392SERBSF10,625

392SERBSF10,625

Site Name (Subject):	STARLING DAVID PROPERTY
Site ID (Document ID):	NCD003185311
Document Name (DocType):	Preliminary Assessment/Site Inspection (PA/SI)
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State of North Carolina
Department of Environment, Health, and Natural Resources
Division of Solid Waste Management
P.O. Box 27687 · Raleigh, North Carolina 27611-7687

James G. Martin, Governor
William W. Cobey, Jr., Secretary

William L. Meyer
Director

December 14, 1989

Mr. Robert Morris
EPA N.C. CERCLA Project Officer
U.S. EPA Region IV Waste Division
345 Courtland Street, N.E.
Atlanta, GA 30365

SUBJECT: Screening Site Investigation Report

SITE: David Starling Disposal Site
NCD 003185311
Route 2, Box 246
U.S. Highway 258
Farmville, Pitt County, NC 27828

Dear Mr. Morris:

Submitted herewith is the Screening Site Investigation Report for the David Starling Disposal Site. This report is based upon Superfund Section file documents, communication with persons knowledgeable of the site, and a site visit on 8-16-89.

From 1-6-71 until 3-31-71, a burial area at the David Starling property was used for disposal of 10,000 gallons of barium chromate, barium carbonate, and chromic acid. This waste was generated by Union Carbide (now EverReady) in Greenville, NC. The site is now inactive as a waste disposal area. No site remediation or waste removal has been performed at the site.

The Starling site is located in the Coastal Plain Physiographic Province and is underlain by sedimentary deposits to a depth of approximately 400 feet. Hydrologic connection throughout this sedimentary aquifer system is assumed because of the spatially discontinuous nature of the strata which comprise it. The sandy clay loam and loam clay soils on site belong to the Norfolk-Exum-Goldsboro soil association, and typically have permeabilities greater than 10E-3 centimeters per second. Depth to the seasonal high water table at the site is less than 10 feet.

The nearest drinking well to the site is located within 2000 feet of the burial area at the Starling residence. Based on information gathered during a visit to the site vicinity on 8-2-88, N.C. Public Water Supply Section records, and a USGS map house count, it has been estimated that approximately 6600 persons use ground water derived from within three miles of the site.

The site is situated in the Neuse River Drainage Basin, and the nearest surface water body to the site, Jacob Branch, is located 2500 feet to the south. Jacob Branch has been classified by the N.C. NRCD Division of Environmental Management as a Class C surface water body suitable for fish and wildlife propogation, secondary recreation, agriculture and other uses requiring waters of lower quality. There are no drinking water intakes within 15 miles downstream of the site.

While water from Starling's deep well does not appear to have been contaminated to date, monitoring well samples indicate that chromium levels of 170 ug/l and phenol levels of .014 mg/l exist in ground water at the site. Leaching of contaminants from the burial site, therefore, is occurring.

Please contact me at (919) 733-2801, if additional information is required.

Sincerely,

D. Mark Durway

D. Mark Durway, Hydrogeologist
NC Superfund Branch
Solid Waste Management Section

DMD/starl.si

NORTH CAROLINA

DEHNR/DSWM

David Starling Property
NCD003185311
Screening Site Investigation

December 1989

By: D. Mark Durway
Hydrogeologist
Superfund Section
Division of Solid Waste Management

SCREENING SITE INVESTIGATION REPORT

David Starling Property
NCD 083185311
Farmville, NC

December 1989

Superfund Section
Division of Solid Waste Management
North Carolina Department of Environment, Health
and Natural Resources

Prepared by:

D. Mark Durway
Hydrogeologist

TABLE OF CONTENTS

EXECUTIVE SUMMARY

From 1-6-71 until 3-31-71, a burial area at the David Starling property was used for disposal of 10,000 gallons of barium chromate, barium carbonate, and chromic acid. This waste was generated by Union Carbide (now EverReady) in Greenville, NC. The site is now inactive as a waste disposal area. No site remediation or waste removal has been performed at the site.

