DUPONT

Carmen Johnson
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Received
Solid Waste
Section

RESPONSE TO NORTH CAROLINA ON INDUSTRIAL LANDFILL INFORMATION REQUEST -

DUPONT KINSTON SITE

Submitted by Jan A. Kneib
DuPont Kinston Site
June 26, 1996

R-12003-h REV. 8-90

CLOSED

DU PONT
ESTABLISHED 1802

E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

KINSTON PLANT
P.O. BOX 800
KINSTON, NORTH CAROLINA 28502-0800
PHONE (919) 522-6111

FIBERS DEPARTMENT

June 26, 1996

Mr. James C. Coffey
Supervisor
Permitting Branch
Solid Waste Section
NC DEHNR
P.O. Box 27687
Raleigh, North Carolina 27611-7687

RESPONSE TO 1/18/96 INFORMATION REQUEST ON INDUSTRIAL LANDFILL, PERMIT NUMBER 54-04

Dear Mr. Coffey:

The information contained in the attached binder is in response to your January 18, 1996 request for information on our permitted industrial landfill. We are enclosing two copies of our submittal for your review. We believe that the attached information demonstrates that the current landfill design in conjunction with the nature and types of wastes managed in the landfill have not nor will not lead to an exceedance of a groundwater standard established under 15A NCAC 2L in the uppermost aquifer at the 500-foot compliance boundary for the landfill. As this landfill is a critical part of our facility we would like to meet with you when you have had the opportunity to review the attached information to ensure that our submittal satisfies your needs. If additional information is needed we will then have sufficient time to develop this information without running up against the January 1, 1998 deadline. We will contact you to set a date for the meeting.

As our above-grade landfill is located on top of, or close to past disposal sites, which are identified as solid waste management units (SWMUs) under the RCRA Corrective Action Program, we could not use groundwater monitoring data followed by modeling of such data to demonstrate compliance with 2L groundwater standards at the compliance boundary. Instead, we used a very conservative leaching and modeling approach as described and summarized in the first section of the attached binder.

If you have any questions on this information please call me at 919-522-6294.

Sincerely,

Jan A. Kneib

Jan A. Kneib
Environmental Coordinator
WPS+:ENV
cc: Billy Morris - Washington Regional Office

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Section 1

Summary

This report contains information on the DuPont Kinston site nonhazardous industrial landfill (Permit Number 54-04) as requested by Division of Solid Waste Management on January 18, 1996. The enclosed information demonstrates that the permitted industrial landfill will not cause any exceedances of groundwater standards established under 15A NCAC 2L in the uppermost aquifer at the 500-foot compliance point for the life of the landfill. This demonstration was made using conservative assumptions for the leaching potential of the wastes managed in the landfill plus conservative modeling assumptions. This section is a summary of the information included in this submission. Supporting details and data are included in the enclosed reports.

Landfill Description and History

The industrial landfill on the Kinston site is an above-grade landfill which began receiving waste in 1973 and was permitted by the State of North Carolina on June 29, 1981. The landfill currently receives four types of wastes: coal ash from the coal-fired boilers, wastewater treatment plant sludge from the sandbed filters, bagged asbestos waste, and demolition/construction debris. All four wastes are non-RCRA hazardous wastes. The only other wastes known to have been disposed of in the landfill are a one-time disposal of wastewater treatment plant sludge from the aeration basin (mixed with ash prior to disposal) and nonhazardous ash from a solid waste incinerator that was operated from 1970 to 1986. The incinerator burned plant trash and debris, off-spec polyester product, and a polyvinyl butyral DuPont product.

The current footprint of the landfill is approximately 13.2 acres. This will also be the expected footprint of the landfill as of 1/1/98. The landfill is located on top of or in the vicinity of several previous disposal sites. These sites were used for the disposal of, and for some wastes open-pit incineration of, coal ash, waste finish oils, waste glycols, waste solvents, waste monomers, lab wastes, waste acids, and other miscellaneous wastes. These various disposal areas are all identified as solid waste management units (SWMUs) under the RCRA Corrective Action Program and will be studied and remediated as necessary. The industrial landfill is also an identified SWMU under the Corrective Action Program as well. Previous samples of the Neuse River upstream and downstream have shown no impact from these disposal areas.

Summary of Geology/Hydrogeology of the Landfill Area

The geology of the surficial unit is generally an orange-brown (grading to dark gray) deposit of clayey sand and sandy clay. It extends from the surface to a depth of approximately 10-15 feet in the vicinity of the landfill. At the lower elevations near the Neuse River, which is located about 1,000 feet south and southeast of the closest landfill boundary, the base of the surficial unit is a poorly-sorted, fine to very coarse sand with pebbles.

Underlying the surficial unit is a consolidated mudstone layer that is believed to correspond to the Beaufort Formation described by Brown et al (1977). This layer is a deposit of semi-consolidated to consolidated mudstones interbedded with sandstones and is approximately 20-25 feet thick.

The source of water for recharge of the surficial aquifer in the area of the Kinston site is precipitation. The mudstone and clayey silt units beneath the surficial aquifer are believed to be confining or semi-confining units because of their thickness and lithology, and the considerable difference in hydraulic head and flow regime between deep and shallow well pairs. Groundwater in the surficial aquifer flows south and southeast towards the Neuse River. Groundwater in this area will flow directly into the Neuse River. A recent slug test on existing monitoring well MW-14 located downgradient of the landfill resulted in an average hydraulic conductivity of 2.85×10^{-3} cm/s (8.07 feet/day).

Approach Used to Demonstrate No Exceedance of Groundwater Standards

Since the landfill is located on or near past disposal sites we could not use an approach based on the modeling of monitoring well sample results. Monitoring well samples in the landfill area taken as part of our semi-annual sampling program are not believed to represent contaminants leaching from the landfill, but are believed to represent contamination from the past disposal sites which will be evaluated under the RCRA Corrective Action Program. Therefore, we chose to conduct a modeling analysis using conservative assumptions to assure ourselves that the landfill would not cause any exceedances of State groundwater standards over the life of the landfill. Of the four wastes managed in the landfill we felt that asbestos and construction/demolition debris do not possess sufficient leachability potential to warrant further study. Therefore, we concentrated on the other two wastes: coal ash and wastewater treatment plant sludge from the sandbed filters.

Samples of these two wastes were leached using a modified Synthetic Precipitation Leaching Procedure (SPLP), EPA Method 1312. Instead of using the normal 24-hour leaching period a 48-hour leaching period was used to ensure that the wastes and leach solution reached equilibrium. The leachates from these two samples were then analyzed for RCRA Appendix IX constituents plus those RCRA Toxicity Characteristic constituents not included in the Appendix IX list.

Nine constituents were identified in these leachates above Method Detection Limits. These constituents were antimony, barium, cobalt, nickel, thallium, zinc, cyanide, DDT, and dibutyl phthalate. Of these nine only thallium was present in the actual SPLP test method leachate itself above 2L groundwater standards.

Groundwater modeling using the AT123D computer model was conducted to predict downgradient groundwater concentrations of the nine constituents detected using the modified SPLP. Many conservative assumptions were used to ensure ourselves that groundwater standards would not be exceeded. We assumed that the entire aquifer flow beneath the landfill consisted of landfill leachate as produced by the modified SPLP. In other words, there was no fresh groundwater beneath the landfill to dilute the leachate. We used the 250-foot review boundary as our modeling point instead of the 500-foot compliance boundary. Other conservative assumptions included: use of low values for aquifer dispersivity and molecular diffusion, and no biodegradation of organic constituents. All nine constituents detected were modeled even though only one constituent exceeded the 2L Groundwater Standards in the modified SPLP leachate itself.

The results show that even with all of the conservatism used in our evaluation no North Carolina Groundwater 2L Standards would be exceeded. The following table show the modeling results:

Chemical	**Model Result**	**Concentration Reached At**	**Groundwater Quality Std.**
Antimony	0.003 mg/L	Year 40	0.006 mg/L
Barium	0.44 mg/L	Year 51	2.0 mg/L
Cobalt	0.033 mg/L	Year 43	0.21 mg/L
Nickel	0.05 mg/L	Year 119	0.10 mg/L
Thallium	9.0×10^{-8} mg/L	Year 200	0.002 mg/L
Zinc	0.23 mg/L	Year 35	2.1 mg/L
Cyanide	0.036 mg/L	Year 6	0.154 mg/L
DDT	0.0 mg/L	Year 200	2.5×10^{-4} mg/L
Dibutyl Phthalate	0.0 mg/L	Year 200	0.70 mg/L

Note: The Model Result concentration represents the **maximum** concentration that would be reached using all of the assumptions discussed above.

Section 2

WASTE CHARACTERIZATION FORM (WCF)

DATE 04-JUN-96

I. LOCATION KINSTON PLANT
EPA I.D. NO. NCD003190386
EPA WASTE CODES
REVISION NO.
CONTRACTOR'S CODE
DUPONT CODE

II. NAME OF WASTE DEMOLITION DEBRIS (DIRT, CONCRETE, REBAR, ETC)

III. COMPOSITION

A. MAJOR COMPONENTS	C. ONE TIME OR TYPICAL ANALYSIS	D. CONCENTRATION RANGE UPPER	D. CONCENTRATION RANGE LOWER	E. EXPOSURE LIMITS ACGIH	E. EXPOSURE LIMITS OSHA
1. DEMO	100				
2					
3					
4					
5					

B. TRACE COMPONENTS NOT LISTED ABOVE (PPM OR N/A)

Ag	As	Ba	Cd
Cl*	Cn	Cr	Cu
F*	Hg	I*	N*
Ni	P*	Pb	S*
Se	Zn	Tl	CR+6

Other N/A TO ABOVE

Indicate Test Method:
TCLP TOTAL METALS

Ash
Halogen
Viscosity

F. DOES THE WASTE CONTAIN

Sulfides	Yes	No X
Cyanides	Yes	No X
PCB's	Yes	No X
**Dioxin	Yes	No X
**Listed Solvent	Yes	No X
***Halogenated Organic Compounds 1000 mg/l	Yes	No X
Insecticides, Pesticides, Herbicides or Rodenticides	Yes	No X

IV. PHYSICAL STATE @ 25 DEG C: SOLID, LIQUID, SLUDGE, LIQUID/SOLID PHASES, GAS, OTHER

SPECIFY SOLID

. Is there a dusting hazard if containers are opened? N/A Estimated specific gravity N/A
. Multiple phases NO vol% of each phase % solid % liquid
. Can the waste be pumped? N/A Poured? N/A . % Free flowing liquid layer (volume%)
. Pressure of container N/A . % Separate phase water N/A psig

V. SHIPPING CONTAINERS

BULK DUMP TRUCKS CONTAINER SPEC.
NON-BULK:

	SIZE	MATERIALS OF CONSTRUCTION	CONTAINER SPEC.	APPROX. WT. PER CONTAINER	LABEL USED
OTHER	N/A				

VI. PROPERTIES

FLASH POINT N/A DEG F (CLOSED CUP)
COLOR DIRT pH N/A RADIOACTIVE N/S PYROPHORIC N/A
REACTIVE**** N/A Btu/lb N/A CORROS. N/A OSHA CAR. N/A
TOXIC N/A SHOCK SENSITIVE N/A ODOR (YES/NO) N/A
ETIOLOGICAL N/A EXPLOSIVI N/A OTHER N/A

VII. D.O.T. SHIPPING DESCRIPTION NOT D.O.T. REGULATED
D.O.T. HAZARD CLASSIFICATION EPA HAZ. SUBST. RQ
D.O.T. PLACARD D.O.T. LABEL UN NO. NA NO.

VIII. VOLUME

ANNUAL (SEE BELOW) THIS REQUEST PER SHIPMENT

IX. REMARKS (TREATMENT OF SPILLS, SAFETY SUGGESTIONS, MSDS)

ANNUAL VOLUME VARIES WITH AMOUNT OF CONSTRUCTION ON SITE. RANGES FROM 0.6 MM LBS TO 100 MM LBS ANNUALLY.

* Organically bound ** As defined in 40 CFR 261.31
**** Per 40 CFR 261.2 *** Per 40 CFR 261.3 and 40 CFR 268 App. III

PREPARED BY: JOHN C. SUGG

WASTE CHARACTERIZATION FORM (WCF)

DATE: 4-Jun-96

I. LOCATION
EPA I.D. NO.: KINSTON PLANT / NCD003190386
EPA WASTE CODES:
REVISION NO.:
CONTRACTOR'S CODE:
DUPONT CODE: KPW-19

II. NAME OF WASTE: FLY AND BOTTOM ASH

III. COMPOSITION

A. MAJOR COMPONENTS	C. ONE TIME OR TYPICAL ANALYSIS	D. CONCENTRATION RANGE UPPER	D. CONCENTRATION RANGE LOWER	E. EXPOSURE LIMITS ACGIH	E. EXPOSURE LIMITS OSHA
1 FLY/BOT TOM ASH	100				
2					
3					
4					
5					

B. TRACE COMPONENTS NOT LISTED ABOVE (PPM OR N/A)

Ag	As	Ba 2.6 mg	Cd
Cl*	Cn	Cr	Cu
F*	Hg	I*	N*
Ni	P*	Pb	S*
Se	Zn	Ti	CR+6

Other: N/A EXCEPT AS INDICATED ABOVE

Indicate Test Method: TCLP TOTAL METALS

Ash:
Halogen:
Viscosity:

F. DOES THE WASTE CONTAIN

Sulfides	Yes	No X
Cyanides	Yes	No X
PCB's	Yes	No X
**Dioxin	Yes	No X
**Listed Solvent	Yes	No X
***Halogenated Organic Compounds 1000 mg/l	Yes	No X
Insecticides, Pesticides, Herbicides or Rodenticides	Yes	No X

IV. PHYSICAL STATE @ 25 DEG C: SOLID, LIQUID, SLUDGE, LIQUID/SOLID PHASES, GAS, OTHER

SPECIFY: SOLID

. Is there a dusting hazard if containers are op: YES — Estimated specific gravity: N/A
. Multiple phases: NO — vol% of each phase: 100 % solid — % liquid
. Can the waste be pumped? NO — Poured? N/A — . % Free flowing liquid layer (volume%)
. Pressure of container: N/A — . % Separate phase water: N/A — psig: N/A

V. SHIPPING CONTAINERS

BULK: N/A — CONTAINER SPEC.:

NON-BULK:

SIZE	MATERIALS OF CONSTRUCTION	CONTAINER SPEC.	APPROX. WT. PER CONTAINER	LABEL USED

OTHER:

VI. PROPERTIES

FLASH POINT: N/A DEG F (CLOSED CUP)
COLOR: GRAY — pH: 4.1 — RADIOACTIVE: NO — PYROPHORIC: NO
REACTIVE****: NO — Btu/lb: N/A — CORROS.: NO — OSHA CAR.: NO
TOXIC: NO — SHOCK SENSITIVE: NO — ODOR (YES/NO): N/A
ETIOLOGICAL: NO — EXPLOSIVE: NO — OTHER: N/A

VII. D.O.T. SHIPPING DESCRIPTION: NOT D.O.T. REGULATED

D.O.T. HAZARD CLASSIFICATION — EPA HAZ. SUBST. — RQ
D.O.T. PLACARD — D.O.T. LABEL — UN NO. — NA NO.

VIII. VOLUME

ANNUAL: 11-13 MM LBS — THIS REQUEST — PER SHIPMENT

IX. REMARKS (TREATMENT OF SPILLS, SAFETY SUGGESTIONS, MSDS)

* Organically bound ** As defined in 40 CFR 261.31
**** Per 40 CFR 261.23 *** Per 40 CFR 261.3 and 40 CFR 268 App. III

PREPARED BY: JOHN C. SUGG

WASTE CHARACTERIZATION FORM (WCF)

DATE 4-JUN-96

I. LOCATION KINSTON PLANT
EPA I.D. NO. NCD003190386
EPA WASTE CODES
REVISION NO.
CONTRACTOR'S CODE
DUPONT CODE KPW-18

II. NAME OF WASTE ASBESTOS MATERIALS

III. COMPOSITION

A. MAJOR COMPONENTS	C. ONE TIME OR TYPICAL ANALYSIS	D. CONCENTRATION RANGE UPPER	D. CONCENTRATION RANGE LOWER	E. EXPOSURE LIMITS ACGIH	E. EXPOSURE LIMITS OSHA
1 ASBESTOS MATERIALS	50				
2 PPE	10				
3 DEBRIS	40				
4					
5					

B. TRACE COMPONENTS NOT LISTED ABOVE (PPM OR N/A)

Ag	As	Ba	Cd
Cl*	Cn	Cr	Cu
F*	Hg	I*	N*
Ni	P*	Pb	S*
Se	Zn	Ti	CR+6

Other N/A TO ABOVE

Indicate Test Method:
TCLP TOTAL METALS

Ash
Halogen
Viscosity

F. DOES THE WASTE CONTAIN

Sulfides	Yes	No X
Cyanides	Yes	No X
PCB's	Yes	No X
**Dioxin	Yes	No X
**Listed Solvent	Yes	No X
***Halogenated Organic Compounds 1000 mg/l	Yes	No X
Insecticides, Pesticides, Herbicides or Rodenticides	Yes	No X

IV. PHYSICAL STATE @ 25 DEG C: SOLID, LIQUID, SLUDGE, LIQUID/SOLID PHASES, GAS, OTHER

SPECIFY SOLID

. Is there a dusting hazard if containers are open YES Estimated specific gravity N/A
. Multiple phas NO vol% of each phase N/A % solid N/A % liquid N/A
. Can the waste be pumpe NO Poured? NO . % Free flowing liquid N/A (volume%)
. Pressure of container N/A . % Separate phase water N/A psig N/A

V. SHIPPING CONTAINERS

BULK N/A CONTAINER SPEC.
NON-BULK:

	SIZE	MATERIALS OF CONSTRUCTION	CONTAINER SPEC.	APPROX. WT. PER CONTAINER	LABEL USED
	1.5 L. FT.	PLASTIC	BAG		

OTHER

VI. PROPERTIES

FLASH POINT N/A DEG F (CLOSED CUP)
COLOR GRAY/WHITE pH N/A RADIOACTIVE NO PYROPHORIC NO
REACTIVE**** NO Btu/lb N/A CORROS. NO OSHA CAR. YES
TOXIC NO SHOCK SENSITIVE NO ODOR (YES/NO) NO
ETIOLOGICAL NO EXPLOSIVE NO OTHER N/A

VII. D.O.T. SHIPPING DESCRIPTION WASTE ENVIRONMENTALLY HAZARDOUS SUBSTANCES,SOLID, N.O.S. (ASBESTOS)
D.O.T. HAZARD CLASSIFICATION 9 EPA HAZ. SUBST. NO RQ
D.O.T. PLACARD N/A D.O.T. LABEL 9 UN NO. 3077 NA NO.

VIII. VOLUME

ANNUAL 22-30 M LBS THIS REQUEST PER SHIPMENT

IX. REMARKS (TREATMENT OF SPILLS, SAFETY SUGGESTIONS, MSDS)

* Organically bound
** As defined in 40 CFR 261.31
**** Per 40 CFR 261.23
*** Per 40 CFR 261.3 and 40 CFR 268 App. III

PREPARED BY: JOHN C. SUGG

WASTE CHARACTERIZATION FORM (WCF)

DATE: 04-JUN-96

I. LOCATION
EPA I.D. NO.: NCD003190386
EPA WASTE CODES:
REVISION NO.:
CONTRACTOR'S CODE:
DUPONT CODE: KPW-20

II. NAME OF WASTE: WWT SLUDGE

III. COMPOSITION

A. MAJOR COMPONENTS	C. ONE TIME OR TYPICAL ANALYSIS	D. CONCENTRATION RANGE UPPER	D. CONCENTRATION RANGE LOWER	E. EXPOSURE LIMITS ACGIH	E. EXPOSURE LIMITS OSHA
1 PROCESS WASTES	95				
2 HUMAN WASTES	5				
3					
4					
5					

B. TRACE COMPONENTS NOT LISTED ABOVE (PPM OR N/A)

Ag	As	Ba	Cd
Cl*	Cn	Cr	Cu
F*	Hg	I*	N*
Ni	P*	Pb	S*
Se	Zn	Ti	CR+6

Other: N/A TO ABOVE

Indicate Test Method: TCLP — TOTAL METALS

Ash:
Halogen:
Viscosity:

F. DOES THE WASTE CONTAIN

Sulfides	Yes	No X
Cyanides	Yes	No X
PCB's	Yes	No X
**Dioxin	Yes	No X
**Listed Solvent	Yes	No X
***Halogenated Organic Compounds 1000 mg/l	Yes	No X
Insecticides, Pesticides, Herbicides or Rodenticides	Yes	No X

IV. PHYSICAL STATE @ 25 DEG C: SOLID, LIQUID, SLUDGE, LIQUID/SOLID PHASES, GAS, OTHER

SPECIFY: SLUDGE

. Is there a dusting hazard if containers are open: N/A — Estimated specific gravity:
. Multiple phases: NO — vol% of each phase: % solid: % liquid:
. Can the waste be pumped? NO — Poured? NO — . % Free flowing liquid layer: (volume%):
. Pressure of container: N/A — . % Separate phase water: psig:

V. SHIPPING CONTAINERS

BULK: N/A — CONTAINER SPEC.:

NON-BULK:

	SIZE	MATERIALS OF CONSTRUCTION	CONTAINER SPEC.	APPROX. WT. PER CONTAINER	LABEL USED
	N/A				
OTHER					

VI. PROPERTIES

FLASH POINT: N/A — DEG F (CLOSED CUP)
COLOR: BLACK — pH: 6-9 — RADIOACTIVE: NO — PYROPHORIC: NO
REACTIVE****: NO — Btu/lb: N/A — CORROS.: NO — OSHA CAR.: NO
TOXIC: NO — SHOCK SENSITIVE: NO — ODOR (YES/NO): YES-CHARACTERISTIC
ETIOLOGICAL: NO — EXPLOSIVE: NO — OTHER: N/A

VII. D.O.T. SHIPPING DESCRIPTION: NOT D.O.T. REGULATED
D.O.T. HAZARD CLASSIFICATION: — EPA HAZ. SUBST.: — RQ:
D.O.T. PLACARD: — D.O.T. LABEL: — UN NO.: — NA NO.:

VIII. VOLUME

ANNUAL: 550-600 M LBS — THIS REQUEST: — PER SHIPMENT:

IX. REMARKS (TREATMENT OF SPILLS, SAFETY SUGGESTIONS, MSDS)

* Organically bound — ** As defined in 40 CFR 261.31
**** Per 40 CFR 261.23 — *** Per 40 CFR 261.3 and 40 CFR 268 App. III

PREPARED BY: JOHN C. SUGG

Section 3

N. C. Department of Human Resources
Division of Health Services

WELL COMPLETION RECORD

PLETE ALL INFORMATION REQUESTED BELOW FOR EACH WELL INSTALLED, AND RETURN FORM TO THE N.C. ARTMENT OF HUMAN RESOURCES, SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH, BOX 2091, RALEIGH, N.C. 27602

E OF SITE:	PERMIT NO.:
DUPONT KINSTON FACILITY	53-0039-WM-0050
RESS:	OWNER (print):
O BOX 800 KINSTON NC 28502-0800	E I DUPONT DE NEMOURS & COMPANY
LING CONTRACTOR:	REGISTRATION NO.:
W ENGINEERING	332

Type:	Schedule 40 PVC dia. 2 in.	Grout Depth:	from 0 to 2 ft. - dia.	in.
Depth:	from 0 to 10 ft. - dia.	in.	Bentonite Seal:	from 2 to 3 ft. - dia.	in.
Type:	0.01 in. Slot PVC dia. 2 in.	Sand/Gravel PK:	from 3 to 10 ft. - dia.	in.
Depth:	from 5 to 10 ft. - dia. 2 in.	Total Well Depth:	from 0 to 10 ft. - dia.	in.

Water Level: 8 feet from top of casing — Date Measured 6 / 6 / 88

(gpm): _____ Method of Testing: _____ Casing is 2 feet above land surface

ONITORING WELL MW-13

DRILLING LOG

DEPTH TO	FORMATION DESCRIPTION
0.5 ft.	Topsoil clayey silty very fine sand, red brown
8.5	Clayey silty fine-medium sand, some gravel, light to dark brown (5 YR 5/1 and 10 YR 4/2) to light olive brown (5YR 5/6) some coarser sand lens, moist
10	Shale black (1/1) moist slightly plastic with gray fine sand seams

LOCATION SKETCH

(show distance to numbered roads, or other map reference points)

ARKS: _____

E: _____ SIGNATURE: _____

342 (6/85)
Hazardous Waste Management Branch

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc. _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Law Engineering
DRILLER REGISTRATION NUMBER 332
STATE WELL CONSTRUCTION PERMIT NUMBER: 53-0039-WM-0050

WELL LOCATION: (Show sketch of the location below)
Nearest Town: Grifton, SR 1802
County: Lenoir
(Road, Community, or Subdivision and Lot No.)
OWNER E.I. Dupont-de Nemours & Company
ADDRESS P.O. Box 800 (Street or Route No.)
Kinston, (City or Town) NC (State) 28501 (Zip Code)
DATE DRILLED 5/18/88 USE OF WELL Monitoring-MW14
TOTAL DEPTH 10 ft. CUTTINGS COLLECTED ☐ Yes ☒ No
DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
STATIC WATER LEVEL: 5.5 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 2 FT. ABOVE LAND SURFACE.
YIELD (gpm): 1 METHOD OF TEST _____
WATER ZONES (depth): Surficial (0-10 ft)
CHLORINATION: Type No Amount _____

Depth From	Depth To	DRILLING LOG Formation Description
0	1 ft	Topsoil
1	4	Fine sandy clayey silt, olive brown
4	7	Medium to coarse sand, yellow orange
7	10	Black shale

If additional space is needed use back of form.

CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
From	+2 above	4 Ft.	2"	40	PVC
From		Ft.			
From		Ft.			

GROUT:

	Depth From	To	Material	Method
From	0	2.5 Ft.	Cement	
From	3.5	2.5 Ft.	Bentonite	

SCREEN:

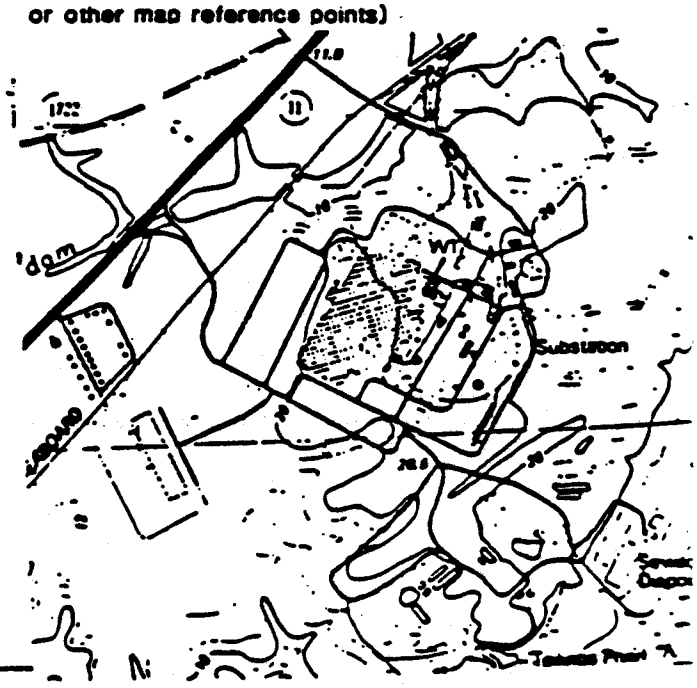
	Depth From	To	Diameter	Slot Size	Material
From	4	8 Ft.	2" in.	0.01 in.	PVC
From		Ft.	in.	in.	
From		Ft.	in.	in.	

GRAVEL PACK:

	Depth From	To	Size	Material
From	3.5	9 Ft.	Coarse	Sand
From		Ft.		

REMARKS: _____

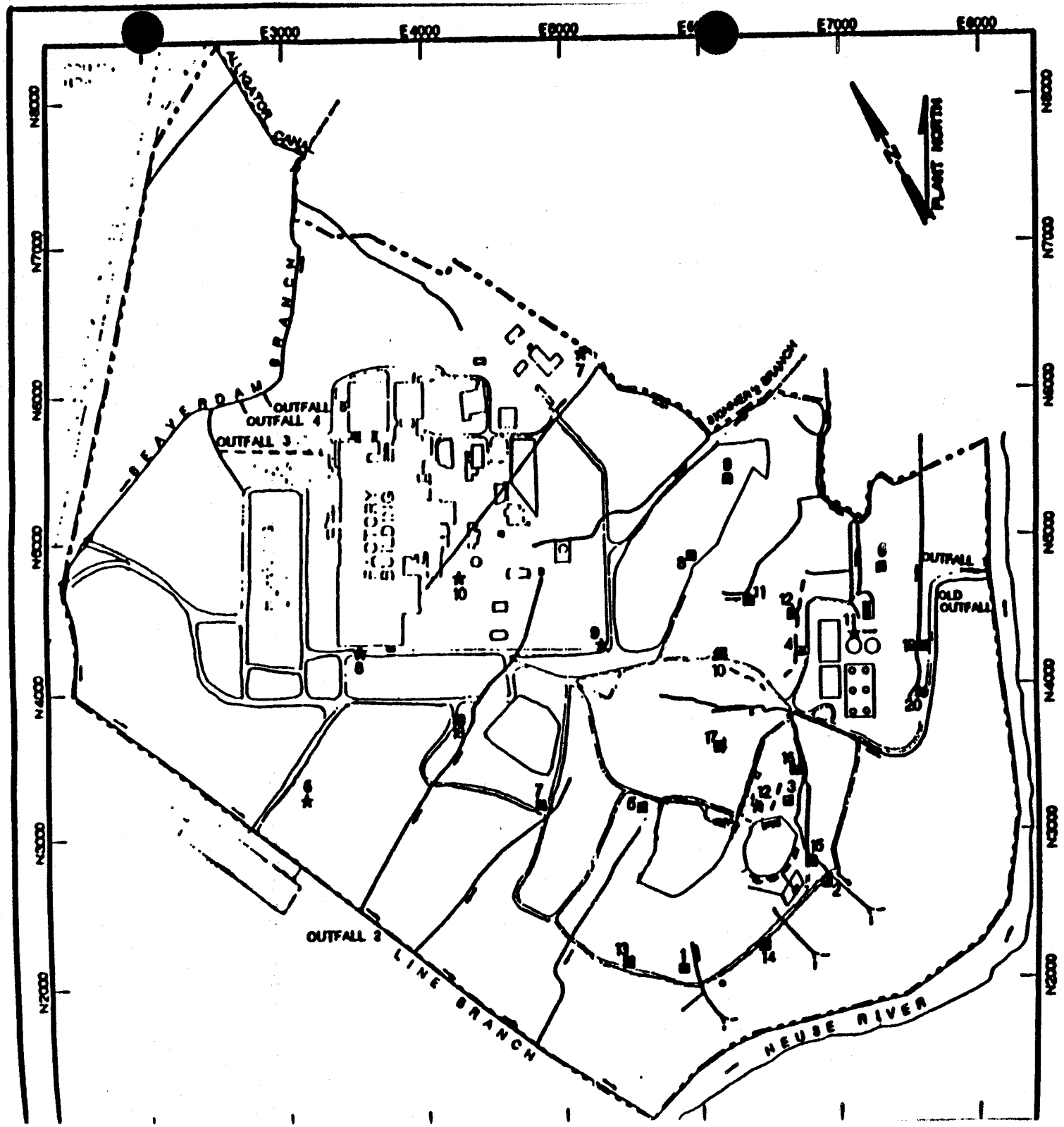
LOCATION SKETCH
(Show direction and distance from at least two State Roa or other map reference points)



I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTIO STANDARDS. AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT _____ DATE 9-15-88

GW-1 Revised 11/84 Submit original to Division of Environmental Management and copy to well own



LEGEND

- ★ ACTIVE PRODUCTION WELLS
- ■ MONITORING WELLS (OLD)
- ■ MONITORING WELLS (NEW)

- WASTE MANAGEMENT UNITS
- BUILDINGS & ROADS
- SURFACE WATER & DITCHES
- SUBSURFACE DRAINS
- PROPERTY BOUNDARY

0 500 1000 1500

SCALE 1" = 1000'

GRID SYSTEM BASED ON LOCAL PLANT COORDINATE DATUM

FIGURE
WELL LOCATION MAP

E.I. du Pont de Nemours
Kinston Dacron Plant
Kinston, North Carolina
August, 1988

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Law Engineering

DRILLER REGISTRATION NUMBER 332

STATE WELL CONSTRUCTION PERMIT NUMBER: 53-0039-WM-0050

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Grifton, SR 1802 County: Lenoir
(Road, Community, or Subdivision and Lot No.)

2. OWNER E.I. Dupont-de Nemours & Company
ADDRESS P.O. Box 800 (Street or Route No.)
Kinston, (City or Town) NC (State) 28501 (Zip Code)

3. DATE DRILLED 5/19/88 USE OF WELL Monitoring-MW15

4. TOTAL DEPTH 7.5 ft CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 5.5 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 2 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): <1 METHOD OF TEST _____

8. WATER ZONES (depth): Surficial (0-7.5 ft)

9. CHLORINATION: Type No Amount _____

10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From +2 above	To 4	Ft.	2"	40	PVC
From	To	Ft.			
From	To	Ft.			

11. GROUT:

	Depth		Material	Method
From 0	To 2.5	Ft.	Cement	
From 2.5	To 3.5	Ft.	Bentonite	

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From 4	To 7	Ft.	2" in.	0.01 in.	PVC
From	To	Ft.	in.	in.	
From	To	Ft.	in.	in.	

13. GRAVEL PACK:

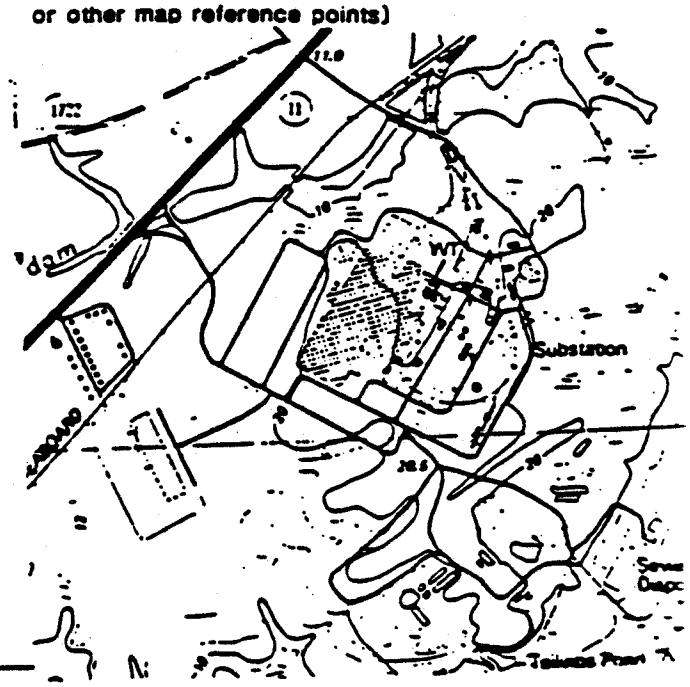
	Depth		Size	Material
From 3.5	To 7.0	Ft.	Coarse	Sand
From	To	Ft.		

14. REMARKS: _____

Depth From	Depth To	DRILLING LOG Formation Description
0	1 ft	Topsoil
1	4	Silty clayey fine to co
		yellow brown to gray
4	7	Black shale

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Rc or other map reference points)

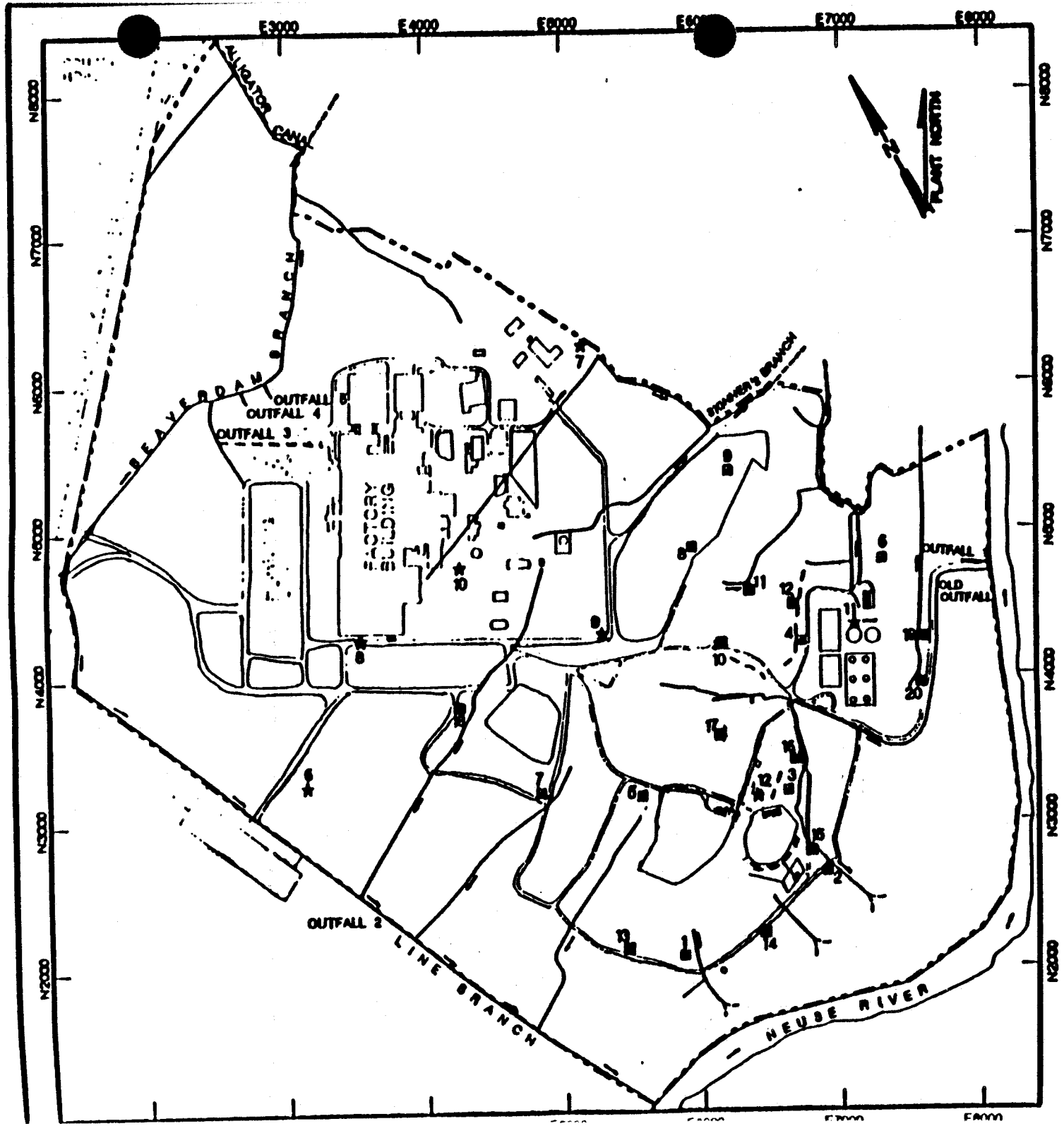


I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTIC STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT _____ DATE 8-15-88

GW-1 Revised 11/84

Submit original to Division of Environmental Management and copy to well owr



LEGEND

- ★ ACTIVE PRODUCTION WELLS
- ■ MONITORING WELLS (OLD)
- ■ MONITORING WELLS (NEW)

- WASTE MANAGEMENT UNITS
- BUILDINGS & ROADS
- SURFACE WATER & DITCHES
- SUBSURFACE DRAINS
- PROPERTY BOUNDARY

0 500 1000 1500

SCALE 1" = 1000'

GRID SYSTEM BASED ON LOCAL PLANT COORDINATE DATUM

FIGURE
WELL LOCATION MAP

E.I. du Pont de Nemours
Kinston Dacron Plant
Kinston, North Carolina
August, 1988

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Law Engineering
DRILLER REGISTRATION NUMBER 332

STATE WELL CONSTRUCTION PERMIT NUMBER: 53-0039-WM-0050

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Grifton, SR 1802 County: Lenoir
(Road, Community, or Subdivision and Lot No.)

2. OWNER E.I. Dupont-de Nemours & Company
ADDRESS P.O. Box 800 (Street or Route No.)
Kinston, NC 28501
City or Town State Zip Code

3. DATE DRILLED 5/19/88 USE OF WELL Monitoring-MW16

4. TOTAL DEPTH 10 ft CUTTINGS COLLECTED ☐ Yes ☒ No

5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No

6. STATIC WATER LEVEL: 5 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 2 FT. ABOVE LAND SURFACE.

7. YIELD (gpm): < 1 METHOD OF TEST _____

8. WATER ZONES (depth): Surficial (0-10 ft)

9. CHLORINATION: Type No Amount _____

10. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+2 above	To 4.5 Ft.	2"	40	PVC
From		To Ft.			
From		To Ft.			

11. GROUT:

	Depth		Material	Method
From	0	To 2.5 Ft.	Cement	
From	2.5	To 3.5 Ft.	Bentonite	

12. SCREEN:

	Depth		Diameter	Slot Size	Material
From	4.5	To 9.5 Ft.	2" in.	0.01 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

13. GRAVEL PACK:

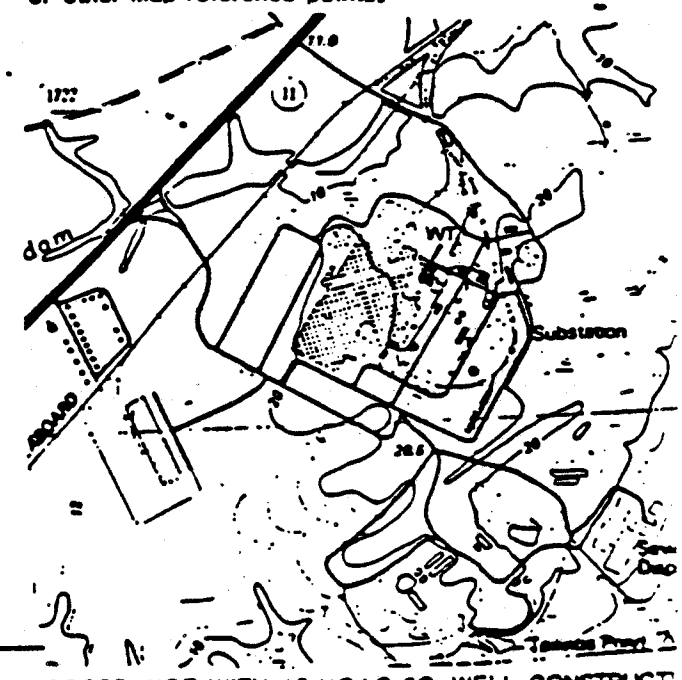
	Depth		Size	Material
From	3.5	To 10 Ft.	Coarse	Sand
From		To Ft.		

14. REMARKS: _____

Depth From	To	DRILLING LOG Formation Description
0	1 ft	Topsoil
1	5	Silty fine-medium sand, dark gray
5	10	Silty fine sand some cl yellow brown

If additional space is needed use back of form.

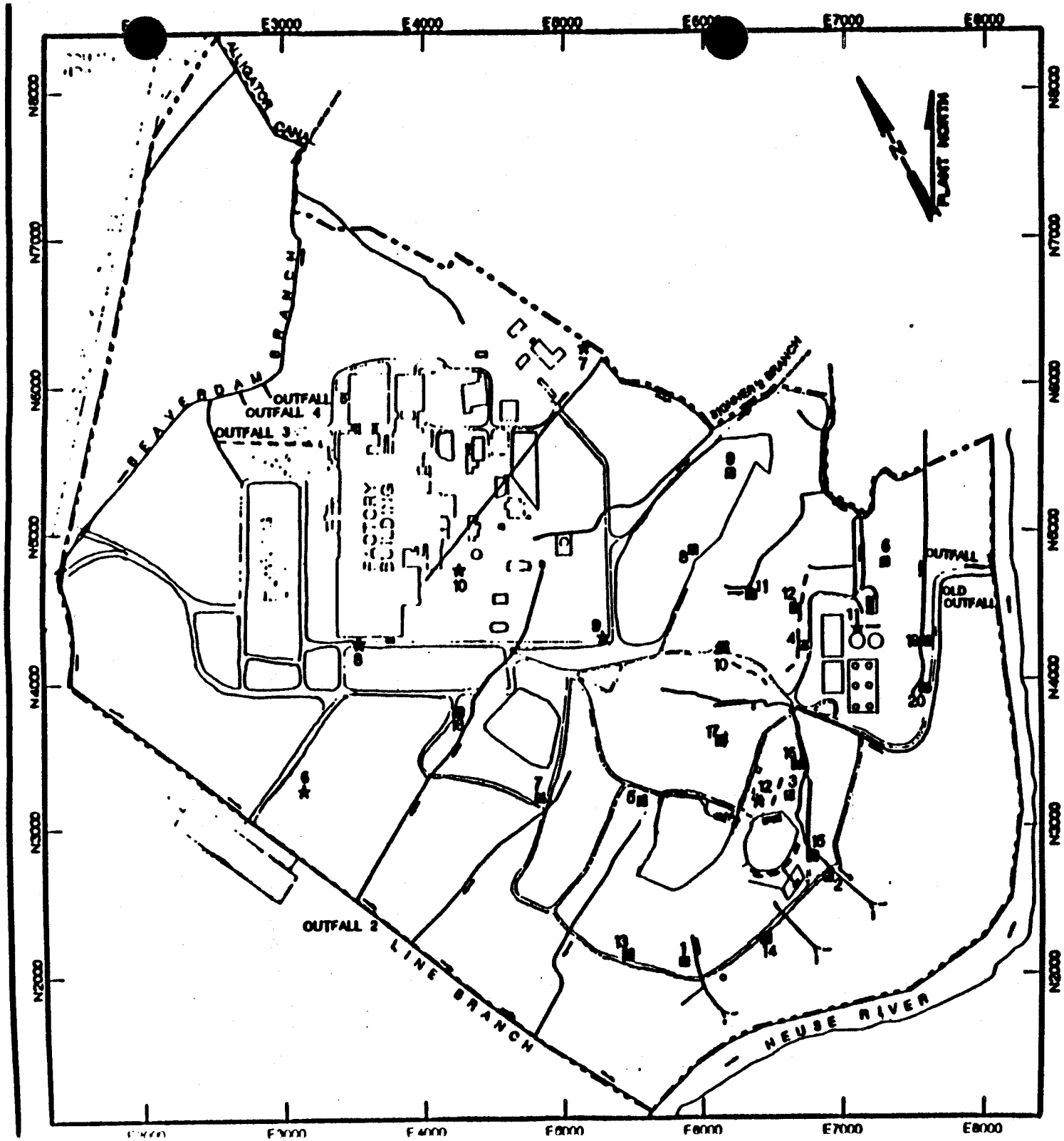
LOCATION SKETCH
(Show direction and distance from at least two State R or other map reference points)



I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTI STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

5-19-88
DATE



LEGEND

- ★ ACTIVE PRODUCTION WELLS
- ▣ MONITORING WELLS (OLD)
- ■ MONITORING WELLS (NEW)

- WASTE MANAGEMENT UNITS
- BUILDINGS & ROADS
- SURFACE WATER & DITCHES
- SUBSURFACE DRAINS
- PROPERTY BOUNDARY

0 500 1000 1500

SCALE 1"=1000'

GRID SYSTEM BASED ON LOCAL PLANT COORDINATE DATUM

FIGURE
WELL LOCATION MAP

E.I. du Pont de Nemours
Kinston Dacron Plant
Kinston, North Carolina
August, 1988

NORTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH,N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR Law Engineering

DRILLER REGISTRATION NUMBER 332

STATE WELL CONSTRUCTION PERMIT NUMBER: 53-0039-WM-0050

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Grifton, SR 1802 County: Lenoir
(Road, Community, or Subdivision and Lot No.)

2. OWNER E.I. Dupont-de Nemours & Company
ADDRESS P.O. Box 800 (Street or Route No.)
Kinston, NC 28501
City or Town State Zip Code

3. DATE DRILLED 5/20/88 USE OF WELL Monitoring-MW17
4. TOTAL DEPTH 27 ft CUTTINGS COLLECTED ☐ Yes ☒ No
5. DOES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
6. STATIC WATER LEVEL: 11 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 2 FT. ABOVE LAND SURFACE.
7. YIELD (gpm): 1 METHOD OF TEST _____
8. WATER ZONES (depth): Surficial (0-30 ft)
9. CHLORINATION: Type No Amount _____
10. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	+2 above	9 Ft.	2"	40	PVC
		Ft.			
		Ft.			

11. GROUT:

	Depth From	To	Material	Method
	0	5.5 Ft.	Cement	
	5.5	7.5 Ft.	Bentonite	

12. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	9	19 Ft.	2" in.	0.01 in.	PVC
		Ft.	in.	in.	
		Ft.	in.	in.	

13. GRAVEL PACK:

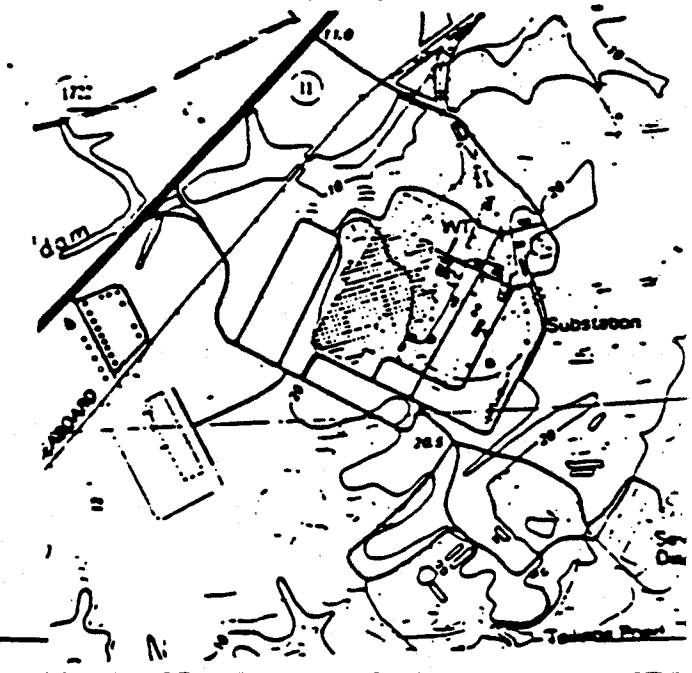
	Depth From	To	Size	Material
	7.5	20 Ft.	Coarse	Sand
		Ft.		

14. REMARKS: _____

Depth From	To	DRILLING LOG Formation Description
0	1.5 ft	Topsoil
1.5	7.5	Fine sandy clay, light brown
7.5	11.5	Silty fine to coarse san dark yellow orange
11.5	16.5	Medium to v.c. sand yell green
16.5	22.5	Fine sandy clay, black
22.5	27	Silty fine-medium sand,
27	---	Black shale

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Ro or other map reference points)



I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15 NCAC 2C. WELL CONSTRUCTIO STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Anthony Boyle 8-19-88

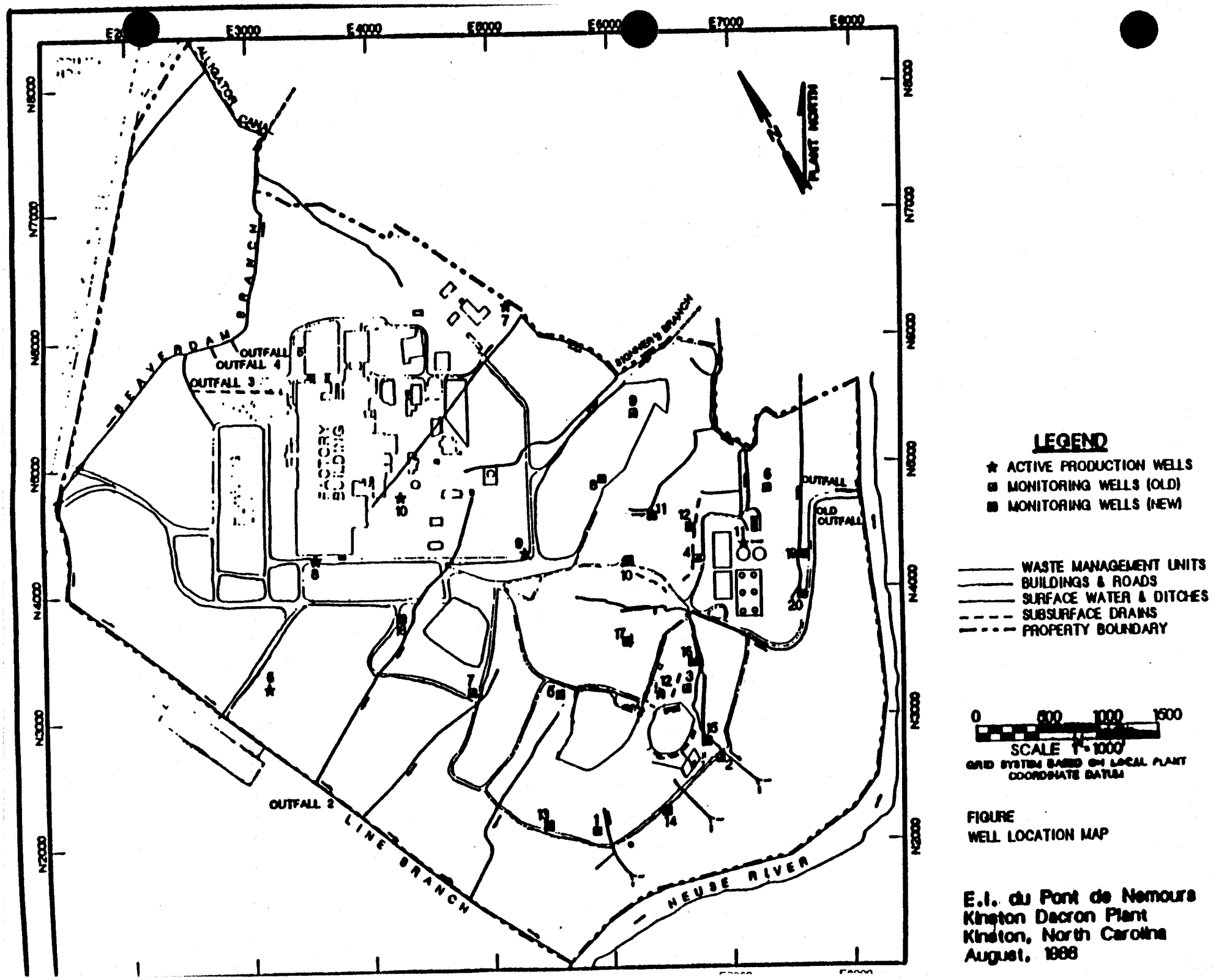


FIGURE
WELL LOCATION MAP

E.I. du Pont de Nemours
Kinston Dacron Plant
Kinston, North Carolina
August, 1988

ARTH CAROLINA DEPARTMENT OF NATURAL RESOURCES AND COMMUNITY DEVELOPMENT
DIVISION OF ENVIRONMENTAL MANAGEMENT - GROUNDWATER SECTION
P.O. BOX 27687 - RALEIGH, N.C. 27611, PHONE (919) 733-6083

FOR OFFICE USE ONLY
Quad. No. _____ Serial No. _____
Lat. _____ Long. _____ Pc ___
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. ___

WELL CONSTRUCTION RECORD

LLING CONTRACTOR Law Engineering
LLER REGISTRATION NUMBER 332

STATE WELL CONSTRUCTION PERMIT NUMBER: 53-0039-WM-0050

ELL LOCATION: (Show sketch of the location below)
earest Town: Grifton, SR 1802 County: Lenoir
oad, Community, or Subdivision and Lot No.)

WNER E.I. Dupont-de Nemours & Company
DDRESS P.O. Box 800 (Street or Route No.)
Kinston, (City or Town) NC (State) 28501 (Zip Code)
ATE DRILLED 5/23/88 USE OF WELL Monitoring-MW18
OTAL DEPTH 18 ft CUTTINGS COLLECTED ☐ Yes ☒ No
OES WELL REPLACE EXISTING WELL? ☐ Yes ☒ No
TATIC WATER LEVEL: 7 FT. ☐ above ☒ below TOP OF CASING.
TOP OF CASING IS 2 FT. ABOVE LAND SURFACE.
ELD (gpm): ~1.5 METHOD OF TEST
A ZONES (depth): Surficial (0-18 ft)
HLORINATION: Type No Amount

ASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+2 above	To 7 Ft.	2"	40	PVC
From		To Ft.			
From		To Ft.			

ROUT:

	Depth		Material	Method
From	0	To 4 Ft.	Cement	
From	4	To 6 Ft.	Bentonite	

CREEN:

	Depth		Diameter	Slot Size	Material
From	7	To 17 Ft.	2 in.	0.01 in.	PVC
From		To Ft.	in.	in.	
From		To Ft.	in.	in.	

RAVEL PACK:

	Depth		Size	Material
om	17	To 6 Ft.	Coarse	Sand
From		To Ft.		

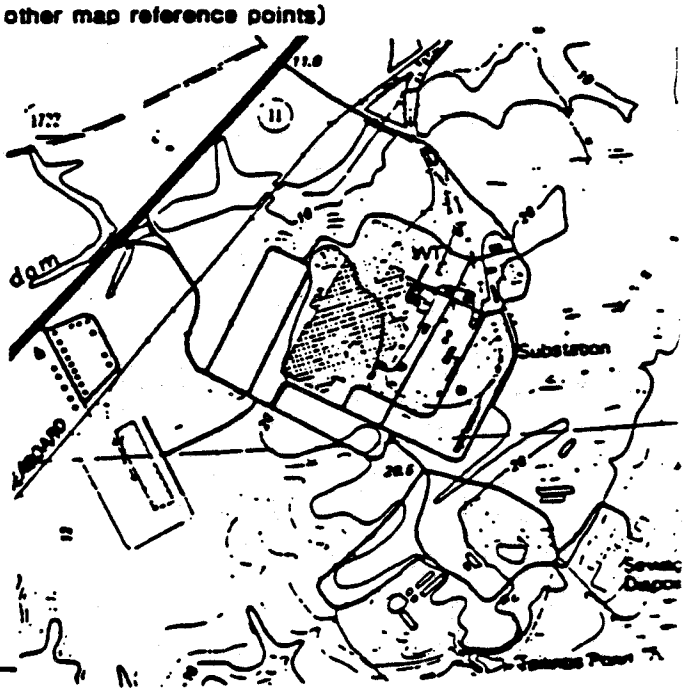
EMARKS:

DRILLING LOG

Depth From	Depth To	Formation Description
0	2 ft	Topsoil
2	7	Fine -medium sand light gra
7	11	Clayey fine sand, greenish gray
11	13	Fine-medium sand, gray gree
13	15	Clayey fine sand, olive bla
15	18	Black shale

If additional space is needed use back of form.

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)



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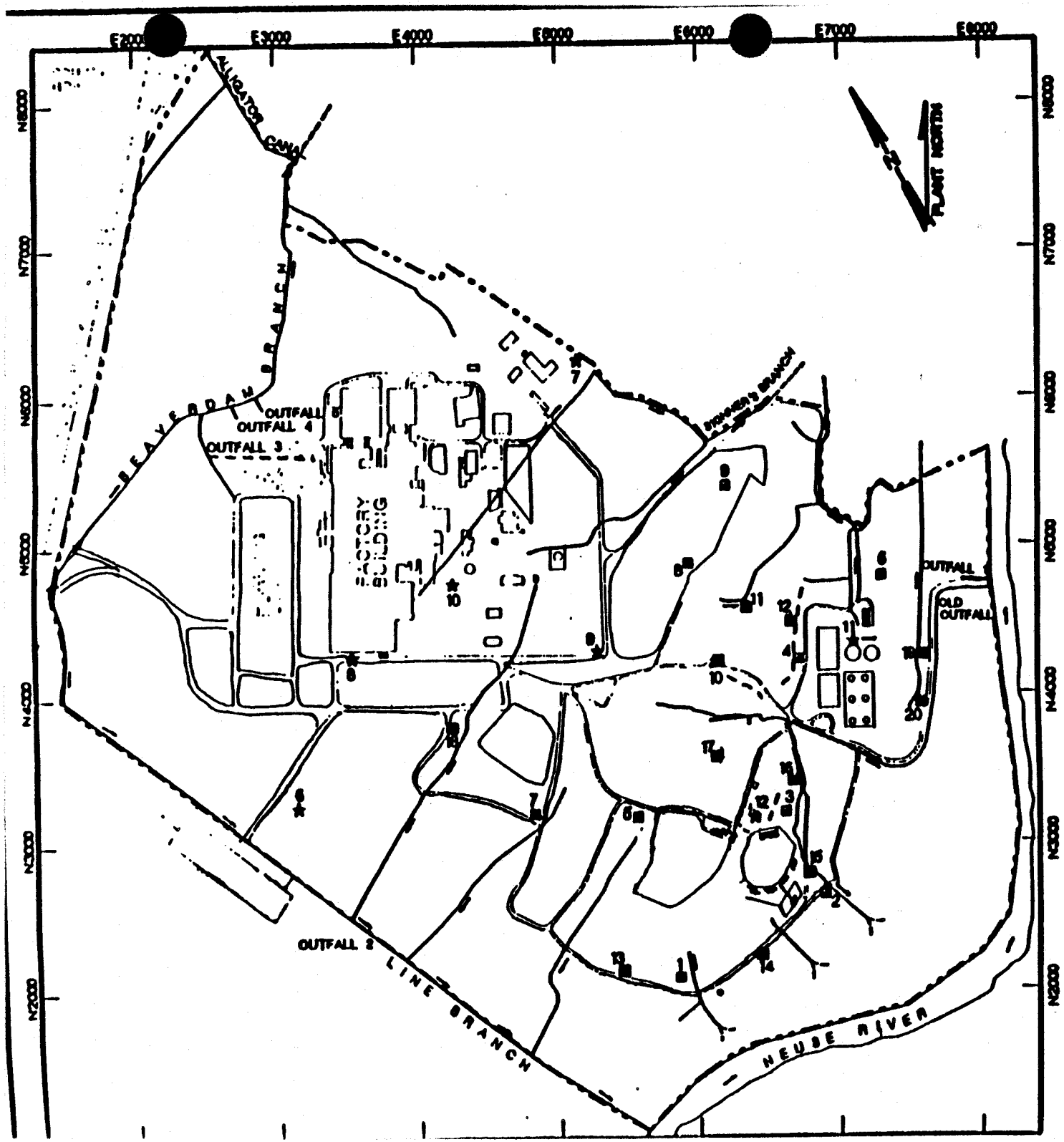
Anthony Boyle 8-15-88
SIGNATURE OF CONTRACTOR OR AGENT DATE



LEGEND

- ★ ACTIVE PRODUCTION WELLS
- ■ MONITORING WELLS (OLD)
- ■ MONITORING WELLS (NEW)

- WASTE MANAGEMENT UNITS
- BUILDINGS & ROADS
- SURFACE WATER & DITCHES
- SUBSURFACE DRAINS
- PROPERTY BOUNDARY

0 500 1000 1500

SCALE 1" = 1000'

GRID SYSTEM BASED ON LOCAL PLANT COORDINATE DATUM

FIGURE
WELL LOCATION MAP

E.I. du Pont de Nemours
Kinston Dacron Plant
Kinston, North Carolina
August, 1988

Section 4

ANALYTICAL DATA REPORT

Lancaster Laboratories
A Thermo Analytical Laboratory
Where quality is a science

June 5, 1996

Mr. Joe Peterpaul
Du Pont Engineering
6324 Fairview Road
Charlotte, NC 28210

Dear Mr. Peterpaul:

As you requested on June 5, 1996, I reviewed the reports of the Synthetic Precipitation Leaching Procedure (SPLP) extractions performed on Lancaster Laboratories' Sample Numbers 2498400 through 2498403. The samples were extracted over a 48-hour period of time as requested at the time of sample submission.

If you have any further questions, please call me at 717-656-2300, Ext. 1280.

Sincerely,

Ramona Layman

Ramona V. Layman, B.S.
Group Leader
Metals

RVL/jms

Lancaster Laboratories
2425 New Holland Pike
PO Box 12425
Lancaster, PA 17605-2425
717-656-2300 Fax: 717-656-2681

Shipping Address:
Lancaster Laboratories
2425 New Holland Pike
Lancaster, PA 17601
717-656-2300 Fax: 717-656-2681

Environmental • Foods • Pharmaceuticals
MEMBER ACIL
A subsidiary of Thermo Process Systems Inc., a Thermo Electron company

Conoco Inc.
P.O. Box 1267
Ponca City, OK 74602-1267
(405) 767-3456

DUPONT KINSTON

FLYASH LANDFILL PROJECT

Environmental Services Division

CED Reporting Check List

Location Kinston Jobname Hyash Plant Project

SLB	**Preliminary Administration** Sign out file/Update reporting schedule Review Project Sheet Verify location/jobname in sample table
SLB	**PROJECT BACKSTOP** Disk Deliverable Integrity QC Batch Integrity (Correct problems/ Pull backstop as necessary)
SLB	**COMPLETENESS CHECK** Samples ✓ 100% Tests ✓ 100% Parameters ____ 100% or ✓ <100%
SLN	**ACCURACY CHECK** CED Results vs. Hard Copy Lab Reports
SLB	**COMMENTS/NARRATIVE REVIEW**
	Overview Review Report Cover letter for customer
SWN	Report Finish Title Page Copy and Bind
SWN	Mail to Client(s)

Sherri Blaylock
Certified by

May 23, 1996
Date

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: Bio-Sludge
Sample Name: KIN-BIO-SLUDGE
Date Sampled: April 22, 1996
Lab Sample ID: 2498402-1 Analysis Lab: LANCAS

Method Number: 6010A Pre-prep Method: 1312 Prep Method: 3010A

Analyte/Parameter	Dilution	Result		MDL	PQL	Unit	Date Analyzed
ANTIMONY TR	1	.0052	J	.0031	0.01	MG/L	May 2, 1996
ARSENIC TR	1	< .0027		.0027	0.01	MG/L	May 2, 1996
BARIUM	1	.58		.0022	0.1	MG/L	May 1, 1996
BERYLLIUM	1	< .0013		.0013	0.01	MG/L	May 1, 1996
CADMIUM	1	< .0027		.0027	0.01	MG/L	May 1, 1996
CHROMIUM	1	< .0043		.0043	0.03	MG/L	May 1, 1996
COBALT	1	< .0055		.0055	0.05	MG/L	May 1, 1996
COPPER	1	< .0038		.0038	0.025	MG/L	May 1, 1996
LEAD TR	1	< .0020		.0020	0.005	MG/L	May 2, 1996
NICKEL	1	< .0054		.0054	0.05	MG/L	May 1, 1996
SELENIUM TR	1	< .0027		.0027	0.01	MG/L	May 2, 1996
SILVER	1	< .0036		.0036	0.02	MG/L	May 1, 1996
THALLIUM TR	1	< .0045		.0045	0.02	MG/L	May 2, 1996
TIN	1	< .025		.025	0.3	MG/L	May 1, 1996
VANADIUM	1	< .0070		.0070	0.02	MG/L	May 1, 1996
ZINC	1	.206		.012	0.025	MG/L	May 2, 1996

Method Number: 7470A Pre-prep Method: 1312 Prep Method: 7470A

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
MERCURY	1	< .000043	.000043	0.0002	MG/L	Apr 29, 1996

Method Number: 8081 Pre-prep Method: 1312 Prep Method: 3510B

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
ALDRIN	1	< .04	.04	0.1	UG/L	May 3, 1996
ALPHA BHC	1	< .002	.002	0.01	UG/L	May 3, 1996
BETA BHC	1	< .07	.07	0.1	UG/L	May 3, 1996
CHLORDANE	1	< .1	.1	0.6	UG/L	May 3, 1996
DDD	1	< .006	.006	0.01	UG/L	May 3, 1996
DDE	1	< .005	.005	0.01	UG/L	May 3, 1996
DDT	1	.01	.007	0.01	UG/L	May 3, 1996
DELTA BHC	1	< .004	.004	0.01	UG/L	May 3, 1996
DIELDRIN	1	< .005	.005	0.01	UG/L	May 3, 1996
ENDOSULFAN I	1	< .03	.03	0.1	UG/L	May 3, 1996
ENDOSULFAN II	1	< .009	.009	0.01	UG/L	May 3, 1996
ENDOSULFAN SULFATE	1	< .006	.006	0.03	UG/L	May 3, 1996
ENDRIN	1	< .005	.005	0.01	UG/L	May 3, 1996
ENDRIN ALDEHYDE	1	< .008	.008	0.1	UG/L	May 3, 1996
GAMMA BHC - LINDANE	1	< .02	.02	0.1	UG/L	May 3, 1996
HEPTACHLOR	1	< .004	.004	0.01	UG/L	May 3, 1996
HEPTACHLOR EPOXIDE	1	< .003	.003	0.01	UG/L	May 3, 1996
KEPONE	1	< .3	.3	0.7	UG/L	May 3, 1996
METHOXYCHLOR	1	< .03	.03	0.05	UG/L	May 3, 1996
PCB-1016	1	< .07	.07	1	UG/L	May 3, 1996
PCB-1221	1	< .1	.1	1	UG/L	May 3, 1996
PCB-1232	1	< .08	.08	1	UG/L	May 3, 1996
PCB-1242	1	< .04	.04	1	UG/L	May 3, 1996
PCB-1248	1	< .06	.06	1	UG/L	May 3, 1996
PCB-1254	1	< .05	.05	1	UG/L	May 3, 1996
PCB-1260	1	< .06	.06	1	UG/L	May 3, 1996
TOXAPHENE	1	< .9	.9	4	UG/L	May 3, 1996

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
DECACHLOROBIPHENYL		77.0	May 3, 1996
TETRACHLORO-M-XYLENE		70.0	May 3, 1996

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: Bio-Sludge
Sample Name: KIN-BIO-SLUDGE
Date Sampled: April 22, 1996
Lab Sample ID: 2498402-1 Analysis Lab: LANCAS

Method Number: 8151 Pre-prep Method: 1312

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
2,4,5-T	1	< .00005	.00005	0.0001	MG/L	May 3, 1996
2,4,5-TP	1	< .00004	.00004	0.0001	MG/L	May 3, 1996
2,4-D	1	< .0001	.0001	0.001	MG/L	May 3, 1996
DINOSEB	1	< .00007	.00007	0.001	MG/L	May 3, 1996

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
2,4-DICHLOROPHENYLACETIC ACID		14.0	May 3, 1996

Method Number: 8270B Pre-prep Method: 1312 Prep Method: 3510B

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
1,2,4,5-TETRACHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,2,4-TRICHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,2-DICHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,3,5-TRINITROBENZENE	1	< 5.	5.	20	UG/L	May 2, 1996
1,3-DICHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,3-DINITROBENZENE	1	< 2.	2.	10	UG/L	May 2, 1996
1,4-DICHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,4-NAPHTHOQUINONE	1	< 1.	1.	10	UG/L	May 2, 1996
1,4-PHENYLENEDIAMINE	1	< 20.	20.	200	UG/L	May 2, 1996
1-NAPHTHYLAMINE	1	< 2.	2.	10	UG/L	May 2, 1996
2,3,4,6-TETRACHLOROPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
2,4,5-TRICHLOROPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2,4,6-TRICHLOROPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2,4-DICHLOROPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
2,4-DIMETHYLPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2,4-DINITROPHENOL	1	< 5.	5.	25	UG/L	May 2, 1996
2,4-DINITROTOLUENE	1	< 2.	2.	10	UG/L	May 2, 1996
2,6-DICHLOROPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2,6-DINITROTOLUENE	1	< 1.	1.	10	UG/L	May 2, 1996
2-ACETYLAMINOFLUORENE	1	< 2.	2.	10	UG/L	May 2, 1996
2-CHLORONAPHTHALENE	1	< 1.	1.	10	UG/L	May 2, 1996
2-CHLOROPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2-METHYLNAPHTHALENE	1	< 1.	1.	10	UG/L	May 2, 1996
2-METHYLPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
2-NAPHTHYLAMINE	1	< 2.	2.	10	UG/L	May 2, 1996
2-NITROANILINE	1	< 1.	1.	10	UG/L	May 2, 1996
2-NITROPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
2-PICOLINE	1	< 1.	1.	10	UG/L	May 2, 1996
3 OR 4-METHYLPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
3,3'-DICHLOROBENZIDINE	1	< 2.	2.	20	UG/L	May 2, 1996
3,3'-DIMETHYLBENZIDINE	1	< 2.	2.	20	UG/L	May 2, 1996
3-METHYLCHOLANTHRENE	1	< 2.	2.	10	UG/L	May 2, 1996
3-NITROANILINE	1	< 1.	1.	10	UG/L	May 2, 1996
4,6-DINITRO-2-METHYLPHENOL	1	< 5.	5.	25	UG/L	May 2, 1996
4-AMINOBIPHENYL	1	< 1.	1.	10	UG/L	May 2, 1996
4-BROMOPHENYL PHENYL ETHER	1	< 2.	2.	10	UG/L	May 2, 1996
4-CHLORO-3-METHYLPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
4-CHLOROANILINE	1	< 2.	2.	10	UG/L	May 2, 1996
4-CHLOROPHENYL PHENYL ETHER	1	< 2.	2.	10	UG/L	May 2, 1996
4-NITROANILINE	1	< 2.	2.	10	UG/L	May 2, 1996
4-NITROPHENOL	1	< 5.	5.	25	UG/L	May 2, 1996
4-NITROQUINOLINE-1-OXIDE	1	< 10.	10.	100	UG/L	May 2, 1996
5-NITRO-O-TOLUIDINE	1	< 2.	2.	10	UG/L	May 2, 1996
7,12-DIMETHYLBENZ(A)ANTHRACENE	1	< 2.	2.	10	UG/L	May 2, 1996
A,A-DIMETHYLPHENETHYLAMINE	1	< 1.	1.	20	UG/L	May 2, 1996
ACENAPHTHENE	1	< 1.	1.	10	UG/L	May 2, 1996
ACENAPHTHYLENE	1	< 1.	1.	10	UG/L	May 2, 1996
ACETOPHENONE	1	< 2.	2.	10	UG/L	May 2, 1996
ANILINE	1	< 2.	2.	10	UG/L	May 2, 1996
ANTHRACENE	1	< 1.	1.	10	UG/L	May 2, 1996

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: Bio-Sludge
Sample Name: KIN-BIO-SLUDGE
Date Sampled: April 22, 1996
Lab Sample ID: 2498402-1 Analysis Lab: LANCAS

Analyte/Parameter	Dilution	Result		MDL	PQL	Unit	Date Analyzed
BENZO (A) ANTHRACENE	1	< 1.		1.	10	UG/L	May 2, 1996
BENZO (A) PYRENE	1	< 2.		2.	10	UG/L	May 2, 1996
BENZO (B) FLUORANTHENE	1	< 2.		2.	10	UG/L	May 2, 1996
BENZO (GHI) PERYLENE	1	< 2.		2.	10	UG/L	May 2, 1996
BENZO (K) FLUORANTHENE	1	< 2.		2.	10	UG/L	May 2, 1996
BENZYL ALCOHOL	1	3.	J	2.	20	UG/L	May 2, 1996
BIS (2-CHLOROETHOXY) METHANE	1	< 1.		1.	10	UG/L	May 2, 1996
BIS (2-CHLOROETHYL) ETHER	1	< 1.		1.	10	UG/L	May 2, 1996
BIS (2-ETHYLHEXYL) PHTHALATE	1	< 2.		2.	10	UG/L	May 2, 1996
BIS(2CHLOROISOPROPYL)ETHER	1	< 2.		2.	10	UG/L	May 2, 1996
BUTYL BENZYL PHTHALATE	1	< 2.		2.	10	UG/L	May 2, 1996
CHLOROBENZILATE	1	< 4.		4.	10	UG/L	May 2, 1996
CHRYSENE	1	< 1.		1.	10	UG/L	May 2, 1996
DI-N-BUTYL PHTHALATE	1	92.		1.	10	UG/L	May 2, 1996
DI-N-OCTYL PHTHALATE	1	< 2.		2.	10	UG/L	May 2, 1996
DIALLATE (TRANS/CIS)	1	< 2.		2.	10	UG/L	May 2, 1996
DIBENZ (A,H) ANTHRACENE	1	< 2.		2.	10	UG/L	May 2, 1996
DIBENZOFURAN	1	< 1.		1.	10	UG/L	May 2, 1996
DIETHYL PHTHALATE	1	< 2.		2.	10	UG/L	May 2, 1996
DIMETHOATE	1	< 2.		2.	10	UG/L	May 2, 1996
DIMETHYL PHTHALATE	1	< 3.		3.	10	UG/L	May 2, 1996
ETHYL METHANESULFONATE	1	< 1.		1.	20	UG/L	May 2, 1996
FLUORANTHENE	1	< 1.		1.	10	UG/L	May 2, 1996
FLUORENE	1	< 1.		1.	10	UG/L	May 2, 1996
HEXACHLOROBENZENE	1	< 1.		1.	10	UG/L	May 2, 1996
HEXACHLOROBUTADIENE	1	< 1.		1.	10	UG/L	May 2, 1996
HEXACHLOROCYCLOPENTADIENE	1	< 3.		3.	10	UG/L	May 2, 1996
HEXACHLOROETHANE	1	< 2.		2.	10	UG/L	May 2, 1996
HEXACHLOROPROPENE	1	< 2.		2.	10	UG/L	May 2, 1996
INDENO (1,2,3-CD) PYRENE	1	< 2.		2.	10	UG/L	May 2, 1996
ISODRIN	1	< 1.		1.	20	UG/L	May 2, 1996
ISOPHORONE	1	< 1.		1.	10	UG/L	May 2, 1996
ISOSAFROLE	1	< 1.		1.	10	UG/L	May 2, 1996
METHAPYRILENE	1	< 1.		1.	20	UG/L	May 2, 1996
METHYL METHANESULFONATE	1	< 1.		1.	10	UG/L	May 2, 1996
N-NITROSODI-N-BUTYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSODI-N-PROPYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSODIETHYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSODIMETHYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSODIPHENYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSOMETHYLETHYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSOMORPHOLINE	1	< 1.		1.	10	UG/L	May 2, 1996
N-NITROSOPIPERIDINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSOPYRROLIDINE	1	< 2.		2.	10	UG/L	May 2, 1996
NAPHTHALENE	1	< 1.		1.	10	UG/L	May 2, 1996
NITROBENZENE	1	< 1.		1.	10	UG/L	May 2, 1996
O,O,O-TRIETHYLPHOSPHOROTHIOATE	1	< 2.		2.	10	UG/L	May 2, 1996
O-TOLUIDINE	1	< 2.		2.	10	UG/L	May 2, 1996
P-(DIMETHYLAMINO)AZOBENZENE	1	< 1.		1.	10	UG/L	May 2, 1996
PENTACHLOROBENZENE	1	< 1.		1.	10	UG/L	May 2, 1996
PENTACHLORONITROBENZENE	1	< 2.		2.	10	UG/L	May 2, 1996
PENTACHLOROPHENOL	1	< 1.		1.	25	UG/L	May 2, 1996
PHENACETIN	1	< 2.		2.	10	UG/L	May 2, 1996
PHENANTHRENE	1	< 1.		1.	10	UG/L	May 2, 1996
PHENOL	1	< 1.		1.	10	UG/L	May 2, 1996
PRONAMIDE	1	< 1.		1.	10	UG/L	May 2, 1996
PYRENE	1	< 1.		1.	10	UG/L	May 2, 1996
PYRIDINE	1	< 2.		2.	10	UG/L	May 2, 1996
SAFROLE	1	< 2.		2.	10	UG/L	May 2, 1996
TETRAETHYL DITHIOPYROPHOSPHATE	1	< 2.		2.	10	UG/L	May 2, 1996
THIONAZIN	1	< 2.		2.	20	UG/L	May 2, 1996

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
2,4,6-TRIBROMOPHENOL		81.0	May 2, 1996
2-FLUOROBIPHENYL		73.0	May 2, 1996
2-FLUOROPHENOL		57.0	May 2, 1996

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: Bio-Sludge
Sample Name: KIN-BIO-SLUDGE
Date Sampled: April 22, 1996
Lab Sample ID: 2498402-1 Analysis Lab: LANCAS

Analyte/Parameter	Dilution	RPR	Date Analyzed
NITROBENZENE-D5		76.0	May 2, 1996
PHENOL-D6		37.0	May 2, 1996
TERPHENYL-D14		87.0	May 2, 1996

Method Number: 9012 Pre-prep Method: 1312 Prep Method: 9012

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL CYANIDE (WATER)	1	.035	.004	0.005	MG/L	May 1, 1996

Method Number: 9030A Pre-prep Method: 1312

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
SULFIDE	1	< .5	.5	2	MG/L	May 2, 1996

Comments:

All results are from 1312 SPLP leachate.
8081: Due to interfering peaks on the chromatogram, values reported represent the lowest possible detection limits.
8151: Surrogate recoveries were outside control limits in both the original and reextracts, suggesting a possible matrix effect.
8270B: N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total for both compounds.

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: Bio-Sludge
Sample Name: KIN-BIO-SLUDGE
Date Sampled: April 22, 1996
Lab Sample ID: 2498403-1 Analysis Lab: LANCAS

Method Number: 8240B Pre-prep Method: 1312

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
1,1,1,2-TETRACHLOROETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,1,1-TRICHLOROETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,1,2,2-TETRACHLOROETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
1,1,2-TRICHLOROETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
1,1-DICHLOROETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
1,1-DICHLOROETHENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,2,3-TRICHLOROPROPANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,2-DIBROMO-3-CHLOROPROPANE	1	< 3.	3.	5	UG/L	Apr 30, 1996
1,2-DIBROMOETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,2-DICHLOROETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
1,2-DICHLOROPROPANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,4-DIOXANE	1	< 70.	70.	250	UG/L	Apr 30, 1996
2-BUTANONE	1	< 3.	3.	10	UG/L	Apr 30, 1996
2-CHLORO-1,3-BUTADIENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
2-HEXANONE	1	< 7.	7.	10	UG/L	Apr 30, 1996
4-METHYL-2-PENTANONE	1	< 5.	5.	10	UG/L	Apr 30, 1996
ACETONE	1	< 6.	6.	20	UG/L	Apr 30, 1996
ACETONITRILE	1	< 25.	25.	100	UG/L	Apr 30, 1996
ACROLEIN	1	< 40.	40.	100	UG/L	Apr 30, 1996
ACRYLONITRILE	1	< 10.	10.	50	UG/L	Apr 30, 1996
ALLYL CHLORIDE	1	< 1.	1.	5	UG/L	Apr 30, 1996
BENZENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
BROMODICHLOROMETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
BROMOFORM	1	< 1.	1.	5	UG/L	Apr 30, 1996
BROMOMETHANE	1	< 3.	3.	5	UG/L	Apr 30, 1996
CARBON DISULFIDE	1	< 3.	3.	5	UG/L	Apr 30, 1996
CARBON TETRACHLORIDE	1	< 1.	1.	5	UG/L	Apr 30, 1996
CHLOROBENZENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
CHLOROETHANE	1	< 3.	3.	5	UG/L	Apr 30, 1996
CHLOROFORM	1	< 1.	1.	5	UG/L	Apr 30, 1996
CHLOROMETHANE	1	< 3.	3.	5	UG/L	Apr 30, 1996
CIS-1,2-DICHLOROETHENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
CIS-1,3-DICHLOROPROPENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
DIBROMOCHLOROMETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
DIBROMOMETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
DICHLORODIFLUOROMETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
ETHYL METHACRYLATE	1	< 1.	1.	5	UG/L	Apr 30, 1996
ETHYLBENZENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
ISOBUTYL ALCOHOL	1	< 100.	100.	250	UG/L	Apr 30, 1996
METHACRYLONITRILE	1	< 10.	10.	50	UG/L	Apr 30, 1996
METHYL IODIDE	1	< 1.	1.	5	UG/L	Apr 30, 1996
METHYL METHACRYLATE	1	< 1.	1.	5	UG/L	Apr 30, 1996
METHYLENE CHLORIDE	1	< 2.	2.	5	UG/L	Apr 30, 1996
PENTACHLOROETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
PROPIONITRILE	1	< 30.	30.	100	UG/L	Apr 30, 1996
STYRENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
TETRACHLOROETHENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
TOLUENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
TRANS-1,2-DICHLOROETHENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
TRANS-1,3-DICHLOROPROPENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
TRANS-1,4-DICHLORO-2-BUTENE	1	< 15.	15.	50	UG/L	Apr 30, 1996
TRICHLOROETHENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
TRICHLOROFLUOROMETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
VINYL ACETATE	1	< 2.	2.	10	UG/L	Apr 30, 1996
VINYL CHLORIDE	1	< 2.	2.	5	UG/L	Apr 30, 1996
XYLENE (TOTAL)	1	< 1.	1.	5	UG/L	Apr 30, 1996

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
1,2-DICHLOROETHANE-D4		96.0	Apr 30, 1996
BROMOFLUOROBENZENE		94.0	Apr 30, 1996
TOLUENE-D8		96.0	Apr 30, 1996

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: Bio-Sludge
Sample Name: KIN-BIO-SLUDGE
Date Sampled: April 22, 1996
Lab Sample ID: 2498403-1 Analysis Lab: LANCAS

Analyte/Parameter	Dilution	RPR	Date Analyzed

Comments:

All results are from 1312 SPLP leachate.

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: F/B-Ash
Sample Name: KIN-F/B-ASH
Date Sampled: April 22, 1996
Lab Sample ID: 2498400-1 Analysis Lab: LANCAS

Method Number: 6010A Pre-prep Method: 1312 Prep Method: 3010A

Analyte/Parameter	Dilution	Result		MDL	PQL	Unit	Date Analyzed
ANTIMONY TR	1	< .0031		.0031	0.01	MG/L	May 1, 1996
ARSENIC TR	1	< .0027		.0027	0.01	MG/L	May 1, 1996
BARIUM	1	.31		.0022	0.1	MG/L	May 1, 1996
BERYLLIUM	1	< .0013		.0013	0.01	MG/L	May 1, 1996
CADMIUM	1	< .0027		.0027	0.01	MG/L	May 1, 1996
CHROMIUM	1	< .0043		.0043	0.03	MG/L	May 1, 1996
COBALT	1	.0330	J	.0055	0.05	MG/L	May 1, 1996
COPPER	1	< .0038		.0038	0.025	MG/L	May 1, 1996
LEAD TR	1	< .0020		.0020	0.005	MG/L	May 1, 1996
NICKEL	1	.050		.0054	0.05	MG/L	May 1, 1996
SELENIUM TR	1	< .0027		.0027	0.01	MG/L	May 1, 1996
SILVER	1	< .0036		.0036	0.02	MG/L	May 1, 1996
THALLIUM TR	1	.0047	J	.0045	0.02	MG/L	May 1, 1996
TIN	1	< .025		.025	0.3	MG/L	May 1, 1996
VANADIUM	1	< .0070		.0070	0.02	MG/L	May 1, 1996
ZINC	1	.252		.012	0.025	MG/L	May 1, 1996

Method Number: 7470A Pre-prep Method: 1312 Prep Method: 7470A

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
MERCURY	1	< .000040	.000040	0.0002	MG/L	Apr 29, 1996

Method Number: 8081 Pre-prep Method: 1312 Prep Method: 3510B

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
ALDRIN	1	< .004	.004	0.01	UG/L	May 2, 1996
ALPHA BHC	1	< .002	.002	0.01	UG/L	May 2, 1996
BETA BHC	1	< .007	.007	0.01	UG/L	May 2, 1996
CHLORDANE	1	< .07	.07	0.3	UG/L	May 2, 1996
DDD	1	< .006	.006	0.01	UG/L	May 2, 1996
DDE	1	< .005	.005	0.01	UG/L	May 2, 1996
DDT	1	< .007	.007	0.01	UG/L	May 2, 1996
DELTA BHC	1	< .004	.004	0.01	UG/L	May 2, 1996
DIELDRIN	1	< .005	.005	0.01	UG/L	May 2, 1996
ENDOSULFAN I	1	< .003	.003	0.01	UG/L	May 2, 1996
ENDOSULFAN II	1	< .009	.009	0.01	UG/L	May 2, 1996
ENDOSULFAN SULFATE	1	< .006	.006	0.03	UG/L	May 2, 1996
ENDRIN	1	< .005	.005	0.01	UG/L	May 2, 1996
ENDRIN ALDEHYDE	1	< .008	.008	0.1	UG/L	May 2, 1996
GAMMA BHC - LINDANE	1	< .002	.002	0.01	UG/L	May 2, 1996
HEPTACHLOR	1	< .004	.004	0.01	UG/L	May 2, 1996
HEPTACHLOR EPOXIDE	1	< .003	.003	0.01	UG/L	May 2, 1996
KEPONE	1	< .3	.3	0.7	UG/L	May 2, 1996
METHOXYCHLOR	1	< .03	.03	0.05	UG/L	May 2, 1996
PCB-1016	1	< .07	.07	1	UG/L	May 2, 1996
PCB-1221	1	< .1	.1	1	UG/L	May 2, 1996
PCB-1232	1	< .08	.08	1	UG/L	May 2, 1996
PCB-1242	1	< .04	.04	1	UG/L	May 2, 1996
PCB-1248	1	< .06	.06	1	UG/L	May 2, 1996
PCB-1254	1	< .05	.05	1	UG/L	May 2, 1996
PCB-1260	1	< .06	.06	1	UG/L	May 2, 1996
TOXAPHENE	1	< .9	.9	4	UG/L	May 2, 1996

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
DECACHLOROBIPHENYL		82.0	May 2, 1996
TETRACHLORO-M-XYLENE		71.0	May 2, 1996

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: F/B-Ash
Sample Name: KIN-F/B-ASH
Date Sampled: April 22, 1996
Lab Sample ID: 2498400-1 Analysis Lab: LANCAS

Method Number: 8151 Pre-prep Method: 1312 Prep Method: 8151

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
2,4,5-T	1	< .00005	.00005	0.0001	MG/L	May 2, 1996
2,4,5-TP	1	< .00004	.00004	0.0001	MG/L	May 2, 1996
2,4-D	1	< .0001	.0001	0.001	MG/L	May 2, 1996
DINOSEB	1	< .00007	.00007	0.001	MG/L	May 2, 1996

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
2,4-DICHLOROPHENYLACETIC ACID		88.0	May 2, 1996

Method Number: 8270B Pre-prep Method: 1312 Prep Method: 3510B

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
1,2,4,5-TETRACHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,2,4-TRICHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,2-DICHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,3,5-TRINITROBENZENE	1	< 5.	5.	20	UG/L	May 2, 1996
1,3-DICHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,3-DINITROBENZENE	1	< 2.	2.	10	UG/L	May 2, 1996
1,4-DICHLOROBENZENE	1	< 1.	1.	10	UG/L	May 2, 1996
1,4-NAPHTHOQUINONE	1	< 1.	1.	10	UG/L	May 2, 1996
1,4-PHENYLENEDIAMINE	1	< 20.	20.	200	UG/L	May 2, 1996
1-NAPHTHYLAMINE	1	< 2.	2.	10	UG/L	May 2, 1996
2,3,4,6-TETRACHLOROPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
2,4,5-TRICHLOROPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2,4,6-TRICHLOROPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2,4-DICHLOROPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
2,4-DIMETHYLPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2,4-DINITROPHENOL	1	< 5.	5.	25	UG/L	May 2, 1996
2,4-DINITROTOLUENE	1	< 2.	2.	10	UG/L	May 2, 1996
2,6-DICHLOROPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2,6-DINITROTOLUENE	1	< 1.	1.	10	UG/L	May 2, 1996
2-ACETYLAMINOFLUORENE	1	< 2.	2.	10	UG/L	May 2, 1996
2-CHLORONAPHTHALENE	1	< 1.	1.	10	UG/L	May 2, 1996
2-CHLOROPHENOL	1	< 1.	1.	10	UG/L	May 2, 1996
2-METHYLNAPHTHALENE	1	< 1.	1.	10	UG/L	May 2, 1996
2-METHYLPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
2-NAPHTHYLAMINE	1	< 2.	2.	10	UG/L	May 2, 1996
2-NITROANILINE	1	< 1.	1.	10	UG/L	May 2, 1996
2-NITROPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
2-PICOLINE	1	< 1.	1.	10	UG/L	May 2, 1996
3 OR 4-METHYLPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
3,3'-DICHLOROBENZIDINE	1	< 2.	2.	20	UG/L	May 2, 1996
3,3'-DIMETHYLBENZIDINE	1	< 2.	2.	20	UG/L	May 2, 1996
3-METHYLCHOLANTHRENE	1	< 2.	2.	10	UG/L	May 2, 1996
3-NITROANILINE	1	< 1.	1.	10	UG/L	May 2, 1996
4,6-DINITRO-2-METHYLPHENOL	1	< 5.	5.	25	UG/L	May 2, 1996
4-AMINOBIPHENYL	1	< 1.	1.	10	UG/L	May 2, 1996
4-BROMOPHENYL PHENYL ETHER	1	< 2.	2.	10	UG/L	May 2, 1996
4-CHLORO-3-METHYLPHENOL	1	< 2.	2.	10	UG/L	May 2, 1996
4-CHLOROANILINE	1	< 2.	2.	10	UG/L	May 2, 1996
4-CHLOROPHENYL PHENYL ETHER	1	< 2.	2.	10	UG/L	May 2, 1996
4-NITROANILINE	1	< 2.	2.	10	UG/L	May 2, 1996
4-NITROPHENOL	1	< 5.	5.	25	UG/L	May 2, 1996
4-NITROQUINOLINE-1-OXIDE	1	< 10.	10.	100	UG/L	May 2, 1996
5-NITRO-O-TOLUIDINE	1	< 2.	2.	10	UG/L	May 2, 1996
7,12-DIMETHYLBENZ(A)ANTHRACENE	1	< 2.	2.	10	UG/L	May 2, 1996
A,A-DIMETHYLPHENETHYLAMINE	1	< 1.	1.	20	UG/L	May 2, 1996
ACENAPHTHENE	1	< 1.	1.	10	UG/L	May 2, 1996
ACENAPHTHYLENE	1	< 1.	1.	10	UG/L	May 2, 1996
ACETOPHENONE	1	< 2.	2.	10	UG/L	May 2, 1996
ANILINE	1	< 2.	2.	10	UG/L	May 2, 1996
ANTHRACENE	1	< 1.	1.	10	UG/L	May 2, 1996

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: F/B-Ash
Sample Name: KIN-F/B-ASH
Date Sampled: April 22, 1996
Lab Sample ID: 2498400-1 Analysis Lab: LANCAS

Analyte/Parameter	Dilution	Result		MDL	PQL	Unit	Date Analyzed
BENZO (A) ANTHRACENE	1	< 1.		1.	10	UG/L	May 2, 1996
BENZO (A) PYRENE	1	< 2.		2.	10	UG/L	May 2, 1996
BENZO (B) FLUORANTHENE	1	< 2.		2.	10	UG/L	May 2, 1996
BENZO (GHI) PERYLENE	1	< 2.		2.	10	UG/L	May 2, 1996
BENZO (K) FLUORANTHENE	1	< 2.		2.	10	UG/L	May 2, 1996
BENZYL ALCOHOL	1	3.	J	2.	20	UG/L	May 2, 1996
BIS (2-CHLOROETHOXY) METHANE	1	< 1.		1.	10	UG/L	May 2, 1996
BIS (2-CHLOROETHYL) ETHER	1	< 1.		1.	10	UG/L	May 2, 1996
BIS (2-ETHYLHEXYL) PHTHALATE	1	< 2.		2.	10	UG/L	May 2, 1996
BIS(2CHLOROISOPROPYL)ETHER	1	< 2.		2.	10	UG/L	May 2, 1996
BUTYL BENZYL PHTHALATE	1	< 2.		2.	10	UG/L	May 2, 1996
CHLOROBENZILATE	1	< 4.		4.	10	UG/L	May 2, 1996
CHRYSENE	1	< 1.		1.	10	UG/L	May 2, 1996
DI-N-BUTYL PHTHALATE	1	< 1.		1.	10	UG/L	May 2, 1996
DI-N-OCTYL PHTHALATE	1	< 2.		2.	10	UG/L	May 2, 1996
DIALLATE (TRANS/CIS)	1	< 2.		2.	10	UG/L	May 2, 1996
DIBENZ (A,H) ANTHRACENE	1	< 2.		2.	10	UG/L	May 2, 1996
DIBENZOFURAN	1	< 1.		1.	10	UG/L	May 2, 1996
DIETHYL PHTHALATE	1	< 2.		2.	10	UG/L	May 2, 1996
DIMETHOATE	1	< 2.		2.	10	UG/L	May 2, 1996
DIMETHYL PHTHALATE	1	< 3.		3.	10	UG/L	May 2, 1996
ETHYL METHANESULFONATE	1	< 1.		1.	20	UG/L	May 2, 1996
FLUORANTHENE	1	< 1.		1.	10	UG/L	May 2, 1996
FLUORENE	1	< 1.		1.	10	UG/L	May 2, 1996
HEXACHLOROBENZENE	1	< 1.		1.	10	UG/L	May 2, 1996
HEXACHLOROBUTADIENE	1	< 1.		1.	10	UG/L	May 2, 1996
HEXACHLOROCYCLOPENTADIENE	1	< 3.		3.	10	UG/L	May 2, 1996
HEXACHLOROETHANE	1	< 2.		2.	10	UG/L	May 2, 1996
HEXACHLOROPROPENE	1	< 2.		2.	10	UG/L	May 2, 1996
INDENO (1,2,3-CD) PYRENE	1	< 2.		2.	10	UG/L	May 2, 1996
ISODRIN	1	< 1.		1.	20	UG/L	May 2, 1996
ISOPHORONE	1	< 1.		1.	10	UG/L	May 2, 1996
ISOSAFROLE	1	< 1.		1.	10	UG/L	May 2, 1996
METHAPYRILENE	1	< 1.		1.	20	UG/L	May 2, 1996
METHYL METHANESULFONATE	1	< 1.		1.	10	UG/L	May 2, 1996
N-NITROSODI-N-BUTYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSODI-N-PROPYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSODIETHYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSODIMETHYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSODIPHENYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSOMETHYLETHYLAMINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSOMORPHOLINE	1	< 1.		1.	10	UG/L	May 2, 1996
N-NITROSOPIPERIDINE	1	< 2.		2.	10	UG/L	May 2, 1996
N-NITROSOPYRROLIDINE	1	< 2.		2.	10	UG/L	May 2, 1996
NAPHTHALENE	1	< 1.		1.	10	UG/L	May 2, 1996
NITROBENZENE	1	< 1.		1.	10	UG/L	May 2, 1996
O,O,O-TRIETHYLPHOSPHOROTHIOATE	1	< 2.		2.	10	UG/L	May 2, 1996
O-TOLUIDINE	1	< 2.		2.	10	UG/L	May 2, 1996
P-(DIMETHYLAMINO)AZOBENZENE	1	< 1.		1.	10	UG/L	May 2, 1996
PENTACHLOROBENZENE	1	< 1.		1.	10	UG/L	May 2, 1996
PENTACHLORONITROBENZENE	1	< 2.		2.	10	UG/L	May 2, 1996
PENTACHLOROPHENOL	1	< 1.		1.	25	UG/L	May 2, 1996
PHENACETIN	1	< 2.		2.	10	UG/L	May 2, 1996
PHENANTHRENE	1	< 1.		1.	10	UG/L	May 2, 1996
PHENOL	1	< 1.		1.	10	UG/L	May 2, 1996
PRONAMIDE	1	< 1.		1.	10	UG/L	May 2, 1996
PYRENE	1	< 1.		1.	10	UG/L	May 2, 1996
PYRIDINE	1	< 2.		2.	10	UG/L	May 2, 1996
SAFROLE	1	< 2.		2.	10	UG/L	May 2, 1996
TETRAETHYL DITHIOPYROPHOSPHATE	1	< 2.		2.	10	UG/L	May 2, 1996
THIONAZIN	1	< 2.		2.	20	UG/L	May 2, 1996

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
2,4,6-TRIBROMOPHENOL		86.0	May 2, 1996
2-FLUOROBIPHENYL		85.0	May 2, 1996
2-FLUOROPHENOL		67.0	May 2, 1996

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: F/B-Ash
Sample Name: KIN-F/B-ASH
Date Sampled: April 22, 1996
Lab Sample ID: 2498400-1 Analysis Lab: LANCAS

Analyte/Parameter	Dilution	RPR	Date Analyzed
NITROBENZENE-D5		91.0	May 2, 1996
PHENOL-D6		43.0	May 2, 1996
TERPHENYL-D14		91.0	May 2, 1996

Method Number: 9012 Pre-prep Method: 1312 Prep Method: 9012

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL CYANIDE (WATER)	1	< .004	.004	0.005	MG/L	May 1, 1996

Method Number: 9030A Pre-prep Method: 1312

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
SULFIDE	1	< .5	.5	2	MG/L	May 2, 1996

Comments:

All results are from 1312 SPLP leachate.
8270B: N-nitrosodiphenylamine decomposes in the GC inlet forming diphenylamine. The result reported for N-nitrosodiphenylamine represents the combined total for both compounds.