The Starling site is located in the Coastal Plain Physiographic Province and is underlain by sedimentary deposits to a depth of approximately 400 feet. Hydrologic connection throughout this sedimentary aquifer system is assumed because of the spatially discontinuous nature of the strata which comprise it. The sandy clay loam and loam clay soils on site belong to the Norfolk-Exum-Goldsboro soil association, and typically have permeabilities greater than 10E-3 centimeters per second. Depth to the seasonal high water table at the site is less than 10 feet.

The nearest drinking well to the site is located within 2000 feet of the burial area at the Starling residence. Based on information gathered during a visit to the site vicinity on 8-2-88, N.C. Public Water Supply Section records, and a USGS map house count,it has been estimated that approximately 6600 persons use ground water derived from within three miles of the site.

The site is situated in the Neuse River Drainage Basin, and the nearest surface water body to the site, Jacob Branch, is located 2500 feet to the south. Jacob Branch has been classified by the N.C. NRCD Division of Environmental Management as a Class C surface water body suitable for fish and wildlife propogation, secondary recreation, agriculture and other uses requiring waters of lower quality. There are no drinking water intakes within 15 miles downstream of the site.

On 8-16-89, a site investigation was done at the Starling disposal site. While analyses show that water from Starling's deep well does not appear to have been contaminated to date, monitoring well samples indicate that chromium levels of 170 ug/l and phenol levels of .014 mg/l exist in ground water at the site. Leaching of contaminants from the burial area, therefore, is occurring.

1.0 BACKGROUND

1.1 Location

The Starling disposal site is located approximately 1100' west of the David Starling residence, which is located midway between the towns of Farmville and Fountain. The Starling's address is:

Mr. and Mrs. David Starling
Route 2, Box 246
Farmville, Pitt Co., NC 27828
Tel. (919) 753-3362

Site coordinates are 35° 38' 29" N latitude and 77° 37' 45" W longitude (App. A, maps 1 and 2).

1.2 Site Layout

The Starling disposal site is comprised of a 25' x 100' burial area which is located in a field. This burial area is located immediately west of the Starling's former hog pens (App. A, map 3). There are six ground water monitoring wells in the vicinity of the burial area (Refs. 10,13).

The disposal area is situated approximately 800' west of the nearest residence, and about 1000' west of the Starling's 180' deep drinking well. This deep well was sampled during the site visit on 8-16-89 (Ref 11).

1.3 Ownership and Site Use History

During the period 1-6-71 to 3-31-71 a total of 10,000 gallons of barium chromate, barium carbonate, and chromic acid were buried in a field on the David Starling property (Refs. 9,10). This waste was generated by Union Carbide (now EverReady) of Greenville, NC, which payed Starling to accept and dispose of it. At the time, Starling did contract work for Union Carbide, such as mowing and landscaping. According to his son, Phil Starling, the reason Union Carbide needed the waste disposed of was that the Pitt County Landfill, which had been receiving the waste, refused to continue accepting it. David Starling was told by Union Carbide that the waste was completely harmless, and that it would "make the grass green," according to Phil Starling; on the contrary, he said, it killed some of Starling's cows and hogs. (It is assumed that these animals ingested the waste prior to its being completely buried). Phil Starling described the waste as an orange-yellow, chalky solid, though some of the waste was also liquid, he said (Refs. 1,11).

1.4 Permit and Regulatory History

Union Carbide of Greenville, NC installed monitoring wells at the site, monitoring is being conducted on a voluntary basis by EverReady. EverReady is sending analytical reports to the N.C. Department of Environment, Health, and Natural Resources (DEHNR) Division of Environmental Management in Raleigh, as these reports are generated (Ref. 13).

Apparently, the Starling disposal site was not issued permits to operate, and has never been regulated.

1.5 Remedial Actions to Date

Remedial action has not been taken at the Starling disposal site; however, a remedial action plan was developed, but never implemented (Ref. 9).

1.6 Summary Trip Report

On 8-16-89, a screening site investigation was conducted at the David Starling property. Present for the investigation were the following:

D. Mark Durway, N.C. Superfund
Jack Butler, N.C. Superfund
Phil Starling, David Starling's son

Upon arriving at the site, Starling provided a tour of the area in which 10,000 gallons of barium chromate, barium carbonate, and chromic acid were buried in 1971 (Refs. 9,10). In addition, he provided background information about the site (Refs. 11,12).

It was observed that the disposal area was situated approximately 800' west of the nearest residence. This residence and several others on the Starling property were using water from a 180' deep well located approximately 1100' east of the burial area. A sample was collected from this well for laboratory analysis (Appendix B, analysis set 1).

A site inspection form is provided in Appendix D.

2.0 ENVIRONMENTAL SETTING

2.1 Topography

The Starling disposal site is located in the North Carolina Coastal Plain Physiographic Province on a broad, essentially flat, interstream divide. Site elevation is about 90′ above mean sea level (App. A, map 1).

2.2 Surface Water

The Starling site is situated in the Neuse River Drainage Basin, and the nearest surface water body to the site, Jacob Branch, is located 2500 feet to the south (App. A, map 1). Jacob Branch has been classified by the N.C. DEHNR Division of Environmental Management as a Class C surface water body suitable for fish and wildlife propogation, secondary recreation, agriculture and other uses requiring waters of lower quality (Ref 7).

2.3 Geology, Soils, and Groundwater

The Starling site is underlain by sedimentary deposits to a depth of approximately 400 feet, where crystalline basement rock is encountered. Sedimentary deposits from the land surface down include: surficial sands of post-Pliocene age; gray marine clays and interbedded shell beds of the Pliocene Yorktown Formation; and interbedded sands and clays of the lower Cretaceous (Ref 10). Hydrologic connection throughout the sedimentary aquifer system is assumed because of the spatially discontinuous nature of the strata which comprise it.

The sandy clay loam and loam clay soils on site belong to the Norfolk-Exum-Goldsboro soil association, and typically have permeabilities greater than 10E-3 centimeters per second. Depth to the seasonal high water table at the site is less than 10 feet (Ref. 5).

2.4 Climate and Meteorology

Mean annual precipitation and mean annual lake evaporation of 48′ and 41′, respectively, provide for annual net precipitation of 7". The 1-year 24-hour rainfall in the area is approximately 3.4"′ (Ref. 8).

2.5 Land Use

Land use in the site vicinity is predominantly for agricultural purposes. Chief crops grown are tobacco, peanuts, corn, soybeans, cotton and cucumbers. Livestock production includes cattle, hogs, and chickens (Ref. 5).

2.6 Population Distribution

The Starling site is located midway between the towns of Farmville and Fountain in a rural area. Based on the town populations and a USGS map house count, population distribution around the site has been estimated as follows (App. A, map 1; Refs. 2,3,4):

25 persons within 0.25 miles
40 persons within 0.50 miles
150 persons within 1 mile
475 persons within 2 miles
1500 persons within 3 miles
6335 persons within 4 miles

The towns of Farmville and Fountain, which lie outside a three mile radius of the site, have populations of 4,834 and 473 persons, respectively (Ref. 3).

2.7 Water Supply

Based on information gathered during a visit to the site vicinity on 8-2-88, N.C. Public Water Supply Section records, and a USGS map house count,it has been estimated that approximately 6600 persons use ground water derived from within three miles of the site (App. A, map 1; Refs. 2,3,4). However, the majority of these persons live outside a three mile radius of the site. The explanation for this is that the Farmville municipal water system, which supplies 5900 of these people, has four of its wells within three miles of the Starling disposal site (App. A, maps 1 and 5). Water from these wells is pumped to a central distribution point where it mixes with water from other municipal wells on the system before being distributed to customers (Ref. 3). All customers, therefore, potentially use ground water derived from within three miles of the Starling disposal site. The town of Fountain, and some of the main rural roads in the site area, are also served by the Farmville municipal water system (App. A, map 1; Refs. 3,4).