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: F/B-Ash
Sample Name: KIN-F/B-ASH
Date Sampled: April 22, 1996
Lab Sample ID: 2498401-1 Analysis Lab: LANCAS

Method Number: 8240B Pre-prep Method: 1312

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
1,1,1,2-TETRACHLOROETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,1,1-TRICHLOROETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,1,2,2-TETRACHLOROETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
1,1,2-TRICHLOROETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
1,1-DICHLOROETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
1,1-DICHLOROETHENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,2,3-TRICHLOROPROPANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,2-DIBROMO-3-CHLOROPROPANE	1	< 3.	3.	5	UG/L	Apr 30, 1996
1,2-DIBROMOETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,2-DICHLOROETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
1,2-DICHLOROPROPANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
1,4-DIOXANE	1	< 70.	70.	250	UG/L	Apr 30, 1996
2-BUTANONE	1	< 3.	3.	10	UG/L	Apr 30, 1996
2-CHLORO-1,3-BUTADIENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
2-HEXANONE	1	< 7.	7.	10	UG/L	Apr 30, 1996
4-METHYL-2-PENTANONE	1	< 5.	5.	10	UG/L	Apr 30, 1996
ACETONE	1	< 6.	6.	20	UG/L	Apr 30, 1996
ACETONITRILE	1	< 25.	25.	100	UG/L	Apr 30, 1996
ACROLEIN	1	< 40.	40.	100	UG/L	Apr 30, 1996
ACRYLONITRILE	1	< 10.	10.	50	UG/L	Apr 30, 1996
ALLYL CHLORIDE	1	< 1.	1.	5	UG/L	Apr 30, 1996
BENZENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
BROMODICHLOROMETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
BROMOFORM	1	< 1.	1.	5	UG/L	Apr 30, 1996
BROMOMETHANE	1	< 3.	3.	5	UG/L	Apr 30, 1996
CARBON DISULFIDE	1	< 3.	3.	5	UG/L	Apr 30, 1996
CARBON TETRACHLORIDE	1	< 1.	1.	5	UG/L	Apr 30, 1996
CHLOROBENZENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
CHLOROETHANE	1	< 3.	3.	5	UG/L	Apr 30, 1996
CHLOROFORM	1	< 1.	1.	5	UG/L	Apr 30, 1996
CHLOROMETHANE	1	< 3.	3.	5	UG/L	Apr 30, 1996
CIS-1,2-DICHLOROETHENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
CIS-1,3-DICHLOROPROPENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
DIBROMOCHLOROMETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
DIBROMOMETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
DICHLORODIFLUOROMETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
ETHYL METHACRYLATE	1	< 1.	1.	5	UG/L	Apr 30, 1996
ETHYLBENZENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
ISOBUTYL ALCOHOL	1	< 100.	100.	250	UG/L	Apr 30, 1996
METHACRYLONITRILE	1	< 10.	10.	50	UG/L	Apr 30, 1996
METHYL IODIDE	1	< 1.	1.	5	UG/L	Apr 30, 1996
METHYL METHACRYLATE	1	< 1.	1.	5	UG/L	Apr 30, 1996
METHYLENE CHLORIDE	1	< 2.	2.	5	UG/L	Apr 30, 1996
PENTACHLOROETHANE	1	< 1.	1.	5	UG/L	Apr 30, 1996
PROPIONITRILE	1	< 30.	30.	100	UG/L	Apr 30, 1996
STYRENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
TETRACHLOROETHENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
TOLUENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
TRANS-1,2-DICHLOROETHENE	1	< 2.	2.	5	UG/L	Apr 30, 1996
TRANS-1,3-DICHLOROPROPENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
TRANS-1,4-DICHLORO-2-BUTENE	1	< 15.	15.	50	UG/L	Apr 30, 1996
TRICHLOROETHENE	1	< 1.	1.	5	UG/L	Apr 30, 1996
TRICHLOROFLUOROMETHANE	1	< 2.	2.	5	UG/L	Apr 30, 1996
VINYL ACETATE	1	< 2.	2.	10	UG/L	Apr 30, 1996
VINYL CHLORIDE	1	< 2.	2.	5	UG/L	Apr 30, 1996
XYLENE (TOTAL)	1	< 1.	1.	5	UG/L	Apr 30, 1996

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
1,2-DICHLOROETHANE-D4		95.0	Apr 30, 1996
BROMOFLUOROBENZENE		94.0	Apr 30, 1996
TOLUENE-D8		94.0	Apr 30, 1996

Location: KINSTON
Project Name: FLYASH PLANT PROJECT
Sample Source: F/B-Ash
Sample Name: KIN-F/B-ASH
Date Sampled: April 22, 1996
Lab Sample ID: 2498401-1 Analysis Lab: LANCAS

Analyte/Parameter	Dilution	RPR	Date Analyzed

Comments:

All results are from 1312 SPLP leachate.

Location: KINSTON
Project Name: FLYASH PLANT PROJECT

Analyte/Parameter	Result		Unit	MDL	PQL	Method No.	Sampled	Sample Name
ANTIMONY TR	.0052	J	MG/L	.0031	0.01	6010A	96-04-22	KIN-BIO-SLUDGE
BARIUM	.58		MG/L	.0022	0.1	6010A	96-04-22	KIN-BIO-SLUDGE
ZINC	.206		MG/L	.012	0.025	6010A	96-04-22	KIN-BIO-SLUDGE
DDT	.01		UG/L	.007	0.01	8081	96-04-22	KIN-BIO-SLUDGE
BENZYL ALCOHOL	3.	J	UG/L	2.	20	8270B	96-04-22	KIN-BIO-SLUDGE
DI-N-BUTYL PHTHALATE	92.		UG/L	1.	10	8270B	96-04-22	KIN-BIO-SLUDGE
TOTAL CYANIDE (WATER)	.035		MG/L	.004	0.005	9012	96-04-22	KIN-BIO-SLUDGE
BARIUM	.31		MG/L	.0022	0.1	6010A	96-04-22	KIN-F/B-ASH
COBALT	.0330	J	MG/L	.0055	0.05	6010A	96-04-22	KIN-F/B-ASH
NICKEL	.050		MG/L	.0054	0.05	6010A	96-04-22	KIN-F/B-ASH
THALLIUM TR	.0047	J	MG/L	.0045	0.02	6010A	96-04-22	KIN-F/B-ASH
ZINC	.252		MG/L	.012	0.025	6010A	96-04-22	KIN-F/B-ASH
BENZYL ALCOHOL	3.	J	UG/L	2.	20	8270B	96-04-22	KIN-F/B-ASH

Method Number: 6010A Prep Method: 3010A Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 03144
Batch Number: 3

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
BARIUM	100	LCS -1 LANCAS
BERYLLIUM	94	LCS -1 LANCAS
CADMIUM	102	LCS -1 LANCAS
CHROMIUM	103	LCS -1 LANCAS
COBALT	99	LCS -1 LANCAS
COPPER	103	LCS -1 LANCAS
NICKEL	102	LCS -1 LANCAS
SILVER	103	LCS -1 LANCAS
TIN	103	LCS -1 LANCAS
VANADIUM	99	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
BARIUM	99	1	LCSD -1 LANCAS
BERYLLIUM	92	3	LCSD -1 LANCAS
CADMIUM	99	3	LCSD -1 LANCAS
CHROMIUM	103	1	LCSD -1 LANCAS
COBALT	98	1	LCSD -1 LANCAS
COPPER	101	2	LCSD -1 LANCAS
NICKEL	100	1	LCSD -1 LANCAS
SILVER	105	1	LCSD -1 LANCAS
TIN	103	1	LCSD -1 LANCAS
VANADIUM	98	1	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
BARIUM	92	2498402-1 LANCAS
BERYLLIUM	88	2498402-1 LANCAS
CADMIUM	88	2498402-1 LANCAS
CHROMIUM	89	2498402-1 LANCAS
COBALT	86	2498402-1 LANCAS
COPPER	90	2498402-1 LANCAS
NICKEL	87	2498402-1 LANCAS
SILVER	59	2498402-1 LANCAS
TIN	86	2498402-1 LANCAS
VANADIUM	87	2498402-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
BARIUM	92	1	2498402-1 LANCAS
BERYLLIUM	88	1	2498402-1 LANCAS
CADMIUM	88	1	2498402-1 LANCAS
CHROMIUM	90	1	2498402-1 LANCAS
COBALT	87	1	2498402-1 LANCAS
COPPER	91	1	2498402-1 LANCAS
NICKEL	88	1	2498402-1 LANCAS
SILVER	80	29	2498402-1 LANCAS
TIN	87	1	2498402-1 LANCAS
VANADIUM	88	1	2498402-1 LANCAS

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
BARIUM	0.6	MG/L	3	2498402-1 LANCAS
BERYLLIUM	< 0.01	MG/L	0	2498402-1 LANCAS
CADMIUM	< 0.01	MG/L	0	2498402-1 LANCAS
CHROMIUM	< 0.03	MG/L	0	2498402-1 LANCAS
COBALT	< 0.05	MG/L	0	2498402-1 LANCAS
COPPER	< 0.025	MG/L	0	2498402-1 LANCAS
NICKEL	< 0.05	MG/L	0	2498402-1 LANCAS
SILVER	< 0.02	MG/L	0	2498402-1 LANCAS
TIN	< 0.3	MG/L	0	2498402-1 LANCAS
VANADIUM	< 0.02	MG/L	0	2498402-1 LANCAS

Comments:

6010A: (Silver) Batch matrix spike recovery and MS/MSD relative percent difference were outside control limits. Post digestion spike recovery was 104%. Lab control samples met acceptance criteria.

Method Number: 6010A Prep Method: 3010A Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 05478
Batch Number: 2

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-F/B-ASH	22APR96	LANCAS 2498400 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
ANTIMONY TR	105	LCS -1 LANCAS
ARSENIC TR	101	LCS -1 LANCAS
BARIUM	99	LCS -1 LANCAS
BERYLLIUM	98	LCS -1 LANCAS
CADMIUM	100	LCS -1 LANCAS
CHROMIUM	100	LCS -1 LANCAS
COBALT	102	LCS -1 LANCAS
COPPER	102	LCS -1 LANCAS
LEAD TR	100	LCS -1 LANCAS
NICKEL	99	LCS -1 LANCAS
SELENIUM TR	100	LCS -1 LANCAS
SILVER	106	LCS -1 LANCAS
THALLIUM TR	100	LCS -1 LANCAS
TIN	102	LCS -1 LANCAS
VANADIUM	98	LCS -1 LANCAS
ZINC	101	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ANTIMONY TR	106	0	LCSD -1 LANCAS
ARSENIC TR	101	0	LCSD -1 LANCAS
BARIUM	100	1	LCSD -1 LANCAS
BERYLLIUM	98	0	LCSD -1 LANCAS
CADMIUM	100	0	LCSD -1 LANCAS
CHROMIUM	101	0	LCSD -1 LANCAS
COBALT	102	0	LCSD -1 LANCAS
COPPER	103	1	LCSD -1 LANCAS
LEAD TR	100	1	LCSD -1 LANCAS
NICKEL	100	1	LCSD -1 LANCAS
SELENIUM TR	100	0	LCSD -1 LANCAS
SILVER	111	4	LCSD -1 LANCAS
THALLIUM TR	101	1	LCSD -1 LANCAS
TIN	102	0	LCSD -1 LANCAS
VANADIUM	98	1	LCSD -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ZINC	101	0	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
ANTIMONY TR	93	2498400-1 LANCAS
ARSENIC TR	90	2498400-1 LANCAS
BARIUM	90	2498400-1 LANCAS
BERYLLIUM	92	2498400-1 LANCAS
CADMIUM	88	2498400-1 LANCAS
CHROMIUM	92	2498400-1 LANCAS
COBALT	92	2498400-1 LANCAS
COPPER	94	2498400-1 LANCAS
LEAD TR	89	2498400-1 LANCAS
NICKEL	89	2498400-1 LANCAS
SELENIUM TR	89	2498400-1 LANCAS
SILVER	60	2498400-1 LANCAS
THALLIUM TR	90	2498400-1 LANCAS
TIN	91	2498400-1 LANCAS
VANADIUM	87	2498400-1 LANCAS
ZINC	84	2498400-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ANTIMONY TR	92	1	2498400-1 LANCAS
ARSENIC TR	90	0	2498400-1 LANCAS
BARIUM	90	0	2498400-1 LANCAS
BERYLLIUM	92	0	2498400-1 LANCAS
CADMIUM	88	0	2498400-1 LANCAS
CHROMIUM	91	0	2498400-1 LANCAS
COBALT	92	0	2498400-1 LANCAS
COPPER	94	1	2498400-1 LANCAS
LEAD TR	89	0	2498400-1 LANCAS
NICKEL	89	0	2498400-1 LANCAS
SELENIUM TR	89	0	2498400-1 LANCAS
SILVER	58	4	2498400-1 LANCAS
THALLIUM TR	90	1	2498400-1 LANCAS
TIN	92	1	2498400-1 LANCAS
VANADIUM	87	0	2498400-1 LANCAS
ZINC	83	0	2498400-1 LANCAS

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
ANTIMONY TR	< 0.01	MG/L	0	2498400-1 LANCAS
ARSENIC TR	< 0.01	MG/L	0	2498400-1 LANCAS
BARIUM	0.27	MG/L	0	2498400-1 LANCAS
BERYLLIUM	< 0.01	MG/L	0	2498400-1 LANCAS
CADMIUM	< 0.01	MG/L	0	2498400-1 LANCAS
CHROMIUM	< 0.03	MG/L	0	2498400-1 LANCAS
COBALT	< 0.05	MG/L	0	2498400-1 LANCAS
COPPER	< 0.025	MG/L	0	2498400-1 LANCAS
LEAD TR	< 0.005	MG/L	0	2498400-1 LANCAS
NICKEL	< 0.05	MG/L	0	2498400-1 LANCAS
SELENIUM TR	< 0.01	MG/L	0	2498400-1 LANCAS
SILVER	< 0.02	MG/L	0	2498400-1 LANCAS
THALLIUM TR	< 0.02	MG/L	0	2498400-1 LANCAS
TIN	< 0.3	MG/L	0	2498400-1 LANCAS
VANADIUM	< 0.02	MG/L	0	2498400-1 LANCAS
ZINC	0.24	MG/L	4	2498400-1 LANCAS

Comments:

6010A: (Silver) Batch matrix spike and spike duplicate recoveries were outside control

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID

limits. Post digestion spike recovery was 106%. Lab control samples met acceptance criteria.

Method Number: 6010A Prep Method: 3010A Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 05478
Batch Number: 3

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
ZINC	100	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ZINC	99	1	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
ZINC	85	2498402-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ZINC	84	1	2498402-1 LANCAS

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
ZINC	0.21	MG/L	0	2498402-1 LANCAS

Method Number: 6010A Prep Method: 3010A Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 05936
Batch Number: 3

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
ANTIMONY TR	108	LCS -1 LANCAS
ARSENIC TR	100	LCS -1 LANCAS
LEAD TR	98	LCS -1 LANCAS
SELENIUM TR	99	LCS -1 LANCAS
THALLIUM TR	99	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ANTIMONY TR	106	2	LCSD -1 LANCAS
ARSENIC TR	98	2	LCSD -1 LANCAS
LEAD TR	97	1	LCSD -1 LANCAS
SELENIUM TR	97	2	LCSD -1 LANCAS
THALLIUM TR	98	2	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
ANTIMONY TR	79	2498402-1 LANCAS
ARSENIC TR	76	2498402-1 LANCAS
LEAD TR	76	2498402-1 LANCAS
SELENIUM TR	74	2498402-1 LANCAS
THALLIUM TR	77	2498402-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ANTIMONY TR	81	2	2498402-1 LANCAS
ARSENIC TR	78	3	2498402-1 LANCAS
LEAD TR	77	2	2498402-1 LANCAS
SELENIUM TR	76	2	2498402-1 LANCAS
THALLIUM TR	79	2	2498402-1 LANCAS

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
ANTIMONY TR	< 0.01	MG/L	0	2498402-1 LANCAS
ARSENIC TR	< 0.01	MG/L	0	2498402-1 LANCAS
LEAD TR	< 0.005	MG/L	0	2498402-1 LANCAS
SELENIUM TR	< 0.01	MG/L	0	2498402-1 LANCAS
THALLIUM TR	< 0.02	MG/L	0	2498402-1 LANCAS

Comments:

6010A: (Antimony) Batch matrix spike recovery was outside control limits. Post digestion spike recovery was 103%. Lab control samples met acceptance criteria.
6010A: (Thallium, Arsenic, Selenium, Lead) Batch matrix spike and spike duplicate recoveries were outside control limits. Post digestion spike recoveries were 95%, 97%, 95%, and 95%. Lab control samples met acceptance criteria.

Method Number: 7470A Prep Method: 7470A Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 05220
Batch Number: 1

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1
KIN-F/B-ASH	22APR96	LANCAS 2498400 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
MERCURY	110	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
MERCURY	105	5	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
MERCURY	83	2498400-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
MERCURY	83	1	2498400-1 LANCAS

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
MERCURY	< 0.0002	MG/L	0	2498400-1 LANCAS

Method Number: 8081 Prep Method: 3510B Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 06014
Batch Number: 1

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-F/B-ASH	22APR96	LANCAS 2498400 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
ALDRIN	70	LCS -1 LANCAS
ALPHA BHC	96	LCS -1 LANCAS
BETA BHC	96	LCS -1 LANCAS
DDD	91	LCS -1 LANCAS
DDE	84	LCS -1 LANCAS
DDT	92	LCS -1 LANCAS
DELTA BHC	103	LCS -1 LANCAS
DIELDRIN	88	LCS -1 LANCAS
ENDOSULFAN I	85	LCS -1 LANCAS
ENDOSULFAN II	91	LCS -1 LANCAS
ENDOSULFAN SULFATE	96	LCS -1 LANCAS
ENDRIN	107	LCS -1 LANCAS
ENDRIN ALDEHYDE	91	LCS -1 LANCAS
GAMMA BHC - LINDANE	95	LCS -1 LANCAS
HEPTACHLOR	72	LCS -1 LANCAS
HEPTACHLOR EPOXIDE	90	LCS -1 LANCAS
KEPONE	43	LCS -1 LANCAS
METHOXYCHLOR	116	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ALDRIN	66	6	LCSD -1 LANCAS
ALPHA BHC	93	3	LCSD -1 LANCAS
BETA BHC	94	2	LCSD -1 LANCAS
DDD	94	3	LCSD -1 LANCAS
DDE	79	6	LCSD -1 LANCAS
DDT	92	0	LCSD -1 LANCAS
DELTA BHC	101	2	LCSD -1 LANCAS
DIELDRIN	85	3	LCSD -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ENDOSULFAN I	78	9	LCSD -1 LANCAS
ENDOSULFAN II	90	1	LCSD -1 LANCAS
ENDOSULFAN SULFATE	95	1	LCSD -1 LANCAS
ENDRIN	105	2	LCSD -1 LANCAS
ENDRIN ALDEHYDE	90	1	LCSD -1 LANCAS
GAMMA BHC - LINDANE	95	0	LCSD -1 LANCAS
HEPTACHLOR	70	3	LCSD -1 LANCAS
HEPTACHLOR EPOXIDE	87	3	LCSD -1 LANCAS
KEPONE	40	7	LCSD -1 LANCAS
METHOXYCHLOR	118	2	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
ALDRIN	87	2498400-1 LANCAS
ALPHA BHC	100	2498400-1 LANCAS
BETA BHC	100	2498400-1 LANCAS
DDD	98	2498400-1 LANCAS
DDE	83	2498400-1 LANCAS
DDT	97	2498400-1 LANCAS
DELTA BHC	104	2498400-1 LANCAS
DIELDRIN	69	2498400-1 LANCAS
ENDOSULFAN I	88	2498400-1 LANCAS
ENDOSULFAN II	83	2498400-1 LANCAS
ENDOSULFAN SULFATE	103	2498400-1 LANCAS
ENDRIN	109	2498400-1 LANCAS
ENDRIN ALDEHYDE	89	2498400-1 LANCAS
GAMMA BHC - LINDANE	97	2498400-1 LANCAS
HEPTACHLOR	83	2498400-1 LANCAS
HEPTACHLOR EPOXIDE	87	2498400-1 LANCAS
KEPONE	73	2498400-1 LANCAS
METHOXYCHLOR	118	2498400-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ALDRIN	83	5	2498400-1 LANCAS
ALPHA BHC	101	1	2498400-1 LANCAS
BETA BHC	99	1	2498400-1 LANCAS
DDD	99	1	2498400-1 LANCAS
DDE	79	4	2498400-1 LANCAS
DDT	100	3	2498400-1 LANCAS
DELTA BHC	114	9	2498400-1 LANCAS
DIELDRIN	91	27	2498400-1 LANCAS
ENDOSULFAN I	87	1	2498400-1 LANCAS
ENDOSULFAN II	93	11	2498400-1 LANCAS
ENDOSULFAN SULFATE	108	5	2498400-1 LANCAS
ENDRIN	115	5	2498400-1 LANCAS
ENDRIN ALDEHYDE	93	4	2498400-1 LANCAS
GAMMA BHC - LINDANE	97	1	2498400-1 LANCAS
HEPTACHLOR	87	5	2498400-1 LANCAS
HEPTACHLOR EPOXIDE	94	7	2498400-1 LANCAS
KEPONE	68	7	2498400-1 LANCAS
METHOXYCHLOR	124	4	2498400-1 LANCAS

Comments:

8081: (Methoxychlor) Batch matrix spike duplicate recovery was outside control limits.
Batch matrix spike recovery and lab control samples met acceptance criteria.

Method Number: 8081 Prep Method: 3510B Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 06014
Batch Number: 2

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
ALDRIN	70	LCS -1 LANCAS
ALPHA BHC	96	LCS -1 LANCAS
BETA BHC	96	LCS -1 LANCAS
DDD	91	LCS -1 LANCAS
DDE	84	LCS -1 LANCAS
DDT	92	LCS -1 LANCAS
DELTA BHC	103	LCS -1 LANCAS
DIELDRIN	88	LCS -1 LANCAS
ENDOSULFAN I	85	LCS -1 LANCAS
ENDOSULFAN II	91	LCS -1 LANCAS
ENDOSULFAN SULFATE	96	LCS -1 LANCAS
ENDRIN	107	LCS -1 LANCAS
ENDRIN ALDEHYDE	91	LCS -1 LANCAS
GAMMA BHC - LINDANE	95	LCS -1 LANCAS
HEPTACHLOR	72	LCS -1 LANCAS
HEPTACHLOR EPOXIDE	90	LCS -1 LANCAS
KEPONE	43	LCS -1 LANCAS
METHOXYCHLOR	116	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ALDRIN	66	6	LCSD -1 LANCAS
ALPHA BHC	93	3	LCSD -1 LANCAS
BETA BHC	94	2	LCSD -1 LANCAS
DDD	94	3	LCSD -1 LANCAS
DDE	79	6	LCSD -1 LANCAS
DDT	92	0	LCSD -1 LANCAS
DELTA BHC	101	2	LCSD -1 LANCAS
DIELDRIN	85	3	LCSD -1 LANCAS
ENDOSULFAN I	78	9	LCSD -1 LANCAS
ENDOSULFAN II	90	1	LCSD -1 LANCAS
ENDOSULFAN SULFATE	95	1	LCSD -1 LANCAS
ENDRIN	105	2	LCSD -1 LANCAS
ENDRIN ALDEHYDE	90	1	LCSD -1 LANCAS
GAMMA BHC - LINDANE	95	0	LCSD -1 LANCAS
HEPTACHLOR	70	3	LCSD -1 LANCAS
HEPTACHLOR EPOXIDE	87	3	LCSD -1 LANCAS
KEPONE	40	7	LCSD -1 LANCAS
METHOXYCHLOR	118	2	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
ALDRIN	83	2498402-1 LANCAS
ALPHA BHC	90	2498402-1 LANCAS
BETA BHC	87	2498402-1 LANCAS
DDD	99	2498402-1 LANCAS
DDE	69	2498402-1 LANCAS
DDT	88	2498402-1 LANCAS
DELTA BHC	103	2498402-1 LANCAS
DIELDRIN	79	2498402-1 LANCAS
ENDOSULFAN I	73	2498402-1 LANCAS
ENDOSULFAN II	83	2498402-1 LANCAS
ENDOSULFAN SULFATE	98	2498402-1 LANCAS
ENDRIN	84	2498402-1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
ENDRIN ALDEHYDE	81	2498402-1 LANCAS
GAMMA BHC - LINDANE	84	2498402-1 LANCAS
HEPTACHLOR	84	2498402-1 LANCAS
HEPTACHLOR EPOXIDE	84	2498402-1 LANCAS
KEPONE	67	2498402-1 LANCAS
METHOXYCHLOR	110	2498402-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
ALDRIN	84	0	2498402-1 LANCAS
ALPHA BHC	89	1	2498402-1 LANCAS
BETA BHC	88	1	2498402-1 LANCAS
DDD	93	6	2498402-1 LANCAS
DDE	70	1	2498402-1 LANCAS
DDT	87	1	2498402-1 LANCAS
DELTA BHC	104	1	2498402-1 LANCAS
DIELDRIN	80	1	2498402-1 LANCAS
ENDOSULFAN I	72	1	2498402-1 LANCAS
ENDOSULFAN II	84	1	2498402-1 LANCAS
ENDOSULFAN SULFATE	99	1	2498402-1 LANCAS
ENDRIN	83	1	2498402-1 LANCAS
ENDRIN ALDEHYDE	82	1	2498402-1 LANCAS
GAMMA BHC - LINDANE	83	1	2498402-1 LANCAS
HEPTACHLOR	85	1	2498402-1 LANCAS
HEPTACHLOR EPOXIDE	84	0	2498402-1 LANCAS
KEPONE	65	3	2498402-1 LANCAS
METHOXYCHLOR	112	1	2498402-1 LANCAS

ts:

8081: (DDE) Batch matrix spike and spike duplicate recoveries were outside control limits. Lab control samples met acceptance criteria.

Method Number: 8151 Prep Method: Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 03628
Batch Number: 2

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
2,4,5-T	95	LCS -1 LANCAS
2,4,5-TP	86	LCS -1 LANCAS
2,4-D	100	LCS -1 LANCAS
DINOSEB	54	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
2,4,5-T	93	2	LCSD -1 LANCAS
2,4,5-TP	86	0	LCSD -1 LANCAS
2,4-D	98	2	LCSD -1 LANCAS
DINOSEB	66	20	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
2,4,5-T	50	2498402-1 LANCAS
2,4,5-TP	77	2498402-1 LANCAS
2,4-D	88	2498402-1 LANCAS
DINOSEB	27	2498402-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
2,4,5-T	53	6	2498402-1 LANCAS
2,4,5-TP	82	6	2498402-1 LANCAS
2,4-D	93	6	2498402-1 LANCAS
DINOSEB	57	72	2498402-1 LANCAS

Method Number: 8151 Prep Method: 8151 Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 03628
Batch Number: 1

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-F/B-ASH	22APR96	LANCAS 2498400 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
2,4,5-T	95	LCS -1 LANCAS
2,4,5-TP	86	LCS -1 LANCAS
2,4-D	100	LCS -1 LANCAS
DINOSEB	54	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
2,4,5-T	93	2	LCSD -1 LANCAS
2,4,5-TP	86	0	LCSD -1 LANCAS
2,4-D	98	2	LCSD -1 LANCAS
DINOSEB	66	20	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
2,4,5-T	93	2498400-1 LANCAS
2,4,5-TP	85	2498400-1 LANCAS
2,4-D	96	2498400-1 LANCAS
DINOSEB	49	2498400-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
2,4,5-T	111	18	2498400-1 LANCAS
2,4,5-TP	100	16	2498400-1 LANCAS
2,4-D	118	21	2498400-1 LANCAS
DINOSEB	69	34	2498400-1 LANCAS

Method Number: 8240B Prep Method: Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 027000
Batch Number: 1

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498403 1
KIN-F/B-ASH	22APR96	LANCAS 2498401 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
1,1,1,2-TETRACHLOROETHANE	114	LCS -1 LANCAS
1,1,1-TRICHLOROETHANE	111	LCS -1 LANCAS
1,1,2,2-TETRACHLOROETHANE	104	LCS -1 LANCAS
1,1,2-TRICHLOROETHANE	95	LCS -1 LANCAS
1,1-DICHLOROETHANE	117	LCS -1 LANCAS
1,1-DICHLOROETHENE	123	LCS -1 LANCAS
1,2,3-TRICHLOROPROPANE	102	LCS -1 LANCAS
1,2-DIBROMO-3-CHLOROPROPANE	97	LCS -1 LANCAS
1,2-DIBROMOETHANE	101	LCS -1 LANCAS
1,2-DICHLOROETHANE	117	LCS -1 LANCAS
1,2-DICHLOROPROPANE	101	LCS -1 LANCAS
1,4-DIOXANE	60	LCS -1 LANCAS
2-BUTANONE	83	LCS -1 LANCAS
2-HEXANONE	96	LCS -1 LANCAS
4-METHYL-2-PENTANONE	93	LCS -1 LANCAS
ACETONE	99	LCS -1 LANCAS
ACROLEIN	79	LCS -1 LANCAS
ACRYLONITRILE	90	LCS -1 LANCAS
ALLYL CHLORIDE	113	LCS -1 LANCAS
BENZENE	104	LCS -1 LANCAS
BROMODICHLOROMETHANE	104	LCS -1 LANCAS
BROMOFORM	102	LCS -1 LANCAS
BROMOMETHANE	107	LCS -1 LANCAS
CARBON DISULFIDE	132	LCS -1 LANCAS
CARBON TETRACHLORIDE	116	LCS -1 LANCAS
CHLOROBENZENE	107	LCS -1 LANCAS
CHLOROETHANE	112	LCS -1 LANCAS
CHLOROFORM	116	LCS -1 LANCAS
CHLOROMETHANE	94	LCS -1 LANCAS
CIS-1,2-DICHLOROETHENE	111	LCS -1 LANCAS
CIS-1,3-DICHLOROPROPENE	100	LCS -1 LANCAS
DIBROMOCHLOROMETHANE	102	LCS -1 LANCAS
DIBROMOMETHANE	109	LCS -1 LANCAS
DICHLORODIFLUOROMETHANE	84	LCS -1 LANCAS
ETHYL METHACRYLATE	99	LCS -1 LANCAS
ETHYLBENZENE	110	LCS -1 LANCAS
ISOBUTYL ALCOHOL	87	LCS -1 LANCAS
METHACRYLONITRILE	104	LCS -1 LANCAS
METHYL IODIDE	113	LCS -1 LANCAS
METHYL METHACRYLATE	91	LCS -1 LANCAS
METHYLENE CHLORIDE	105	LCS -1 LANCAS
PENTACHLOROETHANE	114	LCS -1 LANCAS
PROPIONITRILE	99	LCS -1 LANCAS
STYRENE	110	LCS -1 LANCAS
TETRACHLOROETHENE	122	LCS -1 LANCAS
TOLUENE	109	LCS -1 LANCAS
TRANS-1,2-DICHLOROETHENE	117	LCS -1 LANCAS
TRANS-1,3-DICHLOROPROPENE	102	LCS -1 LANCAS
TRANS-1,4-DICHLORO-2-BUTENE	125	LCS -1 LANCAS
TRICHLOROETHENE	103	LCS -1 LANCAS
TRICHLOROFLUOROMETHANE	125	LCS -1 LANCAS
VINYL ACETATE	96	LCS -1 LANCAS
VINYL CHLORIDE	104	LCS -1 LANCAS
XYLENE (TOTAL)	112	LCS -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
1,1,1,2-TETRACHLOROETHANE	112	2493487-1 LANCAS
1,1,1-TRICHLOROETHANE	110	2493487-1 LANCAS
1,1,2,2-TETRACHLOROETHANE	100	2493487-1 LANCAS
1,1,2-TRICHLOROETHANE	95	2493487-1 LANCAS
1,1-DICHLOROETHANE	119	2493487-1 LANCAS
1,1-DICHLOROETHENE	124	2493487-1 LANCAS
1,2,3-TRICHLOROPROPANE	98	2493487-1 LANCAS
1,2-DIBROMO-3-CHLOROPROPANE	80	2493487-1 LANCAS
1,2-DIBROMOETHANE	100	2493487-1 LANCAS
1,2-DICHLOROETHANE	116	2493487-1 LANCAS
1,2-DICHLOROPROPANE	104	2493487-1 LANCAS
1,4-DIOXANE	63	2493487-1 LANCAS
2-BUTANONE	79	2493487-1 LANCAS
2-CHLORO-1,3-BUTADIENE	83	2493487-1 LANCAS
2-HEXANONE	89	2493487-1 LANCAS
4-METHYL-2-PENTANONE	89	2493487-1 LANCAS
ACETONE	90	2493487-1 LANCAS
ACETONITRILE	101	2493487-1 LANCAS
ACROLEIN	89	2493487-1 LANCAS
ACRYLONITRILE	94	2493487-1 LANCAS
ALLYL CHLORIDE	116	2493487-1 LANCAS
BENZENE	105	2493487-1 LANCAS
BROMODICHLOROMETHANE	103	2493487-1 LANCAS
BROMOFORM	95	2493487-1 LANCAS
BROMOMETHANE	105	2493487-1 LANCAS
CARBON DISULFIDE	130	2493487-1 LANCAS
CARBON TETRACHLORIDE	115	2493487-1 LANCAS
CHLOROBENZENE	108	2493487-1 LANCAS
CHLOROETHANE	108	2493487-1 LANCAS
CHLOROFORM	116	2493487-1 LANCAS
CHLOROMETHANE	92	2493487-1 LANCAS
CIS-1,2-DICHLOROETHENE	114	2493487-1 LANCAS
CIS-1,3-DICHLOROPROPENE	99	2493487-1 LANCAS
DIBROMOCHLOROMETHANE	99	2493487-1 LANCAS
DIBROMOMETHANE	98	2493487-1 LANCAS
DICHLORODIFLUOROMETHANE	79	2493487-1 LANCAS
ETHYL METHACRYLATE	94	2493487-1 LANCAS
ETHYLBENZENE	112	2493487-1 LANCAS
ISOBUTYL ALCOHOL	83	2493487-1 LANCAS
METHACRYLONITRILE	99	2493487-1 LANCAS
METHYL IODIDE	114	2493487-1 LANCAS
METHYL METHACRYLATE	86	2493487-1 LANCAS
METHYLENE CHLORIDE	111	2493487-1 LANCAS
PENTACHLOROETHANE	107	2493487-1 LANCAS
PROPIONITRILE	97	2493487-1 LANCAS
STYRENE	109	2493487-1 LANCAS
TETRACHLOROETHENE	122	2493487-1 LANCAS
TOLUENE	111	2493487-1 LANCAS
TRANS-1,2-DICHLOROETHENE	119	2493487-1 LANCAS
TRANS-1,3-DICHLOROPROPENE	99	2493487-1 LANCAS
TRANS-1,4-DICHLORO-2-BUTENE	117	2493487-1 LANCAS
TRICHLOROETHENE	106	2493487-1 LANCAS
TRICHLOROFLUOROMETHANE	125	2493487-1 LANCAS
VINYL ACETATE	92	2493487-1 LANCAS
VINYL CHLORIDE	104	2493487-1 LANCAS
XYLENE (TOTAL)	114	2493487-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
1,1,1,2-TETRACHLOROETHANE	114	1	2493487-1 LANCAS
1,1,1-TRICHLOROETHANE	111	0	2493487-1 LANCAS
1,1,2,2-TETRACHLOROETHANE	107	7	2493487-1 LANCAS
1,1,2-TRICHLOROETHANE	98	3	2493487-1 LANCAS
1,1-DICHLOROETHANE	115	3	2493487-1 LANCAS
1,1-DICHLOROETHENE	124	0	2493487-1 LANCAS
1,2,3-TRICHLOROPROPANE	105	7	2493487-1 LANCAS
1,2-DIBROMO-3-CHLOROPROPANE	99	20	2493487-1 LANCAS
1,2-DIBROMOETHANE	104	4	2493487-1 LANCAS
1,2-DICHLOROETHANE	118	2	2493487-1 LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
1,2-DICHLOROPROPANE	103	2	2493487-1 LANCAS
1,4-DIOXANE	70	11	2493487-1 LANCAS
2-BUTANONE	84	6	2493487-1 LANCAS
2-CHLORO-1,3-BUTADIENE	85	2	2493487-1 LANCAS
2-HEXANONE	97	9	2493487-1 LANCAS
4-METHYL-2-PENTANONE	94	5	2493487-1 LANCAS
ACETONE	96	7	2493487-1 LANCAS
ACETONITRILE	122	18	2493487-1 LANCAS
ACROLEIN	70	24	2493487-1 LANCAS
ACRYLONITRILE	93	1	2493487-1 LANCAS
ALLYL CHLORIDE	112	3	2493487-1 LANCAS
BENZENE	103	2	2493487-1 LANCAS
BROMODICHLOROMETHANE	104	2	2493487-1 LANCAS
BROMOFORM	101	6	2493487-1 LANCAS
BROMOMETHANE	100	5	2493487-1 LANCAS
CARBON DISULFIDE	126	2	2493487-1 LANCAS
CARBON TETRACHLORIDE	116	1	2493487-1 LANCAS
CHLOROBENZENE	107	1	2493487-1 LANCAS
CHLOROETHANE	101	7	2493487-1 LANCAS
CHLOROFORM	117	1	2493487-1 LANCAS
CHLOROMETHANE	90	2	2493487-1 LANCAS
CIS-1,2-DICHLOROETHENE	111	2	2493487-1 LANCAS
CIS-1,3-DICHLOROPROPENE	101	3	2493487-1 LANCAS
DIBROMOCHLOROMETHANE	101	2	2493487-1 LANCAS
DIBROMOMETHANE	100	2	2493487-1 LANCAS
DICHLORODIFLUOROMETHANE	79	1	2493487-1 LANCAS
ETHYL METHACRYLATE	95	1	2493487-1 LANCAS
ETHYLBENZENE	112	0	2493487-1 LANCAS
ISOBUTYL ALCOHOL	89	8	2493487-1 LANCAS
METHACRYLONITRILE	103	4	2493487-1 LANCAS
METHYL IODIDE	112	2	2493487-1 LANCAS
METHYL METHACRYLATE	88	2	2493487-1 LANCAS
METHYLENE CHLORIDE	109	2	2493487-1 LANCAS
PENTACHLOROETHANE	109	2	2493487-1 LANCAS
PROPIONITRILE	99	1	2493487-1 LANCAS
STYRENE	109	0	2493487-1 LANCAS
TETRACHLOROETHENE	120	2	2493487-1 LANCAS
TOLUENE	111	0	2493487-1 LANCAS
TRANS-1,2-DICHLOROETHENE	117	2	2493487-1 LANCAS
TRANS-1,3-DICHLOROPROPENE	100	1	2493487-1 LANCAS
TRANS-1,4-DICHLORO-2-BUTENE	122	4	2493487-1 LANCAS
TRICHLOROETHENE	105	1	2493487-1 LANCAS
TRICHLOROFLUOROMETHANE	123	2	2493487-1 LANCAS
VINYL ACETATE	92	1	2493487-1 LANCAS
VINYL CHLORIDE	101	3	2493487-1 LANCAS
XYLENE (TOTAL)	111	3	2493487-1 LANCAS

Method Number: 8270B Prep Method: 3510B Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 033010
Batch Number: 2

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
1,2,4-TRICHLOROBENZENE	83	LCS -1 LANCAS
1,2-DICHLOROBENZENE	85	LCS -1 LANCAS
1,3-DICHLOROBENZENE	84	LCS -1 LANCAS
1,4-DICHLOROBENZENE	83	LCS -1 LANCAS
2,4,5-TRICHLOROPHENOL	97	LCS -1 LANCAS
2,4,6-TRICHLOROPHENOL	92	LCS -1 LANCAS
2,4-DICHLOROPHENOL	94	LCS -1 LANCAS
2,4-DIMETHYLPHENOL	71	LCS -1 LANCAS

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
2,4-DINITROPHENOL	61	LCS -1 LANCAS
2,4-DINITROTOLUENE	95	LCS -1 LANCAS
2,6-DINITROTOLUENE	90	LCS -1 LANCAS
2-CHLORONAPHTHALENE	96	LCS -1 LANCAS
2-CHLOROPHENOL	96	LCS -1 LANCAS
2-METHYLNAPHTHALENE	90	LCS -1 LANCAS
2-METHYLPHENOL	94	LCS -1 LANCAS
2-NITROANILINE	97	LCS -1 LANCAS
2-NITROPHENOL	100	LCS -1 LANCAS
3 OR 4-METHYLPHENOL	90	LCS -1 LANCAS
3,3'-DICHLOROBENZIDINE	78	LCS -1 LANCAS
3-NITROANILINE	83	LCS -1 LANCAS
4,6-DINITRO-2-METHYLPHENOL	77	LCS -1 LANCAS
4-BROMOPHENYL PHENYL ETHER	88	LCS -1 LANCAS
4-CHLORO-3-METHYLPHENOL	99	LCS -1 LANCAS
4-CHLOROANILINE	72	LCS -1 LANCAS
4-CHLOROPHENYL PHENYL ETHER	96	LCS -1 LANCAS
4-NITROANILINE	87	LCS -1 LANCAS
4-NITROPHENOL	38	LCS -1 LANCAS
ACENAPHTHENE	90	LCS -1 LANCAS
ACENAPHTHYLENE	93	LCS -1 LANCAS
ANILINE	75	LCS -1 LANCAS
ANTHRACENE	92	LCS -1 LANCAS
BENZO (A) ANTHRACENE	95	LCS -1 LANCAS
BENZO (A) PYRENE	84	LCS -1 LANCAS
BENZO (B) FLUORANTHENE	95	LCS -1 LANCAS
BENZO (GHI) PERYLENE	92	LCS -1 LANCAS
BENZO (K) FLUORANTHENE	92	LCS -1 LANCAS
BENZYL ALCOHOL	98	LCS -1 LANCAS
BIS (2-CHLOROETHOXY) METHANE	93	LCS -1 LANCAS
BIS (2-CHLOROETHYL) ETHER	96	LCS -1 LANCAS
BIS (2-ETHYLHEXYL) PHTHALATE	112	LCS -1 LANCAS
BIS(2CHLOROISOPROPYL)ETHER	75	LCS -1 LANCAS
BUTYL BENZYL PHTHALATE	86	LCS -1 LANCAS
CHRYSENE	94	LCS -1 LANCAS
DI-N-BUTYL PHTHALATE	87	LCS -1 LANCAS
DI-N-OCTYL PHTHALATE	95	LCS -1 LANCAS
DIBENZ (A,H) ANTHRACENE	97	LCS -1 LANCAS
DIBENZOFURAN	92	LCS -1 LANCAS
DIETHYL PHTHALATE	74	LCS -1 LANCAS
DIMETHYL PHTHALATE	42	LCS -1 LANCAS
FLUORANTHENE	91	LCS -1 LANCAS
FLUORENE	96	LCS -1 LANCAS
HEXACHLOROBENZENE	104	LCS -1 LANCAS
HEXACHLOROBUTADIENE	57	LCS -1 LANCAS
HEXACHLOROCYCLOPENTADIENE	45	LCS -1 LANCAS
HEXACHLOROETHANE	72	LCS -1 LANCAS
INDENO (1,2,3-CD) PYRENE	95	LCS -1 LANCAS
ISOPHORONE	102	LCS -1 LANCAS
N-NITROSODI-N-PROPYLAMINE	92	LCS -1 LANCAS
N-NITROSODIMETHYLAMINE	69	LCS -1 LANCAS
N-NITROSODIPHENYLAMINE	86	LCS -1 LANCAS
NAPHTHALENE	89	LCS -1 LANCAS
NITROBENZENE	99	LCS -1 LANCAS
PENTACHLOROPHENOL	80	LCS -1 LANCAS
PHENANTHRENE	98	LCS -1 LANCAS
PHENOL	54	LCS -1 LANCAS
PYRENE	103	LCS -1 LANCAS
PYRIDINE	71	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
1,2,4-TRICHLOROBENZENE	85	2	LCSD -1 LANCAS
1,2-DICHLOROBENZENE	85	1	LCSD -1 LANCAS
1,3-DICHLOROBENZENE	84	1	LCSD -1 LANCAS
1,4-DICHLOROBENZENE	85	3	LCSD -1 LANCAS
2,4,5-TRICHLOROPHENOL	99	2	LCSD -1 LANCAS
2,4,6-TRICHLOROPHENOL	97	5	LCSD -1 LANCAS
2,4-DICHLOROPHENOL	95	1	LCSD -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
2,4-DIMETHYLPHENOL	67	5	LCSD -1 LANCAS
2,4-DINITROPHENOL	80	27	LCSD -1 LANCAS
2,4-DINITROTOLUENE	96	1	LCSD -1 LANCAS
2,6-DINITROTOLUENE	90	0	LCSD -1 LANCAS
2-CHLORONAPHTHALENE	96	0	LCSD -1 LANCAS
2-CHLOROPHENOL	98	1	LCSD -1 LANCAS
2-METHYLNAPHTHALENE	96	6	LCSD -1 LANCAS
2-METHYLPHENOL	94	0	LCSD -1 LANCAS
2-NITROANILINE	97	0	LCSD -1 LANCAS
2-NITROPHENOL	100	1	LCSD -1 LANCAS
3 OR 4-METHYLPHENOL	93	3	LCSD -1 LANCAS
3,3'-DICHLOROBENZIDINE	78	1	LCSD -1 LANCAS
3-NITROANILINE	86	4	LCSD -1 LANCAS
4,6-DINITRO-2-METHYLPHENOL	83	8	LCSD -1 LANCAS
4-BROMOPHENYL PHENYL ETHER	88	0	LCSD -1 LANCAS
4-CHLORO-3-METHYLPHENOL	105	5	LCSD -1 LANCAS
4-CHLOROANILINE	77	6	LCSD -1 LANCAS
4-CHLOROPHENYL PHENYL ETHER	97	1	LCSD -1 LANCAS
4-NITROANILINE	90	3	LCSD -1 LANCAS
4-NITROPHENOL	42	8	LCSD -1 LANCAS
ACENAPHTHENE	90	0	LCSD -1 LANCAS
ACENAPHTHYLENE	94	1	LCSD -1 LANCAS
ANILINE	77	2	LCSD -1 LANCAS
ANTHRACENE	92	0	LCSD -1 LANCAS
BENZO (A) ANTHRACENE	96	1	LCSD -1 LANCAS
BENZO (A) PYRENE	83	1	LCSD -1 LANCAS
BENZO (B) FLUORANTHENE	93	2	LCSD -1 LANCAS
BENZO (GHI) PERYLENE	95	3	LCSD -1 LANCAS
BENZO (K) FLUORANTHENE	92	0	LCSD -1 LANCAS
BENZYL ALCOHOL	101	3	LCSD -1 LANCAS
BIS (2-CHLOROETHOXY) METHANE	94	1	LCSD -1 LANCAS
BIS (2-CHLOROETHYL) ETHER	98	2	LCSD -1 LANCAS
BIS (2-ETHYLHEXYL) PHTHALATE	112	0	LCSD -1 LANCAS
BIS(2CHLOROISOPROPYL)ETHER	76	2	LCSD -1 LANCAS
BUTYL BENZYL PHTHALATE	85	2	LCSD -1 LANCAS
CHRYSENE	95	1	LCSD -1 LANCAS
DI-N-BUTYL PHTHALATE	90	3	LCSD -1 LANCAS
DI-N-OCTYL PHTHALATE	98	4	LCSD -1 LANCAS
DIBENZ (A,H) ANTHRACENE	100	2	LCSD -1 LANCAS
DIBENZOFURAN	93	1	LCSD -1 LANCAS
DIETHYL PHTHALATE	71	4	LCSD -1 LANCAS
DIMETHYL PHTHALATE	35	18	LCSD -1 LANCAS
FLUORANTHENE	96	6	LCSD -1 LANCAS
FLUORENE	98	1	LCSD -1 LANCAS
HEXACHLOROBENZENE	104	0	LCSD -1 LANCAS
HEXACHLOROBUTADIENE	59	4	LCSD -1 LANCAS
HEXACHLOROCYCLOPENTADIENE	49	10	LCSD -1 LANCAS
HEXACHLOROETHANE	74	2	LCSD -1 LANCAS
INDENO (1,2,3-CD) PYRENE	95	1	LCSD -1 LANCAS
ISOPHORONE	100	2	LCSD -1 LANCAS
N-NITROSODI-N-PROPYLAMINE	95	3	LCSD -1 LANCAS
N-NITROSODIMETHYLAMINE	67	3	LCSD -1 LANCAS
N-NITROSODIPHENYLAMINE	87	1	LCSD -1 LANCAS
NAPHTHALENE	91	2	LCSD -1 LANCAS
NITROBENZENE	96	3	LCSD -1 LANCAS
PENTACHLOROPHENOL	79	1	LCSD -1 LANCAS
PHENANTHRENE	99	1	LCSD -1 LANCAS
PHENOL	54	0	LCSD -1 LANCAS
PYRENE	100	3	LCSD -1 LANCAS
PYRIDINE	71	0	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
1,2,4-TRICHLOROBENZENE	87	2498402-1 LANCAS
1,2-DICHLOROBENZENE	87	2498402-1 LANCAS
1,3-DICHLOROBENZENE	87	2498402-1 LANCAS
1,4-DICHLOROBENZENE	88	2498402-1 LANCAS
2,4,5-TRICHLOROPHENOL	92	2498402-1 LANCAS
2,4,6-TRICHLOROPHENOL	89	2498402-1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID	
2,4-DICHLOROPHENOL	93	2498402-1	LANCAS
2,4-DIMETHYLPHENOL	67	2498402-1	LANCAS
2,4-DINITROPHENOL	48	2498402-1	LANCAS
2,4-DINITROTOLUENE	98	2498402-1	LANCAS
2,6-DINITROTOLUENE	88	2498402-1	LANCAS
2-CHLORONAPHTHALENE	90	2498402-1	LANCAS
2-CHLOROPHENOL	97	2498402-1	LANCAS
2-METHYLNAPHTHALENE	95	2498402-1	LANCAS
2-METHYLPHENOL	93	2498402-1	LANCAS
2-NITROANILINE	93	2498402-1	LANCAS
2-NITROPHENOL	98	2498402-1	LANCAS
3 OR 4-METHYLPHENOL	176	2498402-1	LANCAS
3,3'-DICHLOROBENZIDINE	81	2498402-1	LANCAS
3-NITROANILINE	82	2498402-1	LANCAS
4,6-DINITRO-2-METHYLPHENOL	76	2498402-1	LANCAS
4-BROMOPHENYL PHENYL ETHER	88	2498402-1	LANCAS
4-CHLORO-3-METHYLPHENOL	102	2498402-1	LANCAS
4-CHLOROANILINE	78	2498402-1	LANCAS
4-CHLOROPHENYL PHENYL ETHER	100	2498402-1	LANCAS
4-NITROANILINE	93	2498402-1	LANCAS
4-NITROPHENOL	40	2498402-1	LANCAS
ACENAPHTHENE	90	2498402-1	LANCAS
ACENAPHTHYLENE	90	2498402-1	LANCAS
ANILINE	75	2498402-1	LANCAS
ANTHRACENE	90	2498402-1	LANCAS
BENZO (A) ANTHRACENE	91	2498402-1	LANCAS
BENZO (A) PYRENE	81	2498402-1	LANCAS
BENZO (B) FLUORANTHENE	89	2498402-1	LANCAS
BENZO (GHI) PERYLENE	92	2498402-1	LANCAS
BENZO (K) FLUORANTHENE	91	2498402-1	LANCAS
BENZYL ALCOHOL	105	2498402-1	LANCAS
BIS (2-CHLOROETHOXY) METHANE	95	2498402-1	LANCAS
BIS (2-CHLOROETHYL) ETHER	98	2498402-1	LANCAS
BIS (2-ETHYLHEXYL) PHTHALATE	102	2498402-1	LANCAS
BIS(2CHLOROISOPROPYL)ETHER	76	2498402-1	LANCAS
BUTYL BENZYL PHTHALATE	59	2498402-1	LANCAS
CHRYSENE	90	2498402-1	LANCAS
DI-N-BUTYL PHTHALATE	38	2498402-1	LANCAS
DI-N-OCTYL PHTHALATE	88	2498402-1	LANCAS
DIBENZ (A,H) ANTHRACENE	95	2498402-1	LANCAS
DIBENZOFURAN	93	2498402-1	LANCAS
DIETHYL PHTHALATE	63	2498402-1	LANCAS
DIMETHYL PHTHALATE	21	2498402-1	LANCAS
FLUORANTHENE	97	2498402-1	LANCAS
FLUORENE	99	2498402-1	LANCAS
HEXACHLOROBENZENE	104	2498402-1	LANCAS
HEXACHLOROBUTADIENE	74	2498402-1	LANCAS
HEXACHLOROCYCLOPENTADIENE	52	2498402-1	LANCAS
HEXACHLOROETHANE	82	2498402-1	LANCAS
INDENO (1,2,3-CD) PYRENE	93	2498402-1	LANCAS
ISOPHORONE	101	2498402-1	LANCAS
N-NITROSODI-N-PROPYLAMINE	91	2498402-1	LANCAS
N-NITROSODIMETHYLAMINE	70	2498402-1	LANCAS
N-NITROSODIPHENYLAMINE	84	2498402-1	LANCAS
NAPHTHALENE	91	2498402-1	LANCAS
NITROBENZENE	95	2498402-1	LANCAS
PENTACHLOROPHENOL	74	2498402-1	LANCAS
PHENANTHRENE	96	2498402-1	LANCAS
PHENOL	56	2498402-1	LANCAS
PYRENE	94	2498402-1	LANCAS
PYRIDINE	75	2498402-1	LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
1,2,4-TRICHLOROBENZENE	70	22	2498402-1	LANCAS
1,2-DICHLOROBENZENE	71	21	2498402-1	LANCAS
1,3-DICHLOROBENZENE	72	19	2498402-1	LANCAS
1,4-DICHLOROBENZENE	72	20	2498402-1	LANCAS
2,4,5-TRICHLOROPHENOL	94	2	2498402-1	LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
2,4,6-TRICHLOROPHENOL	92	3	2498402-1	LANCAS
2,4-DICHLOROPHENOL	90	3	2498402-1	LANCAS
2,4-DIMETHYLPHENOL	64	5	2498402-1	LANCAS
2,4-DINITROPHENOL	34	35	2498402-1	LANCAS
2,4-DINITROTOLUENE	80	20	2498402-1	LANCAS
2,6-DINITROTOLUENE	76	14	2498402-1	LANCAS
2-CHLORONAPHTHALENE	78	15	2498402-1	LANCAS
2-CHLOROPHENOL	93	4	2498402-1	LANCAS
2-METHYLNAPHTHALENE	75	24	2498402-1	LANCAS
2-METHYLPHENOL	90	4	2498402-1	LANCAS
2-NITROANILINE	84	11	2498402-1	LANCAS
2-NITROPHENOL	95	3	2498402-1	LANCAS
3 OR 4-METHYLPHENOL	206	16	2498402-1	LANCAS
3,3'-DICHLOROBENZIDINE	74	9	2498402-1	LANCAS
3-NITROANILINE	80	2	2498402-1	LANCAS
4,6-DINITRO-2-METHYLPHENOL	71	7	2498402-1	LANCAS
4-BROMOPHENYL PHENYL ETHER	70	22	2498402-1	LANCAS
4-CHLORO-3-METHYLPHENOL	97	6	2498402-1	LANCAS
4-CHLOROANILINE	72	7	2498402-1	LANCAS
4-CHLOROPHENYL PHENYL ETHER	80	22	2498402-1	LANCAS
4-NITROANILINE	80	16	2498402-1	LANCAS
4-NITROPHENOL	41	1	2498402-1	LANCAS
ACENAPHTHENE	74	20	2498402-1	LANCAS
ACENAPHTHYLENE	77	15	2498402-1	LANCAS
ANILINE	68	10	2498402-1	LANCAS
ANTHRACENE	74	19	2498402-1	LANCAS
BENZO (A) ANTHRACENE	76	18	2498402-1	LANCAS
BENZO (A) PYRENE	68	18	2498402-1	LANCAS
BENZO (B) FLUORANTHENE	74	18	2498402-1	LANCAS
BENZO (GHI) PERYLENE	81	13	2498402-1	LANCAS
BENZO (K) FLUORANTHENE	77	17	2498402-1	LANCAS
BENZYL ALCOHOL	96	8	2498402-1	LANCAS
BIS (2-CHLOROETHOXY) METHANE	77	21	2498402-1	LANCAS
BIS (2-CHLOROETHYL) ETHER	81	20	2498402-1	LANCAS
BIS (2-ETHYLHEXYL) PHTHALATE	86	17	2498402-1	LANCAS
BIS(2CHLOROISOPROPYL)ETHER	63	19	2498402-1	LANCAS
BUTYL BENZYL PHTHALATE	48	20	2498402-1	LANCAS
CHRYSENE	76	18	2498402-1	LANCAS
DI-N-BUTYL PHTHALATE	15	20	2498402-1	LANCAS
DI-N-OCTYL PHTHALATE	77	13	2498402-1	LANCAS
DIBENZ (A,H) ANTHRACENE	83	13	2498402-1	LANCAS
DIBENZOFURAN	75	22	2498402-1	LANCAS
DIETHYL PHTHALATE	49	25	2498402-1	LANCAS
DIMETHYL PHTHALATE	17	18	2498402-1	LANCAS
FLUORANTHENE	80	19	2498402-1	LANCAS
FLUORENE	79	22	2498402-1	LANCAS
HEXACHLOROBENZENE	82	24	2498402-1	LANCAS
HEXACHLOROBUTADIENE	58	23	2498402-1	LANCAS
HEXACHLOROCYCLOPENTADIENE	46	12	2498402-1	LANCAS
HEXACHLOROETHANE	66	21	2498402-1	LANCAS
INDENO (1,2,3-CD) PYRENE	82	13	2498402-1	LANCAS
ISOPHORONE	83	20	2498402-1	LANCAS
N-NITROSODI-N-PROPYLAMINE	76	19	2498402-1	LANCAS
N-NITROSODIMETHYLAMINE	64	8	2498402-1	LANCAS
N-NITROSODIPHENYLAMINE	67	21	2498402-1	LANCAS
NAPHTHALENE	73	22	2498402-1	LANCAS
NITROBENZENE	79	18	2498402-1	LANCAS
PENTACHLOROPHENOL	66	11	2498402-1	LANCAS
PHENANTHRENE	80	19	2498402-1	LANCAS
PHENOL	55	3	2498402-1	LANCAS
PYRENE	75	22	2498402-1	LANCAS
PYRIDINE	65	15	2498402-1	LANCAS

mments:

8270B: Benzyl alcohol was detected in the method blank at 2.0 ug/l. The blank value was not subtracted from the results.

Method Number: 8270B Prep Method: 3510B Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 033010
Batch Number: 4

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-F/B-ASH	22APR96	LANCAS 2498400 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
1,2,4-TRICHLOROBENZENE	83	LCS -1 LANCAS
1,2-DICHLOROBENZENE	82	LCS -1 LANCAS
1,3-DICHLOROBENZENE	80	LCS -1 LANCAS
1,4-DICHLOROBENZENE	81	LCS -1 LANCAS
2,4,5-TRICHLOROPHENOL	97	LCS -1 LANCAS
2,4,6-TRICHLOROPHENOL	98	LCS -1 LANCAS
2,4-DICHLOROPHENOL	92	LCS -1 LANCAS
2,4-DIMETHYLPHENOL	62	LCS -1 LANCAS
2,4-DINITROPHENOL	87	LCS -1 LANCAS
2,4-DINITROTOLUENE	98	LCS -1 LANCAS
2,6-DINITROTOLUENE	91	LCS -1 LANCAS
2-CHLORONAPHTHALENE	96	LCS -1 LANCAS
2-CHLOROPHENOL	92	LCS -1 LANCAS
2-METHYLNAPHTHALENE	90	LCS -1 LANCAS
2-METHYLPHENOL	87	LCS -1 LANCAS
2-NITROANILINE	98	LCS -1 LANCAS
2-NITROPHENOL	97	LCS -1 LANCAS
3 OR 4-METHYLPHENOL	83	LCS -1 LANCAS
3,3'-DICHLOROBENZIDINE	79	LCS -1 LANCAS
3-NITROANILINE	80	LCS -1 LANCAS
4,6-DINITRO-2-METHYLPHENOL	85	LCS -1 LANCAS
4-BROMOPHENYL PHENYL ETHER	89	LCS -1 LANCAS
4-CHLORO-3-METHYLPHENOL	95	LCS -1 LANCAS
4-CHLOROANILINE	71	LCS -1 LANCAS
4-CHLOROPHENYL PHENYL ETHER	100	LCS -1 LANCAS
4-NITROANILINE	91	LCS -1 LANCAS
4-NITROPHENOL	40	LCS -1 LANCAS
ACENAPHTHENE	91	LCS -1 LANCAS
ACENAPHTHYLENE	94	LCS -1 LANCAS
ANILINE	70	LCS -1 LANCAS
ANTHRACENE	90	LCS -1 LANCAS
BENZO (A) ANTHRACENE	93	LCS -1 LANCAS
BENZO (A) PYRENE	82	LCS -1 LANCAS
BENZO (B) FLUORANTHENE	89	LCS -1 LANCAS
BENZO (GHI) PERYLENE	94	LCS -1 LANCAS
BENZO (K) FLUORANTHENE	95	LCS -1 LANCAS
BENZYL ALCOHOL	91	LCS -1 LANCAS
BIS (2-CHLOROETHOXY) METHANE	93	LCS -1 LANCAS
BIS (2-CHLOROETHYL) ETHER	94	LCS -1 LANCAS
BIS (2-ETHYLHEXYL) PHTHALATE	108	LCS -1 LANCAS
BIS(2CHLOROISOPROPYL)ETHER	75	LCS -1 LANCAS
BUTYL BENZYL PHTHALATE	87	LCS -1 LANCAS
CHRYSENE	92	LCS -1 LANCAS
DI-N-BUTYL PHTHALATE	88	LCS -1 LANCAS
DI-N-OCTYL PHTHALATE	90	LCS -1 LANCAS
DIBENZ (A,H) ANTHRACENE	99	LCS -1 LANCAS
DIBENZOFURAN	94	LCS -1 LANCAS
DIETHYL PHTHALATE	77	LCS -1 LANCAS
DIMETHYL PHTHALATE	47	LCS -1 LANCAS
FLUORANTHENE	93	LCS -1 LANCAS
FLUORENE	99	LCS -1 LANCAS
HEXACHLOROBENZENE	106	LCS -1 LANCAS
HEXACHLOROBUTADIENE	52	LCS -1 LANCAS
HEXACHLOROCYCLOPENTADIENE	48	LCS -1 LANCAS
HEXACHLOROETHANE	63	LCS -1 LANCAS
INDENO (1,2,3-CD) PYRENE	96	LCS -1 LANCAS
ISOPHORONE	98	LCS -1 LANCAS
N-NITROSODI-N-PROPYLAMINE	89	LCS -1 LANCAS
N-NITROSODIMETHYLAMINE	63	LCS -1 LANCAS
N-NITROSODIPHENYLAMINE	85	LCS -1 LANCAS

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
NAPHTHALENE	90	LCS -1 LANCAS
NITROBENZENE	94	LCS -1 LANCAS
PENTACHLOROPHENOL	84	LCS -1 LANCAS
PHENANTHRENE	97	LCS -1 LANCAS
PHENOL	49	LCS -1 LANCAS
PYRENE	101	LCS -1 LANCAS
PYRIDINE	69	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
1,2,4-TRICHLOROBENZENE	85	2	LCSD -1 LANCAS
1,2-DICHLOROBENZENE	84	2	LCSD -1 LANCAS
1,3-DICHLOROBENZENE	84	5	LCSD -1 LANCAS
1,4-DICHLOROBENZENE	86	5	LCSD -1 LANCAS
2,4,5-TRICHLOROPHENOL	102	5	LCSD -1 LANCAS
2,4,6-TRICHLOROPHENOL	100	3	LCSD -1 LANCAS
2,4-DICHLOROPHENOL	96	4	LCSD -1 LANCAS
2,4-DIMETHYLPHENOL	65	4	LCSD -1 LANCAS
2,4-DINITROPHENOL	91	4	LCSD -1 LANCAS
2,4-DINITROTOLUENE	100	2	LCSD -1 LANCAS
2,6-DINITROTOLUENE	93	2	LCSD -1 LANCAS
2-CHLORONAPHTHALENE	96	0	LCSD -1 LANCAS
2-CHLOROPHENOL	97	4	LCSD -1 LANCAS
2-METHYLNAPHTHALENE	92	2	LCSD -1 LANCAS
2-METHYLPHENOL	89	2	LCSD -1 LANCAS
2-NITROANILINE	100	2	LCSD -1 LANCAS
2-NITROPHENOL	101	4	LCSD -1 LANCAS
3 OR 4-METHYLPHENOL	86	4	LCSD -1 LANCAS
3,3'-DICHLOROBENZIDINE	79	0	LCSD -1 LANCAS
3-NITROANILINE	90	12	LCSD -1 LANCAS
4,6-DINITRO-2-METHYLPHENOL	90	5	LCSD -1 LANCAS
4-BROMOPHENYL PHENYL ETHER	89	0	LCSD -1 LANCAS
4-CHLORO-3-METHYLPHENOL	101	6	LCSD -1 LANCAS
4-CHLOROANILINE	78	9	LCSD -1 LANCAS
4-CHLOROPHENYL PHENYL ETHER	104	5	LCSD -1 LANCAS
4-NITROANILINE	105	14	LCSD -1 LANCAS
4-NITROPHENOL	44	10	LCSD -1 LANCAS
ACENAPHTHENE	92	1	LCSD -1 LANCAS
ACENAPHTHYLENE	97	3	LCSD -1 LANCAS
ANILINE	75	6	LCSD -1 LANCAS
ANTHRACENE	92	1	LCSD -1 LANCAS
BENZO (A) ANTHRACENE	94	0	LCSD -1 LANCAS
BENZO (A) PYRENE	83	2	LCSD -1 LANCAS
BENZO (B) FLUORANTHENE	90	1	LCSD -1 LANCAS
BENZO (GHI) PERYLENE	99	5	LCSD -1 LANCAS
BENZO (K) FLUORANTHENE	96	2	LCSD -1 LANCAS
BENZYL ALCOHOL	93	2	LCSD -1 LANCAS
BIS (2-CHLOROETHOXY) METHANE	95	2	LCSD -1 LANCAS
BIS (2-CHLOROETHYL) ETHER	95	2	LCSD -1 LANCAS
BIS (2-ETHYLHEXYL) PHTHALATE	108	1	LCSD -1 LANCAS
BIS(2CHLOROISOPROPYL)ETHER	75	1	LCSD -1 LANCAS
BUTYL BENZYL PHTHALATE	88	1	LCSD -1 LANCAS
CHRYSENE	92	1	LCSD -1 LANCAS
DI-N-BUTYL PHTHALATE	92	5	LCSD -1 LANCAS
DI-N-OCTYL PHTHALATE	98	9	LCSD -1 LANCAS
DIBENZ (A,H) ANTHRACENE	103	4	LCSD -1 LANCAS
DIBENZOFURAN	94	0	LCSD -1 LANCAS
DIETHYL PHTHALATE	82	6	LCSD -1 LANCAS
DIMETHYL PHTHALATE	49	4	LCSD -1 LANCAS
FLUORANTHENE	99	6	LCSD -1 LANCAS
FLUORENE	102	3	LCSD -1 LANCAS
HEXACHLOROBENZENE	106	0	LCSD -1 LANCAS
HEXACHLOROBUTADIENE	61	16	LCSD -1 LANCAS
HEXACHLOROCYCLOPENTADIENE	51	7	LCSD -1 LANCAS
HEXACHLOROETHANE	69	9	LCSD -1 LANCAS
INDENO (1,2,3-CD) PYRENE	99	3	LCSD -1 LANCAS
ISOPHORONE	102	4	LCSD -1 LANCAS
N-NITROSODI-N-PROPYLAMINE	90	1	LCSD -1 LANCAS
N-NITROSODIMETHYLAMINE	69	8	LCSD -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID		
N-NITROSODIPHENYLAMINE	85	1	LCSD	-1	LANCAS
NAPHTHALENE	91	1	LCSD	-1	LANCAS
NITROBENZENE	95	2	LCSD	-1	LANCAS
PENTACHLOROPHENOL	84	0	LCSD	-1	LANCAS
PHENANTHRENE	99	2	LCSD	-1	LANCAS
PHENOL	53	7	LCSD	-1	LANCAS
PYRENE	98	3	LCSD	-1	LANCAS
PYRIDINE	71	4	LCSD	-1	LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID	
1,2,4-TRICHLOROBENZENE	88	2498400-1	LANCAS
1,2-DICHLOROBENZENE	89	2498400-1	LANCAS
1,3-DICHLOROBENZENE	90	2498400-1	LANCAS
1,4-DICHLOROBENZENE	92	2498400-1	LANCAS
2,4,5-TRICHLOROPHENOL	92	2498400-1	LANCAS
2,4,6-TRICHLOROPHENOL	91	2498400-1	LANCAS
2,4-DICHLOROPHENOL	89	2498400-1	LANCAS
2,4-DIMETHYLPHENOL	67	2498400-1	LANCAS
2,4-DINITROPHENOL	64	2498400-1	LANCAS
2,4-DINITROTOLUENE	88	2498400-1	LANCAS
2,6-DINITROTOLUENE	84	2498400-1	LANCAS
2-CHLORONAPHTHALENE	95	2498400-1	LANCAS
2-CHLOROPHENOL	92	2498400-1	LANCAS
2-METHYLNAPHTHALENE	88	2498400-1	LANCAS
2-METHYLPHENOL	89	2498400-1	LANCAS
2-NITROANILINE	91	2498400-1	LANCAS
2-NITROPHENOL	96	2498400-1	LANCAS
3 OR 4-METHYLPHENOL	87	2498400-1	LANCAS
3,3'-DICHLOROBENZIDINE	76	2498400-1	LANCAS
3-NITROANILINE	71	2498400-1	LANCAS
4,6-DINITRO-2-METHYLPHENOL	72	2498400-1	LANCAS
4-BROMOPHENYL PHENYL ETHER	84	2498400-1	LANCAS
4-CHLORO-3-METHYLPHENOL	90	2498400-1	LANCAS
4-CHLOROANILINE	68	2498400-1	LANCAS
4-CHLOROPHENYL PHENYL ETHER	93	2498400-1	LANCAS
4-NITROANILINE	82	2498400-1	LANCAS
4-NITROPHENOL	40	2498400-1	LANCAS
ACENAPHTHENE	88	2498400-1	LANCAS
ACENAPHTHYLENE	92	2498400-1	LANCAS
ANILINE	67	2498400-1	LANCAS
ANTHRACENE	85	2498400-1	LANCAS
BENZO (A) ANTHRACENE	89	2498400-1	LANCAS
BENZO (A) PYRENE	76	2498400-1	LANCAS
BENZO (B) FLUORANTHENE	86	2498400-1	LANCAS
BENZO (GHI) PERYLENE	86	2498400-1	LANCAS
BENZO (K) FLUORANTHENE	86	2498400-1	LANCAS
BENZYL ALCOHOL	95	2498400-1	LANCAS
BIS (2-CHLOROETHOXY) METHANE	89	2498400-1	LANCAS
BIS (2-CHLOROETHYL) ETHER	93	2498400-1	LANCAS
BIS (2-ETHYLHEXYL) PHTHALATE	100	2498400-1	LANCAS
BIS(2CHLOROISOPROPYL)ETHER	74	2498400-1	LANCAS
BUTYL BENZYL PHTHALATE	63	2498400-1	LANCAS
CHRYSENE	85	2498400-1	LANCAS
DI-N-BUTYL PHTHALATE	75	2498400-1	LANCAS
DI-N-OCTYL PHTHALATE	86	2498400-1	LANCAS
DIBENZ (A,H) ANTHRACENE	90	2498400-1	LANCAS
DIBENZOFURAN	88	2498400-1	LANCAS
DIETHYL PHTHALATE	59	2498400-1	LANCAS
DIMETHYL PHTHALATE	26	2498400-1	LANCAS
FLUORANTHENE	86	2498400-1	LANCAS
FLUORENE	92	2498400-1	LANCAS
HEXACHLOROBENZENE	98	2498400-1	LANCAS
HEXACHLOROBUTADIENE	74	2498400-1	LANCAS
HEXACHLOROCYCLOPENTADIENE	56	2498400-1	LANCAS
HEXACHLOROETHANE	87	2498400-1	LANCAS
INDENO (1,2,3-CD) PYRENE	87	2498400-1	LANCAS
ISOPHORONE	94	2498400-1	LANCAS
N-NITROSODI-N-PROPYLAMINE	89	2498400-1	LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID	
N-NITROSODIMETHYLAMINE	68	2498400-1	LANCAS
N-NITROSODIPHENYLAMINE	80	2498400-1	LANCAS
NAPHTHALENE	90	2498400-1	LANCAS
NITROBENZENE	94	2498400-1	LANCAS
PENTACHLOROPHENOL	80	2498400-1	LANCAS
PHENANTHRENE	92	2498400-1	LANCAS
PHENOL	51	2498400-1	LANCAS
PYRENE	91	2498400-1	LANCAS
PYRIDINE	69	2498400-1	LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
1,2,4-TRICHLOROBENZENE	89	1	2498400-1	LANCAS
1,2-DICHLOROBENZENE	88	1	2498400-1	LANCAS
1,3-DICHLOROBENZENE	92	2	2498400-1	LANCAS
1,4-DICHLOROBENZENE	90	2	2498400-1	LANCAS
2,4,5-TRICHLOROPHENOL	100	9	2498400-1	LANCAS
2,4,6-TRICHLOROPHENOL	98	7	2498400-1	LANCAS
2,4-DICHLOROPHENOL	95	7	2498400-1	LANCAS
2,4-DIMETHYLPHENOL	66	2	2498400-1	LANCAS
2,4-DINITROPHENOL	87	31	2498400-1	LANCAS
2,4-DINITROTOLUENE	100	13	2498400-1	LANCAS
2,6-DINITROTOLUENE	93	10	2498400-1	LANCAS
2-CHLORONAPHTHALENE	98	3	2498400-1	LANCAS
2-CHLOROPHENOL	95	3	2498400-1	LANCAS
2-METHYLNAPHTHALENE	91	3	2498400-1	LANCAS
2-METHYLPHENOL	91	2	2498400-1	LANCAS
2-NITROANILINE	101	10	2498400-1	LANCAS
2-NITROPHENOL	99	4	2498400-1	LANCAS
3 OR 4-METHYLPHENOL	90	4	2498400-1	LANCAS
3,3'-DICHLOROBENZIDINE	78	3	2498400-1	LANCAS
3-NITROANILINE	89	23	2498400-1	LANCAS
4,6-DINITRO-2-METHYLPHENOL	86	18	2498400-1	LANCAS
4-BROMOPHENYL PHENYL ETHER	86	2	2498400-1	LANCAS
4-CHLORO-3-METHYLPHENOL	97	7	2498400-1	LANCAS
4-CHLOROANILINE	75	9	2498400-1	LANCAS
4-CHLOROPHENYL PHENYL ETHER	100	7	2498400-1	LANCAS
4-NITROANILINE	95	15	2498400-1	LANCAS
4-NITROPHENOL	44	9	2498400-1	LANCAS
ACENAPHTHENE	92	4	2498400-1	LANCAS
ACENAPHTHYLENE	95	3	2498400-1	LANCAS
ANILINE	75	10	2498400-1	LANCAS
ANTHRACENE	90	6	2498400-1	LANCAS
BENZO (A) ANTHRACENE	94	6	2498400-1	LANCAS
BENZO (A) PYRENE	84	9	2498400-1	LANCAS
BENZO (B) FLUORANTHENE	92	7	2498400-1	LANCAS
BENZO (GHI) PERYLENE	98	14	2498400-1	LANCAS
BENZO (K) FLUORANTHENE	93	8	2498400-1	LANCAS
BENZYL ALCOHOL	96	2	2498400-1	LANCAS
BIS (2-CHLOROETHOXY) METHANE	94	5	2498400-1	LANCAS
BIS (2-CHLOROETHYL) ETHER	96	3	2498400-1	LANCAS
BIS (2-ETHYLHEXYL) PHTHALATE	108	8	2498400-1	LANCAS
BIS(2CHLOROISOPROPYL)ETHER	75	0	2498400-1	LANCAS
BUTYL BENZYL PHTHALATE	80	24	2498400-1	LANCAS
CHRYSENE	91	7	2498400-1	LANCAS
DI-N-BUTYL PHTHALATE	87	16	2498400-1	LANCAS
DI-N-OCTYL PHTHALATE	96	12	2498400-1	LANCAS
DIBENZ (A,H) ANTHRACENE	102	13	2498400-1	LANCAS
DIBENZOFURAN	93	6	2498400-1	LANCAS
DIETHYL PHTHALATE	67	12	2498400-1	LANCAS
DIMETHYL PHTHALATE	28	9	2498400-1	LANCAS
FLUORANTHENE	98	12	2498400-1	LANCAS
FLUORENE	99	7	2498400-1	LANCAS
HEXACHLOROBENZENE	101	4	2498400-1	LANCAS
HEXACHLOROBUTADIENE	72	2	2498400-1	LANCAS
HEXACHLOROCYCLOPENTADIENE	59	5	2498400-1	LANCAS
HEXACHLOROETHANE	87	1	2498400-1	LANCAS
INDENO (1,2,3-CD) PYRENE	101	14	2498400-1	LANCAS
ISOPHORONE	99	5	2498400-1	LANCAS

Matrix Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
N-NITROSODI-N-PROPYLAMINE	94	5	2498400-1 LANCAS
N-NITROSODIMETHYLAMINE	70	2	2498400-1 LANCAS
N-NITROSODIPHENYLAMINE	84	5	2498400-1 LANCAS
NAPHTHALENE	92	2	2498400-1 LANCAS
NITROBENZENE	96	2	2498400-1 LANCAS
PENTACHLOROPHENOL	72	10	2498400-1 LANCAS
PHENANTHRENE	98	6	2498400-1 LANCAS
PHENOL	53	3	2498400-1 LANCAS
PYRENE	97	6	2498400-1 LANCAS
PYRIDINE	71	4	2498400-1 LANCAS

Comments:

8270B: Benzyl alcohol was detected in the method blank at 3.0 ug/l. The blank value was not subtracted from the results.

Method Number: 9012 Prep Method: 9012 Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: 04757
Batch Number: 1

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1
KIN-F/B-ASH	22APR96	LANCAS 2498400 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
TOTAL CYANIDE (WATER)	95	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
TOTAL CYANIDE (WATER)	100	6	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
TOTAL CYANIDE (WATER)	75	2498402-1 LANCAS

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
TOTAL CYANIDE (WATER)	< 0.005	MG/L	0	2498400-1 LANCAS

Method Number: 9030A Prep Method: Pre-prep: 1312
Batch Start Date: 24APR96
Instrument: NA
Batch Number: 3

The following field samples are included in this batch:

Sample Name	Date Sampled	Lab ID
KIN-BIO-SLUDGE	22APR96	LANCAS 2498402 1
KIN-F/B-ASH	22APR96	LANCAS 2498400 1

Lab Control Spike:

Analyte/Parameter	RPR	Lab Sample ID
SULFIDE	88	LCS -1 LANCAS

Lab Control Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
SULFIDE	88	0	LCSD -1 LANCAS

Matrix Spike:

Analyte/Parameter	RPR	Lab Sample ID
SULFIDE	93	2487117-1 LANCAS

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
SULFIDE	< 2	MG/L	0	2487210-1 LANCAS

Research and Engineering

Project Number ADS

Type or Print Data

Facility Name	Telephone Number	Transporter Name	Telephone Number
DUPONT KINSTON	919) 522- 6718	FEDERAL EXPRESS	( ) -

Facility Address	Transporter Address
HWY. 11 N. KINSTON, NC 28502	

Facility Supervisor	Method of Shipping
JOE PETERPAUL	OVERNIGHT AIR

Process Producing Sample	Special Shipping Instructions
FLYASH LANDFILL PROJECT	PACK IN WET ICE TO LANCASTER LABS
Employee(s) Sampling: John C. Sugg	Remarks: *MDL REPORTING*NC GW CRITERIA*
Other Employee(s) Handling: Jerry O-Bailey	*SPLP=AP9 & RCRA TCLP LIST*
	*8081=AP9 PEST/PCB*8151=AP9 HERB*

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Analysis Req. ▶ Preservative	52470 AP9	STM AA9	# 9	- 0 3 0 1 2	- 5	- 8	- 3 1 5 1
KIN-F/B-ASH	4/22/96	1230	ASH	500 ML	WM/G	2	NONE	X	X	X	X	X	X	X
KIN-BIO-SLUDGE	4/22/96	1245	SLUDGE	500 ML	WM/G	2	NONE	X	X	X	X	X	X	X

Signatures

	Date/Time		Date/Time	
Bottles Relinquished by: S. Engelking	4-18-96 1225	Bottles Received by: John C. Sugg	4/22/96 1040	Condition of Samples Upon Arrival at Final Destination: GOOD
Relinquished by: John C. Sugg	4/22/96 1415	Received by		
Relinquished by		Received by		Signature: K. Gute Date: 4-23-96
Relinquished by		Received by		Temp. of Samples on Arrival (Temp. sensitive analysis only): 2.4°
Relinquished by		Received by		
Relinquished by		Received by: K. Gute	4-23-96 0950	Signature: K. Gute Date: 4-23-96

5-157 X3, 10-91

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Research and Engineering

2498400-03

Project Number: ADS

Type or Print Data

Facility Name: DUPONT KINSTON	Telephone Number: (919) 522- 6718	Transporter Name: FEDERAL EXPRESS	Telephone Number: ( ) -
Facility Address: HWY. 11 N. KINSTON, NC 28502		Transporter Address:	
Facility Supervisor: JOE PETERPAUL		Method of Shipping: OVERNIGHT AIR	
Process Producing Sample: FLYASH LANDFILL PROJECT	Special Shipping Instructions: PACK IN WET ICE TO LANCASTER LABS		
Employee(s) Sampling: John C. Sugg	Remarks: *MDL REPORTING*NC GW CRITERIA*		
Other Employee(s) Handling: JERRY O. BAILEY	*SPLP=AP9 & RCRA TCLP LIST* *8081=AP9 PEST/PCB*8151=AP9 HERB*		

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Analysis Req.▶ Preservative	8240 AP9	8270 AP9	TMET AP9	S9030A	CN9012	8081	8151
KIN-F/B-ASH	4/22/96	1340	ASH	500 ML	WM/G	4	NONE	X	X	X	X	X	X	X
KIN-BIO-SLUDGE	4/22/96	1345	SLUDGE	500 ML	WM/G	2	NONE	X	X	X	X	X	X	X

Signatures

Bottles Relinquished by: [signature]	Date/Time: 4/19/96 1335	Bottles Received by: John C. Sugg	Date/Time: 4/22/96 0730	Condition of Samples Upon Arrival at Final Destination: GOOD
Relinquished by: John C. Sugg	Date/Time: 4/22/96 1410	Received by:	Date/Time:	
Relinquished by:	Date/Time:	Received by:	Date/Time:	Signature: K. Guito — Date: 4-23-96
Relinquished by:	Date/Time:	Received by:	Date/Time:	Temp. of Samples on Arrival (Temp. sensitive analysis only): 1.7°
Relinquished by:	Date/Time:	Received by:	Date/Time:	
Relinquished by:	Date/Time:	Received by: K. Guito	Date/Time: 4-23-96 0950	Signature: K. Guito — Date: 4-23-96

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Section 5

EVALUATION OF LANDFILL IMPACT ON GROUNDWATER

DuPont Kinston Plant
Kinston, North Carolina

June 7, 1996 **DERS Project No. 402550-17**

Prepared by

DuPont Environmental Remediation Services
140 Cypress Station Drive, Suite 140
Houston, Texas 77090

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1.0 INTRODUCTION

This document summarizes computer modeling performed by DuPont Environmental Remediation Services (DERS) to evaluate transport of landfill leachate at the DuPont Kinston Plant in Kinston, North Carolina. The evaluation was performed to assess the impact on groundwater in the underlying aquifer from various chemical compounds that could potentially be leached from the landfill.

1.1 Site Location and Description

The DuPont Kinston plant is a synthetic fibers production facility in Lenoir County, North Carolina, located between the cities of Kinston and Greenville. The plant is bounded on the east by the Neuse River, on the west by Highway 11, and on the north and south by private property.

1.2 Landfill History

The landfill is located in the southeast portion of the site approximately 1,000 feet west of the Neuse River and was permitted in 1981. The landfill is approximately 13.2 acres in size and sits at the top of a plateau 40 feet above the Neuse River flood plain. A history of landfill disposal practices can be found elsewhere in the document to which this report is an attachment.

2.0 EVALUATION OF GROUNDWATER QUALITY BENEATH THE LANDFILL

To evaluate whether groundwater quality might be degraded as a result of chemicals leaching from the landfill, transport modeling was performed to determine the concentration of various potential leachate constituents in the aquifer at a review boundary, 250 feet downgradient from the landfill. Conservative assumptions for leachate concentrations and mass loading to the aquifer were used during modeling. The following sections describe procedures followed when modeling flow and transport of leachate constituents through the aquifer beneath the landfill.

2.1 Groundwater Model

The American Petroleum Institute's Exposure and Risk Assessment Decision Support System (DSS) was used to perform computer modeling. The computer model AT123D was used to predict contaminant levels in groundwater at a location downgradient from the landfill. AT123D is an analytical flow and transport model that solves the equations of contaminant flow through an aquifer under transient groundwater flow conditions. AT123D simulates three-dimensional dispersion (longitudinal, lateral, and vertical), one-dimensional uniform advection, linear, reversible equilibrium adsorption, and lumped first-order decay. The model has the ability to simulate numerous source geometries and mass loading conditions.

In DSS, the AT123D program is divided into five modules: model control parameters, media-specific parameters, receptor well geometry, source geometry, and chemical-specific parameters. In the model control parameters module, aquifer dimensions, type of source, and simulation time are specified. Aquifer dimensions can be either finite or infinite in both lateral and vertical directions. The type of source can be either instantaneous or time-varying (or superseded by direct input from another model). Media-specific parameters include porosity, hydraulic conductivity and gradient, dispersivities, bulk density, fraction organic carbon, and aquifer thickness. In the receptor well geometry module, the location of a receptor well is specified along with the location of the screened interval within the aquifer. The dimensions of the source are specified in the source geometry module, while the partition coefficient, decay rate, and molecular diffusion coefficient of the chemicals are specified in the chemical-specific parameter module.

2.2 Calculation and Review of Model Input Parameters

Prior to performing any computer modeling, a review of available aquifer and chemical-specific data was performed. Physical aspects of the aquifer and chemical-specific parameters are required input to the flow and transport model. The following section presents values for input parameters used in the computer model and describes calculations performed to compute values for those parameters whose values were unknown.

2.2.1 Determination of Monitoring Point

As stated in the North Carolina Administrative Code (NCAC), Title 15, Subchapter 2L, the compliance boundary for industrial landfills permitted prior to December 30, 1983, should be located 500 feet away from the edge of the landfill. However, to be conservative, groundwater concentrations were modeled at the review boundary, 250 feet downgradient from the edge of the landfill.

2.2.2 Aquifer Parameters

A hydraulic gradient of 0.0218 meters per meter was calculated using area-specific groundwater data from 1990. Based on lithologic logs from wells installed around the landfill which indicate a medium-grained sand aquifer, an effective porosity of 0.35 was chosen. Conservative values for aquifer dispersivity were chosen to minimize chemical dispersion effects. Longitudinal dispersivity was set at 1.0 meter, transverse dispersivity at 0.1 meter, and vertical dispersivity at 0.01 meter.

Monitoring well MW-14 is the nearest downgradient well to the landfill. Data for this well indicate that the saturated thickness of the aquifer is 3.24 feet. The lithologic log for this well indicates the aquifer is composed of medium-grained sand with some clay and silt. A dry-weight soil bulk density equal to 1.65 g/cm^3 was chosen for the aquifer. A default value of 0.1 percent was chosen for fraction of organic carbon in the aquifer. A slug test was performed on well MW-14 to determine hydraulic conductivity of the aquifer downgradient of the landfill. The average hydraulic conductivity calculated from this test equaled 2.85×10^{-3} cm/s (8.07 ft/d). Appendix A contains slug test data and test results.

To determine the natural flux rate of groundwater through the aquifer beneath the landfill, the following equation was used:

$$Q = K \times i \times b \times w$$

Where:

Q = Volumetric flux rate,
K = Hydraulic conductivity,
i = Hydraulic gradient,
b = Aquifer saturated thickness, and
w = Lateral width of aquifer through which flux passes.

Using the information presented above, and the length for the downgradient edge of the landfill [lateral width of aquifer through which flux passes (equal to 1,190 feet)], the flux rate of groundwater through the aquifer beneath the landfill equals 1.85×10^6 gallons per year.

2.2.3 Leachate Analyses, Source Geometry, and Chemical Parameters

Samples of coal ash and filtered sand bed biosolids were collected by plant personnel in April 1996, and were analyzed for Appendix IX volatile and semi-volatile compounds, Appendix IX herbicides, metals, and total cyanides by the Synthetic Precipitation Leaching Procedure. A conservative 48-hour leach was used rather than the normal 24-hour leach, to be certain that equilibrium conditions had been met. The laboratory report for these analyses can be found elsewhere in the document of which this report is an attachment. The following table summarizes concentrations of chemicals detected.

Summary of Landfill Leachate Analyses

Chemical	Concentration
Antimony	0.0032 mg/L (J)
Barium	0.31 mg/L and 0.58
Cobalt	0.033 mg/L (J)
Nickel	0.05 mg/L
Thallium	0.0047 (J)
Zinc	0.252 mg/L and 0.206 mg/L
Cyanide	0.035 mg/L
DDT	1.0×10^{-5}
Dibutyl phthalate	0.092 mg/L

Note: (J) Qualifier indicates that the results were above the method detection limit, but below the practical quantitation limit. Results were still considered valid.

The landfill is rectangular in shape; the eastern side is 1,190 feet long, the western side is 1,055 feet long, the northern side is 567 feet long, and the southern side is 488 feet long. The landfill covers an area of approximately 13.2 acres. Figure 1 shows the landfill and surrounding area.

AT123D calculates a retardation factor for a chemical based on the formula:

$$R = 1 + \rho_b \left(\frac{K_d}{n} \right)$$

Where:

R	=	Retardation factor,
ρ_b	=	Soil bulk density,
K_d	=	Distribution coefficient,
K_d	=	K_{oc}*f_{oc},
K_{oc}	=	Organic carbon distribution coefficient,
f_{oc}	=	Fraction organic carbon, and
n	=	Porosity.

Input requirements to AT123D include soil bulk density, porosity, fraction organic carbon, and the organic carbon distribution coefficient. For metals, K_{oc} represents the ability for cationic species to adsorb onto any negatively charged aquifer matrix particle, not just the organic carbon portion. Values of K_{oc} for the organic compounds DDT and dibutyl phthalate were obtained from EPA's *Superfund Public Health Evaluation Manual*. Metal K_{oc} values were obtained from the publication *A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture* (Oak Ridge National Laboratory (ORNL) September 1984). The ORNL document summarized K_d values from published literature and an assumed fraction organic carbon value. The following table lists K_{oc} values used during modeling.

Distribution Coefficient Values

Chemical	Organic Carbon Distribution Coefficient (K_{oc})
Antimony	1,500 mL/g
Barium	2,000 mL/g
Cobalt	1,500 mL/g
Nickel	5,000 mL/g
Thallium	50,000 mL/g
Zinc	1,333 mL/g
Cyanide	0 mL/g
DDT	243,000 mL/g
Dibutyl phthalate	170,000 mL/g

To calculate mass loading rates to the aquifer for the various chemicals, the infiltration rate through the landfill must be known. Using the conservative assumption that all of the 1.85×10^6 gallons per year natural flux rate beneath the aquifer is due to precipitation infiltration, the mass loading of each chemical to the aquifer can be calculated. The following table lists the mass loading rates to the aquifer for the detected chemicals based on a surficial area of 13.2 acres for the landfill.

Mass Loading to Aquifer
Infiltration of 1.85×10^6 gallons per year

Chemical	Mass Loading Rate
Antimony	0.022 kg/yr
Barium	3.12 kg/yr
Cobalt	0.23 kg/yr
Nickel	0.35 kg/yr
Thallium	0.033 kg/yr
Zinc	1.61 kg/yr
Cyanide	0.25 kg/yr
DDT	7.01×10^{-5} kg/yr
Dibutyl phthalate	0.64 kg/yr

Note: The average concentration was used to calculate mass loading rate when two concentrations were detected.

A conservative molecular diffusion coefficient equal to $1.0x10^{-10}$ cm^2/s was used for each chemical. This low value will limit concentration decreases due to diffusion.

2.2.4 Groundwater Quality Standards

Groundwater quality standards were determined in one of four ways: referencing Class GA Standards in the North Carolina Administrative Code, Title 15, Subchapter 2L, Section .0202; referencing Federal Maximum Contaminant Levels; calculating the systemic threshold concentration as shown in NCAC T15A: 02L.0200; calculating the concentration which corresponds to an incremental lifetime cancer risk of $1x10^{-6}$ using the EPA's *Risk Assessment Guidance for Superfund: Human Health Evaluation Manual.* The following table lists groundwater quality standards for the nine detectable chemicals.

Groundwater Quality Standards

Chemical	Groundwater Quality Standard
Antimony	0.006 mg/L (2)
Barium	2.0 mg/L (1)
Cobalt	0.21 mg/L (3)
Nickel	0.1 (1) mg/L
Thallium	0.002 mg/L (2)
Zinc	2.1 mg/L (1)
Cyanide	0.154 mg/L (1)
DDT	$2.5x10^{-4}$ mg/L (4)
Dibutyl phthalate	0.70 mg/L (3)

Notes:

(1) References NCAC T15A: 02L.0200 Class GA standards.
(2) References federal maximum contaminant levels.
(3) Systemic threshold concentration calculated using equation in NCAC T15A: 02L.0200.
(4) Concentration which corresponds to an incremental lifetime cancer risk of $1x10^{-6}$.

Following are the calculations for cobalt, dibutyl phthalate, and DDT.

Systemic threshold concentration equation:

- Concentration = [Reference Dose*70 Kg(adult body weight)*Relative Source Contribution (0.10 for inorganics; 0.20 for organics)]/[2 liters/day (average water consumption)].
- Cobalt concentration = (0.06 mg/Kg/day)*(70 Kg)*(0.10)/(2 L/d) = 0.21 mg/L.
- Dibutyl phthalate concentration = (0.1 mg/Kg/day)*(70 Kg)*(0.20)/(2 L/d) = 0.70 mg/L.

Equation to determine maximum concentration for a carcinogen:

- Concentration = [$1x10^{-6}$ (incremental lifetime cancer risk)*70 Kg (adult body weight)* 70 years (averaging time)*365 days/year]/[350 days/year (exposure frequency)*30 years (exposure duration)*Oral cancer slope factor ($(mg/Kg\text{-}day)^{-1}$)*2 L/day (water ingestion rate)]
- DDT concentration = ($1x10^{-6}$*70 Kg*70 yrs*365 d)/(350 d*30 yrs*0.34 $(mg/Kg\text{-}day)^{-1}$*2 L/d = 0.00025 mg/L

2.3 Groundwater Modeling

The AT123D model was run using the aquifer and chemical parameters specified in the preceding section. The model assumed that the natural flux rate of groundwater beneath the landfill was due completely to infiltration of precipitation over the landfill. The following section discusses results of the modeling.

2.3.1 Summary of Model Input Parameters

The following table summarizes input parameters used when performing AT123D modeling of the aquifer beneath the landfill.

Summary of Input Parameters

Parameter	Value
Aquifer width	Infinite
Aquifer thickness	0.9876 meters (3.24 feet)
Effective porosity	0.35
Hydraulic conductivity	898 meters per year (8.07 ft/d)
Hydraulic gradient	0.0218 meters per meter
Longitudinal dispersivity	1.0 meter
Transverse dispersivity	0.1 meters
Vertical dispersivity	0.01 meters
Soil bulk density	1.65 grams per cubic centimeter
Fraction organic carbon	0.001
Degradation rate	0.0 per day
Molecular diffusion coefficient	1.0×10^{-10} square centimeters per second
Length of source in X direction	147.22 meters (483 ft)
Length of source in Y direction	362.71 meters (1,190 ft)
Thickness of source	0.9876 meters (3.24 ft)
Receptor Well X Coordinate	223.42 meters (483 ft + 250 ft)
Receptor Well Y Coordinate	181.36 meters (one half the 1,190 ft length)
Receptor Well Z Coordinate	0.0 to 0.9876 meters (0.0 to 3.24 ft)

Input values of organic carbon distribution coefficients for each chemical can be found in Section 2.2.3. Each chemical source was modeled as a constant release at the mass loading rate described in Section 2.2.3. The source area was assumed to be the area of the aquifer immediately underlying the landfill.

The theoretical receptor well was located 250 feet immediately downgradient from the edge of the center of the source area so that the maximum possible aquifer concentration could be determined. The receptor well was screened across the entire saturated thickness of the aquifer [equal to 0.9876 meters (3.24 feet)].

2.3.2 Natural Flux Groundwater Modeling Results

A simulation time of 50 years was sufficient to reach a maximum concentration at the receptor well for three of the metals and cyanide. Barium required a simulation time of 100 years, and nickel, thallium, DDT, and dibutyl phthalate required a simulation time of 200 years due to the high retardation factors for these chemicals. The following table lists the results for this modeling scenario.

Chemical	Model Result	Concentration Reached At	Groundwater Quality Standard
Antimony	0.003 mg/L	Year 40	0.006 mg/L
Barium	0.44 mg/L	Year 51	2.0 mg/L
Cobalt	0.033 mg/L	Year 43	0.21 mg/L
Nickel	0.05 mg/L	Year 119	0.10 mg/L
Thallium	9.0×10^{-8} mg/L	Year 200	0.002 mg/L
Zinc	0.23 mg/L	Year 35	2.1 mg/L
Cyanide	0.036 mg/L	Year 6	0.154 mg/L
DDT	0.0 mg/L	Year 200	2.5×10^{-4} mg/L
Dibutyl phthalate	0.0 mg/L	Year 200	0.70 mg/L

Model results indicate that none of the metals, cyanide, DDT, or dibutyl phthalate concentrations in groundwater at the receptor well would be above groundwater quality standards. Appendix B contains the AT123D output files for this scenario.

2.3.3 Assumptions and Limitations

There are assumptions and limitations to the AT123D model that could affect the results of this modeling exercise. In AT123D, the model assumes the aquifer to be homogeneous, isotropic, and of uniform geometry. Groundwater flow is limited to one-dimensional, uniform flow conditions. The maximum simulation time allowed in the model is 200 years.

Numerous conservative assumptions were incorporated into the model. These included:

- Natural flux through the aquifer due completely to infiltration through the landfill.
- Leachate concentrations determined using a 48-hour rather than a 24-hour leaching.
- Low values for aquifer dispersivity.

- ❑ Low value for molecular diffusion.
- ❑ Biodegradation of the organic chemicals set at zero.
- ❑ Receptor well located downgradient from the edge of the center of the landfill.
- ❑ The receptor well was located at the review boundary rather than the compliance boundary.

Incorporating these assumptions resulted in a conservative estimate as to the resulting chemical concentration at the receptor well (i.e., landfill review boundary).

SECTION 1.0

SECTION 2.0

SECTION 3.0

SECTION 4.0

SECTION 5.0

3.0 SUMMARY

Groundwater flow and chemical transport modeling was performed to predict the concentration of various leachate constituents in the aquifer at the review boundary 250 feet downgradient from the landfill. Numerous conservative assumptions were incorporated into the model, which produced a conservative estimate of the resulting chemical concentration at the review boundary. Modeling results do not indicate that groundwater quality in the aquifer beneath the landfill would exceed applicable limits at the review boundary.

4.0 REFERENCES

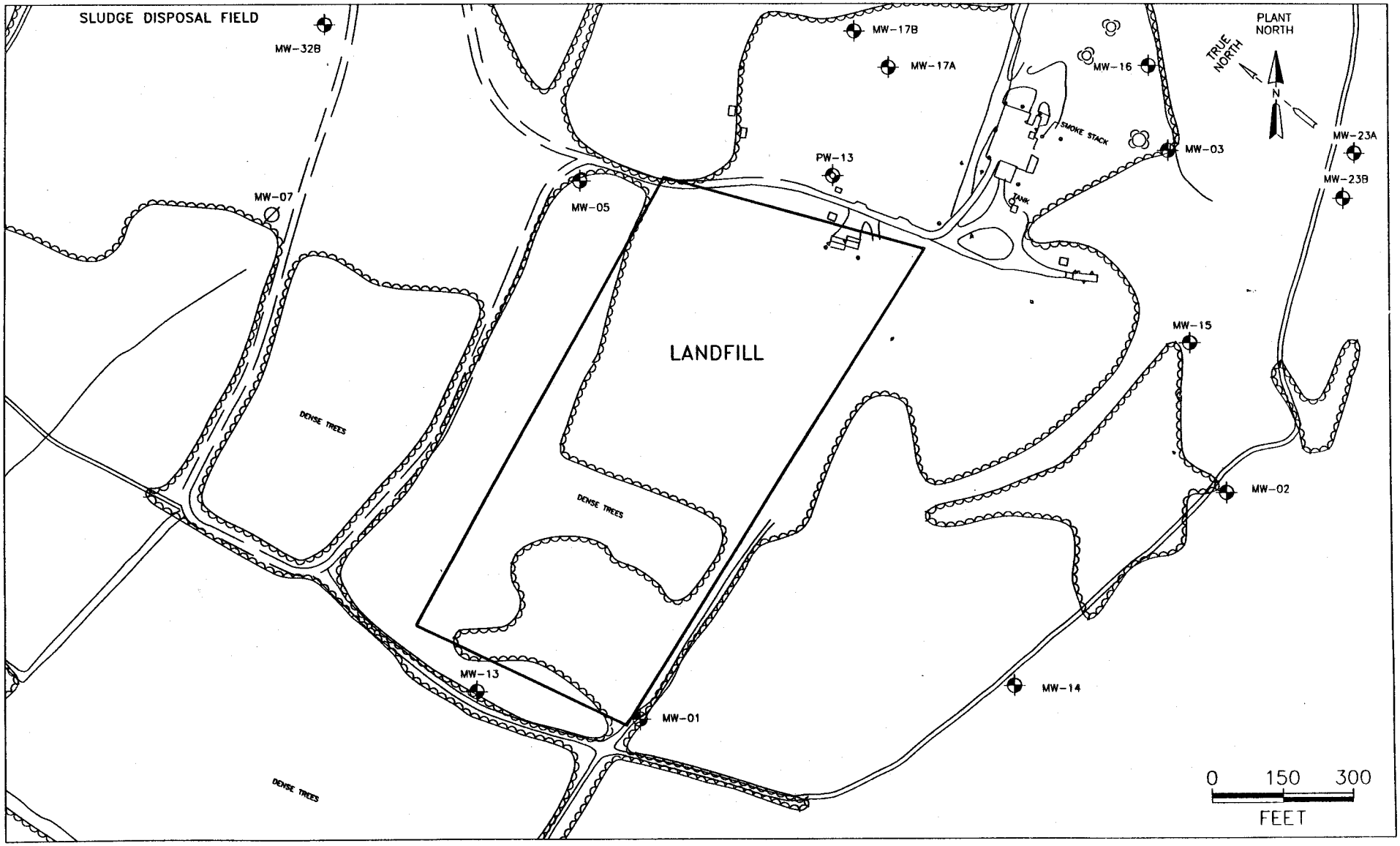
Baes, C. F., III, R. D. Sharp, A. L. Sjoreen, and R. W. Shor. 1984. A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture. Oak Ridge National Laboratory. September 1984.

EPA 1991. Risk Assessment Guidance for Superfund: Volume 1 - Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals). Interim Publication 9285.7-01B.

EPA 1995. Risk-based Concentration Table, July - December 1995. Office of RCRA Technical and Program Support Branch. October 20, 1995.

EPA 1986. Superfund Public Health Evaluation Manual. EPA 540/1-86/060.

FIGURES



FILE: KINSTON\GEO\MAPS\LDFL596

DuPont Environmental Remediation Services
Houston, Texas

TITLE:
Landfill Location Map

DuPont Kinston Plant, Kinston, North Carolina

DWN: RAH	DES.:	PROJECT NO.: 402550	
CHKD: JFG	APPR: MJV		
DATE: 5/28/96	REV.:	FIGURE NO.: 1	

APPENDIX A APPENDIX B APPENDIX C APPENDIX D APPENDIX E

APPENDICES

APPENDIX A
SLUG TEST DATA

DuPont Kinston Plant
Slug Test in Monitoring Well MW-14

Method of Analysis: Bouwer and Rice

Solution: $\ln s_0 - \ln s_t = [2*K*L*t]/[r_c^2*\ln(r_e/r_w)]$

where:

s_0 = initial drawdown in well due to instantaneous removal of water
s_t = drawdown in well at time t
L = length of well screen
r_c = radius of well casing
$\ln(r_e/r_w)$ = empirical "shape factor"
r_e = equivalent radius over which head loss occurs
r_w = radius of well (including gravel pack)
H = static height of water in well
b = saturated thickness of aquifer

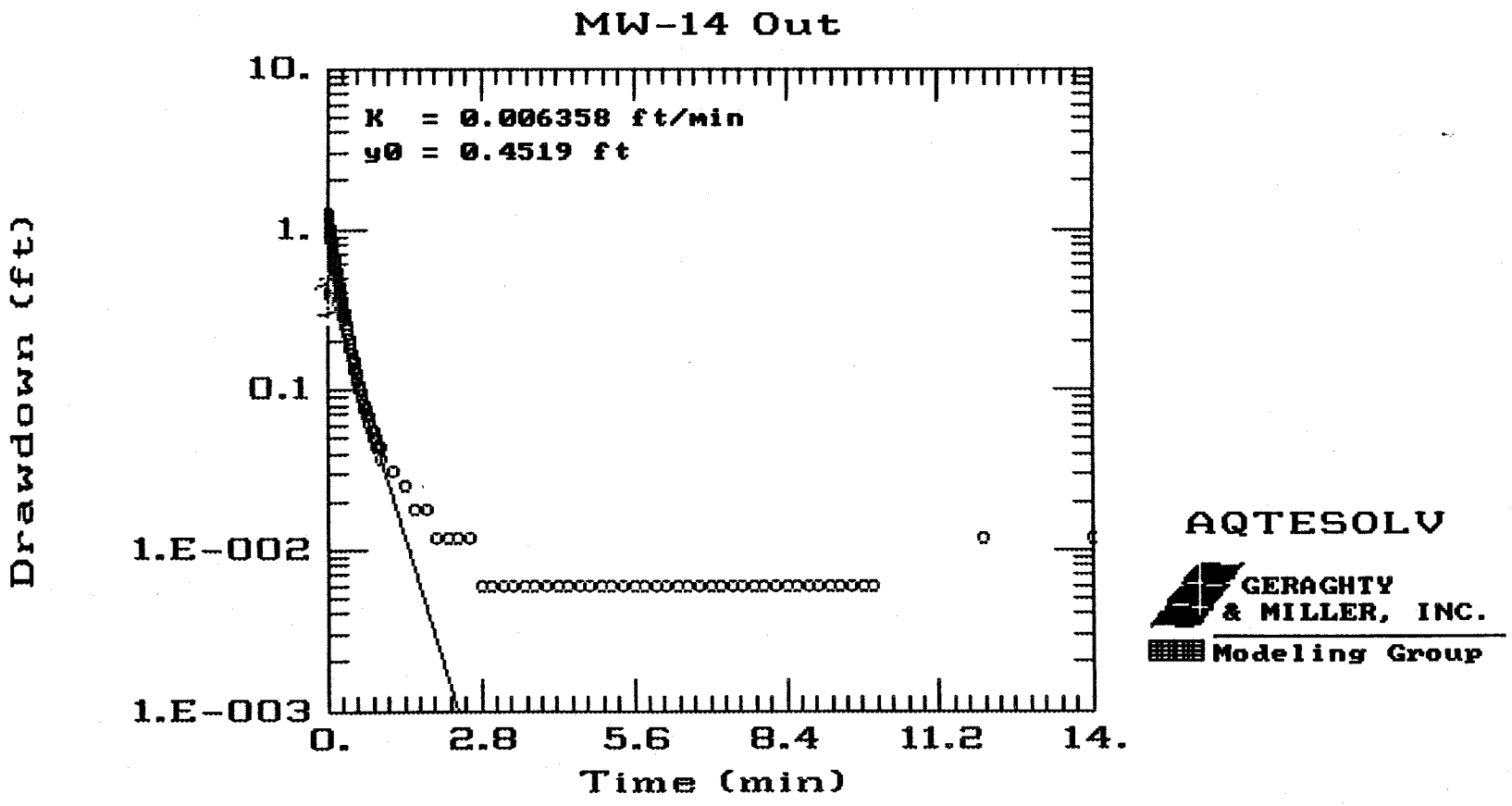
At MW-14:

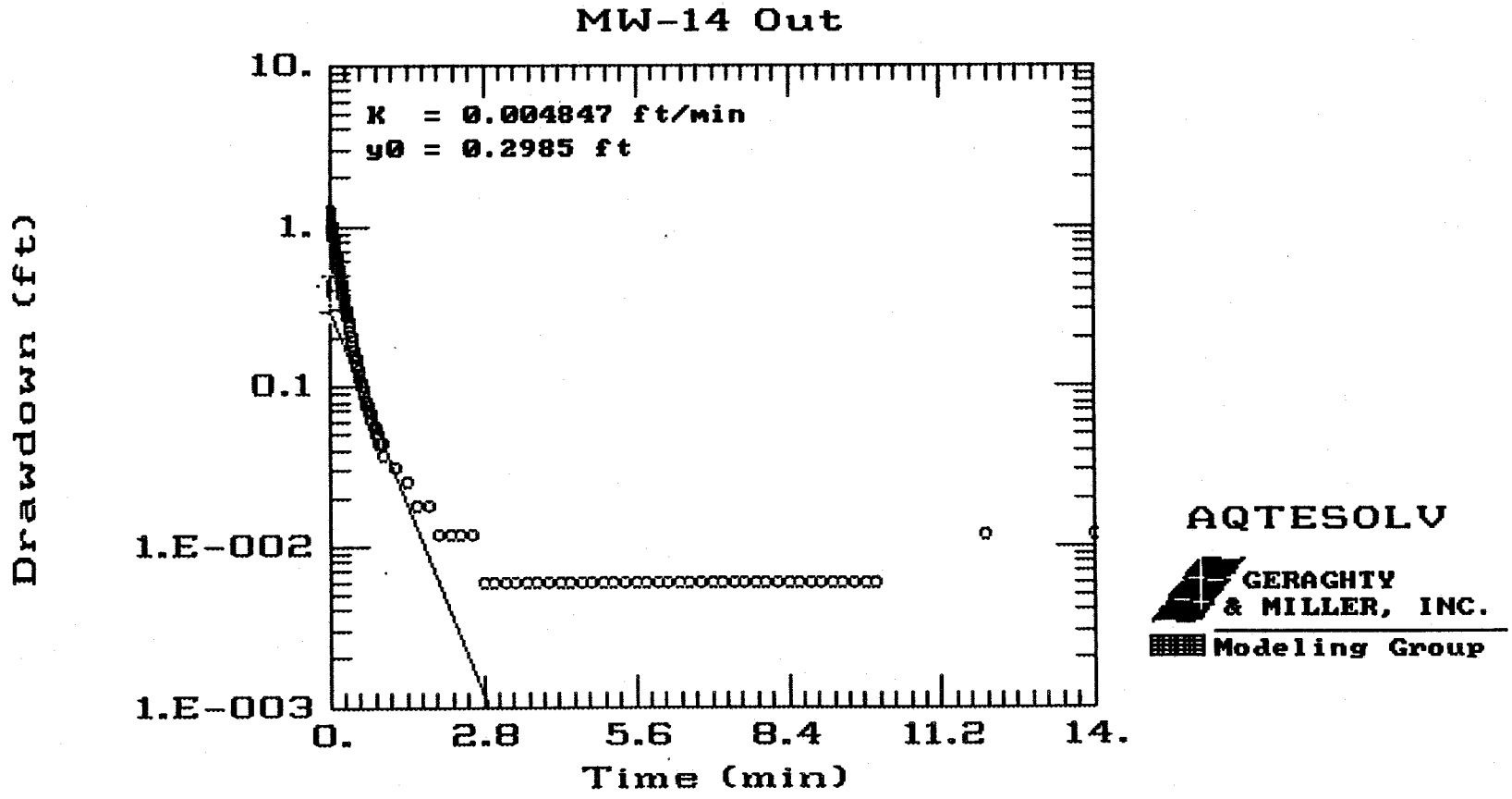
s_0 = 1.266 feet
L = 2.53 feet
r_c = 0.083 feet
rw = 0.25 feet
H = 3.24 feet
b = 3.24 feet

Time versus Drawdown Data for MW-14 Slug Test

Time (min)	Drawdown (feet)	Time (min)	Drawdown (feet)	Time (min)	Drawdown (feet)	Time (min)	Drawdown (feet)
0.0033	1.266	0.16	0.585	0.3166	0.289	1.4	0.025
0.0066	1.26	0.1633	0.579	0.32	0.289	1.6	0.018
0.01	1.108	0.1666	0.567	0.3233	0.283	1.8	0.018
0.0133	1.197	0.17	0.56	0.3266	0.283	2	0.012
0.0166	1.184	0.1733	0.554	0.33	0.277	2.2	0.012
0.02	1.146	0.1766	0.541	0.3333	0.27	2.4	0.012
0.0233	1.14	0.18	0.535	0.35	0.252	2.6	0.012
0.0266	1.121	0.1833	0.529	0.3666	0.239	2.8	0.006
0.03	1.108	0.1866	0.516	0.3833	0.22	3	0.006
0.0333	1.09	0.19	0.51	0.4	0.207	3.2	0.006
0.0366	1.071	0.1933	0.504	0.4166	0.195	3.4	0.006
0.04	1.052	0.1966	0.497	0.4333	0.182	3.6	0.006
0.0433	1.039	0.2	0.485	0.45	0.17	3.8	0.006
0.0466	1.02	0.2033	0.478	0.4666	0.157	4	0.006
0.05	1.008	0.2066	0.472	0.4833	0.151	4.2	0.006
0.0533	0.995	0.21	0.466	0.5	0.138	4.4	0.006
0.0566	0.894	0.2133	0.459	0.5166	0.132	4.6	0.006
0.06	0.957	0.2166	0.453	0.5333	0.126	4.8	0.006

0.0633	0.945	0.22	0.447	0.55	0.119	5	0.006
0.0666	0.932	0.2233	0.434	0.5666	0.113	5.2	0.006
0.07	0.919	0.2266	0.428	0.5833	0.107	5.4	0.006
0.0733	0.901	0.23	0.422	0.6	0.1	5.6	0.006
0.0766	0.888	0.2333	0.415	0.6166	0.094	5.8	0.006
0.08	0.869	0.2366	0.409	0.6333	0.094	6	0.006
0.0833	0.856	0.24	0.409	0.65	0.088	6.2	0.006
0.0866	0.844	0.2433	0.403	0.6666	0.081	6.4	0.006
0.09	0.831	0.2466	0.396	0.6833	0.075	6.6	0.006
0.0933	0.819	0.25	0.39	0.7	0.075	6.8	0.006
0.0966	0.806	0.2533	0.384	0.7166	0.075	7	0.006
0.1	0.793	0.2566	0.378	0.7333	0.069	7.2	0.006
0.1033	0.781	0.26	0.371	0.75	0.069	7.4	0.006
0.1066	0.768	0.2633	0.365	0.7666	0.063	7.6	0.006
0.11	0.749	0.2666	0.359	0.7833	0.063	7.8	0.006
0.1133	0.737	0.27	0.352	0.8	0.056	8	0.006
0.1166	0.73	0.2733	0.352	0.8166	0.056	8.2	0.006
0.12	0.718	0.2766	0.346	0.8333	0.056	8.4	0.006
0.1233	0.705	0.28	0.34	0.85	0.05	8.6	0.006
0.1266	0.693	0.2833	0.333	0.8666	0.05	8.8	0.006
0.13	0.68	0.2866	0.333	0.8833	0.05	9	0.006
0.1333	0.667	0.29	0.327	0.9	0.05	9.2	0.006
0.1366	0.661	0.2933	0.321	0.9166	0.044	9.4	0.006
0.14	0.648	0.2966	0.315	0.9333	0.044	9.6	0.006
0.1433	0.636	0.3	0.315	0.95	0.044	9.8	0.006
0.1466	0.63	0.3033	0.308	0.9666	0.044	10	0.006
0.15	0.617	0.3066	0.302	0.9833	0.044	12	0.012
0.1533	0.604	0.31	0.302	1	0.037	14	0.012
0.1566	0.598	0.3133	0.296	1.2	0.031		


MW-14 Out
K = 0.006358 ft/min
y0 = 0.4519 ft
Drawdown (ft)
10.
1.
0.1
1.E-002
1.E-003
0.
2.8
5.6
8.4
11.2
14.
Time (min)
AQTESOLV
GERAGHTY & MILLER, INC.
Modeling Group


MW-14 Out
K = 0.004847 ft/min
y0 = 0.2985 ft
10.
1.
0.1
1.E-002
1.E-003
Drawdown (ft)
0.
2.8
5.6
8.4
11.2
14.
Time (min)
AQTESOLV
GERAGHTY & MILLER, INC.
Modeling Group

APPENDIX A APPENDIX B APPENDIX C

APPENDIX B
AT123D OUTPUT FILE -
NATURAL FLUX INFILTRATION

AT123D Output File
Analysis for ...

Chemicals in the analysis
Antimony

Number of years simulated: 50

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 50
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 50
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .5000E+02

INPUT DATA/RESULTS FOR CHEMICAL: Antimony

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) ..... .1500E-02
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)..... .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	.220E-01
.220E-01	.220E-01	.220E-01	.220E-01	

RETARDATION FACTOR ..... .8071E+01
RETARDED SEEPAGE VELOCITY (M/YR) ..... .6930E+01
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .6930E+01
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .6930E+00
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .6930E-01

time [yr] = 1.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00

z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .108E-04
z [m] = .11E+00 conc [mg/l] = .108E-04
z [m] = .22E+00 conc [mg/l] = .108E-04
z [m] = .33E+00 conc [mg/l] = .108E-04
z [m] = .44E+00 conc [mg/l] = .108E-04
z [m] = .55E+00 conc [mg/l] = .108E-04
z [m] = .66E+00 conc [mg/l] = .108E-04
z [m] = .77E+00 conc [mg/l] = .108E-04
z [m] = .88E+00 conc [mg/l] = .108E-04
z [m] = .99E+00 conc [mg/l] = .108E-04

avg. conc. [mg/l] = .108E-04

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .437E-03
z [m] = .11E+00 conc [mg/l] = .437E-03
z [m] = .22E+00 conc [mg/l] = .437E-03
z [m] = .33E+00 conc [mg/l] = .437E-03
z [m] = .44E+00 conc [mg/l] = .437E-03
z [m] = .55E+00 conc [mg/l] = .437E-03
z [m] = .66E+00 conc [mg/l] = .437E-03
z [m] = .77E+00 conc [mg/l] = .437E-03
z [m] = .88E+00 conc [mg/l] = .437E-03
z [m] = .99E+00 conc [mg/l] = .437E-03

avg. conc. [mg/l] = .437E-03

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .117E-02
z [m] = .11E+00 conc [mg/l] = .117E-02
z [m] = .22E+00 conc [mg/l] = .117E-02
z [m] = .33E+00 conc [mg/l] = .117E-02
z [m] = .44E+00 conc [mg/l] = .117E-02
z [m] = .55E+00 conc [mg/l] = .117E-02
z [m] = .66E+00 conc [mg/l] = .117E-02
z [m] = .77E+00 conc [mg/l] = .117E-02
z [m] = .88E+00 conc [mg/l] = .117E-02
z [m] = .99E+00 conc [mg/l] = .117E-02

avg. conc. [mg/l] = .117E-02

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .190E-02
z [m] = .11E+00 conc [mg/l] = .190E-02
z [m] = .22E+00 conc [mg/l] = .190E-02
z [m] = .33E+00 conc [mg/l] = .190E-02
z [m] = .44E+00 conc [mg/l] = .190E-02
z [m] = .55E+00 conc [mg/l] = .190E-02
z [m] = .66E+00 conc [mg/l] = .190E-02
z [m] = .77E+00 conc [mg/l] = .190E-02
z [m] = .88E+00 conc [mg/l] = .190E-02
z [m] = .99E+00 conc [mg/l] = .190E-02

avg. conc. [mg/l] = .190E-02

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .262E-02
z [m] = .11E+00 conc [mg/l] = .262E-02
z [m] = .22E+00 conc [mg/l] = .262E-02
z [m] = .33E+00 conc [mg/l] = .262E-02
z [m] = .44E+00 conc [mg/l] = .262E-02
z [m] = .55E+00 conc [mg/l] = .262E-02
z [m] = .66E+00 conc [mg/l] = .262E-02
z [m] = .77E+00 conc [mg/l] = .262E-02
z [m] = .88E+00 conc [mg/l] = .262E-02
z [m] = .99E+00 conc [mg/l] = .262E-02

avg. conc. [mg/l] = .262E-02

time [yr] = 35.0

z [m] =	.00E+00	conc [mg/l] =	.305E-02
z [m] =	.11E+00	conc [mg/l] =	.305E-02
z [m] =	.22E+00	conc [mg/l] =	.305E-02
z [m] =	.33E+00	conc [mg/l] =	.305E-02
z [m] =	.44E+00	conc [mg/l] =	.305E-02
z [m] =	.55E+00	conc [mg/l] =	.305E-02
z [m] =	.66E+00	conc [mg/l] =	.305E-02
z [m] =	.77E+00	conc [mg/l] =	.305E-02
z [m] =	.88E+00	conc [mg/l] =	.305E-02
z [m] =	.99E+00	conc [mg/l] =	.305E-02

avg. conc. [mg/l] = .305E-02

time [yr] = 40.0

z [m] =	.00E+00	conc [mg/l] =	.313E-02
z [m] =	.11E+00	conc [mg/l] =	.313E-02
z [m] =	.22E+00	conc [mg/l] =	.313E-02
z [m] =	.33E+00	conc [mg/l] =	.313E-02
z [m] =	.44E+00	conc [mg/l] =	.313E-02
z [m] =	.55E+00	conc [mg/l] =	.313E-02
z [m] =	.66E+00	conc [mg/l] =	.313E-02
z [m] =	.77E+00	conc [mg/l] =	.313E-02
z [m] =	.88E+00	conc [mg/l] =	.313E-02
z [m] =	.99E+00	conc [mg/l] =	.313E-02

avg. conc. [mg/l] = .313E-02

time [yr] = 45.0

z [m] =	.00E+00	conc [mg/l] =	.313E-02
z [m] =	.11E+00	conc [mg/l] =	.313E-02
z [m] =	.22E+00	conc [mg/l] =	.313E-02
z [m] =	.33E+00	conc [mg/l] =	.313E-02
z [m] =	.44E+00	conc [mg/l] =	.313E-02
z [m] =	.55E+00	conc [mg/l] =	.313E-02
z [m] =	.66E+00	conc [mg/l] =	.313E-02
z [m] =	.77E+00	conc [mg/l] =	.313E-02
z [m] =	.88E+00	conc [mg/l] =	.313E-02
z [m] =	.99E+00	conc [mg/l] =	.313E-02

avg. conc. [mg/l] = .313E-02

time [yr] = 50.0

z [m] =	.00E+00	conc [mg/l] =	.313E-02
z [m] =	.11E+00	conc [mg/l] =	.313E-02
z [m] =	.22E+00	conc [mg/l] =	.313E-02
z [m] =	.33E+00	conc [mg/l] =	.313E-02
z [m] =	.44E+00	conc [mg/l] =	.313E-02
z [m] =	.55E+00	conc [mg/l] =	.313E-02
z [m] =	.66E+00	conc [mg/l] =	.313E-02
z [m] =	.77E+00	conc [mg/l] =	.313E-02
z [m] =	.88E+00	conc [mg/l] =	.313E-02
z [m] =	.99E+00	conc [mg/l] =	.313E-02

avg. conc. [mg/l] = .313E-02

AT123D Output File
Analysis for ...

Chemicals in the analysis
Barium

Number of years simulated: 100

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 100
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 100
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .1000E+03

INPUT DATA/RESULTS FOR CHEMICAL: Barium

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) .... .2000E-02
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)............................ .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	.312E+01
.312E+01	.312E+01	.312E+01	.312E+01	

RETARDATION FACTOR .... .1043E+02
RETARDED SEEPAGE VELOCITY (M/YR) .... .5363E+01
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .5363E+01
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .5363E+00
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .5363E-01

time [yr] = 1.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00

z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .168E-04
z [m] = .11E+00 conc [mg/l] = .168E-04
z [m] = .22E+00 conc [mg/l] = .168E-04
z [m] = .33E+00 conc [mg/l] = .168E-04
z [m] = .44E+00 conc [mg/l] = .168E-04
z [m] = .55E+00 conc [mg/l] = .168E-04
z [m] = .66E+00 conc [mg/l] = .168E-04
z [m] = .77E+00 conc [mg/l] = .168E-04
z [m] = .88E+00 conc [mg/l] = .168E-04
z [m] = .99E+00 conc [mg/l] = .168E-04

avg. conc. [mg/l] = .168E-04

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .121E-01
z [m] = .11E+00 conc [mg/l] = .121E-01
z [m] = .22E+00 conc [mg/l] = .121E-01
z [m] = .33E+00 conc [mg/l] = .121E-01
z [m] = .44E+00 conc [mg/l] = .121E-01
z [m] = .55E+00 conc [mg/l] = .121E-01

z [m] = .66E+00 conc [mg/l] = .121E-01
z [m] = .77E+00 conc [mg/l] = .121E-01
z [m] = .88E+00 conc [mg/l] = .121E-01
z [m] = .99E+00 conc [mg/l] = .121E-01

avg. conc. [mg/l] = .121E-01

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .760E-01
z [m] = .11E+00 conc [mg/l] = .760E-01
z [m] = .22E+00 conc [mg/l] = .760E-01
z [m] = .33E+00 conc [mg/l] = .760E-01
z [m] = .44E+00 conc [mg/l] = .760E-01
z [m] = .55E+00 conc [mg/l] = .760E-01
z [m] = .66E+00 conc [mg/l] = .760E-01
z [m] = .77E+00 conc [mg/l] = .760E-01
z [m] = .88E+00 conc [mg/l] = .760E-01
z [m] = .99E+00 conc [mg/l] = .760E-01

avg. conc. [mg/l] = .760E-01

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .156E+00
z [m] = .11E+00 conc [mg/l] = .156E+00
z [m] = .22E+00 conc [mg/l] = .156E+00
z [m] = .33E+00 conc [mg/l] = .156E+00
z [m] = .44E+00 conc [mg/l] = .156E+00
z [m] = .55E+00 conc [mg/l] = .156E+00
z [m] = .66E+00 conc [mg/l] = .156E+00
z [m] = .77E+00 conc [mg/l] = .156E+00
z [m] = .88E+00 conc [mg/l] = .156E+00
z [m] = .99E+00 conc [mg/l] = .156E+00

avg. conc. [mg/l] = .156E+00

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .237E+00
z [m] = .11E+00 conc [mg/l] = .237E+00
z [m] = .22E+00 conc [mg/l] = .237E+00

z [m] = .33E+00 conc [mg/l] = .237E+00
z [m] = .44E+00 conc [mg/l] = .237E+00
z [m] = .55E+00 conc [mg/l] = .237E+00
z [m] = .66E+00 conc [mg/l] = .237E+00
z [m] = .77E+00 conc [mg/l] = .237E+00
z [m] = .88E+00 conc [mg/l] = .237E+00
z [m] = .99E+00 conc [mg/l] = .237E+00

avg. conc. [mg/l] = .237E+00

time [yr] = 35.0

z [m] = .00E+00 conc [mg/l] = .318E+00
z [m] = .11E+00 conc [mg/l] = .318E+00
z [m] = .22E+00 conc [mg/l] = .318E+00
z [m] = .33E+00 conc [mg/l] = .318E+00
z [m] = .44E+00 conc [mg/l] = .318E+00
z [m] = .55E+00 conc [mg/l] = .318E+00
z [m] = .66E+00 conc [mg/l] = .318E+00
z [m] = .77E+00 conc [mg/l] = .318E+00
z [m] = .88E+00 conc [mg/l] = .318E+00
z [m] = .99E+00 conc [mg/l] = .318E+00

avg. conc. [mg/l] = .318E+00

time [yr] = 40.0

z [m] = .00E+00 conc [mg/l] = .391E+00
z [m] = .11E+00 conc [mg/l] = .391E+00
z [m] = .22E+00 conc [mg/l] = .391E+00
z [m] = .33E+00 conc [mg/l] = .391E+00
z [m] = .44E+00 conc [mg/l] = .391E+00
z [m] = .55E+00 conc [mg/l] = .391E+00
z [m] = .66E+00 conc [mg/l] = .391E+00
z [m] = .77E+00 conc [mg/l] = .391E+00
z [m] = .88E+00 conc [mg/l] = .391E+00
z [m] = .99E+00 conc [mg/l] = .391E+00

avg. conc. [mg/l] = .391E+00

time [yr] = 45.0

z [m] = .00E+00 conc [mg/l] = .432E+00
z [m] = .11E+00 conc [mg/l] = .432E+00
z [m] = .22E+00 conc [mg/l] = .432E+00
z [m] = .33E+00 conc [mg/l] = .432E+00
z [m] = .44E+00 conc [mg/l] = .432E+00
z [m] = .55E+00 conc [mg/l] = .432E+00
z [m] = .66E+00 conc [mg/l] = .432E+00
z [m] = .77E+00 conc [mg/l] = .432E+00
z [m] = .88E+00 conc [mg/l] = .432E+00
z [m] = .99E+00 conc [mg/l] = .432E+00

avg. conc. [mg/l] = .432E+00

time [yr] = 50.0

z [m] = .00E+00 conc [mg/l] = .443E+00
z [m] = .11E+00 conc [mg/l] = .443E+00
z [m] = .22E+00 conc [mg/l] = .443E+00
z [m] = .33E+00 conc [mg/l] = .443E+00
z [m] = .44E+00 conc [mg/l] = .443E+00
z [m] = .55E+00 conc [mg/l] = .443E+00
z [m] = .66E+00 conc [mg/l] = .443E+00
z [m] = .77E+00 conc [mg/l] = .443E+00
z [m] = .88E+00 conc [mg/l] = .443E+00
z [m] = .99E+00 conc [mg/l] = .443E+00

avg. conc. [mg/l] = .443E+00

time [yr] = 55.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00
z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 60.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00
z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 65.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00
z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 70.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00
z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 75.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00
z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 80.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00
z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 85.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00

z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 90.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00
z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 95.0

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00
z [m] = .44E+00 conc [mg/l] = .444E+00
z [m] = .55E+00 conc [mg/l] = .444E+00
z [m] = .66E+00 conc [mg/l] = .444E+00
z [m] = .77E+00 conc [mg/l] = .444E+00
z [m] = .88E+00 conc [mg/l] = .444E+00
z [m] = .99E+00 conc [mg/l] = .444E+00

avg. conc. [mg/l] = .444E+00

time [yr] = 100.

z [m] = .00E+00 conc [mg/l] = .444E+00
z [m] = .11E+00 conc [mg/l] = .444E+00
z [m] = .22E+00 conc [mg/l] = .444E+00
z [m] = .33E+00 conc [mg/l] = .444E+00

z [m] =	.44E+00	conc [mg/l] =	.444E+00
z [m] =	.55E+00	conc [mg/l] =	.444E+00
z [m] =	.66E+00	conc [mg/l] =	.444E+00
z [m] =	.77E+00	conc [mg/l] =	.444E+00
z [m] =	.88E+00	conc [mg/l] =	.444E+00
z [m] =	.99E+00	conc [mg/l] =	.444E+00

avg. conc. [mg/l] = .444E+00

z [m] =	.44E+00	conc [mg/l] =	.444E+00
z [m] =	.55E+00	conc [mg/l] =	.444E+00
z [m] =	.66E+00	conc [mg/l] =	.444E+00
z [m] =	.77E+00	conc [mg/l] =	.444E+00
z [m] =	.88E+00	conc [mg/l] =	.444E+00
z [m] =	.99E+00	conc [mg/l] =	.444E+00

avg. conc. [mg/l] = .444E+00

AT123D Output File
Analysis for ...

Chemicals in the analysis
Cobalt

Number of years simulated: 50

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 50
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 50
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .5000E+02

INPUT DATA/RESULTS FOR CHEMICAL: Cobalt

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) ..... .1500E-02
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)..... .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	.230E+00
.230E+00	.230E+00	.230E+00	.230E+00	

RETARDATION FACTOR ..... .8071E+01
RETARDED SEEPAGE VELOCITY (M/YR) ..... .6930E+01
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .6930E+01
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .6930E+00
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .6930E-01

time [yr] = 1.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00

z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .112E-03
z [m] = .11E+00 conc [mg/l] = .112E-03
z [m] = .22E+00 conc [mg/l] = .112E-03
z [m] = .33E+00 conc [mg/l] = .112E-03
z [m] = .44E+00 conc [mg/l] = .112E-03
z [m] = .55E+00 conc [mg/l] = .112E-03
z [m] = .66E+00 conc [mg/l] = .112E-03
z [m] = .77E+00 conc [mg/l] = .112E-03
z [m] = .88E+00 conc [mg/l] = .112E-03
z [m] = .99E+00 conc [mg/l] = .112E-03

avg. conc. [mg/l] = .112E-03

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .457E-02
z [m] = .11E+00 conc [mg/l] = .457E-02
z [m] = .22E+00 conc [mg/l] = .457E-02
z [m] = .33E+00 conc [mg/l] = .457E-02
z [m] = .44E+00 conc [mg/l] = .457E-02
z [m] = .55E+00 conc [mg/l] = .457E-02
z [m] = .66E+00 conc [mg/l] = .457E-02
z [m] = .77E+00 conc [mg/l] = .457E-02
z [m] = .88E+00 conc [mg/l] = .457E-02
z [m] = .99E+00 conc [mg/l] = .457E-02

avg. conc. [mg/l] = .457E-02

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .122E-01
z [m] = .11E+00 conc [mg/l] = .122E-01
z [m] = .22E+00 conc [mg/l] = .122E-01
z [m] = .33E+00 conc [mg/l] = .122E-01
z [m] = .44E+00 conc [mg/l] = .122E-01
z [m] = .55E+00 conc [mg/l] = .122E-01
z [m] = .66E+00 conc [mg/l] = .122E-01
z [m] = .77E+00 conc [mg/l] = .122E-01
z [m] = .88E+00 conc [mg/l] = .122E-01
z [m] = .99E+00 conc [mg/l] = .122E-01

avg. conc. [mg/l] = .122E-01

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .199E-01
z [m] = .11E+00 conc [mg/l] = .199E-01
z [m] = .22E+00 conc [mg/l] = .199E-01
z [m] = .33E+00 conc [mg/l] = .199E-01
z [m] = .44E+00 conc [mg/l] = .199E-01
z [m] = .55E+00 conc [mg/l] = .199E-01
z [m] = .66E+00 conc [mg/l] = .199E-01
z [m] = .77E+00 conc [mg/l] = .199E-01
z [m] = .88E+00 conc [mg/l] = .199E-01
z [m] = .99E+00 conc [mg/l] = .199E-01

avg. conc. [mg/l] = .199E-01

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .273E-01
z [m] = .11E+00 conc [mg/l] = .273E-01
z [m] = .22E+00 conc [mg/l] = .273E-01
z [m] = .33E+00 conc [mg/l] = .273E-01
z [m] = .44E+00 conc [mg/l] = .273E-01
z [m] = .55E+00 conc [mg/l] = .273E-01
z [m] = .66E+00 conc [mg/l] = .273E-01
z [m] = .77E+00 conc [mg/l] = .273E-01
z [m] = .88E+00 conc [mg/l] = .273E-01
z [m] = .99E+00 conc [mg/l] = .273E-01

avg. conc. [mg/l] = .273E-01

time [yr] = 35.0

z [m] =	.00E+00	conc [mg/l] =	.319E-01
z [m] =	.11E+00	conc [mg/l] =	.319E-01
z [m] =	.22E+00	conc [mg/l] =	.319E-01
z [m] =	.33E+00	conc [mg/l] =	.319E-01
z [m] =	.44E+00	conc [mg/l] =	.319E-01
z [m] =	.55E+00	conc [mg/l] =	.319E-01
z [m] =	.66E+00	conc [mg/l] =	.319E-01
z [m] =	.77E+00	conc [mg/l] =	.319E-01
z [m] =	.88E+00	conc [mg/l] =	.319E-01
z [m] =	.99E+00	conc [mg/l] =	.319E-01

avg. conc. [mg/l] = .319E-01

time [yr] = 40.0

z [m] =	.00E+00	conc [mg/l] =	.327E-01
z [m] =	.11E+00	conc [mg/l] =	.327E-01
z [m] =	.22E+00	conc [mg/l] =	.327E-01
z [m] =	.33E+00	conc [mg/l] =	.327E-01
z [m] =	.44E+00	conc [mg/l] =	.327E-01
z [m] =	.55E+00	conc [mg/l] =	.327E-01
z [m] =	.66E+00	conc [mg/l] =	.327E-01
z [m] =	.77E+00	conc [mg/l] =	.327E-01
z [m] =	.88E+00	conc [mg/l] =	.327E-01
z [m] =	.99E+00	conc [mg/l] =	.327E-01

avg. conc. [mg/l] = .327E-01

time [yr] = 45.0

z [m] =	.00E+00	conc [mg/l] =	.328E-01
z [m] =	.11E+00	conc [mg/l] =	.328E-01
z [m] =	.22E+00	conc [mg/l] =	.328E-01
z [m] =	.33E+00	conc [mg/l] =	.328E-01
z [m] =	.44E+00	conc [mg/l] =	.328E-01
z [m] =	.55E+00	conc [mg/l] =	.328E-01
z [m] =	.66E+00	conc [mg/l] =	.328E-01
z [m] =	.77E+00	conc [mg/l] =	.328E-01
z [m] =	.88E+00	conc [mg/l] =	.328E-01
z [m] =	.99E+00	conc [mg/l] =	.328E-01

avg. conc. [mg/l] = .328E-01

time [yr] = 50.0

z [m] =	.00E+00	conc [mg/l] =	.328E-01
z [m] =	.11E+00	conc [mg/l] =	.328E-01
z [m] =	.22E+00	conc [mg/l] =	.328E-01
z [m] =	.33E+00	conc [mg/l] =	.328E-01
z [m] =	.44E+00	conc [mg/l] =	.328E-01
z [m] =	.55E+00	conc [mg/l] =	.328E-01
z [m] =	.66E+00	conc [mg/l] =	.328E-01
z [m] =	.77E+00	conc [mg/l] =	.328E-01
z [m] =	.88E+00	conc [mg/l] =	.328E-01
z [m] =	.99E+00	conc [mg/l] =	.328E-01

avg. conc. [mg/l] = .328E-01

AT123D Output File
Analysis for ...

Chemicals in the analysis
Nickel

Number of years simulated: 200

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 200
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 200
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .2000E+03

INPUT DATA/RESULTS FOR CHEMICAL: Nickel

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) .... .5000E-02
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)............................ .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00
.350E+00	.350E+00	.350E+00	.350E+00	.350E+00

.350E+00 .350E+00 .350E+00 .350E+00 .350E+00
.350E+00 .350E+00 .350E+00 .350E+00 .350E+00
.350E+00 .350E+00 .350E+00 .350E+00

RETARDATION FACTOR ..... .2457E+02
RETARDED SEEPAGE VELOCITY (M/YR) ..... .2276E+01
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .2276E+01
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .2276E+00
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .2276E-01

time [yr] = 1.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00

z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .119E-06
z [m] = .11E+00 conc [mg/l] = .119E-06
z [m] = .22E+00 conc [mg/l] = .119E-06
z [m] = .33E+00 conc [mg/l] = .119E-06
z [m] = .44E+00 conc [mg/l] = .119E-06
z [m] = .55E+00 conc [mg/l] = .119E-06
z [m] = .66E+00 conc [mg/l] = .119E-06
z [m] = .77E+00 conc [mg/l] = .119E-06
z [m] = .88E+00 conc [mg/l] = .119E-06
z [m] = .99E+00 conc [mg/l] = .119E-06

avg. conc. [mg/l] = .119E-06

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .211E-04
z [m] = .11E+00 conc [mg/l] = .211E-04
z [m] = .22E+00 conc [mg/l] = .211E-04
z [m] = .33E+00 conc [mg/l] = .211E-04
z [m] = .44E+00 conc [mg/l] = .211E-04
z [m] = .55E+00 conc [mg/l] = .211E-04
z [m] = .66E+00 conc [mg/l] = .211E-04
z [m] = .77E+00 conc [mg/l] = .211E-04
z [m] = .88E+00 conc [mg/l] = .211E-04
z [m] = .99E+00 conc [mg/l] = .211E-04

avg. conc. [mg/l] = .211E-04

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .356E-03
z [m] = .11E+00 conc [mg/l] = .356E-03
z [m] = .22E+00 conc [mg/l] = .356E-03
z [m] = .33E+00 conc [mg/l] = .356E-03
z [m] = .44E+00 conc [mg/l] = .356E-03
z [m] = .55E+00 conc [mg/l] = .356E-03
z [m] = .66E+00 conc [mg/l] = .356E-03
z [m] = .77E+00 conc [mg/l] = .356E-03
z [m] = .88E+00 conc [mg/l] = .356E-03
z [m] = .99E+00 conc [mg/l] = .356E-03

avg. conc. [mg/l] = .356E-03

time [yr] = 35.0

z [m] = .00E+00 conc [mg/l] = .176E-02
z [m] = .11E+00 conc [mg/l] = .176E-02
z [m] = .22E+00 conc [mg/l] = .176E-02
z [m] = .33E+00 conc [mg/l] = .176E-02
z [m] = .44E+00 conc [mg/l] = .176E-02
z [m] = .55E+00 conc [mg/l] = .176E-02
z [m] = .66E+00 conc [mg/l] = .176E-02
z [m] = .77E+00 conc [mg/l] = .176E-02
z [m] = .88E+00 conc [mg/l] = .176E-02
z [m] = .99E+00 conc [mg/l] = .176E-02

avg. conc. [mg/l] = .176E-02

time [yr] = 40.0

z [m] = .00E+00 conc [mg/l] = .446E-02
z [m] = .11E+00 conc [mg/l] = .446E-02
z [m] = .22E+00 conc [mg/l] = .446E-02
z [m] = .33E+00 conc [mg/l] = .446E-02
z [m] = .44E+00 conc [mg/l] = .446E-02
z [m] = .55E+00 conc [mg/l] = .446E-02
z [m] = .66E+00 conc [mg/l] = .446E-02
z [m] = .77E+00 conc [mg/l] = .446E-02
z [m] = .88E+00 conc [mg/l] = .446E-02
z [m] = .99E+00 conc [mg/l] = .446E-02

avg. conc. [mg/l] = .446E-02

time [yr] = 45.0

z [m] = .00E+00 conc [mg/l] = .796E-02
z [m] = .11E+00 conc [mg/l] = .796E-02
z [m] = .22E+00 conc [mg/l] = .796E-02
z [m] = .33E+00 conc [mg/l] = .796E-02
z [m] = .44E+00 conc [mg/l] = .796E-02
z [m] = .55E+00 conc [mg/l] = .796E-02
z [m] = .66E+00 conc [mg/l] = .796E-02
z [m] = .77E+00 conc [mg/l] = .796E-02
z [m] = .88E+00 conc [mg/l] = .796E-02
z [m] = .99E+00 conc [mg/l] = .796E-02

avg. conc. [mg/l] = .796E-02

time [yr] = 50.0

z [m] = .00E+00 conc [mg/l] = .117E-01
z [m] = .11E+00 conc [mg/l] = .117E-01
z [m] = .22E+00 conc [mg/l] = .117E-01
z [m] = .33E+00 conc [mg/l] = .117E-01
z [m] = .44E+00 conc [mg/l] = .117E-01
z [m] = .55E+00 conc [mg/l] = .117E-01
z [m] = .66E+00 conc [mg/l] = .117E-01
z [m] = .77E+00 conc [mg/l] = .117E-01
z [m] = .88E+00 conc [mg/l] = .117E-01

z [m] = .99E+00 conc [mg/l] = .117E-01

avg. conc. [mg/l] = .117E-01

time [yr] = 55.0

z [m] = .00E+00 conc [mg/l] = .156E-01
z [m] = .11E+00 conc [mg/l] = .156E-01
z [m] = .22E+00 conc [mg/l] = .156E-01
z [m] = .33E+00 conc [mg/l] = .156E-01
z [m] = .44E+00 conc [mg/l] = .156E-01
z [m] = .55E+00 conc [mg/l] = .156E-01
z [m] = .66E+00 conc [mg/l] = .156E-01
z [m] = .77E+00 conc [mg/l] = .156E-01
z [m] = .88E+00 conc [mg/l] = .156E-01
z [m] = .99E+00 conc [mg/l] = .156E-01

avg. conc. [mg/l] = .156E-01

time [yr] = 60.0

z [m] = .00E+00 conc [mg/l] = .194E-01
z [m] = .11E+00 conc [mg/l] = .194E-01
z [m] = .22E+00 conc [mg/l] = .194E-01
z [m] = .33E+00 conc [mg/l] = .194E-01
z [m] = .44E+00 conc [mg/l] = .194E-01
z [m] = .55E+00 conc [mg/l] = .194E-01
z [m] = .66E+00 conc [mg/l] = .194E-01
z [m] = .77E+00 conc [mg/l] = .194E-01
z [m] = .88E+00 conc [mg/l] = .194E-01
z [m] = .99E+00 conc [mg/l] = .194E-01

avg. conc. [mg/l] = .194E-01

time [yr] = 65.0

z [m] = .00E+00 conc [mg/l] = .233E-01
z [m] = .11E+00 conc [mg/l] = .233E-01
z [m] = .22E+00 conc [mg/l] = .233E-01
z [m] = .33E+00 conc [mg/l] = .233E-01
z [m] = .44E+00 conc [mg/l] = .233E-01
z [m] = .55E+00 conc [mg/l] = .233E-01

z [m] = .66E+00 conc [mg/l] = .233E-01
z [m] = .77E+00 conc [mg/l] = .233E-01
z [m] = .88E+00 conc [mg/l] = .233E-01
z [m] = .99E+00 conc [mg/l] = .233E-01

avg. conc. [mg/l] = .233E-01

time [yr] = 70.0

z [m] = .00E+00 conc [mg/l] = .272E-01
z [m] = .11E+00 conc [mg/l] = .272E-01
z [m] = .22E+00 conc [mg/l] = .272E-01
z [m] = .33E+00 conc [mg/l] = .272E-01
z [m] = .44E+00 conc [mg/l] = .272E-01
z [m] = .55E+00 conc [mg/l] = .272E-01
z [m] = .66E+00 conc [mg/l] = .272E-01
z [m] = .77E+00 conc [mg/l] = .272E-01
z [m] = .88E+00 conc [mg/l] = .272E-01
z [m] = .99E+00 conc [mg/l] = .272E-01

avg. conc. [mg/l] = .272E-01

time [yr] = 75.0

z [m] = .00E+00 conc [mg/l] = .310E-01
z [m] = .11E+00 conc [mg/l] = .310E-01
z [m] = .22E+00 conc [mg/l] = .310E-01
z [m] = .33E+00 conc [mg/l] = .310E-01
z [m] = .44E+00 conc [mg/l] = .310E-01
z [m] = .55E+00 conc [mg/l] = .310E-01
z [m] = .66E+00 conc [mg/l] = .310E-01
z [m] = .77E+00 conc [mg/l] = .310E-01
z [m] = .88E+00 conc [mg/l] = .310E-01
z [m] = .99E+00 conc [mg/l] = .310E-01

avg. conc. [mg/l] = .310E-01

time [yr] = 80.0

z [m] = .00E+00 conc [mg/l] = .348E-01
z [m] = .11E+00 conc [mg/l] = .348E-01
z [m] = .22E+00 conc [mg/l] = .348E-01

z [m] = .33E+00 conc [mg/l] = .348E-01
z [m] = .44E+00 conc [mg/l] = .348E-01
z [m] = .55E+00 conc [mg/l] = .348E-01
z [m] = .66E+00 conc [mg/l] = .348E-01
z [m] = .77E+00 conc [mg/l] = .348E-01
z [m] = .88E+00 conc [mg/l] = .348E-01
z [m] = .99E+00 conc [mg/l] = .348E-01

avg. conc. [mg/l] = .348E-01

time [yr] = 85.0

z [m] = .00E+00 conc [mg/l] = .386E-01
z [m] = .11E+00 conc [mg/l] = .386E-01
z [m] = .22E+00 conc [mg/l] = .386E-01
z [m] = .33E+00 conc [mg/l] = .386E-01
z [m] = .44E+00 conc [mg/l] = .386E-01
z [m] = .55E+00 conc [mg/l] = .386E-01
z [m] = .66E+00 conc [mg/l] = .386E-01
z [m] = .77E+00 conc [mg/l] = .386E-01
z [m] = .88E+00 conc [mg/l] = .386E-01
z [m] = .99E+00 conc [mg/l] = .386E-01

avg. conc. [mg/l] = .386E-01

time [yr] = 90.0

z [m] = .00E+00 conc [mg/l] = .421E-01
z [m] = .11E+00 conc [mg/l] = .421E-01
z [m] = .22E+00 conc [mg/l] = .421E-01
z [m] = .33E+00 conc [mg/l] = .421E-01
z [m] = .44E+00 conc [mg/l] = .421E-01
z [m] = .55E+00 conc [mg/l] = .421E-01
z [m] = .66E+00 conc [mg/l] = .421E-01
z [m] = .77E+00 conc [mg/l] = .421E-01
z [m] = .88E+00 conc [mg/l] = .421E-01
z [m] = .99E+00 conc [mg/l] = .421E-01

avg. conc. [mg/l] = .421E-01

time [yr] = 95.0

z [m] = .00E+00 conc [mg/l] = .450E-01
z [m] = .11E+00 conc [mg/l] = .450E-01
z [m] = .22E+00 conc [mg/l] = .450E-01
z [m] = .33E+00 conc [mg/l] = .450E-01
z [m] = .44E+00 conc [mg/l] = .450E-01
z [m] = .55E+00 conc [mg/l] = .450E-01
z [m] = .66E+00 conc [mg/l] = .450E-01
z [m] = .77E+00 conc [mg/l] = .450E-01
z [m] = .88E+00 conc [mg/l] = .450E-01
z [m] = .99E+00 conc [mg/l] = .450E-01

avg. conc. [mg/l] = .450E-01

time [yr] = 100.

z [m] = .00E+00 conc [mg/l] = .472E-01
z [m] = .11E+00 conc [mg/l] = .472E-01
z [m] = .22E+00 conc [mg/l] = .472E-01
z [m] = .33E+00 conc [mg/l] = .472E-01
z [m] = .44E+00 conc [mg/l] = .472E-01
z [m] = .55E+00 conc [mg/l] = .472E-01
z [m] = .66E+00 conc [mg/l] = .472E-01
z [m] = .77E+00 conc [mg/l] = .472E-01
z [m] = .88E+00 conc [mg/l] = .472E-01
z [m] = .99E+00 conc [mg/l] = .472E-01

avg. conc. [mg/l] = .472E-01

time [yr] = 105.

z [m] = .00E+00 conc [mg/l] = .486E-01
z [m] = .11E+00 conc [mg/l] = .486E-01
z [m] = .22E+00 conc [mg/l] = .486E-01
z [m] = .33E+00 conc [mg/l] = .486E-01
z [m] = .44E+00 conc [mg/l] = .486E-01
z [m] = .55E+00 conc [mg/l] = .486E-01
z [m] = .66E+00 conc [mg/l] = .486E-01
z [m] = .77E+00 conc [mg/l] = .486E-01
z [m] = .88E+00 conc [mg/l] = .486E-01
z [m] = .99E+00 conc [mg/l] = .486E-01

avg. conc. [mg/l] = .486E-01

time [yr] = 110.

z [m] =	.00E+00	conc [mg/l] =	.493E-01
z [m] =	.11E+00	conc [mg/l] =	.493E-01
z [m] =	.22E+00	conc [mg/l] =	.493E-01
z [m] =	.33E+00	conc [mg/l] =	.493E-01
z [m] =	.44E+00	conc [mg/l] =	.493E-01
z [m] =	.55E+00	conc [mg/l] =	.493E-01
z [m] =	.66E+00	conc [mg/l] =	.493E-01
z [m] =	.77E+00	conc [mg/l] =	.493E-01
z [m] =	.88E+00	conc [mg/l] =	.493E-01
z [m] =	.99E+00	conc [mg/l] =	.493E-01

avg. conc. [mg/l] = .493E-01

time [yr] = 115.

z [m] =	.00E+00	conc [mg/l] =	.497E-01
z [m] =	.11E+00	conc [mg/l] =	.497E-01
z [m] =	.22E+00	conc [mg/l] =	.497E-01
z [m] =	.33E+00	conc [mg/l] =	.497E-01
z [m] =	.44E+00	conc [mg/l] =	.497E-01
z [m] =	.55E+00	conc [mg/l] =	.497E-01
z [m] =	.66E+00	conc [mg/l] =	.497E-01
z [m] =	.77E+00	conc [mg/l] =	.497E-01
z [m] =	.88E+00	conc [mg/l] =	.497E-01
z [m] =	.99E+00	conc [mg/l] =	.497E-01

avg. conc. [mg/l] = .497E-01

time [yr] = 120.

z [m] =	.00E+00	conc [mg/l] =	.498E-01
z [m] =	.11E+00	conc [mg/l] =	.498E-01
z [m] =	.22E+00	conc [mg/l] =	.498E-01
z [m] =	.33E+00	conc [mg/l] =	.498E-01
z [m] =	.44E+00	conc [mg/l] =	.498E-01
z [m] =	.55E+00	conc [mg/l] =	.498E-01
z [m] =	.66E+00	conc [mg/l] =	.498E-01
z [m] =	.77E+00	conc [mg/l] =	.498E-01
z [m] =	.88E+00	conc [mg/l] =	.498E-01
z [m] =	.99E+00	conc [mg/l] =	.498E-01

avg. conc. [mg/l] = .498E-01

time [yr] = 125.

z [m] =	.00E+00	conc [mg/l] =	.498E-01
z [m] =	.11E+00	conc [mg/l] =	.498E-01
z [m] =	.22E+00	conc [mg/l] =	.498E-01
z [m] =	.33E+00	conc [mg/l] =	.498E-01
z [m] =	.44E+00	conc [mg/l] =	.498E-01
z [m] =	.55E+00	conc [mg/l] =	.498E-01
z [m] =	.66E+00	conc [mg/l] =	.498E-01
z [m] =	.77E+00	conc [mg/l] =	.498E-01
z [m] =	.88E+00	conc [mg/l] =	.498E-01
z [m] =	.99E+00	conc [mg/l] =	.498E-01

avg. conc. [mg/l] = .498E-01

time [yr] = 130.

z [m] =	.00E+00	conc [mg/l] =	.498E-01
z [m] =	.11E+00	conc [mg/l] =	.498E-01
z [m] =	.22E+00	conc [mg/l] =	.498E-01
z [m] =	.33E+00	conc [mg/l] =	.498E-01
z [m] =	.44E+00	conc [mg/l] =	.498E-01
z [m] =	.55E+00	conc [mg/l] =	.498E-01
z [m] =	.66E+00	conc [mg/l] =	.498E-01
z [m] =	.77E+00	conc [mg/l] =	.498E-01
z [m] =	.88E+00	conc [mg/l] =	.498E-01
z [m] =	.99E+00	conc [mg/l] =	.498E-01

avg. conc. [mg/l] = .498E-01

time [yr] = 135.

z [m] =	.00E+00	conc [mg/l] =	.498E-01
z [m] =	.11E+00	conc [mg/l] =	.498E-01
z [m] =	.22E+00	conc [mg/l] =	.498E-01
z [m] =	.33E+00	conc [mg/l] =	.498E-01
z [m] =	.44E+00	conc [mg/l] =	.498E-01
z [m] =	.55E+00	conc [mg/l] =	.498E-01
z [m] =	.66E+00	conc [mg/l] =	.498E-01

z [m] = .77E+00 conc [mg/l] = .498E-01
z [m] = .88E+00 conc [mg/l] = .498E-01
z [m] = .99E+00 conc [mg/l] = .498E-01

avg. conc. [mg/l] = .498E-01

time [yr] = 140.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 145.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 150.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01

z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 155.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 160.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 165.

z [m] = .00E+00 conc [mg/l] = .499E-01

z [m] =	.11E+00	conc [mg/l] =	.499E-01
z [m] =	.22E+00	conc [mg/l] =	.499E-01
z [m] =	.33E+00	conc [mg/l] =	.499E-01
z [m] =	.44E+00	conc [mg/l] =	.499E-01
z [m] =	.55E+00	conc [mg/l] =	.499E-01
z [m] =	.66E+00	conc [mg/l] =	.499E-01
z [m] =	.77E+00	conc [mg/l] =	.499E-01
z [m] =	.88E+00	conc [mg/l] =	.499E-01
z [m] =	.99E+00	conc [mg/l] =	.499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 170.

z [m] =	.00E+00	conc [mg/l] =	.499E-01
z [m] =	.11E+00	conc [mg/l] =	.499E-01
z [m] =	.22E+00	conc [mg/l] =	.499E-01
z [m] =	.33E+00	conc [mg/l] =	.499E-01
z [m] =	.44E+00	conc [mg/l] =	.499E-01
z [m] =	.55E+00	conc [mg/l] =	.499E-01
z [m] =	.66E+00	conc [mg/l] =	.499E-01
z [m] =	.77E+00	conc [mg/l] =	.499E-01
z [m] =	.88E+00	conc [mg/l] =	.499E-01
z [m] =	.99E+00	conc [mg/l] =	.499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 175.

z [m] =	.00E+00	conc [mg/l] =	.499E-01
z [m] =	.11E+00	conc [mg/l] =	.499E-01
z [m] =	.22E+00	conc [mg/l] =	.499E-01
z [m] =	.33E+00	conc [mg/l] =	.499E-01
z [m] =	.44E+00	conc [mg/l] =	.499E-01
z [m] =	.55E+00	conc [mg/l] =	.499E-01
z [m] =	.66E+00	conc [mg/l] =	.499E-01
z [m] =	.77E+00	conc [mg/l] =	.499E-01
z [m] =	.88E+00	conc [mg/l] =	.499E-01
z [m] =	.99E+00	conc [mg/l] =	.499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 180.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 185.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 190.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 195.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

time [yr] = 200.

z [m] = .00E+00 conc [mg/l] = .499E-01
z [m] = .11E+00 conc [mg/l] = .499E-01
z [m] = .22E+00 conc [mg/l] = .499E-01
z [m] = .33E+00 conc [mg/l] = .499E-01
z [m] = .44E+00 conc [mg/l] = .499E-01
z [m] = .55E+00 conc [mg/l] = .499E-01
z [m] = .66E+00 conc [mg/l] = .499E-01
z [m] = .77E+00 conc [mg/l] = .499E-01
z [m] = .88E+00 conc [mg/l] = .499E-01
z [m] = .99E+00 conc [mg/l] = .499E-01

avg. conc. [mg/l] = .499E-01

AT123D Output File
Analysis for ...

Chemicals in the analysis
Thallium

Number of years simulated: 200

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 200
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 200
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .2000E+03

INPUT DATA/RESULTS FOR CHEMICAL: Thalllium

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) ..... .5000E-01
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)..... .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
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.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
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.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
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.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
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.330E-01	.330E-01	.330E-01	.330E-01	.330E-01
.330E-01	.330E-01	.330E-01	.330E-01	.330E-01

.330E-01 .330E-01 .330E-01 .330E-01 .330E-01
.330E-01 .330E-01 .330E-01 .330E-01 .330E-01
.330E-01 .330E-01 .330E-01 .330E-01

RETARDATION FACTOR ..... .2367E+03
RETARDED SEEPAGE VELOCITY (M/YR) ..... .2363E+00
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .2363E+00
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .2363E-01
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .2363E-02

time [yr] = 1.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00

z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 35.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 40.0

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00
z [m] =	.33E+00	conc [mg/l] =	.000E+00
z [m] =	.44E+00	conc [mg/l] =	.000E+00
z [m] =	.55E+00	conc [mg/l] =	.000E+00
z [m] =	.66E+00	conc [mg/l] =	.000E+00
z [m] =	.77E+00	conc [mg/l] =	.000E+00
z [m] =	.88E+00	conc [mg/l] =	.000E+00
z [m] =	.99E+00	conc [mg/l] =	.000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 45.0

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00
z [m] =	.33E+00	conc [mg/l] =	.000E+00
z [m] =	.44E+00	conc [mg/l] =	.000E+00
z [m] =	.55E+00	conc [mg/l] =	.000E+00
z [m] =	.66E+00	conc [mg/l] =	.000E+00
z [m] =	.77E+00	conc [mg/l] =	.000E+00
z [m] =	.88E+00	conc [mg/l] =	.000E+00
z [m] =	.99E+00	conc [mg/l] =	.000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 50.0

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00
z [m] =	.33E+00	conc [mg/l] =	.000E+00
z [m] =	.44E+00	conc [mg/l] =	.000E+00
z [m] =	.55E+00	conc [mg/l] =	.000E+00
z [m] =	.66E+00	conc [mg/l] =	.000E+00
z [m] =	.77E+00	conc [mg/l] =	.000E+00
z [m] =	.88E+00	conc [mg/l] =	.000E+00

z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 55.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 60.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 65.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00

z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 70.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 75.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 80.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00

z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 85.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 90.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 95.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 100.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 105.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 110.

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00
z [m] =	.33E+00	conc [mg/l] =	.000E+00
z [m] =	.44E+00	conc [mg/l] =	.000E+00
z [m] =	.55E+00	conc [mg/l] =	.000E+00
z [m] =	.66E+00	conc [mg/l] =	.000E+00
z [m] =	.77E+00	conc [mg/l] =	.000E+00
z [m] =	.88E+00	conc [mg/l] =	.000E+00
z [m] =	.99E+00	conc [mg/l] =	.000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 115.

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00
z [m] =	.33E+00	conc [mg/l] =	.000E+00
z [m] =	.44E+00	conc [mg/l] =	.000E+00
z [m] =	.55E+00	conc [mg/l] =	.000E+00
z [m] =	.66E+00	conc [mg/l] =	.000E+00
z [m] =	.77E+00	conc [mg/l] =	.000E+00
z [m] =	.88E+00	conc [mg/l] =	.000E+00
z [m] =	.99E+00	conc [mg/l] =	.000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 120.

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00
z [m] =	.33E+00	conc [mg/l] =	.000E+00
z [m] =	.44E+00	conc [mg/l] =	.000E+00
z [m] =	.55E+00	conc [mg/l] =	.000E+00
z [m] =	.66E+00	conc [mg/l] =	.000E+00
z [m] =	.77E+00	conc [mg/l] =	.000E+00
z [m] =	.88E+00	conc [mg/l] =	.000E+00
z [m] =	.99E+00	conc [mg/l] =	.000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 125.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 130.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 135.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00

z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 140.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 145.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 150.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00

z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 155.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 160.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 165.

z [m] = .00E+00 conc [mg/l] = .000E+00

z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 170.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 175.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 180.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 185.

z [m] = .00E+00 conc [mg/l] = .128E-07
z [m] = .11E+00 conc [mg/l] = .128E-07
z [m] = .22E+00 conc [mg/l] = .128E-07
z [m] = .33E+00 conc [mg/l] = .128E-07
z [m] = .44E+00 conc [mg/l] = .128E-07
z [m] = .55E+00 conc [mg/l] = .128E-07
z [m] = .66E+00 conc [mg/l] = .128E-07
z [m] = .77E+00 conc [mg/l] = .128E-07
z [m] = .88E+00 conc [mg/l] = .128E-07
z [m] = .99E+00 conc [mg/l] = .128E-07

avg. conc. [mg/l] = .128E-07

time [yr] = 190.

z [m] = .00E+00 conc [mg/l] = .256E-07
z [m] = .11E+00 conc [mg/l] = .256E-07
z [m] = .22E+00 conc [mg/l] = .256E-07
z [m] = .33E+00 conc [mg/l] = .256E-07
z [m] = .44E+00 conc [mg/l] = .256E-07
z [m] = .55E+00 conc [mg/l] = .256E-07
z [m] = .66E+00 conc [mg/l] = .256E-07
z [m] = .77E+00 conc [mg/l] = .256E-07
z [m] = .88E+00 conc [mg/l] = .256E-07
z [m] = .99E+00 conc [mg/l] = .256E-07

avg. conc. [mg/l] = .256E-07

time [yr] = 195.

z [m] = .00E+00 conc [mg/l] = .491E-07
z [m] = .11E+00 conc [mg/l] = .491E-07
z [m] = .22E+00 conc [mg/l] = .491E-07
z [m] = .33E+00 conc [mg/l] = .491E-07
z [m] = .44E+00 conc [mg/l] = .491E-07
z [m] = .55E+00 conc [mg/l] = .491E-07
z [m] = .66E+00 conc [mg/l] = .491E-07
z [m] = .77E+00 conc [mg/l] = .491E-07
z [m] = .88E+00 conc [mg/l] = .491E-07
z [m] = .99E+00 conc [mg/l] = .491E-07

avg. conc. [mg/l] = .491E-07

time [yr] = 200.

z [m] = .00E+00 conc [mg/l] = .902E-07
z [m] = .11E+00 conc [mg/l] = .902E-07
z [m] = .22E+00 conc [mg/l] = .902E-07
z [m] = .33E+00 conc [mg/l] = .902E-07
z [m] = .44E+00 conc [mg/l] = .902E-07
z [m] = .55E+00 conc [mg/l] = .902E-07
z [m] = .66E+00 conc [mg/l] = .902E-07
z [m] = .77E+00 conc [mg/l] = .902E-07
z [m] = .88E+00 conc [mg/l] = .902E-07
z [m] = .99E+00 conc [mg/l] = .902E-07

avg. conc. [mg/l] = .902E-07

AT123D Output File
Analysis for ...

Chemicals in the analysis
Zinc

Number of years simulated: 50

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 50
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 50
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .5000E+02

INPUT DATA/RESULTS FOR CHEMICAL: Zinc

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) ..... .1330E-02
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)..... .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	.161E+01
.161E+01	.161E+01	.161E+01	.161E+01	

RETARDATION FACTOR ..... .7270E+01
RETARDED SEEPAGE VELOCITY (M/YR) ..... .7694E+01
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .7694E+01
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .7694E+00
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .7694E-01

time [yr] = 1.00

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00
z [m] =	.33E+00	conc [mg/l] =	.000E+00
z [m] =	.44E+00	conc [mg/l] =	.000E+00
z [m] =	.55E+00	conc [mg/l] =	.000E+00
z [m] =	.66E+00	conc [mg/l] =	.000E+00
z [m] =	.77E+00	conc [mg/l] =	.000E+00
z [m] =	.88E+00	conc [mg/l] =	.000E+00
z [m] =	.99E+00	conc [mg/l] =	.000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00

z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .282E-02
z [m] = .11E+00 conc [mg/l] = .282E-02
z [m] = .22E+00 conc [mg/l] = .282E-02
z [m] = .33E+00 conc [mg/l] = .282E-02
z [m] = .44E+00 conc [mg/l] = .282E-02
z [m] = .55E+00 conc [mg/l] = .282E-02
z [m] = .66E+00 conc [mg/l] = .282E-02
z [m] = .77E+00 conc [mg/l] = .282E-02
z [m] = .88E+00 conc [mg/l] = .282E-02
z [m] = .99E+00 conc [mg/l] = .282E-02

avg. conc. [mg/l] = .282E-02

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .481E-01
z [m] = .11E+00 conc [mg/l] = .481E-01
z [m] = .22E+00 conc [mg/l] = .481E-01
z [m] = .33E+00 conc [mg/l] = .481E-01
z [m] = .44E+00 conc [mg/l] = .481E-01
z [m] = .55E+00 conc [mg/l] = .481E-01
z [m] = .66E+00 conc [mg/l] = .481E-01
z [m] = .77E+00 conc [mg/l] = .481E-01
z [m] = .88E+00 conc [mg/l] = .481E-01
z [m] = .99E+00 conc [mg/l] = .481E-01

avg. conc. [mg/l] = .481E-01

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .108E+00
z [m] = .11E+00 conc [mg/l] = .108E+00
z [m] = .22E+00 conc [mg/l] = .108E+00
z [m] = .33E+00 conc [mg/l] = .108E+00
z [m] = .44E+00 conc [mg/l] = .108E+00
z [m] = .55E+00 conc [mg/l] = .108E+00
z [m] = .66E+00 conc [mg/l] = .108E+00
z [m] = .77E+00 conc [mg/l] = .108E+00
z [m] = .88E+00 conc [mg/l] = .108E+00
z [m] = .99E+00 conc [mg/l] = .108E+00

avg. conc. [mg/l] = .108E+00

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .168E+00
z [m] = .11E+00 conc [mg/l] = .168E+00
z [m] = .22E+00 conc [mg/l] = .168E+00
z [m] = .33E+00 conc [mg/l] = .168E+00
z [m] = .44E+00 conc [mg/l] = .168E+00
z [m] = .55E+00 conc [mg/l] = .168E+00
z [m] = .66E+00 conc [mg/l] = .168E+00
z [m] = .77E+00 conc [mg/l] = .168E+00
z [m] = .88E+00 conc [mg/l] = .168E+00
z [m] = .99E+00 conc [mg/l] = .168E+00

avg. conc. [mg/l] = .168E+00

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .215E+00
z [m] = .11E+00 conc [mg/l] = .215E+00
z [m] = .22E+00 conc [mg/l] = .215E+00
z [m] = .33E+00 conc [mg/l] = .215E+00
z [m] = .44E+00 conc [mg/l] = .215E+00
z [m] = .55E+00 conc [mg/l] = .215E+00
z [m] = .66E+00 conc [mg/l] = .215E+00
z [m] = .77E+00 conc [mg/l] = .215E+00
z [m] = .88E+00 conc [mg/l] = .215E+00
z [m] = .99E+00 conc [mg/l] = .215E+00

avg. conc. [mg/l] = .215E+00

time [yr] = 35.0

z [m] =	.00E+00	conc [mg/l] =	.229E+00
z [m] =	.11E+00	conc [mg/l] =	.229E+00
z [m] =	.22E+00	conc [mg/l] =	.229E+00
z [m] =	.33E+00	conc [mg/l] =	.229E+00
z [m] =	.44E+00	conc [mg/l] =	.229E+00
z [m] =	.55E+00	conc [mg/l] =	.229E+00
z [m] =	.66E+00	conc [mg/l] =	.229E+00
z [m] =	.77E+00	conc [mg/l] =	.229E+00
z [m] =	.88E+00	conc [mg/l] =	.229E+00
z [m] =	.99E+00	conc [mg/l] =	.229E+00

avg. conc. [mg/l] = .229E+00

time [yr] = 40.0

z [m] =	.00E+00	conc [mg/l] =	.229E+00
z [m] =	.11E+00	conc [mg/l] =	.229E+00
z [m] =	.22E+00	conc [mg/l] =	.229E+00
z [m] =	.33E+00	conc [mg/l] =	.229E+00
z [m] =	.44E+00	conc [mg/l] =	.229E+00
z [m] =	.55E+00	conc [mg/l] =	.229E+00
z [m] =	.66E+00	conc [mg/l] =	.229E+00
z [m] =	.77E+00	conc [mg/l] =	.229E+00
z [m] =	.88E+00	conc [mg/l] =	.229E+00
z [m] =	.99E+00	conc [mg/l] =	.229E+00

avg. conc. [mg/l] = .229E+00

time [yr] = 45.0

z [m] =	.00E+00	conc [mg/l] =	.229E+00
z [m] =	.11E+00	conc [mg/l] =	.229E+00
z [m] =	.22E+00	conc [mg/l] =	.229E+00
z [m] =	.33E+00	conc [mg/l] =	.229E+00
z [m] =	.44E+00	conc [mg/l] =	.229E+00
z [m] =	.55E+00	conc [mg/l] =	.229E+00
z [m] =	.66E+00	conc [mg/l] =	.229E+00
z [m] =	.77E+00	conc [mg/l] =	.229E+00
z [m] =	.88E+00	conc [mg/l] =	.229E+00
z [m] =	.99E+00	conc [mg/l] =	.229E+00

avg. conc. [mg/l] = .229E+00

time [yr] = 50.0

z [m] =	.00E+00	conc [mg/l] =	.229E+00
z [m] =	.11E+00	conc [mg/l] =	.229E+00
z [m] =	.22E+00	conc [mg/l] =	.229E+00
z [m] =	.33E+00	conc [mg/l] =	.229E+00
z [m] =	.44E+00	conc [mg/l] =	.229E+00
z [m] =	.55E+00	conc [mg/l] =	.229E+00
z [m] =	.66E+00	conc [mg/l] =	.229E+00
z [m] =	.77E+00	conc [mg/l] =	.229E+00
z [m] =	.88E+00	conc [mg/l] =	.229E+00
z [m] =	.99E+00	conc [mg/l] =	.229E+00

avg. conc. [mg/l] = .229E+00

AT123D Output File
Analysis for ...

Chemicals in the analysis
Cyanide

Number of years simulated: 50

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 50
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 50
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .5000E+02

INPUT DATA/RESULTS FOR CHEMICAL: Cyanide

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) ..... .0000E+00
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)..... .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	.250E+00
.250E+00	.250E+00	.250E+00	.250E+00	

RETARDATION FACTOR ..... .1000E+01
RETARDED SEEPAGE VELOCITY (M/YR) ..... .5593E+02
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .5593E+02
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .5593E+01
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .5593E+00

time [yr] = 1.00

z [m] =	.00E+00	conc [mg/l] =	.000E+00
z [m] =	.11E+00	conc [mg/l] =	.000E+00
z [m] =	.22E+00	conc [mg/l] =	.000E+00
z [m] =	.33E+00	conc [mg/l] =	.000E+00
z [m] =	.44E+00	conc [mg/l] =	.000E+00
z [m] =	.55E+00	conc [mg/l] =	.000E+00
z [m] =	.66E+00	conc [mg/l] =	.000E+00
z [m] =	.77E+00	conc [mg/l] =	.000E+00
z [m] =	.88E+00	conc [mg/l] =	.000E+00
z [m] =	.99E+00	conc [mg/l] =	.000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] =	.00E+00	conc [mg/l] =	.297E-01
z [m] =	.11E+00	conc [mg/l] =	.297E-01
z [m] =	.22E+00	conc [mg/l] =	.297E-01

z [m] = .33E+00 conc [mg/l] = .297E-01
z [m] = .44E+00 conc [mg/l] = .297E-01
z [m] = .55E+00 conc [mg/l] = .297E-01
z [m] = .66E+00 conc [mg/l] = .297E-01
z [m] = .77E+00 conc [mg/l] = .297E-01
z [m] = .88E+00 conc [mg/l] = .297E-01
z [m] = .99E+00 conc [mg/l] = .297E-01

avg. conc. [mg/l] = .297E-01

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .361E-01
z [m] = .11E+00 conc [mg/l] = .361E-01
z [m] = .22E+00 conc [mg/l] = .361E-01
z [m] = .33E+00 conc [mg/l] = .361E-01
z [m] = .44E+00 conc [mg/l] = .361E-01
z [m] = .55E+00 conc [mg/l] = .361E-01
z [m] = .66E+00 conc [mg/l] = .361E-01
z [m] = .77E+00 conc [mg/l] = .361E-01
z [m] = .88E+00 conc [mg/l] = .361E-01
z [m] = .99E+00 conc [mg/l] = .361E-01

avg. conc. [mg/l] = .361E-01

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .321E-01
z [m] = .11E+00 conc [mg/l] = .321E-01
z [m] = .22E+00 conc [mg/l] = .321E-01
z [m] = .33E+00 conc [mg/l] = .321E-01
z [m] = .44E+00 conc [mg/l] = .321E-01
z [m] = .55E+00 conc [mg/l] = .321E-01
z [m] = .66E+00 conc [mg/l] = .321E-01
z [m] = .77E+00 conc [mg/l] = .321E-01
z [m] = .88E+00 conc [mg/l] = .321E-01
z [m] = .99E+00 conc [mg/l] = .321E-01

avg. conc. [mg/l] = .321E-01

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .361E-01
z [m] = .11E+00 conc [mg/l] = .361E-01
z [m] = .22E+00 conc [mg/l] = .361E-01
z [m] = .33E+00 conc [mg/l] = .361E-01
z [m] = .44E+00 conc [mg/l] = .361E-01
z [m] = .55E+00 conc [mg/l] = .361E-01
z [m] = .66E+00 conc [mg/l] = .361E-01
z [m] = .77E+00 conc [mg/l] = .361E-01
z [m] = .88E+00 conc [mg/l] = .361E-01
z [m] = .99E+00 conc [mg/l] = .361E-01

avg. conc. [mg/l] = .361E-01

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .321E-01
z [m] = .11E+00 conc [mg/l] = .321E-01
z [m] = .22E+00 conc [mg/l] = .321E-01
z [m] = .33E+00 conc [mg/l] = .321E-01
z [m] = .44E+00 conc [mg/l] = .321E-01
z [m] = .55E+00 conc [mg/l] = .321E-01
z [m] = .66E+00 conc [mg/l] = .321E-01
z [m] = .77E+00 conc [mg/l] = .321E-01
z [m] = .88E+00 conc [mg/l] = .321E-01
z [m] = .99E+00 conc [mg/l] = .321E-01

avg. conc. [mg/l] = .321E-01

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .361E-01
z [m] = .11E+00 conc [mg/l] = .361E-01
z [m] = .22E+00 conc [mg/l] = .361E-01
z [m] = .33E+00 conc [mg/l] = .361E-01
z [m] = .44E+00 conc [mg/l] = .361E-01
z [m] = .55E+00 conc [mg/l] = .361E-01
z [m] = .66E+00 conc [mg/l] = .361E-01
z [m] = .77E+00 conc [mg/l] = .361E-01
z [m] = .88E+00 conc [mg/l] = .361E-01
z [m] = .99E+00 conc [mg/l] = .361E-01

avg. conc. [mg/l] = .361E-01

time [yr] = 35.0

z [m] =	.00E+00	conc [mg/l] =	.321E-01
z [m] =	.11E+00	conc [mg/l] =	.321E-01
z [m] =	.22E+00	conc [mg/l] =	.321E-01
z [m] =	.33E+00	conc [mg/l] =	.321E-01
z [m] =	.44E+00	conc [mg/l] =	.321E-01
z [m] =	.55E+00	conc [mg/l] =	.321E-01
z [m] =	.66E+00	conc [mg/l] =	.321E-01
z [m] =	.77E+00	conc [mg/l] =	.321E-01
z [m] =	.88E+00	conc [mg/l] =	.321E-01
z [m] =	.99E+00	conc [mg/l] =	.321E-01

avg. conc. [mg/l] = .321E-01

time [yr] = 40.0

z [m] =	.00E+00	conc [mg/l] =	.361E-01
z [m] =	.11E+00	conc [mg/l] =	.361E-01
z [m] =	.22E+00	conc [mg/l] =	.361E-01
z [m] =	.33E+00	conc [mg/l] =	.361E-01
z [m] =	.44E+00	conc [mg/l] =	.361E-01
z [m] =	.55E+00	conc [mg/l] =	.361E-01
z [m] =	.66E+00	conc [mg/l] =	.361E-01
z [m] =	.77E+00	conc [mg/l] =	.361E-01
z [m] =	.88E+00	conc [mg/l] =	.361E-01
z [m] =	.99E+00	conc [mg/l] =	.361E-01

avg. conc. [mg/l] = .361E-01

time [yr] = 45.0

z [m] =	.00E+00	conc [mg/l] =	.321E-01
z [m] =	.11E+00	conc [mg/l] =	.321E-01
z [m] =	.22E+00	conc [mg/l] =	.321E-01
z [m] =	.33E+00	conc [mg/l] =	.321E-01
z [m] =	.44E+00	conc [mg/l] =	.321E-01
z [m] =	.55E+00	conc [mg/l] =	.321E-01
z [m] =	.66E+00	conc [mg/l] =	.321E-01
z [m] =	.77E+00	conc [mg/l] =	.321E-01
z [m] =	.88E+00	conc [mg/l] =	.321E-01
z [m] =	.99E+00	conc [mg/l] =	.321E-01

avg. conc. [mg/l] = .321E-01

time [yr] = 50.0

z [m] =	.00E+00	conc [mg/l] =	.361E-01
z [m] =	.11E+00	conc [mg/l] =	.361E-01
z [m] =	.22E+00	conc [mg/l] =	.361E-01
z [m] =	.33E+00	conc [mg/l] =	.361E-01
z [m] =	.44E+00	conc [mg/l] =	.361E-01
z [m] =	.55E+00	conc [mg/l] =	.361E-01
z [m] =	.66E+00	conc [mg/l] =	.361E-01
z [m] =	.77E+00	conc [mg/l] =	.361E-01
z [m] =	.88E+00	conc [mg/l] =	.361E-01
z [m] =	.99E+00	conc [mg/l] =	.361E-01

avg. conc. [mg/l] = .361E-01

AT123D Output File
Analysis for ...

Chemicals in the analysis
DDT

Number of years simulated: 200

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 200
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 200
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .2000E+03

INPUT DATA/RESULTS FOR CHEMICAL: DDT

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) .... .2430E+00
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)............................ .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
.701E-04	.701E-04	.701E-04	.701E-04	.701E-04
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.701E-04 .701E-04 .701E-04 .701E-04

RETARDATION FACTOR ..... .1147E+04
RETARDED SEEPAGE VELOCITY (M/YR) ..... .4878E-01
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .4878E-01
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .4878E-02
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .4878E-03

time [yr] = 1.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00

z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 35.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 40.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 45.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 50.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00

z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 55.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 60.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 65.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00

z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 70.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 75.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 80.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00

z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 85.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 90.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 95.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 100.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 105.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 110.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 115.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 120.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 125.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 130.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 135.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00

z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 140.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 145.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 150.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00

z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 155.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 160.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 165.

z [m] = .00E+00 conc [mg/l] = .000E+00

z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 170.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 175.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 180.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 185.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 190.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 195.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 200.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

AT123D Output File
Analysis for ...

Chemicals in the analysis
Dibutyl phthalate

Number of years simulated: 200

GENERAL INPUT DATA
****

NO. OF POINTS IN X-DIRECTION 1
NO. OF POINTS IN Y-DIRECTION 1
NO. OF POINTS IN Z-DIRECTION 10
NO. OF ROOTS: NO. OF SERIES TERMS 1000
NO. OF BEGINNING TIME STEPS 1
NO. OF ENDING TIME STEP 200
NO. OF TIME INTERVALS FOR PRINTED OUT SOLUTION 1
INSTANTANEOUS SOURCE CONTROL = 0 FOR INSTANT SOURCE 1
SOURCE CONDITION CONTROL = 0 FOR STEADY SOURCE 200
INTERMITTENT OUTPUT CONTROL = 0 NO SUCH OUTPUT 1
CASE CONTROL =1 THERMAL, = 2 FOR CHEMICAL, = 3 RAD 2

X-COORDINATE OF RECEPTOR WELL (METERS) ..... .2230E+03
Y-COORDINATE OF RECEPTOR WELL (METERS) ..... .1810E+03
AQUIFER DEPTH, = 0.0 FOR INFINITE DEEP (METERS) ... .9880E+00
AQUIFER WIDTH, = 0.0 FOR INFINITE WIDE (METERS) ... .0000E+00
BEGIN POINT OF X-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF X-SOURCE LOCATION (METERS) ..... .1470E+03
BEGIN POINT OF Y-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Y-SOURCE LOCATION (METERS) ..... .3630E+03
BEGIN POINT OF Z-SOURCE LOCATION (METERS) ..... .0000E+00
END POINT OF Z-SOURCE LOCATION (METERS) ..... .9880E+00

POROSITY ..... .3500E+00
HYDRAULIC CONDUCTIVITY (METER/YEAR) ..... .8980E+03
HYDRAULIC GRADIENT ..... .2180E-01
LONGITUDINAL DISPERSIVITY (METER) ..... .1000E+01
LATERAL DISPERSIVITY (METER) ..... .1000E+00
VERTICAL DISPERSIVITY (METER) ..... .1000E-01

BULK DENSITY OF THE SOIL (KG/M**3) ..... .1650E+04
TIME INTERVAL SIZE FOR THE DESIRED SOLUTION (YR) .. .1000E+01
DISCHARGE TIME (YR) ..... .2000E+03

INPUT DATA/RESULTS FOR CHEMICAL: Dibutyl phthalate

INST. WASTE RELEASE (KG) VALID FOR INST CASE ONLY.. .1000E+01
DISTRIBUTION COEFFICIENT, KD (M**3/KG) .... .1700E+00
MOLECULAR DIFFUSION COEFFICIENT (M**2/YR) .3154E-06
DECAY CONSTANT (1/YR)............................ .0000E+00
LIST OF TRANSIENT SOURCE RELEASE RATE

.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00
.640E+00	.640E+00	.640E+00	.640E+00	.640E+00

.640E+00 .640E+00 .640E+00 .640E+00 .640E+00
.640E+00 .640E+00 .640E+00 .640E+00 .640E+00
.640E+00 .640E+00 .640E+00 .640E+00

RETARDATION FACTOR ..... .8024E+03
RETARDED SEEPAGE VELOCITY (M/YR) ..... .6970E-01
RETARDED LONGITUDINAL DISPERSION COEF. (M**2/YR) .. .6970E-01
RETARDED LATERAL DISPERSION COEFFICIENT (M**2/YR) . .6970E-02
RETARDED VERTICAL DISPERSION COEFFICIENT (M**2/YR). .6970E-03

time [yr] = 1.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 5.00

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 10.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00

z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 15.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 20.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 25.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 30.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 35.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 40.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 45.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 50.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00

z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 55.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 60.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 65.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00

z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 70.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 75.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 80.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00

z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 85.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 90.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 95.0

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 100.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 105.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 110.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 115.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 120.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 125.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 130.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 135.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00

z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 140.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 145.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 150.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00

z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 155.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 160.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 165.

z [m] = .00E+00 conc [mg/l] = .000E+00

z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 170.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 175.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 180.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 185.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 190.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
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z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 195.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

time [yr] = 200.

z [m] = .00E+00 conc [mg/l] = .000E+00
z [m] = .11E+00 conc [mg/l] = .000E+00
z [m] = .22E+00 conc [mg/l] = .000E+00
z [m] = .33E+00 conc [mg/l] = .000E+00
z [m] = .44E+00 conc [mg/l] = .000E+00
z [m] = .55E+00 conc [mg/l] = .000E+00
z [m] = .66E+00 conc [mg/l] = .000E+00
z [m] = .77E+00 conc [mg/l] = .000E+00
z [m] = .88E+00 conc [mg/l] = .000E+00
z [m] = .99E+00 conc [mg/l] = .000E+00

avg. conc. [mg/l] = .000E+00

Section 6

Drawing Under Seperate Cover

Section 7

Kinston Groundwater Assessment

PHASE 3
Volume 1 of 2

prepared for
DuPont–Kinston

DUPONT

CH2M HILL

APRIL 1992

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WDCR344/065.51

Chapter 1

Background and Site History

Introduction

The Du Pont Kinston Plant (Figures 1-1 and 1-2) began a voluntary groundwater assessment in 1986. The purpose of the first phase of the assessment, completed in March 1987 by CH2M HILL, was to identify the historical waste handling and disposal practices to develop a program to assess the potential impacts upon the quality of groundwater beneath the Kinston Plant. During Phase 2 of the assessment, completed in October 1988 by CH2M HILL, a number of waste management units (WMUs) identified in Phase 1 were investigated. Conclusions and recommendations from the Phase 2 work were the basis for the development of Phase 3 of the assessment. This report presents the data and summarizes Phase 3 work performed by CH2M HILL and Du Pont Environmental Remediation Services (DERS) for Du Pont at the Kinston Plant. Phase 3 of the assessment includes all data collected between the completion of Phase 2 and January 1992. In addition to presenting this Phase 3 data, the purpose of this report is to provide a current understanding of the potential for the migration of contamination from the Kinston Plant toward the Kentec property.