The Starling's 180' deep well, located 1100' from the disposal area, is the nearest drinking well to the site (Ref. 11).

There are no drinking water intakes within 15 miles downstream of the site (App. A, map 4; Refs. 3,4).

2.8 Critical Environments

There are no fresh water wetlands or critical habitats within one mile of the Starling disposal site, based on current listings of the U.S. Fish and Wildlife Service (Ref. 6). However, wetlands exist within three miles of the site on Contentnea Creek (App. A, map 1).

3.0 WASTE TYPES AND QUANITITIES

A total of 10,000 gallons of barium chromate, barium carbonate, and chromic acid were buried in a field on the David Starling property. This waste was generated by Union Carbide of Greenville, NC (Refs. 9,10)

4.0 LABORATORY DATA SUMMARY

On 8-16-89, a site investigation was done at the Starling disposal site. Since many samples had been previously collected at and in the vicinity of the burial area, only a ground water sample was collected from Starling's drinking well during the investigation. Analysis of this sample shows that water from Starling's deep well does not appear to be contaminated (App. B, analysis set 1). Monitoring well samples collected in 1986 and 1983 indicate, however, that chromium levels of 170 ug/l and phenol levels of .014 mg/l do exist in ground water at the site (App. B, analysis sets 2 and 3). Leaching of contaminants from the burial area, therefore, is occurring.

5.0 TOXICOLOGICAL AND CHEMICAL CHARACTERISTICS

Toxicological and chemical characteristics of substances known or believed to be present at the Starling disposal site are discussed the Site Health and Safety Plan in Appendix E.

APPENDIX A

MAPS AND PHOTOGRAPHS

FOUNTAIN, N. C.
NW/4 FALKLAND 15' QUADRANGLE
N3537.5—W7737.5/7.5
1981

FALKLAND, N. C.
NE/4 FALKLAND 15' QUADRANGLE
N3537.5—W7730/7.5
1980

WALSTONBURG, N. C.
SW/4 FALKLAND 15' QUADRANGLE
N3530—W7737.5/7.5
1981

FARMVILLE, N. C.
SE/4 FALKLAND 15' QUADRANGLE
N3530—W7730/7.5
1981

DAVID STARLING PROPERTY
NCD 003185311
Farmville, Pitt Co., NC

Indicates number and location of Farmville municipal water system well.