This report is organized into two volumes. The first volume contains five chapters and summarizes the overall results of the Phase 3 investigation. Chapter 1 briefly discusses the information gathered in each of the three phases of the groundwater assessment. Chapter 2 discusses the regional and Kinston site-specific geology. Chapter 3 discusses the hydrogeology of the Kinston Plant area. Chemical analyses of samples taken at the site are presented in Chapter 4. Chapter 5 presents conclusions with respect to the potential for contaminant transport from the Kinston Plant toward the Kentec property. Volume 2 contains appendices which include additional data and information.

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 1-2

SITE MAP
DuPont Kinston Facility

CH2MHILL

Phase 1

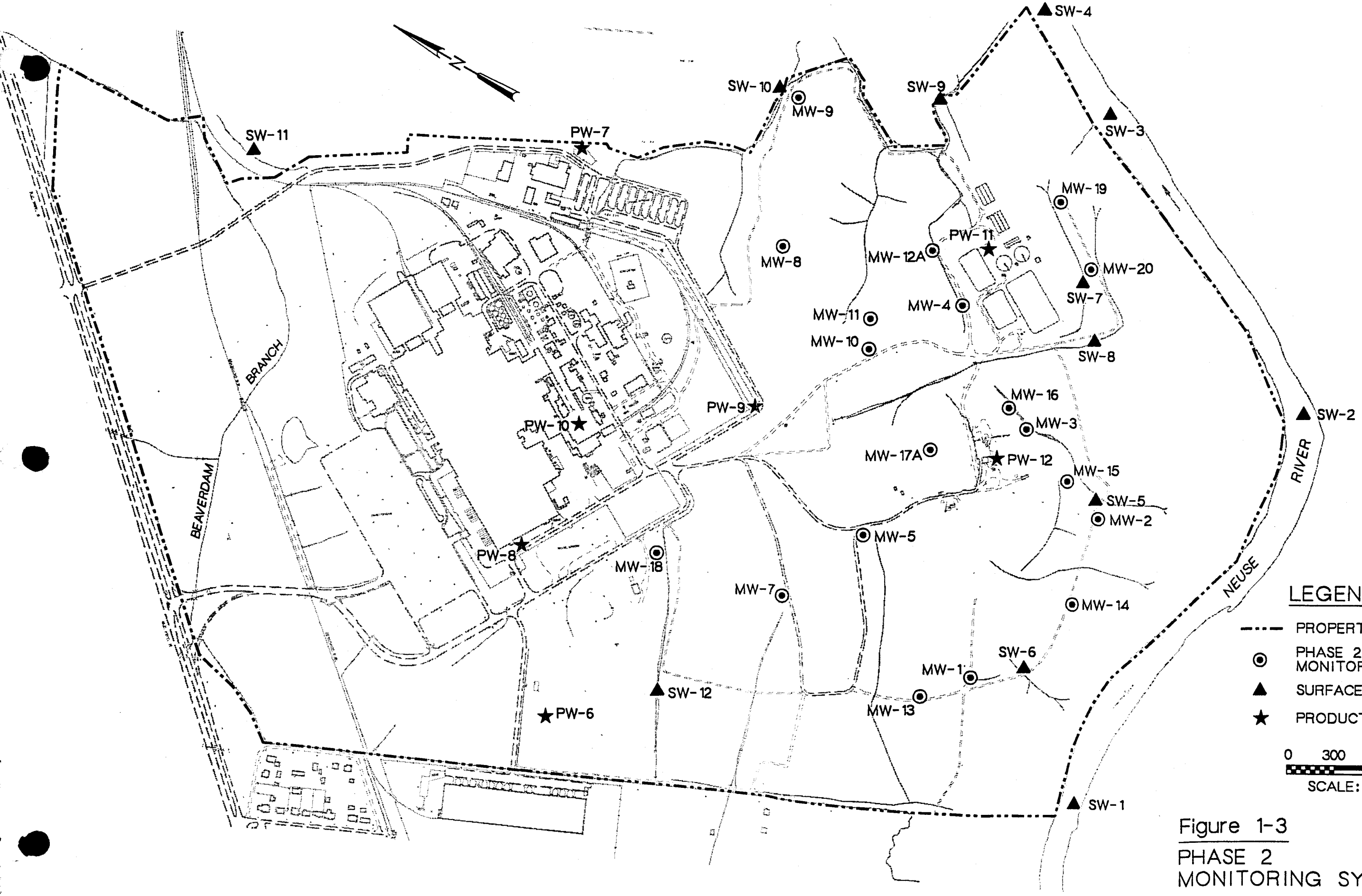
The primary purpose of the Phase 1 groundwater assessment (CH2M HILL, 1986), conducted between September and December 1986, was to identify historical waste handling and disposal practices and to develop a program to assess the potential impacts upon the quality of groundwater beneath the plant site. The methodology of the assessment was a search of existing records and published literature, bolstered by interviews with plant personnel.

Waste Management Units (WMU) were identified and defined by Du Pont as a location where plant wastes or raw materials have been disposed, treated, or stored regardless of whether the wastes or raw materials are identified by any regulatory definition of solid or hazardous waste. The wastes derive primarily from the Dacron® manufacturing process (finishing oils, vented process water, waste Dacron®, and monomer), and from general plant operations (coal ash, solid waste, domestic sewage, cleaning wastes, and laboratory wastes).

Phase 2

The purpose of Phase 2 was to demonstrate the presence or absence of shallow groundwater contamination from historical waste handling practices at WMUs.

Included in this phase were the drilling of boreholes and installation of 11 shallow monitoring wells, and sampling and analysis of groundwater and surface water. Groundwater samples were collected from the 11 new monitoring wells, existing monitoring wells, and active water supply production wells. Surface water samples were also collected during Phase 2. These sampling locations are given in Figure 1-3.



LEGEND

- PROPERTY LINE
- PHASE 2 MONITORING WELLS
- SURFACE WATER SAMPLES
- PRODUCTION WELLS

0 300 600 900

SCALE: 1"=600'

Figure 1-3

PHASE 2
MONITORING SYSTEM
DuPont Kinston Facility

CH2M HILL

The analytical data indicated the presence of some organic compounds in the shallow groundwater in the non-manufacturing area on the Kinston Plant. Some organic contamination was also evident in surface water samples from surface drainageways in the non-manufacturing area on the Kinston Plant site. However, no contamination was detected in the Neuse River downstream of the Kinston Plant. No contamination attributable to the WMUs was found in the Kinston Plant's production wells. The details of these results are discussed in the CH2M HILL Phase 2 report (CH2M HILL, 1988).

Phase 3

Inasmuch as the results of the Phase 2 investigation indicated shallow groundwater contamination near some of the WMUs, a Phase 3 investigation was implemented. The purposes of Phase 3 of the groundwater assessment (the current phase) were; (1) to evaluate the extent of groundwater contamination in the non-manufacturing areas where it was detected in Phase 2, (2) to conduct an investigation of the groundwater quality in the plant's manufacturing area, and (3) evaluate the sources of contamination remaining within the non-manufacturing area WMUs. Each of these purposes was addressed by a separate investigation.

The first investigation, conducted by CH2M HILL, evaluated the extent of shallow groundwater contamination and the potential for deep contamination at the non-manufacturing area of the Kinston Plant. The locations of the WMUs in the non-manufacturing area are given in Figure 1-4. This investigation included the drilling and installation of six shallow and six deep monitoring wells; sampling and analysis of groundwater, surface water, and sediment; in-situ hydraulic conductivity testing; and development of a topographic map of the site. The chronology of field activities for the non-manufacturing area investigation is given in Table 1-1.

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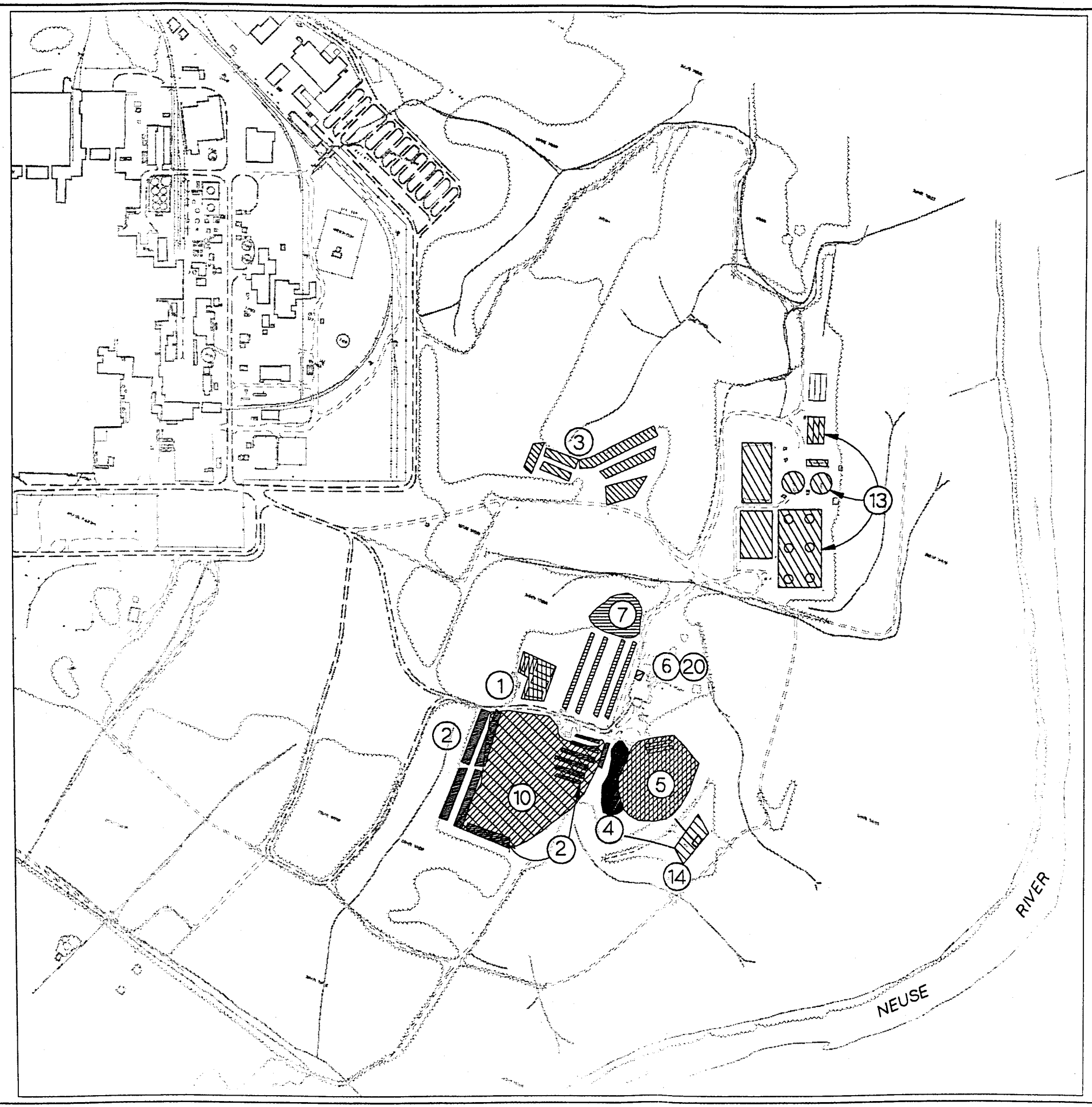
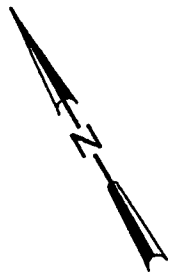
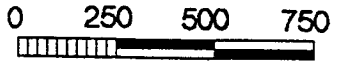




WASTE MANAGEMENT UNITS

1 GLYCOL PITS
2 FINISH OIL PITS (SOUTH)
3 FINISH OIL PITS (NORTH)
4 MONOMER PIT
5 ASH LANDFILL (CLOSED)
6 DACRON PIT
7 RESIDUE LANDFILL AND BURNING PIT
10 ASH LANDFILL (ACTIVE)
13 TRADE WASTE FACILITY
14 LEACHATE POND (CLOSED)
20 SOLID WASTE INCINERATOR



SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 1-4

PHASE 3
WASTE MANAGEMENT UNITS
UNDER INVESTIGATION -
NONMANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

Table 1-1 CHRONOLOGY OF PHASE 3 FIELD WORK—NON MANUFACTURING AREA	
August 21 - October 18, 1989	Drilling, installation and development of all monitoring wells.
October 30 - November 10, 1989	Groundwater and sediment sampling. Sludge and surface water sampling from wastewater treatment plant.
December 4-7, 1989 and January 30, 1990	In-situ hydraulic conductivity tests.
January 31, 1990	Surface water sampling.
July 24-26, 1990	Sampling of selected groundwater and surface water locations

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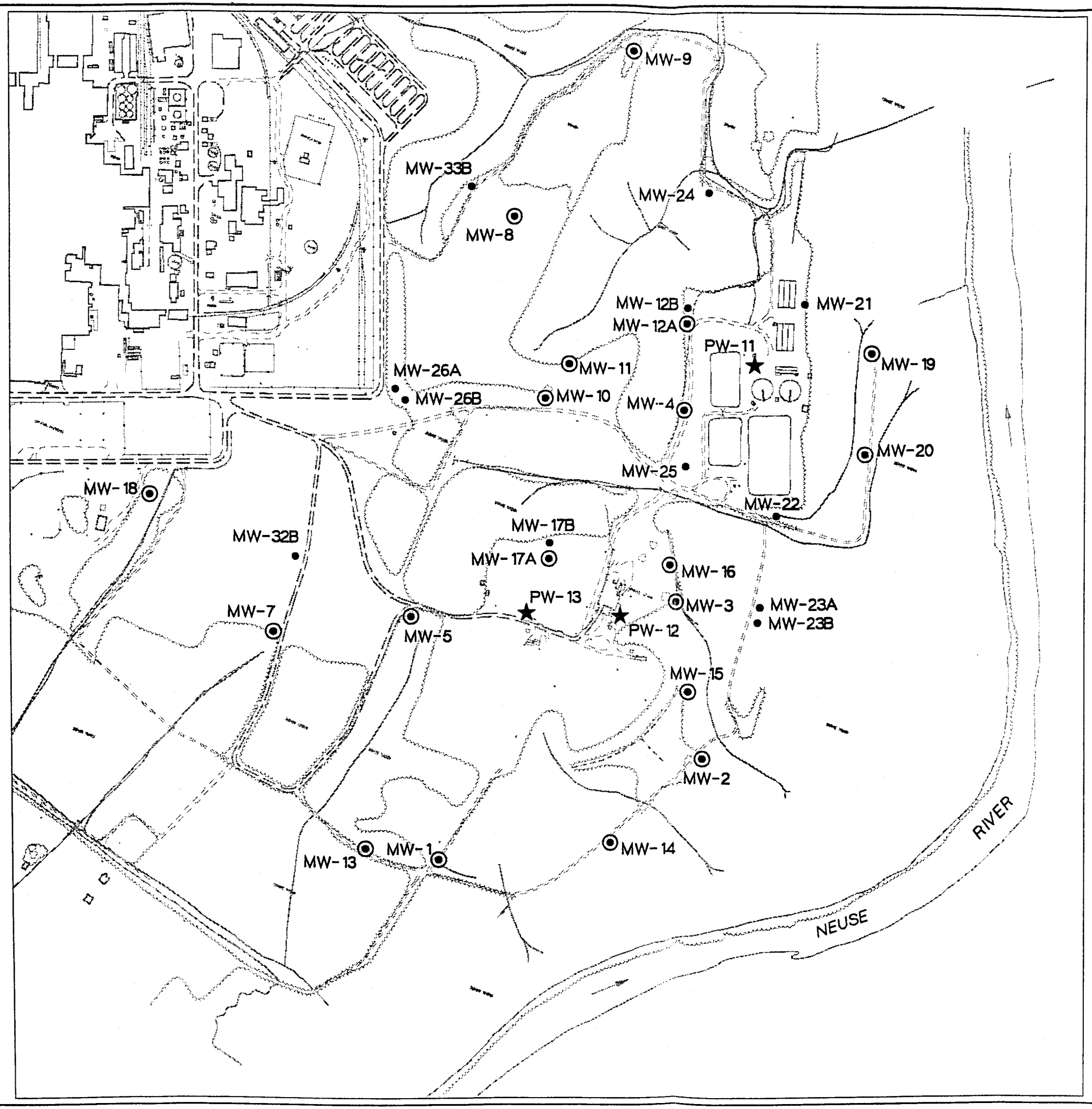
The locations of the Phase 3 monitoring wells are given in Figure 1-5. A complete discussion of the monitoring well installation is given in Appendix A. Groundwater samples were collected from three small production wells (PWs 11, 12, and 13) and from all of the monitoring wells, except six of the oldest (MWs 1, 2, 6, 7, 8, and 9). Surface water and/or sediment samples were collected from surface drainageways, the Neuse River, and the wastewater treatment plant. Surface water and sediment sampling locations are given in Figure 1-6. A complete discussion of the sampling activities is given in Appendix B. In-situ hydraulic conductivity results are given in Appendix C. A summary of the chemical analytical results is given in Appendix D.

The second investigation evaluated the groundwater quality in the Kinston Plant's manufacturing area (Figure 1-7). This investigation was started by CH2M HILL and completed by DERS. The investigation included the drilling of boreholes and the installation of monitoring wells; cone penetrometer sampling; sampling and analysis of groundwater, surface water, and soil samples; and in-situ hydraulic conductivity testing. The chronology of field activities is given in Table 1-2.

Seventeen shallow and one deep monitoring well were drilled and installed at the Kinston Plant manufacturing area. The locations of these wells are given in Figure 1-7. Groundwater samples were collected and analyzed from all monitoring wells. Two surface water samples were also collected and analyzed from the area by CH2M HILL (Figure 1-7). Monitoring wells installed and data collected by CH2M HILL are given in Appendix E. Boring logs from monitoring wells and chemical analytical data collected by DERS are also included in Appendix E.

The third investigation during Phase 3 focused on collecting data that would characterize the current contamination at and near WMUs in the non-manufacturing area of the Kinston Plant. This investigation was conducted by CH2M HILL. This investigation



LEGEND

- ⊙ EXISTING MONITORING WELLS
- • PHASE 3 MONITORING WELLS
- ★ PRODUCTION WELLS

0 250 500 750

SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 1-5

PHASE 3 GROUNDWATER MONITORING SYSTEM - NONMANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

N

LEGEND

- ▲ SURFACE WATER SAMPLES
- △ SEDIMENT SAMPLES
- ——— DRAINAGE DITCH
- -------- UNDERGROUND DRAIN

0 300 600 900

SCALE: 1"=600'

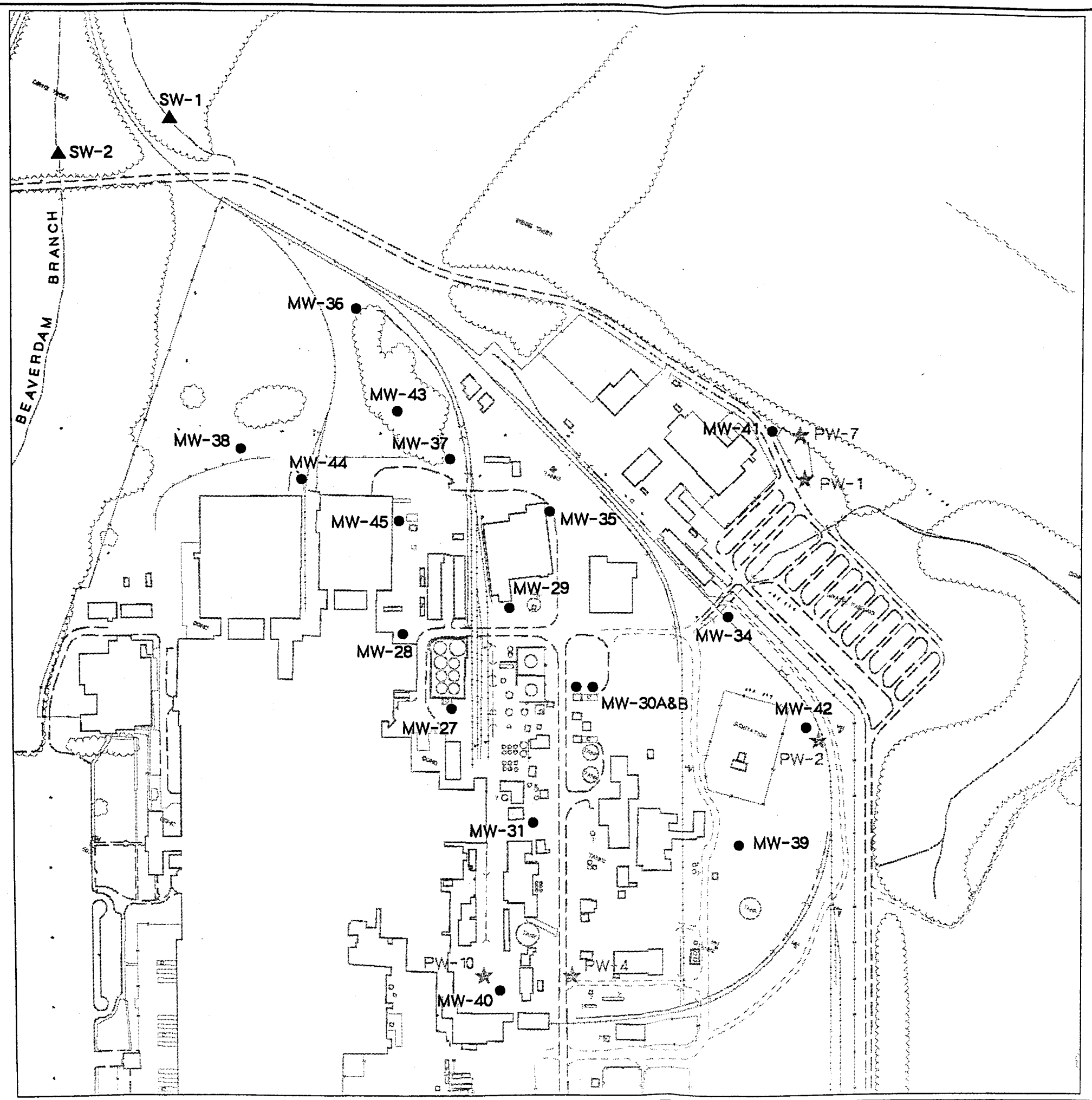
NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 1-6

PHASE 3 SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS - NONMANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

14-Apr-1992 1805fc34.dgn



N

LEGEND

- ● MONITORING WELLS
- ☆ PRODUCTION WELLS
- ▲ SURFACE WATER SAMPLES

0 150 300 450

SCALE: 1"=300'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 1-7

PHASE 3
GROUNDWATER MONITORING
SYSTEM AND SURFACE
WATER LOCATIONS -
MANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

Table 1-2 CHRONOLOGY OF PHASE 3 FIELD WORK—MANUFACTURING AREA	
September 11-19, 1989	Drilling and installation of monitoring wells (MWs 27, 28, 29, 30A, 31)
November 9, 1989	Groundwater sampling from monitoring wells (MWs 27, 28, 29, 30A, 31)
August 2-17, 1990	Drilling and installation of monitoring wells (MWs 30B, 32-41)
August 27-30, 1990	Groundwater and surface water sampling
May 21-22, 1991	Groundwater sampling
June-July 1991	Cone Penetrometer Test (CPT), groundwater sampling, piezometer installation, and in-situ hydraulic conductivity testing
November 21 - December 12, 1991	Soil borings, monitoring well installation (MWs 42-45), and groundwater sampling
January 29, 1992	Water-level measurements in monitoring wells

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included the drilling of borings and the installation of piezometers, and the sampling and analysis of groundwater and soil. A chronology of field activities for this investigation is given in Table 1-3. A complete summary of the data collected is given in Appendix F.

WDCR519/006.51

Table 1-3 CHRONOLOGY OF PHASE 3 FIELD WORK-SOURCE CHARACTERIZATION	
November 13 - December 4, 1991	Drilling of soil borings and installation of Phase 3 piezometers. Collection of sediment, sludge, and subsurface soil samples.
December 4 - 6, 1991	Geoprobe groundwater sampling
December 10 - 13, 1991	Groundwater sampling during Phase 3.

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Chapter 2

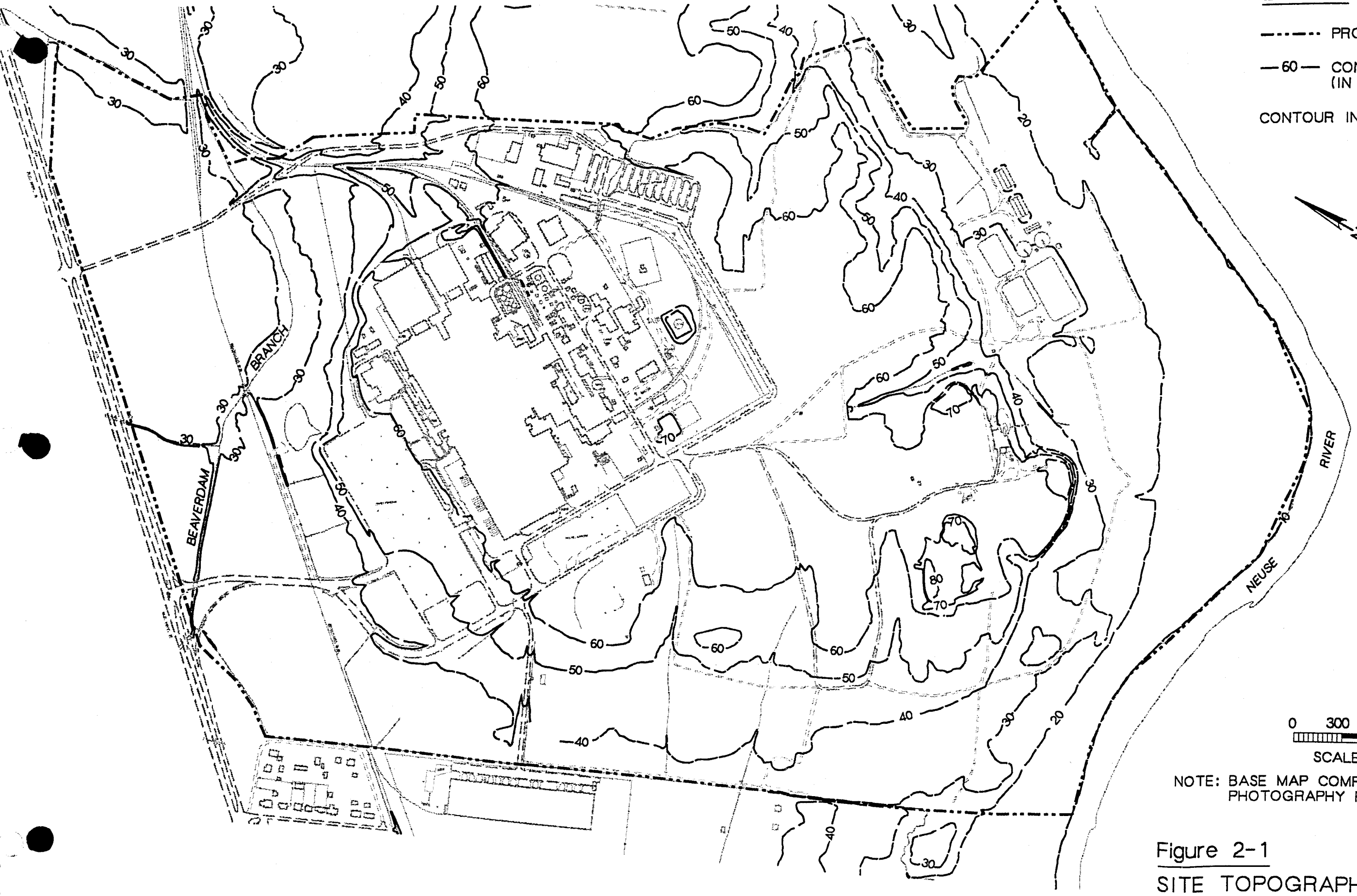
Geology

This chapter discusses the physical setting of the Du Pont Kinston Plant. The discussion is divided into sections on site topography, regional geology, and site geology. The discussion is based on data collected during Phases 1, 2, and 3. The hydrogeology of the site is discussed in Chapter 3.

Site Topography and Drainage

The 650-acre Kinston Plant is bounded on the south and southeast by the Neuse River and on the northwest by State Route 11. A topographic map of the Kinston Plant, compiled in 1989, is given in Figure 2-1. Figure 1-1 shows the location and topography of the Kinston Plant, Kentec facility, and vicinity on a smaller scale. The manufacturing area of the plant is situated on a terrace approximately 65 feet above mean sea level (MSL); the land drops steeply (approximately 30 feet) in all directions away from the manufacturing area. Along the western side of the Neuse River the land surface elevation drops another 15 feet to the floodplain of the river, which lies at elevations between 10 and 20 feet MSL.

There are various natural and man-enhanced drainageways (also referred to as drainage ditches) and subsurface drains (french drains) throughout the Kinston Plant property which collect surface water runoff and groundwater. In general, the drainageways extend radially away from the terrace and the manufacturing area. Drainage flowing northeast from the manufacturing area discharges to Beaverdam Branch, flows north and east past the Kentec property to its junction with the Neuse River one mile east of the plant. Drainage flowing west, east, and south from the Kinston Plant discharges into the Neuse River or into the floodplain adjacent to the river.



NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 2-1

SITE TOPOGRAPHY
DuPont Kinston Facility

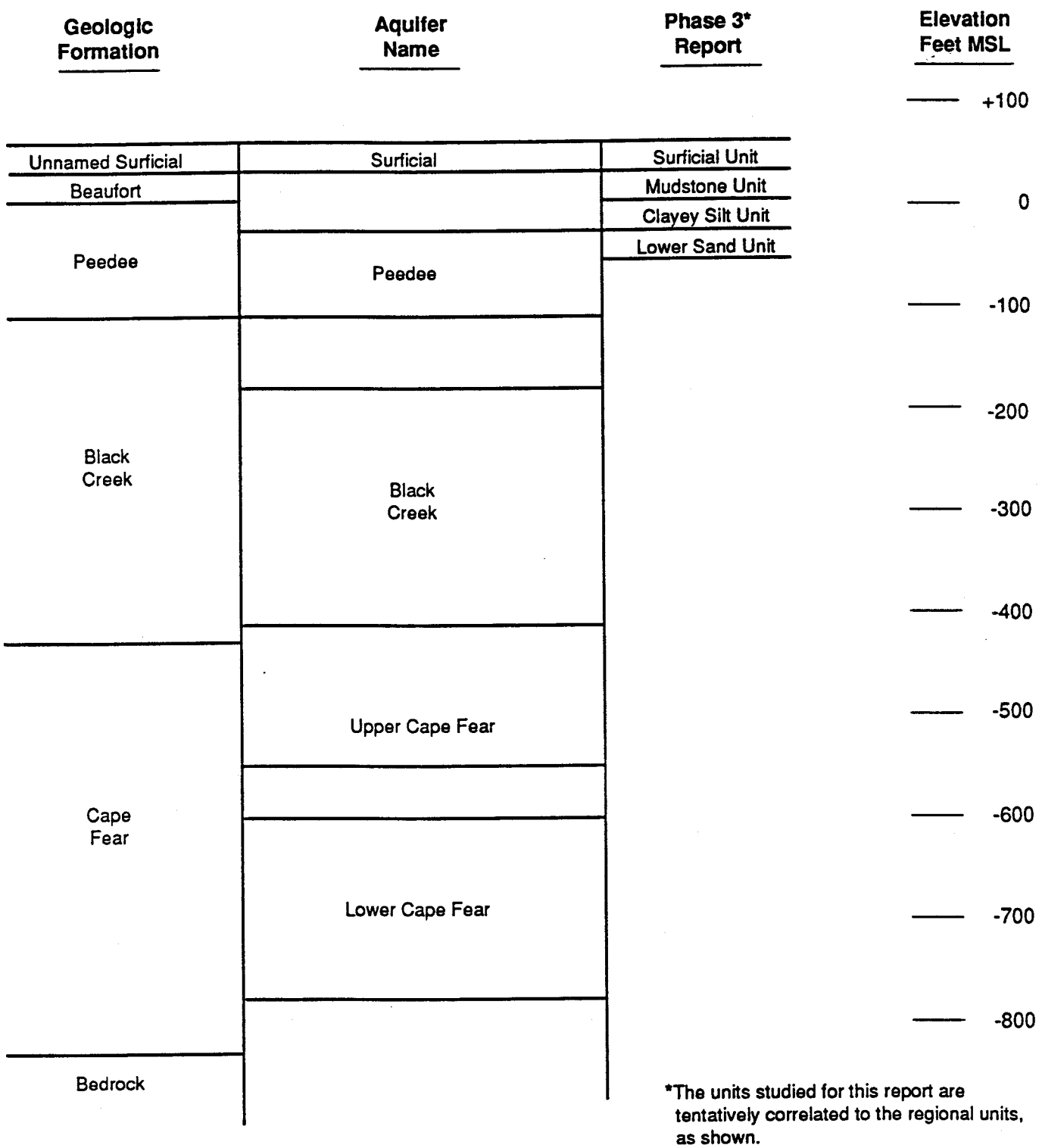
CH2M HILL

The Neuse River flows approximately 60 miles from the plant to the eastern shore of North Carolina, discharging into Pamlico Sound. Average flow of the Neuse River for a 46-year period at the city of Kinston 5 miles upstream of the plant is 1.3 million gallons per minute (gpm), with a range of 11.7 to 0.05 million gpm (Harned, 1980). The Neuse River is not expected to be significantly affected by tidal influences near the plant site.

Regional Geology

The Du Pont Kinston Plant is located along the inner margin of the central Atlantic Coastal Plain about 25 miles southeast of the Piedmont. The sediments of the Coastal Plain are a wedge-shaped sequence of marine and non-marine sedimentary rocks that dip and thicken to the southeast. Approximately 830 feet of sediments overlie crystalline bedrock at the Du Pont Kinston Plant (NCDNR&CD, 1985). These sediments, which are from Lower Cretaceous to Recent in age, were deposited during successive periods of westward transgression and eastward regression of the sea. The major sedimentary units that overlie the bedrock, from oldest to youngest, are: (1) the Cape Fear Formation, (2) the Black Creek Formation, (3) the Peedee Formation, (4) the Beaufort Formation, and (5) unnamed surficial deposits (see Figure 2-2). This Phase 3 investigation studied sediments from the upper part of the Peedee, the Beaufort, and the surficial deposits overlying the Beaufort.

The late Cretaceous Peedee is made up of dark green or gray, medium- to coarse-grained quartz sands interlayered and mixed with clays and silts (Narkunas, 1980). The sand beds are commonly gray or greenish gray and contain varying amounts of glauconite. Thin beds of consolidated calcareous sandstone and impure limestone are interlayered with the sands in some areas, and shells are common throughout the formation (Winner and Coble, 1989). The Peedee Formation is approximately 120 feet thick in the Kinston, North Carolina area (Nelson and Barksdale, 1965). The Peedee is a major source of water in the region surrounding the study area.



*The units studied for this report are tentatively correlated to the regional units, as shown.

References: Winner and Coble, 1984
Narkunas, 1980
DuPont Well Logs

Figure 2-2
GEOLOGIC FORMATIONS AND ASSOCIATED AQUIFERS IN THE VICINITY OF THE KINSTON PLANT
Kinston, North Carolina

CH2M HILL

The Beaufort Formation, of early Paleocene age, overlies the Peedee Formation. Regionally, it is made up of fine unconsolidated glauconitic sand interbedded with silts and clays. The Beaufort also contains shells and other signs of marine life, including worm burrows. The Beaufort Formation dips to the southeast at 12 feet per mile in the central coastal plain (Narkunas, 1980). The Beaufort is known to pinch out in eastern Lenoir County immediately to the west of the site (Winner and Coble, 1989).

In limited areas of eastern Lenoir and western Craven Counties at and near the Du Pont Kinston Plant, the Beaufort is semiconsolidated to consolidated; it is cemented with silica and is composed of interlayered mudstone, sandstone, and glauconitic sand, which contain volcanic ash locally (Brown et. al., 1977). This mudstone is described as a marine volcaniclastic, meaning that it contains some ash and other fallen debris associated with volcanic eruptions in the geologic past (Brown et. al., 1977). The reason for the limited area of occurrence of this consolidated mudstone is not known.

Surficial deposits overlie the mudstone regionally. These deposits consist of sands, silty sands, and clays deposited in a fluvial (river or stream) environment. These sediments do not appear to be a part of the marine Beaufort Formation.

Site Geology

This discussion of the geology of the Du Pont Kinston Plant is based on examination of surface landforms and on the interpretation of samples obtained during drilling at the site. Complete logs of each boring from Phase 3 drilling are included in Appendices A and E. Locations of geologic cross sections are shown in Figure 2-3; the cross sections are shown in Figures 2-4 through 2-7.

The uppermost unit (called "the surficial unit" in this report) is generally an orange-brown (grading to dark gray) deposit of clayey sand and sandy clay. This unit extends

LEGEND

- PROPERTY LINE
- MONITORING WELLS
- PRODUCTION WELLS
- SOIL BORINGS

N

0 300 600 900

SCALE: 1"=600'

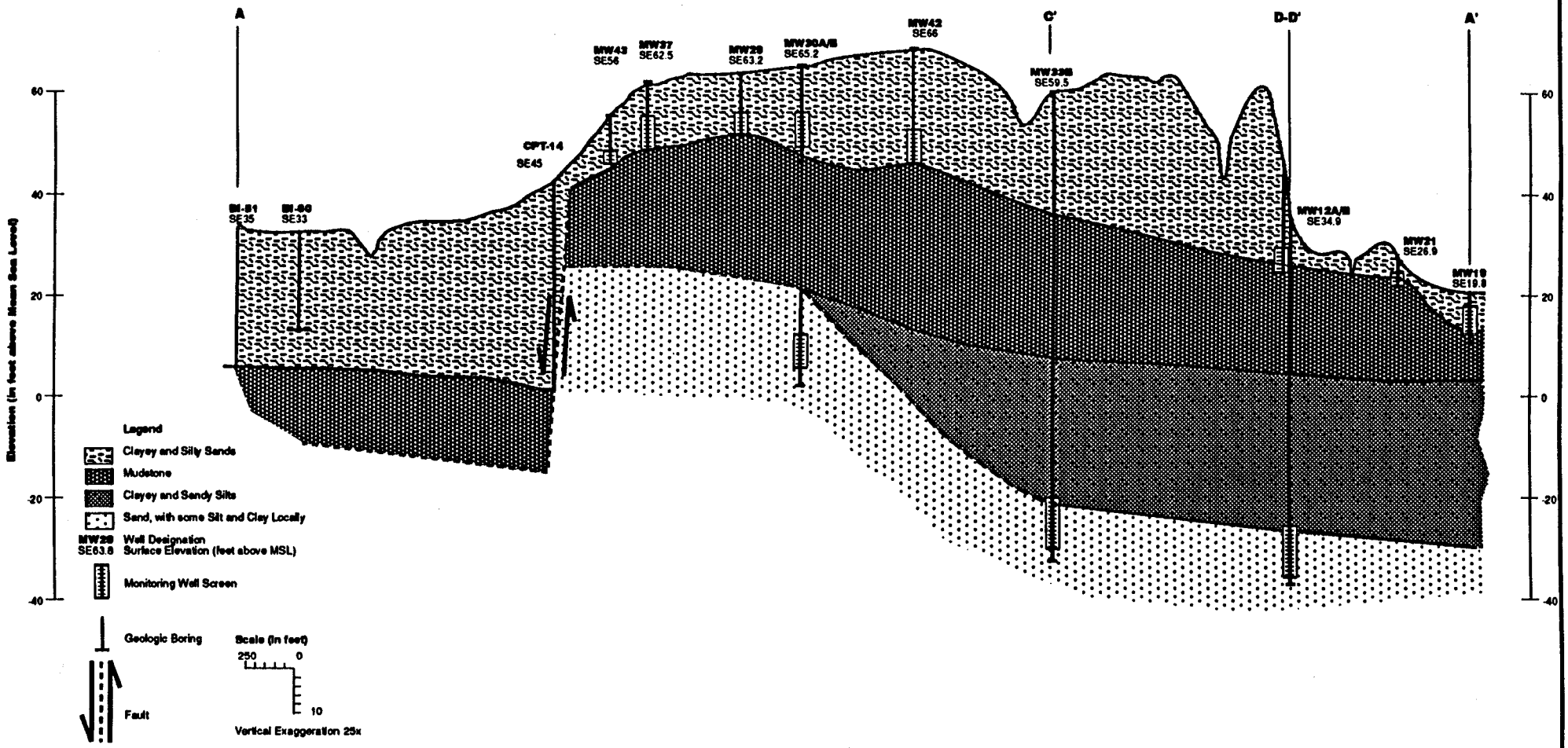
NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 2-3

LOCATION OF GEOLOGIC CROSS SECTIONS

DuPont Kinston Facility

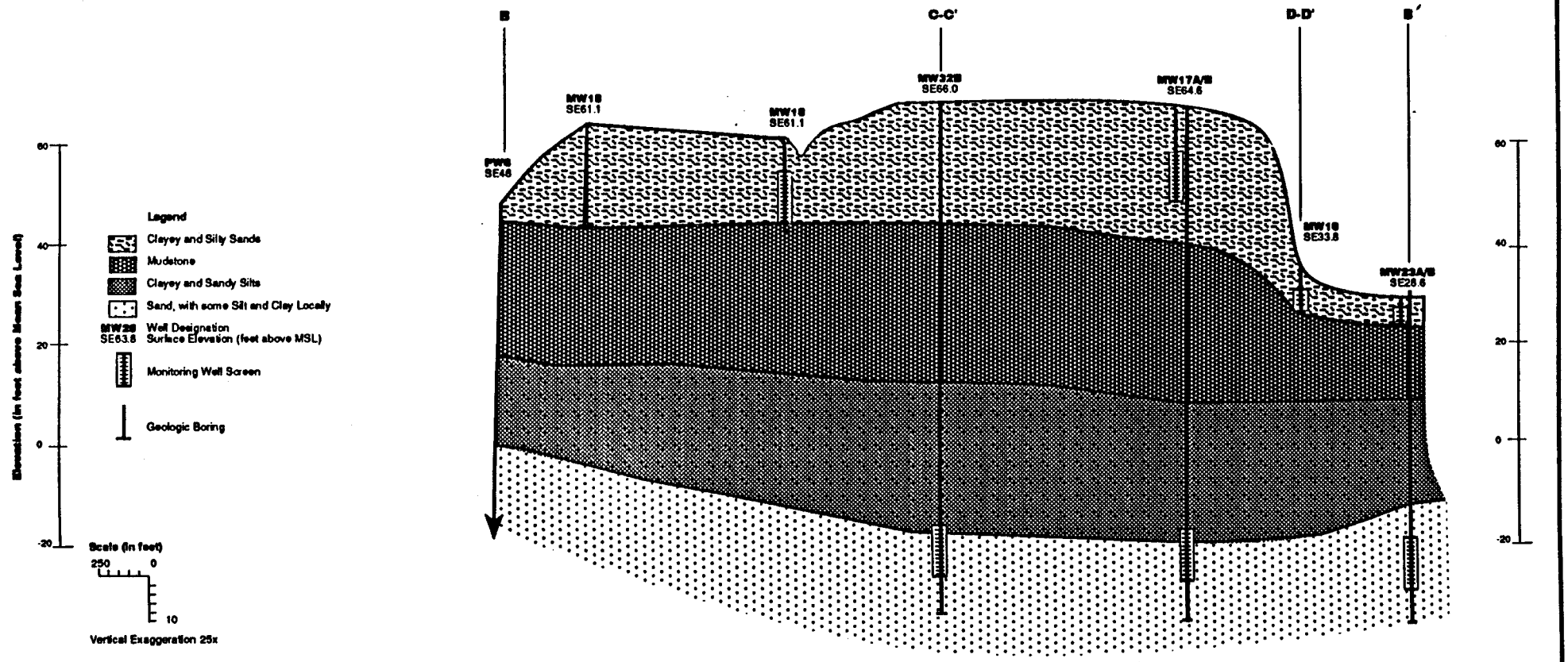
CH2MHILL



Note: This cross section was interpolated between boring locations. Dashed lines indicate estimated where no data is available. Actual conditions between borings may differ from those shown here.

Figure 2-4
GEOLOGIC CROSS SECTION A-A'
DuPont Kinston Facility

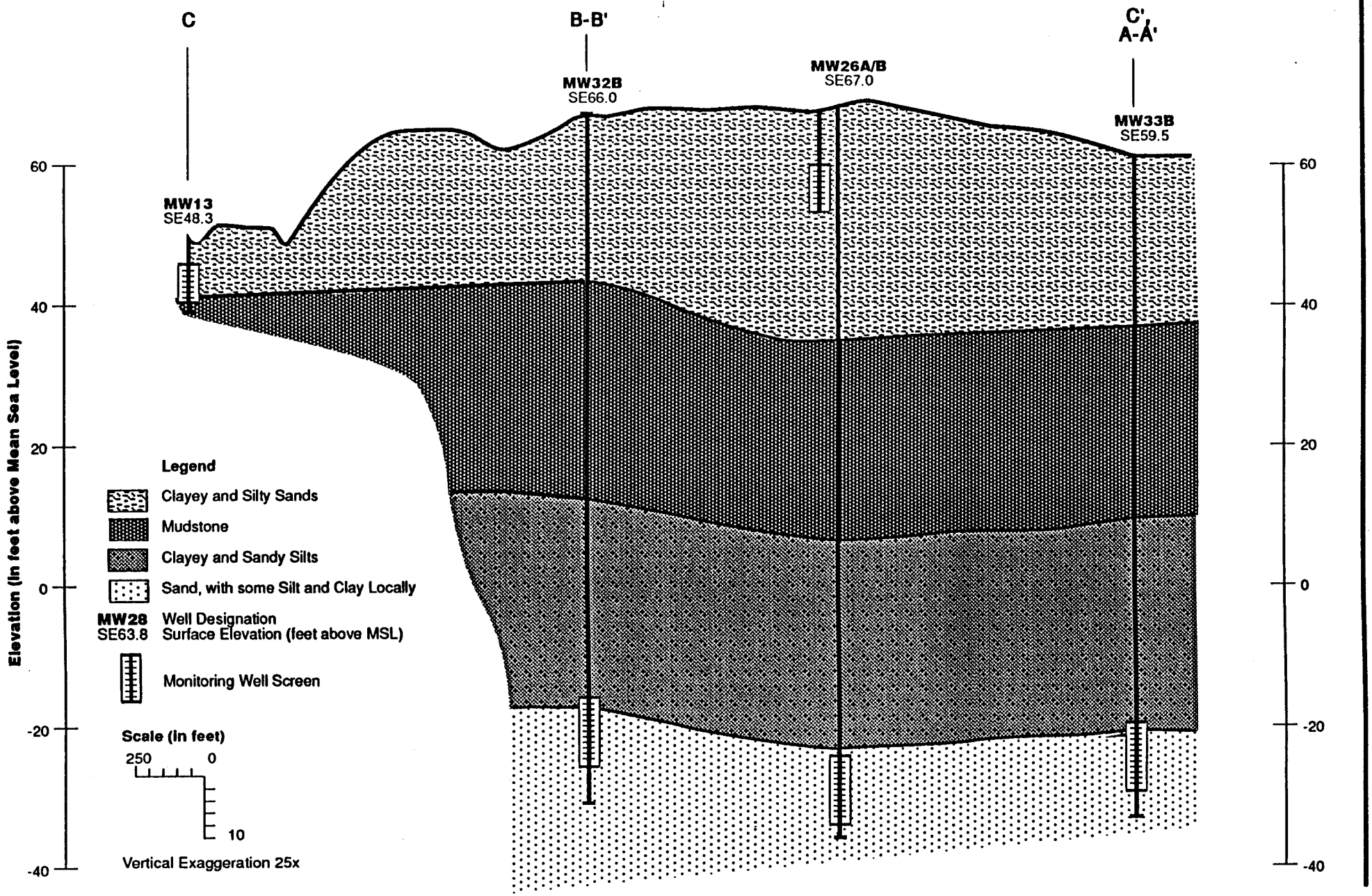
CH2MHILL



Note: This cross section was interpolated between boring locations.
Actual conditions between borings may differ from those shown here.

Figure 2-5
GEOLOGIC CROSS SECTION B-B'
DuPont Kinston Facility

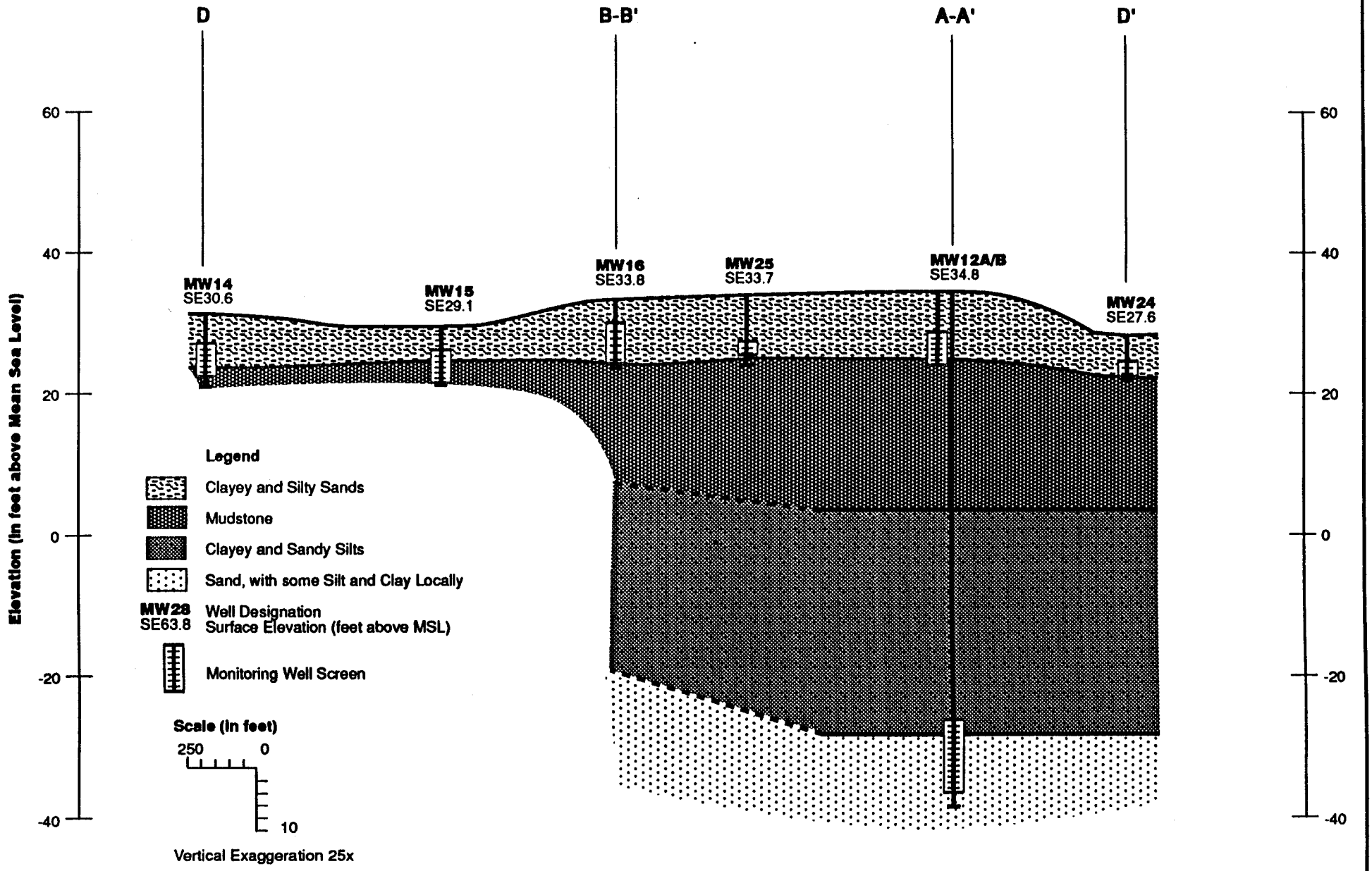
CH2MHILL



Note: This cross section was interpolated between boring locations.
Actual conditions between borings may differ from those shown here.

Figure 2-6
GEOLOGIC CROSS SECTION C-C'
DuPont Kinston Facility

CH2M HILL



Note: This cross section was interpolated between boring locations. Dashed lines indicate estimated where no data is available. Actual conditions between borings may differ from those shown here.

Figure 2-7
GEOLOGIC CROSS SECTION D-D'
DuPont Kinston Facility

CH2MHILL

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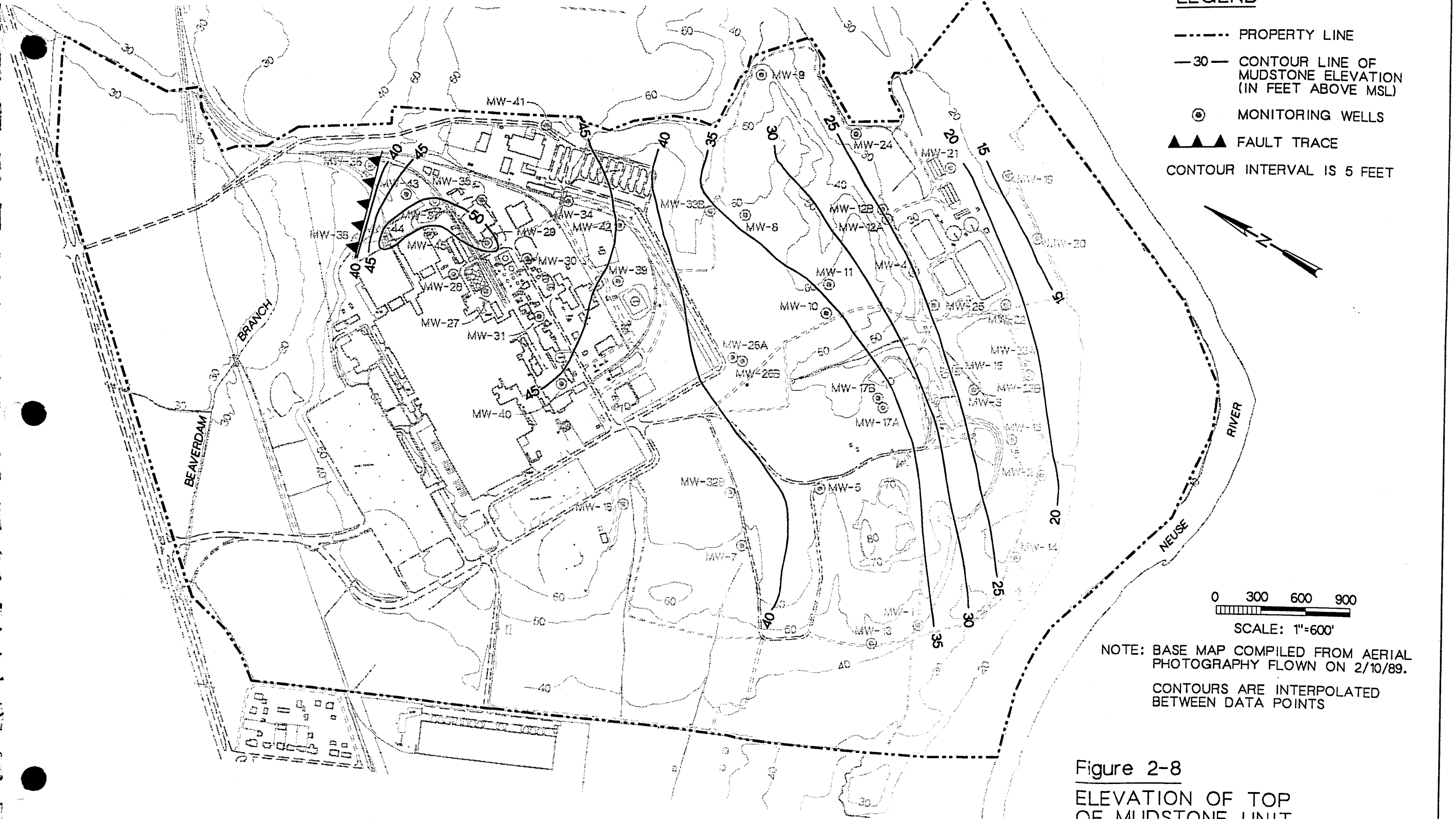

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

CONTOURS ARE INTERPOLATED BETWEEN DATA POINTS

Figure 2-8

ELEVATION OF TOP OF MUDSTONE UNIT

DuPont Kinston Facility

CH2MHILL

from the surface to a depth of 5 to 35 feet. It is thickest near the central portion of the site (MWs 17, 26, 32, and 33) and thins out near the Neuse River and near the manufacturing area. Scattered throughout the surficial unit is a clean, medium- to very coarse-grained, poorly sorted sand that contains fine pebbles locally. At lower elevations near the Neuse River, the base of the surficial unit is a poorly-sorted, fine to very coarse sand with pebbles. All of the shallow monitoring wells at the site are screened in the surficial unit.

Underlying the surficial unit is a consolidated mudstone layer that is believed to correspond to the Beaufort Formation described by Brown et al (1977). This layer (called "the mudstone unit" in this report) is a deposit of semi-consolidated to consolidated mudstones interbedded with sandstones and is approximately 20 to 25 feet thick. The sandstones are generally glauconitic and contain shell fragments near the bottom of the unit. Pebbles were also observed at the base of the mudstone unit in wells MW17B, MW23B, and MW33B. At MW23B, the pebbles were contained in a conglomerate of angular mudstone that appears to define the contact between the Beaufort and Peedee (Brown et al, 1977). Figure 2-8 is a contour map showing the elevation of the top of the mudstone unit.

The elevation of the base of the mudstone in the non-manufacturing area ranges from 3 to 11 feet MSL and averages approximately 6 feet MSL. This is consistent with the basal elevation of the Beaufort Formation at West Landing, on the east bank of the Neuse (see Figure 1-1), as reported by Brown et. al. (1977). In the manufacturing area, the base of the mudstone is approximately 25 feet MSL at MW 30B. Brown et. al. (1977) postulate the existence of block faulting oriented N20°E near the Kinston Plant. The apparent displacement of the bottom of the mudstone unit along cross section A-A' indicates that faulting postulated by Brown et al (1977) occurs north of the manufacturing area. The fault that was mapped by DERS has a vertical displacement of approximately 35 feet with the northern block having the lower elevation.

The sedimentary sequence that underlies the mudstone at the Kinston Plant is believed to correspond to the upper part of the Peedee Formation. The uppermost unit of this sequence is a 20- to 30-foot-thick, olive gray, clayey and sandy silt or sandy clay that contains some pebbles and abundant shell fragments locally. These sediments (called the "clayey silt unit" in this report) do not show strong layering. The boring log from MW 30B suggests that this clayey silt unit is absent or is not directly underlying the mudstone in the manufacturing area.

The clayey silt unit is underlain by a unit of olive to dark gray, fine- to medium-grained, glauconitic sands with interfingered layers of sands and clays. These sands (called the "lower sand unit" of the Peedee Formation in this report) are structurally loose, in contrast to the overlying unit, which is firm to stiff. The top of the lower sand unit is typically from 20 to 30 feet below MSL. In the manufacturing area where the clayey silt unit is apparently absent, the top of the lower sand unit is at an elevation of 20 feet above MSL. The deep monitoring wells are screened in this lower sand unit. The total thickness of the lower sand unit is not defined at the site, but is anticipated to be 80 to 100 feet.

Formations lying beneath the Peedee were not studied for this investigation. A general description of these deeper formations are given in Figure 2-2 and Winner and Coble, 1989.

WDCR519/008.51

Chapter 3

Hydrogeology

This chapter discusses the hydrogeology of the Kinston Plant area. Included are discussions of the regional aquifer system, hydraulic conductivity measurements, groundwater flow directions, and the rate of groundwater flow.

The North Carolina Coastal Plain in the area near the Kinston Plant consists of a system of several aquifers within the geologic units discussed in Chapter 2. From shallowest to deepest, these are: (1) the surficial aquifer, (2) the Peedee aquifer, (3) the Black Creek aquifer, and (4) the Cape Fear aquifer (Winner and Coble, 1989; see Figure 2-2). These aquifers are not co-extensive with the geologic units of the same name, however. The aquifers include only the more permeable zones within each geological unit. The surficial aquifer is unconfined and each of the three deeper aquifers is confined. The aquifers studied in this investigation are the surficial aquifer and the upper part of the Peedee aquifer.

The unconfined surficial aquifer at the Kinston Plant is within the surficial sediments that overlie the mudstone unit. These sediments are a mix of sands, clays, and silts. The depth to water in these sediments ranges from approximately 2 to 10 feet below land surface. The shallow monitoring wells are screened in this aquifer. The source of water for this aquifer is recharge water originating as precipitation. The average annual precipitation in the immediate area is 45.9 inches per year, approximately 20 percent of which recharges the surficial aquifer (Narkunas, 1980).

The mudstone and clayey silt units beneath the surficial aquifer are believed to be confining or semi-confining units because of their thickness and lithology, and the considerable difference in hydraulic head and flow regime between deep and shallow

Groundwater Flow Direction

Table 3-3 shows the water-level data recorded on October 30, 1989, February 1, 1990, and August 27, 1990, by CH2M HILL. Table 3-4 shows the water-level data recorded by DERS on May 22, 1991, December 9, 1991, and January 29, 1992. All rounds of water-level measurements showed similar hydrologic features for the entire Kinston Plant so the most comprehensive set of data, only February 1, 1990, are discussed here. Figure 3-1 shows the elevation of the potentiometric surface in the surficial unconfined aquifer on February 1, 1990.

Figure 3-1 shows that groundwater in the surficial aquifer in the non-manufacturing area generally flows away from the plant and toward the Neuse River. The elevation of the potentiometric surface appears to mimic the topography of the land surface. The potentiometric surface near drainageways and the aeration basin and holding ponds of the wastewater treatment plant is assumed to be controlled by topographic features. Groundwater in the surficial aquifer in the vicinity of the non-manufacturing area WMUs will discharge directly to the Neuse River or to the onsite drainageways which flow to the Neuse River.

Figure 3-1 indicates that groundwater in the surficial aquifer in the manufacturing area flows to the north toward the fault. The large decline in water levels measured in wells from the upthrown side of the fault (MWs 43 and 44) as compared to the wells on the downthrown side of the fault (MWs 36 and 38) suggests that the fault influences the direction of the surficial aquifer groundwater flow.

Horizontal hydraulic gradients are low (<0.001) in the relatively flat areas near MW26 and MW39, but are relatively high (0.05) below the steeply sloping areas between wells MW17A and MW16 and high (0.04) between MW11 and MW12A. The horizontal hydraulic gradients are also low to moderate (0.01) in the relatively flat areas near the Neuse River and the manufacturing area.

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Table 3-3
KINSTON WATER-LEVEL ELEVATIONS; CH2M HILL
(Elevation in feet above mean sea level)

Well	Ground Elevation	Elevation of Measuring Point[a]	Elevation of Potentiometric Surface (10/30/89)	Elevation of Potentiometric Surface (2/1/90)	Elevation of Potentiometric Surface (8/27/90)
MW1	43.7	44.73	--	--	--
MW2	27.7	28.71	21.83	22.93	--
MW3	31.8	32.85	26.07	26.59	--
MW4	34.3	35.36	28.85	30.61	--
MW5	64.2	65.22	55.72	58.71	--
MW6	26.8	27.86	--	--	--
MW7	58.8	59.85	53.41	54.93	--
MW8	62.9	63.96	52.16	54.38	--
MW9	46.0	46.04	--	38.01	--
MW10	64.3	66.53	53.50	56.38	--
MW11	64.3	66.77	51.63	53.71	--
MW12A	34.2	36.21	30.24	31.44	--
MW12B	34.9	36.69	8.85	9.99	--
MW13	48.3	50.24	42.58	43.56	--
MW14	30.6	33.00	25.47	27.33	--
MW15	29.1	31.29	24.97	25.90	--
MW16	33.8	35.87	29.39	31.04	--
MW17A	64.5	66.45	53.96	55.23	--
MW17B	64.6	66.44	7.00	7.72	--
MW18	58.9	61.11	55.37	57.04	--
MW19	19.8	22.05	16.17	18.09	--
MW20	20.2	22.40	16.12	17.40	--
MW21	26.9	29.32	24.35	24.98	--
MW22	29.2	32.03	24.66	25.15	--
MW23A	28.6	31.19	22.72	24.65	--
MW23B	28.6	30.40	9.74	10.86	--
MW24	27.6	30.14	23.66	26.09	--
MW25	33.7	35.92	30.04	32.29	--
MW26A	67.4	70.04	58.65	60.17	--
MW26B	67.0	69.53	-0.84	0.04	--

Table 3-3
KINSTON WATER-LEVEL ELEVATIONS; CH2M HILL
(Elevation in feet above mean sea level)

Well	Ground Elevation	Elevation of Measuring Point[a]	Elevation of Potentiometric Surface (10/30/89)	Elevation of Potentiometric Surface (2/1/90)	Elevation of Potentiometric Surface (8/27/90)
MW27	63.4	63.39	58.54	58.66	58.92
MW28	63.8	63.80	56.57	56.47	56.72
MW29	63.2	63.16	58.10	58.51	58.76
MW30A	65.2	65.16	59.64	60.33	60.18
MW30B	65.3	65.33	--	--	27.66
MW31	65.2	65.20	59.57	59.36	59.67
MW32B	66.0	68.06	6.49	7.19	--
MW33B	59.5	61.05	2.31	3.47	--
MW34	65.5	66.92	--	--	60.08
MW35	62.7	62.66	--	--	57.96
MW36	45.5	47.22	--	--	28.12
MW37	62.5	64.00	--	--	52.93
MW38	55.4	57.14	--	--	27.94
MW39	67.6	69.42	--	--	60.60
MW40	64.2	64.21	--	--	60.61
MW41	63.7	65.56	--	--	57.59
Surface Water Elevations					
AB	--	38.85	34.4	34.2	--
NHP	--	36.53	30.5	31.5	--
SHP	--	36.87	31.6	30.4	--

AB = aeration basin
NHP = north holding pond
SHP = south holding pond
[a]The measuring point is the top of the PVC casing or the top of the protective surface casing on the side adjacent to the lock, whichever is higher.
-- = measurement not taken

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Table 3-4
KINSTON WATER-LEVEL ELEVATIONS; DERS
(Elevation in feet above mean sea level)

Monitoring Well	Elevation of Potentiometric Surface (5/22/91)	Elevation of Potentiometric Surface (12/9/91)	Elevation of Potentiometric Surface (1/29/92)
MW-27	57.73	57.98	58.21
MW-28	56.24	55.86	56.24
MW-29	58.18	57.46	58.29
MW-30A	60.14	58.43	59.94
MW-30B	10.69	27.75	27.92
MW-31	59.60	58.72	59.32
MW-34	60.62	58.04	60.84
MW-35	57.58	56.75	57.48
MW-36	28.62	28.14	29.00
MW-37	52.60	52.68	52.89
MW-38	28.14	28.00	28.58
MW-39	60.32	59.55	61.80
MW-40	59.49	60.14	60.73
MW-41	59.36	57.18	59.52
MW-42	---	57.00	60.26
MW-43	---	50.11	DRY
MW-44	---	DRY	51.94
MW-45	---	52.35	52.73

---Indicates measurement not taken; well had not been installed.

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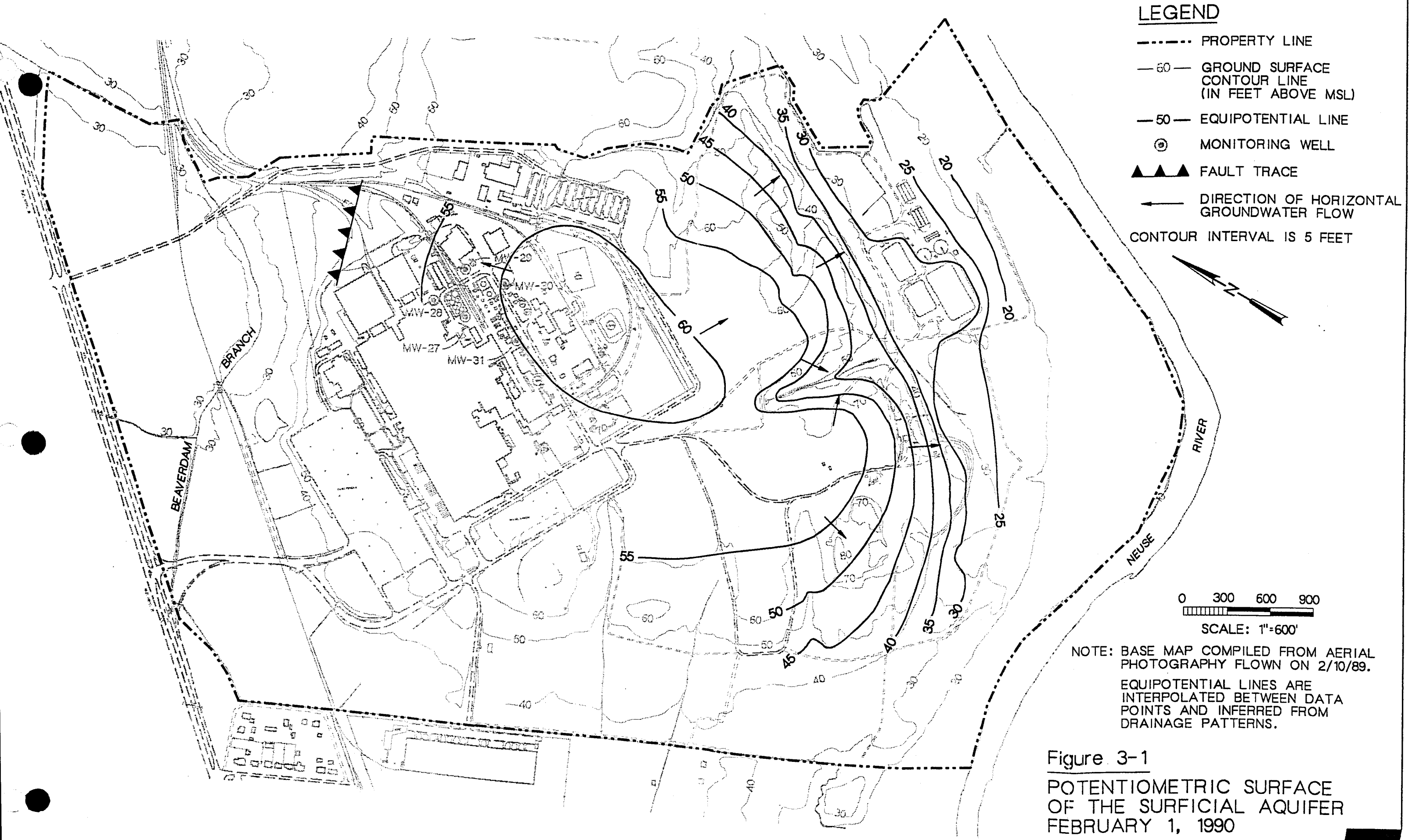

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

EQUIPOTENTIAL LINES ARE INTERPOLATED BETWEEN DATA POINTS AND INFERRED FROM DRAINAGE PATTERNS.

Figure 3-1

POTENTIOMETRIC SURFACE OF THE SURFICIAL AQUIFER FEBRUARY 1, 1990

DuPont Kinston Facility

CH2M HILL

Figure 3-2 shows the elevation of the potentiometric surface of the lower sand unit of the Peedee aquifer as measured on February 1, 1990, in the six deep monitoring wells. This figure shows that horizontal flow in this unit of the Peedee aquifer is toward the Kinston Plant under the influence of the Kinston Plant's production wells located in the manufacturing area. This is consistent with regional maps of the potentiometric surface of the Peedee aquifer, which also show a cone of depression centered at the Du Pont Kinston Plant (Winner and Coble, 1989).

As discussed in the Phase 1 report, the Kinston Plant currently has five active production wells; PW6, PW7, PW8, PW9, and PW10 (see Figure 1-2). Each of these wells produces between 500 and 1,000 gpm. The production wells are screened in the Black Creek and Cape Fear aquifers. However, the influence of the pumping from these wells extends to the Peedee aquifer. The pumping from these wells has created a capture zone in the Peedee, Black Creek, and Cape Fear aquifers that is beyond the Kinston Plant boundaries. Therefore, under the current plant pumping conditions, if any contamination were to migrate to these deeper aquifers it would probably be captured by the Plant's own production wells.

A review of Table 3-5 shows that the hydraulic head in the shallow wells MW12A, MW17A, MW23A, and MW26A is consistently greater than the hydraulic head in the corresponding deeper wells in the non-manufacturing area. The vertical gradients at these well pair locations ranged from 0.30 at MW23A/B to 0.70 at MW26A/B on February 1, 1990 (see Table 3-5). In the manufacturing area, the vertical gradient at well pair MW30A/B is also downward; its value was 0.8 on August 27, 1990. The high downward gradients are caused by nearby pumping of production wells in the manufacturing area. The actual amount of downward flow depends on the vertical hydraulic conductivity of the unconsolidated clayey silt unit and the mudstone unit.

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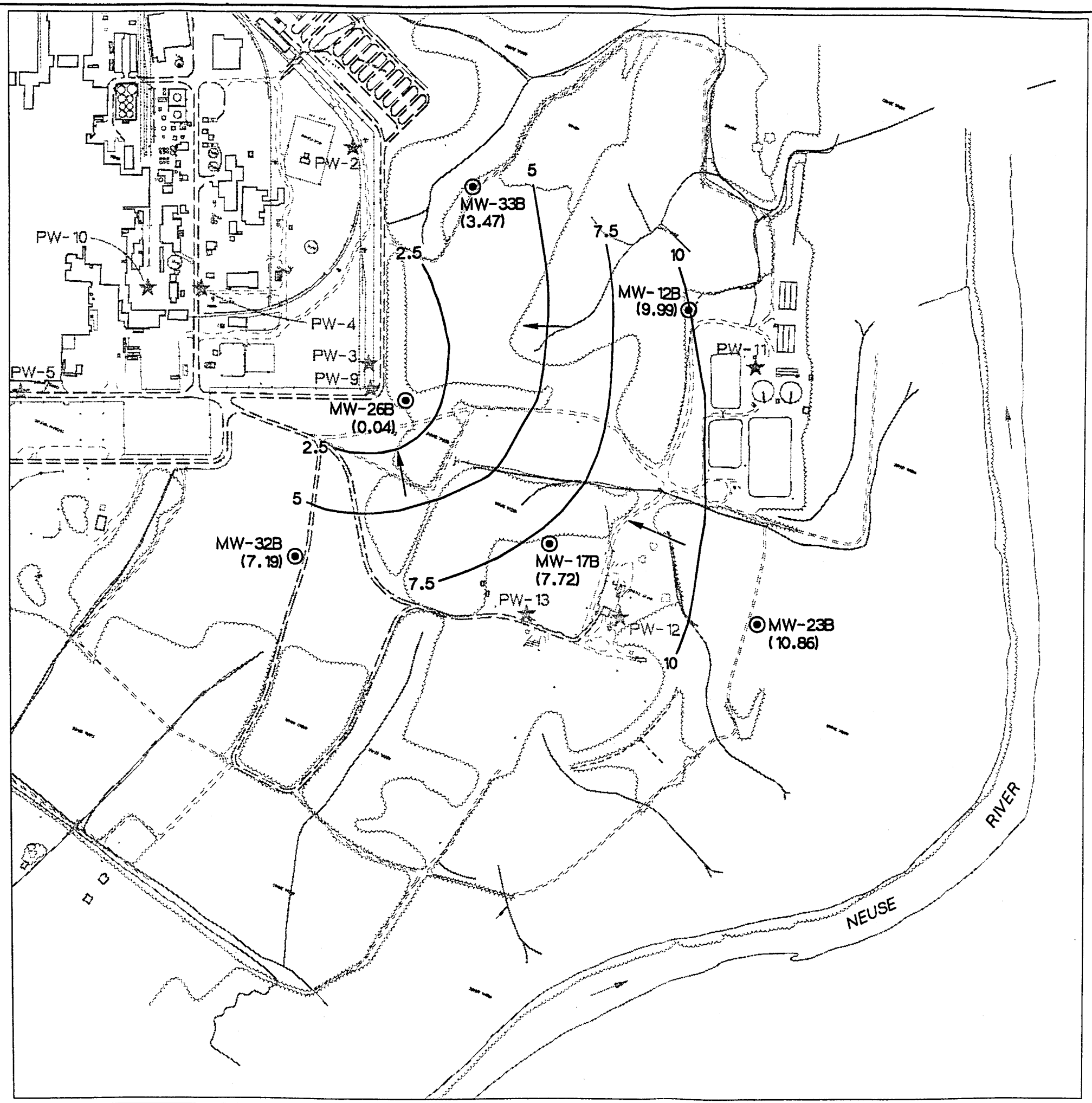

N

LEGEND

- ⊙ PEEDEE AQUIFER MONITORING WELLS
- (7.19) WATER LEVEL ELEVATION IN FEET ABOVE MSL
- ★ PRODUCTION WELLS
- — 5 — EQUIPOTENTIAL LINE (IN FEET ABOVE MSL)
- ← DIRECTION OF HORIZONTAL GROUNDWATER FLOW

CONTOUR INTERVAL IS 2.5 FEET

EQUIPOTENTIAL LINES ARE INTERPOLATED BETWEEN DATA POINTS. ACTIVE PRODUCTION WELLS ARE IN THE MANUFACTURING AREA.

0 250 500 750

SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 3-2

POTENTIOMETRIC SURFACE OF THE PEEDEE AQUIFER FEBRUARY 1, 1990 DuPont Kinston Facility

CH2M HILL

Table 3-5
VERTICAL GRADIENTS AT DU PONT KINSTON
(February 1, 1990)

Well Pair	Hydraulic Head in Shallow Well (ft)	Elevation of Screened Zone of Shallow Well (ft)	Hydraulic Head in Deep Well (ft)	Elevation of Screened Zone of Deep Well (ft)	Distance Between Screen Centers (ft)	Downward Gradient*
MW12 A/B	31.44	24.2 to 29.2	9.99	-26.1 to -36.1	57.8	0.37
MW17 A/B	55.23	45.5 to 55.5	7.72	-18.4 to -28.4	73.9	0.64
MW23 A/B	24.65	21.1 to 23.1	10.86	-19.4 to -29.4	46.5	0.30
MW26 A/B	60.17	49.9 to 59.9	0.04	-26.0 to -36.0	85.9	0.70

*Gradient measured between centers of screened intervals.

WDCR519/012.51

Chapter 4

Chemical Analysis

Introduction

Volatile and acid extractable semi-volatile organic compounds were detected in Phase 2 in some of the samples from the 16 monitoring wells and 12 surface water locations. The monitoring program was expanded in Phase 3 to verify the Phase 2 results and to further define the extent of contamination.

During the Phase 3 investigation, groundwater, surface water, and sediment samples were collected for chemical analysis.

This chapter presents the data that were collected during Phase 3. The chapter is divided into three sections; non-manufacturing area, manufacturing area, and source characterization.

Non-Manufacturing Area

Groundwater samples were collected from the 26 new and existing monitoring wells and three production wells during Phase 3 of the non-manufacturing area investigation. Groundwater sampling locations are shown in Figure 4-1. Seventeen surface water samples, two underground drain samples, and six sediment/sludge samples were collected for chemical analysis. Surface water and sediment sampling locations are shown in Figure 4-2.

The analytical protocol for each location and sample medium varied based upon the chemical analytical results from Phase 2 and knowledge of disposal practices at each

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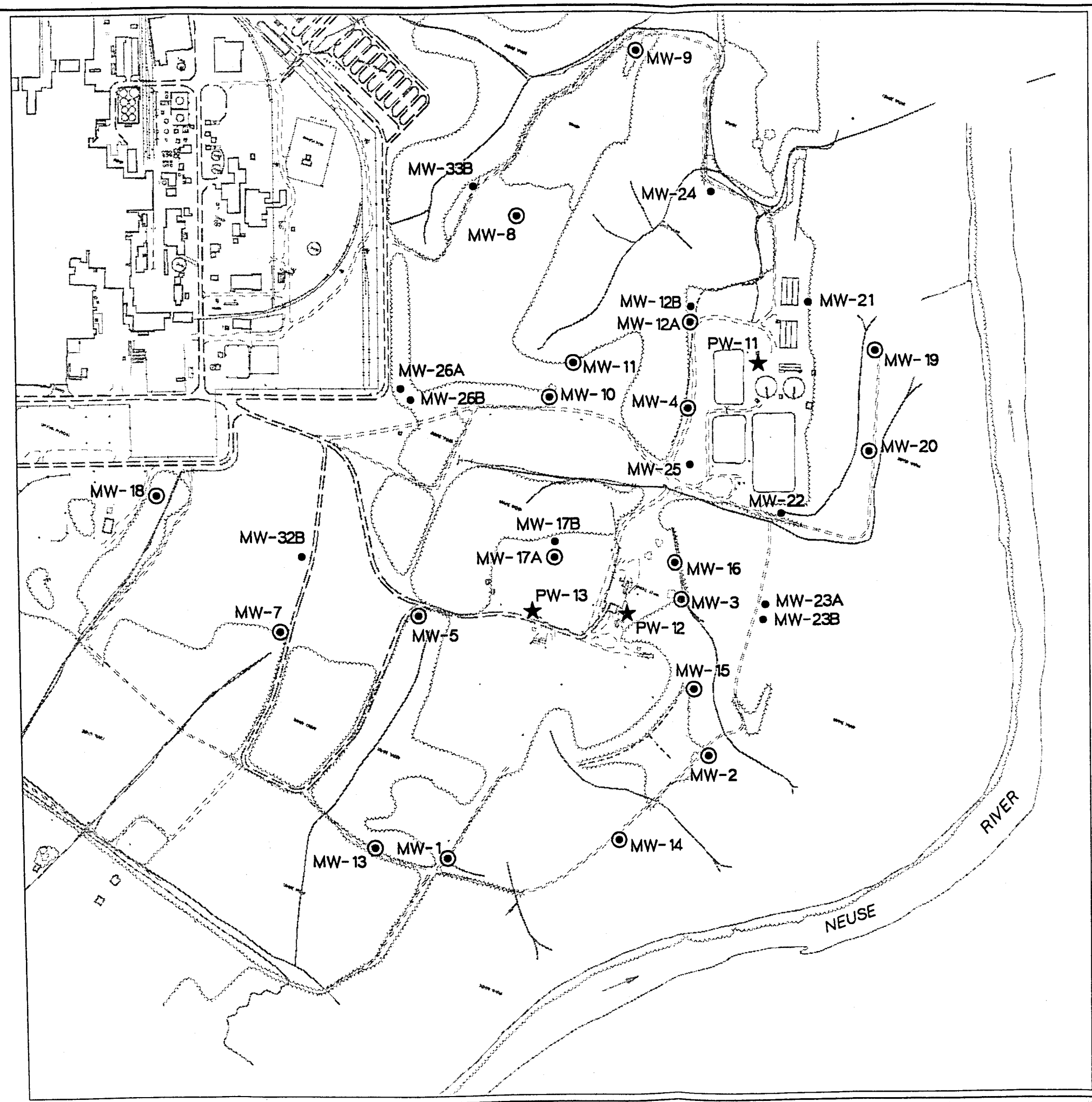

N

LEGEND

- ⊙ EXISTING MONITORING WELLS
- • PHASE 3 MONITORING WELLS
- ★ PRODUCTION WELLS

0 250 500 750

SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 4-1

PHASE 3 GROUNDWATER MONITORING SYSTEM - NONMANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

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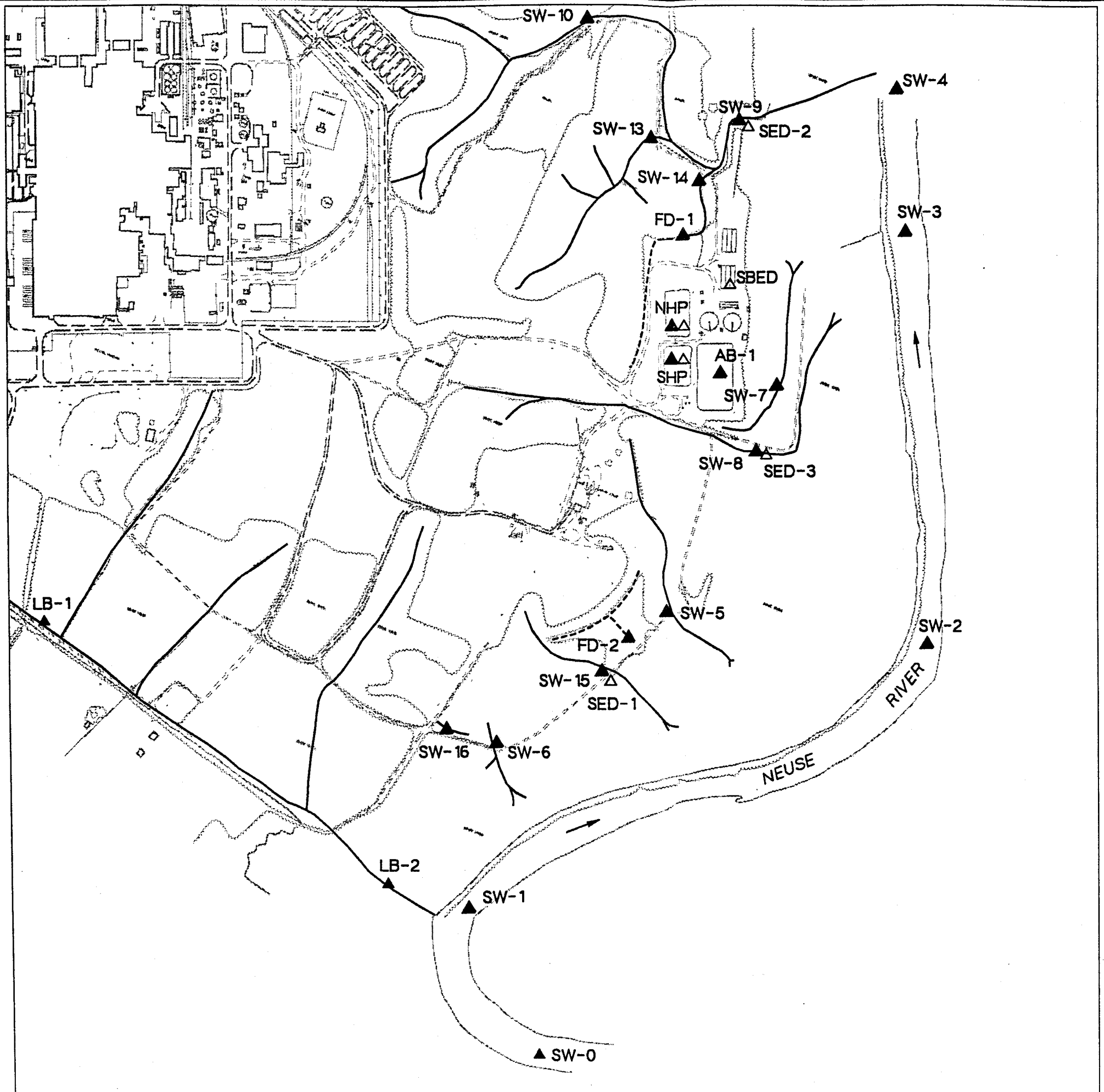

N

LEGEND

- ▲ SURFACE WATER SAMPLES
- △ SEDIMENT SAMPLES
- ——— DRAINAGE DITCH
- -------- UNDERGROUND DRAIN

0 300 600 900

SCALE: 1"=600'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 4-2

PHASE 3 SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS - NONMANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

WMU. Tables 4-1 and 4-2 give the chemical analytical protocol for the samples collected during Phase 3 of the non-manufacturing area investigation. Field duplicate, trip blank, and equipment blank samples were also analyzed and are reported in Appendix D. Laboratory quality control blanks were also analyzed with each batch of samples. All data are presented in Appendix D.

Surficial Aquifer Groundwater

The Phase 2 investigation did not indicate trace metal values at elevated concentrations in the surficial aquifer groundwater. Therefore, the focus of the chemical analyses in Phase 3 was on the organic compounds. Table 4-3 presents the data for the surficial aquifer groundwater samples from monitoring wells near WMUs 3 and 13. Table 4-4 presents the data for the surficial aquifer groundwater samples from monitoring wells near WMUs 1, 2, 4, 5, 7, and 10.

The primary compounds detected in the surficial aquifer using the volatile organic analytical method were chloroform, acetone, methylene chloride, and 1,4-dioxane. Figure 4-3 shows the distribution of the total volatile organic concentrations in the surficial aquifer for the non-manufacturing area. The groundwater contamination from the surficial aquifer is contained in the non-manufacturing area.

Peedee Aquifer Groundwater

In the non-manufacturing area, the Peedee aquifer was monitored by collecting and analyzing groundwater samples from six monitoring wells (MWs 12B, 17B, 23B, 26B, 32B, and 33B) and three production wells (PWs 11, 12, and 13). Two rounds of groundwater samples were collected in November 1989 and July 1990. The total depth of PW 11 is approximately 100 feet below ground surface and PWs 12 and 13 are 150 feet below ground surface.

Table 4-1
KINSTON CHEMICAL ANALYTICAL PROTOCOL - PHASE 3, NON-MANUFACTURING AREA

	VOCs	AEOs	TOC	Inorganics	Glycols	Methanol	Asbestos	Pb, Cr (TCLP)
Monitoring Wells								
MW3-MW5, MW10-MW12B, MW17A-MW26B, MW32B, MW33B	X	X	X	X				
MW13-MW16	X	X	X	X			X	
Production Wells								
PW11, PW12, PW13	X	X	X	X				
French Drains								
FD1, FD2	X	X	X	X				
Water Treatment Plant								
AB1, NHP, SHP (water) SBED, NHP-1, SHP-1 (sludge)	X	X	X	X				X
Sediment								
SED1-SED3	X	X		X				
Surface Water								
SW1-SW16	X	X	X	X				
LB1,2; SW0-SW4	X	X						

VOC - Volatile organic compounds
AEO - Acid extractable organic compounds
TOC - Total Organic Carbon
TCLP - Toxic Characteristic Leaching Procedures

WDCR519/014.51

Table 4-2
CHEMICAL CONSTITUENTS ANALYZED

Volatile Organic Compounds (EPA Method 624)	
Acetone	1,3-Dichlorobenzene
Benzene	1,4-Dichlorobenzene
Bromodichloromethane	1,4-Dioxane
Bromoform	Ethylbenzene
Bromomethane	2-Hexanone
2-Butanone	4-Methyl-2-Pentanone
Carbon Disulfide	Methylene Chloride
Carbon Tetrachloride	Styrene
Chlorobenzene	1,1,2,2-Tetrachloroethane
Chloroethane	Tetrachloroethylene
2-Chloroethylvinylether	Toluene
Chloromethane	trans-1,3-Dichloropropene
cis-1,3-Dichloropropene	1,1,1-Trichloroethane
Dibromochloromethane	1,1,2-Trichloroethane
1,1-Dichloroethane	Trichloroethylene
1,1-Dichloroethylene	Trichlorofluoromethane
1,2-Dichloroethane	Vinyl Acetate
1,2-Dichloroethylene	Vinyl Chloride
1,2-Dichloropropane	Xylenes (total)
1,2-Dichlorobenzene	
Acid Extractable Organics (EPA Method 625)	
Benzoic Acid	2-Methylphenol
4-Chloro-3-methylphenol	4-Methylphenol
2-Chlorophenol	2-Nitrophenol
2,4-Dichlorophenol	4-Nitrophenol
4,6-Dinitro-2-methylphenol	Phenol
2,4-Dinitrophenol	Pentachlorophenol
2,4-Dimethylphenol	2,4,5-Trichlorophenol
Dowtherm A	2,4,6-Trichlorophenol
Other Organics	
Ethylene Glycol	Triethylene Glycol
Methanol	Total Organic Carbon (EPA 415.2)
Inorganics	
Calcium (EPA 200.7)	Magnesium (EPA 200.7)
Chloride (EPA 325.3)	Manganese (EPA 200.7)
Chromium (EPA 200.7)	Sodium (EPA 200.7)
Iron (EPA 200.7)	Lead (EPA 239.2)
Potassium (EPA 200.7)	Silicon (EPA 200.7)
	Sulfate (EPA 375.4)

WDCR519/015.51

Table 4-3
ORGANIC CHEMICAL ANALYSES
SURFICIAL AQUIFER GROUNDWATER SAMPLES
NON-MANUFACTURING AREA; WMUS 3 AND 13

	WMUs 3 and 13															
	MW4		MW10		MW11		MW12A		MW19		MW20		MW21	MW22	MW24	MW25
Analysis (ppb)	7/88	11/89	7/88	11/89	7/88	11/89	7/88	11/89	7/88	11/89	7/88	11/89	11/89	11/89	11/89	11/89
Acetone	<10	<10	1,700	<10	18,000	7,800B	9,700	1,000B	<10	<10	<10	<10	<10	<10	<10	7J
Carbon Disulfide	<5	2J	<500	<5	<500	180J	<500	<50	<5	<5	<5	<5	<5	71	<5	2J
Chloroform	<5	<5	<500	<5	1,300	3,100	1,100	<50	<5	<5	<5	<5	<5	<5	<5	<5
1,4-Dioxane	320	360	<5,000	60	<5,000	<2,500	<5,000	1,700	<50	<50	<50	65	200	710	<50	81
Methyl Ethyl Ketone	<10	<10	<1,000	<10	2,700	<500	1,400	<100	<10	<10	<10	<10	<10	<10	<10	<10
Methylene Chloride	<10	4BJ	7,600	5B	16,000	9,400B	5,000	52B	15	3BJ	15	2BJ	4BJ	2BJ	5B	3BJ
Trichloroethylene	<5	<5	<500	<5	<500	<250	<500	12J	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1-Trichloroethane	<5	<5	<500	<5	<500	51J	<500	<50	<5	<5	<5	<5	<5	<5	<5	<5
Dowtherm A	/	<10	/	42	/	<250	/	<50	/	<10	/	<10	<10	2400	<10	<10
Toluene	<5	<5	<500	<5	<500	64J	<500	120	<5	<5	<5	<5	<5	<5	<5	<5
Phenol	<10	<10	29	<10	360	120J	300	66	<10	<10	<10	<10	<10	24J	<10	10
2-Methylphenol	<10	<10	<10	<10	390	360	<1,000	73	<10	<10	<10	<10	<10	<100	<10	<10
4-Methylphenol	<10	<10	4	<10	<500	<250	380	460	<10	<10	<10	<10	<10	<100	<10	<10
TOC (mg/l)	19.1	25.8	35.5	24.6	1,580	2,290	1,220	284	13.8	7.9	47.2	33.6	13.3	7.8	6.8	15.3

"J" = Estimated value. Measured value is less than the quantitative detection limit.
"B" = Compound was detected in associated laboratory blank.
<5 = Below quantitative detection limit shown.
"/" = Sample not taken or analysis not performed.