Hachures point toward areas served by the Farmville municipal water system

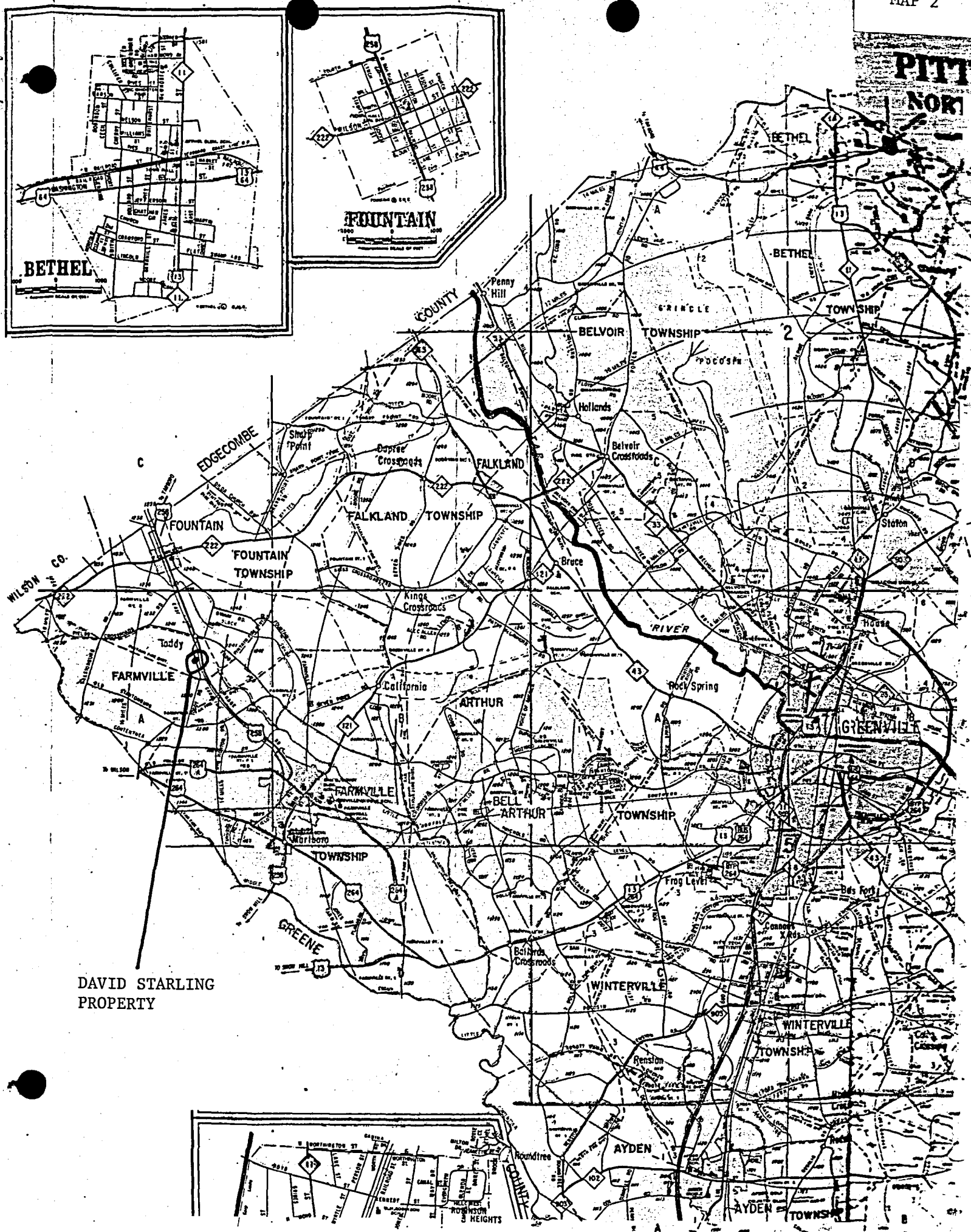
~103 HOMES w/i 2-3 MILES EXCLUDING FOUNTAIN