Table 4-4
ORGANIC CHEMICAL ANALYSES
SURFICIAL AQUIFER GROUNDWATER SAMPLES
NON-MANUFACTURING AREA; WMUS 1, 2, 4, 5, 7, AND 10

	WMUs 1, 2, 4, 5, 7 and 10												
	MW3		MW13		MW14		MW15		MW16		MW17A		MW23A
Analysis (ppb)	7/88	11/89	7/88	11/89	7/88	11/89	7/88	11/89	7/88	11/89	7/88	11/89	11/89
Acetone	<1,000	<10	<10	6BJ	<10	11B	<10	9BJ	890	29B	<5,000	2,700B	<10
Benzene	<500	8	<5	<5	<5	<5	<5	3J	29	26	<2,500	<1,000	<5
Chlorobenzene	1,300	20	<5	<5	<5	<5	<5	<5	42	47	<2,500	<1,000	<5
Chloroform	<500	<5	<5	<5	<5	<5	<5	<5	260	1J	40,000	23,000	<5
1,4-Dioxane	74,000	550	<50	<50	<50	80	<50	3,200	<500	1,100	<25,000	<10,000	<50
Methylene Chloride	11	4BJ	<10	3BJ	<10	4BJ	<10	6B	580	5B	50,000	19,000B	4BJ
Tetrachloroethylene	<5	<5	<5	<5	<5	<5	<5	<5	<50	<5	<2,500	730J	<5
Vinyl Chloride	<1,000	<10	<10	<10	<10	<10	<10	<10	110	17	<5,000	<2,000	<10
Dowtherm A	/	<10	/	<10	/	<10	/	<10	/	<10	/	960	<10
Phenol	<10	<10	<10	<10	<10	<10	<10	<10	47	<10	330	61	<10
2-Methylphenol	<10	<10	<10	<10	<10	<10	<10	<10	450	23	9,500	3,500	<10
4-Methylphenol	<10	<10	<10	<10	<10	<10	<10	<10	67	<10	390	250	<10
TOC (mg/l)	37.8	16.6	21.5	3.6	16.1	10.9	41.6	34.9	292	66.6	1,270	759	7.1

"/" = Sample not taken or analysis not performed.
<5 = Below quantitative detection limit shown.
B = Compound detected at low concentrations in associated laboratory blank.
J = Estimated value. Measured value is less than the quantitative detection limit.

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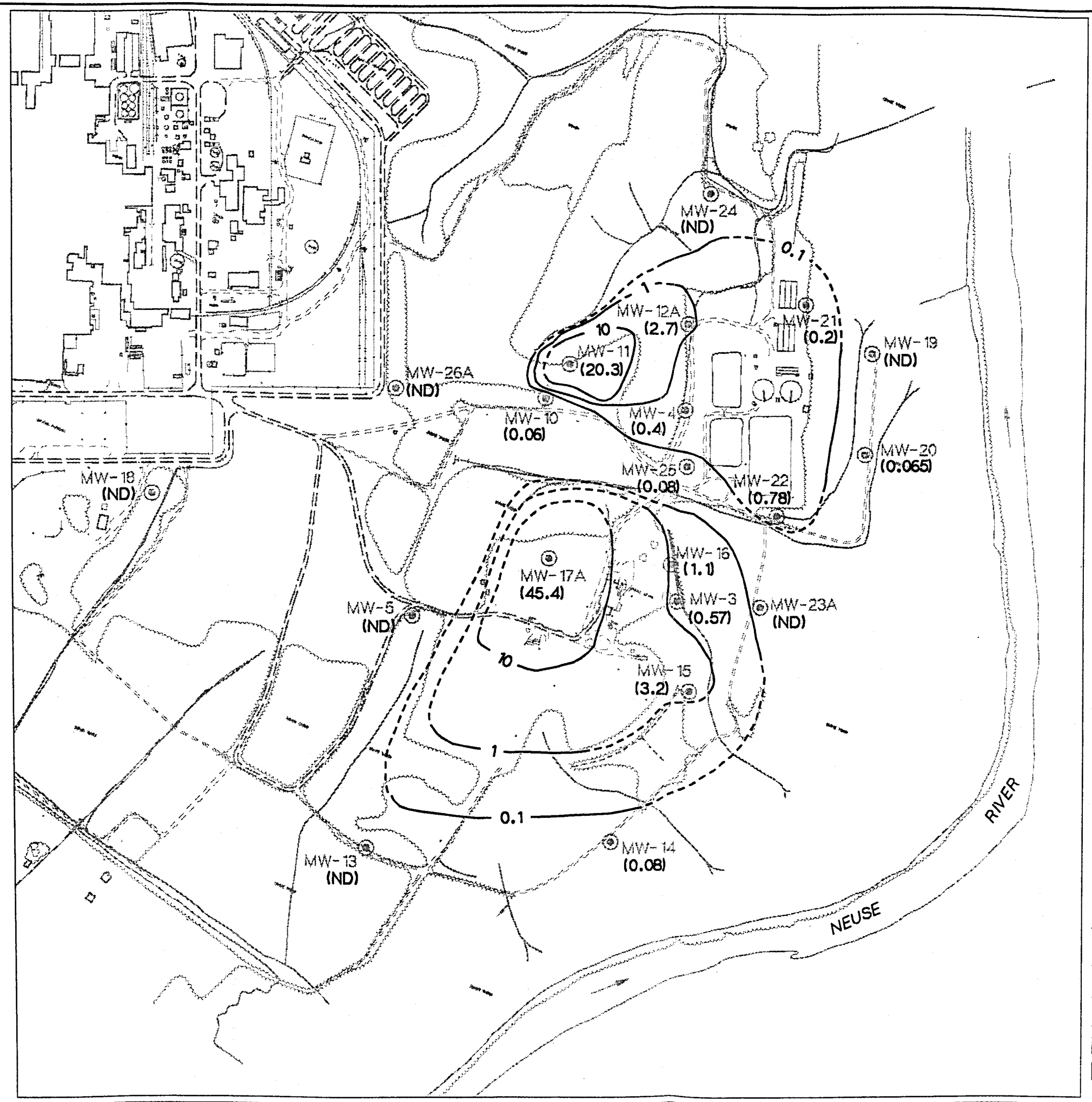

N

LEGEND

— 10 —	ISOCONCENTRATION LINE OF TOTAL VOLATILE ORGANIC COMPOUNDS (ppm)
⊙	MONITORING WELLS
(45.4)	TOTAL VOLATILE ORGANIC CONCENTRATION IN ppm
(ND)	NONE DETECTED

DATA ARE FROM NOVEMBER 1989.

ISOCONCENTRATION LINES ARE INTERPOLATED BETWEEN DATA POINTS; LINES ARE DASHED WHERE THE CONCENTRATION DISTRIBUTION IS ESTIMATED.

0 250 500 750

SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 4-3

DISTRIBUTION OF TOTAL VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN THE SURFICIAL AQUIFER - NONMANUFACTURING AREA
DuPont Kinston Facility

CH2M HILL

The organic compounds detected in the samples from these wells are given in Table 4-5. The only organic compound observed above the detection limit during both rounds of sampling was phenol at MW 17B (39 and 27 ppb) and MW 23B (11 and 38 ppb). None of the volatile organic compounds detected in the surficial aquifer were detected in the Peedee aquifer in the non-manufacturing area.

Surface Water and Sediment

Seventeen surface water samples were collected from the locations shown in Figure 4-2. Table 4-6 shows the surface water results from the samples collected near WMUs 3 and 13. Table 4-7 shows the results from the surface water samples collected near WMUs 1, 2, 4, 5, 7, and 10. Table 4-8 shows the results from the surface water samples collected from the Neuse River and adjoining Line Branch. The surface water from each of these areas flows directly to the Neuse River and has no potential impact on Beaverdam Branch.

Some of the organic compounds observed in the surficial groundwater were detected in surface water samples collected from the drainageways near the WMUs. 1,4-Dioxane was detected in nearly all of the drainageway surface water samples. Surface water from the drainageways flows directly to the Neuse River but does not flow toward the Kentec property or its vicinity. Other than the trace concentrations that can be attributable to laboratory analytical procedures, no organic compounds were detected in the Neuse River downstream of the Kinston Plant.

Six sediment samples were collected from drainage channels from the locations shown in Figure 4-2. The only organic compounds detected in the sediment include 1,4-dioxane and Dowtherm A (Appendix D, Table D-5). Concentrations were low, typically less than 1 ppm.

Table 4-5
ORGANIC CHEMICAL ANALYSIS
GROUNDWATER SAMPLES
PEEDEE AQUIFER WELLS

Analysis (ppb)	MW12B		MW17B		MW23B		MW26B		MW32B		MW33B		PW11			PW12			PW13	
	11/89	7/90	11/89	7/90	11/89	7/90	11/89	7/90	11/89	7/90	11/89	7/90	7/88	11/89	7/90	7/88	11/89	7/90	11/89	7/90
Carbon Disulfide	<5	<5	<5	<5	<5	2J	2J	<5	<5	<5	2J	<5	<5	<5	<5	<5	<5	<5	<5	<5
Dowtherm A	75	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	/	<10	<10	/	26	<10	27	<10
Phenol	<10	6J	39	27	11	38	10	<10	<10	<10	21	<10	<10	<10	<10	<10	<10	<10	<10	<10
TOC (ppm)	3.2	/	2.1	/	16.3	/	1.9	/	15.5	/	4.6	/	39	10.1	/	20.8	<1	/	2.1	/

"/" = Sample not taken or analysis not performed.
J = Estimated value. Measured value is less than the quantitative detection limit.
<5 = Below quantitative detection limit shown.

Table 4-6
ORGANIC CHEMICAL ANALYSES
SURFACE WATER AND UNDERGROUND DRAIN
NON-MANUFACTURING AREA; WMUS 3 AND 13

Analysis (ppb)	Surface Water									Wastewater Plant			Underground Drain
	SW7		SW8		SW9		SW 10	SW13	SW14	AB1	NIIP	SIIP	FD1
	7/88	1/90	7/88	1/90	7/88	1/90	1/90	1/90	1/90	1/90	1/90	1/90	1/90
Acetone	<10	58	<10	62	<10	52	7J	10	150	<10	45B	100B	<10
Carbon Disulfide	<5	140	<5	200	<5	24	<5	<5	88	<5	<5	50	<5
1,4-Dioxane	1,400	405	920	140	800	64	<50	<50	250	<50	120	500	780
Methylene Chloride	<10	<10	<10	<10	<10	<10	<10	<10	<10	3BJ	6B	62B	2BJ
Tetrachloroethylene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	7	<5	<5
Toluene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	2J	22	<5
Trichloroethylene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5	<5	<5
Dowtherm A	/	<10	/	210	/	<10	<10	<10	<10	<10	27	2,600	8J
2-Methylphenol	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Methylphenol	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	19	<10
Phenol	<10	<10	<10	<10	<10	<10	>42.3 <10	<10	<10	<10	<10	6J	<10
TOC (ppm)	13.5	43.2	8.4	60.1	28.2	42.3	51.6	63.7	108	45	111	134	22.5

<5 = Below quantitative detection limit.
"/" = Sample not taken or analysis not performed.
"B" = Compound was detected in associated laboratory blank.
"J" = Estimated value. Measured value is less than quantitative detection limit.

Table 4-7
ORGANIC CHEMICAL ANALYSES
SURFACE WATER AND UNDERGROUND DRAIN
NON-MANUFACTURING AREA; WMUS 1, 2, 4, 5, 7, AND 10

Analysis (ppb)	Surface Water						Underground Drain	
	SW5		SW6		SW15	SW16	FD2	
	7/88	1/90	7/88	1/90	1/90	1/90	1/90	7/90
Acetone	<10	13	<10	190	89	1,400	120B	75B
Carbon Disulfide	<5	7	<5	190	300	51	4J	<5
Chloroform	<5	<5	<5	<5	23	400	6	<5
1,4-Dioxane	420	92	<50	900	180	540	1,400	2,900
Methyl Ethyl Ketone	<10	<10	<10	<10	<10	89J	16	11
Benzene	<5	<5	<5	<5	<5	<5	<5	7
1,2-Dichloroethylene	<5	<5	<5	<5	<5	<5	<5	11
Trichloroethylene	<5	<5	<5	<5	<5	<5	<5	2J
Toluene	<5	<5	<5	<5	<5	<5	<5	12
Xylenes	<5	<5	<5	<5	<5	<5	<5	5
Methylene Chloride	13	7J	14	<10	29	230	32B	9B
Dowtherm A	/	<10	/	37	3J	120	740	<10
2-Methylphenol	14	<10	<10	35	18	950	240	160
4-Methylphenol	<10	<10	<10	12	<10	57J	72J	150
Phenol	<10	<10	<10	8J	65	27J	260	210
TOC (ppm)	24.7	61.8	135	82.2	92.8	1,160	269	/

"/" = Sample not taken or analysis not performed.
J = Estimated value. Measured value is less than the quantitative limit.
<5 = Below method detection limit shown.

Table 4-8
ORGANIC CHEMICAL ANALYSES
SURFACE WATER SAMPLES
NEUSE RIVER AND LINE BRANCH

Analysis (ppb)	SW0	SW1			SW2			SW3			SW4			LB1	LB2
	7/90	7/88	1/90	7/90	7/88	1/90	7/90	7/88	1/90	7/90	7/88	1/90	7/90	7/90	7/90
Acetone	10B	<10	20	9B	<10	48	9BJ	<10	24	10B	<10	21	9BJ	14B	13B
Carbon Disulfide	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5	<5	8	2J
1,4-Dioxane	<50	300	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Methylene Chloride	5B	22	<5	5B	21	<5	5B	24	<5	22B	<10	<5	7B	20B	9B
TOC (ppm)	/	29.5	9.3	/	21.5	29.3	/	7	13.9	/	17.3	6.3	/	/	/

<5 = Below quantitative detection limit shown.
"B" = Compound was detected in associated laboratory blank.
"J" = Estimated value. Measured value is less than the quantitative detection limit.
"/ " = Sample not taken or analysis not performed.

Manufacturing Area

The Phase 3 investigation in the manufacturing area was conducted in two separate projects. The first project was an initial study of the manufacturing area by CH2M HILL in 1989 and 1990. DERS performed the second project in 1991. In total, seventeen surficial aquifer monitoring wells and one Peedee aquifer monitoring well (MW 30B) were installed in the manufacturing area. Monitoring well locations are shown in Figure 4-4.

Four separate rounds of groundwater samples from monitoring wells, one round of surface water samples, and 30 groundwater samples collected from temporary soil borings were analyzed for volatile organic compounds. In addition, the first and second rounds of groundwater samples and the surface water samples were analyzed for acid extractable organics (see Table 4-1), ethylene glycol, and triethylene glycol. Table 4-9 presents the results of the groundwater and surface water samples for the first two rounds of sampling. Table 4-10 presents the most recent groundwater sampling results (December, 1991). A complete summary of the water quality data collected for the manufacturing area investigation is given in Appendix E.

The data from the manufacturing area investigation indicate that the primary organic compound detected in the surficial groundwater in the manufacturing area is trichloroethylene (TCE). Figure 4-5 shows the distribution of the concentration of TCE. The highest concentrations of TCE are evident near MW 30A with decreasing concentrations along the direction of surficial aquifer groundwater flow to the north.

These data do not indicate that surficial aquifer groundwater contamination in the manufacturing area has migrated to Beaverdam Branch or off Kinston Plant property. No organic compounds were observed above the detection limit in the Peedee aquifer at monitoring well MW 30B.

4-9

ORGANIC[illegible]ICAL ANALYSES
GROUNDWATER AND SURFACE WATER
MANUFACTURING AREA–CH2M HILL

Analysis (ppb)	Detection Limit	MW27		MW28		MW29		MW30A		MW30B	MW31		MW34	MW35	MW36	MW37	MW38	MW39	MW40	MW41	SW1	SW2
		11/89	8/90	11/89	8/90	11/89	8/90	11/89	8/90	8/90	11/89	8/90	8/90	8/90	8/90	8/90	8/90	8/90	8/90	8/90	8/90	8/90
Methylene Chloride	10	9B	2BJ	7B	9B	6BJ	13BJ	48BJ	55BJ	9B	2BJ	6B	5B	6B	5B	6B	5B	6B	6B	6B	11B	5B
Acetone	10	-	6BJ	-	6BJ	<33	19BJ	<250	92BJ	20B	6BJ	7BJ	13B	9BJ	5BJ	10B	7BJ	11B	7BJ	7BJ	11B	6BJ
Carbon Disulfide	5	-	-	-	-	<17	<20	<120	<100	1J	3J	-	5	-	-	-	-	-	-	-	9	5
1,2 Dichloroethylene	5	-	3J	-	-	<17	18J	<120	30J	-	-	-	-	2J	-	4J	4J	-	4J	-	-	-
Chloroform	5	-	-	-	-	<17	<20	<120	<100	-	-	2J	-	-	-	-	-	-	-	-	-	-
Methyl Ethyl Ketone	10	-	-	-	-	<33	<40	<250	<200	-	-	-	-	5J	-	-	-	-	-	-	-	-
Trichloroethylene	5	-	-	2J	2J	390	490	4,200	2,700	2J	10	1J	-	9	-	19	5	-	1J	2J	-	-
Tetrachloroethylene	5	-	-	-	-	<17	<20	<120	<100	-	4J	2J	-	-	-	-	-	-	-	-	-	-
Toluene	5	-	3J	-	3BJ	<17	<20	<120	<100	1J	-	1J	3J	1J	-	2J	2J	1J	3J	-	3J	-
1,4 Dioxane	50	-	-	-	12J	<170	<200	<1200	<1000	-	-	-	-	-	-	-	-	-	220	-	-	-
Dowtherm A	10	24	-	-	-	-	-	-	-	-	2000	2J	-	-	-	-	-	-	4J	-	-	-
Ethylene Glycol	1000	<250	-	<250	-	<250	-	330	-	-	<250	-	-	-	-	-	-	-	-	-	-	-
Triethylene Glycol	1000	<250	-	<250	-	<250	-	890	-	-	<250	-	-	-	-	-	-	-	-	-	-	-

"J" = Estimated value. Measured value is less than the quantitative limit.
"B" = Compound was detected in associated laboratory blank.
<5 = Below quantitative detection limit shown.
"-" = Below detection limit.

Table 4-10
VOLATILE ORGANIC CHEMICAL ANALYSIS
GROUNDWATER, DECEMBER 1991
MANUFACTURING AREA—DERS

Monitoring Well	TCE	1,1-DCA	1,1-DCE	1,2-DCE	1,1,1-TCA	CS_2
Detection Limit	<1.9	<4.7	<2.8	<1.8	<3.8	<10
MW27	-	-	-	-	-	-
MW28	-	-	-	-	-	-
MW29	110	-	-	4.10	-	-
MW30A	373	<24	<14	<8	<19	<50
MW30B	-	-	-	-	-	-
MW31	-	19.3	30.3	-	135	-
MW34	-	-	-	-	-	-
MW35	9.23	-	-	-	-	-
MW36	-	-	-	-	-	-
MW37	38.4	-	-	2.05	-	-
MW38	-	-	-	3.06	-	-
MW39	-	-	-	-	-	-
MW40	-	-	-	-	-	-
MW41	-	-	-	-	-	-
MW42	-	-	-	-	-	-
MW43	-	-	-	-	-	-
MW44	Dry	Dry	Dry	Dry	Dry	Dry
MW45	-	-	-	11.6	-	-

TCE = Trichloroethylene
1,1-DCA = 1,1-Dichloroethane
1,1-DCE = 1,1-Dichloroethylene
1,2-DCE = 1,2-Dichloroethylene
1,1,1-TCA = 1,1,1-Trichloroethane
CS_2 = Carbon Disulfide
<5 = Below quantitative detection limit shown
"-" = Below detection limit
Dry = No water in well
All concentrations are in ppb.

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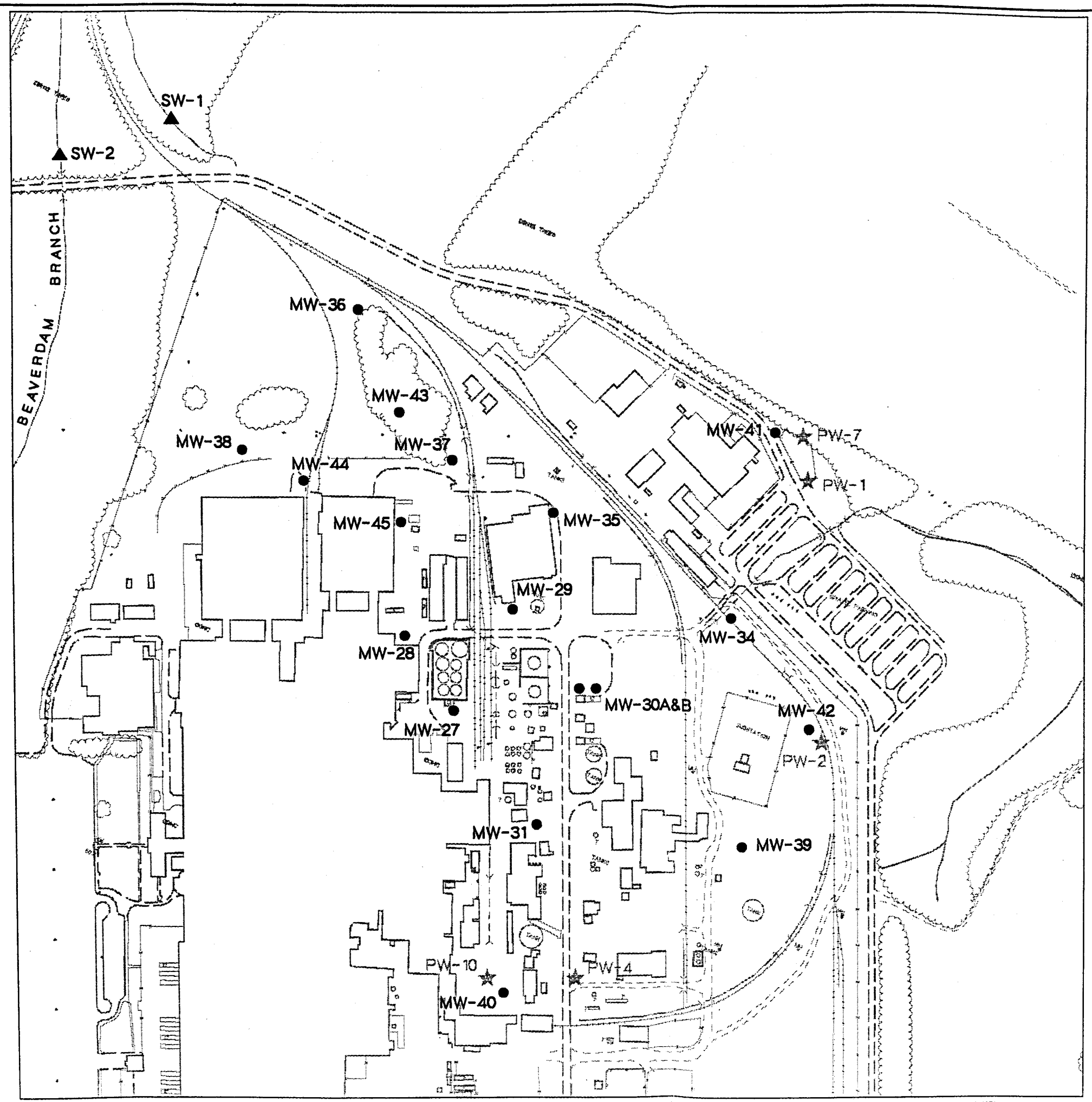

N

LEGEND

- ● MONITORING WELLS
- ★ PRODUCTION WELLS
- ▲ SURFACE WATER SAMPLES

0 150 300 450

SCALE: 1"=300'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 4-4

PHASE 3 GROUNDWATER MONITORING SYSTEM AND SURFACE WATER LOCATIONS - MANUFACTURING AREA
DuPont Kinston Facility

CH2M HILL

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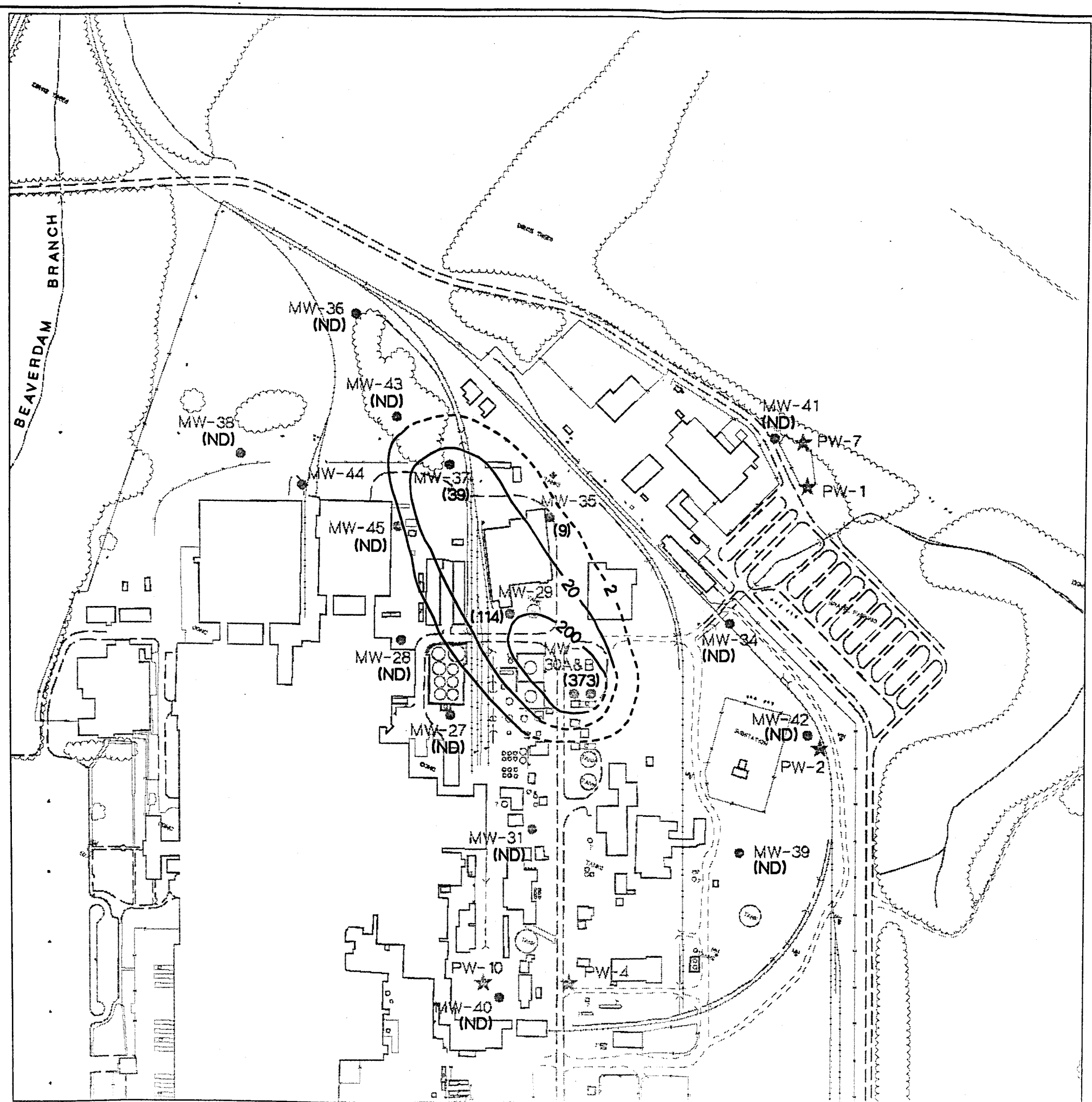


N

LEGEND

—100—	ISOCONCENTRATION LINE OF TRICHLOROETHYLENE (ppb)
●	MONITORING WELLS
★	PRODUCTION WELLS
(114)	TRICHLOROETHYLENE CONCENTRATION IN ppb
(ND)	NONE DETECTED

DATA ARE FROM DECEMBER 1991.

ISCCONCENTRATION LINES ARE INTERPOLATED BETWEEN DATA POINTS; LINES ARE DASHED WHERE THE CONCENTRATION DISTRIBUTION IS ESTIMATED.

0 150 300 450

SCALE: 1"=300'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 4-5

DISTRIBUTION OF TRICHLOROETHYLENE CONCENTRATIONS IN THE SURFICIAL AQUIFER - MANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

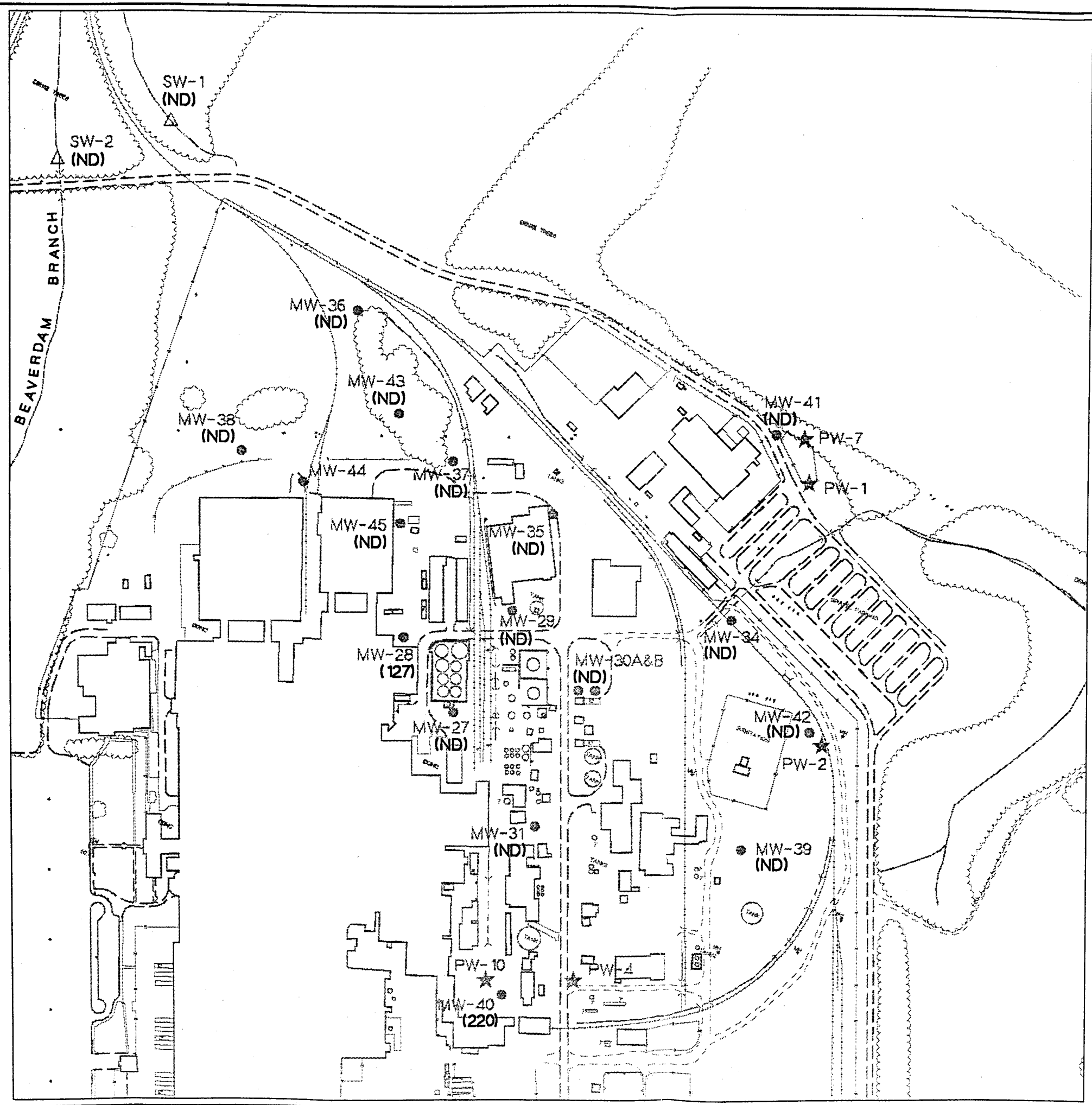
1,4-Dioxane was analyzed from groundwater and surface water samples during the three sampling rounds conducted in the manufacturing area. 1,4-Dioxane was detected in MW28 (127 ppb) and MW40 (220 ppb) during the August 1990 sampling round. 1,4-Dioxane was not detected in any of the other rounds of sampling at these two locations and at any of the other groundwater and surface water sampling locations. Figure 4-6 shows the distribution of 1,4-dioxane during the August 1990 sampling event. The data indicate that 1,4-dioxane in the manufacturing area has not migrated to Beaverdam Branch or off the Kinston Plant.

Source Characterization

The Phase 3 source characterization investigation provided data to characterize the soil, groundwater, and waste, in and adjacent to, the non-manufacturing area WMUs. The source characterization included the collection and analysis of soil, sediment, and groundwater samples from within and around potential sources for the surficial aquifer groundwater contamination. Soil and groundwater sampling was performed in November and December 1991. A summary of the results from this investigation is given in this section. A complete presentation of the source characterization data is given in Appendix F.

Soil and Sediment Sampling

Twenty-seven soil samples were collected from 18 soil borings and were analyzed for various organic and inorganic compounds as discussed in Appendix F. In addition, one composite ash sample was collected from each of WMUs 1, 2, 3, 5, and 10, and two composite samples were collected from WMU 7. Three sediment samples were collected from the primary drainageway in the non-manufacturing area. Two samples of soil from each of the wastewater treatment plant holding ponds were also collected and analyzed. The locations of the soil and sediment samples are given in Figure 4-7.



LEGEND

- ● MONITORING WELLS
- ★ PRODUCTION WELLS
- △ SURFACE WATER SAMPLE
- (127) 1,4 DIOXANE CONCENTRATION IN ppb
- (ND) NONE DETECTED

DATA ARE FROM AUGUST, 1990.

0 150 300 450

SCALE: 1"=300'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 4-6

DISTRIBUTION OF 1,4 DIOXANE CONCENTRATIONS IN THE SURFICIAL AQUIFER AND BEAVERDAM BRANCH - MANUFACTURING AREA
DuPont Kinston Facility

CH2M HILL

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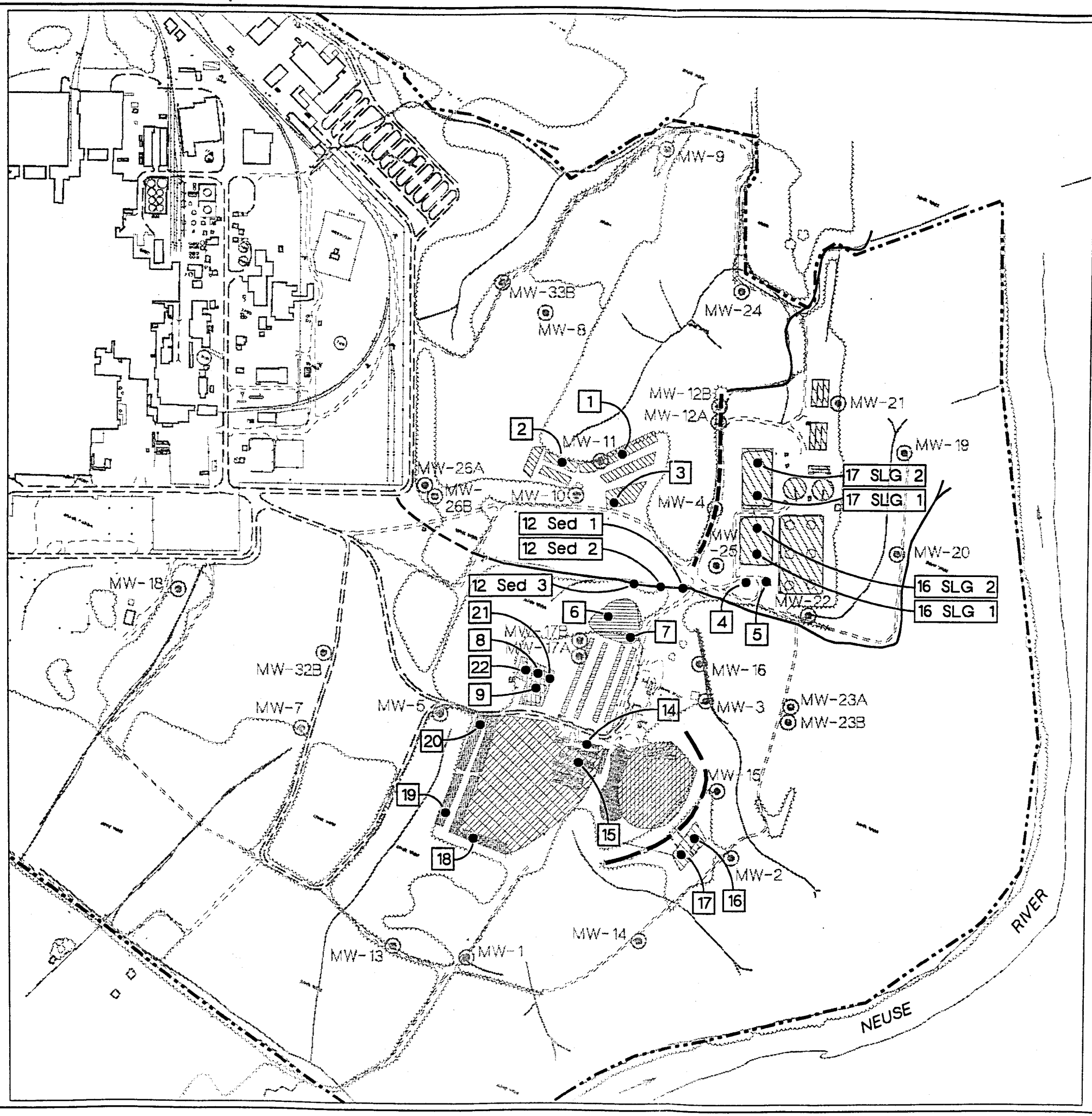

LEGEND

- MW-1 — MONITORING WELLS
- DuPONT PROPERTY LINE
- 1 — SOIL BORING/SEDIMENT SAMPLE

0 250 500 750

SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 4-7

SOIL SAMPLE LOCATIONS - SOURCE CHARACTERIZATION

DuPont Kinston Facility

CH2MHILL

Table 4-11 summarizes the highest concentrations of the most prevalent compounds detected from each of the WMUs. In general, the highest concentrations in soil were detected 8 to 10 feet below ground surface.

Groundwater Sampling

The groundwater sampling portion of the source characterization focused on the groundwater contamination adjacent to WMUs 1, 2, 3, 5, 7, and 10. Field activities included the installation of three piezometers and the sampling of groundwater from the three piezometers, six existing monitoring wells and 13 Geoprobe sampling locations. Groundwater sampling locations are shown in Figure 4-8.

The data from the groundwater sampling are presented in Appendix F, Tables F-11 and F-12. The results are similar to those observed in the Phase 3 non-manufacturing area. Elevated volatile organic compounds were identified immediately downgradient of WMUs 1, 2, and 3.

WDCR519/013.51

Table 4-11
SOURCE CHARACTERIZATION MAXIMUM SOIL CONCENTRATIONS

Compounds	Waste Management Unit				
	WMU1	WMU2	WMU3	WMU7	WMU14
Methylene Chloride	4,100	0.64	1.0	NA	0.21
Acetone	82	2.3	3.8	NA	0.09
Chloroform	7,000	0.05	6.3	NA	0.004
1,4-Dioxane	450	2.2	<0.25	NA	0.10
Tetrachloroethylene	640	0.220	1.3	NA	<0.005
2-Methyphenol	1,900	3.2	1.6	0.23	<0.33
Dowtherm A	3,500	54	8.3	50	<0.33

All concentrations are in ppm.
NA = Not Analyzed
<0.25 = Below quantitative detection limit shown

WDCR617/043.51

Chapter 5

Summary and Conclusions

The Phase 3 groundwater assessment of the Du Pont Kinston Plant was performed from 1989 through January 1992. Three separate investigations have been performed, including: (1) the characterization of the potential sources of contamination within and adjacent to the non-manufacturing area WMUs, (2) the evaluation of the extent of groundwater contamination in the non-manufacturing area, and (3) the investigation of the groundwater quality in the manufacturing area. The purposes of this Phase 3 report are to present all of the data collected during Phase 3 and to provide a current understanding of the potential for the migration of contamination from the Kinston Plant toward the Kentec property.

In general, the data currently indicate that no contamination migrates from the Kinston Plant to the area in the vicinity of the Kentec facility by surface water or groundwater. Organic compounds were detected in the surficial aquifer groundwater on the Kinston Plant. However, the data indicates that this contamination is not currently migrating offsite within the surficial aquifer, and does not appear to have migrated to the underlying Peedee aquifer. Even if contamination were to migrate to the Peedee aquifer or deeper aquifers, the direction of groundwater flow within these aquifers is thought to be toward the pumping centers of the production wells on the Kinston property. These production wells would be expected to contain any contamination in these aquifers to within the boundary of the Kinston Plant.

Organic compounds were detected in drainageways that receive groundwater discharge from contaminated portions of the surficial aquifer on the Kinston Plant. None of these drainageways flow within one mile of the Kentec property. None of the organic compounds detected in the surficial groundwater on the Plant were detected in

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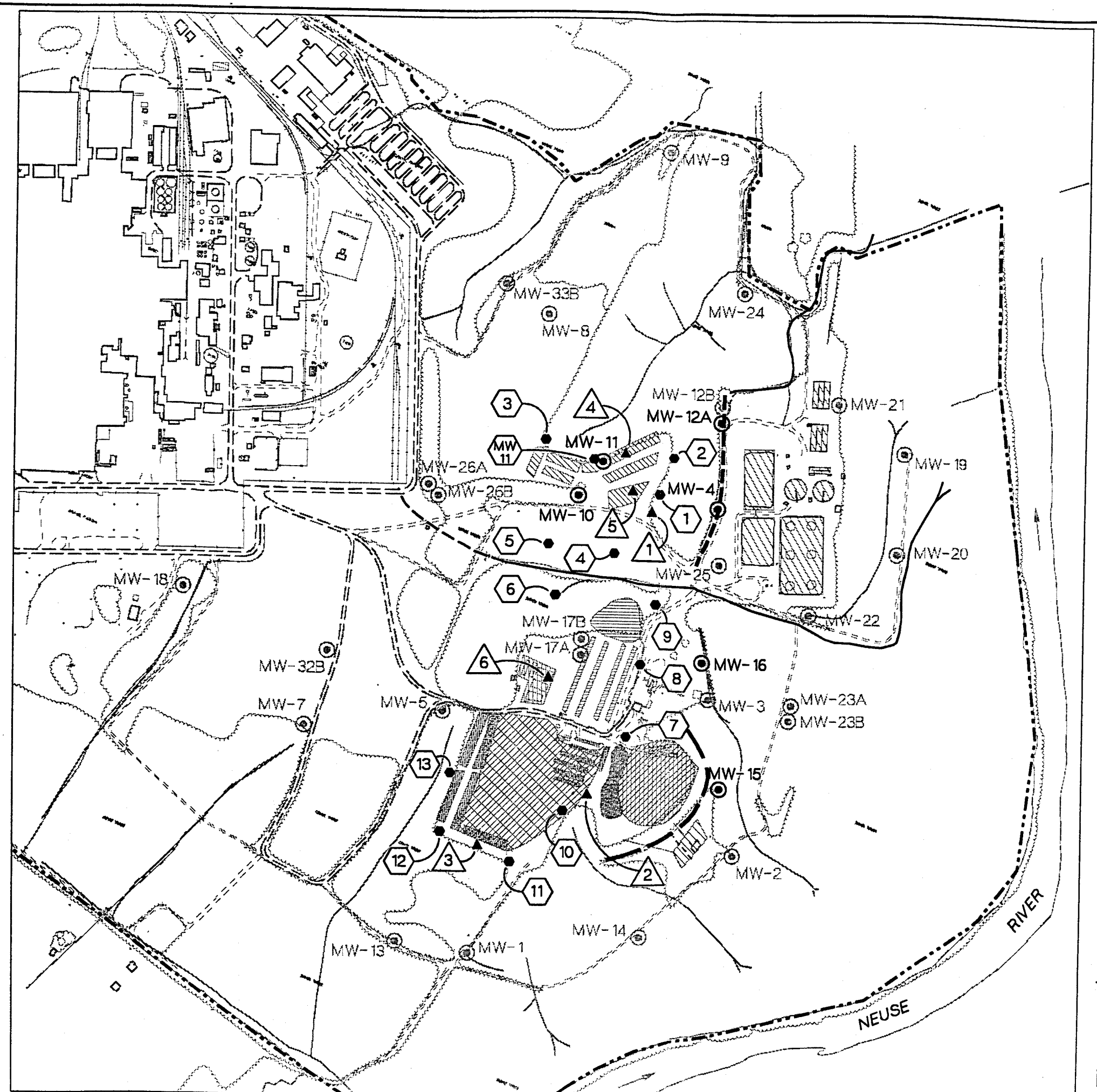

LEGEND

- MW-1 MONITORING WELLS
- DuPONT PROPERTY LINE
- GEOPROBE SAMPLES
- PIEZOMETERS

0 250 500 750

SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure 4-8

GROUNDWATER SAMPLE LOCATIONS - SOURCE CHARACTERIZATION

DuPont Kinston Facility

CH2MHILL

Beaverdam Branch and the Neuse River at locations immediately downstream of the Kinston Plant.

WDCR618/002.51

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WDCR337/071.51

Kinston Groundwater Assessment

PHASE 3
Volume 2 of 2

prepared for
DuPont–Kinston

DUPONT

CH2M HILL

APRIL 1992

Appendix A

DRILLING AND MONITORING WELL INSTALLATION

Non-Manufacturing Area

Appendix A

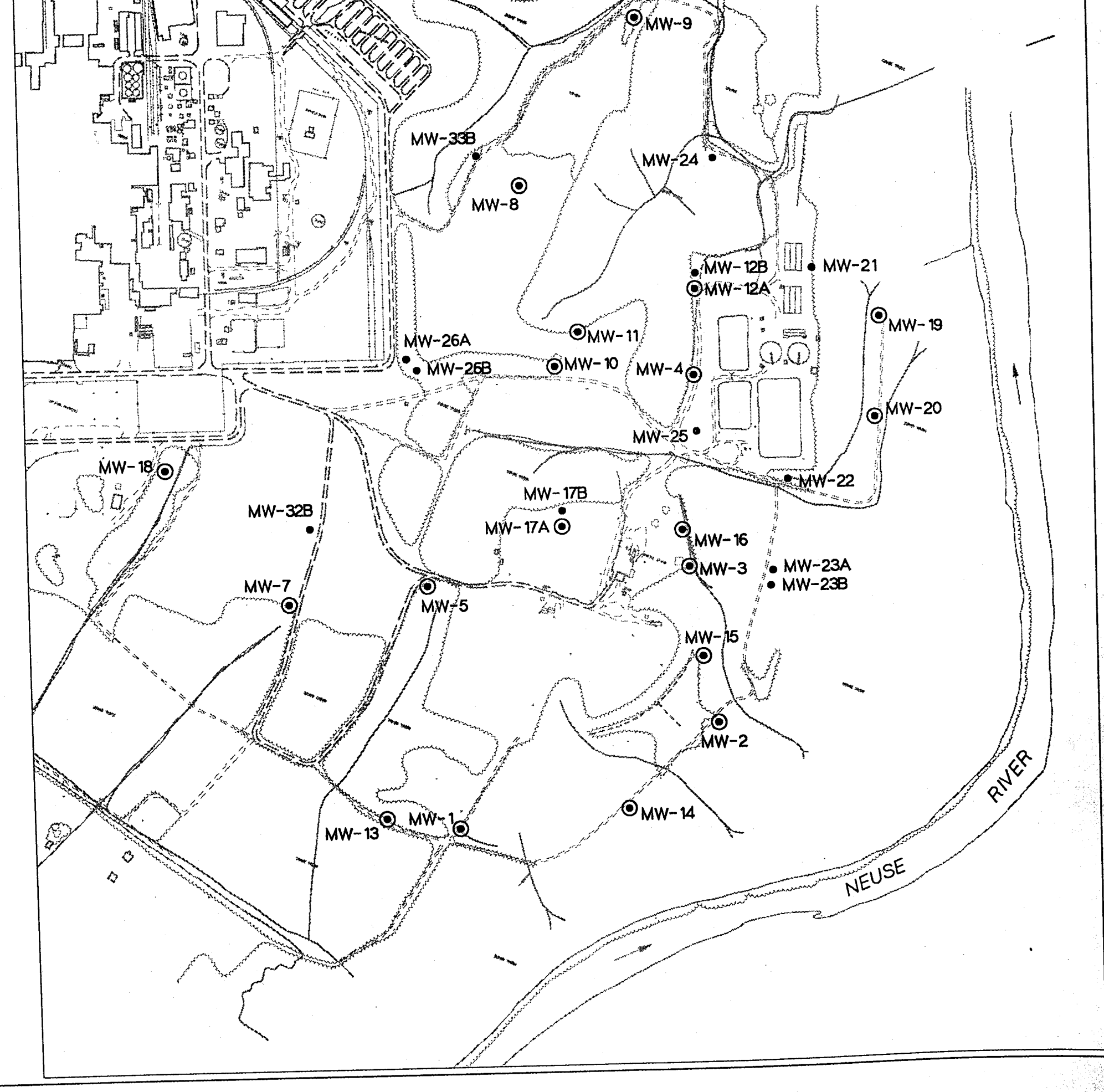
Drilling and Monitoring Well Installation Non-Manufacturing Area

This section describes the procedures, materials, and equipment used for drilling, subsurface soil sampling, and monitoring well installation at the DuPont-Kinston plant from August 21 to October 12, 1989. Drilling and well installation were performed by Westinghouse Environmental and Geotechnical Services, Inc.,. of Raleigh, North Carolina, under the supervision of D. Dronfield, S. Brown, and J. Ford of CH2M HILL. The well elevations were surveyed to ±0.01 foot (NCGS datum) by Barrow Surveying of Kinston, North Carolina. The boring logs and well completion diagrams for each of the monitoring wells installed are given at the end of this appendix. In addition, boring logs for the other wells installed during Phase 2 are provided.

Six shallow wells and six deep wells were installed during Phase 3 drilling. The shallow and deep zones are separated by a 15- to 30-foot-thick layer of hard, silicified mudstone. The locations of these wells are shown in Figure A-1.

The drilling and well installation were done using two drilling rigs--a CME-55 rig equipped with hollow stem augers and a NQ barrel for coring and a Speedstar 30K air and mud rotary rig. The smaller CME-55 rig was used for installation of the six shallow monitoring wells and for rock coring through the mudstone layer at the 6 deep well locations. The large Speedstar 30K rig was used for all stages of the deep well installation except for coring.

The six shallow boreholes were drilled to auger refusal at or below the top of the mudstone layer. This depth ranged from 6 to 35.5 feet below land surface. Soil



LEGEND

- ⊙ EXISTING MONITORING WELLS
- • PHASE 3 MONITORING WELLS

0 250 500 750

SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure A-1

PHASE 3 GROUNDWATER MONITORING SYSTEM - NONMANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

samples were taken during drilling using a 2-foot split spoon at 5-foot intervals. Two-inch diameter PVC casing and screen were installed in each borehole to a depth chosen by the CH2M HILL hydrogeologists. In general, the screened interval was installed in permeable zones overlying the mudstone layer. A sand pack of No. 2 sand was placed in the annulus between the PVC casing and screen and the borehole wall. This sand pack was added to a depth approximately 1 foot above the screen. A 1- to 2-foot thick layer of bentonite pellets was added to the annular space above the sand pack to prevent near-surface contamination of the well by grout and surface water. The borehole was filled with cement grout from the top of the bentonite to the land surface. A protective steel casing and locking cap and three guard posts were installed at each off-plant well to prevent tampering and damage to the wells. Schematic diagrams of both the shallow and deep monitoring wells are shown in Figure A-2. Deep wells are designated with the letter B and shallow wells paired with deep wells are designated with the letter A.

The deep wells at Kinston were completed with 8-inch, 6-inch, and 2-inch casings installed in a telescoped configuration designed to prevent downward migration of contaminants during drilling. All drilling was done using mud rotary drilling except the installation of the 8-inch casing at MW23B, where air rotary was used. The 8-inch casing was installed to a depth approximately 2 feet below the top of the mudstone layer. The annulus between the 8-inch casing and the borehole was grouted and pressure tested to ensure a watertight seal. Powdered bentonite was added to the grout used in the deep wells to prevent excessive shrinkage. After installation of the 8-inch casing, the CME-55 rig cored through the rock with a NQ barrel and took continuous samples. After coring and reaming, a 6-inch casing was installed inside the 8-inch casing to a depth approximately 5 feet below the bottom of the mudstone layer into a clayey silt unit. The annulus between the 6-inch casing and the borehole was then grouted and pressure tested. Drilling continued below the bottom of the 6-inch casing to a final depth determined on the basis of the sediments present. At wells MW12B, MW32B, and MW33B, Shelby tubes were

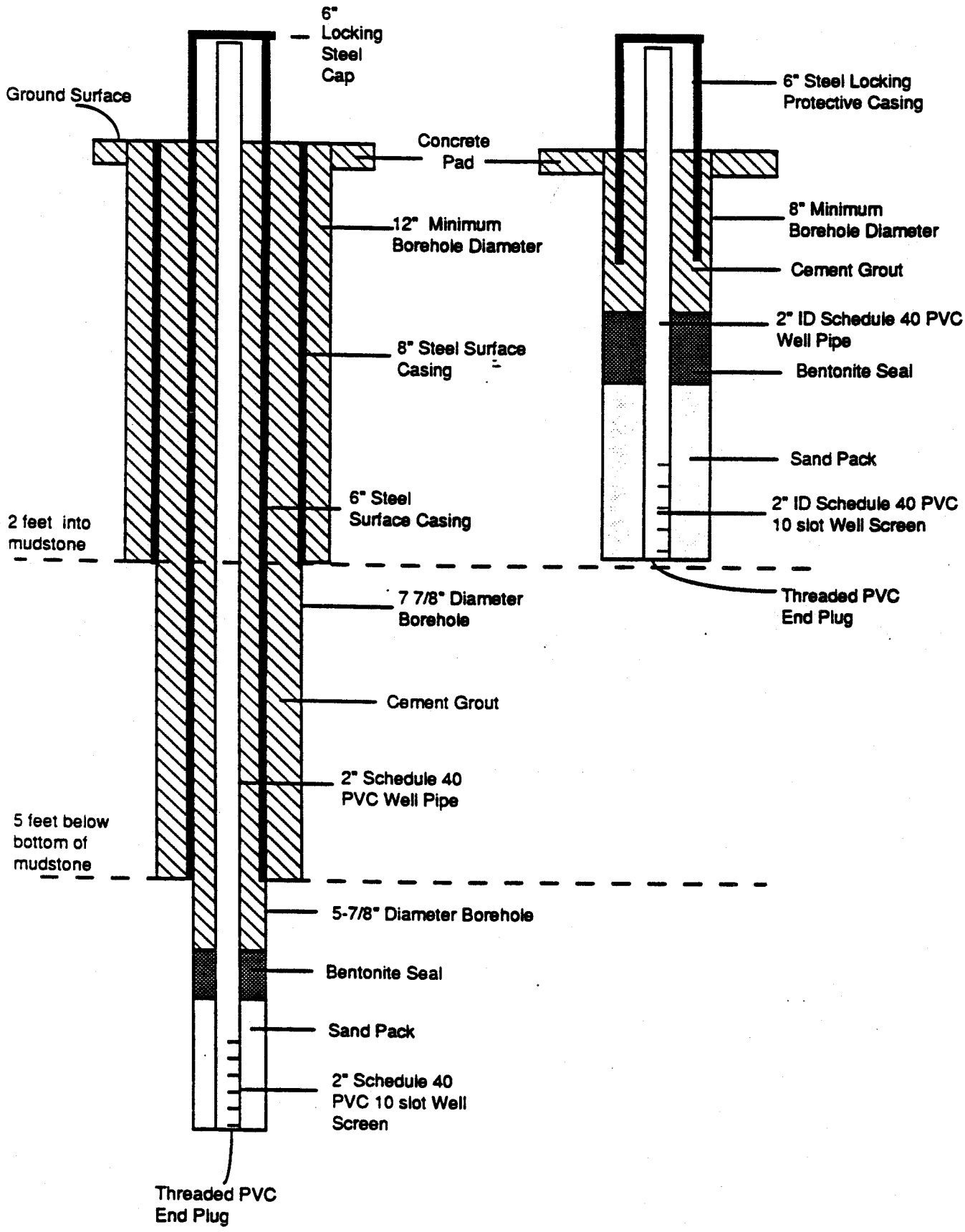


Figure A-2
Well Construction Diagram
Du Pont Kinston Facility

taken in the clayey silt unit immediately below the mudstone rock layer. Two-inch PVC casing and screen were installed inside the 6-inch casing to final depths ranging from 60 to 105 feet below land surface. A sand pack was placed in the borehole annulus to a depth approximately 3 feet above the screen, followed by a 3-foot thick layer of bentonite. Cement grout was tremied into the borehole from the top of bentonite to the land surface. Guard posts, a protective steel casing and locking cap, and a cement pad were installed at each well.

All equipment was decontaminated by steam cleaning between wells to prevent cross contamination. In addition, all equipment used in the drilling of the deep wells was steam cleaned between different phases of the drilling. The borehole itself was washed out after installation of both the 8-inch and 6-inch casings. All equipment was also steam cleaned before drilling began and after drilling ended at the Kinston plant to prevent cross contamination to and from other locations.

Each well was developed by block surging and pumping to remove drilling mud and natural fines from around the well screen. Various methods of pumping were used at individual sites as described below. Development continued until the turbidity of the water substantially reduced or showed little potential for further progress due to substantial amounts of fines in the screened zone.

Activities at Specific Drilling Locations

Some details of drilling activities at all of the wells are given below to describe unique circumstances encountered during drilling. More details are reported in the field logbook and in Table A1.

Table A1
DuPONT-KINSTON PHASE 3 MONITORING WELL CONFIGURATIONS

Well	Ground Elevation (in feet above MSL)	Depth to Top of Bentonite	Depth to Top of Sand	Depth to Top of Screen	Depth to Bottom of Screen (Screened Interval)	Depth to Bottom of 8-Inch Casing	Depth to Bottom of 6-Inch Casing	Total Borehole Depth
MW12B	34.9	53'	56'	61'	71' (10')	10'9"	38'	73'
MW17B	64.6	76'	79'	83'	93' (10')	31'	68'	95'
MW21	26.9	2'1"	2'8"	3'7"	5'6" (1'11")	--	--	6'
MW22	29.2	3'	4'	5'	6'6" (1'6")	--	--	6'6"
MW23A	28.6	3'	4'	5'6"	7'6" (2')	--	--	8'
MW23B	28.6	41'	44'6"	48'	58' (10')	8'10"	33'	60'
MW24	27.6	2'6"	3'	3'6"	5'6" (2')	--	--	6'
MW25	33.7	4'3"	5'	6'9"	8'9" (2')	--	--	10'
MW26A	67.1	4'6"	6'	7'6"	17'6" (10')	--	--	35'6"
MW26B	67.0	87'	89'	93'	103' (10')	37'6"	73'	105'
MW32B	65.96	76'	79'	83'	93' (10')	30'	57'	96'
MW33B	59.53	74'	77'	80'	90' (10')	25'	55'	92'

by repeated cycles of surging with a surge block and pumping with a vacuum pump. The water was clear at the end of development.

The installation of MW22 proceeded normally. Water was still highly turbid at the end of development but the rate of reduction in turbidity was considered too slow to continue development. The well was developed using a surge block and vacuum pump.

Monitoring well 23A, a shallow well, was drilled to auger refusal at 7-1/2 feet bls. The monitoring well was installed without incident. Turbidity was low at the end of development. The well was developed using a surge block and vacuum pump.

Work on the deep monitoring well MW 23B began August 28 with the installation of the 8-inch casing to 8 feet 9 inches bls by air rotary drilling. The casing was grouted in place. This was followed by coring with continuous sampling down to a depth of 26 feet 6 inches. After reaming, a 6-inch casing was set to 33 feet bls. Drilling later proceeded to a final depth of 60 feet with a 10-foot section of 2-inch PVC screen set from 48 to 58 feet bls. The sand pack, bentonite, and grout were installed normally at depths shown in Table A1. Well MW23B was developed using water jetting similar to that done at MW 17B. The discharge water was clear at the end of development.

Well MW24 was installed without incident to a depth of 5.5 feet bls. The discharge water was clear at the end of development by surge block and vacuum pump.

Two dry boreholes were drilled to auger refusal at 6 feet bls at site MW25 before a third borehole to 9 feet intercepted the water table. Well MW25 was developed using a surge block with a bottom check valve that allowed the surge block to act as a bailer. The well was quickly bailed dry using this device. MW 25 was bailed dry three or four times after successive periods of partial recovery. The water was highly turbid at the end of development.

Before the installation of wells MW26A and MW26B, a pilot hole was drilled with 3-1/4-inch hollow stem augers to auger refusal at 35.5 feet bls. Using sediment logs from the pilot hole, well MW26A was installed without incident to a depth of 17.5 feet bls using 6-1/4-inch hollow stem augers. The turbidity of the discharge water was substantial at the end of development but the rate of removal of additional suspended silt and very fine sand was considered too slow for any further development. Well MW 26A was developed by surging and air lifting.

The installation of well MW26B began with the placement of the 8-inch casing 2 feet into the mudstone layer at a depth of 37.5 feet bls. The casing was pressure grouted using a 2-inch tremie pipe with a side-flow bottom. A 6-inch casing was later installed to 73 feet bls, followed by installation of a 10-foot section of 2-inch PVC screen to 103 feet bls. The well was developed by a combination of surging and water jetting. The discharge water was clear at the end of development.

Wells MW32B and MW33B were drilled and installed using the same materials and procedures used for the other deep wells described above. A pilot hole was drilled and logged down to auger refusal using the CME-55 rig at each of these two locations. The start of drilling at MW33B was delayed by the need to improve the access road to the site. Shelby tubes were taken at both sites; however, the Shelby tube at MW33B had to be taken three times because the tubes bent in the resistant clay layer being sampled. Both wells were developed by surging and air lifting using a specially-designed surge block. The discharge water was clear at the end of development for both wells MW32B and MW33B.

WDCR519/029.51

PHASE 3 GEOLOGIC LOGS

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
BORING : MW-12B
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD, S. BROWN (CORING)
PAGE 1 OF 2; 0 ft - 50 ft
DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR; CME-55 W/ NQ BARREL FOR CORING
CH2M HILL
GROUND ELEVATION (FT MSL): 34.9 START DATE: 8/29/89 FINISH DATE: 9/14/89
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTRUCTION 2 Inch PVC
						NOTE: REFER TO MW-12 LOG IN PHASE 2 REPORT FOR SHALLOW LITHOLOGIES		
29.9	5							
						8 INCH STEEL CASING TO 10.75 FEET		
			CORING					
24.9	10	10'-16'11"	CS-1	47	N/A	0-47": MIX OF MUDSTONE AND COMPACTED CLAY, MED GRAY (N5) TO DARK GRAY (N3), INTERVALS VARY IN DEGREE OF CONSOLIDATION, SOME SAND LAYERS AND STRINGERS		
19.9	15							
		16'11" TO 21'11"	CS-2	52	N/A	0-19": SAME AS CS-1		
						19-25": MUDSTONE WITH ABUNDANT GLAUCONITIC SANDSTONE, MED GRAY (N5), HIGHLY CONSOLIDATED		
14.9	20					25-52": SAME AS CS-1		
		21'11" TO 31'11"	CS-3	118	N/A	0-10": CLAY, DARK GRAY (N3), COMPACTED 10-14": SAME AS CS-2, GLAUCONITIC MUDSTONE INTERVAL		
9.9	25					14-68": SAME AS CS-1		
						68-76": GLAUCONITIC SANDSTONE WITH ABUNDANT MUDSTONE STRINGERS, MED. LT. GRAY (N6), CONSOLIDATED		
4.9	30					76-115": SAME AS 0-10" INTERVAL BUT OLIVE BLACK (5 Y 2/1)		
						115-118": SAME AS 68-76" INTERVAL BUT NO MUDSTONE		
		32'9" TO 37'9"	CS-4	10	N/A			
-0.1	35					0-10": CLAYEY F. SAND, DARK GRAY (N3), SEMICONSOLIDATED		
						6 INCH STEEL CASING TO 38.0 FEET		
-5.1	40							
-10.1	45							
			SPLIT SPOON					
		46-48	S-1	24	N/A	0-24": VERY COARSE SANDY CLAY, OLIVE GRAY (5Y 3/2),15% WELL ROUNDED PEBBLES , MOIST		

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD
DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR
GROUND ELEVATION (FT MSL): 34.9 START DATE: 8/29/89 FINISH DATE: 9/14/89

BORING : MW-12B
PAGE 2 OF 2;50 ft - 100 ft
CH2M HILL
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
		51-53	S-2	24	N/A	0-24":SAME AS S-1		GROUT / BENTONITE
-20.1	55							
		56-58	S-3	24	N/A	0-24": SANDY CLAY, OLIVE GRAY (5Y 3/2) , MEDIUM SAND, WET		
-25.1	60							
		61-63	S-4	24	N/A	0-24": SAME AS S-3		SAND
-30.1	65							
		66-68	S-5	5	N/A	0-24": FINE TO MEDIUM UNCONSOLIDATED SAND, MODERATE YELLOWISH GREEN (10GY 6/4)		
-35.1	70							
		71-73	S-6	15	N/A	0-24": SAME AS S-5 EXCEPT DARK YELLOWISH GREEN (10GY 4/4)		

BORING TERMINATED AT 73.0 FEET

WELL SUMMARY

SCREEN :61.0-71.0 FT
SAND PACK: 56.0-71.0 FT
BENTONITE PACK: 53.0-56.0 FT
GROUT: 0-53.0 FT
6 INCH STEEL CASING TO 38.0 FT

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
BORING : MW-17B
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD/ S. BROWN
PAGE 1 OF 2; 0 ft - 50 ft
DRILLING METHOD/EQUIPMENT: MUD ROTARY /SPEEDSTAR; CME-55 W/ HSA, NQ BARREL FOR CORING
CH2M HILL
GROUND ELEVATION (FT MSL): 64.6 START DATE: 8/29/89 FINISH DATE: 9/11/89
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
59.6	5					NOTE: REFER TO MW-17 LOG IN PHASE 2 REPORT FOR SHALLOW LITHOLOGIES		
54.6	10							
49.6	15							
44.6	20							
39.6	25					8 INCH STEEL CASING TO 31.0 FEET		
			CORING					
34.6	30	30' 7" TO 37' 8"	CS-1	35	N/A	0-4": SILTY CLAY W/ SOME SAND, DARK GRAY (N3), UNCONSOLIDATED, COMPACTED 4-35": MUDSTONE W/ SAND STRINGERS AND LAYERS, MED. GRAY (N5) TO MED. DARK GRAY (N4), CONSOLIDATED, HARD		
29.6	35							
		37' 8" TO 45' 4"	CS-2	60	N/A	0-5": CLAYEY SILT W/ SOME SAND, MED. DARK GRAY (N4), PLASTIC, WET 5-17": MIX OF CLAYEY F. SAND AND MUDSTONE W/ SOME SAND STRINGERS , DARK GRAY (N3), MUDSTONE IS CONSOLIDATED, HARD, SAND IS UNCONSOLIDATED, LOOSE 17-24": MUDSTONE, MED. DARK GRAY (N4), CONSOLIDATED 24-27": CLAY, DARK GRAY (N3), UNCONSOLIDATED 27-46": MUDSTONE W/ SAND STRINGERS, MED. DARK GRAY (N4), CONSOLIDATED 46-50": MIX OF CLAY AND MUDSTONE, DARK GRAY (N3), UNCONSOLIDATED TO SEMICONSOLIDATED		
24.6	40							
19.6	45	45' 2" TO 55' 3"	CS-3	113	N/A	50-60": SAME AS CS-2 27-46" BUT W/ SEMICONSOLIDATED ZONES 0-18": MUDSTONE W/ SAND STRINGERS AND LAYERS, MED. GRAY (N5), INDURATED 18-22": GLAUCONITIC SANDSTONE W/ MUDSTONE STRINGERS, MED. LT. GRAY (N6), INDURATED. (LIKE 0-18" INTERVAL BUT MORE SAND-RICH)		

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA — BORING : MW-17B

DRILLER: WESTINGHOUSE ENVIRONMENTAL — LOGGER: J. FORD/ S. BROWN — PAGE 2 OF 2;50 ft - 100 ft

DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR; CME-55 W/ HSA, NQ BARREL FOR CORING — CH2M HILL

GROUND ELEVATION (FT MSL): 64.6 — START DATE: 8/29/89 — FINISH DATE: 9/11/89 — PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
		45'2" TO 55'3"	CS-3 CONT'D	113	N/A	22-34": SAME AS CS-2 46-50" BUT W/ SOME OLIVE GRAY (5Y 5/1) ZONES 34-40": SAME AS 18-22" INTERVAL 40-113": MUDSTONE AND CLAY, BOTH W/ SAND STRINGERS, MED. LT. GRAY (N6) TO DARK GRAY (N3), SEMICONSOLIDATED TO CONSOLIDATED, SOME WORM BURROWS EVIDENT		
9.6	55	55'3" TO 63'7"	CS-4	35	N/A	0-8": MUDSTONE W/ SAND STRINGERS, MED. DK. GRAY (N4), CONSOLIDATED 8-24": GLAUCONITIC SANDSTONE, MED. LT. GRAY (N6), GRADING FROM CONSOLIDATED AT TOP TO SEMICONSOLIDATED AT BOTTOM, CONTAINS SHELLS AND VF. PEBBLES, SAND IS FINE TO VERY COARSE		
4.6	60					24-29": CLAYEY FINE SAND, OLIVE BLACK (5 Y 2/1), UNCONSOLIDATED 29-35": SILTY CLAY, DARK GRAY (N3), UNCONSOLIDATED		
-0.4	65							
						6-INCH CASING TO 68.0 FT		
-5.4	70							GROUT
			SPLIT SPOON					
-10.4	75	73-75	S-1	24	N/A	0-24": COARSE SANDY CLAY WITH ABUNDANT SHELL FRAGMENTS OLIVE GRAY (5Y 3/2) , MOIST		BENT.
-15.4	80	78-80	S-2	24	N/A	0-24":VERY SANDY CLAY, OLIVE GRAY (5Y 3/2) ,MEDIUM SAND		
-20.4	85	83-85	S-3	24	N/A	0-24": SAME AS S-2		SAND
-25.4	90	88-90	S-4	24	N/A	0-24": MEDIUM TO COARSE UNCONSOLIDATED SANDS INTERLAYERING WITH SILT, GRAYISH GREEN (10GY 5/2), WET		
-30.4	95	93-95	S-5	24	N/A	0-24": FINE TO MEDIUM UNCONSOLIDATED SAND, GRAYISH GREEN (10GY 5/2) TO DARK GRAY (N3), WET		
						BORING TERMINATED AT 95.0 FEET WELL SUMMARY SCREEN: 83.0 - 93.0 FT; SAND PACK: 79.0 - 93.0 FT; BENTONITE: 76.0 - 79.0; GROUT: 0 - 76.0		

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA
BORING : MW-21
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: STEVEN BROWN
PAGE 1 OF 1
DRILLING METHOD/EQUIPMENT: CME-55 WITH 4 1/4" HSA
CH2M HILL
GROUND ELEVATION (FT MSL): 26.9 START DATE: 8/23/89 FINISH DATE: 8/24/89
PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2-INCH PVC
21.9	5	3.5-5	S1	15	12-15-20	0-9": COARSE SAND TO VF. PEBBLES, GRAYISH ORANGE (10 YR 7/4), MOIST,LOOSE; 9-15": MUDSTONE, DARK GRAY (N3), CONSOLIDATED, DRY TO SLIGHTLY MOIST NOTE: AUGER REFUSAL AT 6 FT BELOW LAND SURFACE		GROUT BENTONITE SAND BACKFILL

WELL SUMMARY

GROUT: 0 TO 2'1"
BENTONITE: 2'1" TO 2'6"
SAND: 2'6" TO 3'10"
NATURAL PACK: 3'10" TO 5'6"
SCREEN: 3'7" TO 5'6"

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: STEVEN BROWN
DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA
GROUND ELEVATION (FT MSL): 29.2 START DATE: 8/25/89 FINISH DATE: 8/25/89

BORING : MW-22
PAGE 1 OF 1
CH2M HILL
PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2-INCH PVC
24.2	5	4.5-6	S1	22	5-6-12	0-6": VF. TO F. SAND, DARK GRAYISH YELLOW (5Y7/4), MOIST; 6-22": MED. TO C. BEACH SAND, LIGHT OLIVE GRAY (5 Y 6/1), WET		GROUT / BENTONITE / SAND

NOTE: AUGER REFUSAL AT 6' 6" BELOW LAND SURFACE

WELL SUMMARY

GROUT: 0 TO 3'
BENTONITE: 3' TO 4'
SAND: 4' TO 5'
SCREEN: 5' TO 6'6"

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: STEVEN BROWN
DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA
GROUND ELEVATION (FT MSL): 28.6 START DATE: 8/24/89 FINISH DATE: 8/24/89

BORING : MW-23A
PAGE 1 OF 1
CH2M HILL
PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION: 2-INCH PVC
23.6	5	3.5-5	S1	18	10-11-11	0-5": SILTY CLAY WITH TR. VF. SAND, DARK ORANGE (10 YR 6/6), DRY; 4-9": MED SAND TO VF. PEBBLES, LIGHT YELLOWISH BROWN (5 YR 5/6); 9-18": MED. TO VC. BEACH SAND, PALE GRAYISH ORANGE (10 YR 8/2)		GROUT; BENTONITE; SAND
		7.5-8	S2	6	50 (<6)	0-6": SILICEOUS MUDSTONE, MED. DARK GRAY (N4), PARTIALLY WEATHERED TO CLAY		
18.6	10							

NOTE: AUGER REFUSAL AT 7' 6" BELOW LAND SURFACE

WELL SUMMARY

GROUT: 0 TO 3'
BENTONITE: 3' TO 4'
SAND: 4' TO 7'6"
SCREEN: 5'6" TO 7'6"

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA — BORING : MW-23B

DRILLER: WESTINGHOUSE ENVIRONMENTAL — LOGGER: J. FORD/ S. BROWN — PAGE 1 OF 2; 0 ft - 50 ft

DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR; CME-55 W/ HSA, NQ BARREL FOR CORING — CH2M HILL

GROUND ELEVATION (FT MSL): 28.6 — START DATE: 8/28/89 — FINISH DATE: 9/13/89 — PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION (2 Inch PVC)
						NOTE: REFER TO LOG FOR MW-23A FOR SHALLOW LITHOLOGIES		
23.6	5					8 INCH STEEL CASING TO 8.8 FEET		
			CORING					
		7'9" TO 12'6"	CS-1	30	N/A			
						0-30": MIX OF CLAY AND MUDSTONE W/ SAND STRINGERS, MED. GRAY (N5), SEMICONSOLIDATED TO CONSOLIDATED		
18.6	10							
		12'6" TO 18'	CS-2	44	N/A	0-17": SAME AS CS-1 BUT LESS CONSOLIDATED, MORE BROKEN		
13.6	15					17-22": GLAUCONITIC SANDSTONE W/ MUDSTONE STRINGERS, MED. LT. GRAY (N6), CONSOLIDATED, HARD		
						17-44": SAME AS CS-1		
						0-9": MIX OF SANDSTONE W/ MUDSTONE STRINGERS AND MUDSTONE W/ SANDSTONE STRINGERS, LT. GRAY (N7) TO DARK GRAY (N3), CONSOLIDATED		
8.6	20	18' TO 25'6"	CS-3	40	N/A	9-32": MUDSTONE W/ SANDSTONE STRINGERS, DARK GRAY (N3), SEMICONSOLIDATED TO CONSOLIDATED,FEW BREAKS		
						32-39": CONGLOMERATE OF ANGULAR PEBBLES OF QUARTZITE AND MUDSTONE, MED. LT. GRAY (N6), HIGHLY CONSOLIDATED		
3.6	25					39-40": SANDY MUDSTONE, DARK GRAY (N3), SEMICONSOLIDATED		
			SPLIT SPOON					
		24' TO 26'	CS-4	24	8-12-15	0-24": SANDY CLAY, DARK GRAY (N3), SAND IS VF. TO COARSE, UNCONSOLIDATED		
		25' TO 26'6"	CS-5	12	7-11-20	0-12": SAME AS CS-4		
-1.4	30							
						6 INCH STEEL CASING TO 33.0 FEET		
-6.4	35							GROUT
-11.4	40	38-40	S-1	24	N/A	0-24": VERY COARSE SANDY CLAY OLIVE GRAY (5Y 3/2) MOIST, 15% SHELL FRAGMENTS		BENT.
-16.4	45	43-45	S-2	24	N/A	0-24":INTERLAYERED MEDIUM SANDS AND SILTY CLAYS, SANDS ARE DUSKY YELLOW GREEN (5GY 5/2) > 20%, CLAYS ARE OLIVE GRAY (5Y 3/2)<80%, WET		SAND
		48-50	S-3	19	N/A	0-19": SANDY CLAY OLIVE GRAY (5Y 3/2) COARSE SAND AND SHELL FRAGMENTS, MOIST		

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD
DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR
GROUND ELEVATION (FT MSL): 28.6 START DATE: 8/29/89 FINISH DATE: 9/13/89

BORING : MW-23B
PAGE 2 OF 2;50 ft - 100 ft
CH2M HILL
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
-26.4	-65	53-55	S-4	19	N/A	0-19":FINE TO MEDIUM UNCONSOLIDATED SAND ,DARK YELLOWISH GREEN (10GY 3/2), SOME SHELL FRAGMENTS<10%		SAND
-31.4	-60	58-60	S-5	13	N/A	0-13":SAME AS S-4		

BORING TERMINATED AT 60.0 FEET

WELL SUMMARY

GROUT: 0 - 41 FT
BEN TONITE: 41 - 44.5 FT
SAND PACK: 44.5 - 58 FT
SCREEN: 48.0 - 58.0 FT

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA
BORING : MW-24
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: DOUG DRONFIELD
PAGE 1 OF 1
DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA
CH2M HILL
GROUND ELEVATION (FT MSL): 27.6 START DATE: 8/28/89 FINISH DATE: 8/28/89
PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2-INCH PVC
22.6	5	3.5-5	S1	18	6-5-5	0-2": SANDY SILT, OLIVE BLACK (5 YR 2/1), WET, SLIGHTLY PLASTIC; 2-14": MED. SAND TO PEBBLES, BROWN GREY (5 YR 4/1), WET; 14-18": SILT AND MUDSTONE FRAGMENTS, GREEN BLACK (5 G 2/1)		GROUT / BENTONITE / SAND

NOTE: AUGER REFUSAL AT 6 FT BELOW LAND SURFACE

WELL SUMMARY

GROUT: 0 TO 2'6"
BENTONITE: 2'6" TO 3'
SAND: 3' TO 5'6"
SCREEN: 3'6" TO 5'6"

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: STEVEN BROWN
DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA
GROUND ELEVATION (FT MSL): 33.7 START DATE: 8/29/89 FINISH DATE: 8/29/89

BORING : MW-25
PAGE 1 OF 1
CH2M HILL
PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION: 2-INCH PVC
28.7	5	4-5.5	S1	10	2-1-2	0-10": CLAYEY F. SAND, OLIVE GRAY (5 Y 4/1), WELL GRADED, WET		GROUT; BENTONITE; SAND
23.7	10	8.5-10	S2	14	6-40-50	0-5": C. SAND TO MED. PEBBLES W/ TR. CLAY, MED. OLIVE GRAY (5 Y 5/1), WET; 5-12": CLAY, DARK GRAY (N3), MOIST TO WET; 12-14": MUDSTONE, MED. GRAY (N5), DRY		

NOTE: AUGER REFUSAL AT 9 FT BELOW LAND SURFACE

THIS LOG REPRESENTS THE THIRD ATTEMPT AT INSTALLING MW-25. THE FIRST TWO ATTEMPTS PRODUCED DRY HOLES

WELL SUMMARY

GROUT: 0 TO 4'3"
BENTONITE: 4'3" TO 5'
SAND: 5' TO 8'9"
SCREEN: 6'9" TO 8'9"

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
BORING : MW-26B

DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD
PAGE 1 OF 3; 0 ft - 50 ft

DRILLING METHOD/EQUIPMENT: MUD ROTARY /SPEEDSTAR
CH2M HILL

GROUND ELEVATION (FT MSL): 67.0 START DATE: 8/23/89 FINISH DATE: 9/7/89
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 inch PVC
62.0	5					NOTE: REFER TO MW-26A LOG FOR SHALLOW LITHOLOGIES		
57.0	10							
52.0	15							
47.0	20							
42.0	25							
37.0	30							
32.0	35					8 INCH STEEL CASING TO 37.5 FT		
			CORING					
		37'6" TO 41'2"	CS-1	20	N/A	0-20": MUDSTONE, LIGHT OLIVE GRAY (5 Y 6/1) TO GRAYISH BLACK (N2), LAYERED, DRY, LIGHT ZONES ALMOST ENTIRELY CLAY, CAN SCRATCH, DARK ZONES HARD AND SILICIFIED		
27.0	40							
		41'2" TO 50'1"	CS-2	98	N/A	0-6": MUDSTONE W/ SAND STRINGERS, SANDY AT TOP, MED. DK. GRAY (N4), SEMICONSOLIDATED TO CONSOLIDATED 6-7": SANDSTONE W/ MUDSTONE STRINGERS, MED. LT. GRAY (N6) 7-19": SAME AS 0-6"INTERVAL BUT WORM BURROWS EVIDENT 19-20": SAME AS 6-7" INTERVAL 20-98": MIX OF CLAY AND MUDSTONE, OLIVE GRAY (5 Y 6/1) TO MED. GRAY (N5), CLAY IS COMPACTED, SEMICONSOLIDATED, MUDSTONE IS CONSOLIDATED, SAND STRINGERS AND SANDY ZONES IN MUDSTONE LOCALLY,SOME CAVITIES EVIDENT IN THE MIDDLE OF THIS INTERVAL		
22.0	45							

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA — BORING : MW-26A

DRILLER: WESTINGHOUSE ENVIRONMENTAL — LOGGER: STEVEN BROWN — PAGE 1 OF 1

DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA — CH2M HILL

GROUND ELEVATION (FT MSL): 67.4 — START DATE: 8/28/89 — FINISH DATE: 8/29/89 — PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION: 2-INCH PVC
62.4	5	3 -5	S1	24	5-7-8	0-24":SILTY CLAY, DUSKY YELLOW (5 Y 6/4), DRY		GROUT / BENTONITE
57.4	10	8-10	S2	18	4-4-3	0-12": SAME AS S1; 12-18": VC SAND TO VF. PEBBLES WITH TR. CLAY, YELLOWISH GRAY (5 Y 7/2), WET		SAND
52.4	15	13-15	S3	24	WOR	0-6": SILTY CLAY WITH TRACE F. SAND, DARK YELLOWISH ORANGE (10 YR 6/6), WET; 6-24": SILTY CLAY WITH TRACE VF. SAND, MED. DARK GRAY (N4), WET		
47.4	20	18-20	S4	24	2-1-2	0-12": CLAY, MED. DARK GRAY (N4), WET; 12-24": SAME AS 0-12" EXCEPT WITH TRACE F. SAND		
42.4	25	23-25	S5	24	6-4-5	0-12": SILTY CLAY, MED. DARK GRAY (N4), DRY 12-24": SILTY CLAY, MED. DARK GRAY (N4), MOIST		
37.4	30	28-30	S6	24	4-4-12	0-24": SILTY GLAUCONITIC F. SAND, GRAYISH BLACK (N2), WET		
32.4	35	33-33'10"	S7	24	8-50/<6	0-6": CLAY W/ TR. F. SAND, PALE YELLOWISH ORANGE (10 YR 8/6), CONTAINS ROOTS, MOIST; 6-10": MUDSTONE, DARK GRAY (N3), DRY		

NOTE: AUGER REFUSAL AT 35' 6" BELOW LAND SURFACE

PILOT HOLE DRILLED TO AUGER REFUSAL ON 8/23/89.
WELL MW-26A INSTALLED 8/28/89 TO 8/29/89

WELL SUMMARY

GROUT: 0 TO 4'6"
BENTONITE: 4'6" TO 6'
SAND: 6' TO 17'6"
SCREEN: 7'6" TO 17'6"

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD
DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR
GROUND ELEVATION (FT MSL): 67.0 START DATE: 8/23/89 FINISH DATE: 9/7/89

BORING : MW-26B
PAGE 2 OF 3;50 ft - 100 ft
CH2M HILL
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION (2 Inch PVC)
		50'1" TO 60'1"	CS-3	116	N/A	MIX OF CLAY AND MUDSTONE W/ SAND STRINGERS, SANDY ZONES W/ MUDSTONE STRINGERS LOCALLY, LIGHT OLIVE GRAY (5 Y 6/1) TO MED. GRAY (N3), SEMICONSOLIDATED TO CONSOLIDATED		
-12.0	65							
-7.0	60	60'1" TO 70'1"	CS-4	80	N/A	0-10": MUDSTONE W/ SOME SAND STRINGERS, MED. DARK GRAY (N4), CONSOLIDATED 10-18": GLAUCONITIC SANDSTONE W/ MUDSTONE STRINGERS, LT. GRAY (N7) TO MED. GRAY (N5), HIGHLY INDURATED AND SILICIFIED		
-2.0	65					18-70":SILTY CLAYEY FINE SAND (80% SAND) W/ SOME SHELLS LOCALLY, MED. DARK GRAY (N4), UNCONSOLIDATED TO SEMICONSOLIDATED, 70-80": SANDY SILTY CLAY (30% SAND), DARK GRAY (N3), UNCONSOLIDATED		
-3.0	70	70' TO 75'	CS-5	0	N/A	NO RECOVERY. UNCONSOLIDATED SEDIMENTS TOO LOOSE AND FLUID TO STAY IN CORE BARREL		
-8.0	75					6-INCH STEEL CASING TO 73.0 FT		
			SPLIT SPOON					
-13.0	80	78-80	S-1	24	N/A	0-24":COARSE SANDY CLAY WITH ABUNDANT SHELLFRAGMENTS, OLIVE GRAY (5Y 3/2), MEDIUM TO COARSE SAND, DENSE, MOIST		GROUT
-18.0	85	83-85	S-2	18	N/A	0-18":SILTY CLAY WITH COARSE SAND AND SHELL FRAGMENTS, OLIVE GRAY (5Y 3/2), MEDIUM TO COARSE SAND, DENSE, MOIST		BENT.
-23.0	90	88-90	S-3	24	N/A	0-24":SAME AS S-2		
-28.0	95	93-95	S-4	3	N/A	0-3": INTERFINGERING LAYERS OF CLEAN CLAY AND COARSE SAND GRAYISH OLIVE GREEN (5GY 3/2), WET		SAND
		98-100	S-5	4	N/A	0-4":FINE TO MEDIUM UNCONSOLIDATED SANDS, DARK GRAY (N3) TO MODERATE GREEN (5G 5/6), WET , GLAUCONITIC		

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
BORING : MW-26B
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD
PAGE 1 OF 3; 0 ft - 50 ft
DRILLING METHOD/EQUIPMENT: MUD ROTARY /SPEEDSTAR
CH2M HILL
GROUND ELEVATION (FT MSL): 67.0 START DATE: 8/23/89 FINISH DATE: 9/7/89
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
62.0	5					NOTE: REFER TO MW-26A LOG FOR SHALLOW LITHOLOGIES		
57.0	10							
52.0	15							
47.0	20							
42.0	25							
37.0	30							
32.0	35					8 INCH STEEL CASING TO 37.5 FT		
			CORING					
		37'6" TO 41'2"	CS-1	20	N/A	0-20": MUDSTONE, LIGHT OLIVE GRAY (5 Y 6/1) TO GRAYISH BLACK (N2), LAYERED, DRY, LIGHT ZONES ALMOST ENTIRELY CLAY, CAN SCRATCH, DARK ZONES HARD AND SILICIFIED		
27.0	40							
		41'2" TO 50'1"	CS-2	98	N/A	0-6": MUDSTONE W/ SAND STRINGERS, SANDY AT TOP, MED. DK. GRAY (N4), SEMICONSOLIDATED TO CONSOLIDATED 6-7": SANDSTONE W/ MUDSTONE STRINGERS, MED. LT. GRAY (N6) 7-19": SAME AS 0-6"INTERVAL BUT WORM BURROWS EVIDENT 19-20": SAME AS 6-7" INTERVAL 20-98": MIX OF CLAY AND MUDSTONE, OLIVE GRAY (5 Y 6/1) TO MED. GRAY (N5), CLAY IS COMPACTED, SEMICONSOLIDATED, MUDSTONE IS CONSOLIDATED, SAND STRINGERS AND SANDY ZONES IN MUDSTONE LOCALLY,SOME CAVITIES EVIDENT IN THE MIDDLE OF THIS INTERVAL		
22.0	45							

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD
DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR
GROUND ELEVATION (FT MSL): 67.0 START DATE: 8/23/89 FINISH DATE: 9/7/89

BORING : MW-26B
PAGE 2 OF 3;50 ft - 100 ft
CH2M HILL
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
		50'1" TO 60'1"	CS-3	116	N/A			
12.0	55					MIX OF CLAY AND MUDSTONE W/ SAND STRINGERS, SANDY ZONES W/ MUDSTONE STRINGERS LOCALLY, LIGHT OLIVE GRAY (5 Y 6/1) TO MED. GRAY (N3), SEMICONSOLIDATED TO CONSOLIDATED		
7.0	60	60'1" TO 70'1"	CS-4	80	N/A	0-10": MUDSTONE W/ SOME SAND STRINGERS, MED. DARK GRAY (N4), CONSOLIDATED		
						10-18": GLAUCONITIC SANDSTONE W/ MUDSTONE STRINGERS, LT. GRAY (N7) TO MED. GRAY (N5), HIGHLY INDURATED AND SILICIFIED		
2.0	65					18-70":SILTY CLAYEY FINE SAND (80% SAND) W/ SOME SHELLS LOCALLY, MED. DARK GRAY (N4), UNCONSOLIDATED TO SEMICONSOLIDATED,		
						70-80": SANDY SILTY CLAY (30% SAND), DARK GRAY (N3), UNCONSOLIDATED		
-3.0	70	70' TO 75'	CS-5	0	N/A	NO RECOVERY. UNCONSOLIDATED SEDIMENTS TOO LOOSE AND FLUID TO STAY IN CORE BARREL		
-8.0	75					6-INCH STEEL CASING TO 73.0 FT		
			SPLIT SPOON					
-13.0	80	78-80	S-1	24	N/A	0-24":COARSE SANDY CLAY WITH ABUNDANT SHELLFRAGMENTS, OLIVE GRAY (5Y 3/2), MEDIUM TO COARSE SAND, DENSE, MOIST		GROUT
-18.0	85	83-85	S-2	18	N/A	0-18":SILTY CLAY WITH COARSE SAND AND SHELL FRAGMENTS, OLIVE GRAY (5Y 3/2), MEDIUM TO COARSE SAND, DENSE, MOIST		BENT.
-23.0	90	88-90	S-3	24	N/A	0-24":SAME AS S-2		
-28.0	95	93-95	S-4	3	N/A	0-3": INTERFINGERING LAYERS OF CLEAN CLAY AND COARSE SAND GRAYISH OLIVE GREEN (5GY 3/2), WET		SAND
		98-100	S-5	4	N/A	0-4":FINE TO MEDIUM UNCONSOLIDATED SANDS, DARK GRAY (N3) TO MODERATE GREEN (5G 5/6), WET , GLAUCONITIC		

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA
BORING : MW-26B
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: J. FORD
PAGE 3 OF 3;100 ft - 150 ft
DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR
CH2M HILL
GROUND ELEVATION (FT MSL): 67.0 START DATE: 8/23/89 FINISH DATE: 9/7/89
PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
								SAND
-38.0	-105	103-105	S-6	3	N/A	0-3":SAME AS S-5		
						BORING TERMINATED AT 105.0 FEET		

WELL SUMMARY

GROUT: 0 - 87.0 FT
BENTONITE: 87.0 - 89.0 FT
SAND PACK: 89.0 - 103.0 FT
SCREEN: 93.0 - 103.0 FT

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA — BORING : MW-32B

DRILLER: WESTINGHOUSE ENVIRONMENTAL — LOGGER: J. FORD / S. BROWN — PAGE 1 OF 2; 0 ft - 50 ft

DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR; CME-55 W/ HSA, NQ BARREL FOR CORING — CH2M HILL

GROUND ELEVATION (FT MSL): 66.0 — START DATE: 9/18/89 — FINISH DATE: 9/29/89 — PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
61.0	5	4.5-6	SPLIT SPOON SS-1	10	8-10-12	0-2": SANDY CLAY, DUSKY BROWN (5 YR 2/2) 2"-6" SANDY CLAY, MODERATE YELLOWISH BROWN (10 YR 5/4), STIFF, MOIST; 6"-10" CLAY, MODERATE REDDISH BROWN (10R 4/6) STIFF, MOIST		
56.0	10	9-10.5	SS-2	18	5-5-7	0-18": VERY SANDY CLAY, DARK YELLOWISH ORANGE (10YR6/6), VERY FINE PEBBLES, STIFF, MOIST, MORE SANDY TOWARDS BOTTOM		
51.0	15	14-15.5	SS-3	17	10-8-10	0 - 2" FINE SANDY CLAY, LIGHT BROWN (5YR 5/6), MOIST, GLAUCONITIC,2"-17" MEDIUM SAND, MODERATE OLIVE BROWN (5Y 4/4) MOIST,WELL SORTED , FIRM ,GLAUCONITIC		
46.0	20	19-20.5	SS-4	20	5-6-20	0 -7" SILTY SAND, LIGHT OLIVE BROWN (5Y 5/6) ,LOOSE, WET 7"-20" SILTY FINE SAND, GRAYISH BLACK (N 2) LOOSE, WET		
41.0	25	24-25.5	SS-5	10	50/10"	0-10": MUDSTONE, DARK GRAY (N 3) , VERY BROKEN WITH SAND STRINGERS		
						AUGER REFUSAL AT 29.0 FEET DURING PILOT HOLE DRILLING		
						8 INCH STEEL CASING TO 30.0 FEET		
36.0	30	28.5'-35.6'	CORING CS-1	46	N/A	0 - 46": MIX OF MUDSTONE AND COMPACTED CLAY , LIGHT GRAY (N7) TO DARK GRAY(N 4), INTERVALS VARY IN DEGREE OF CONSOLIDATIONSOME SAND LAYERS AND STRINGERS		
31.0	35	35.5'-38'	CS-2	5	N/A	0 - 5":MUDSTONE, MEDIUM GRAY (N 5) , CONSOLIDATED, DRY, UNBROKEN, SOME SAND STRINGERS		
		38-40.6'	CS-3	17	N/A	0 - 17":SAME AS CS-2 BUT MOREBROKEN		
26.0	40	40.6-50.5'	CS-4	97	N/A	0-52" SAME AS CS-2		
						52-58": GLAUCONITIC SANDSTONE W/ MUDSTONE STRINGERS, MED..LT. GREY (N7)		
21.0	45					58-66" CLAY, MEDIUM DARK GRAY (N 4) , MOIST		
						66-97": MUDSTONE W/ SAND STRINGERS, MED. LT. GREY (N7) TO MED. GREY (N5)		