~200 HOMES w/i 3-4 MILES EXCLUDING FARMVILLE

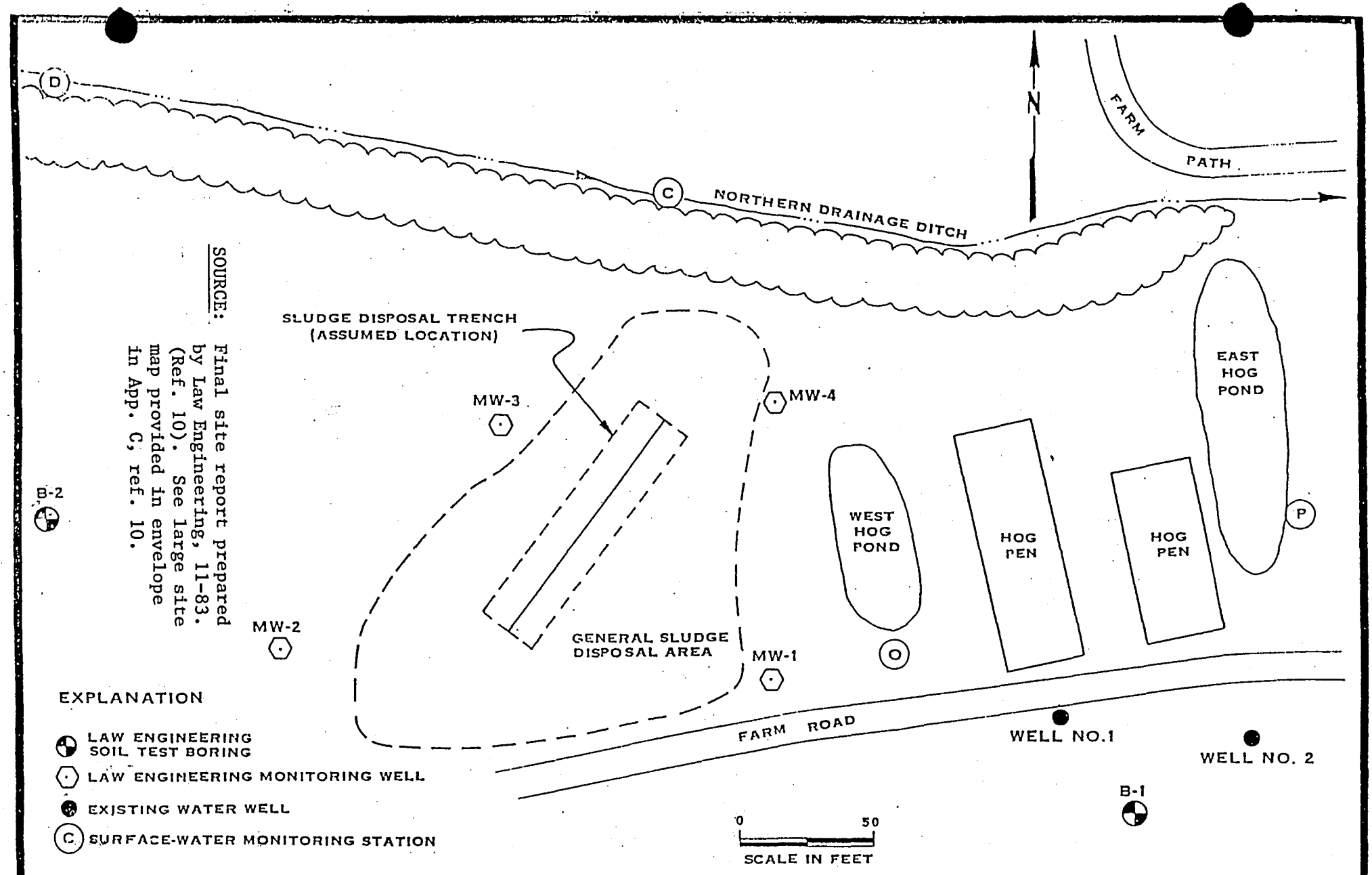
~19 HOMES w/i 1 MILE

~64 HOMES w/i 1-2 MILES

SCALE 1:24 000
CONTOUR INTERVAL 2 METERS



DAVID STARLING
PROPERTY



SOURCE: Final site report prepared by Law Engineering, 11-83. (Ref. 10). See large site map provided in envelope in App. C, ref. 10.

UNION CARBIDE CORPORATION

DAVID STARLING DISPOSAL SITE

LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

GENERAL SLUDGE DISPOSAL AREA AND LAYOUT OF BORINGS

JOB NO. MH2303

FIGURE

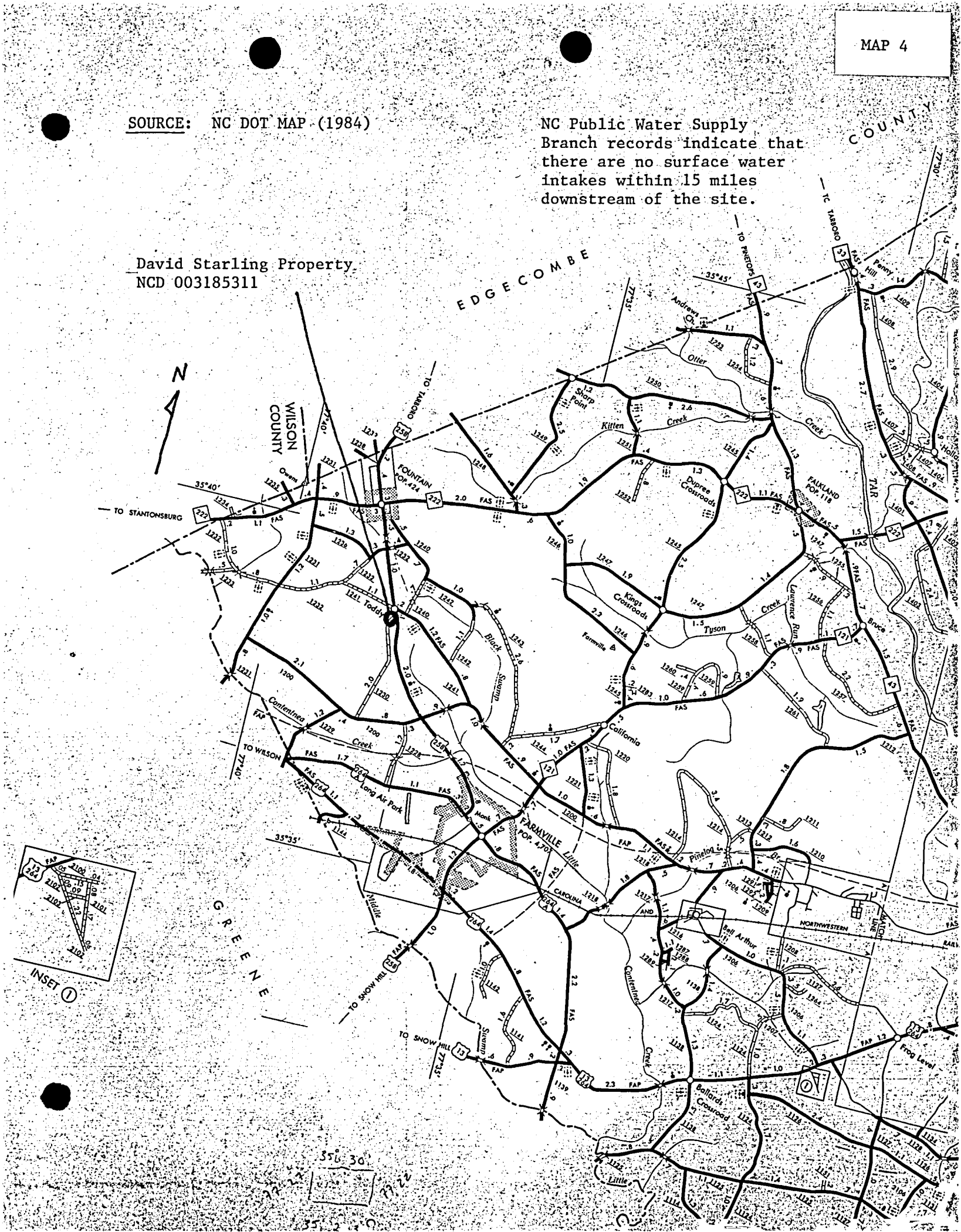
MAP 3