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA — BORING : MW-32B

DRILLER: WESTINGHOUSE ENVIRONMENTAL — LOGGER: J. FORD / S. BROWN — PAGE 2 OF 2;50 ft - 100 ft

DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR — CH2M HILL

GROUND ELEVATION (FT MSL): 66.0 — START DATE: 9/18/89 — FINISH DATE: 9/29/89 — PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 inch PVC
		50.5-55.6'	CS-5	47	N/A	0-38": MIX OF COMPACTED CLAY AND MUDSTONE W/ SAND STRINGERS, MED. LT. GRAY (N6), CLAY IS STIFF 38-47": GLAUCONITIC SANDSTONE, MED. GRAY (N5), CONSOLIDATED		
11.0	65							
		55.6-60'	CS-6	0	N/A	NO RECOVERY 6-INCH STEEL CASING TO 57.0 FEET		
6.0	60							
		62-64	SPLIT SPOON S-1	24	N/A	0 -24":SILTY SANDY CLAY, DARK GRAY (N3), ABUNDANT SHELL FRAGMENTS, SEMI-MOIST		GROUT
1.0	65							
		67-69	S-2	24	N/A	0 - 24":SAME AS S-1		
-4.0	70							
		72-74	S-3	24	N/A	0 -24":COARSE SANDY, CLAY WITH SMALL PEBBLES,GRAYISH BLACK (N2),MOIST , SHELL FRAGMENTS		BENT.
-9.0	75							
		77-79	S-4	21	N/A	0 - 21":FINE SANDY CLAY, GRAYISH BLACK (N2), NO SHELL FRAGMENTS OR PEBBLES, MOIST TO WET		
-14.0	80							
		82-84	S-5	24	N/A	0 -24":MEDIUM SANDY CLAY,GRAYISH OLIVE GREEN (5GY 3/2),>5% SHELL FAGMENTS, MOIST,TRACES OF GLAUCONITIC SANDS		
-19.0	85							
		87-89	S-6	19	N/A	0 -16" ALTERNATING BANDS OF FINE UNCONSOLIDATED SANDS AND CLAYS, MEDIUM DARK GRAY (N4), 16 -19" FINE- MEDIUM UNCONSOLIDATED SAND, DARK YELLOWISH GREEN (10GY 3/2)		SAND
-24.0	90							
-29.0	95	94-96	S-7	24	N/A	0 - 24":FINE-MEDIUM UNCONSOLIDATED SAND,GRAYISH GREEN (10GY 5/2)		
						BORING TERMINATED AT 96.0 FEET WELL SUMMARY GROUT: 0-76.0 FT; BENTONITE: 76.0-79.0 SAND: 83.0 - 93.0 FT; SCREEN: 83.0-93.0 FT		

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA — BORING : MW-33B

DRILLER: WESTINGHOUSE ENVIRONMENTAL — LOGGER: J. FORD / S. BROWN — PAGE 1 OF 2; 0 ft - 50 ft

DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR — CH2M HILL

GROUND ELEVATION (FT MSL): 59.5 — START DATE: 10/2/89 — FINISH DATE: 10/12/89 — PROJECT #:SAT 21805.EO

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 inch PVC
54.5	5	4-5.5	SS-1	22	11-13-20	0 -22": CLAY, DARK YELLOWISH ORANGE (10 YR 6/6), LOCALLY SILTY WITH FINE SAND, STIFF, MOIST		
49.5	10	9-10.5	SS-2	15	7-8-10	0 - 15":FINE TO MEDIUM GLAUCONITIC SAND, GRAYISH OLIVE (10Y 4/2), WET, LOOSE		
44.5	15	14-15.5	SS-3	22	6-8-12	0-10" CLAYEY SANDY SILT, DARK GRAY (N 3), LOOSE, WET, 10"-22" SANDY SILTY CLAY, DARK GRAY (N 3), STIFF, MOIST		
39.5	20	19-20.5	SS-4	18	17-26-33	0 - 18": CLAYEY GLAUCONITIC SAND, OLIVE GRAY (5Y 3/2), STIFF, WET		
		24-24.3	SS-4	8	50/4.5"	0-8":BROKEN MUDSTONE AND CLAY, MEDIUM GRAY (N 4) ,DRY, STIFF		
34.5	25		CORING			AUGER REFUSAL AT 24.0 FEET DURING PILOT HOLE DRILLING 8-INCH STEEL CASING TO 25.0 FEET		
		24'7" TO 29'6"	CS-1	31	N/A	0-4": MUDSTONE W/ SOME SAND STRINGERS, MED. DK. GREY (N4) 4-8": GLAUCONITIC SANDSTONE W/ SOME MUDSTONE STRINGERS, LT. GREY (N7), HARD 8-31": MIX OF COMPACTED CLAY AND MUDSTONE W/ SAND STRINGERS, LT. GREY (N7) TO MED. DK. GREY (N4), CLAY IS STIFF, MOIST, MUDSTONE IS DRY		
29.5	30							
		29'6" TO 39'6"	CS-2	72	N/A	0-69": SAME AS CS-1 8-31" INTERVAL 69-72": MIX OF SANDY SILTY CLAY AND MUDSTONE PIECES, MED. DARK GREY (N4)		
24.5	35							
19.5	40	39'6" TO 42'10"	CS-3	34	N/A	0-3": MUDSTONE W/ SOME SAND STRINGERS, MED. GREY (N5) 3-5": CLAY, MED. GREY (N5), UNCONSOLIDATED 5-10": GLAUCONITIC SANDSTONE W/ SOME MUDSTONE STRINGERS, MED. LT. GREY (N6), VERY HARD 10-34": MIX OF CLAY AND MUDSTONE W/ SAND STRINGERS, MED. GREY (N5)		
14.5	45	42'10" TO 49'7"	CS-4	69	N/A	0-3": SAME AS CS-3 10-34" INTERVAL 3-25": SAME AS CS-3 5-10" INTERVAL 25-38": COMPACTED CLAY, MED. GREY (N5), V. STIFF, MOIST 38-64": SAME AS CS-3 0-3" INTERVAL 64-69": SAME AS CS-3 5-10" INTERVAL		

PROJECT: DU PONT KINSTON FACILITY , KINSTON, NORTH CAROLINA — BORING : MW-33B

DRILLER: WESTINGHOUSE ENVIRONMENTAL — LOGGER: J. FORD/ S. BROWN — PAGE 2 OF 2;50 ft - 100 ft

DRILLING METHOD/EQUIPMENT: MUD ROTARY / SPEEDSTAR; CME-55 W/ HSA, NQ BARREL FOR CORING — CH2M HILL

GROUND ELEVATION (FT MSL): 59.5 — START DATE: 10/2/89 — FINISH DATE: 10/12/89 — PROJECT #:SAT 21805.EO

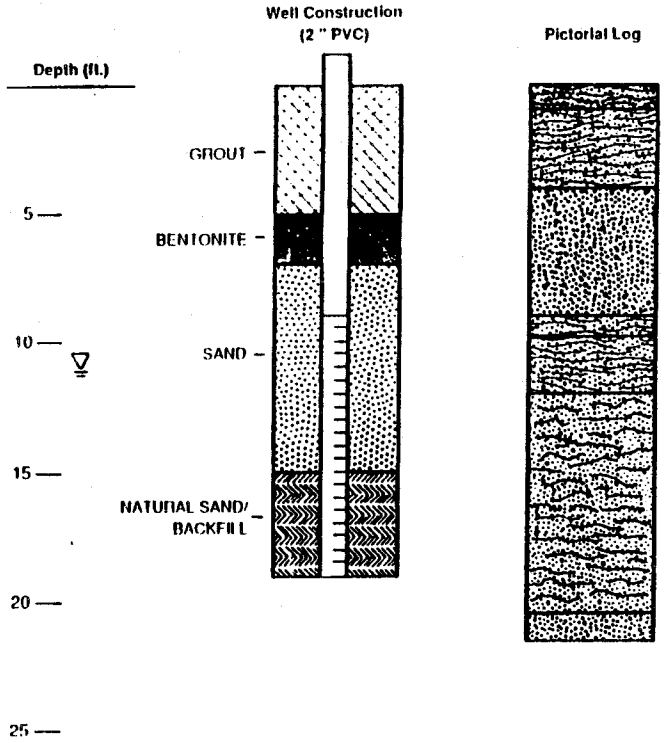
ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION 2 Inch PVC
		49'7" TO 54'7"	CS-5	35	N/A	0-19": MIX OF CLAY AND CLAYSTONE, DARK GREY (N3), SEMICONSOLIDATED TO CONSOLIDATED, V. STIFF, MOIST 19-35": GLAUCONITIC SANDSTONE W/ SOME MUDSTONE STRINGERS, LT. GREY (N7), PROGRESSIVELY LESS CONSOLIDATED TOWARD BOTTOM, CONTAINS SHELLS AND VF. OPALESCENT PEBBLES NEAR BOTTOM		
-4.5	55					6-INCH STEEL CASING TO 55.0 FEET		
		54'7" TO 59'7"	CS-6	0	N/A	NO RECOVERY		
-0.5	60							GROUT
			SPLIT SPOON					
-5.5	65	64-66	S-1	24		0 - 24":SILTY CLAY, OLIVE GRAY (5Y 3/2), MOIST		
-10.5	70	69-71	S-2	24		0 - 24": SILTY SANDY CLAY, GRAYISH GREEN (10GY 5/2) SEMI-MOIST TO MOIST 10% SHELL FRAGMENTS		
-15.5	75	74-76	S-3	24		0 -24":SAME AS S-2		BENT.
-20.5	80	79-81	S-4	24		0 -24":SAME AS S-2		
-25.5	85	84-86	S-5	22		0 -22":FINE TO MEDIUM UNCONSOLIDATED SAND, MODERATE GREEN (5G 5/6), VERY WET		SAND
-30.5	90	90-92	S-6	18		0 - 18":SAME AS S-5		
						BORING TERMINATED AT 92.0 FEET		

WELL SUMMARY

GROUT: 0 TO 74.0 FT
BENTONITE: 74.0 TO 77.0 FT
SAND: 77.0 TO 90.0 FT
SCREEN: 80.0 TO 90.0 FT

PHASE 2 GEOLOGIC LOGS

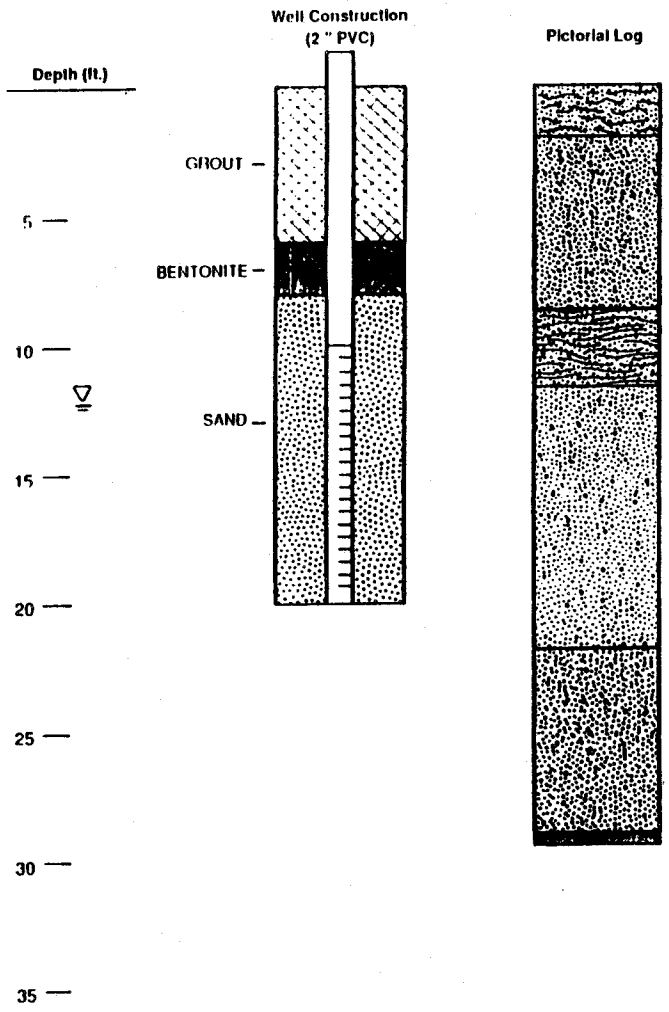
DRAFT



Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
				Topsoil: silty clayey sand, brown.	64.3 63.3
S1	3.5-5	22	2-3-4	Silty fine sand with trace c. sand, olive gray (5 Y 4/1)	59.8
				Fine sandy clay, medium gray (N6), to dark yellow orange (10 YR 6/6), moist, sl. plastic	
S2	8.5-10	15	3-5-4	Fine silty clayey sand, dark yellow orange (10YR 6/6).	55.8 54.8
				Fine sandy clayey silt, medium brown (5 YR 3/4) with a green gray (5 GY 6/1), 2" seam, very moist, plastic.	52.8
S3	13.5-15	15	4-4-7	Fine-medium sand with trace silt, dark green gray with black specs, wet, sl. odor.	
S4	20-21.5	20	5-4-3	Same as above to clayey fine sand, gray black (N2), wet, sl. less odor.	42.8

WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 10
Du PONT - KINSTON

CH2M HILL

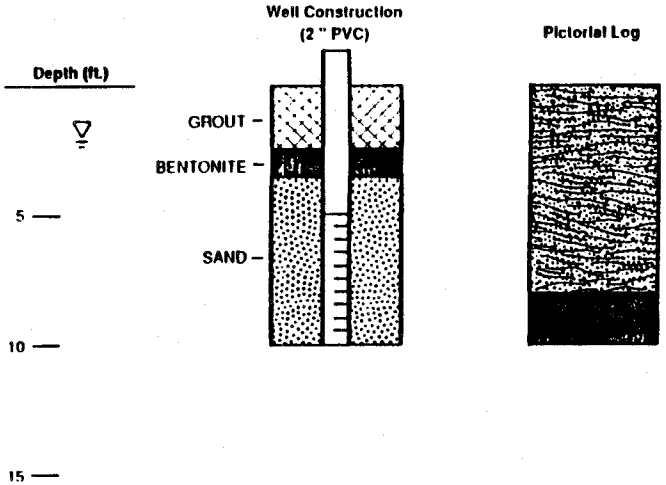


Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
				Topsoil: silty fine sand, gray brown.	64.3
					62.5
S1	3-5 5	22	2-3 4	Fine sandy clay, trace silt, light brown (5YR 5/6) to clayey fine sand, trace silt, yellow brown (10 YR 5/4), dry, plastic.	
					55.5
S2	8 5-10	15	3-5-4	Fine sandy silty clay, greenish gray (5 GY 6/1) to clayey silty fine sand, olive gray (5 Y 5/2), dry to slightly moist.	
					52.5
S3	13.5-15	15	4-4-7	Fine sand, trace clay, greenish black (5 GY 2/1), wet, slight odor	
S4	18.5-20	20	5-4-3	Same as above with slightly more clay.	
					42.5
S5	23.5-25	15	WOR/15	Fine sandy clay, some silt, black (N1), wet, slight odor.	
					35.5
S6	29-29.5	6	50/6	Shale, gray black, (N2), very dry with several light gray seams (~1/8 in), very dry.	

WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 11
Du PONT - KINSTON

CH2MHILL

Depth (ft.)	Well Construction (2 " PVC)	Pictorial Log	Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
								34.2
			S1	3.5-5	19	2-3-5	Silty fine sand, some clay, gray brown (5 YR 3/2) to light olive (10Y 5/4), moist to very moist, slight odor.	
								26.0
			S2	8.5-10	22	35-50/6	Shale, black (N1) fissile, dry with several thin fine sand seams (~1/8 in.)	



WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 12
Du PONT - KINSTON

CH2M HILL

Depth (ft.)	Well Construction (2" PVC)	Pictorial Log	Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
							Topsoil: clayey silty very fine sand, red brown.	48.3
5 ▽	GROUT BENTONITE SAND		S1	3.5-5	15	6-9-11	Clayey silty fine-medium sand, some small gravel, light to dark brown (5 YR 5/6 and 10 YR 4/2), to light olive brown (5 YR 5/6), some coarser sand lens, moist.	
10			S2	8.5-10	22	15-19-50/5	Shale black (N1), moist, slightly plastic with gray fine sand seams	40.1
15								

WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 13
Du PONT - KINSTON

CH2MHILL

Depth (ft.)	Well Construction (2 " PVC)	Pictorial Log	Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
								30.6
							Topsoil: silty fine sand, orange brown.	29.6
							Fine sandy clayey silt, olive brown (5 Y 5/6) moist	26.6
5	GROUT BENTONITE SAND		S1	3 5 5 0	21	2-2-2	Medium-c. sand, some clay and silt, dark yellow orange (10 YR 6/6), very wet.	23.6
10			S2	8 5-9 0	2	50/1	Shale, black (N1), with gray sand lens, moist	
15								

WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 14
Du PONT - KINSTON

CH2M HILL

Depth (ft.)	Well Construction (2 " PVC)	Pictorial Log	Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
							Topsoil: silty fine sand, brown.	29.1
▽	GROUT BENTONITE						Silty clayey fine-c. sand, yellow brown (10 YR 5/4) to brownish gray (5 YR 4/1), wet.	
5	SAND		S1	3 5-5	12	3 6-7		24.8
							Shale, black (N1), wet at 5 ft.	
10								
15								

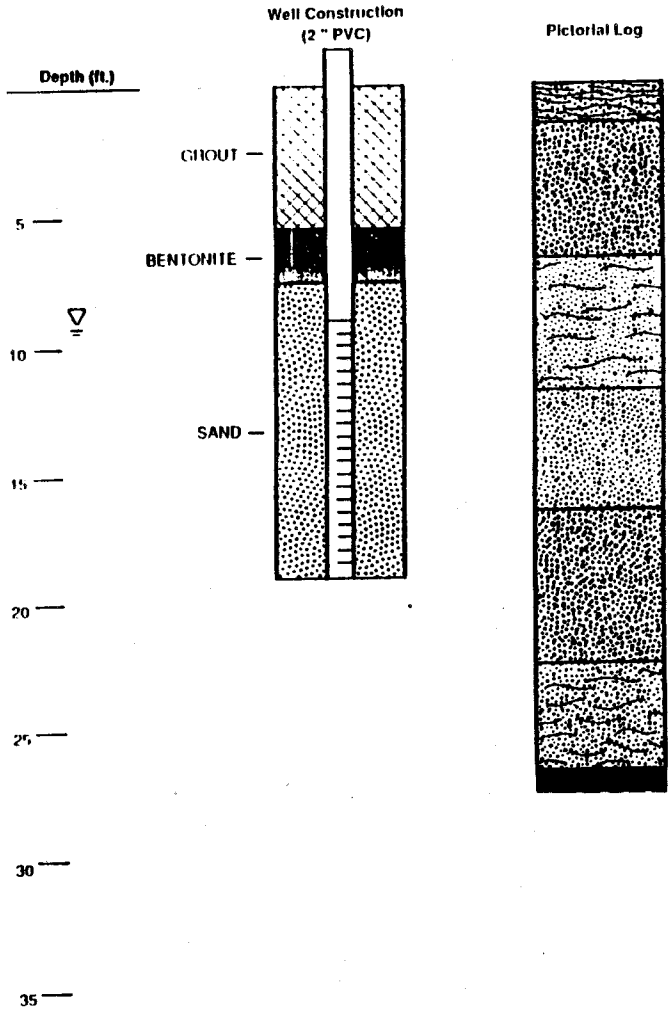
WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 15
Du PONT - KINSTON

CH2MHILL

Depth (ft.)	Well Construction (2 " PVC)	Pictorial Log	Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
							Topsoil: silty f. sand, green brown, moist.	33.8
							Silty fine to medium sand, dark gray (N4) moist.	
	GROUT							30.0
	BENTONITE		S1	3.5-5	22	1-2-2	Fine sandy clayey silt, dark gray (N4) moist plastic, sl. odor.	29.0
5	SAND						Silty f. sand some clay, gray (N6) to yellow brown (10 YR 2/2), wet, plastic sl. odor, 4" of clean basal c. sand to v.f. gravel at bottom.	
			S2	8.5-10	24	2-2-13		
10							Black shale, (N1) at 10 ft.	24.0
15								

WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 16
Du PONT - KINSTON

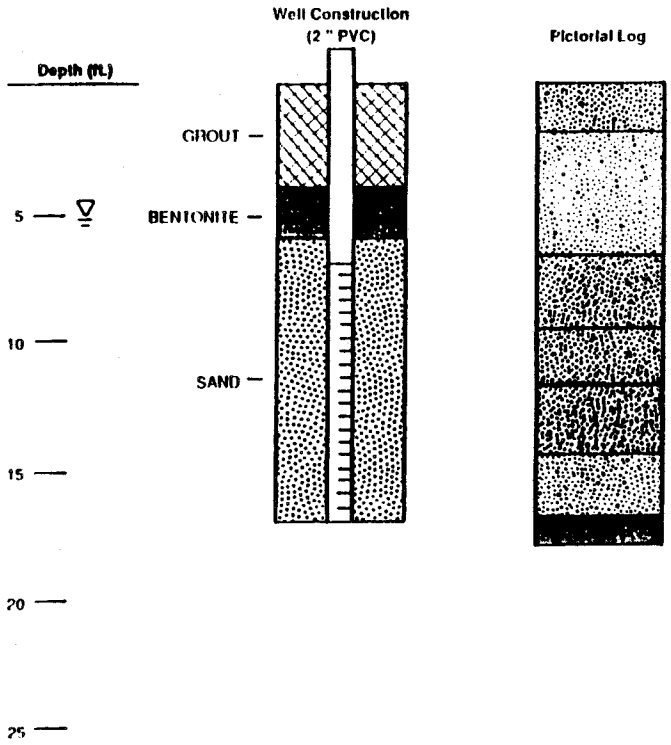
CH2MHILL



Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
				Topsoil: silty fine sand, orange brown, moist	64.5
					63.0
S1	3 5 5	20	8 8 9	Fine sandy clay, some silt and m sand, light brown (5 YR 5/6), moist, plastic.	
					57.0
S2	8 5 10	21	6-7-6	Silty fine-c. sand, dark yellowish orange (10 YR 5/6) to dusky yellow (5 YR 6/4), moist.	
					53.0
S3	13 5 15	20	4-8-4	Medium-v.c. sand, grayish yellow green (5 GY 7/2), wet, noticable odor	
					48.0
S4	18 5 20	23	WOH	Fine sandy clay, black (N1), wet, odor	
					42.0
S5	25 26 5	23	11-24-37	Silty fine-medium sand, black (N1), wet, slight odor	
				Shale	38.0

WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 17
Du PONT - KINSTON

CH2M HILL

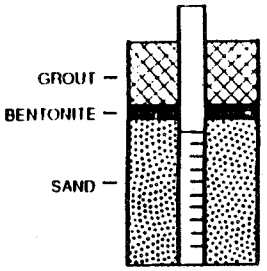


Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
				Topsoil: fine sand, black, moist.	58.9
					56.8
S1	3.5-5	14	13-20-27	Fine medium sand, trace silt, light gray (N8), moist.	
					51.8
S2	8.5-10	24	1-3-2	Clayey fine sand, greenish gray (5 GY 4/1), moist.	
					48.8
				Fine-medium sand, some clay grayish green (5 GY 5/2), wet, sl. odor.	
					46.8
S3	13.5-15	16	4-9-13	Clayey f. sand, olive black (5 Y 2/1), wet.	
					44.8
				Fine-m sand, some silt, dusky green (5 G 3/2)	
					41.8
S4	17-18	18	20-40-50/4	Shale black (N1), moist, fractured	

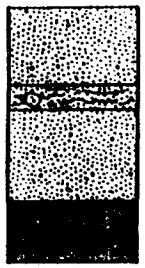
WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 18
Du PONT - KINSTON

CH2M HILL

Well Construction
(2 " PVC)



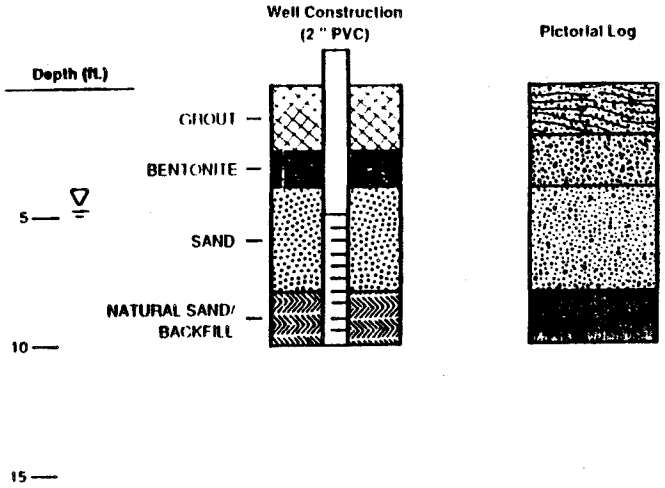
Pictorial Log



Depth (ft.)	Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
					Topsoil: fine-medium sand, olive brown	19.8
						16.8
	S1	3.5-5	18	3-11-13	Fine sandy clay, some silt, olive gray (5Y 4/1), moist, plastic.	15.8
5					Medium-very c. sand, light brown (5 YR 5/6), wet.	
						12.3
	S2	8.5-10	18	50/5	Shale, black (N1), moist, fractured.	
10						
15						

WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 19
Du PONT - KINSTON

CH2MHILL



Sample Number	Interval (ft.)	Recovery (in.)	Blow Count 6"-6"-6"	Written Log	Elevation (ft.)
					20.2
				Topsoil: silty sandy clay	
					17.8
S1	3 5 5	17	9-9-16	Clayey medium-c. sand, pale green (10 G 6/2), moist.	15.8
				Fine-c. clean sand, light olive gray (5 Y 6/1), wet.	
S2	8 9 5	11	50/4	Shale fragments, black (N1), wet	11.8

WELL CONSTRUCTION AND GEOLOGIC LOG
MONITORING WELL 20
Du PONT - KINSTON

CH2MHILL

Appendix B

SAMPLING OF SOILS, GROUNDWATER, AND SURFACE WATER

Non-Manufacturing Area

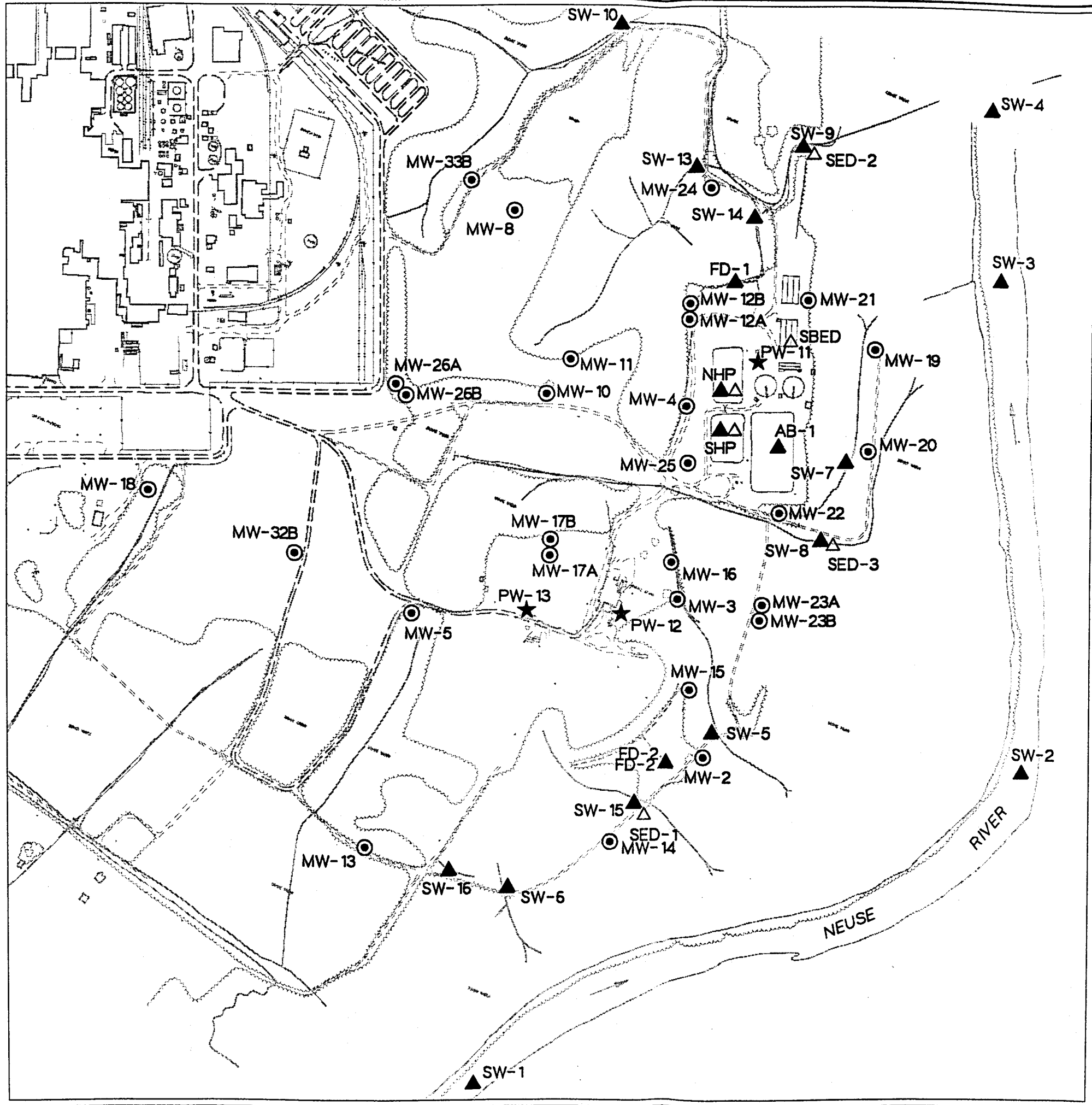
Appendix B
Sampling of Soils, Groundwater, and Surface Water

Introduction

This appendix describes the equipment and procedures used during sampling of soils, groundwater, and surface water. S. Brown and A. Bryda of CH2M HILL sampled soils and groundwater at the Du Pont Kinston site from October 31 to November 10, 1989. S. Brown and D. Martinson collected surface water samples on January 31, 1990. Groundwater samples were collected from three production wells and 26 monitoring wells. Another round of groundwater samples were collected from the Peedee aquifer wells and surface water samples from the Neuse River on July 24-26, 1990. Soil samples were collected from three drainage ditches and surface water samples were collected from 14 locations. The locations of these sampling points are shown in Figures B-1 and B-2.

The CH2M HILL laboratories in Montgomery, Alabama; Redding, California; Gainesville, Florida; and Corvallis, Oregon; analyzed the samples for the selected constituents shown in Table B-1. The specific analyses done for each sample are shown in Table B-2. The laboratory provided containers and preservatives consistent with standard laboratory procedures. Chain-of-custody forms were maintained to keep track of the movement and handling of the samples.

General Procedures



LEGEND

- ⊙ MONITORING WELLS
- ★ PRODUCTION WELLS
- ▲ UNDERGROUND FRENCH DRAINS

0 250 500 750

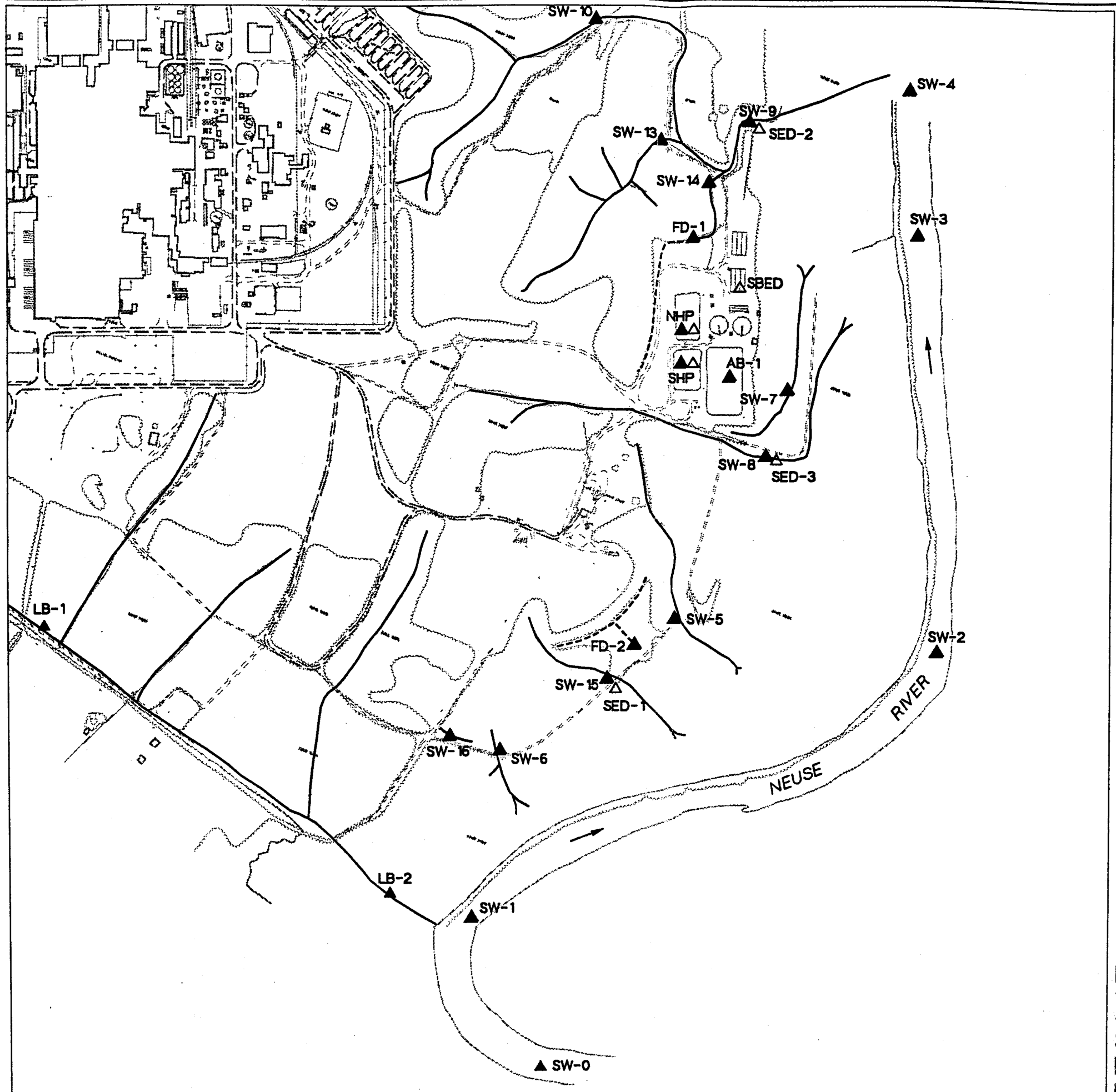
SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure B-1

PHASE 3 GROUNDWATER SAMPLING LOCATIONS - NONMANUFACTURING AREA
DuPont Kinston Facility

CH2M HILL



LEGEND

- ▲ SURFACE WATER SAMPLES
- △ SEDIMENT SAMPLES
- ——— DRAINAGE DITCH
- -------- UNDERGROUND DRAIN

0 300 600 900

SCALE: 1"=600'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure B-2

SURFACE WATER AND SEDIMENT SAMPLING LOCATIONS - NONMANUFACTURING AREA
DuPont Kinston Facility

CH2MHILL

Table B-1
CONSTITUENTS ANALYZED AND DETECTION LIMITS

Volatile Organic Compounds	Method Detection Limit Water (µg/l)
Acetone	10
Benzene	5
Bromodichloromethane	5
Bromoform	5
Bromomethane	10
2-Butanone	10
Carbon Disulfide	5
Carbon Tetrachloride	5
Chlorobenzene	5
Chloroethane	10
2-Chloroethylvinylether	10
Chloroform	5
Chloromethane	10
cis-1,3-Dichloropropene	5
Dibromochloromethane	5
1,1-Dichloroethane	5
1,1-Dichloroethylene	5
1,2-Dichloroethane	5
1,2-Dichloroethylene (total)	5
1,2-Dichloropropane	5
1,2-Dichlorobenzene	5
1,3-Dichlorobenzene	5
1,4-Dichlorobenzene	5
1,4-Dioxane	50
Ethylbenzene	5

Table B-1
CONSTITUENTS ANALYZED AND DETECTION LIMITS

2-Hexanone	10
4-Methyl-2-Pentanone	10
Methylene Chloride	5
Styrene	5
1,1,2,2-Tetrachloroethane	5
Tetrachloroethylene	5
Toluene	5
trans-1,3-Dichloropropene	5
1,1,1-Trichloroethane	5
1,1,2-Trichloroethane	5
Trichloroethylene	5
Trichlorofluoromethane	5
Vinyl Acetate	10
Vinyl Chloride	10
Xylenes (total)	5
Acid Extractable Organics	**Method Detection Limit Water (µg/l)**
Benzoic Acid	50
4-Chloro-3-methylphenol	10
2-Chlorophenol	10
2,4-Dichlorophenol	10
4,6-Dinitro-2-methylphenol	50
2,4-Dinitrophenol	50
2,4-Dimethylphenol	10
Dowtherm A	10
2-Methylphenol	10
4-Methylphenol	10

Table B-1
CONSTITUENTS ANALYZED AND DETECTION LIMITS

2-Nitrophenol	10
4-Nitrophenol	50
Phenol	10
Pentachlorophenol	50
2,4,5-Trichlorophenol	50
2,4,6-Trichlorophenol	10
Other Organics	
Ethylene Glycol	250
Methanol	1,000
Triethylene Glycol	250
Total Organic Carbon	1,000
Inorganics	
Calcium	5,000
Chloride	1,000
Chromium	10
Iron	100
Potassium	2,000
Magnesium	2,000 or 5,000
Manganese	15
Sodium	2,000
Lead	3
Silicon	500
Sulfate	1,000 or 2,000

Table B-2
DUPONT KINGSTON SAMPLING PROTOCOL

	VOC	AEOs	TOC	Inorganics	TEG and Ethylene Glycol	Methanol	Asbestos	Pb, Cr (TCLP)
Monitoring Wells								
MW3	√	√	√	√				
MW4	√	√	√	√				
MW5	√	√	√	√				
MW10	√	√	√	√				
MW10 (dup)	√	√	√	√				
MW11	√	√	√	√				
MW12A	√	√	√	√				
MW12B	√	√	√	√				
MW13	√	√	√	√			√	
MW14	√	√	√	√			√	
MW15	√	√	√	√			√	
MW16	√	√	√	√			√	
MW17A	√	√	√	√				
MW17B	√	√	√	√				

Table B-2
DUPONT KINGSTON SAMPLING PROTOCOL

	VOC	AEOs	TOC	Inorganics	TEG and Ethylene Glycol	Methanol	Asbestos	Pb, Cr (TCLP)
MW18	√	√	√	√				
MW18 (dup)	√	√	√	√				
MW19	√	√	√	√				
MW20	√	√	√	√				
MW21	√	√	√	√				
MW22	√	√	√	√				
MW23A	√	√	√	√				
MW23B	√	√	√	√				
MW24	√	√	√	√				
MW25	√	√	√	√				
MW26A	√	√	√	√				
MW26B	√	√	√	√				
MW32B	√	√	√	√				
MW33B	√	√	√	√				
(EQI after MW11)	√	√	√	√				

Table B-2
DUPONT KINGSTON SAMPLING PROTOCOL

	VOC	AEOs	TOC	Inorganics	TEG and Ethylene Glycol	Methanol	Asbestos	Pb, Cr (TCLP)
Production Wells								
PW11	√	√	√	√				
PW12	√	√	√	√				
PW13	√	√	√	√				
French Drains								
FD1	√	√	√	√				
FD2	√	√	√	√				
Water Treatment Plant								
AB1 (water)	√	√	√	√				
NHP (water)	√	√	√	√				
SHP (water)	√	√	√	√				
SBED (sludge)								√
NHP-1 (sludge)								√
SHP-1 (sludge)								√

Table B-2
DUPONT KINGSTON SAMPLING PROTOCOL

	VOC	AEOs	TOC	Inorganics	TEG and Ethylene Glycol	Methanol	Asbestos	Pb, Cr (TCLP)
Sediment								
SED1	√	√		√				
SED2	√	√		√				
SED2 (dup)	√	√		√				
SED3	√	√		√				
Surface Water								
SW0	√	√						
SW1	√	√	√	√				
SW2	√	√	√	√				
SW3	√	√	√	√				
SW4	√	√	√	√				
SW5	√	√	√	√				
SW6	√	√	√	√				
SW7	√	√	√	√				
SW8	√	√	√	√				
SW8 Dup	√	√	√	√				

Table B-2
DUPONT KINGSTON SAMPLING PROTOCOL

	VOC	AEOs	TOC	Inorganics	TEG and Ethylene Glycol	Methanol	Asbestos	Pb, Cr (TCLP)
SW9	✓	✓	✓	✓				
SW10	✓	✓	✓	✓				
SW13	✓	✓	✓	✓				
SW14	✓	✓	✓	✓				
SW15	✓	✓	✓	✓				
SW16	✓	✓	✓	✓				
LB1	✓	✓						
LB2	✓	✓						

VOCs = Volatile Organic Compounds
AEOs = Acid Extractable Organic Compounds

levels were referenced to the surveyed elevations of the surface casings of the wells and of selected measuring points near the surface impoundments. The measuring point of all monitoring wells was either the top of the PVC casing or the top of the steel protective casing measured on the side with the lock, whichever was higher. A summary of water levels recorded on October 30, 1989, and February 1, 1990, is shown in Table B-3.

Groundwater Sampling

Sampling began after enough time had elapsed to allow the monitoring wells to be recharged with natural groundwater after development. The development of all monitoring wells developed using air lifting or bailing was completed at least two weeks before sampling began. The development of the wells developed using water jetting was completed at least seven weeks before sampling.

The sampling procedure at most shallow wells began with purging the well with a QED positive displacement bladder pump until in-line measurements of Eh, pH, temperature, and conductivity were stable for three well volumes. This was done to ensure that the samples collected were representative of the groundwater in the formation near the well. A summary of field parameters measured during sampling is given in Tables B-4 and B-5.

After purging was completed, the samples were collected in the sample bottles provided by the laboratory. All samples of dissolved metals were filtered with a 0.45 micron filter to eliminate suspended solids. The samples collected at each site were packed in ice, sealed, and shipped to the laboratory in Montgomery within 48 hours of sampling. All samples were analyzed within standard holding time limits.

Table B-3
KINSTON WATER LEVEL ELEVATIONS
October 30, 1989; February 1, 1990
(Elevations in feet above mean sea level)

Well	Ground Elevation	Elevation of Measuring Point[c]	Depth to Water From Measuring Point (10/30/89)	Elevation of Potentio-metric Surface (10/30/89)	Depth to Water From Measuring Point (02/01/90)	Elevation of Potentio-metric Surface (02/01/90)
MW1	43.7	44.73	No Water	---	No Water	---
MW2	27.7	28.71	6.88	21.83	5.78	22.93
MW3	31.8	32.85	6.78	26.07	6.26	26.59
MW4	34.3	35.36	6.51	28.85	4.75	30.61
MW5	64.2	65.22	9.50	55.72	6.51	58.71
MW6	26.8	27.86	Abandoned	---	---	---
MW7	58.8	59.85	6.44	53.41	4.92	54.93
MW8	62.9	63.96	11.80	52.16	9.58	54.38
MW9	46.0	46.04	No Water	---	8.03	38.01
MW10	64.3	66.53	13.03[a]	53.50	10.15	56.38
MW11	64.3	66.77	15.14[b]	51.63	13.06	53.71
MW12A	34.2	36.21	5.97	30.24	4.77	31.44
MW12B	34.9	36.69	27.84	8.85	26.70	9.99
MW13	48.3	50.24	7.66	42.58	6.68	43.56
MW14	30.6	33.00	7.53	25.47	5.67	27.33
MW15	29.1	31.29	6.32	24.97	5.39	25.90
MW16	33.8	35.87	6.48	29.39	4.83	31.04
MW17A	64.5	66.45	12.49	53.96	11.22	55.23
MW17B	64.6	66.44	59.44	7.0	58.72	7.72
MW18	58.9	61.11	5.74	55.37	4.07	57.04
MW19	19.8	22.05	5.88	16.17	3.96	18.09
MW20	20.2	22.40	6.28	16.12	5.00	17.40
MW21	26.9	29.32	4.97	24.35	4.34	24.98
MW22	29.2	32.03	7.37	24.66	6.88	25.15
MW23A	28.6	31.19	8.47	22.72	6.54	24.65
MW23B	28.6	30.40	20.66	9.74	19.54	10.86
MW24	27.6	30.14	6.48	23.66	4.05	26.09
MW25	33.7	35.92	5.88	30.04	3.63	32.29
MW26A	67.4	70.04	11.39	58.65	9.87	60.17
MW26B	67.0	69.53	70.37	-0.84	69.49	+0.04
MW27	63.4	63.39	4.85	58.54	4.73	58.66
MW28	63.8	63.80	7.23	56.57	7.33	56.47
MW29	63.2	63.16	5.06	58.10	4.65	58.51
MW30	65.2	65.16	5.52	59.64	4.83	60.33
MW31	65.2	65.20	5.63	59.57	5.84	59.36

Table B-3
KINSTON WATER LEVEL ELEVATIONS
October 30, 1989; February 1, 1990
(Elevations in feet above mean sea level)

Well	Ground Elevation	Elevation of Measuring Point[c]	Depth to Water From Measuring Point (10/30/89)	Elevation of Potentio-metric Surface (10/30/89)	Depth to Water From Measuring Point (02/01/90)	Elevation of Potentio-metric Surface (02/01/90)
MW32B	66.0	68.06	61.57	6.49	60.87	7.19
MW33B	59.5	61.50	59.19	2.31	58.03	3.47
Surface Water Elevations						
AB	---	38.85	4.5	34.44	4.7	34.2
NHP	---	36.53	6.0	30.5	5.0	31.5
SHP	---	36.87	5.3	31.6	6.5	30.4

[a]Water level taken 11/06/89.
[b]Water level taken 11/10/89.
[c]Measuring point is either the top of the PVC casing or the top of the steel protective casing on the side adjacent to the lock, whichever is higher.

AB = aeration basin
NHP = north holding pond
SHP = south holding pond

Table B-4
FIELD PARAMETERS FROM MONITORING WELL SAMPLING DURING PHASE 3

Well Number	Date	pH	Eh (mg)	Conductivity (umhos/cm)	Alkalinity (mg/l $CaCO_3$)	Temp (°C)
MW3	Nov. 6, 1989	6.4	-115	483	370	18.8
MW4	Nov. 2, 1989	5.9	-97	435	220	18.4
MW5	Oct. 31, 1989	7.9	-190	140	73	17.4
MW10	Nov. 6, 1989	5.8	-115	257	115	23.2
MW11	Nov. 10, 1989	4.6	-40	1,320	41[b]	21.3
MW12A	Nov. 9, 1989	5.5	-83	690	94.3[b]	20.1
MW12B	Nov. 8, 1989	7.9	-145	252	184[b]	18.3
	Jul. 25, 1990	7.9	+40	300	--	19.5
MW13	Nov. 7, 1989	5.1	+141	155	33/12[a]	23.4
MW14	Nov. 7, 1989	5.5	+105	610	59	20.7
MW15	Nov. 7, 1989	6.7	-92	1,180	1,370/668[a]	21.9
MW16	Nov. 7, 1989	6.2	-106	850	1,110/353[a]	21.8
MW17A	Nov. 10, 1989	5.5	-119	800	230[b]	22.2
MW17B	Nov. 7, 1989	11.4/ 11.6[a]	-160	920	500	20.6
	Jul. 24, 1990	10.9	+31	550	--	25.0
MW18	Oct. 31, 1989	5.4	+207	100	1	19.3
MW19	Nov. 1, 1989	4.7	+87	290	0	19.4
MW20	Nov. 1, 1989	6.4	-64	280	6	19.4
MW21	Nov. 2, 1989	6.1	+151	362	97	17.8
MW22	Nov. 1, 1989	6.7	-123	474	188	20.4
MW23A	Nov. 3, 1989	4.8	+184	49	0	16.5
MW23B	Nov. 3, 1989	8.5	+82	200	123	18.0
	Jul. 26, 1990	6.2	+65	265	--	17.0

Table B-4
FIELD PARAMETERS FROM MONITORING WELL SAMPLING DURING PHASE 3

Well Number	Date	pH	Eh (mg)	Conductivity (umhos/cm)	Alkalinity (mg/l $CaCO_3$)	Temp (°C)
MW24	Nov. 6, 1989	5.4	+181	122	16	19.3
MW25	Nov. 1, 1989	6.0	-7	261	32[b]	20.9
MW26A	Oct. 31, 1989	4.1	+335	82	0	21.3
MW26B	Oct. 31, 1989	9.5/ 8.8[a]	-145	170	180	18.2
	Jul. 24, 1990	8.1	+69	275	--	20.0
MW32B	Nov. 3, 1989	7.7	+82	249	173	18.6
	Jul. 24, 1990	7.8	+193	310	--	23.0
MW33B	Nov. 3, 1989	7.8	-48	248	161	18.4
	Jul. 24, 1990	8.0	-14	285	--	18.5

[a]11.4/11.6 = Field Measurement/Lab Measurement
[b]Measurement made in the lab

Dash (-) indicates sample not analyzed for that constituent
Eh measurement is an uncorrected field measurement

Table B-5
FIELD PARAMETERS FOR PRODUCTION WELL AND MISCELLANEOUS WATER SAMPLING

Well Number	Date	pH	Eh (mg)	Conductivity (umhos/cm)	Alkalinity (mg/l $CaCO_3$)	Temp (°C)
PW6	June 1988	8.4	-121	800	-	19.4
PW7	June 1988	8.9	-113	262	-	20.1
PW8	June 1988	8.4	-124	269	-	19.4
PW9	June 1988	8.5	-128	281	-	20.1
PW10	June 1988	7.6	-120	280	-	19.5
PW11	June 1988	7.9	-110	332	-	19.5
	Nov. 8, 1989	5.8	+1	300	214	19.9
PW12	June 1988	7.8	-114	308	-	21.0
	Nov. 8, 1989	6.2	-97	270	207/171[a]	22.2
	July 25, 1990	8.2	+70	335	-	23.5
PW13	Nov. 8, 1989	6.1	-11	269	219	19.2
	July 25, 1990	8.8	+94	360	-	24.5
FD-1	Nov. 8, 1989	6.2	-128	448	1,770/251[a]	20.2
FD-2	Nov. 8, 1989	6.0	-134	1,400	2,030/620[a]	25.5
NHP	Nov. 8, 1989	7.3	+23	1,020	343[b]	23.3
SHP	Nov. 8, 1989	6.0	-32	950	90[b]	25.9
AB1	Nov. 8, 1989	6.2	-97	438	183[b]	25.0

[a]11.4/11.6 = Field Measurement/Lab Measurement
[b]Measurement made in the lab
Dash (-) indicates sample not analyzed for that constituent
Eh measurement is an uncorrected field measurement

Because monitoring well MW25 recharged too slowly and monitoring wells MW22 and MW24 contained too small a water column to be sampled using the bladder pump, a Teflon® bailer was used for sampling these wells. MW22 and MW24 were purged until parameters stabilized for three well volumes before sampling began. MW25 was bailed dry once before sampling and, subsequently, had to be sampled in two stages because the yield was insufficient to fill all the sample bottles without a second recovery period.

The deep wells were purged using a large positive displacement bladder pump rather than the QED pump used on the shallow wells. This allowed for faster purging of the well. Purging continued until parameters stabilized for three well volumes. The QED sampling pump was then used to sample the well after the parameters restabilized to the values recorded at the end of purging.

After each well the sampling equipment was decontaminated using (1) a detergent wash, (2) a 10 percent methanol solution, (3) tap water, and (4) deionized water. One gallon of each of these four fluids was pumped successively through the QED sampling pump between wells. The filter paper was changed and the metals filter was cleaned by spraying the inside of the filter with deionized water between uses. The 10 percent methanol solution was deleted from the decontamination procedure before wells MW27 through MW31 to prevent methanol contamination of the sample.

Duplicate samples were taken at wells MW10 and MW18 as a quality control of the laboratory results. As a check of the decontamination procedures, an equipment blank was taken after MW11 following decontamination. To take the equipment blank sample, deionized water was pumped through the QED pump until all the sample bottles were full. Some black flecks were present in the water during sampling of the equipment blank. Trip blanks were sent with each shipment of samples to detect potential contamination of the samples during shipping and handling.

Groundwater samples from three deep production wells were also collected. Each of these wells was connected to a storage tank from which water could be collected using

a faucet. The wells were purged until at least two storage tank volumes had been evacuated. Field parameters were measured and samples were then taken directly from the faucets.

Surface Water and Soil Sampling

Surface water and soil samples were collected from the two holding ponds, the sand beds, and the aeration basin of the Du Pont wastewater treatment plant. The soil samples were collected using a hand auger and the surface-water samples were collected using a dip bottle. The samples were distributed as little as possible during sampling to prevent volatiles from escaping.

Surface water samples were also taken from two french drain locations, FD-1 and FD-2, shown in Figure B-2. These samples were collected using a peristaltic pump. The hose on the peristaltic pump was changed between samples. Soil samples were collected from three drainage ditch locations using a hand auger. A duplicate sample was taken at the SED-2 sampling location.

Fourteen surface-water samples were collected on January 31, 1990, and seven surface water samples were collected on July 25 and 26, 1990, from the locations shown in Figure B-2. These surface-water samples are designated by "SW." Samples SW-0 through SW-4 were taken from the Neuse River in a boat. The temperature, conductivity, pH, Eh, dissolved oxygen, and alkalinity of the sample water were recorded during sampling. These field parameters are shown in Table B-6. All surface water samples were collected by dipping the sample bottles directly into the water source.

Table B-6
FIELD PARAMETERS DURING SURFACE WATER SAMPLING
JANUARY 1, 1990

Sample	pH	Eh (mv)	Conductivity (umhos/cm)	Alkalinity (mg/l $CaCo_3$)	Temperature (°C)	Dissolved Oxygen (mg/l)
SW1	6.77	-83	68	12	10°	10.3
SW2	6.76	-139	62	12	10°	10.5
SW3	6.77	-60	61	8	10°	10.4
SW4	6.72	-32	61	9	10°	12.4
SW5	6.86	-187	57	>225	13.3°	0.4
SW6	6.77	-172	47	59	12.5°	2.3
SW7	5.95	-136	155	17	12.5°	2.4
SW8 SW8(DUP)	7.09	-177	275	128	11.2°	1.8
SW9	6.56	-9	243	69	13.7°	5.5
SW10	6.67	-134	182	13	12.7°	7.0
SW13	7.32	-155	410	105	13.6°	5.4
SW14	6.38	+6	272	139	12°	2.1
SW15	6.31	-171	50	195	11.9°	0.5
SW16	4.95	-124	137	147	10.4°	5.0

Eh measurement is an uncorrected field measurement

WDCR53/058.51

Appendix C

IN SITU HYDRAULIC CONDUCTIVITY TESTING

Appendix C

IN SITU HYDRAULIC CONDUCTIVITY TESTING

From December 4, 1989 to January 30, 1990, in situ hydraulic conductivity was measured in 5 shallow wells and 3 deep wells at the Du Pont Kinston plant. Data from these tests provide an estimate of the ability of the formation in the vicinity of the well to transmit water in a horizontal direction.

Two different methods were used to measure in situ hydraulic conductivity. In theory, each method involves the instantaneous introduction or withdrawal of water to or from the borehole. In each case, the water level is recorded continuously from the time the instantaneous change is made until the water level has recovered to near its natural static level. The rate at which the water level recovery occurs is used to estimate the hydraulic conductivity in the immediate vicinity of the well. The two methods used to measure hydraulic conductivity were:

1) The slug test/falling head method in which 1 gallon of deionized water was poured down the well as rapidly as possible, followed by a falling water-level recovery. This method was used in wells where the water level was from 0 to 3 feet above the top of the screen.

2) The gas displacement/rising head method in which the water level is lowered 3 feet using compressed gas and allowed to stabilize, followed by a release of pressure and a rising water-level recovery. This method was used in wells with a water level greater than 3 feet above the top of the screen.

The water level recovery was recorded using 5-psi Druck pressure transducers and a Campbell 21X micrologger. During the in situ hydraulic conductivity tests, the

transducers were in a fixed position in the well before water-level recovery began. Two or more tests were conducted at each well to be sure that at least one representative data set was collected. Tests were performed on the shallow wells MW16, MW20, MW21, and MW31 and on the deep wells MW12B, MW26B, and MW33B. The results of these tests are summarized in Table C1 and presented graphically at the end of this appendix.

The recovery data were analyzed by the method developed by Hvorslev (1951). The method involves fitting a regression line to a semilog plot of normalized hydraulic heads versus time. The normalized hydraulic heads are defined as (H-h)/(H-Ho), where H is the initial head prior to the instantaneous water-level rise or fall, Ho is the head after the instantaneous water-level rise or fall but before recovery begins, and h is the head at specified time during the recovery.

For the 5 shallow wells under unconfined conditions, hydraulic conductivity is given by:

$$K = \frac{R^2}{2L(t_2-t_1)} \ln\frac{L}{R} \ln\frac{s_1}{s_2}, \quad \text{for } \frac{L}{R} > 8$$

where:

K = hydraulic conductivity
R = radius of borehole
L = screen length
t_1 = time when recovery equals h_1
t_2 = time when recovery equals h_2
s_1 = residual change in water level at time t_1, $(H-h_1)$
s_2 = residual change in water level at time t_2, $(H-h_2)$

For the deep wells, which were assumed to be screened in the upper fifth of a confined aquifer, hydraulic conductivity is given by:

$$K = \frac{\pi r^2}{C_s R\,(t_2 - t_1)} \ln \frac{S_1}{S_2}$$

where:

π = pi

C_s = a shape factor

R = radius of borehole

r = radius of screen

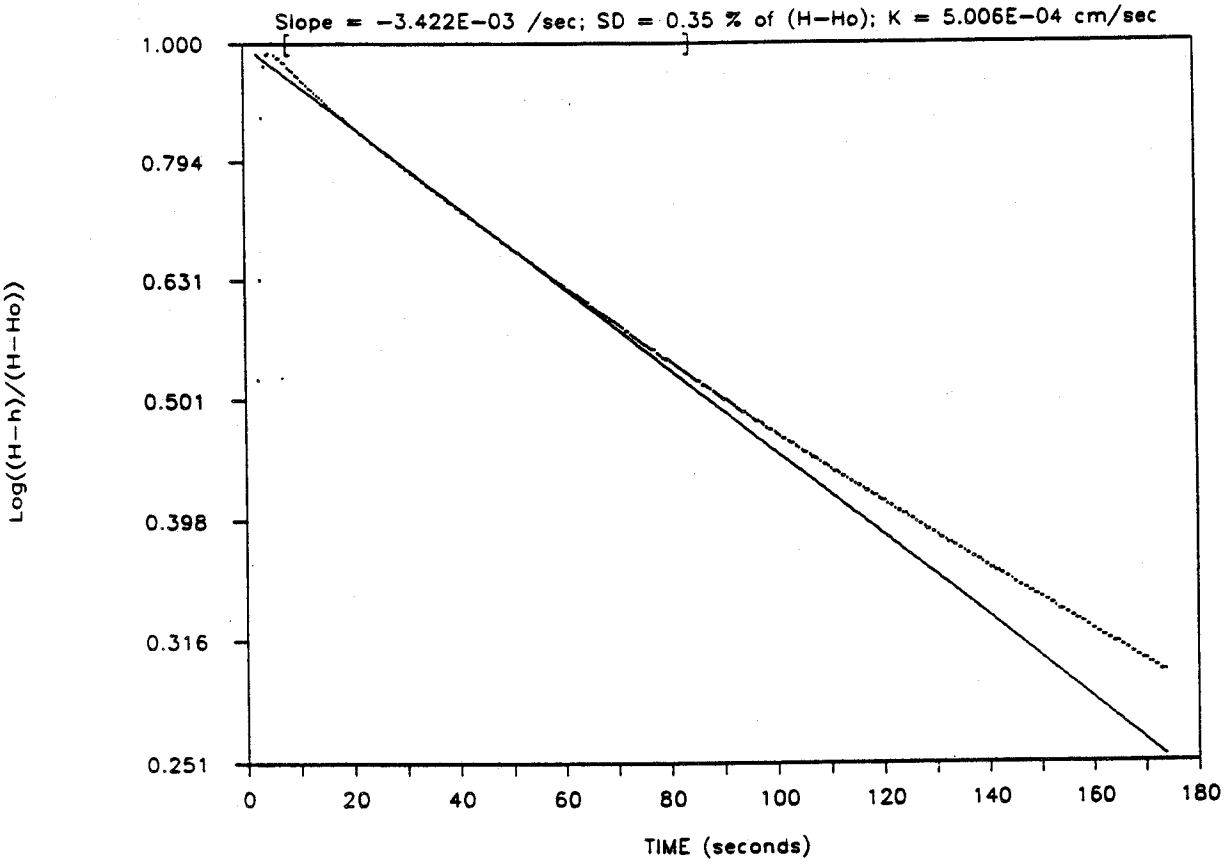
Several assumptions must be satisfied for these two equations to be valid. First, the head in the formation must be constant. Second, flow to the well must follow Darcy's Law. Third, the effects of the sand pack around the well are assumed to be negligible. Fourth, the screen and sand pack must not inhibit flow to the well.

WDCR465/071.51

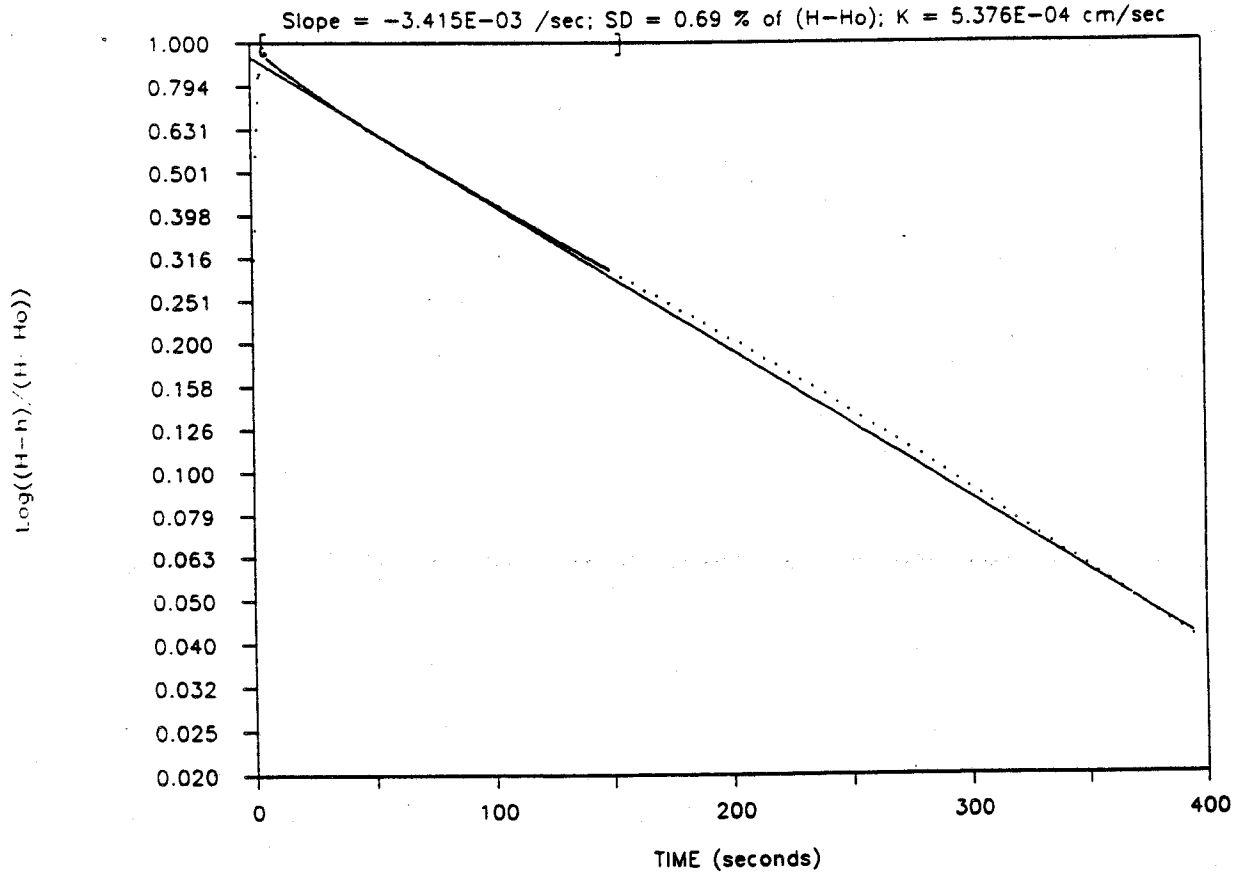
TABLE C1
HYDRAULIC CONDUCTIVITY VALUES

Monitoring Wells	Type of Test	Hydraulic Conductivity (cm/sec) Test 1	Test 2	Arithmetic mean
Shallow				
MW16	Slug Test/Falling Head	5×10^{-4}	5×10^{-4}	5×10^{-4}
MW20	Slug Test/Falling Head	6×10^{-3}	5×10^{-3}	6×10^{-3}
MW21	Slug Test/Falling Head	5×10^{-3}	5×10^{-3}	5×10^{-3}
MW31	Gas Displacement/Rising Head	4×10^{-4}	3×10^{-4}	4×10^{-4}
Deep				
MW12B	Gas Displacement/Rising Head	3×10^{-3}	3×10^{-3}	3×10^{-3}
MW26B	Gas Displacement/Rising Head	2×10^{-3}	1×10^{-3}	2×10^{-3}
MW33B	Gas Displacement/Rising Head	2×10^{-2}	2×10^{-2}	2×10^{-2}

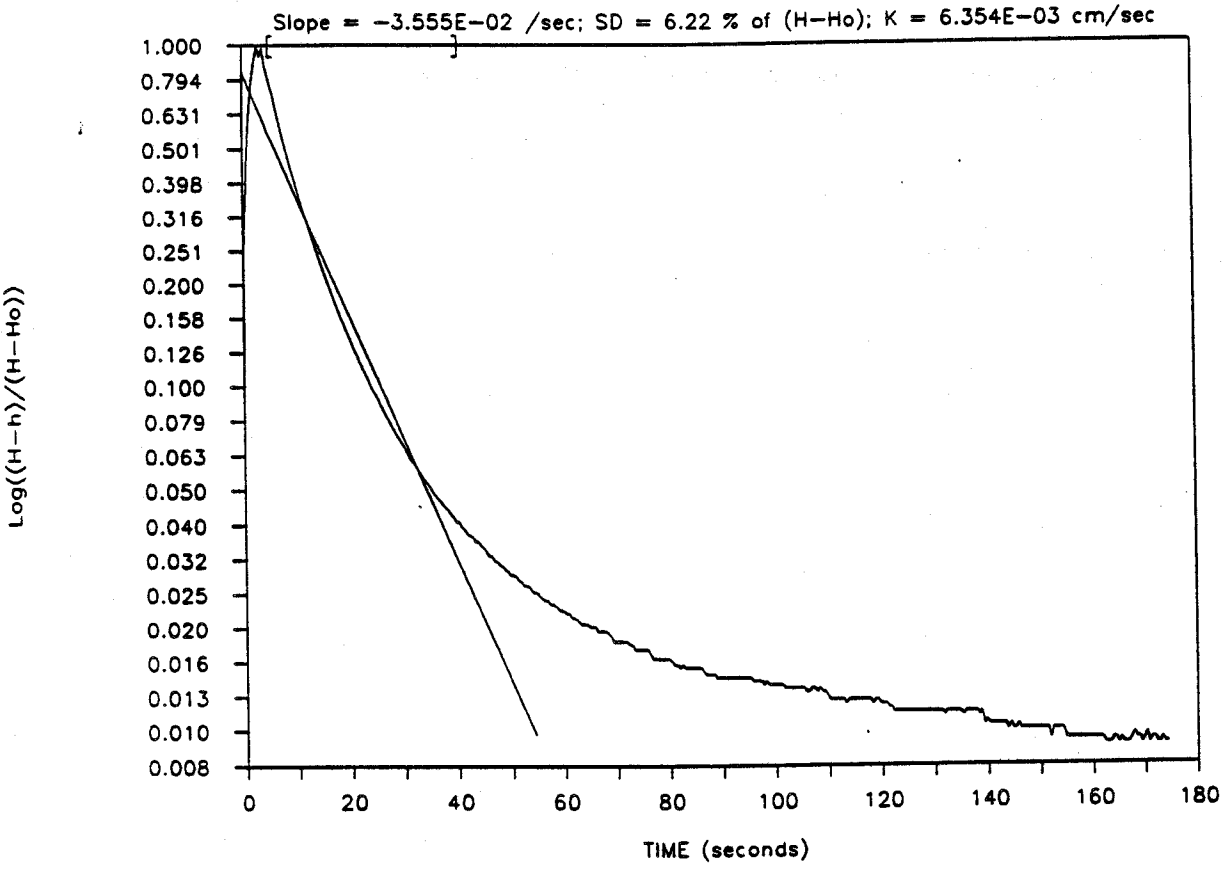
Aquifer Slug Test #1 (Falling Head) at MW-16; 350 data points



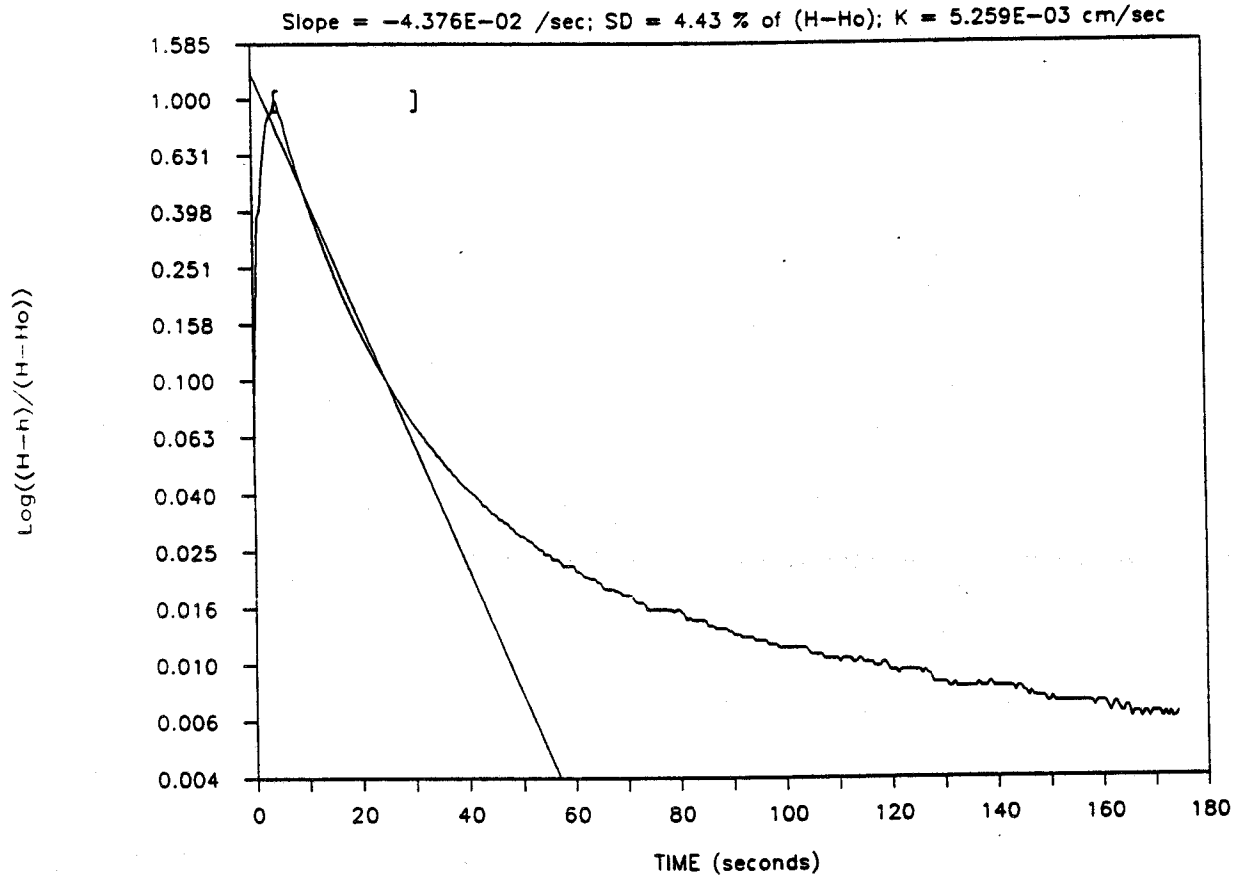
Aquifer Slug Test #2 (Falling Head) at MW-16; 350 data points



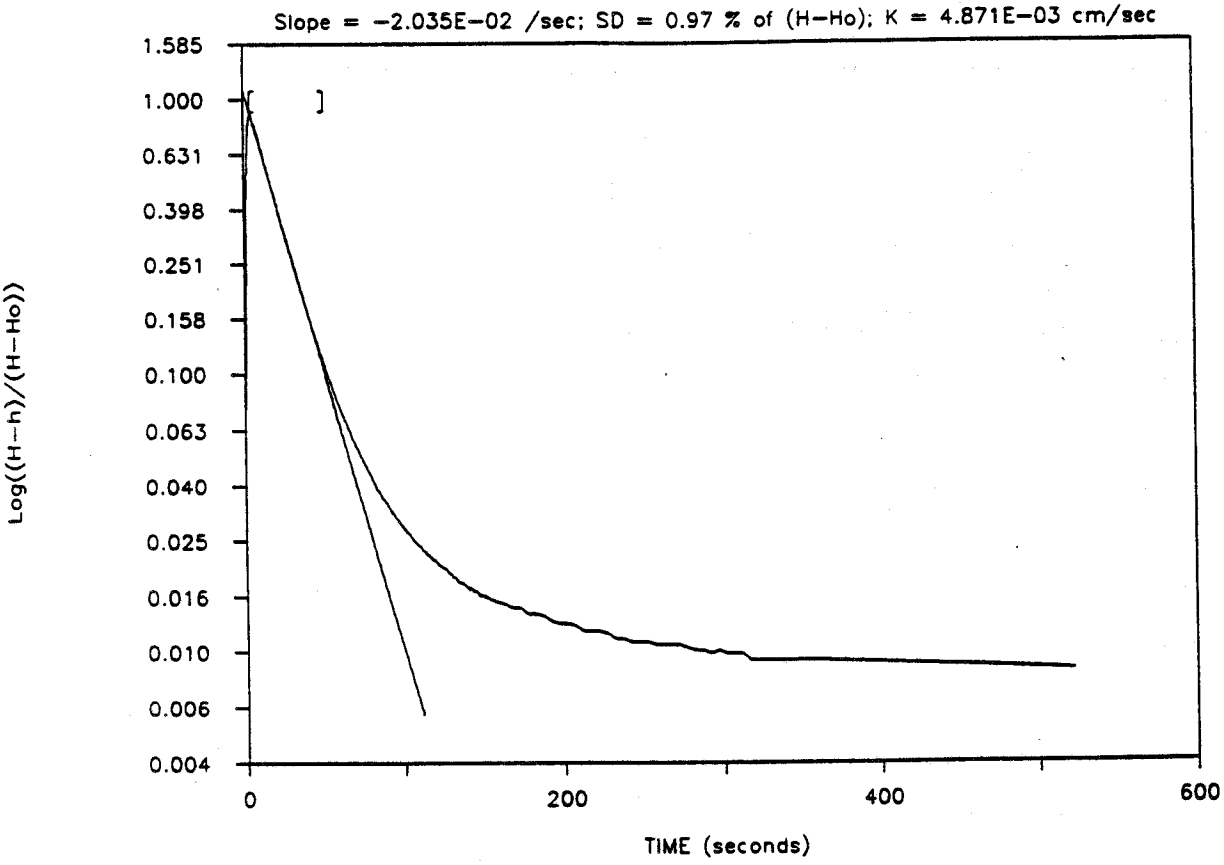
Aquifer Slug Test #1 (Falling Head) at MW-20; 350 data points



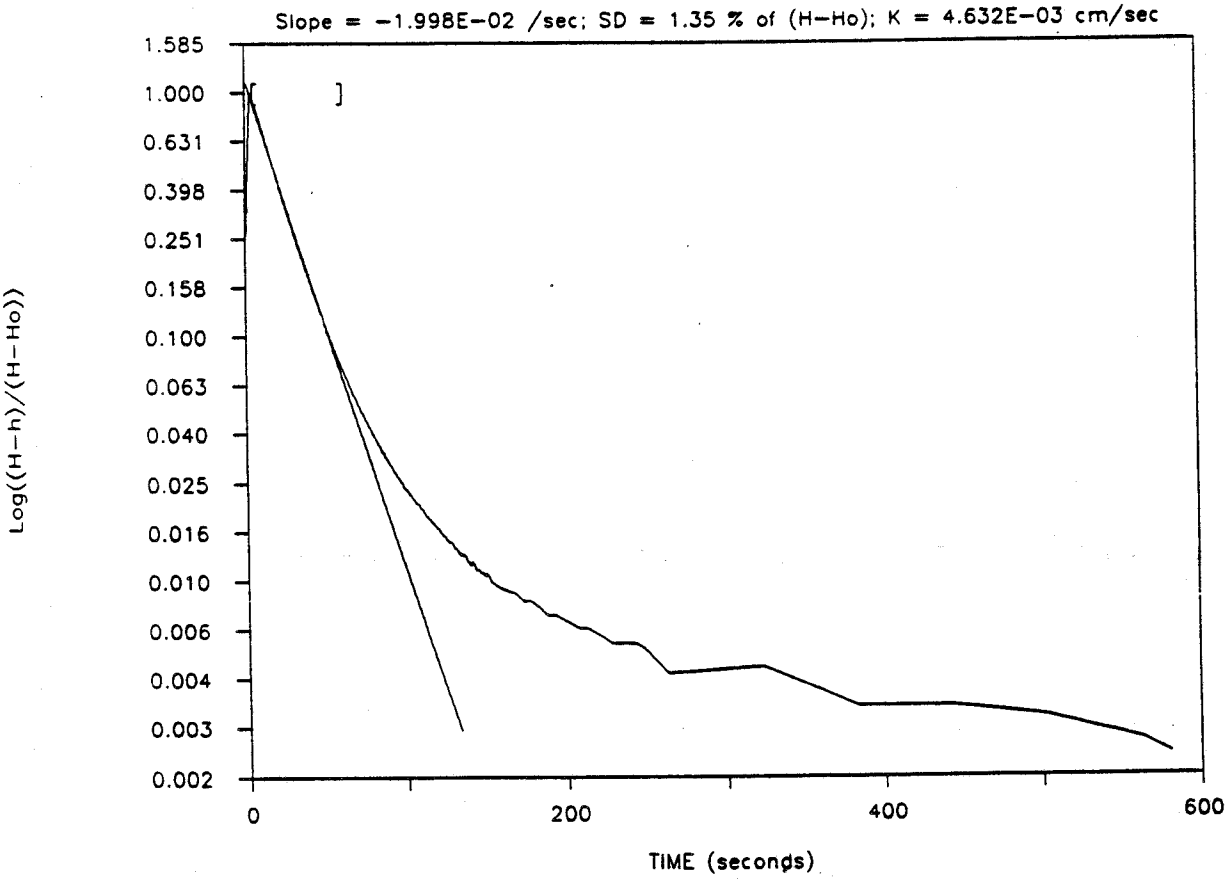
Aquifer Slug Test #2 (Falling Head) at MW-20; 350 data points



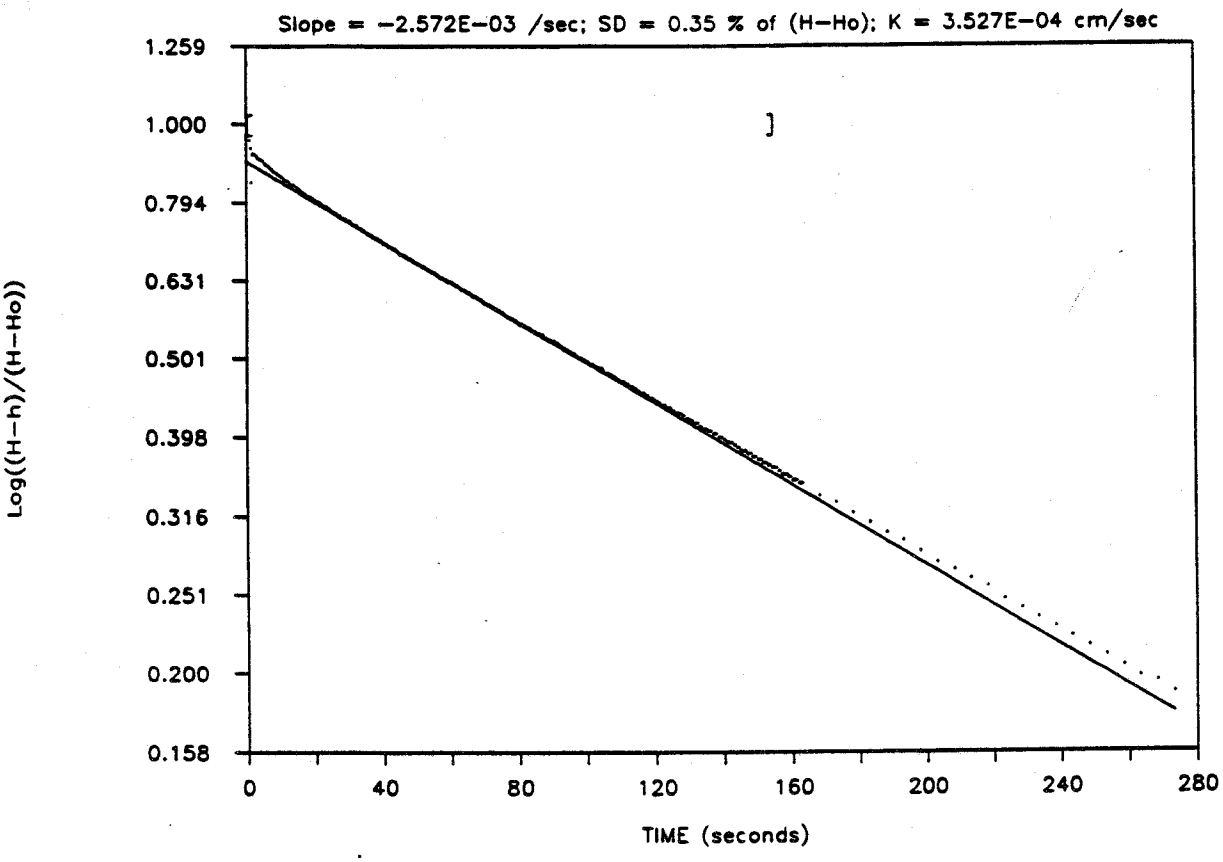
Aquifer Slug Test #1 (Falling Head) at MW-21; 347 data points



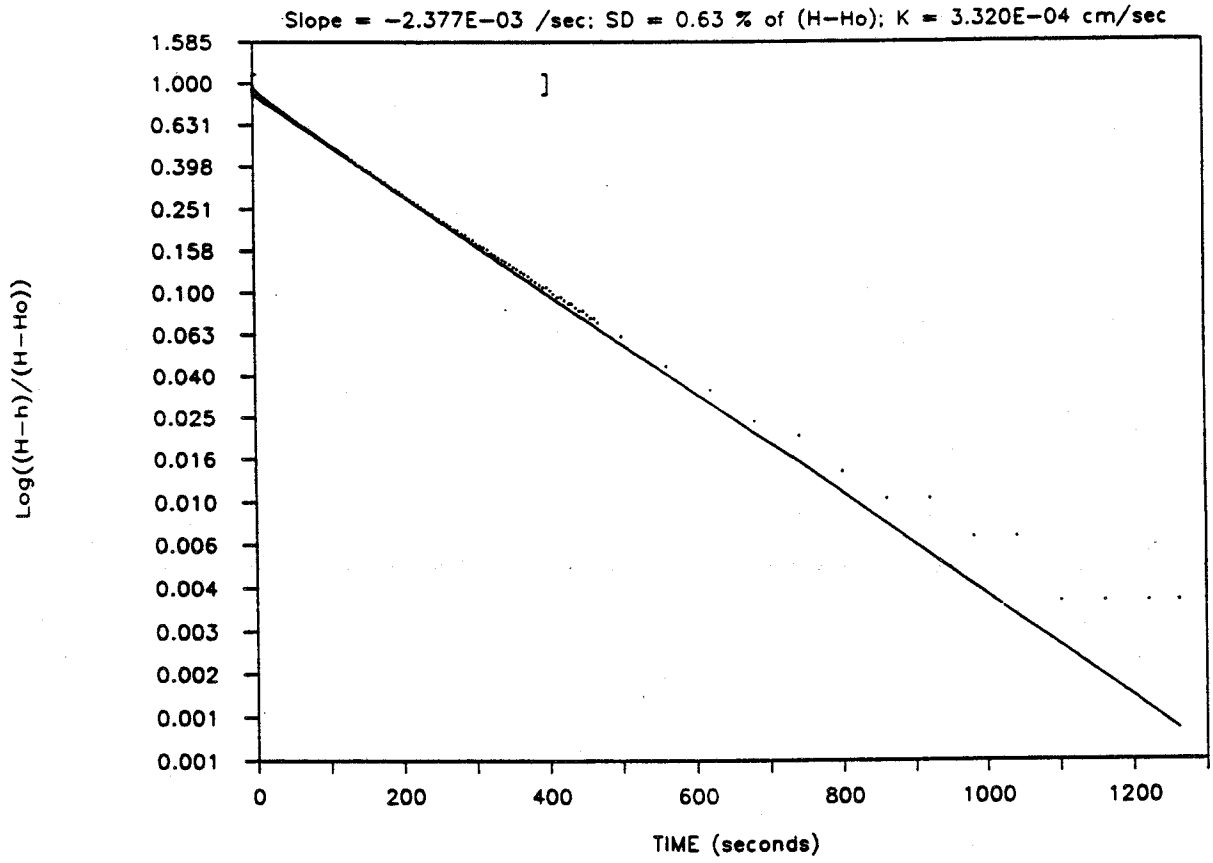
Aquifer Slug Test #2 (Falling Head) at MW-21; 333 data points



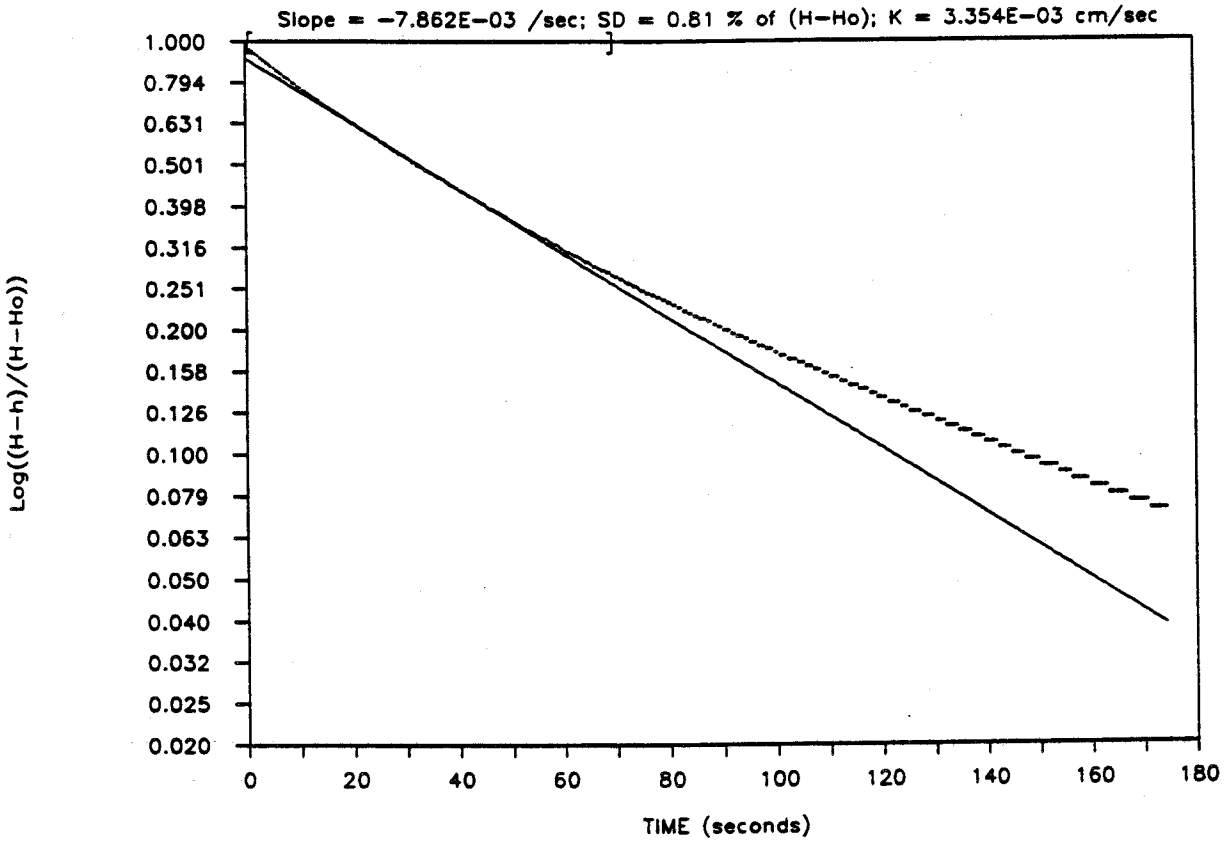
Aquifer Slug Test #1 (Rising Head) at MW-31; 350 data points



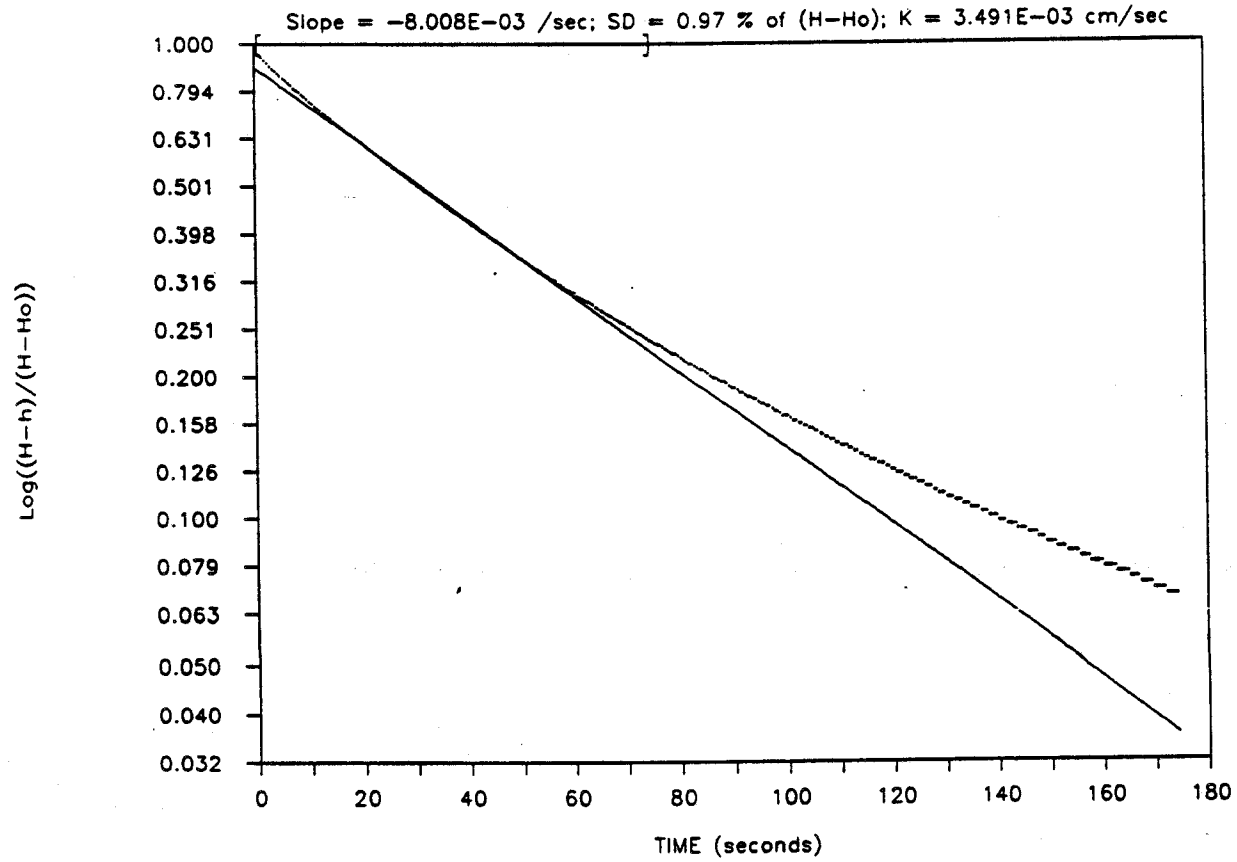
Aquifer Slug Test #2 (Rising Head) at MW-31; 343 data points



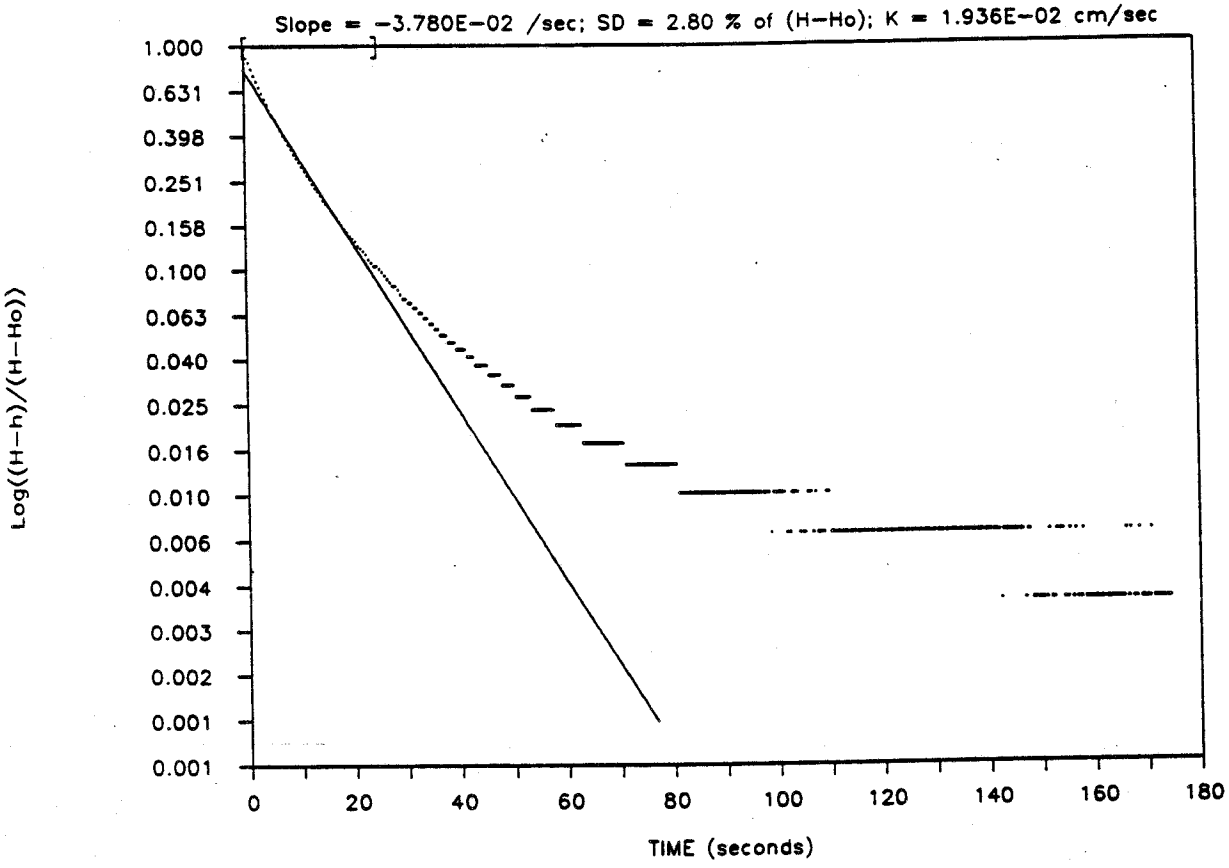
Aquifer Slug Test #1 (Rising Head) at MW-12B; 350 data points



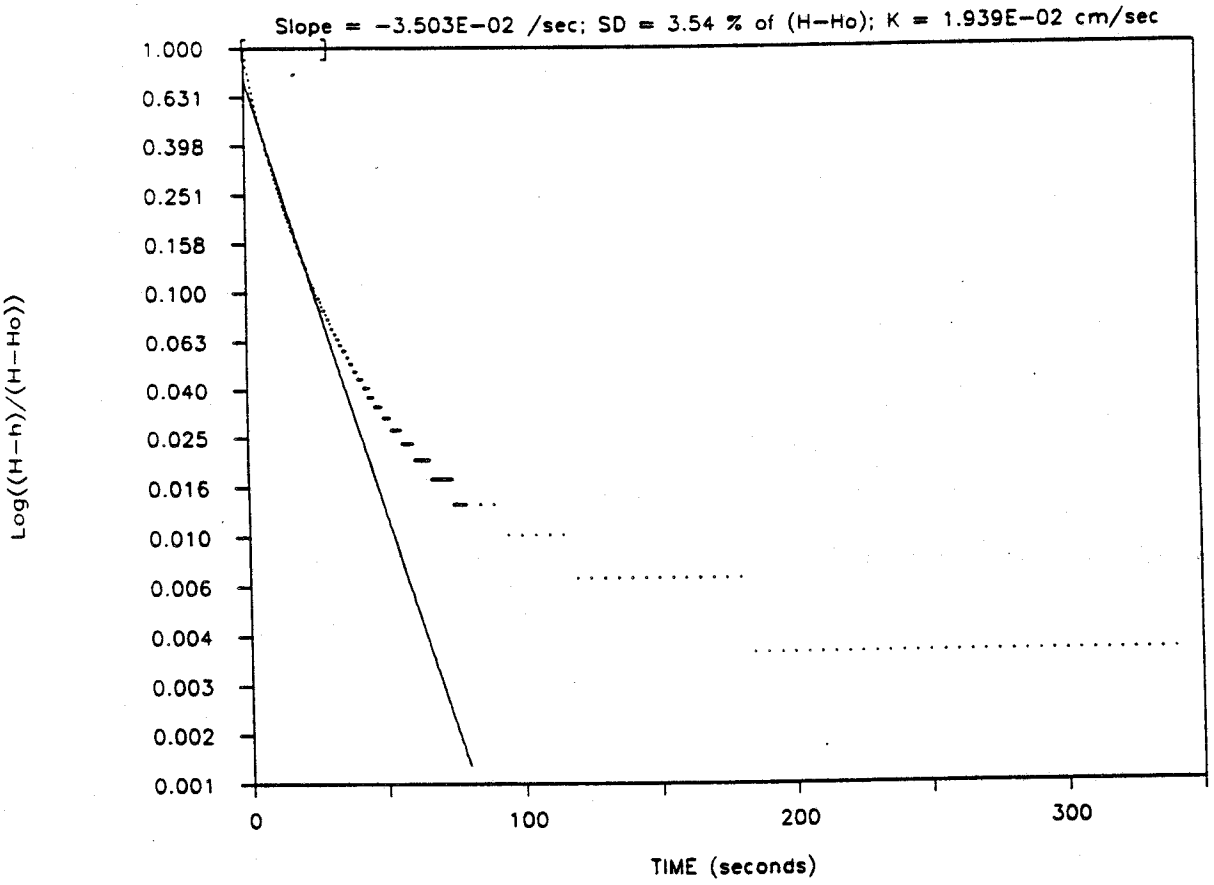
Aquifer Slug Test #2 (Rising Head) at MW-12B; 350 data points



Aquifer Slug Test #1 (Rising Head) at MW-33B; 350 data points



Aquifer Slug Test #2 (Rising Head) at MW-33B; 213 data points



Appendix D

WATER QUALITY ANALYSES

Non-Manufacturing Area

Table D-1
ORGANIC CHEMICAL ANALYSES
KINSTON GROUNDWATER SAMPLES
NOVEMBER 1989

	Method Detection Limit (undiluted)	MW26B	MW32B	MW33B	PW11	PW12	PW13	FD1	FD2
Acid Extractable Organics (AEOs; ug/l)[1]									(Dilution = 12)
Dowtherm A	10	-	-	-	-	26	27	8J	740
2-Methylphenol	10	-	-	-	-	-	-	-	240
4-Methylphenol	10	-	-	-	-	-	-	-	72J
Phenol	10	10	-	21	-	-	-	-	260
2,4,6-Trichlorophenol	10	-	-	-	-	-	-	-	-
Other Organic Compounds or Index									
Ethylene Glycol (ug/l)	250	/	/	/	/	/	/	/	/
Methanol (mg/l)	1	/	/	/	/	/	/	/	/
Triethylene Glycol (ug/l)	250	/	/	/	/	/	/	/	/
Total Organic Carbon (mg/l)	1	1.9	15.5	4.6	10.4	<1.0	2.1	22.5	269

NOTES:
All values in ug/l (ppb) except where indicated.
The method detection limit of diluted analyses equals the dilution factor multiplied by the undiluted method detection limit.
[1]Compounds in this group not listed in this table were below detection limits in all samples. See table for a list of organic compounds analyzed in this group and their detection limits.
"-" = Undetected, below method detection limit.
"/" = Sample not taken or analysis not performed.
"B" = Compound was detected in associated laboratory blank.
"J" = Estimated value. Measured value is less than quantitative detection limit.

Table D-2
ORGANIC CHEMICAL ANALYSES
KINSTON QUALITY CONTROL DATA
NOVEMBER 1989

	TB1	TB2	TB3	TB4A (11/6/89)	TB4B (11/7/89)	TB5	TB6	TB7	TB8	EQ-BLANK (Taken after 17A)
Volatile Organic Compounds (ug/l)[a]										
Acetone	-	-	-	4 BJ	5 BJ	7 BJ	21 BJ	-	60	3 BJ
Methylene Chloride	5 B	8 B	3 BJ	4 BJ	3 BJ	3 BJ	3 BJ	3 BJ	5 J	5 B
Toluene	-	-	-	-	-	-	-	-	-	2 J
Xylenes (Total)	-	-	-	-	-	-	2 J	-	-	-
Total Organic Carbon (mg/l)	/	/	/	/	/	/	/	/	/	453

[a]Compounds in this group not listed in the table were below detection limits in all samples.
See Table B-1 for a list of organic compounds analyzed in this group and their detection limits
"-" = Undetected, below method detection limit
"/" = Not analyzed
"B" = Compound was detected in associated laboratory blank
"J" = Estimated value. Measured value is less than quantitative detection limit

Table D-3
INORGANIC CHEMICAL ANALYSES
KINSTON GROUNDWATER SAMPLES
NOVEMBER 1989

	Calcium (mg/l)	Chloride (mg/l)	Chromium (mg/l)	Iron (mg/l)	Potassium (mg/l)	Magnesium (mg/l)	Manganese (mg/l)	Sodium (mg/l)	Lead (mg/l)	Silicon (mg/l)	Sulfate (mg/l)	Asbestos (% Content)
Detection Limit	5	1	0.010	0.1	2.0	2.0/5.0	0.015	2	0.003	5.0	1.0	5
Sample Location												
MW3	65.5	16	<0.01	53.7	<2.0	13.1	0.302	25.4	<0.003	3.6	9.5	/
MW4	45.2	15	<0.01	76.8	<2.0	11.6	0.234	17.5	<0.003	9.3	<1.0	/
MW5	24.6	3	<0.01	0.425	2.4	<5	0.033	5.4	<0.003	10.6	4.3	/
MW10	7.7	33	<0.07	56.0	<2.0	<2.0	0.028	11.6	<0.003	6.2	7.0	/
MW10 (Dup)	7.8	31	<0.01	56.4	<2.0	<2.0	0.028	11.5	<0.003	5.8	9.2	/
MW11	28.5	1	<0.01	404	4.2	4.6	3.240	72.8	<0.003	27.4	60.7	/
MW12A	24.0	41	<0.01	196	<2.0	5.2	0.437	50.8	<0.003	29.7	67.4	/
MW12B	36.4	6	<0.01	<0.100	11.4	7.6	<0.015	21.8	<0.003	5.9	9.5	/
MW13	15.8	9	<0.01	0.124	<2.0	3.0	<0.015	12.4	<0.003	3.0	35.8	ND
MW14	37.8	26	<0.01	1.334	<2.0	6.0	0.159	91.4	<0.003	5.2	246	ND
MW15	187	63	<0.01	16.3	22.1	33.8	0.426	59.3	<0.003	5.9	8.4	ND
MW16	53.0	39	<0.01	133	<2.0	14.3	0.355	72.7	<0.003	4.5	1.4	ND
MW17A	21.6	35	0.019	237	4.3	4.9	0.622	21.8	<0.003	5.0	31.3	/
MW17B	83.2	9	<0.01	<0.100	11.4	<2.0	<0.015	15.8	<0.003	3.6	11.2	/
MW18	12.7	4	<0.01	<0.100	<2.0	<5	0.030	5.1	<0.003	5.0	18.0	/
MW18 (Dup)	12.8	4	<0.01	0.142	<2.0	<5	0.031	5.2	<0.003	5.7	20.4	/
MW19	12.2	44	<0.01	6.118	<2.0	3.0	0.058	41.7	<0.003	8.2	7.4	/
MW20	7.6	42	<0.01	1.413	4.1	<2.0	0.125	60.6	<0.003	7.2	24.9	/
MW21	21.5	58	<0.01	1.082	5.0	4.3	0.064	66.8	0.005	10.5	123	/
MW22	4.94	56	<0.01	2.136	4.7	<2.0	0.028	88.7	<0.003	5.3	22.1	/
MW23A	4.2	4	<0.01	0.194	<2.0	<2.0	0.016	4.8	<0.003	5.7	20.4	/
MW23B	25.9	4	<0.01	<0.100	9.7	3.9	<0.015	16.9	<0.003	8.2	7.4	/
MW24	14.2	5	0.013	1.065	<2.0	2.5	0.018	6.1	0.005	7.2	24.9	/
MW25	28.8	14	0.013	17.0	2.4	5.0	0.201	26.1	0.003	10.5	123	/
MW26A	5.8	4	<0.01	0.600	<2.0	<5	0.067	4.0	<0.003	5.3	22.1	/
MW26B	26.5	3	<0.01	0.112	8.4	<5	<0.015	13.7	<0.003	13.8	7.1	/
MW27-MW31	/	/	/	/	/	/	/	/	/	/	/	/
MW32B	42.8	4	<0.01	<0.100	6.4	9.8	<0.015	7.2	<0.003	9.5	2.6	/
MW33B	42.1	4	<0.01	<0.100	7.2	7.7	<0.15	10.5	<0.003	8.3	1.6	/

Table D-3
INORGANIC CHEMICAL ANALYSES
KINSTON GROUNDWATER SAMPLES
NOVEMBER 1989

	Calcium (mg/l)	Chloride (mg/l)	Chromium (mg/l)	Iron (mg/l)	Potassium (mg/l)	Magnesium (mg/l)	Manganese (mg/l)	Sodium (mg/l)	Lead (mg/l)	Silicon (mg/l)	Sulfate (mg/l)	Asbestos (% Content)
PW11	44.2	4	<0.01	<0.100	4.9	4.2	<0.015	31.5	<0.003	4.6	<1.0	/
PW12	51.8	5	<0.01	0.304	4.9	5.0	<0.015	13.1	<0.003	4.6	<1.0	/
PW13	55.6	5	<0.01	0.168	4.3	4.5	<0.015	11.6	<0.003	4.4	<1.0	/
FD1	96.9	13	<0.01	8.245	<2.0	8.8	0.136	15.3	<0.003	6.7	25.8	/
FD2	139	58	<0.01	198	18.9	22.6	1.406	91.9	<0.003	8.6	93.4	/

NOTES:
All data in mg/l (ppm) unless otherwise indicated.
"/" = Sample not taken or analysis not performed.
<5 = Below method detection limit shown.
"ND" = Asbestos fibers not detected.

Table D-4
ORGANIC CHEMICAL ANALYSES
KINSTON SURFACE WATER DATA
November 1989 and January 1990

Volatile Organic Compounds[a]	Method Detection Limit (ug/l)	Surface Water (ug/l)														
		SW-1	SW-2	SW-3	SW-4	SW-5	SW-6	SW-7	SW-8	SW-8 (Dup)	SW-9	SW-10	SW-13	SW-14	SW-15	SW-16
Acetone	10	20	48	24	21	13	190	58	62	60	52	7J	10	150	89	1,400
Carbon Disulfide	5	-	-	-	5	7	190	140	11	200	24	-	-	88	300	51
Chlorobenzene	5	-	-	-	-	-	4J	-	-	-	-	-	-	-	-	-
Chloroform	5	-	-	-	-	-	-	-	-	-	-	-	-	-	23	440
1,4-Dioxane	50	-	-	-	-	92	900	40J	140	140	64	-	-	250	180	540
2-Hexanone	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	68J
Methyl Ethyl Ketone	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	98J
Methylene Chloride	5	-	-	-	-	7J	-	-	-	-	-	-	-	-	29	230
Toluene	5	-	-	-	-	-	3J	-	-	-	-	-	-	-	-	-
Acid Extractable Organics[a]																
Dowtherm A	10	-	-	-	-	-	37	-	210	190	-	-	-	6J	3J	120
2-Methylphenol	10	-	-	-	-	-	35	-	-	-	-	-	-	18	18	950
4-Methylphenol	10	-	-	-	-	-	12	-	-	-	-	-	-	-	-	57J
Phenol	10	-	-	-	-	-	8J	-	-	-	-	-	-	-	6J	27J
Total Organic Carbon	1.0 (mg/l)	9.3 (mg/l)	29.3 (mg/l)	13.9 (mg/l)	6.3 (mg/l)	61.8 (mg/l)	82.2 (mg/l)	43.2 (mg/l)	60.1 (mg/l)	16.4 (mg/l)	42.3 (mg/l)	51.6 (mg/l)	63.7 (mg/l)	108 (mg/l)	92.8 (mg/l)	1,160 (mg/l)

[a]Compounds in this group not listed in the table were below detection limits in all samples.
See Table B-1 for a list of organic compounds analyzed in this group and their detection limits
"-" = Undetected, below method detection limit.
"B" = Compound was detected in associated laboratory blank.
"J" = Estimated value. Measured value is less than quantitative detection limit.

Table D-5
ORGANIC CHEMICAL ANALYSES
KINSTON WASTEWATER TREATMENT PLANT AND SEDIMENT DATA
November 1989 and January 1990

Volatile Organic Compounds[a]	Method Detection Limit (ug/l)	Wastewater Treatment Plant (ug/l)			Sediments (ug/kg)			
		NHP	SHP	AB1	SED-1	SED-2	SED-2 (Dup)	SED-3
Acetone	10	45B	100B	-	15B	26B	21B	25B
Carbon Disulfide	5	-	50	-	-	-	-	-
Chloroform	5	3J	-	-	-	-	-	-
1,4-Dioxane	50	120	500	-	-	120	150	99
Methylene Chloride	5	6B	62B	3BJ	17B	35B	39B	28B
Tetrachloroethylene	5	7	-	-	-	-	-	-
Toluene	5	2J	22	-	-	-	-	-
Trichloroethylene	5	5	-	-	-	-	-	-
Acid Extractable Organics[a]								
Dowtherm A	10	27	2,600	-	310J	<500	1,200	5,500
4-Methylphenol	10	-	19	-	-	-	-	-
Phenol	10	-	6J	-	-	-	-	-
Total Organic Carbon	1.0 (mg/l)	111 (mg/l)	134 (mg/l)	45.0 (mg/l)	/	/	/	/

[a]Compounds in this group not listed in the table were below detection limits in all samples.
See Table B-1 for a list of organic compounds analyzed in this group and their detection limits.
"-" = Undetected, below method detection limit.
"B" = Compound was detected in associated laboratory blank.
"J" = Estimated value. Measured value is less than quantitative detection limit.
"/" = Sample not taken or analysis not performed.

Table D-6
INORGANIC CHEMICAL ANALYSES
KINSTON WASTEWATER TREATMENT PLANT, SURFACE WATER AND SEDIMENT DATA
November 1989 and January 1990

	Calcium	Chloride	Chromium	Iron	Potassium	Magnesium	Manganese	Sodium	Lead	Silicon	Sulfate	Alkalinity as $CaCO_3$	TCLP Chromium	TCLP Lead
WASTEWATER TREATMENT PLANT (mg/l)														
ABI (water)	26.2	68	0.253	7.196	23.4	12.7	0.963	101	0.190	7.0	12.2	183	/	/
NHP (water)	7.2	148	0.044	1.228	7.5	<2.0	0.624	238	0.020	5.7	9.8	343	/	/
SHP (water)	12.5	235	0.066	2.931	10.2	<2.0	0.069	166	0.008	6.0	10.1	90	/	/
SBED-1 (sludge)	/	/	/	/	/	/	/	/	/	/	/	/	<0.015	<0.15
NHP-1 (sludge)	/	/	/	/	/	/	/	/	/	/	/	/	0.074	<0.15
SHP-1 (sludge)	/	/	/	/	/	/	/	/	/	/	/	/	0.021	<0.15
SURFACE WATER (mg/l)														
SW1	6.0	18	<0.010	0.597	<5.0	<5.0	0.16	9.1	<0.003	2.9	12.5	/	/	/
SW2	5.7	9	<0.010	0.757	<5.0	<5.0	0.16	9.0	0.004	2.9	9.5	/	/	/
SW3	6.3	9	<0.010	1.594	<5.0	<5.0	0.18	9.3	0.006	3.0	10.8	/	/	/
SW4	5.6	9	<0.010	0.916	<5.0	<5.0	<0.15	8.6	0.003	2.7	10.2	/	/	/
SW5	46.3	33	0.011	0.730	<5.0	10.8	0.107	83.5	<0.003	7.1	206	/	/	/
SW6	69.9	25	<0.010	69.2	6.0	14.5	0.336	55.4	<0.003	6.7	<1.0	74	/	/
SW7	<5	44	0.019	3.988	<5.0	<5.0	0.034	44.3	0.015	7.8	1.8	/	/	/
SW8	31.2	30	<0.010	1.797	<5.0	<5.0	0.087	47.2	<0.003	4.8	10.5	/	/	/
SW8 Dup	29.9	30	<0.010	1.925	<5.0	<5.0	0.084	46.5	<0.003	4.6	11.1	/	/	/
SW9	31.6	21	<0.010	1.831	<5.0	6.6	0.075	25.9	<0.003	5.6	32.7	/	/	/
SW10	22.8	14	<0.010	0.265	<5.0	<5.0	0.027	19.1	0.004	3.6	28.3	/	/	/
SW13	38.9	33	<0.010	0.258	<5.0	15.9	0.022	50.4	<0.003	7.0	20.0	/	/	/
SW14	54.4	25	<0.010	17.5	<5.0	5.8	0.172	28.0	<0.003	7.0	35.9	/	/	/
SW15	137	36	<0.010	373.0	<5.0	21.8	4.556	158	<0.003	9.8	51.8	/	/	/
SW16	46.7	49	<0.010	52.8	<5.0	9.6	0.511	79.4	<0.003	6.3	97.7	/	/	/
SEDIMENT (mg/kg)														
SED-1	344	55.5	11.5	2.496	<281	<281	6.8	<281	6.3	136	<10	1,040	/	/
SED-2	2,180	43.6	61.6	5.933	616	956	35.9	<304	7.4	175	14	2,230	/	/
SED-2 Dup	27,180	780	41.9	6.471	1.329	965	18.6	878	2.8	339	34	914	/	/
SED-3	3,145	1,810	43.3	7.031	1.370	930	10.2	<341	2.4	148	34	1,520	/	/

"/" = Sample not taken or analysis not performed.
<5 = Below method detection limit shown.

Table D-7
PHASE 3 SAMPLING: JULY 1990

		French Drain	Surface Water							Groundwater								
Analysis	Method Detection Limit	FD-2	SW0	SW1	SW2	SW3	SW4	LB1	LB2	MW12B	MW17B	MW23B	MW26B	MW32B	MW33B	PW11	PW12	PW13
Acetone	10	75B	10B	9B	9BJ	10B	9BJ	14B	13B	-	-	-	-	-	-	-	-	-
Benzene	5	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon Disulfide	5	-	-	-	-	-	-	8	2J	-	-	2J	-	-	-	-	-	-
Chloroform	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethylene	5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dioxane	50	2,900	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Ethyl Ketone	10	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl Isobutyl Ketone	10	6J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylene Chloride	10	9B	5B	5B	5B	22B	7B	20B	9B	-	-	-	-	-	-	-	-	-
Trichloroethylene	5	2J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Toluene	5	12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylenes	5	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	5	4J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylbenzene	5	1J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	5	1J	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dowtherm A	10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	10	160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol	10	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	10	210	-	-	-	-	-	-	-	6J	27	38	-	-	-	-	-	-

"J" = Estimated value. Measured value is less than the quantitative detection limit.
"B" = Compound was detected in associated laboratory blank.
<5 = Below quantitative detection limit shown.
"/" = Sample not taken or analysis not performed.

Table D-8
FIELD PARAMETERS FROM MONITORING WELL SAMPLING

Well Number	Date	pH	Eh (mg)	Conductivity (umhos/cm)	Alkalinity (mg/l $CaCO_3$)	Temp (°C)
MW3	June 10-24, 1988	6.7	-27	600	-	19.0
	Nov. 6, 1989	6.4	-115	483	370	18.8
MW4	June 10-24, 1988	5.9	-19	500	-	19.8
	Nov. 2, 1989	5.9	-97	435	220	18.4
MW5	June 1988	8.4	-157	142	-	20.1
	Oct. 31, 1989	7.9	-190	140	73	17.4
MW7	June 1988	6.1	-184	102	-	20.8
MW8	June 1988	7.7	+540	340	-	26.7
MW10	June 1988	6.9	+14	350	-	21.3
	Nov. 6, 1989	5.8	-115	257	115	23.2
MW11	June 1988	6.7	-	1,250	-	22.5
	Nov. 10, 1989	4.6	-40	1,320	41[b]	21.3
MW12A	June 1988	6.1	-38	1,820	-	20.3
	Nov. 9, 1989	5.5	-83	690	94.3[b]	20.1
MW12B	Nov. 8, 1989	7.9	-145	252	184[b]	18.3
	Jul. 25, 1990	7.9	+40	300	-	19.5
MW13	June 1988	5.8	-256	235	-	20.3
	Nov. 7, 1989	5.1	+141	155	33/12[a]	23.4
MW14	June 1988	6.3	-231	800	-	19.2
	Nov. 7, 1989	5.5	+105	610	59	20.7
MW15	June 1988	6.6	-218	1,600	-	19.5
	Nov. 7, 1989	6.7	-92	1,180	1,370/668[a]	21.9
MW16	June 1988	5.9	+68	1,020	-	25.0
	Nov. 7, 1989	6.2	-106	850	1,110/353[a]	21.8
MW17A	June 1988	5.8	+43	1,210	-	21.0
	Nov. 10, 1989	5.5	-119	800	230[b]	22.2

Table D-8
FIELD PARAMETERS FROM MONITORING WELL SAMPLING

Well Number	Date	pH	Eh (mg)	Conductivity (umhos/cm)	Alkalinity (mg/l $CaCO_3$)	Temp (°C)
MW17B	Nov. 7, 1989	11.4/ 11.6[a]	-160	920	500	20.6
	Jul. 24, 1990	10.9	+31	550	-	25.0
MW18	June 1988	5.5	-117	110	-	17.9
	Oct. 31, 1989	5.4	+207	100	1	19.3
MW19	June 1988	5.6	+159	338	-	18.8
	Nov. 1, 1989	4.7	+87	290	0	19.4
MW20	June 1988	6.7	-218	300	-	20.0
	Nov. 1, 1989	6.4	-64	280	6	19.4
MW21	Nov. 2, 1989	6.1	+151	362	97	17.8
MW22	Nov. 1, 1989	6.7	-123	474	188	20.4
MW23A	Nov. 3, 1989	4.8	+184	49	0	16.5
MW23B	Nov. 3, 1989	8.5	+82	200	123	18.0
	July 26, 1990	6.2	+65	265	-	17.0
MW24	Nov. 6, 1989	5.4	+181	122	16	19.3
MW25	Nov. 1, 1989	6.0	-7	261	32[b]	20.9
MW26A	Oct. 31, 1989	4.1	+335	82	0	21.3
MW26B	Oct. 31, 1989	9.5/ 8.8[a]	-145	170	180	18.2
	Jul. 24, 1990	8.1	+69	275	-	20.0
MW32B	Nov. 3, 1989	7.7	+82	249	173	18.6
	Jul. 24, 1990	7.8	+193	310	-	23.0
MW33B	Nov. 3, 1989	7.8	-48	248	161	18.4
	Jul. 24, 1990	8.0	-14	285	-	18.5

[a]11.4/11.6 = Field Measurement/Lab Measurement
[b]Measurement made in the lab
Dash (-) indicates sample not analyzed for that constituent
Eh measurement is an uncorrected field measurement

Appendix E

MANUFACTURING AREA INVESTIGATION

CH2M HILL Data

FIELD EXPLORATORY BORING LOG

Field location of boring: NEXT TO PRODUCTION WELL No. 2

PROJECT No. 400962 DATE 12-10-91
CLIENT DU PONT KINSTON FACILITY
LOCATION KINSTON, NORTH CAROLINA
LOGGED BY R.L. & J.L. DRILLER ATEC

BORING No. MW-42
Sheet 1 of 1

Casing installation data SEE MONITORING WELL DETAIL SHEET

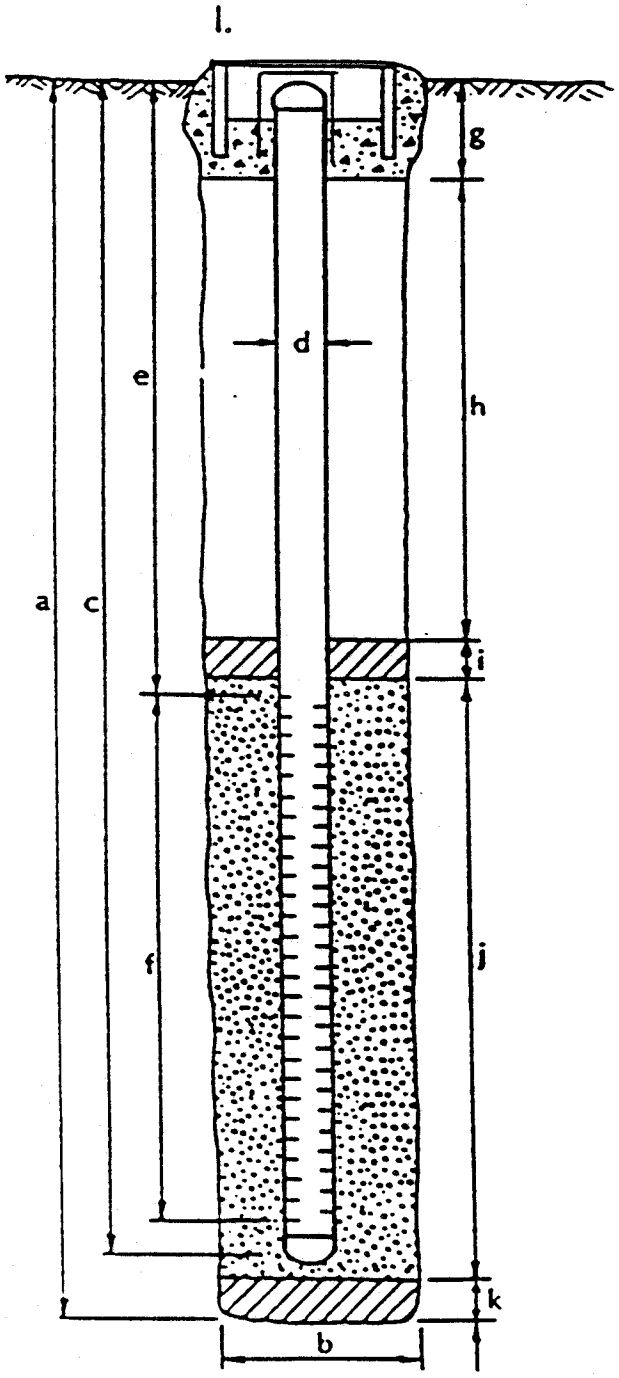
Drilling method HOLLOW STEM AUGER Hole dia. 8-INCH

PID READING (ppm)	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth ft	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
							Water level / Time / Date
		CUTTINGS		2		SP	POORLY GRADED SAND - FINE-GRAINED SAND, LIGHT BROWN TO TAN, DRY
				4			
0	5/8/8/9	SPLIT SPOON		6	X	CL	SANDY CLAY - VERY FINE-GRAINED SAND, MOTTLED GRAY, RED, AND BROWN, DRY, STIFF
				8			
0	3/3/3/4	SPLIT SPOON		10	X		SANDY CLAY - VERY FINE-GRAINED SAND, BROWN TO GRAY, MOIST, MEDIUM STIFF
				12	X		
				14			
0	3/2/2/5	SPLIT SPOON		16	X		AS ABOVE
					X	SC	CLAYEY SAND - FINE-GRAINED SAND, BLACK, WET, LOOSE
				18			
				20	X		
0	7/7/21 50-2"	SPLIT SPOON		22	X		AS ABOVE, WITH MINOR SILT FRACTION, MEDIUM DENSE
							DARK GRAY MUDSTONE, HARD
							BORING TERMINATED AT 22 ft.

REMARKS:

Monitoring Well Detail

PROJECT NUMBER 400962 BORING / WELL NO. MW-42
PROJECT NAME DuPont Kinston Facility TOP OF CASING ELEV. _____
COUNTY Lenoir GROUND SURFACE ELEV. _____
WELL PERMIT NO. 53-0039-WM-0122 DATUM _____



EXPLORATORY BORING

a. Total depth 22 ft.
b. Diameter 8 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Casing length 22 ft.
Material SCH 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 12 ft.
f. Perforated length 10 ft.
Perforated interval from 12 to 22 ft.
Perforation type Factory Machine Slot
Perforation size 0.01 inch
g. Surface seal 1 ft.
Seal material Cement Grout
h. Backfill 9 ft.
Backfill material Cement Grout
i. Seal 1 ft.
Seal material Bentonite
j. Gravel pack 11 ft.
Pack material Torpedo Sand
k. Bottom seal _____ ft.
Seal material _____
l. Monument Casing with cement pad.

FIELD EXPLORATORY BORING LOG

Field location of boring: IN WOODS, MIDWAY BETWEEN MW-37 AND THE PIEZOMETER ON UPTHROWN SIDE OF FAULT

PROJECT No. 400962 DATE 12-11-91
CLIENT DuPont Kinston Facility
LOCATION Kinston, North Carolina
LOGGED BY J. L. DRILLER ATEC

BORING No. MW-43
Sheet 1 of 1

Casing installation data SEE MONITORING WELL DETAIL SHEET

Drilling method Hollow-Stem Auger 8-inch Hole dia.

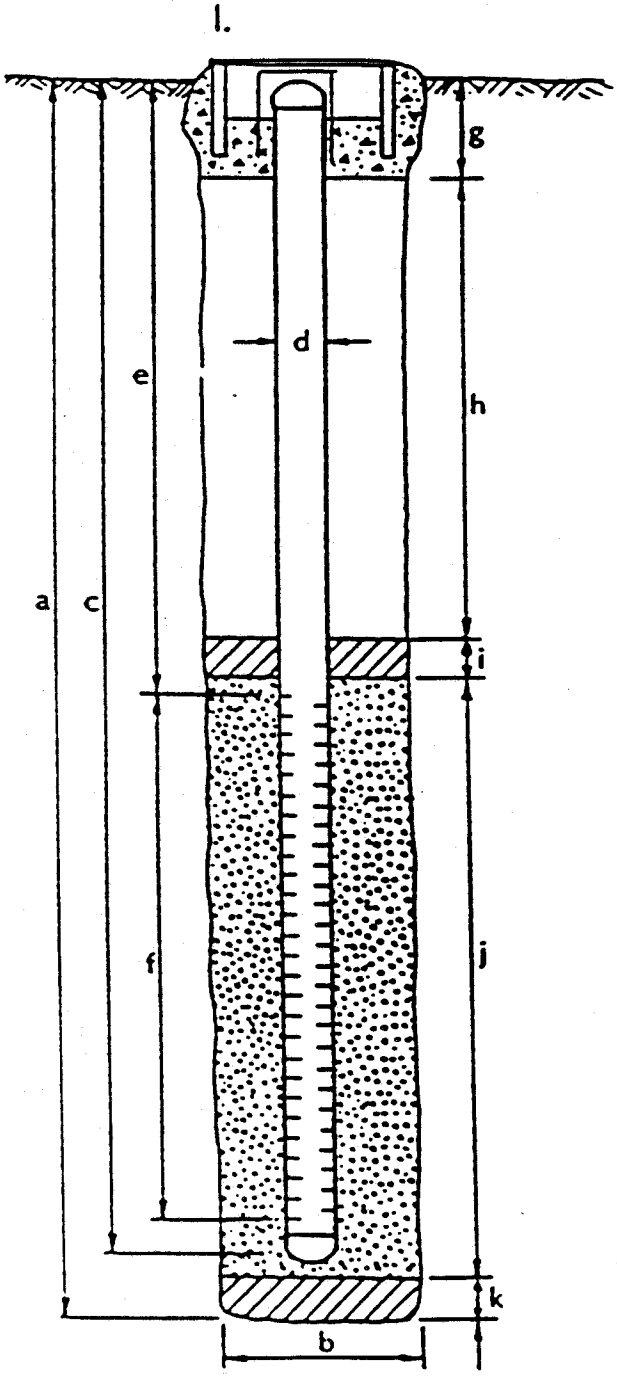
	PID READING (ppm)	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
Water level								
Time								
Date								
			CUTTINGS		2		CL	SILTY CLAY - LIGHT BROWN, DRY
			CUTTINGS		4		SP	POORLY GRADED SAND - FINE-GRAINED SAND, LIGHT BROWN, DRY
	0	7/8/9	SPLIT		6	X	CL	SILTY CLAY - MOTTLED TAN AND GRAY, DRY, VERY STIFF
		12	SPOON		8	X		MUDSTONE, BLACK, HARD
								BORING TERMINATED AT 8.5ft.

REMARKS:

Monitoring Well Detail

PROJECT NUMBER 400962
PROJECT NAME DuPont Kinston Facility
COUNTY Lenoir
WELL PERMIT NO. 53-0039-WM-0122

BORING / WELL NO. MW-43
TOP OF CASING ELEV. _____
GROUND SURFACE ELEV. _____
DATUM _____



EXPLORATORY BORING

a. Total depth 8.5 ft.
b. Diameter 8 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Casing length 8.5 ft.
Material SCH 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 6.5 ft.
f. Perforated length 2 ft.
Perforated interval from 6.5 to 8.5 ft.
Perforation type Factory Machine Slot
Perforation size 0.01 inch
g. Surface seal 1 ft.
Seal material Cement Grout
h. Backfill 3.5 ft.
Backfill material Cement Grout
i. Seal 1 ft.
Seal material Bentonite
j. Gravel pack 3 ft.
Pack material Torpedo Sand
k. Bottom seal ____ ft.
Seal material _____
l. Monument Casing with Cement Pad

FIELD EXPLORATORY BORING LOG

Field location of boring: ON THE NORTH-EAST CORNER OF WAREHOUSE NO. 2

PROJECT No. 400962 DATE 12-11-91
CLIENT DuPont Kinston Facility
LOCATION Kinston, North Carolina
LOGGED BY J.L. DRILLER ATEC

BORING No. MW-44
Sheet 1 of 1

Casing installation data See Monitoring Well Detail Sheet

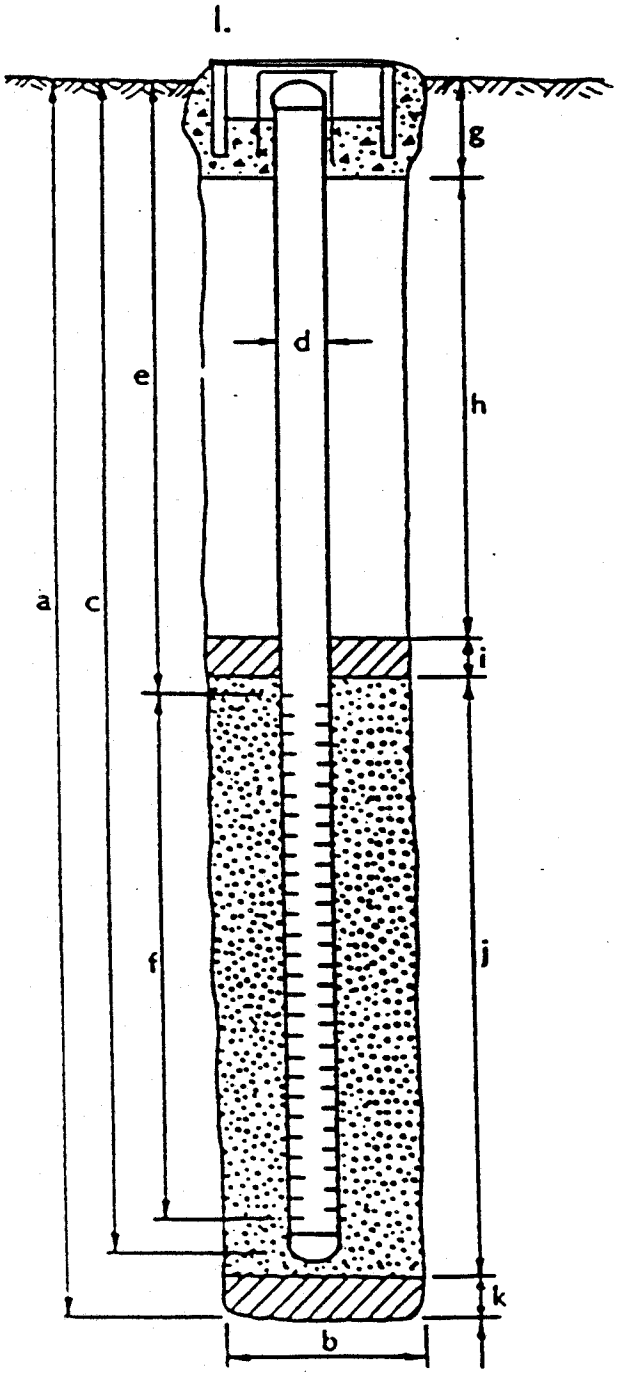
Drilling method Hollow-Stem Auger 8-inch Hole dia.

PID READING (ppm)	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
							Water level
							Time
							Date
		CUTTINGS		2			GRAVEL FILL
				4		CL	SILTY CLAY - LIGHT TO REDDISH BROWN, DRY
0	5/5/7	SPLIT		6	X	SC	CLAYEY SAND - COARSE TO MEDIUM-GRAINED SAND, TAN, DRY, LOOSE
	9	SPOON			X		
0		SPLIT		8	X	CL	CLAY - MOTTLED BROWN, RED, AND GRAY, DRY
0		SPOON		10	X		MUDSTONE, BLACK, HARD
				12			BORING TERMINATED AT 10.5 ft

REMARKS:

Monitoring Well Detail

PROJECT NUMBER 400962 BORING / WELL NO. MW-44
PROJECT NAME DuPont Kinston Facility TOP OF CASING ELEV. ____
COUNTY Lenoir GROUND SURFACE ELEV. ____
WELL PERMIT NO. 53-0039-WM-0122 DATUM ____



EXPLORATORY BORING

a. Total depth 10.5 ft.
b. Diameter 8 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Casing length 10.5 ft.
Material SCH 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 6.5 ft.
f. Perforated length 4 ft.
Perforated interval from 6.5 to 10.5 ft.
Perforation type Factory Machine Slot
Perforation size 0.01 inch
g. Surface seal 1 ft.
Seal material Cement Grout
h. Backfill 3.5 ft.
Backfill material Cement Grout
i. Seal 1 ft.
Seal material Bentonite
j. Gravel pack 5 ft.
Pack material Torpedo Sand
k. Bottom seal ____ ft.
Seal material ____
l. Watertight, traffic-rated, flush mount cover

FIELD EXPLORATORY BORING LOG

Field location of boring: BETWEEN WAREHOUSE AND TANKER TRUCK WASH PAD.

PROJECT No. 400962 DATE 12-11-91
CLIENT DuPont Kinston Facility
LOCATION Kinston, North Carolina
LOGGED BY J.L. DRILLER AIEC

BORING No. MW-45
Sheet 1 of 1

Casing installation data SEE MONITORING WELL DETAIL SHEET

Drilling method Hollow-Stem Auger 8-inch Hole dia.

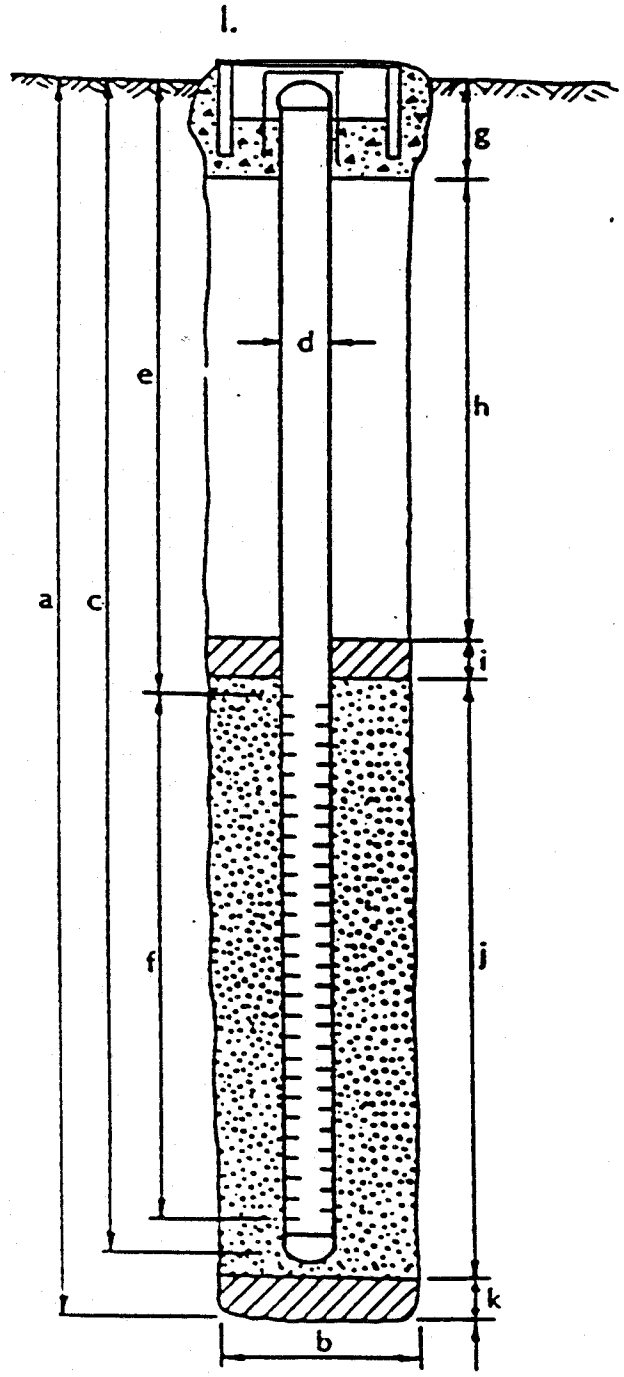
	PID READING (ppm)	Blows/ft. or Pressure PSI	Type of Sample	Sample Number	Depth	Sample	Soil Group Symbol (U.S.C.S.)	DESCRIPTION
Water level								
Time								
Date								
			CUTTINGS		2		SC	CLAYEY SAND - DARK BROWN, DRY
	0	9/10/10/9	SPLIT SPOON		4	X		CLAYEY SAND - DARK BROWN, DRY
					6	X	SP	POORLY GRADED SAND - DARK BROWN, DRY, MEDIUM DENSE
					8			FILL? WOOD FRAGMENTS
	3.5	12/15/17/13	SPLIT SPOON		10	X		FILL, DARK BROWN CLAYEY SAND MIXED IN WITH WOOD FRAGMENTS
					12			
					14			MUDSTONE, BLACK, HARD
								BORING TERMINATED AT 14 ft

REMARKS:

Monitoring Well Detail

PROJECT NUMBER 400962
PROJECT NAME DuPont Kinston Facility
COUNTY Lenoir
WELL PERMIT NO. 53-0039-WM-0122

BORING / WELL NO. MW-45
TOP OF CASING ELEV. _____
GROUND SURFACE ELEV. _____
DATUM _____



EXPLORATORY BORING

a. Total depth 14 ft.
b. Diameter 8 in.
Drilling method Hollow Stem Auger

WELL CONSTRUCTION

c. Casing length 14 ft.
Material SCH 40 PVC
d. Diameter 2 in.
e. Depth to top perforations 7 ft.
f. Perforated length 7 ft.
Perforated interval from 7 to 14 ft.
Perforation type Factory Machine Slot
Perforation size 0.01-inch
g. Surface seal 1 ft.
Seal material Cement Grout
h. Backfill 4 ft.
Backfill material Cement Grout
i. Seal 1 ft.
Seal material Bentonite
j. Gravel pack 8 ft.
Pack material Torpedo Sand
k. Bottom seal ____ ft.
Seal material _____
l. Monument Casing with Cement Pad.

Appendix F

PHASE 3—SOURCE CHARACTERIZATION INVESTIGATION

Appendix F

Phase 3—Source Characterization Investigation

Scope of Activities

The Phase 3 source characterization sampling entailed the collection and analyses of soil, sediment, and groundwater samples from within and around potential sources of groundwater contamination in the non-manufacturing area on the southeast side of the plant. The purpose of the sampling program was to characterize the soil, groundwater, and waste in and adjacent to these units.

The source characterization sampling focused on eleven areas:

- WMU 1—glycol pits
- WMU 2—south finish oil pits
- WMU 3—north finish oil pits
- WMU 5—closed ash landfill
- WMU 7—residue landfill and burning pits
- WMU 10—active ash landfill
- WMU 14—former leachate pond
- Area south of holding pond (part of WMU-16)
- South holding pond (part of WMU-16)
- North holding pond (part of WMU-16)
- Stormwater discharge channel

The field work consisted of the installation of 18 soil borings from which 27 grab samples were collected. In general, two samples were collected from each boring installed at WMUs 1, 2, and 3. The upper sample was obtained in the unsaturated zone just above the water table. The lower sample was collected in the saturated zone.

Only one sample was collected from each of the borings installed at WMUs 7 and 14 and the southwest corner of the wastewater treatment plant. This sample was collected at the water table. In addition, seven composite samples were obtained from the unsaturated soil/ash at WMUs 1, 2, 3, 5, and 10 (one each) and WMU-7 (two). Three sediment samples were collected from the plants stormwater discharge channel and two soil samples were taken from each of the two wastewater treatment plant holding ponds. Soil sampling locations are shown in Figure F-1. The groundwater investigation focused on characterizing groundwater contamination around the perimeters of two general source areas: the north pits area and the south pits and landfill area. Field activities included the installation of six piezometers and the collection of groundwater samples from three of these piezometers and six existing monitoring wells. Thirteen groundwater samples were also collected from Geoprobe sampling locations. One additional Geoprobe location, GP-4, did not yield any water. Monitoring well, piezometer, and Geoprobe sampling locations are shown in Figure F-2.

A total of 41 soil and sediment samples and 22 groundwater samples were submitted for chemical analyses. The analyses performed on each of the soil and groundwater samples are identified respectively in Tables F-1 and F-2.

Analytical Results—Soil and Sediment

WMU-1: Glycol Pits

Soil samples collected from within WMU-1 were found to contain 19 different VOCs. Most of these compounds and the highest concentration at WMU-1 were found in the two samples collected from boring SB-8. The most prominent of these compounds were methylene chloride (maximum concentration of 4,000 ppm) acetone (180 ppm), chloroform (7,000 ppm), trichloroethylene (68 ppm), tetrachloroethylene (640 ppm), 1,1,1-trichloroethane (990 ppm), and 1,4-dioxane (450 ppm). The number and

concentration of VOCs detected in soil samples from the other borings of this unit were significantly lower, with maximum total VOC concentrations below 65 mg/kg.

Four semi-volatile, acid extractable organic compounds (AEOs) were found in the samples, including Dowtherm A which was detected in all samples at concentrations ranging from 0.13 to 3,500 ppm. Ethylene glycol was also found in all samples ranging from 14 to 1,700 ppm. Oil and grease concentrations ranged from 2.7 to 166,000 ppm TCLP analyses on a composite sample from the unsaturated zone of WMU 1 detected only 1 VOC, chloroform, at 81 ppb and one metal, barium, at 1,030 ppb.

Organic chemical analytical results are summarized in Table F-3. TCPL results are summarized in Table F-9.

WMU-2: South Finish Oil Pits

Soil samples from WMU-2 were found to contain 20 different VOCs with total concentrations ranging from 0.1 ppm to 4.1 ppm. The most prevalent of these compounds were methylene chloride and acetone, which were also found in laboratory blanks. Dowtherm A, an AEO, was found in 8 of the 10 samples at concentrations ranging from 0.12 ppm to 54 ppm. Ethylene glycol was found in 6 of 10 samples, and triethylene glycol was found in 2 of 10 samples. Oil and grease concentrations ranged from 5 ppm to 43,400 ppm. TCLP analyses on a composite sample of ash from the unsaturated zone of WMU-2 detected two VOCs (chloroform at 23 ppb and tetra-chloroethylene at 10 ppb) and one metal (barium at 773 ppb). Organic chemical analysis results for WMU-2 samples are summarized in Tables F-4a and F-4b. TCLP results are summarized in Table F-9.

WMU-3: North Finish Oil Pits

Soil samples from WMU-3 contained 20 different VOCs with total concentrations ranging from 0.048 ppm to 9 ppm. The most prevalent compounds were methylene chloride, acetone, chloroform, and tetrachloroethylene. Four AEOs were detected in the samples. Most notable was Dowtherm A which was detected in all six samples at concentrations ranging from 0.36 ppb to 8.3 ppm. Ethylene glycol was found in 4 of 6 samples. Oil and grease concentrations ranged from less than 2.1 ppm to 30,000 ppm. TCLP analyses on the ash from the unsaturated zone of WMU-3 detected two VOCs (chloroform at 106 ppb and tetrachloroethylene at 23 ppb), two AEOs (Dowtherm A of 480 ppb and total cresol at 130 ppb), and two metals (barium at 729 ppb and chromium at 14 ppb). Table F-5 summarizes the total organic analysis results for WMU-3. TCLP results are presented in Table F-9.

WMU-5: Closed Ash Landfill

Composite samples of the ash from WMU-5 were analyzed for TCLP metals. Barium was the only metal found above the detection level at a concentration of 870 ppb Analytical results are summarized in Table F-9.

WMU-7: Residue Landfill and Burning Pits

Soil samples collected from the unsaturated zone at WMU-7 were analyzed for AEOs and priority pollutant metals. Five different AEOs were detected in these samples. Among these were benzoic acid, detected in three of four samples ranging from 0.63 ppm to 24 ppm, and Dowtherm A, detected in three of the four samples ranging from 5.7 ppm to 50 ppm. A summary of the organic analytical results is presented in Table F-6. Inorganic analytical results are summarized in Table F-10.

WMU-10: Active Ash Landfill

TCLP metals analyses on a composite sample of the ash from WMU-10 detected barium at 499 ppb, cadmium at 7 ppb, and chromium at 15 ppb. Analytical results are summarized in Table F-9.

WMU-14: Former Leachate Pond

Soil samples collected from the capillary fringe in the area of WMU-14 were found to contain eight different VOCs. Only four of these compounds were found in concentrations greater than 5 ppb. Methylene chloride (110 ppb and 210 ppb) and acetone (44 ppb and 86 ppb) were found in both samples as well as laboratory blanks. 2-Butanone (15 ppb) and 1,4-dioxene (96 ppb) were also found in SB-16. No AEOs were detected in any samples. Analytical results for WMU-14 are summarized in Table F-6.

Area South of Holding Ponds

Soil samples collected from the capillary fringe at borings SB-4 and SB-5 were found to contain seven different VOCs. Only methylene chloride (48 ppb and 260 ppb) and acetone (20 ppb and 52 ppb) were found at concentrations above 3 ppb. These two compounds were also found in corresponding laboratory blanks. No AEOs were detected in either sample. Table F-6 summarizes analytical results from these samples.

North and South Holding Ponds

Sediment samples collected from the north and south holding ponds contained 13 different VOCs ranging in total concentrations from 34 ppm to 83 ppm. The most prevalent compound is 1,4-dioxane which ranges in concentration from 32 ppm to 78 ppm. Dowtherm A, an AEO, was detected in 3 of the 4 samples at concentrations

ranging from 330 ppm to 89,000 ppm. Table F-8 summarizes the analytical results for these samples.

Stormwater Discharge Channel

A total of eight different VOCs were detected in at least one of the three sediment samples collected from the stormwater discharge channel. Total VOC concentrations ranged from 0.16 ppm to 3.5 ppm. The most prevalent compounds were methylene chloride, which was also detected in associated laboratory blanks, and 1,4-dioxane. A total of four AEO compounds were detected in the samples. Only Dowtherm A was found in all three samples with concentrations ranging from 0.09 ppm to 5 ppm. All other compounds in total were detected at approximately 1 ppm. In general, concentrations of VOCs and AEO increased in the downstream direction. Analytical results for these samples are presented in Table F-7.

Analytical Results—Groundwater

Chemical analyses on 12 groundwater samples collected from monitoring wells, piezometers, and Geoprobe samples around the WMUs 1, 2, 4, 5, 7, and 10 detected 16 different VOCs. The most prevalent compounds were methylene chloride, acetone, chloroform, tetrahydrofuran, and 1,4-dioxane. The greatest total concentration of VOCs was found in PZ-3, adjacent to the southwest side of the south finish oil pits. PZ-3 contained 77,000 ppb total VOCs including 38,000 ppb methylene chloride, and 29,000 ppb chloroform. The average total VOCs in the other 11 samples was approximately 2,500 ppb. The only AEO detected with any regularity were 2-methylphenol, which was found in 3 of 9 samples at concentrations ranging from 590 ppb to 2,300 ppb, and Dowtherm A, found in 5 of 9 samples at concentrations ranging from 15 ppb to 100 ppb. Oil and grease concentrations ranged from 0.11 ppb to 659 ppb.

Ten groundwater samples were collected from the monitoring wells, piezometers, and Geoprobe borings around the WMU 3 area. The most prevalent compounds detected were 1,4-dioxane, found in 7 of 10 samples, acetone (6 of 10), 2-butanone (6 of 10), methylene chloride (6 of 10), and chloroform (5 of 10). The greatest concentrations of total VOCs were 27,000 ppb found in MW-11, 10,000 ppb in GP-1, 7,900 ppb in GP-MW11, and 4,400 ppb in GP-2.

2-Methylphenol was detected in three of the six samples analyzed for AEOs. Phenol and Dowtherm A were found in two of the six samples. Oil and grease concentrations ranged from 0.10 ppm in MW-4 to 86.8 ppm in MW-11. Tables F-11 and F-12 summarize all the analytical results for the Geoprobe samples and the monitoring well/ piezometer samples, respectively.

WDCR617/027.51

Table F-1
KINSTON CHEMICAL ANALYTICAL PROTOCOL
PHASE 3 SOURCE CHARACTERIZATION
SOIL AND SEDIMENT SAMPLING

	VOCs	AEOs	Metals	Glycols	Oil and Grease
WMU 1: Glycol Pits					
SB-8A, SB-8B, SB-9A, SB-9B, SB-22B	X	X		X	X
1-Ash (composite)	X (TCLP)	X (TCLP)	X (TCLP)		
WMU 2: South Pits					
SB-14A, SB-14B, SB-15A, SB-15B, SB-18A, SB-18B, SB-19A, SB-19B, SB-20A, SB-20B	X	X		X	X
2-Ash (Composite)	X (TCLP)	X (TCLP)	X (TCLP)		
WMU 3: North Pits					
SB-1A, SB-1B, SB-2A, SB-2B, SB-3A, SB-3B	X	X		X	X
3-Ash (Composite)	X (TCLP)	X (TCLP)	X (TCLP)		
WMU 5: Closed Ash Landfill					
5-Soil (Composite)			X (TCLP)		
WMU 7: Burning Pits and Residue Landfill					
SB-6, SB-7, 7BP-1 (Composite) 7BP-2 (Composite)		X	X		
WMU 10: Active Ash Landfill					
10-Soil (Composite)			X (TCLP)		
WMU 14: Former Leachate Pond					
SB-16, SB-17	X	X			
Wastewater Treatment Plant					
SB-4, SB-5	X	X			
South Holding Pond					
16 SLG-1, 16 SLG-2	X	X			
North Holding Pond					
17 SLG-1, 17 SLG-2	X	X			
Stormwater Channel					
12 SED-1, 12 SED-2, 12 SED-3	X	X			

VOC = Volatile organic compounds
AEO = Acid extractable organic compounds
TCLP = Toxicity characteristic leaching procedures

Table F-2
KINSTON CHEMICAL ANALYTICAL PROTOCOL
PHASE 3 SOURCE CHARACTERIZATION
GROUNDWATER SAMPLING

	VOCs	AEOs	Glycols	Oil and Grease	BOD, COD	Alkalinity, Dissolved Ca, Fe, Mg
Monitoring Wells and Piezometers						
MW-4, MW-10, MW-11, MW-12A, MW-15,MW-16, PZ-1, PZ-2, PZ-3	X	X	X	X	X	X
Geoprobe Samples						
GP-1, GP-2, GP-5, GP-6, GP-9, GP-11, GPMW-11	X					
GP-3, GP-10, GP-12, GP-13	X	X				
GP-7, GP-8	X	X	X	X	X	X

VOC = Volatile organic compounds
AEO = Acid extractable organic compounds
BOD = 5-day biochemical oxygen demand
COD = Chemical oxygen demand

TABLE F-3
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU-1 : Glycol Pits
[Soil Boring Number (Depth)]

Volatile Organic Compounds (VOCs) (ug/kg)	Method Detection Limit (undiluted)		SB-8A (10-12')	SB-8A DL (10-12')	SB-8B (17-19')	SB-8B DL (17-19')	SB-9A (8-11.5')	SB-9B (17.5-19')	SB-22B (12.5-14')
Concentration	Low	Med	Med	Med	Med	Med	Low	Low	Med
Dilution Factor	1.0	1.0	32	200	1.0	5.0	2.0	1.0	2.0
Percent Moisture	0.0	0.0	34.0	34.0	25.0	25.0	34.0	15.0	21.0
Chloromethane	10	1200	-	-	-	-	-	-	-
Bromomethane	10	1200	-	-	-	-	-	-	-
Vinyl chloride	10	1200	-	-	-	-	-	-	-
Chloroethane	10	1200	-	-	-	-	-	-	-
Methylene chloride	5	620	5.5E6 BE	4.1E6 B	120000 BE	120000 B	120 B	50 B	37000 B
Acetone	10	1200	82000 B	180000 BJ	4400 B	6100 BJ	160 B	100 B	24000 B
Carbon disulfide	5	620	-	-	440 J	-	-	6	-
Trichlorofluoromethane	5	620	360000	170000 J	1700	3900 J	-	-	-
1,1-Dichloroethene	5	620	67000	67000	1100	960 J	-	-	-
1,1-Dichloroethane	5	620	63000	43000 J	380 J	-	-	-	-
1,2-Dichloroethene (total)	5	620	-	-	-	-	-	-	1700
Chloroform	5	620	5.3E6 BE	7.0E6 B	95000 BE	160000 B	-	1 J	490 J
1,2-Dichloroethane	5	620	-	-	-	-	-	-	-
2-Butanone	10	1200	-	-	-	-	-	-	-
1,1,1-Trichloroethane	5	620	1.6E6 E	990000	22000	25000	-	-	-
Carbon tetrachloride	5	620	82000	47000 J	4400	4300	-	-	-
Vinyl acetate	10	1200	-	-	-	-	-	-	-
Bromodichloromethane	5	620	-	-	-	-	-	-	-
1,2-Dichloropropane	5	620	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	5	620	-	-	-	-	-	-	-
Trichloroethene	5	620	160000	68000 J	1400	2900 J	-	-	520 J
Dibromochloromethane	5	620	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	620	-	-	-	-	-	-	-
Benzene	5	620	21000 J	-	230 J	-	-	-	-
trans-1,3-Dichloropropene	5	620	-	-	-	-	-	-	-
2-Chloroethylvinylether	10	1200	-	-	-	-	-	-	-
Bromoform	5	620	-	-	-	-	-	-	-
2-Hexanone	10	1200	-	-	-	-	-	-	- B
4-Methyl-2-pentanone	10	1200	73000	-	1400 J	-	10 J	6 J	-
Tetrachloroethene	5	620	1.4E6 E	640000	28000	44000	-	-	-
1,1,2,2-Tetrachloroethane	5	620	40000 B	- B	660 BJ	1200 BJ	-	-	-
Toluene	5	620	150000	78000 J	1800	2900 J	4 J	-	-
Chlorobenzene	5	620	30000 J	-	520 J	860 J	-	-	-
Ethylbenzene	5	620	10000 J	-	190 J	-	-	-	-
Styrene	5	620	-	-	-	-	-	-	-
Xylenes (total)	5	620	67000	-	1300	2000 J	7 J	6	-
1,3-Dichlorobenzene	5	620	-	-	-	-	-	-	-
1,4-Dichlorobenzene	5	620	-	-	-	-	-	-	-
1,2-Dichlorobenzene	5	620	-	-	-	-	-	-	-
Tetrahydrofuran	5	620	-	-	-	-	1800	53	-
Acrolein	100	12000	-	-	-	-	-	-	-
Iodomethane	10	1200	-	-	-	-	-	-	-

TABLE F-3
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU-1 : Glycol Pits
[Soil Boring Number (Depth)]

	Method Detection Limit (undiluted)		SB-8A (10-12')	SB-8A DL (10-12')	SB-8B (17-19')	SB-8B DL (17-19')	SB-9A (8-11.5')	SB-9B (17.5-19')	SB-22B (12.5-14')
Acrylonitrile	100	12000	- B	- B	- B	- B	-	-	-
Dibromomethane	5	620	-	-	-	-	-	-	-
Ethyl methacrylate	5	620	- B	- B	- B	- B	-	-	-
1,2,3-Trichloropropane	5	620	- B	- B	- B	- B	-	-	-
trans-1,4-Dichloro-2-butene	5	620	-	-	-	-	-	-	-
1,4-Dioxane	50	25000 ?	450000 J	-	-	-	940	-	-
Acid Extractable Organics (AEs)(ug/kg)									
Dilution Factor	1.0		40	300	25		1200	1.0	1.0
Percent Moisture	0.0		34.0	34.0	25.0		30.0	18.0	28.0
Phenol	330		14000 J	41000 J	-	/	-	-	-
2-Chlorophenol	330		-	-	-	/	-	-	-
2-Methylphenol	330		1.4E6 E	1.9E6	130000	/	-	640	870
4-Methylphenol	330		-	-	-	/	-	-	-
2-Nitrophenol	330		-	-	-	/	-	-	-
2,4-Dimethylphenol	330		-	-	-	/	-	-	-
Benzoic Acid	1600		-	-	2600 J	/	-	-	2800
2,4-Dichlorophenol	330		-	-	-	/	-	-	-
4-Chloro-3-methylphenol	330		-	-	-	/	-	-	-
2,4,6-Trichlorophenol	330		-	-	-	/	-	-	-
2,4,5-Trichlorophenol	1600		-	-	-	/	-	-	-
2,4-Dinitrophenol	1600		-	-	-	/	-	-	-
4-Nitrophenol	1600		-	-	-	/	-	-	-
4,6-Dinitro-2-methylphenol	1600		-	-	-	/	-	-	-
Pentachlorophenol	1600		-	-	-	/	-	-	-
Dowtherm A	330		2.4E6 E	3.5E6	300000	/	2.4E6	130 J	2400
Others (mg/kg)									
Dilution Factor			10		10		20	2.0	5.0
Percent Moisture			34		25		35	14	18
Ethylene glycol	1		1700	/	200	/	2900	14	100
Triethylene glycol	1		-	/	-	/	-	-	-
Oil and grease	1.6		166000	/	3890	/	208	2.7	539

Explanation:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Estimated value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-4A
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU - 2 : South Finish Oil Pits
[Soil Boring Number (Depth)]

Volatile Organic Compounds (ug/kg)	Method Detection Limit (undiluted)		SB-14A (6-11')	SB-14A R (6-11')	SB-14B (12-17')	SB-15A (6-8')	SB-15A R (6-8')	SB-15B (27-28')	SB-18A (27.5-29')	SB-18A DL (27.5-29')	SB-18B (37.5-38')
Concentration	Low	Med	Low	Low	Low	Low	Low	Low	Low	Med	Low
Dilution Factor	1.0	1.0	1.0	1.0	2.0	1.0	1.0	1.0	5.0	1.0	5.0
Percent Moisture	0.0	0.0	39.0	39.0	20.0	24.0	24.0	21.0	17.0	17.0	22.0
Chloromethane	10	1200	-	-	-	-	-	-	-	-	-
Bromomethane	10	1200	-	-	-	-	-	-	-	-	-
Vinyl chloride	10	1200	-	-	-	-	-	-	-	-	-
Chloroethane	10	1200	-	-	-	-	-	-	-	-	-
Methylene chloride	5	620	70 B	93 B	280 B	22 B	140 B	41 B	51 B	900 B	640 B
Acetone	10	1200	110 B	160 B	210 B	58 B	13 BJ	83 B	340 B	730 BJ	2300 B
Carbon disulfide	5	620	3 J	3 J	3 J	-	2 J	-	16 J	-	28 J
Trichlorofluoromethane	5	620	-	-	4 J	-	3 J	-	-	-	-
1,1-Dichloroethene	5	620	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	5	620	-	-	4 J	-	-	-	-	-	-
1,2-Dichloroethene (total)	5	620	-	-	-	2 J	-	-	-	-	-
Chloroform	5	620	-	-	38	11	9	3 J	46	-	-
1,2-Dichloroethane	5	620	-	-	-	-	-	-	-	-	-
2-Butanone	10	1200	-	-	-	-	-	-	58 J	-	44 J
1,1,1-Trichloroethane	5	620	-	-	16	-	-	-	-	-	-
Carbon tetrachloride	5	620	-	-	-	-	-	-	-	-	-
Vinyl acetate	10	1200	-	-	-	-	-	-	-	-	-
Bromodichloromethane	5	620	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	5	620	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	5	620	-	-	-	-	-	-	-	-	-
Trichloroethene	5	620	-	-	5 J	-	-	-	29 J	-	-
Dibromochloromethane	5	620	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	620	-	-	-	-	-	-	-	-	-
Benzene	5	620	-	-	5 J	-	-	-	-	-	-
trans-1,3-Dichloropropene	5	620	-	-	-	-	-	-	-	-	-
2-Chloroethylvinylether	10	1200	-	-	-	-	-	-	-	-	-
Bromoform	5	620	-	-	-	-	-	-	-	-	-
2-Hexanone	10	1200	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone	10	1200	-	11 J	-	-	-	-	-	-	-
Tetrachloroethene	5	620	-	6 J	3 J	-	-	-	1500 E	220 J	13 J
1,1,2,2-Tetrachloroethane	5	620	-	-	-	-	-	-	-	-	-
Toluene	5	620	2 J	5 J	34	-	-	-	-	-	-
Chlorobenzene	5	620	-	-	5 J	-	-	-	-	-	-
Ethylbenzene	5	620	-	-	11 J	-	-	-	29 J	-	-
Styrene	5	620	-	-	-	-	-	-	-	-	-
Xylenes (total)	5	620	20	40	52	-	-	-	110	-	-
1,3-Dichlorobenzene	5	620	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	5	620	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	5	620	-	-	-	-	-	-	-	-	-
Tetrahydrofuran	5	620	11	21	250	-	-	180	40	-	-
Acrolein	100	12000	-	-	-	-	-	-	-	-	-
Iodomethane	10	1200	-	-	-	-	-	-	-	-	-

TABLE F-4A
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU - 2 : South Finish Oil Pits
[Soil Boring Number (Depth)]

	Method Detection Limit (undiluted)		SB-14A (6-11')	SB-14A R (6-11')	SB-14B (12-17')	SB-15A (6-8')	SB-15A R (6-8')	SB-15B (27-28')	SB-18A (27.5-29')	SB-18A DL (27.5-29')	SB-18B (37.5-38')
Acrylonitrile	100	12000	-	-	-	-	-	-	-	-	-
Dibromomethane	5	620	-	-	-	9	6 J	-	-	-	-
Ethyl methacrylate	5	620	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	5	620	-	-	-	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	620	-	-	-	-	-	-	-	-	-
1,4-Dioxane	50	25000	-	-	-	-	-	-	-	-	1100
Acid Extractable Organics (ug/kg)											
Concentration	Low		Low		Low	Low		Low	Low		Low
Dilution Factor	1		10		2.0	1.0		1.0	2.0		1.0
Percent Moisture	0.0		16.0		20.0	19.0		19.0	19.0		19.0
Phenol	330		-	/	-	-	/	-	-	/	-
2-Chlorophenol	330		-	/	-	-	/	-	-	/	-
2-Methylphenol	330		-	/	-	-	/	-	-	/	-
4-Methylphenol	330		-	/	-	-	/	-	-	/	-
2-Nitrophenol	330		-	/	-	-	/	-	-	/	-
2,4-Dimethylphenol	330		-	/	-	-	/	-	-	/	-
Benzoic Acid	1600		-	/	-	-	/	-	-	/	-
2,4-Dichlorophenol	330		-	/	-	-	/	-	-	/	-
4-Chloro-3-methylphenol	330		-	/	-	-	/	-	-	/	-
2,4,6-Trichlorophenol	330		-	/	-	-	/	-	-	/	-
2,4,5-Trichlorophenol	1600		-	/	-	-	/	-	-	/	-
2,4-Dinitrophenol	1600		-	/	-	-	/	-	-	/	-
4-Nitrophenol	1600		-	/	-	-	/	-	-	/	-
4,6-Dinitro-2-methylphenol	1600		-	/	-	-	/	-	-	/	-
Pentachlorophenol	1600		-	/	-	-	/	-	-	/	-
Dowtherm A	330		54000	/	13000	610	/	120 J	5800	/	-
Others (mg/kg)											
Dilution Factor	1.0		1.0		1.0	1.0		2.0	1.0		1.0
Percent Moisture	0.0		32		17	19		19	19		19
Ethylene glycol	1		-	/	-	2.6	/	19	-	/	5.4
Triethylene glycol	1		-	/	-	-	/	3.5	-	/	-
Oil and grease	1.6		43400	/	1200	10.9	/	5.0	3250	/	175

Explanation:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Estimated value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-4B
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU - 2 : South Finish Oil Pits (cont.)
[Soil Boring Number (Depth)]

Volatile Organic Compounds (ug/kg)	Method Detection Limit (undiluted)	SB-19A (9.5-11')	SB-19A R (9.5-11')	SB-19B (24-26')	SB-20A (10-11')	SB-20A DL (10-11')	SB-20B (19-20')	SB-20B DL (19-20')
Concentration	Low	Low	Low	Low	Low	Low	Low	Low
Dilution Factor	1.0	1.0	1.0	5.0	1.0	4.0	1.0	2.0
Percent Moisture	0.0	40.0	40.0	23.0	44.0	44.0	29.0	29.0
Chloromethane	10	-	-	-	-	-	-	-
Bromomethane	10	-	-	-	-	-	-	-
Vinyl chloride	10	-	-	-	-	-	-	-
Chloroethane	10	-	-	-	-	-	-	-
Methylene chloride	5	38 B	38 B	270 B	42 B	110 B	24 B	43 B
Acetone	10	56 B	75 B	770 B	480 BE	830 B	380 BE	530 B
Carbon disulfide	5	9	2 J	21 J	4 J	-	56	61
Trichlorofluoromethane	5	-	-	-	2 J	-	-	-
1,1-Dichloroethene	5	-	-	-	-	-	-	-
1,1-Dichloroethane	5	-	-	-	-	-	-	-
1,2-Dichloroethene (total)	5	-	-	-	-	-	-	-
Chloroform	5	-	-	-	-	-	-	-
1,2-Dichloroethane	5	-	-	-	-	-	-	-
2-Butanone	10	-	-	-	56	52 J	66	96
1,1,1-Trichloroethane	5	-	-	-	-	-	-	-
Carbon tetrachloride	5	-	-	-	-	-	-	-
Vinyl acetate	10	-	-	-	-	-	-	-
Bromodichloromethane	5	-	-	-	-	-	-	-
1,2-Dichloropropane	5	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	5	-	-	-	-	-	-	-
Trichloroethene	5	-	-	-	-	-	-	-
Dibromochloromethane	5	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	-	-	-	-	-	-	-
Benzene	5	-	-	-	-	-	-	-
trans-1,3-Dichloropropene	5	-	-	-	-	-	-	-
2-Chloroethylvinylether	10	-	-	-	-	-	-	-
Bromoform	5	-	-	-	-	-	-	-
2-Hexanone	10	-	-	-	10 J	-	-	-
4-Methyl-2-pentanone	10	-	-	-	16 J	-	-	-
Tetrachloroethene	5	7 J	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	-	-	-	-	-	-	-
Toluene	5	8 J	5 J	-	110	89	6 J	4 J
Chlorobenzene	5	-	-	-	-	-	-	-
Ethylbenzene	5	4 J	-	-	-	-	2 J	-
Styrene	5	-	-	-	-	-	-	-
Xylenes (total)	5	15	5 J	-	7 J	-	11	8 J
1,3-Dichlorobenzene	5	-	-	-	-	-	-	-
1,4-Dichlorobenzene	5	-	-	-	-	-	-	-
1,2-Dichlorobenzene	5	-	-	-	-	-	-	-
Tetrahydrofuran	5	-	-	26 J	-	-	54	66
Acrolein	100	-	-	-	-	-	-	-
Iodomethane	10	-	-	-	-	-	-	-

TABLE F-4B
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU - 2 : South Finish Oil Pits (cont.)
[Soil Boring Number (Depth)]

	Method Detection Limit (undiluted)	SB-19A (9.5-11')	SB-19A R (9.5-11')	SB-19B (24-26')	SB-20A (10-11')	SB-20A DL (10-11')	SB-20B (19-20')	SB-20B DL (19-20')
Acrylonitrile	100	-	-	-	-	-	-	-
Dibromomethane	5	-	-	-	-	-	-	-
Ethyl methacrylate	5	-	-	-	-	-	-	-
1,2,3-Trichloropropane	5	-	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	-	-	-	-	-	-	-
1,4-Dioxane	50	-	-	710	390	-	1700	2200
Acid Extractable Organics (ug/kg)								
Concentration	Low	Low		Low	Low		Low	
Dilution Factor	1	1.0		1.0	1.0		1.0	
Percent Moisture	0.0	33.0		30.0	32.0		25.0	
Phenol	330	-	/	-	-	/	-	/
2-Chlorophenol	330	-	/	-	-	/	-	/
2-Methylphenol	330	-	/	3200	-	/	-	/
4-Methylphenol	330	-	/	-	-	/	-	/
2-Nitrophenol	330	-	/	-	-	/	-	/
2,4-Dimethylphenol	330	-	/	-	-	/	-	/
Benzoic Acid	1600	6400	/	-	-	/	-	/
2,4-Dichlorophenol	330	-	/	-	-	/	-	/
4-Chloro-3-methylphenol	330	-	/	-	-	/	-	/
2,4,6-Trichlorophenol	330	-	/	-	-	/	-	/
2,4,5-Trichlorophenol	1600	-	/	-	-	/	-	/
2,4-Dinitrophenol	1600	-	/	-	-	/	-	/
4-Nitrophenol	1600	-	/	-	-	/	-	/
4,6-Dinitro-2-methylphenol	1600	-	/	-	-	/	-	/
Pentachlorophenol	1600	-	/	-	-	/	-	/
Dowtherm A	330	8800	/	-	830	/	230 J	/
Others (mg/kg)								
Dilution Factor	1.0	1.0		50	1.0		10	
Percent Moisture	0.0	33		30	32		25	
Ethylene glycol	1	1.5	/	640	-	/	36	/
Triethylene glycol	1	-	/	-	-	/	130	/
Oil and grease	1.6	28.3	/	245	213	/	533	/

Explanation :
- : Compound was analyaed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Extimate value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-5
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU - 3 : North Finish Oil Pits
[Soil Boring Number (Depth)]

	Method Detection Limit (undiluted)		SB-1A (11-13')	SB-1B (17-19')	SB-2A (13-16')	SB-2A DL (13-16')	SB-2B (24-26')	SB-3A (9-11')	SB-3A R (9-11')	SB-3B (12-14, 24-26')
Volatile Organic Compounds (VOCs) (ug/kg)										
Concentration	Low	Med	Low	Low	Low	Med	Low	Low	Low	Med
Dilution Factor			5.0	1.5	5.0	1.0	1.0	1.0	1.0	1.0
Percent Moisture			21.0	24.0	21.0	21.0	21.0	38.0	38.0	12.0
Chloromethane	10	1200	-	-	-	-	-	-	-	-
Bromomethane	10	1200	-	-	-	-	-	-	-	-
Vinyl chloride	10	1200	-	-	-	-	-	-	-	-
Chloroethane	10	1200	-	-	-	-	-	-	-	-
Methylene chloride	5	620	380 B	300 B	1000 B	650 BJ	17 B	320 B	190 B	1000 B
Acetone	10	1200	300 B	370 B	2200 BE	3800 B	19 B	74 B	33 B	1000 BJ
Carbon disulfide	5	620	-	6 J	50	-	2 J	-	-	-
Trichlorofluoromethane	5	620	18 J	12	9 J	-	-	-	-	-
1,1-Dichloroethene	5	620	25 J	2 J	19 J	-	-	-	-	-
1,1-Dichloroethane	5	620	28 J	4 J	42	-	-	-	-	-
1,2-Dichloroethene (total)	5	620	51	-	-	-	-	-	-	-
Chloroform	5	620	750	220 B	4800 E	3100 B	3 J	13	8 J	6300 B
1,2-Dichloroethane	5	620	-	-	-	-	-	-	-	-
2-Butanone	10	1200	-	18 J	210	-	-	15 J	-	-
1,1,1-Trichloroethane	5	620	430	21	370	-	-	2 J	-	-
Carbon tetrachloride	5	620	150	24	31 J	-	-	-	-	-
Vinyl acetate	10	1200	-	-	-	-	-	-	-	-
Bromodichloromethane	5	620	-	-	-	-	-	-	-	-
1,2-Dichloropropane	5	620	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	5	620	-	-	-	-	-	-	-	-
Trichloroethene	5	620	14 J	3 J	-	-	-	-	-	-
Dibromochloromethane	5	620	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	620	-	-	-	-	-	-	-	-
Benzene	5	620	15 J	3 J	-	-	-	-	-	-
trans-1,3-Dichloropropene	5	620	-	-	-	-	-	-	-	-
2-Chloroethylvinylether	10	1200	-	-	-	-	-	-	-	-
Bromoform	5	620	-	-	-	-	-	-	-	-
2-Hexanone	10	1200	-	5 J	21 BJ	-	- B	-	-	-
4-Methyl-2-pentanone	10	1200	-	8 J	34 BJ	-	- B	8 J	4 J	-
Tetrachloroethene	5	620	650	34	1000	1300	-	4 J	-	-
1,1,2,2-Tetrachloroethane	5	620	-	-	-	- B	-	-	2 J	- B
Toluene	5	620	120	36	100	170 J	2 J	3 J	-	-
Chlorobenzene	5	620	-	-	-	-	-	-	-	-
Ethylbenzene	5	620	13 J	-	9 J	-	-	-	-	-
Styrene	5	620	-	-	-	-	-	-	-	-
Xylenes (total)	5	620	72	6 J	67	-	3 J	-	-	-
1,3-Dichlorobenzene	5	620	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	5	620	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	5	620	-	-	-	-	-	-	-	-
Tetrahydrofuran	5	620	-	-	- B	-	- B	-	-	-
Acrolein	100	12000	-	-	- B	-	- B	-	-	-
Iodomethane	10	1200	-	-	-	-	-	-	-	-

TABLE F-5
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU - 3 : North Finish Oil Pits
[Soil Boring Number (Depth)]

	Method Detection Limit (undiluted)		SB-1A (11-13')	SB-1B (17-19')	SB-2A (13-16')	SB-2A DL (13-16')	SB-2B (24-26')	SB-3A (9-11')	SB-3A R (9-11')	SB-3B (12-14, 24-26')
Acrylonitrile	100	12000	-	-	- B	- B	- B	-	-	- B
Dibromomethane	5	620	6 BJ	2 BJ	8 BJ	-	2 BJ	3 BJ	3 BJ	-
Ethyl methacrylate	5	620	-	-	-	- B	-	-	-	- B
1,2,3-Trichloropropane	5	620	-	-	-	- B	-	-	-	- B
trans-1,4-Dichloro-2-butene	5	620	-	-	-	-	-	-	-	-
1,4-Dioxane	50	25000 ?	-	-	-	-	-	/	-	-
Acid Extractable Organics (AEs)(ug/kg)										
Dilution Factor			1.0	1.0	10		1.0	1.0		1.0
Percent Moisture			22.0	22.0	21.0		21.0	40		18
Phenol	330		-	-	-	/	-	-	/	-
2-Chlorophenol	330		-	-	-	/	-	-	/	-
2-Methylphenol	330		-	-	1600 J	/	-	610	/	1300
4-Methylphenol	330		-	-	-	/	-	390 J	/	-
2-Nitrophenol	330		-	-	-	/	-	-	/	-
2,4-Dimethylphenol	330		-	-	-	/	-	-	/	-
Benzoic Acid	1600		-	980 J	-	/	-	-	/	-
2,4-Dichlorophenol	330		-	-	-	/	-	-	/	-
4-Chloro-3-methylphenol	330		-	-	-	/	-	-	/	-
2,4,6-Trichlorophenol	330		-	-	-	/	-	-	/	-
2,4,5-Trichlorophenol	1600		-	-	-	/	-	-	/	-
2,4-Dinitrophenol	1600		-	-	-	/	-	-	/	-
4-Nitrophenol	1600		-	-	-	/	-	-	/	-
4,6-Dinitro-2-methylphenol	1600		-	-	-	/	-	-	/	-
Pentachlorophenol	330		-	-	-	/	-	-	/	-
Dowtherm A			6000	360 J	4500	/	620	5300	/	8300
Others (ug/g)										
Dilution Factor			10	2.0	1.0		1.0	5.0		10
Percent Moisture			22	22	21		21	40		18
Ethylene glycol	1		93	22	-	/	-	610	/	83
Triethylene glycol	1		-	-	-	/	-	-	/	-
Oil and grease	1.6		1490	84.0	30000	/	<2.1	4940	/	1960

Explanation:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Estimated value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-6
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)	WMU-7 : Burning Pits and Residue Landfill				WWTP		WMU-14: Former Leachate Pond		
		SB-6 (5.5-7.5')	SB-7 (3-4')	7BP-1 composite	7BP-2 composite	SB-4 (5-6')	SB-5 (5-6')	SB-16 (4.5-5')	SB-17 (4.5-5')	SB-17R (4.5-5')
Volatile Organic Compounds (VOCs) (ug/kg)										
Dilution Factor						1.0	1.0	1.0	1.0	1.0
Moisture Content						18.0	26.0	15.0	29.0	29.0
Chloromethane	10	/	/	/	/	-	-	-	-	-
Bromomethane	10	/	/	/	/	-	-	-	-	-
Vinyl chloride	10	/	/	/	/	-	-	-	-	-
Chloroethane	10	/	/	/	/	-	-	-	-	-
Methylene chloride	5	/	/	/	/	48 B	260 B	110 B	670 BE	210 B
Acetone	10	/	/	/	/	20 B	52 B	86 B	110 B	44 B
Carbon disulfide	5	/	/	/	/	-	-	-	4 J	-
Trichlorofluoromethane	5	/	/	/	/	-	-	-	-	-
1,1-Dichloroethene	5	/	/	/	/	-	-	-	-	-
1,1-Dichloroethane	5	/	/	/	/	-	-	-	-	-
1,2-Dichloroethene (total)	5	/	/	/	/	-	-	-	-	-
Chloroform	5	/	/	/	/	-	2 J	-	4 J	2 J
1,2-Dichloroethane	5	/	/	/	/	-	-	-	-	-
2-Butanone	10	/	/	/	/	-	-	15	-	-
1,1,1-Trichloroethane	5	/	/	/	/	-	-	-	-	-
Carbon tetrachloride	5	/	/	/	/	-	-	-	-	-
Vinyl acetate	10	/	/	/	/	-	-	-	-	-
Bromodichloromethane	5	/	/	/	/	-	-	-	-	-
1,2-Dichloropropane	5	/	/	/	/	-	-	-	-	-
cis-1,3-Dichloropropene	5	/	/	/	/	-	-	-	-	-
Trichloroethene	5	/	/	/	/	-	-	-	-	-
Dibromochloromethane	5	/	/	/	/	-	-	-	-	-
1,1,2-Trichloroethane	5	/	/	/	/	-	-	-	-	-
Benzene	5	/	/	/	/	-	-	-	-	-
trans-1,3-Dichloropropene	5	/	/	/	/	-	-	-	-	-
2-Chloroethylvinylether	10	/	/	/	/	-	-	-	-	-
Bromoform	5	/	/	/	/	-	-	-	-	-
2-Hexanone	10	/	/	/	/	-	-	-	-	-
4-Methyl-2-pentanone	10	/	/	/	/	-	1 J	-	-	-
Tetrachloroethene	5	/	/	/	/	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	/	/	/	/	-	-	-	-	-
Toluene	5	/	/	/	/	-	2 J	-	-	-
Chlorobenzene	5	/	/	/	/	-	-	-	-	-
Ethylbenzene	5	/	/	/	/	-	-	-	-	-
Styrene	5	/	/	/	/	-	-	-	-	-
Xylenes (total)	5	/	/	/	/	-	3 J	-	4 J	-
1,3-Dichlorobenzene	5	/	/	/	/	-	-	-	-	-
1,4-Dichlorobenzene	5	/	/	/	/	-	-	-	-	-
1,2-Dichlorobenzene	5	/	/	/	/	-	-	-	-	-
Tetrahydrofuran	5	/	/	/	/	-	-	-	-	-
Acrolein	100	/	/	/	/	-	-	-	-	-
Iodomethane	10	/	/	/	/	-	-	-	-	-
Acrylonitrile	100	/	/	/	/	-	-	-	-	-
Dibromomethane	5	/	/	/	/	1 BJ	1 BJ	1 BJ	3 BJ	4 BJ

TABLE F-6
ORGANIC CHEMICAL ANALYSIS
SUBSURFACE SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)	WMU-7 : Burning Pits and Residue Landfill				WWTP		WMU-14: Former Leachate Pond		
		SB-6 (5.5-7.5')	SB-7 (3-4')	7BP-1 composite	7BP-2 composite	SB-4 (5-6')	SB-5 (5-6')	SB-16 (4.5-5')	SB-17 (4.5-5')	SB-17R (4.5-5')
Ethyl methacrylate	5	/	/	/	/	-	-	-	-	-
1,2,3-Trichloropropane	5	/	/	/	/	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	/	/	/	/	-	-	-	-	-
1,4-Dioxane	50	/	/	/	/	-	-	96	-	-
Acid Extractable Organics (AEs)(ug/kg)										
Dilution Factor		15	5.0	1.0	1.0	1.0	1.0	1.0	1.0	
Percent Moisture		22.0	22.0	12.0	16	21.0	17.0	16.0	19.0	
Phenol	330	-	-	-	-	-	-	-	-	/
2-Chlorophenol	330	-	-	-	-	-	-	-	-	/
2-Methylphenol	330	-	-	-	230 J	-	-	-	-	/
4-Methylphenol	330	-	-	-	-	-	-	-	-	/
2-Nitrophenol	330	-	-	-	-	-	-	-	-	/
2,4-Dimethylphenol	330	-	-	-	-	-	-	-	-	/
Benzoic Acid	1600	-	24,000	1100 J	630 J	-	-	-	-	/
2,4-Dichlorophenol	330	-	-	110 J	-	-	-	-	-	/
4-Chloro-3-methylphenol	330	-	-	-	-	-	-	-	-	/
2,4,6-Trichlorophenol	330	-	-	-	-	-	-	-	-	/
2,4,5-Trichlorophenol	1600	-	-	-	-	-	-	-	-	/
2,4-Dinitrophenol	1600	-	-	-	-	-	-	-	-	/
4-Nitrophenol	1600	-	-	-	-	-	-	-	-	/
4,6-Dinitro-2-methylphenol	1600	-	-	-	-	-	-	-	-	/
Pentachlorophenol	1600	-	-	700 J	-	-	-	-	-	/
Dowtherm A	330	50,000	26,000	-	5700	-	-	-	-	/

Explanation:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Extimated value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-7
ORGANIC CHEMICAL ANALYSIS
SEDIMENT SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

Stormwater Channel

	Method Detection Limit (undiluted)	12SED-1	12SED-2	12SED-3	12SED-3DL
Volatile Organic Compounds (VOCs) (ug/kg)					
Dilution Factor		1.0	1.0	5.0	115
Percent Moisture		18.0	29.0	22.0	22.0
Chloromethane	10	-	-	-	-
Bromomethane	10	-	-	-	-
Vinyl chloride	10	-	-	-	-
Chloroethane	10	-	-	-	-
Methylene chloride	5	110 B	200 B	2100 BE	1400 B
Acetone	10	38 B	20 B	240 B	2500 B
Carbon disulfide	5	-	-	10 J	-
Trichlorofluoromethane	5	-	-	-	-
1,1-Dichloroethene	5	-	-	-	-
1,1-Dichloroethane	5	-	-	-	-
1,2-Dichloroethene (total)	5	-	-	-	-
Chloroform	5	-	-	- B	- B
1,2-Dichloroethane	5	-	-	-	-
2-Butanone	10	-	-	-	-
1,1,1-Trichloroethane	5	-	-	-	-
Carbon tetrachloride	5	-	-	-	-
Vinyl acetate	10	-	-	-	-
Bromodichloromethane	5	-	-	-	-
1,2-Dichloropropane	5	-	-	-	-
cis-1,3-Dichloropropene	5	-	-	-	-
Trichloroethene	5	-	-	-	-
Dibromochloromethane	5	-	-	-	-
1,1,2-Trichloroethane	5	-	-	-	-
Benzene	5	-	-	-	-
trans-1,3-Dichloropropene	5	-	-	-	-
2-Chloroethylvinylether	10	-	-	-	-
Bromoform	5	-	-	-	-
2-Hexanone	10	-	-	-	-
4-Methyl-2-pentanone	10	-	-	23 J	-
Tetrachloroethene	5	-	-	-	-
1,1,2,2-Tetrachloroethane	5	-	-	-	- B
Toluene	5	-	-	-	-
Chlorobenzene	5	-	-	-	-
Ethylbenzene	5	-	-	-	-
Styrene	5	-	-	-	-
Xylenes (total)	5	-	-	-	-
1,3-Dichlorobenzene	5	-	-	-	-
1,4-Dichlorobenzene	5	-	-	-	-
1,2-Dichlorobenzene	5	-	-	-	-
Tetrahydrofuran	100	-	-	30 J	1900
Acrolein	10	-	-	-	-
Iodomethane	100	-	-	-	1300 BJ
Acrylonitrile					

TABLE F-7
ORGANIC CHEMICAL ANALYSIS
SEDIMENT SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

Stormwater Channel

	Method Detection Limit (undiluted)	12SED-1	12SED-2	12SED-3	12SED-3DL
Dibromomethane	5	1 BJ	2 BJ	8 BJ	-
Ethyl methacrylate	5	-	-	-	- B
1,2,3-Trichloropropane	5	-	-	-	- B
trans-1,4-Dichloro-2-butene	5	-	-	-	-
1,4-Dioxane	50	55 J	130	1300	-
Acid Extractable Organics (AEs)(ug/kg)					
Dilution Factor		1.0	1.0	1.0	
Percent Moisture		18.0	19.0	22.0	
Phenol	330	-	120 J	-	/
2-Chlorophenol	330	-	-	-	/
2-Methylphenol	330	-	-	-	/
4-Methylphenol	330	-	73 J	88 J	/
2-Nitrophenol	330	-	-	-	/
2,4-Dimethylphenol	330	-	-	-	/
Benzoic Acid	1600	-	-	-	/
2,4-Dichlorophenol	330	-	-	-	/
4-Chloro-3-methylphenol	330	-	-	-	/
2,4,6-Trichlorophenol	330	-	-	-	/
2,4,5-Trichlorophenol	1600	-	-	-	/
2,4-Dinitrophenol	1600	-	-	-	/
4-Nitrophenol	1600	-	-	-	/
4,6-Dinitro-2-methylphenol	1600	-	-	-	/
Pentachlorophenol	1600	-	110 J	-	/
Dowtherm A	330	92 J	2100	5000	/

Explanation:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Estimated value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-8
ORGANIC CHEMICAL ANALYSIS
SLUDGE SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)		SOUTH HOLDING POND			NORTH HOLDING POND			
			16SLG-1	16SLG-1DL	16SLG-2	17SLG-1	17SLG-1DL	17SLG-2	17SLG-2DL
Volatile Organic Compounds (VOCs) (ug/kg)									
Concentration			Low	Med	Low	Low	Low	Low	Low
Dilution Factor			5.0	1.0	5.0	1.0	5.0	3.0	5.0
Percent Moisture			90.0	90.0	93.0	90.0	90.0	83.0	83.0
Chloromethane	10	1200	-	-	-	34 J	-	-	-
Bromomethane	10	1200	-	-	-	-	-	-	-
Vinyl chloride	10	1200	-	-	-	15 J	-	-	-
Chloroethane	10	1200	-	-	-	-	-	-	-
Methylene chloride	5	620	1500 B	14000 B	1700 B	990 B	1000 B	250 B	320 B
Acetone	10	1200	22000 BE	7900 BJ	9800 B	2800 BE	3100 B	3100 B	1800 B
Carbon disulfide	5	620	350	-	310 J	92	99 J	86 J	54 J
Trichlorofluoromethane	5	620	-	-	-	-	-	-	-
1,1-Dichloroethene	5	620	-	-	-	-	-	-	-
1,1-Dichloroethane	5	620	-	-	-	-	-	-	-
1,2-Dichloroethene (total)	5	620	-	3200 J	-	-	-	-	-
Chloroform	5	620	-	-	-	-	-	-	-
1,2-Dichloroethane	5	620	-	-	-	-	-	-	-
2-Butanone	10	1200	6400	-	1500	690	440 J	820	310
1,1,1-Trichloroethane	5	620	-	-	-	-	-	-	-
Carbon tetrachloride	5	620	-	-	-	-	-	-	-
Vinyl acetate	10	1200	-	-	-	-	-	-	-
Bromodichloromethane	5	620	-	-	-	-	-	-	-
1,2-Dichloropropane	5	620	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	5	620	-	-	-	-	-	-	-
Trichloroethene	5	620	-	-	-	-	-	-	-
Dibromochloromethane	5	620	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	620	-	-	-	-	-	-	-
Benzene	5	620	-	-	-	13 J	-	-	-
trans-1,3-Dichloropropene	5	620	-	-	-	-	-	-	-
2-Chloroethylvinylether	10	1200	-	-	-	-	-	-	-
Bromoform	5	620	-	-	-	-	-	-	-
2-Hexanone	10	1200	110 J	- B	110 J	-	-	-	-
4-Methyl-2-pentanone	10	1200	-	-	-	-	-	-	-
Tetrachloroethene	5	620	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	620	-	-	-	-	-	-	-
Toluene	5	620	440	-	120 J	36 J	-	75 J	76 J
Chlorobenzene	5	620	-	-	-	-	-	-	-
Ethylbenzene	5	620	240 J	-	180 J	43 J	-	24 J	-
Styrene	5	620	-	-	-	-	-	-	-
Xylenes (total)	5	620	160 J	-	130 J	54	-	36 J	-
1,3-Dichlorobenzene	5	620	-	-	-	-	-	-	-
1,4-Dichlorobenzene	5	620	200 J	-	130 J	29 J	-	-	-
1,2-Dichlorobenzene	5	620	200 J	-	260 J	16 J	-	-	-
Tetrahydrofuran	5	620	620	-	370	1900	1200	850	620
Acrolein	100	12000	520 J	-	-	-	-	-	-
Iodomethane	10	1200	-	-	-	-	-	-	-
Acrylonitrile	100	12000	-	-	-	-	-	-	-

TABLE F-8
ORGANIC CHEMICAL ANALYSIS
SLUDGE SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)		SOUTH HOLDING POND			NORTH HOLDING POND			
			16SLG-1	16SLG-1DL	16SLG-2	17SLG-1	17SLG-1DL	17SLG-2	17SLG-2DL
Dibromomethane	5	620	-	-	-	-	-	-	-
Ethyl methacrylate	5	620	-	-	-	-	-	-	-
1,2,3-Trichloropropane	5	620	-	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	620	-	-	-	-	-	-	-
1,4-Dioxane	50	25000	110000 E	37000 J	65000	38000 E	78000	42000 E	32000
Acid Extractable Organics (AEs)(ug/kg)									
Dilution Factor			40		480	20		6.0	
Percent Moisture			90.0		92.0	50.0		59.0	
Phenol	330		-	/	-	-	/	-	/
2-Chlorophenol	330		-	/	-	-	/	-	/
2-Methylphenol	330		-	/	-	-	/	-	/
4-Methylphenol	330		-	/	-	-	/	-	/
2-Nitrophenol	330		-	/	-	-	/	-	/
2,4-Dimethylphenol	330		-	/	-	-	/	-	/
Benzoic Acid	1600		-	/	-	-	/	-	/
2,4-Dichlorophenol	330		-	/	-	-	/	-	/
4-Chloro-3-methylphenol	330		-	/	-	-	/	-	/
2,4,6-Trichlorophenol	330		-	/	-	-	/	-	/
2,4,5-Trichlorophenol	1600		-	/	-	-	/	-	/
2,4-Dinitrophenol	1600		-	/	-	-	/	-	/
4-Nitrophenol	1600		-	/	-	-	/	-	/
4,6-Dinitro-2-methylphenol	1600		-	/	-	-	/	-	/
Pentachlorophenol	1600		-	/	-	-	/	-	/
Dowtherm A	330		6.8E6	/	8.9E7	330000	/	-	/

Explanation:
- - : Compound was analyzed for but not detected
- / : Compound was not analyzed for
- B : Analyte was found in the associated blank
- J : Estimated value. Analyte was found below the quantitation limit.
- E : Compound may be above or below the linear range of instrument. Sample was reanalyzed at a higher dilution.
- R : Replicate
- DL : Dilution

TABLE F-9
TCLP CHEMICAL ANALYSIS
SURFACE and SUBSURFACE SOIL and ASH SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)	WMU - 1 1 ASH composite	WMU - 2 2 ASH composite	WMU - 3 3 ASH composite		WMU - 5 5 SOIL composite	WMU - 10 10 SOIL composite
Volatile Organic Compounds (VOCs) (ug/l)							
Dilution Factor	1	1	1	1			
Vinyl chloride	50	-	-	-		/	/
1,1-Dichloroethene	25	-	-	-		/	/
Chloroform	25	81 BT	23 J	106		/	/
1,2-Dichloroethane	25	-	-	-		/	/
2-Butanone	50	-	-	- B		/	/
Carbon tetrachloride	25	-	-	-		/	/
Trichloroethene	25	-	-	-		/	/
Benzene	25	-	-	-		/	/
Tetrachloroethene	25	-	10 J	23 J		/	/
Chlorobenzene	25	-	-	-		/	/
Tetrahydrofuran	25	/	/	-		/	/
1,4-Dioxane	250	-	-	-		/	/
Acid Extractable Organics (AEs)(ug/l)							
Dilution Factor		10	1	1			
2,4,6-Trichlorophenol	50	-	-	-		/	/
2,4,5-Trichlorophenol	250	-	-	-		/	/
Pentachlorophenol	250	-	-	-		/	/
Dowtherm A	50	-	-	480		/	/
Cresol (total)	100	-	-	130		/	/
Inorganics (ug/l)							
Silver	10	<10	<10	<10	(<2.6)	<10	<10
Arsenic	10	<10	<10	<10		<10	<10
Barium	200	1030	773	729	(120)	870	499
Cadmium	6	<5	<5	<5	(<1.3)	<5	7
Chromium	11	<10	<10	14	(12)	<10	15
Mercury	0.2	<0.2	<0.2	<0.2		<0.2	<0.2
Lead	100	<100	<100	<100		<100	<100
Selenium	25	<25	<25	<25		<25	<25

Explanation:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Estimated value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-10
INORGANIC CHEMICAL ANALYSIS
SOIL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

WMU-7 : Burning Pits and Residue Landfill
[Boring Number (Depth)]

	Reportable Limit	SB-6 (5.5-7.5')	SB-7 (3-4')	7BP-1 composite	7BP-2 composite
Priority Pollutant Metals (mg/kg)					
Silver	2.0	3.4	<2.6	<2.3	<2.2
Arsenic	2.0	4.7	<2.6	2.8	<2.2
Beryllium	1.0	<1.2	<1.3	<1.1	<1.1
Cadmium	1.0	6	2.6	1.2	<1.1
Chromium	2.0	110	78	37.6	16.0
Copper	5.0	1400	360	130	126
Mercury	0.1	<0.11	<0.11	<0.11	<0.11
Nickel	8.0	130	97.0	45.5	22.8
Lead	0.6	198	86.1	35.6	27.4
Antimony	12.0	360	480	76.0	61.0
Selenium	1.0	<1.2	<1.3	<1.1	<1.1
Thallium	2.0	<2.5	<2.6	<2.3	<2.2
Zinc	4.0	1600	450	290	120

TABLE F-11
GROUNDWATER
SAMPLES USING GEOPROBE
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detect. Limit	WMU - 3 : North Finish Oil Pits						WMU - 1,7: Glycol Pits, Burning Pits							WMU - 2: South Finish Oil Pits			
	(undil.)	GP-1	GP-1 DL	GP-2	GP-3	GP-5	GPMW-11	GP-6	GP-7	GP-7D	GP-7DDL	GP-8	GP-8DL	GP-9	GP-10	GP-11	GP-12	GP-13
Volatile Organics (ug/l)																		
Dilution Factor	1.0	10	40	15	1.0	1.5	50	10	4.0	2.0	4.0	10		1.0	1.0	10	20	35
Chloromethane	10	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Bromomethane	10	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Vinyl chloride	10	-	-	-	-	-	-	-	7 J	7 J	-	150	/	-	-	-	-	-
Chloroethane	10	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Methylene chloride	5	5300 BE	4600 B	1300 B	10	12 B	5000	1100 B	13 BJ	14 B	13 BJ	680 B	/	8 B	6 B	420 B	320 B	4000 B
Acetone	10	3500 BE	2400 B	1000 B	16	110 B	2100	1700 B	24 BJ	13 BJ	29 BJ	1200 B	/	82 B	21 B	770 B	2700 B	540 B
Carbon disulfide	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Trichlorofluoromethane	5	-	-	-	2 J	-	-	-	-	-	-	-	/	-	-	-	-	-
1,1-Dichloroethene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
1,1-Dichloroethane	5	-	-	-	-	-	-	-	-	2 J	-	-	/	-	-	-	-	-
1,2-Dichloroethene (total)	5	-	-	-	-	-	-	-	460	490 E	500	88	/	-	-	950	-	-
Chloroform	5	3600	3000	900	-	-	490	-	-	-	-	-	/	-	-	-	-	-
1,2-Dichloroethane	5	-	-	-	-	-	-	-	-	9 J	-	-	/	-	-	-	-	-
2-Butanone	10	140	-	160	-	12 J	350 J	56 J	-	-	-	52 J	/	-	-	180	-	-
1,1,1-Trichloroethane	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Carbon tetrachloride	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Vinyl acetate	10	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Bromodichloromethane	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
1,2-Dichloropropane	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
cis-1,3-Dichloropropene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Trichloroethene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Dibromochloromethane	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
1,1,2-Trichloroethane	5	-	-	-	-	-	-	-	89	99	100	25 J	/	-	-	-	-	-
Benzene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
trans-1,3-Dichloropropene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
2-Chloroethylvinylether	10	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Bromoform	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
2-Hexanone	10	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
4-Methyl-2-pentanone	10	-	-	73 J	-	-	-	53 J	-	-	-	47 J	/	-	-	-	-	-
Tetrachloroethene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Toluene	5	-	-	28 J	-	-	-	-	5 J	4 J	5 J	33 J	/	-	-	-	-	-
Chlorobenzene	5	-	-	-	-	-	-	-	24	30	32	15 J	/	-	-	-	-	-
Ethylbenzene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Styrene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Xylenes (total)	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
1,3-Dichlorobenzene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
1,4-Dichlorobenzene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
1,2-Dichlorobenzene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	160 J
Tetrahydrofuran	5	140	-	-	-	-	-	89	-	-	-	720	/	-	-	-	-	-
Acrolein	100	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Iodomethane	10	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Acrylonitrile	100	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
Dibromomethane	5	-	-	-	-	-	-	- B	-	-	-	-	/	-	-	-	-	-
Ethyl methacrylate	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-

TABLE F-11
GROUNDWATER
SAMPLES USING GEOPROBE
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detect. Limit (undil.)	WMU - 3 : North Finish Oil Pits						WMU - 1,7: Glycol Pits, Burning Pits							WMU - 2: South Finish Oil Pits			
		GP-1	GP-1 DL	GP-2	GP-3	GP-5	GPMW-11	GP-6	GP-7	GP-7D	GP-7DDL	GP-8	GP-8DL	GP-9	GP-10	GP-11	GP-12	GP-13
1,2,3-Trichloropropane	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	-	-	-	-	-	-	-	-	-	-	-	/	-	-	-	-	-
1,4-Dioxane	50	970 J	-	970 J	-	100 J	-	2900	-	-	-	1300	/	490	68	340 J	-	2500 J
Acid Extractable Organics (ug/l)																		
Dilution Factor	1.0				20				1.0	1.0		1.0	5.0		10		25	250
Phenol	10	/	/	/	-	/	/	/	-	-	/	30	-	/	-	/	-	-
2-Chlorophenol	10	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
2-Methylphenol	10	/	/	/	1900	/	/	/	-	-	/	620 E	590	/	-	/	-	2300 J
4-Methylphenol	10	/	/	/	-	/	/	/	-	-	/	-	63	/	-	/	-	-
2-Nitrophenol	10	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
2,4-Dimethylphenol	10	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
Benzoic Acid	50	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
2,4-Dichlorophenol	10	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
4-Chloro-3-methylphenol	10	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
2,4,6-Trichlorophenol	10	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
2,4,5-Trichlorophenol	10	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
2,4-Dinitrophenol	50	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
4-Nitrophenol	50	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
4,6-Dinitro-2-methylphenol	50	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
Pentachlorophenol	10	/	/	/	-	/	/	/	-	-	/	-	-	/	-	/	-	-
Dowtherm A	10	/	/	/	-	/	/	/	69	79	/	15	-	/	-	/	-	-
Others (mg/l)																		
Ethylene glycol	1	/	/	/	/	/	/	/	-	-	/	-	/	/	/	/		
Triethylene glycol	1	/	/	/	/	/	/	/	-	-	/	-	/	/	/	/		
Alkalinity as CaCO3	1	/	/	/	/	/	/	/	19	27	/	567	/	/	/	/		
BOD, 5 Day	10	/	/	/	/	/	/	/	<10	<10	/	>400	/	/	/	/		
Calcium	5	/	/	/	/	/	/	/	<5.0	<5.0	/	19.9	/	/	/	/		
COD	20	/	/	/	/	/	/	/	53	36	/	732	/	/	/	/		
Iron	0.1	/	/	/	/	/	/	/	68	66	/	54	/	/	/	/		
Magnesium	5	/	/	/	/	/	/	/	<5.0	<5.0	/	22.6	/	/	/	/		
Oil and Grease	0.05	/	/	/	/	/	/	/	0.13	0.11	/	7.45	/	/	/	/		

Explanation:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Estimated value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-12
GROUNDWATER SAMPLES
MONITORING WELLS AND PIEZOMETERS
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)	WMU - 3 : North Finish Oil Pits					WMU - 1,7: Glycol and Burning Pits			WMU - 2: South Finish Oil Pits		
		MW-4	MW-10	MW-11	MW-12A	PZ-1	MW-15	MW-15DL	MW-16	PZ-2	PZ-2 DL	PZ-3
Volatile Organics (ug/l)												
Dilution Factor	1.0	1.0	1.0	100	1.0	4.0	1.0	2.0	1.0	1.0	2.0	300
Chloromethane	10	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	10	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	10	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	10	-	-	-	-	-	-	-	-	-	-	-
Methylene chloride	5	5 B	8 B	14000 B	4 BJ	60 B	3 BJ	14 B	5 B	42 B	52 B	38000 B
Acetone	10	4 BJ	13 B	4300 B	19 B	350 B	6 BJ	11 BJ	5 BJ	260 BE	130 B	8700 B
Carbon disulfide	5	-	-	-	6	-	-	-	1 J	59	100	1200 J
Trichlorofluoromethane	5	2 J	2 J	-	-	-	5	4 J	-	-	-	-
1,1-Dichloroethene	5	-	-	-	-	-	-	-	-	1 J	-	-
1,1-Dichloroethane	5	-	3 J	-	-	-	-	-	-	1 J	-	-
1,2-Dichloroethene (total)	5	-	3 J	-	-	-	-	-	-	18	19	-
Chloroform	5	-	-	1400	-	-	-	-	-	100	110	29000
1,2-Dichloroethane	5	-	-	-	-	-	-	-	-	-	-	-
2-Butanone	10	-	-	510 J	-	78	-	-	-	20	14 J	-
1,1,1-Trichloroethane	5	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	5	-	-	-	-	-	-	-	-	-	-	-
Vinyl acetate	10	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	5	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	5	-	-	-	-	-	-	-	-	-	-	-
cis-1,3-Dichloropropene	5	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	5	-	-	-	-	-	-	-	-	26	27	-
Dibromochloromethane	5	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	5	-	-	-	-	-	-	-	-	-	-	-
Benzene	5	-	-	-	-	-	7	6 J	9	2 J	2 J	-
trans-1,3-Dichloropropene	5	-	-	-	-	-	-	-	-	-	-	-
2-Chloroethylvinylether	10	-	-	-	-	-	-	-	-	-	-	-
Bromoform	5	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone	10	-	-	-	-	-	-	-	-	-	-	-
4-Methyl-2-pentanone	10	-	-	-	-	-	-	-	-	5 J	-	-
Tetrachloroethene	5	-	-	-	-	-	-	-	-	6	6 J	-
1,1,2,2-Tetrachloroethane	5	-	-	-	-	-	-	-	-	-	-	-
Toluene	5	-	1 J	-	2 J	-	-	-	1 J	13	13	-
Chlorobenzene	5	-	-	-	-	-	1 J	-	22	-	-	-
Ethylbenzene	5	-	-	-	-	-	-	-	1 J	1 J	-	-
Styrene	5	-	-	-	-	-	-	-	-	-	-	-
Xylenes (total)	5	-	-	-	-	-	-	-	3 J	7	8 J	-
1,3-Dichlorobenzene	5	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	5	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichlorobenzene	5	-	-	-	-	-	-	-	-	-	-	-
Tetrahydrofuran	5	4 J	-	-	12	-	66	57	-	100	76	-
Acrolein	100	-	-	-	-	-	-	-	-	-	-	-
Iodomethane	10	-	-	-	-	-	-	-	-	-	-	-
Acrylonitrile	100	-	-	-	-	-	-	-	-	-	-	-
Dibromomethane	5	-	-	-	-	-	-	-	-	-	-	-
Ethyl methacrylate	5	-	-	-	-	-	-	-	-	-	-	-

TABLE F-12
GROUNDWATER SAMPLES
MONITORING WELLS AND PIEZOMETERS
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)	WMU - 3 : North Finish Oil Pits					WMU - 1,7: Glycol and Burning Pits			WMU - 2: South Finish Oil Pits		
		MW-4	MW-10	MW-11	MW-12A	PZ-1	MW-15	MW-15DL	MW-16	PZ-2	PZ-2 DL	PZ-3
1,2,3-Trichloropropane	5	-	-	-	-	-	-	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	-	-	-	-	-	-	-	-	-	-	-
1,4-Dioxane	50	300	-	6900	1600	310	2300 E	2100	540	-	-	-
Acid Extractable Organics (ug/l)												
Dilution Factor	1.0	1.0	1.0	25	1.0	1.0	1.0		1.0	40		8.0
Phenol	10	-	-	230 J	-	43	-	/	-	-	/	-
2-Chlorophenol	10	-	-	-	-	-	-	/	-	-	/	-
2-Methylphenol	10	-	-	860	-	8 J	-	/	-	-	/	1800
4-Methylphenol	10	-	-	-	-	56	-	/	-	-	/	39 J
2-Nitrophenol	10	-	-	-	-	-	-	/	-	-	/	-
2,4-Dimethylphenol	10	-	-	-	-	-	-	/	-	-	/	-
Benzoic Acid	50	-	-	-	-	-	-	/	-	-	/	-
2,4-Dichlorophenol	10	-	-	-	-	-	-	/	-	-	/	-
4-Chloro-3-methylphenol	10	-	-	-	-	-	-	/	-	-	/	-
2,4,6-Trichlorophenol	10	-	-	-	-	-	-	/	-	-	/	-
2,4,5-Trichlorophenol	10	-	-	-	-	-	-	/	-	-	/	-
2,4-Dinitrophenol	50	-	-	-	-	-	-	/	-	-	/	-
4-Nitrophenol	50	-	-	-	-	-	-	/	-	-	/	-
4,6-Dinitro-2-methylphenol	50	-	-	-	-	-	-	/	-	-	/	-
Pentachlorophenol	10	-	-	-	-	-	-	/	-	-	/	-
Dowtherm A	10	-	46	-	-	4 J	37	/	19	100 J	/	-
Others (mg/l)												
pH		6.3	5.9	4.8	5.8	6.4	6.8	/	6.5	6.2	/	5.2
Conductivity		435	255	1300	340	850	700	/	460	1080	/	1200
Ethylene glycol	1	-	-	33	-	-	-	/	-	-	/	220
Triethylene glycol	1	-	-	21	-	-	-	/	-	-	/	98
Alkalinity as CaCO3	1	192	54	195	65	517	748	/	235	569	/	508
BOD, 5 Day	10	10	16	4400	21	730	19	/	10	1740	/	>8200
Calcium	5	42.5	16.4	21.4	10.6	200	190	/	34.5	120	/	140
COD	20	74	84	7190	178	806	115	/	84	2220	/	13300
Iron	0.1	83	49.1	530	84	55	78	/	110	160	/	200
Magnesium	5	11.4	<5.0	5.1	<5.0	19.7	38.2	/	8.6	25.3	/	51
Oil and Grease	0.05	0.10	0.67	86.8	0.45	3.01	0.31	/	0.16	659	/	91.2

Explantion:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Estimated value. Analyte was found below the quantitation limit
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

TABLE F-13
ORGANIC CHEMICAL ANALYSIS
QUALITY CONTROL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)	Trip Blank 1 11/15/91	Trip Blank 2 11/19/91	Trip Blank 3 11/21/91	Trip Blank 4 11/27/91	Trip Blank 5 12/03/91
Volatile Organic Compounds (VOCs) (ug/l)						
Chloromethane	10	-	-	-	-	-
Bromomethane	10	-	-	-	-	-
Vinyl chloride	10	-	-	-	-	-
Chloroethane	10	-	-	-	-	-
Methylene chloride	5	1 BJ	1 J	3 J	10 B	6 B
Acetone	10	7 BJ	8 BJ	5 BJ	8 BJ	4 BJ
Carbon disulfide	5	-	-	-	-	-
Trichlorofluoromethane	5	-	-	-	-	-
1,1-Dichloroethene	5	-	-	-	-	-
1,1-Dichloroethane	5	-	-	-	-	-
1,2-Dichloroethene (total)	5	-	-	-	-	-
Chloroform	5	-	-	-	- B	- B
1,2-Dichloroethane	5	-	-	-	-	-
2-Butanone	10	-	-	-	-	-
1,1,1-Trichloroethane	5	-	-	-	-	-
Carbon tetrachloride	5	-	-	-	-	-
Vinyl acetate	10	-	-	-	-	-
Bromodichloromethane	5	-	-	-	-	-
1,2-Dichloropropane	5	-	-	-	-	-
cis-1,3-Dichloropropene	5	-	-	-	-	-
Trichloroethene	5	-	-	-	-	-
Dibromochloromethane	5	-	-	-	-	-
1,1,2-Trichloroethane	5	-	-	-	-	-
Benzene	5	-	-	-	-	-
trans-1,3-Dichloropropene	5	-	-	-	-	-
2-Chloroethylvinylether	10	-	-	-	-	-
Bromoform	5	-	-	-	-	-
2-Hexanone	10	-	- B	- B	-	-
4-Methyl-2-pentanone	10	-	- B	- B	-	-
Tetrachloroethene	5	-	-	-	-	-
1,1,2,2-Tetrachloroethane	5	-	-	-	-	-
Toluene	5	-	-	-	-	-
Chlorobenzene	5	-	-	-	-	-
Ethylbenzene	5	-	-	-	-	-
Styrene	5	-	-	-	-	-
Xylenes (total)	5	-	-	-	-	-
1,3-Dichlorobenzene	5	-	-	-	-	-
1,4-Dichlorobenzene	5	-	-	-	-	-
1,2-Dichlorobenzene	5	-	-	-	-	-
Tetrahydrofuran	5	-	-	-	-	- B
Acrolein	100	-	-	-	-	-
Iodomethane	10	-	-	-	-	-
Acrylonitrile	100	-	-	-	-	-
Dibromomethane	5	1 J	1 BJ	1 BJ	-	-
Ethyl methacrylate	5	-	-	-	-	-
1,2,3-Trichloropropane	5	-	-	-	-	-
trans-1,4-Dichloro-2-butene	5	-	-	-	-	-

TABLE F-13
ORGANIC CHEMICAL ANALYSIS
QUALITY CONTROL SAMPLES
KINSTON FEASIBILITY STUDY SAMPLING
NOVEMBER 1991

	Method Detection Limit (undiluted)	Trip Blank 1 11/15/91	Trip Blank 2 11/19/91	Trip Blank 3 11/21/91	Trip Blank 4 11/27/91	Trip Blank 5 12/03/91
1,4-Dioxane	50	-	-	-	-	- B

Explanation:
- : Compound was analyzed for but not detected
/ : Compound was not analyzed for
B : Analyte was found in the associated blank
J : Estimated value. Analyte was found below the quantitation limit.
E : Compound may be above or below the linear range of the instrument. Sample was reanalyzed at a higher dilution.
R : Replicate
DL : Dilution

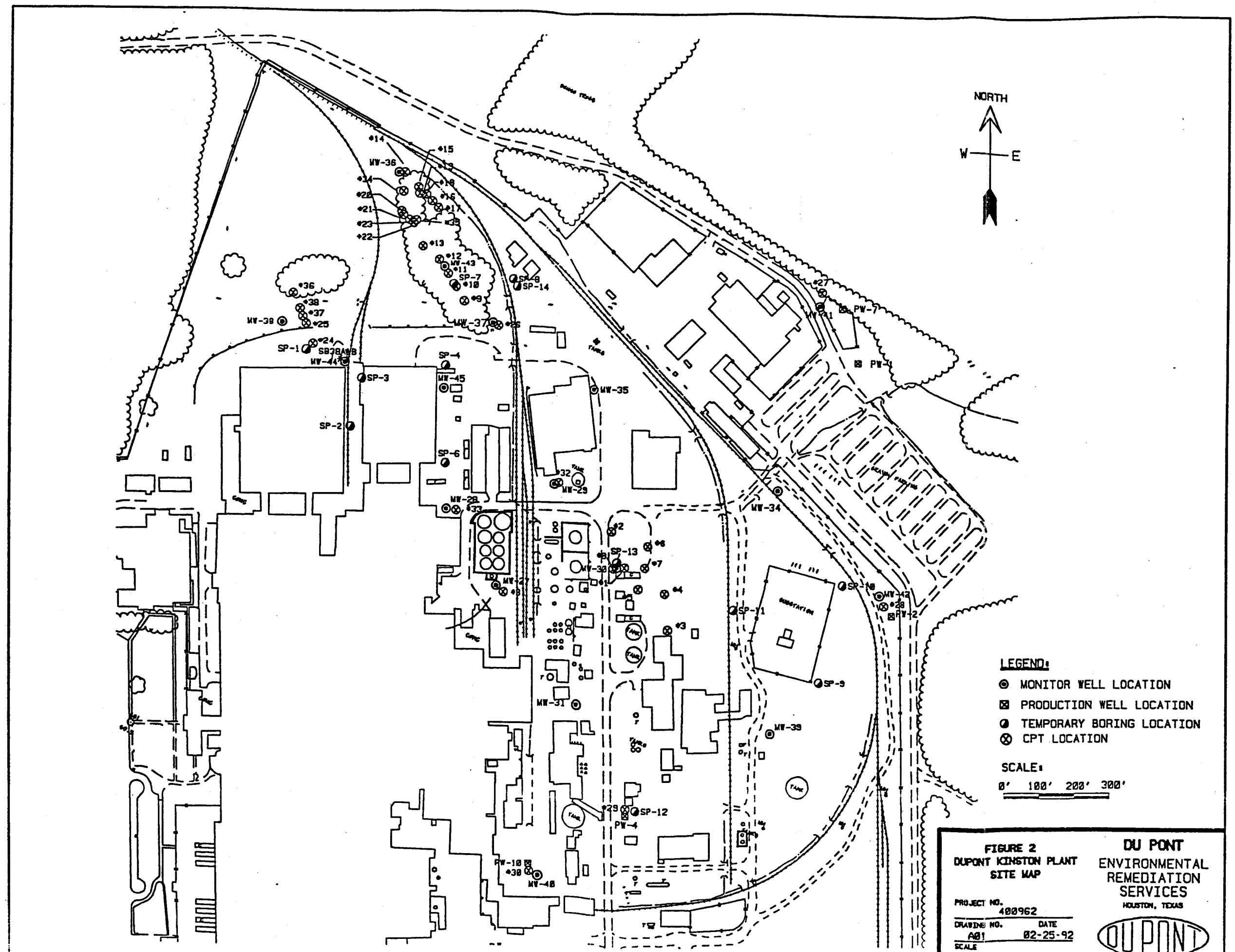


FIGURE 2
DUPONT KINSTON PLANT
SITE MAP

PROJECT NO. 400962
DRAWING NO. A01
DATE 02-25-92
SCALE AS SHOWN

DU PONT
ENVIRONMENTAL
REMEDIATION
SERVICES
HOUSTON, TEXAS

DUPONT

Table E-1
ORGANIC CHEMICAL ANALYSIS
MANUFACTURING AREA GROUNDWATER INVESTIGATION
NOVEMBER 1989 AND JULY 1990

	MW27		MW28		MW29		MW30A		MW30B	MW31	
Analysis (ppb)	11/89	8/90	11/89	8/90	11/89	8/90	11/89	8/90	8/90	11/89	8/90
Methylene Chloride	9B	4BJ	7B	9B	6BJ	13BJ	48BJ	55BJ	9B	2BJ	6B
Acetone	<10	6BJ	<10	6BJ	<33	19BJ	<250	92BJ	20B	6BJ	7BJ
Carbon Disulfide	<5	<5	<5	<5	<17	<20	<120	<100	1J	3J	<5
1,2 Dichloroethene (total)	<5	3J	<5	<5	<17	18J	<120	30J	<5	<5	<5
Chloroform	<5	<5	<5	<5	<17	<20	<120	<100	<5	<5	2J
Methyl Ethyl Ketone	<10	<10	<10	<10	<33	<40	<250	<200	<10	<10	<10
Trichloroethylene	<5	<5	2J	2J	390	490	4200	2700	2J	10	1J
Tetrachloroethylene	<5	<5	<5	<5	<17	<20	<5	<100	<5	4J	2J
Toluene	<5	3J	<5	3BJ	<17	<20	<120	<100	1J	<5	1J
1,4-Dioxane	<50	<50	<50	127	<17	<200	<10	<1000	<50	<50	<50
Dowtherm A	24	<10	<10	<10	<10	<10	<10	<10	<10	2000	2J
Ethylene Glycol	<250	<1000	<250	<1000	<250	<1000	330	<1000	<1000	<250	<1000
Triethylene Gylcol	<250	<1000	<250	<1000	<250	<1000	890	<1000	<1000	<250	<1000

"J" = Estimated value. Measured value is less than the quantitative limit.
"B" = Compound was detected in associated laboratory blank.
<5 = Below quantitative detection limit shown.
"-" = Sample not taken or analysis not performed.

Table E-1 (continued)
ORGANIC CHEMICAL ANALYSIS
MANUFACTURING AREA GROUNDWATER INVESTIGATION
AUGUST 1990

Analysis (ppb)	MW34 8/90	MW35 8/90	MW36 8/90	MW37 8/90	MW38 8/90	MW39 8/90	MW40 8/90	MW41 8/90	SW1 8/90	SW2 8/90	EQ BLK 8/90	MW29 Duplicate 8/90	TB1 8/90	TB2 8/90	TB3 8/90
Methylene Chloride	5B	6B	5B	6B	5B	6B	6B	6B	11B	5B	5B	12BJ	7B	11B	7B
Acetone	13B	9BJ	5BJ	10B	7BJ	11B	7BJ	7BJ	11B	6BJ	10B	23BJ	12B	10B	10B
Carbon Disulfide	5	<5	<5	<5	<5	<5	<5	<5	9	5	<5	<20	<5	<5	<5
1,2 Dichloroethene (total)	<5	2J	<5	4J	4J	<5	4J	<5	<5	<5	<5	23J	<5	<5	<5
Chloroform	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<20	<5	<5	<5
Methyl Ethyl Ketone	<10	5J	<10	<10	<10	<10	<10	<10	<10	<10	<10	<40	5J	5J	<10
Trichloroethylene	<5	9	<5	19	5	<5	1J	2J	<5	<5	<5	620	<5	<5	<5
Tetrachloroethylene	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<20	<5	<5	<5
Toluene	3J	1J	<5	2J	2J	1J	3J	<5	3J	<5	5B	4BJ	2J	2J	2BJ
1,4-Dioxane	<50	<50	<50	<50	<50	<50	220	<50	<50	<50	<50	<200	<50	<50	<50
Dowtherm A	<10	<10	<10	<10	<10	<10	4J	<10	<10	<10	<10	<10	-	-	-
Ethylene Glycol	<1000	<2000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	-	-	-
Triethylene Glycol	<1000	<2000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	-	-	-

"J" = Estimated value. Measured value is less than the quantitative limit.
"B" = Compound was detected in associated laboratory blank.
<5 = Below quantitative detection limit shown.
"-" = Sample not taken or analysis not performed.

Table E-2
FINAL FIELD PARAMETERS FROM
MONITORING WELL AND SURFACE WATER SAMPLES

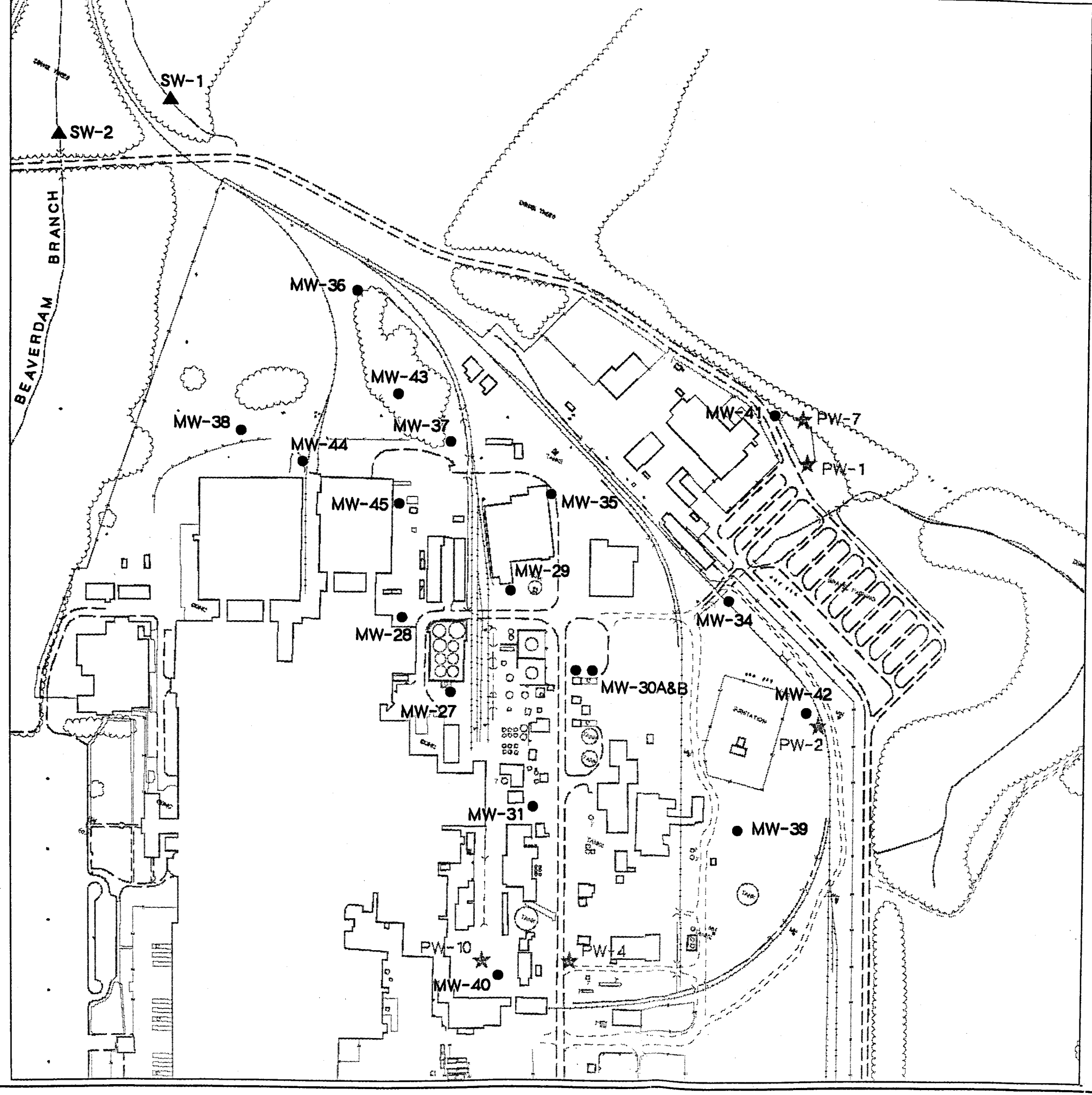
Well	Date	pH	Eh[a] (mv)	Conductivity (umhos/cm)	Temperature (°C)	Dissolved Oxygen (mg/l)
MW27	11/89	66.0	-71	242	23.3	--
	8/90	6.11	-76	272	27.5	--
MW28	11/89	55.6	39	221	22.9	--
	8/90	4.88	181	142	24.5	--
MW29	11/89					--
	8/90	4.13	282.0	135	27.0	--
MW30A	11/89					--
	8/90	4.06	201.0	1,800	28.0	--
MW30B	8/90	10.87	22	300	24.0	--
MW31	11/89	5.8	301	229	24.6	--
	8/90	5.27	165	475	29.2	--
MW34	11/89					--
	8/90	5.36	156	102	24.0	--
MW35	11/89					--
	8/90	4.04	234	1,150	26.8	--
MW36	11/89					--
	8/90	5.98	139	197	23.5	--
MW37	11/89					--
	8/90	6.23	153	330	24.5	--
MW38	11/89					--
	8/90	5.34	188	205	20.5	--
MW39	11/89					--
	8/90	5.69	83	155	25.0	--
MW40	11/89					--
	8/90	6.00	46	333	27.0	--
MW41	11/89					--
	8/90	4.97	137	350	23.5	--
SW1	11/89					
	8/90	6.45	142	473	25.5	5.8
SW2	11/89					
	8/90	6.53	134	153	25.8	4.4

[a]Uncorrected field measurement.
(--)Dash indicates parameters not measured.

Table E-3
MANUFACTURING AREA GROUNDWATER INVESTIGATION
MONITORING WELL CONSTRUCTION DETAILS

Well	Ground Elevation (in feet above MSL)	Depth to Top of Bentonite (in feet)	Depth to Top of Sand Pack (in feet)	Depth to Top of Screen (in feet)	Depth to Bottom of Screen (Screened Interval) (in feet)	Depth to Bottom of 8-inch Casing (in feet)	Depth to Bottom of 6-inch Casing (in feet)	Total Borehole Depth (in feet)	Well Type[a]
MW27	63.4	4'4"	6'	7'	15' (8')	--	--	20	Flush
MW28	63.8	5'	7'1"	8'3"	13'3" (5')	--	--	15.5	Flush
MW29	63.2	5'5"	7'6"	8'9"	11'3" (2'6")	--	--	13.5	Flush
MW30	65.2	5'2"	7'6"	8'7"	15'1" (6'6")	--	--	18	Flush
MW31	65.2	6'5"	8'5"	10'2"	16'8" (6'6")	--	--	18.5	Flush
MW30B	65.3	43.1	45.6	49	59 (10)	25	42	60	Flush
MW34	65.2	10	12.5	15.5	20.5 (5)	--	--	20.5	Above
MW35	62.7	4	6	8	12 (4)	--	--	14	Flush
MW36	45.5	12	15[b]	20	25 (5)	--	--	27	Above
MW37	62.5	4	6	8	13 (5)	--	--	17	Above
MW38	55.4	18	21	25	35 (10)	--	--	37	Above
MW39	67.6	9	11	13	18 (5)	--	--	19	Above
MW40	64.2	3	5	7	17 (10)	--	--	22	Flush
MW41	63.7	6	8[b]	10	15 (5)	--	--	17	Above

[a]Well Type: "above ground" or "flush" mount
[b]MW36--natural sand pack interval 15 to 17 feet below ground surface
MW41--natural sand pack interval 13 to 15 feet below ground surface



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LEGEND

- ● MONITORING WELLS
- ☆ PRODUCTION WELLS
- ▲ SURFACE WATER SAMPLES

0 150 300 450

SCALE: 1"=300'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure E-1

PHASE 3
GROUNDWATER MONITORING SYSTEM AND SURFACE WATER LOCATIONS - MANUFACTURING AREA
DuPont Kinston Facility

CH2M HILL

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA
BORING : MW-27
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: STEVEN BROWN
PAGE 1 OF 1
DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA
CH2M HILL
GROUND ELEVATION (FT MSL): 63.4 START DATE: 9/11/89 FINISH DATE: 9/12/89
PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION: 2-INCH PVC FLUSH MOUNT
58.4	5	3-5	S1	16	4-2-3	0-10": CLAY WITH SOME F. SAND, MODERATE YELLOWISH BROWN (10 YR 5/4), DRY; 10-16": SILTY F. SAND, PALE PINK (10 R 6/2), MOIST		GROUT; CAVE-IN; BENTONITE
53.4	10	8-10	S2	24	5-7-10	0-8": CLAYEY MED. SAND, DARK YELLOWISH BROWN (10 YR 4/2), DRY; 8-12": CLAYEY SAND, DARK YELLOWISH ORANGE (10 YR 6/6), WET; 12-24": MED. SAND TO F. PEBBLES, GREYISH ORANGE (10 YR 7/4) TO LIGHT GRAY (N6), WET		SAND
48.4	15	13-15	S3	23	8-50 (<6")	0-7": CLAYEY F. SAND, GRAYISH ORANGE (10 YR 7/4), WET; 7-17": CLAY WITH SOME F. SAND, DARK YELLOWISH ORANGE (10 YR 6/6) AND DARK YELLOWISH BROWN (10 YR 4/2); 17-23": MUDSTONE, DARK GRAY (N3), DRY		
43.4	20	18-20	S4	11	8-50 (<6")	0-11": CLAY WITH SOME VF. SAND, DARK GRAY (N3), COMPACTED, MOIST		

NOTE: AUGER REFUSAL AT 20 FT BELOW LAND SURFACE

WELL SUMMARY

GROUT: 0 TO 2'7"
CAVE-IN: 2'7" TO 4'4"
BENTONITE: 4'4" TO 6'
SAND: 6' TO 15'
SCREEN: 7' TO 15'
F. SAND BACKFILL: 15' TO 19'

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA — BORING : MW-28

DRILLER: WESTINGHOUSE ENVIRONMENTAL — LOGGER: STEVEN BROWN — PAGE 1 OF 1

DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA — CH2M HILL

GROUND ELEVATION (FT MSL): 63.8 — START DATE: 9/12/89 — FINISH DATE: 9/15/89 — PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION: 2-INCH PVC FLUSH MOUNT
58.8	5	4.5-6	S1	20	4-5-6	0-20": CLAY WITH SOME F. TO C. SAND (10%), LIGHT OLIVE GRAY (5 Y 6/1) TO MODERATE REDDISH ORANGE (10 R 6/6), WITH IRON STAINING, COMPACTED, STIFF, MOIST		GROUT
53.8	10	9-10.5	S2	22	2-15-9	0-8": SAME AS S1; 8-11": F. TO C. SAND WITH SOME CLAY, DARK YELLOWISH ORANGE (10 YR 6/6), UNCONSOLIDATED, WET; 11-14": SAME AS 8-11" INTERVAL EXCEPT GLAUCONITIC AND CONSOLIDATED; 14-18": MIX OF SAND AND DARK GRAY MUDSTONE; 18-22": MIX OF ORANGE TAN SANDY CLAY AND MED. DARK GRAY MUDSTONE (N4), SAND IS V. FINE		BENTONITE
48.8	15	14-15.5	S3	25	15-32-37	0-2": MED. SAND WITH SOME CLAY, MODERATE YELLOWISH BROWN (10 YR 5/4); 2-11": CLAY, MODERATE YELLOWISH BROWN (10 YR 5/4); 11-25": MIX OF MUDSTONE AND CLAY, MED. DARK GRAY (N4), WET		SAND

NOTE: AUGER REFUSAL AT 14' 6" BELOW LAND SURFACE

WELL SUMMARY

GROUT: 0 TO 5'
BENTONITE: 5' TO 7'1"
SAND: 7'1" TO 13'3"
SCREEN: 8'3" TO 13'3"

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA
BORING : MW-29
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: STEVEN BROWN
PAGE 1 OF 1
DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA
CH2M HILL
GROUND ELEVATION (FT MSL): 63.2 START DATE: 9/15/89 FINISH DATE: 9/18/89
PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION: 2-INCH PVC FLUSH MOUNT
58.2	5	3.5-5	S1	19	6-7-8	0-19": CLAYEY F. TO MED. SAND, 20-30% CLAY, GRAYISH ORANGE (10 YR 7/4) TO MODERATE REDDISH ORANGE (10 R 6/6), MOIST		GROUT
53.2	10	8.5-10	S2	14	5-3-3	0- 6": VF. SANDY CLAY, DARK YELLOWISH ORANGE (10 YR 6/6), MOIST, STIFF; 8-14": F. TO MED. SAND WITH SOME CLAY, PALE YELLOWISH ORANGE (10 YR 8/6) WITH SOME IRON STREAKS, WET, LOOSE		BENTONITE
48.2	15	12-13.5	S3	19	35-15-21	0-6": V. CLAYEY VF. TO F. SAND, DARK YELLOWISH ORANGE (10 YR 6/6), WET, STIFF; 6-12": SANDY MUDSTONE, DARK GRAY (N3),HIGHLY BROKEN, DRY; 12-19": CLAY WITH TR. SAND AND SOME SAND STRINGERS, DARK GRAY (N3), DRY		SAND

NOTE: AUGER REFUSAL AT 12 FT BELOW LAND SURFACE

WELL SUMMARY

GROUT: 0 TO 5'5"
BENTONITE: 5'5" TO 7'6"
SAND: 7'6" TO 11'3"
SCREEN: 8'9" TO 11'3"

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA
BORING : MW-30
DRILLER: WESTINGHOUSE ENVIRONMENTAL LOGGER: STEVEN BROWN
PAGE 1 OF 1
DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA
CH2M HILL
GROUND ELEVATION (FT MSL): 65.2 START DATE: 9/18/89 FINISH DATE: 9/19/89
PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION: 2-INCH PVC FLUSH MOUNT
60.2	5	4-5.5	S1	19	5-6-7	0-6": SANDY CLAY , VERY PALE ORANGE (10 YR 8/2), SAND IS VF. TO F., STIFF, MOIST; 6-12": SAME AS TOP 6" BUT LESS SANDY; 12-19": CLAYEY SAND, VERY PALE ORANGE (10 YR 8/2) TO V. LIGHT GRAY (N8), SAND IS MED. TO C. , MOIST		GROUT
55.2	10	8.5-10	S2	25	8-7-12	0-6": CLAY WITH TRACE VF. SAND, GRAYISH ORANGE (10 YR 7/4), WET; 6-25": F. TO C. BEACH SAND, VERY PALE ORANGE (10 YR 8/2), WET LOOSE		BENTONITE
50.2	15	14-15.5	S3	22	3-7-12	0-3": SAME AS S2 6-25" INTERVAL, V. WET AND LOOSE; 3-22": CLAYEY MED. TO C. SAND WITH ROUNDED VF. PEBBLES, DARK GRAY (N3), V. WET AND LOOSE		SAND
		16.5-18	S4	23	23-15-50	0-7": CLAY WITH VF. SAND, VERY PALE ORANGE (10 YR 8/2) WITH YELLOW ORANGE STREAKS, WET, STIFF; 7-23": MIX OF CLAY AND MUDSTONE, MED. GRAY (N5) TO DARK GRAY (N3), DRY WHERE MUDSTONE, MOIST WHERE CLAY		
45.2	20							

NOTE: AUGER REFUSAL AT 16' 6"BELOW LAND SURFACE

WELL SUMMARY

GROUT: 0 TO 5'2"
BENTONITE: 5'2" TO 7'6"
SAND: 7'6" TO 15'1"
SCREEN: 8'7" TO 15'1"

PROJECT: DUPONT KINSTON FACILITY ; KINSTON, NORTH CAROLINA | BORING : MW-31

DRILLER: WESTINGHOUSE ENVIRONMENTAL | LOGGER: STEVEN BROWN | PAGE 1 OF 1

DRILLING METHOD/EQUIPMENT: CME-55 WITH 6 1/4" HSA | CH2M HILL

GROUND ELEVATION (FT MSL): 65.2 | START DATE: 9/19/89 | FINISH DATE: 9/19/89 | PROJECT #:SAT 21805.E0

ELEVATION (FT MSL)	DEPTH (FEET)	SAMPLE COLLECTION DATA: INTERVAL (FEET)	SAMPLE NUMBER	RECOVERY (IN)	STANDARD PENETRATION TEST 6"-6"-6"-6" (N)	WRITTEN LOG	SYMBOLIC LOG	WELL CONSTUCTION: 2-INCH PVC FLUSH MOUNT
60.2	5	4.5-6	S1	20	5-7-12	0- 4": CLAYEY F. SAND, DARK YELLOWISH ORANGE (10 YR 6/6), DRY, STIFF; 4-20": SANDY CLAY, VERY PALE ORANGE (10 YR 8/2) WITH DARK YELLOWISH ORANGE STREAKS (10 YR 6/6), STIFF, MOIST		GROUT
55.2	10	9-10.5	S2	17	7-12-15	0 - 5": CLAYEY VF. SAND, DARK YELLOWISH ORANGE (10 YR 6/6), STIFF, MOIST; 5-10": CLAY WITH TR. VF. SAND, GRAYISH ORANGE (10 YR 7/4), MOIST, STIFF; 10-17": F. TO MED. BEACH SAND, VERY PALE ORANGE (10 YR 8/2), WET, LOOSE		BENTONITE
50.2	15	14-15.5	S3	25	4-9-16	0 -8": CLAYEY SAND, PALE YELLOWISH ORANGE (10 YR 8/6) TO DARK YELLOWISH ORANGE (10 YR 6/6), MOIST, STIFF; 8-10": CLAY WITH SOME F. SAND, LIGHT BROWN (5 YR 5/6), STIFF; 10-13": CLAY, MED. DARK GRAY (N4), MOIST, A BIT LOOSE; 13-25": FINE GLAUCONITIC SAND WITH SOME SHELLS AND VF PEBBLES, GRAYISH BLACK (N2), WET		SAND
45.2		17.5-18.5	S4	21	40-16-17	0 - 4": CLAYEY F. SAND WITH VF. TO F. PEBBLES, MODERATE ORANGE BROWN (10 YR 6/4), WET, MODERATELY STIFF;4-10": CLAY, VERY PALE ORANGE (10 YR 8/2) TO LIGHT BROWN (5 YR 5/6), STIFF, MOIST; 10-21": MIX OF CLAY AND MUDSTONE WITH SAND STRINGERS, MED. GREY (N5) TO DARK GRAY (N3), MOIST TO DRY (0-10" PROBABLY RUNUP)		

NOTE: AUGER REFUSAL AT 17' 8"BELOW LAND SURFACE

WELL SUMMARY

GROUT: 0 TO 6'5"
BENTONITE: 6'5" TO 8'5"
SAND: 8'5" TO 16'8"
SCREEN: 10'2" TO 16'8"

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW30B | SHEET: 1 OF 4

CH2M HILL

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 65.3' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 12", 10", & 6" ROTARY W/A FAILING F-7

WATER LEVEL AND DATE: 27.7' MSL, 8/27/90 | START: 8/2/90 | FINISH: 8/9/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					DRILLING NEXT TO MW30, SEE BORING LOG FOR SOIL DESCRIPTION 0-15'		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5							
10							RIG CHATTER @ 7'
15							HARD DRILLING @ 16.5'
							SET 8" CASING TO 19.5'

PROJECT NUMBER:SAT21805.H0 | BORING NO.: MW30B | SHEET: 2 OF 4

CH2M HILL

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 65.3' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 12", 10", & 6" ROTARY W/A FAILING F-7

WATER LEVEL AND DATE: 27.7'MSL,8/27/90 | START: 8/2/90 | FINISH: 8/9/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
15							
							HARD DRILLING @ 16.5'
	19.2'-21.2'	S1	1.0	6-87--26-40 (113)	0-6" SILT W/ SAND, (ML), BLACK (N1), DRY, FIRM		
20					6-12" POORLY CONSOLIDATED MUDSTONE W/ SILT AND INTERBEDDED SAND SEAMS, BLACK (N1), DRY		ROUGH DRILLING @ 21'
							V. ROUGH DRILLING @ 22'
							SOFTER DRILLING @ 23'
							V. ROUGH DRILLING @ 24'
25	25-25.5'	S2	0.7	50/4"	SILT, (ML), BLACK (N1), DRY, HARD, W/ SOME F. SAND SEAMS AND CONSOLIDATED ROCK FRAGMENTS		SET 26' OF 8" CASING (+1 TO 25'BGS) ON 8/5/90
							NOTE: ON 8/6/90 PRESSURE TEST WAS COMPLETED ON THE 8" CASING
30							

SBLSYM 06/14/88

PROJECT NUMBER: SAT21805.H0.02 | BORING NMBER: MW30B | SHEET: 3 OF: 4

CH2M HILL

ROCK CORE LOG

PROJECT: DUPONT KINSTON LOCATION: LENOIR CO.

ELEVATION: 65.3' DRILLING CONTRACTOR: HARIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: NX CORE BARREL W/ A FAILING F-7 ORIENTATION: VERTICAL

WATER LEVEL AND DATE: 27.7' MSL, 8/27 START: 8/2/90 FINISH: 8/9/90 LOGGER: A. BRYDA

DEPTH BELOW SURFACE	CORE RUN LENGTH AND REC	DISCONTINUITIES R Q D	F / R A C	DESCRIPTION: DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING AND STAINING	GR AL PO HG I	LITHOLOGY: ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	COMMENTS: SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING, ROD DROPS, TEST RESULTS
25.5	NX-1	0%	>10	MULTIPLE FRACTURES, NEAR HORIZONTAL, ROUGH, STEEPED TO UNDULATING, SOME SILT INFILLING, OPEN		MUDSTONE, GRAYISH BLACK (N2), FINE GRAINED, SL. WEATHERED, SOFT, SL. CALCAREOUS	
	4.5'						
	33%						
				SAME AS ABOVE			
29.5	NX-2	0%	>10			SAME W/ SOME INTERVALS OF V. SOFT MUDSTONE/V. HARD CLAY. BOTTOM 6" IS GLAUCONITIC SANDY MUDSTONE.	COREBARREL IS MUDDING UP
	5.5'						
	55%						
				SAME AS ABOVE			
35	NX-3	22%				0-1.5' GLAUCONITIC SANDSTONE, GRAYISH BLACK (N2), SOFT, INTERLAYERED W/ MUDSTONE GRAYISH BLACK (N2), SOFT 1.5-2.0' CLAY, GRAYISH BLACK (N2), SOFT 2.0-3.5' GLAUCONITIC SANDSTONE, SOFT	HARD DRILLING, RIG CHATTER SOFT DRILLING
	5.5'		>10				
	77%						
40.5							HARD DRILLING, RIG CHATTER

RCLSYM 11/09/87

CH2M HILL

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW30B | SHEET: 4 OF 4

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC
ELEVATION: 65.3' | DRILLING CONTRACTOR: HARDIN-HUBER INC.
DRILLING METHOD AND EQUIPMENT: 12", 10", & 6" ROTARY W/A FAILING F-7
WATER LEVEL AND DATE: 27.7'MSL, 8/27/90 | START: 8/2/90 | FINISH: 8/9/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
45	45-47	S3	1.2	3-19- -14-14 (33)	CLAYEY SAND, (SC), GRAYISH GREEN (5GY6/1), WET, MEDIUM TO DENSE, SAND IS F-M.		SET 43' OF 6" CASING (+1 TO 42'BGS) ON 8/7/90 NOTE: ON 8/8/90 PRESSURE TEST WAS COMPLETED ON THE 6" CASING
50	51-53	S4	2.0	15-38- -50/2"	0-18" POORLY GRADDED SAND W/ SILT, (SP-SM), GRAYISH GREEN (10G4/2), WET, LOOSE, GLAUCONITIC F-M. SAND 18-20" WELL GRADED GRAVEL, (GW), GRAYISH GREEEN (10G4/2), WET, LOOSE, GLAUCONITIC, GRAVEL IS WELL ROUNDED 20-24" CLAYEY SAND, (SC), GRAYISH GREEN (10G4/2), WET, LOOSE, GLAUCONITIC F-M.		
55	55-57	S5	1.3	9-13- -20-50 (33)	SAND 0-7" SAME AS S4 18-20" 7-15" SAME AS S4 0-18" W/ SOME FINE GRAVEL AND MICA		
60	60-62	S6	1.5	18-45- 50-50/3" (95)	SAME AS S4 0-18"		WELL CONSTRUCTION INFO 62' TOTAL DEPTH 49-59' 2-INCH SCH 40 PVC, 10 SLOT SCREEN 45.6-59' #2 MORIE SAND PK 43.1-45.6' BEN. PELLETS 0-43.1' CEMENT GROUT 0-25' 8" CASING SET 0-42' 6" CASING SET CASING WAS CUT TO GROUND SURFACE AND A FLUSH MOUNT COVER WAS INSTALLED
65							

SBLSYM 06/14/88

	PROJECT NUMBER:SAT21805.H0	BORING NO.: MW34	SHEET: 1 OF 1
CH2M HILL			

SOIL BORING LOG

PROJECT: DUPONT KINSTON LOCATION: LENOIR CO., NC

ELEVATION: 65.2' DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 8.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 58.4'MSL,8/27/90 START: 8/9/90 FINISH: 8/9/90 LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SY MBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-3' DESCRIPTION FROM CUTTINGS: SILTY SAND, (SM), DARK YELLOW ORANGE (10YR6/6), DRY, SAND IS F-M.		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
	3-5	S1	1.3	2-4-6-8 (10)	SILTY CLAYEY SAND, (SC-SM), DARK YELLOW ORANGE (10YR6/6), DRY, LOOSE TO MEDIUM, SIMILAR TO ABOVE, SAND IS F.		
5							
	8-10	S2	0.5	1-3-2-3 (5)	CLAYEY SAND, (SC), DOMINANT COLOR IS DARK YELLOW ORANGE (10YR6/6), MOIST, V. LOOSE, TO LOOSE SIMIALR TO ABOVE BUT W/ MORE CLAY		
10							
	13-15	S3	1.7	3-5-4-7 (9)	0-3" SAME AS ABOVE 3-8" LEAN CLAY W/ SAND, (CL), V. PALE ORANGE (10YR8/2), MOIST, LOOSE 8-20" CLAYEY SAND, (SC), V. PALE ORANGE (10YR8/2), WET, LOOSE		WATER LEVEL DURING DRILLING ~14' PROBABLY HARD CLAY ABOVE THE TOP OF ROCK
15							
	18-20	S4	1.3	3-6-50/3	0-8" SAME AS S3 8-20" 8-16" LEAN CLAY, (CL), BLACK (N1), DRY, HARD, WITH BLACK CEMENTED MUDSTONE FRAGMENTS AND THIN F. SAND SEAMS IN THE MUDSTONE.		WELL CONSTRUCTION INFO 20.5' TOTAL DEPTH 15.5-20.5' 2-INCH SCH 40 PVC, 10 SLOT SCREEN 12.5-20.5' #2 MORIE SAND PACK 10.5-12.5 BEN. PELLETS 0-10.5' CEMENT GROUT
20							

CH2M HILL

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW35 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 62.7' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 58.0' MSL, 8/27/90 | START: 8/14/90 | FINISH: 8/14/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	R E C	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SY MBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-5' DESCRIPTION FROM CUTTINGS: CLAYEY SAND, (SC), DARK YELLOW ORANGE (10YR6/6), DRY, SAND IS F-M.		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5	5-7	S1	1.3	3-5-8-20 (13)	CLAYEY SAND, (SC), SIMILAR TO ABOVE, DARK YELLOW ORANGE TO V. PALE ORANGE (10YR6/6 TO 10YR8/2), DRY, MEDIUM, SAND IS F-M.		
							WATER LEVEL DURING DRILLING ~9'
10	10-12	S2	1.1	4-5-5-4 (10)	0-5" CLAYEY SAND, (SC), DARK YELLOW ORANGE (10YR6/6), WET, LOOSE TO MEDIUM, SAND IS M-VC. 5-13" LEAN CLAY W/ SAND, (CL), DARK GRAY (N3), DRY, SAND IS M-VC.		
15							WELL CONSTRUCTION INFO
							14' TOTAL DEPTH
							8-12' 2-INCH SCH 40 PVC, 10 SLOT SCREEN
							6-12' #2 MORIE SAND PACK
							4-6' BENTONITE PELLETS
							0-4' CEMENT GROUT
							FLUSH MOUNT WELL
20							SAND PACK AND CASING WERE WASHED INTO PLACE

CH2M HILL

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW36 | SHEET: 1 OF 2

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 45.5' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 28.1'MSL,8/27/90 | START: 8/13/90 | FINISH: 8/13/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-5' DESCRIPTION FROM CUTTINGS: SANDY LEAN CLAY, (CL), DARK YELLOW ORANGE (10YR6/6), SL. MOIST, SIMILAR TO MW37 0-5'		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5	5-7	S1	1.3	4-5-6-8 (11)	SANDY LEAN CLAY, (CL), DARK YELLOW ORANGE TO V. PALE ORANGE (10YR6/6 TO 10YR8/2), DRY, STIFF, SIMILAR TO MW37		
10	10-12	S2	1.1	3-5-5-7 (10)	SANDY LEAN CLAY, (CL), YELLOWISH GRAY (5Y7/2), MOIST, STIFF, SAND IS M-C.		
15	15-17	S3	1.5	6-4-3-6 (7)	0-12" CLAYEY SAND, (SC), GRAYISH OLIVE TO PALE OLIVE (10Y4/2 TO 10Y6/2), WET, LOOSE, GLAUCONITIC NONCALCAREOUS SILECOUS FRAGMENTS, SAND IS C. 12-16" SANDY LEAN CLAY, (CL), YELLOWISH GRAY (5Y7/2), WET, GLAUCONITIC C. SAND 16-18" SIMILAR TO 0-12" BUT LESS CLAY AND C. SAND		WATER LEVEL DURING DRILLING -18'
20							

SBLSYM 06/14/88

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW36 | SHEET: 2 OF 2

CH2M HILL

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 45.5' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25 HSA W/A FAILING F-7

WATER LEVEL AND DATE: 28.1'MSL,8/27/90 | START: 8/13/90 | FINISH: 8/13/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
20	20-22	S4	1.6	11-18-15-16 (33)	POORLY GRADED SAND W/ SILT, (SP-SM), DUSKY YELLOW (5Y6/4), WET, DENSE, SAND IS M-C., SL. ODOR		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
25	25-27	S5	2.0	16-40-50/3"	SAME AS S4		
30							WELL CONSTRUCTION INFO: 27' TOTAL DEPTH 20-25' 2-INCH SCH 40 PVC, 10 SLOT SCREEN 17-25' #2 MORIE SAND PACK 15-17' NATURAL SAND PACK 12-15' BENTONITE PELLETS 0-12' CEMENT GROUT

SBLSYM 06/14/88

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW37 | SHEET: 1 OF 1

CH2M HILL

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 62.5' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 52.9'MSL,8/27/90 | START: 8/13/90 | FINISH: 8/13/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-5' DESCRIPTION FROM CUTTINGS: SANDY LEAN CLAY, (CL), GRAYISH ORANGE (10YR7/4), MOIST		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5	5-7	S1	1.3	5-7-9-13 (16)	SIMILAR TO ABOVE CLAYEY SAND, (SC), GRAYISH ORANGE (10YR7/4), SL. MOIST, MEDIUM, SAND IS F-C.		
10	10-12	S2	1.7	4-12-31-32 (43)	0-12" SIMILAR TO 0-5', SANDY LEAN CLAY, (CL), GRAYISH ORANGE (10YR7/4), SL. MOIST, SAND IS F. 12-20" LEAN CLAY W/ SAND, (CL), DARK GRAY (N3), DRY, HARD, THIN GRAY SAND SEAMS, SOME ROCK FRAGMENTS OF MUDSTONE, SAND IS F.		NO WATER WAS OBSERVED WHILE DRILLING THE WELL, HOWEVER, THE WELL WAS INSTALLED ANYWAY. LATER, WHEN CHECKED, WATER WAS FOUND IN THE WELL.
15	15-17	S3	1.0	5-50/5"	SAME AS S2 12-20"		WELL CONSTRUCTION INFO 17' TOTAL DEPTH 8-13' 2-INCH SCH 40 PVC, 10 SLOT SCREEN 6-17' #2 MORIE SAND PACK 4-6' BENTONITE PELLETS 0-4' CEMENT GROUT APPROXIMATELY 10 GALLONS OF WATER WAS ADDED AFTER THE BENTONITE WAS INSTALLED TO ALLOW THE PELLETS TO SWELL PRIOR TO GROUTING
20							

SBLSYM 06/14/88

PROJECT NUMBER: SAT21805.H0 | BORING NO.: SB38A AND SB38B | SHEET: 1 OF 1

CH2M HILL

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: ~ -62' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: DRY | START: 8/13/90 | FINISH: 8/13/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	PEN. REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-5' DESCRIPTION FROM CUTTINGS: LEAN CLAY, (CL), DARK YELLOW ORANGE (10YR6/6), DRY, STIFF		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5	5-7	S1	0.5	4-4-6-8 (10)	LEAN CLAY W/ SAND, (CL), DARK YELLOW ORANGE (10YR6/6), DRY, STIFF, SAND IS F.		
10	10-12	S2	1.5	4-9-39-50/5 (48)	0-4" SILT, (ML), PALE YELLOW BROWN (10YR6/2), DRY, STIFF 4-18" LEAN CLAY W/ SAND, (CL), DARK GRAY (N3), DRY, HARD, W/ THIN GRAY SAND SEAMS, SAND IS F.		
15							IN SB38A AN OBSTRUCTION WAS ENCOUNTERED ~10.5' BGS, W/ THE POSSIBILITY OF UTILITIES IN THE AREA, WE PULLED OUT AND MOVED OVER 5'. AN OBSTRUCTION WAS AGAIN ENCOUNTERED AT ~10.5' BGS, A SPLIT-SPOON SAMPLE WAS OBTAINED (SEE SOIL DESCRIPTION), THIS DEPTH IS PROBABLY THE TOP OF ROCK.
20							

CH2M HILL

PROJECT NUMBER: SAT21805.HO | BORING NO.: MW38 | SHEET: 1 OF 2

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 55.4' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 27.9'MSL,8/27/90 | START: 8/14/90 | FINISH: 8/14/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-5' DESCRIPTION FROM CUTTINGS: CLAYEY SAND, (SC), DARK YELLOW ORANGE (10YR6/6), MOIST, SAND IS F-M.		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5	5-7	S1	1.7	1-1-2-1 (3)	SAME, DARK YELLOW ORANGE TO GREENISH GRAY (10YR6/6 TO 5GY4/1), MOIST		
10	10-12	S2	1.5	3-5-9-8 (14)	SILTY CLAY, (CL-ML), LIGHT BROWN TO YELLOWISH GRAY (5Y5/6 TO 5Y7/2), DRY, STIFF TO V. STIFF, SOME GLAUCONITIC F. SAND IN THE LOWER 6"		
15	15-17	S3	0.0	12-8--10-12 (18)	NO RECOVERY		
20							

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW38 | SHEET: 2 OF 2

CH2M HILL

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 55.4' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 27.9'MSL,8/27/90 | START: 8/14/90 | FINISH: 8/14/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	R E C	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SY MBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
20	20-22	S4	1.7	6-6-9-10 (15)	POORLY GRADED SAND W/ CLAY, (SP-SC), OLIVE BROWN (5Y5/6), SOME LIGHT BROWN (5YR5/6) SEAMS, MOIST, MEDIUM, SAND IS M-C.		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
25	25-27	S5	1.8	10-13--18-16 (31)	SIMILAR TO ABOVE, SL. MOIST		
30	30-32	S6	2.0	4-7--10-10 (17)	SAME AS ABOVE, WET, SOME THIN CLAY SEAMS		WATER LEVEL DURING DRILLING -30'
35	35-37	S7	1.0	29-40-50/4"	WELL GRADED SAND W/ CLAY, (SW-SC), MODERATE OLIVE BROWN (5Y4/4), WET, DENSE, GLAUCONITIC SAND IS M-C.		WELL CONSTRUCTION INFO: 37' TOTAL DEPTH 30-37' NATURAL SAND PACK 25-35' 2-INCH SCH 40 PVC, 10 SLOT SCREEN 21-30' #2 MORIE SAND PACK 18-21' BENTONITE PELLETS 0-18' CEMENT GROUT SAND PACK, BENTONITE, AND CASING WERE WASHED INTO PLACE.

SBLSYM 06/14/88

CH2M HILL

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW39 | SHEET: 1 OF 2

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 67.6' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 60.6'MSL,8/27/90 | START: 8/10/90 | FINISH: 8/15/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	R E C	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-5' DESCRIPTION FROM CUTTINGS: CLAYEY SAND, (SC), GRAYISH ORANGE (10YR7/4), DRY		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5	5-7	S1	1.5	3-5-6-7 (11)	CLAYEY SAND, (SC), V. PALE GRAY TO GRAYISH ORANGE (10YR4/4 TO 10YR8/2), MOIST, LOOSE TO MEDIUM, SAND IS F-M. W/ TRACE GLAUCONITE		NOTE: THE ORIGINAL MW39 WAS DRILLED AND INSTALLED ~10 FROM ITS PRESENT LOCATION. THE WELL WAS DRILLED TO 27' AND INSTALLED. UPON WELL DEVELOPMENT, A SURGE BLOCK WAS LOST DOWN HOLE, AND THE WELL HAD TO BE ABANDONED. THE PRESENT MW39 IS THE NEW WELL. THE OLD WELL CASING WAS OVERDRILLED AND PULLED OUT OF THE BOREHOLE. THE BOREHOLE WAS THEN BACKFILLED WITH CEMENT GROUT.
10	10-12	S2	2.0	2-3-4-12 (7)	SANDY LEAN CLAY, (CL), SAND IS M-C., 0-16' V. PALE ORANGE TO GRAYISH ORANGE (10YR8/2 TO 10YR7/4) 16-24" MEDIUM BLUISH GRAY (5B5/1), MOIST TO DRY, FIRM, MULTIPLE DRY THIN F. SAND SEAMS.		
15	15-17	S3	2.0	1-2-1-1 (3)	0-4" CLAYEY SAND W/ GRAVEL, (SC), V. PALE ORANGE TO DARK YELLOW ORANGE (10Y8/2 TO 10Y6/6), WET, V. LOOSE, SAND AND GRAVEL IS F-VC. 4-24" FAT CLAY W/ SAND, (CH), BLACK (N1), MOIST, V. SOFT, SAND IS F.		WATER LEVEL DURING DRILLING ~13'
20							

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW39 | SHEET: 2 OF 2

CH2M HILL

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 67.6' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 60.6'MSL,8/27/90 | START: 8/10/90 | FINISH: 8/15/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
20	20-22	S4	2.0	7-8- -14-17 (22)	CLAYEY SAND, (SC), DARK GRAY (N3), WET, MEDIUM, SAND IS F-M.		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
25	25-27	S5	1.9	6-50/5"	LEAN CLAY, (CL), GRAYISH BLACK (N2), DRY, DENSE, SOME THIN DRY GRAY F. SAND SEAMS, SOME ROCK FRAGMENTS IN THE LOWER 4"		
30							WELL CONSTRUCTION INFO: 19' TOTAL DEPTH 13-18' 2-INCH SCH 40 PVC, 10 SLOT SCREEN 11-18' #2 MORIE SAND PACK 9-11' BENTONITE PELLETS 0-9' CEMENT GROUT SAND PACK WAS WASHED INTO PLACE

SBLSYM 06/14/88

CH2M HILL

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW40 | SHEET: 1 OF 2

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 64.2' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 60.6'MSL,8/27/90 | START: 8/14/90 | FINISH: 8/14/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-5' DESCRIPTION FROM CUTTINGS: POORLY GRADED SAND W/ CLAY, (SP-SC), YELLOW GRAY (5YR7/2), MOIST, SAND IS F-M.		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5	5-7	S1	1.8	4-4-4-4 (8)	0-14" SAME AS ABOVE, DARK YELLOW ORANGE (10YR6/6), GRADING INTO 14-22" WELL GRADED SAND W/ CLAY, (SW-SC), V. PALE ORANGE (10YR8/2), WET, LOOSE, SOME GLAUCONITIC F-C. SAND		WATER LEVEL DURING DRILLING -6'
10	10-12	S2	1.4	8-10-7-8 (17)	SAME AS S1 14-22", SAND IS M-C.		AM: 2 PPM AT BOREHOLE
15	15-17	S3	2.0	6-11--15-17 (26)	0-18" SAME AS ABOVE 18-24" POORLY GRADED SAND W/ CLAY, (SP-SC), GRAY BLACK (N2), WET, DENSE, GLAUCONITIC M. SAND		
	17-19	S4	1.3	6-9--11-21 (20)	SAME AS S3 18-24'		
20							

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW40 | SHEET: 2 OF 2

CH2M HILL

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 64.2' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 60.6'MSL,8/27/90 | START: 8/14/90 | FINISH: 8/14/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	REC	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SY MBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
20	20-22	S5	2.0	31-49-50/4"	0-18" SAME AS ABOVE 18-24" SIMILAR W/ ROCK FRAGMENTS AND HIGHER CLAY CONTENT		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
25							
							WELL CONSTRUCTION INFO: 22' TOTAL DEPTH 7-17' 2-INCH SCH 40 PVC, 10 SLOT SCREEN 5-18' #2 MORIE SAND PACK 3-5' BENTONITE PELLETS 0-3' CEMENT GROUT CASING AND SAND PACK WAS WASHED INTO PLACE FLUSH MOUNT WELL

CH2M HILL

PROJECT NUMBER: SAT21805.H0 | BORING NO.: MW41 | SHEET: 1 OF 1

SOIL BORING LOG

PROJECT: DUPONT KINSTON | LOCATION: LENOIR CO., NC

ELEVATION: 63.7' | DRILLING CONTRACTOR: HARDIN-HUBER INC.

DRILLING METHOD AND EQUIPMENT: 4.25" HSA W/A FAILING F-7

WATER LEVEL AND DATE: 57.6'MSL,8/27/90 | START: 8/10/90 | FINISH: 8/10/90 | LOGGER: A. BRYDA

DEPTH BELOW SURFACE	DEPTH INTERVAL	TYPE AND NUMBER	RECOVERY	STD. PEN. TEST 6"-6"-6" (N)	SOIL DESCRIPTION: SOIL NAME, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY, USCS GROUP SYMBOL	SYMBOL	COMMENTS: DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TEST AND INSTRUMENTATION
					0-5' DESCRIPTION FROM CUTTINGS: SILTY SAND, (SM), SAND IS F. GRAINED, V. PALE ORANGE (10YR8/2), DRY, SAND IS F.		AIR MONITORING (AM): OVA AND EXPLOSIMETER. READINGS ARE BACKGROUND UNLESS NOTED OTHERWISE.
5	5-7	S1	1.5	1-2-2-1 (4)	0-12" CALYEY SAND, (SC), YELLOW GRAY (5Y7/2), DRY TO MOIST, V. LOOSE 12-18" SANDY LEAN CLAY, (CL), YELLOW GRAY (5Y7/2), DRY TO MOIST, V. LOOSE, SAND IS F-M.		
10	10-12	S2	1.5	8-12--14-10 (26)	0-12" POORLY GRADED SAND W. CLAY, (SP-SC), YELLOW GRAY (5Y7/2), WET, LOOSE TO MEDIUM 12-18" WELL GRADED SAND, (SW), YELLOW GRAY TO DARK YELLOW ORANGE (5Y7/2 TO 10YR6/6), WET, MEDIUM, SAND IS C-VC. W/ TRACE GLAUCONITE		WATER LEVEL DURING DRILLING -10'
15	15-17	S3	1.3	6-22-25-50/4" (47)	LEAN CLAY, (CL), GRAYISH BLACK (N2), DRY DENSE TO V. DENSE, SOME THIN DRY GRAY F. SAND SEAMS W/ ROCK FRAGMENTS		WELL CONSTRUCTION INFO: 17' TOTAL DEPTH 10-15' 2-INCH SCH 40 PVC, 10 SLOT SCREEN 13-15' NATURAL SAND PACK 8-13' #2 MORIE SAND PACK 6-8' BENTONITE PELLETS 0-6' CEMENT GROUT
20							

SBLSYM 06/14/88

DERS Data

TABLE 1
GROUND-WATER SAMPLE
VOLATILE ORGANICS ANALYTICAL DATA

Du Pont Fibers Kinston Plant
Kinston, North Carolina

WELL NUMBER	TCE	1,1-DCA	1,1-DCE	1,2-DCE	1,1,1-TCA	CARBON DISULFIDE	1,4-DIOXANE
MW-27							
NOV 1989	ND<5	---	---	ND<5	---	ND<5	ND<50
AUG 1990	ND<5	---	---	3J	---	ND<5	ND<50
MAY 1991	ND<5	ND<5	ND<5	2J	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-28							
NOV 1989	2J	---	---	ND<5	---	ND<5	ND<50
AUG 1990	2J	---	---	ND<5	---	ND<5	127
MAY 1991	1J	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-29							
NOV 1989	390	---	---	ND<17	---	ND<17	ND<17
AUG 1990	490	---	---	18J	---	ND<20	ND<200
MAY 1991	140	ND<5	ND<5	5	ND<5	ND<5	ND<50
DEC 1991	110	ND<4.7	ND<2.8	4.10	ND<3.8	ND<10	---
MW-30A							
NOV 1989	4200	---	---	ND<120	---	ND<120	ND<10
AUG 1990	2700	---	---	30J	---	ND<100	ND<1000
MAY 1991	41	ND<5	ND<5	2J	ND<5	ND<5	ND<50
DEC 1991	373	ND<24	ND<14	ND<8.0	ND<19	ND<50	---
MW-30B							
AUG 1990	2J	---	---	ND<5	---	1J	ND<50
MAY 1991	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-31							
NOV 1989	10	---	---	ND<5	---	3J	ND<50
AUG 1990	1J	---	---	ND<5	---	ND<5	ND<50
MAY 1991	ND<10	24	48	ND<10	210	ND<10	ND<100
DEC 1991	ND<1.9	19.3	30.3	ND<1.8	135	ND<10	---
MW-34							
AUG 1990	ND<5	---	---	ND<5	---	5	ND<50
MAY 1991	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---

TABLE 1
GROUND-WATER SAMPLE
VOLATILE ORGANICS ANALYTICAL DATA

Du Pont Fibers Kinston Plant
Kinston, North Carolina

WELL NUMBER	TCE	1,1-DCA	1,1-DCE	1,2-DCE	1,1,1-TCA	CARBON DISULFIDE	1,4-DIOXANE
MW-35							
AUG 1990	9	---	---	2J	---	ND<5	ND<50
MAY 1991	10	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	9.23	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-36							
AUG 1990	ND<5	---	---	ND<5	---	ND<5	ND<50
MAY 1991	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-37							
AUG 1990	19	---	---	4J	---	ND<5	ND<50
MAY 1991	54	ND<5	ND<5	4J	ND<5	ND<5	ND<50
DEC 1991	38.4	ND<4.7	ND<2.8	2.05	ND<3.8	ND<10	---
MW-38							
AUG 1990	5	---	---	4J	---	ND<5	ND<50
MAY 1991	7	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	3.06	ND<3.8	ND<10	---
MW-39							
AUG 1990	ND<5	---	---	ND<5	---	ND<5	ND<50
MAY 1991	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-40							
AUG 1990	1J	---	---	ND<5	---	ND<5	220
MAY 1991	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-41							
AUG 1990	2J	---	---	ND<5	---	ND<5	ND<50
MAY 1991	ND<5	ND<5	ND<5	ND<5	ND<5	ND<5	ND<50
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-42							
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---
MW-43							
DEC 1991	ND<1.9	ND<4.7	ND<2.8	ND<1.8	ND<3.8	ND<10	---

TABLE 1
GROUND-WATER SAMPLE
VOLATILE ORGANICS ANALYTICAL DATA

Du Pont Fibers Kinston Plant
Kinston, North Carolina

WELL NUMBER	TCE	1,1-DCA	1,1-DCE	1,2-DCE	1,1,1-TCA	CARBON DISULFIDE	1,4-DIOXANE
MW-44							
DEC 1991	DRY	DRY	DRY	DRY	DRY	DRY	DRY
MW-45							
DEC 1991	ND<1.9	ND<4.7	ND<2.8	11.5	ND<3.8	ND<10	- - -
NC CLASS GA GROUND WATER STANDARD	2.8		7	70	200		7

Additionally, during November 1989, Dowtherm A was detected in MW-27 and MW-31 at concentrations of 24 and 2000 ug/l, and ethylene glycol and triethylene glycol were detected in MW-30A at concentrations of 330 and 890 ug/l.
During December 1991, toluene, ethylbenzene, and styrene were detected in MW-45 at concentrations of 9.82, 48.3, and 77.9 ug/l.

All units in ug/l (parts per billion).
ND<5 = None detected above indicated method detection limit.
J = Reported value less than quantitation limit.
"- - -" = Analysis not performed.

TABLE 2

TOP OF MUDSTONE ELEVATIONS

Du Pont Fibers Kinston Plant
Kinston, North Carolina

CPT NUMBER	SURFACE ELEVATION (feet MSL)	DEPTH TO MUDSTONE (feet BGL)	MUDSTONE ELEVATION (feet MSL)
1	65.0	17.9	+ 47.1
2	64.1	15.4	+48.7
3	66.0	18.4	+47.6
4	65.0	17.6	+47.4
5	66.1	20.7	+45.4
6	64.4	16.1	+48.3
7	65.2	16.6	+48.6
8	64.3	15.6	+48.7
9	59.6	9.8	+49.8
10	58.7	9.7	+49.0
11	57.4	8.2	+49.2
12	55.3	7.9	+47.4
13	51.4	7.4	+44.0
14	45.0	42.7	+2.3
15	46.6	43.1	+3.5
16	48.4	6.9	+41.5
17	49.7	7.4	+42.3
18	47.5	9.0	+38.5
19	47.2	7.5	+39.7
20	46.2	42.3	+3.9
21	46.9	14.8 +	+32.1 +
22	48.4	8.0	+40.4
23	47.7	9.7	+38.0
24	60.1	18.4	+41.7
25	57.8	19.6	+38.2
26	63.0	10.8	+52.2
27	- - -	- - -	- - -
28	66.5	20.5	+46.0
29	65.0	18.9	+46.1
30	64.0	18.4	+45.6
31	63.6	13.0	+50.6
32	63.0	11.8	+51.2
33	62.8	13.1	+49.7
34	45.8	37.7	+8.1
35	48.1	7.7	+40.4
36	45.5	55.9	-10.4
37	51.8	45.9	+5.9
38	55.0	12.6	+42.4

MSL = Mean Sea Level
BGL = Below Ground Level

TABLE 3

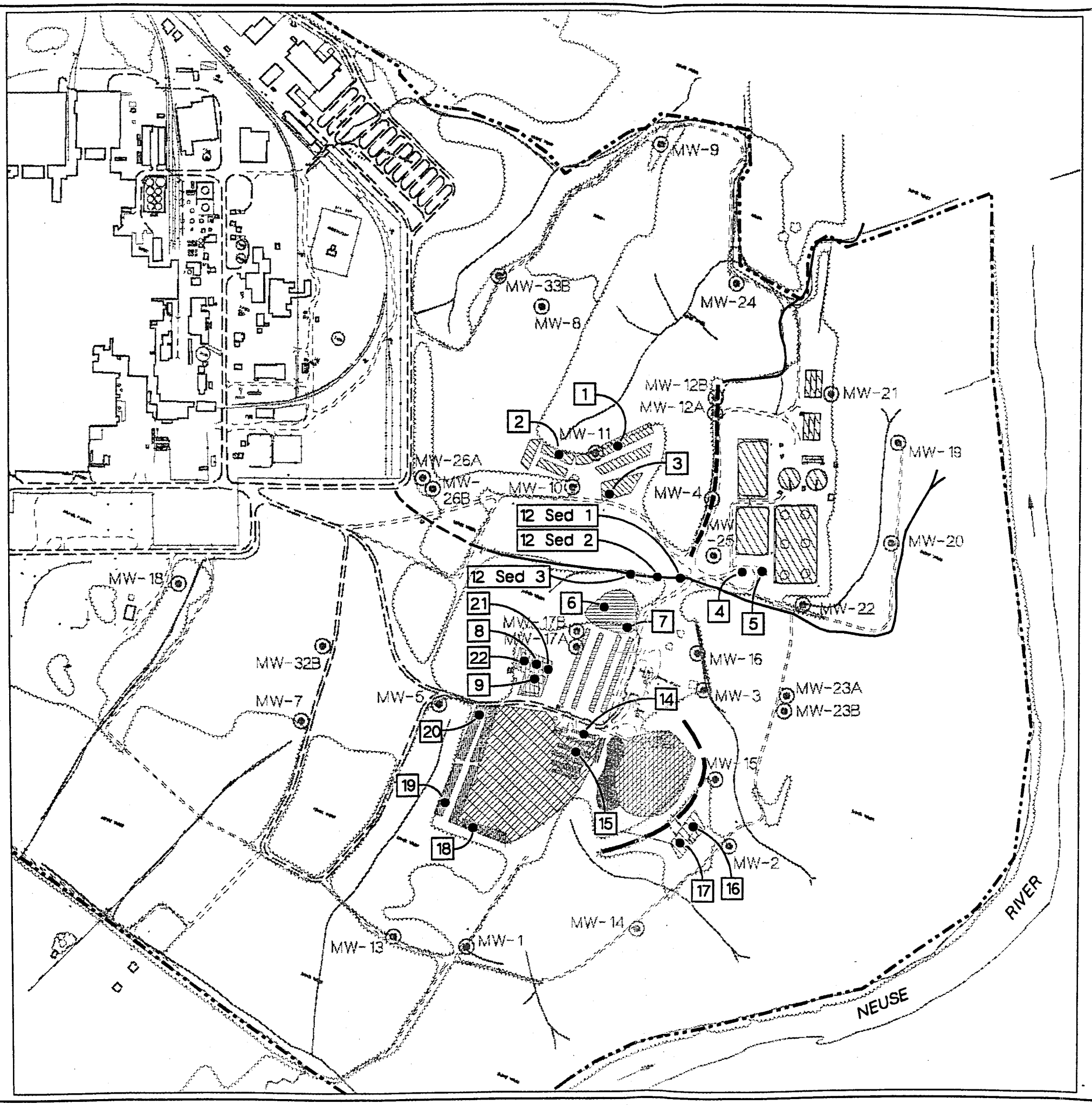
TCE CONCENTRATIONS DETERMINED IN THE FIELD* VS. LABORATORY ANALYSES

Du Pont Fibers Kinston Plant
Kinston, North Carolina

KCP NUMBER	DEPTH OF TEST (feet)	TCE CONC. FIELD ANALYSIS (ug/l)	TCE CONC. LAB ANALYSIS (ug/l)	LOCATION
1	10.7	100 - 150	—	Near MW-30A
1a	15.6	30,000 - 40,000	78,000	Near MW-30A
1b	16.9	3,000 - 5,000	—	Near MW-30A
2	8.4	50 - 75	—	
2a	14.4	100-130	600	
3	11.0	<50	7	Near Tool Shed
3a	18.0	<50	—	Near Tool Shed
4	17.6	50 - 100	—	
5	17.7	<25	—	
6	16.1	25 - 30	—	
7	16.6	ND	—	
8	15.6	<25	—	
26	10.8	75 - 100	87	Near MW-37
27	17.9	ND	<5	Near PW-7/MW-41
28	20.5	50 - 75	15	Near PW-2
29	18.9	ND	1J	Near PW-4
30	18.4	ND	4J	Near PW-10/MW-40
31	13.0	ND	2J	Near MW-27
32	11.8	300 - 400	350	Near MW-29
33	13.1	ND	1J	Near MW-28

<25 = Presence of TCE indicated on the chromatogram, but at a concentration less than the shown quantitation limit.
ND = None Detected.
J = Reported value less than quantitation limit.
--- = Not analyzed

*Analyses performed on Conoco's SEAL unit



LEGEND

- MW-1 — MONITORING WELLS
- DuPONT PROPERTY LINE
- 1 — SOIL BORING/SEDIMENT SAMPLE

0 250 500 750

SCALE: 1"=500'

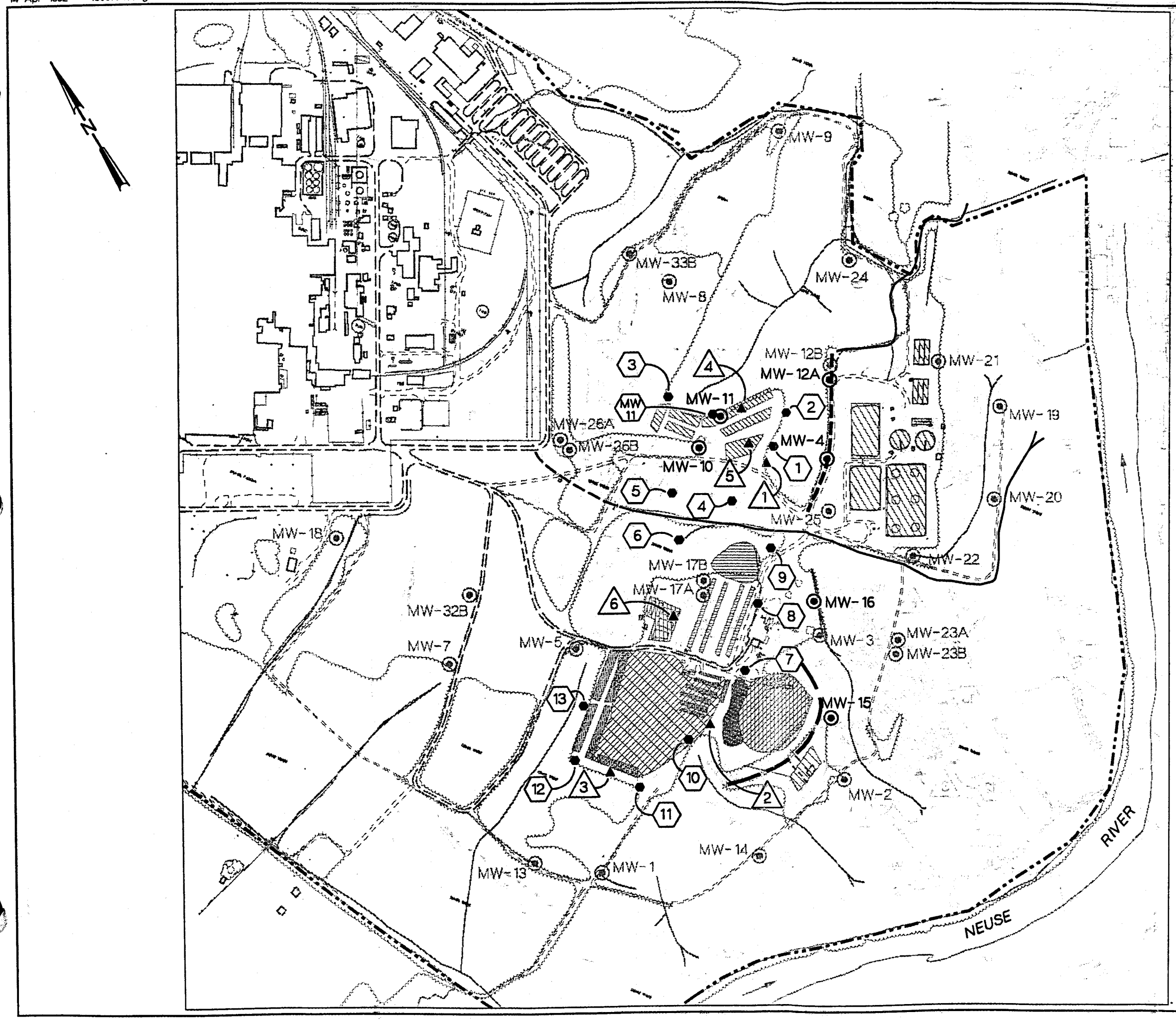
NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure F-1

SOIL SAMPLE LOCATIONS - SOURCE CHARACTERIZATION

DuPont Kinston Facility

CH2MHILL



LEGEND

- MW-1 — MONITORING WELLS
- DuPONT PROPERTY LINE
- GEOPROBE SAMPLES
- PIEZOMETERS

0 250 500 750

SCALE: 1"=500'

NOTE: BASE MAP COMPILED FROM AERIAL PHOTOGRAPHY FLOWN ON 2/10/89.

Figure F-2

GROUNDWATER SAMPLE LOCATIONS - SOURCE CHARACTERIZATION

DuPont Kinston Facility

CH2MHILL

State of North Carolina
Department of Environment,
Health and Natural Resources
Division of Waste Management

James B. Hunt, Jr., Governor
Jonathan B. Howes, Secretary
William L. Meyer, Director

DEHNR

February 6, 1997

Mr. Jan A. Kneib
Environmental Coordinator
DuPont - Kinston Plant
P.O. Box 800
Kinston, North Carolina 28502

RE: Preliminary Evaluation, DuPont-Kinston Industrial Landfill, Lenoir County, Permit Number 54-04

Dear Mr. Kneib,

In accordance with the requirements of Rule .0503(2)(d)(ii), the Solid Waste Section has completed its preliminary evaluation of the information submitted for the referenced industrial landfill. Rule .0503(2)(d)(ii) establishes the requirements for the operators of new industrial waste landfills, lateral expansions of existing landfills, and industrial landfills operating after January 1, 1998. The Rule requires the submittal of a design that ensures that the Groundwater Standards established under 15A NCAC 2L (2L) will not be exceeded in the uppermost aquifer at the compliance boundary **or** a design with a leachate collection system, a closure cap system, and a composite liner system.

Since the referenced landfill is an existing unlined landfill and it is not economically or technically feasible to retrofit an existing landfill with liners and a leachate collection system, the Rule effectively requires the operator to submit a closure cap design that ensures compliance with 2L or close before January 1, 1998.

The Section required the submittal of waste and site characterization, including available water quality data to assist in a preliminary evaluation of the existing landfill. The purpose of this submittal was to determine if a final determination of compliance with Rule .0503(2)(d)(ii) could be made based upon this information.

P.O. Box 27687,
Raleigh, North Carolina 27611-7687
Voice 919-733-4996

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This letter serves as notification that based upon the information available, the existing unlined landfill does not satisfy the criteria of Rule .0503(2)(d)(ii)(A) and therefore this landfill unit will need to stop receiving waste prior to January 1, 1998. This determination was made based upon the following information:

- Groundwater quality samples taken from monitoring wells located at or beyond the compliance boundary indicate that for several chemical constituents the 2L Groundwater Standards have been exceeded.

- It is very difficult to determine to what extent the landfill is contributing to this contamination and to what extent other Solid Waste Management Units (SWMUs) are contributing.

- It is not possible to monitor the industrial landfill separately and distinctly from other SWMUs at the facility.

- Operation of the existing unlined landfill beyond January 1, 1998, may interfere with future assessment and possible corrective action at the facility.

In order to meet the requirements of Rule .0503(2)(d)(ii), the existing unlined landfill will need to stop receiving waste prior to January 1, 1998. A closure plan including a final cap system design will need to be submitted to the Section prior to landfill closure.

It should be noted that a new landfill must meet all the permit requirements of Rules .0503 - .0505, including a demonstration that the proposed design meets the requirements of Rule .0503(2)(d)(ii). An additional submittal of further waste and site characterization will be required for the permitting of an industrial landfill at a new location.

If there are any questions concerning this letter, you may contact me at (919) 733-0692, extension 255, or Bobby Lutfy at extension 258.

Sincerely,

James C Coffey

James C. Coffey, Supervisor
Permitting Branch
Solid Waste Section

cc: Dexter Matthews, Solid Waste Section
Susan Leistiko, Solid Waste Section
Bobby Lutfy, Solid Waste Section
Terry Dover, SWS - Fayetteville
Billy Morris, SWS - Washington
Larry Stanley, Hazardous Waste Section

D-443 (R-5) 9 /72

E. I. Du Pont de Nemours & Co., Inc.
SHIPPING ORDER REQUISITION

SHIPPING ORDER NO. SOP22566

PURCHASE ORDER NO. _____

CUSTOMER ORDER NO. _____

DATE ISSUED 6/25/96 AT KINSTON (NAME OF PLANT)

DATE TO BE SHIPPED _____

TERMS _____

CHARGE _____

SHIP TO NC DEHNR

NO. AND STREET 401 Overlin Rd.

CREDIT _____

CITY Raleigh STATE NC 27605

ROUTING FEDEX

ATTN. James C. Coffey

FOB	DATE SHPD. 6-25-96	B/L NO. 46013	B/L WT. 16	CAR & INITIAL NO.	
SHPG. PT.	FRT. RATE	PPD. FRT.	INDUSTRY	DISTRICT	SALESMAN

DESCRIPTION	BILLING QUAN.	UNIT PRICE	TOTAL AMOUNT
Landfill Data			

REASON FOR SHPMT. _____

TRANS. CHG. 8111-02450-0545

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Authorized by John C. Suggs