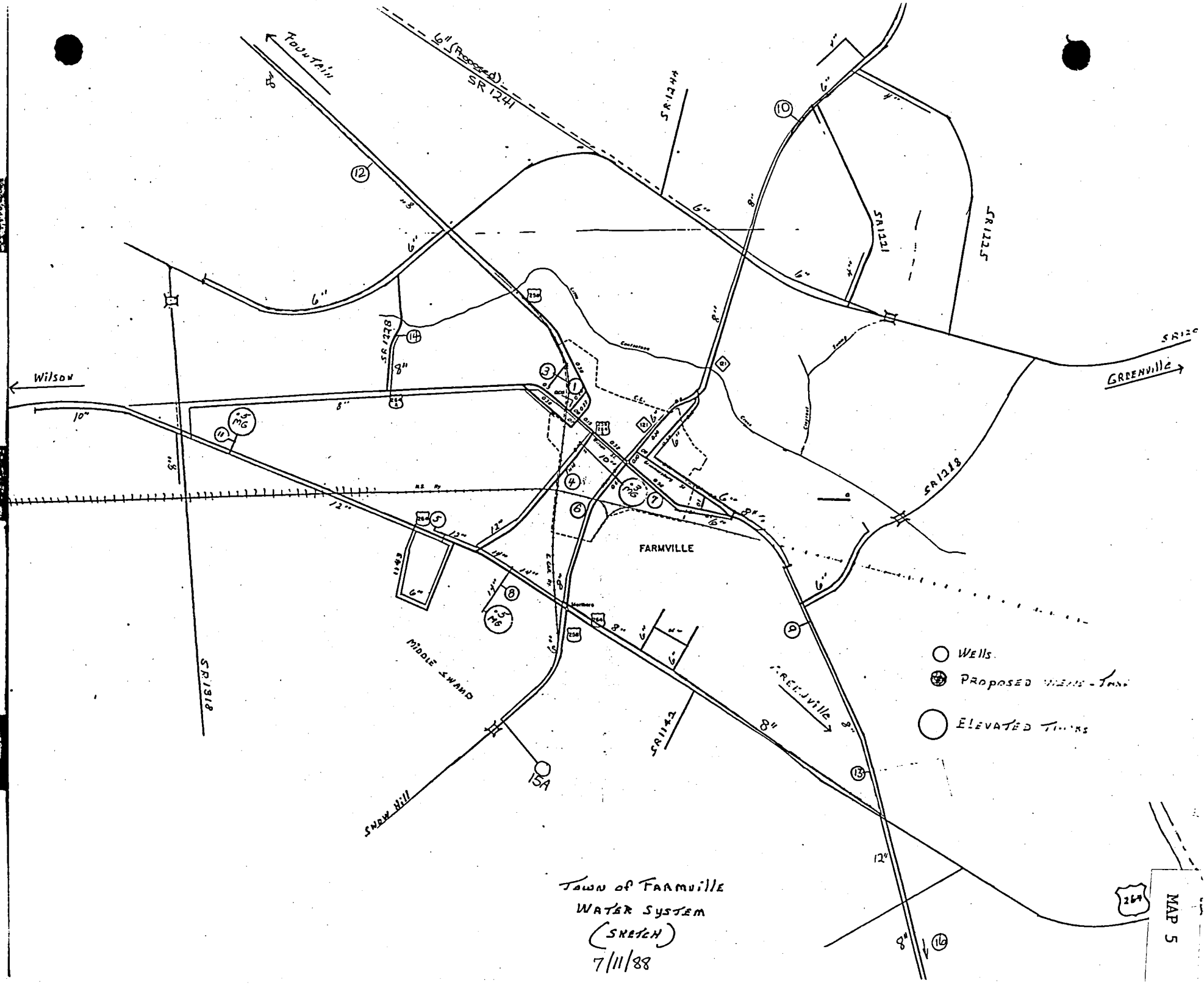
MAP 4

SOURCE: NC DOT MAP (1984)

NC Public Water Supply Branch records indicate that there are no surface water intakes within 15 miles downstream of the site.

David Starling Property
NCD 003185311





Town of Farmville
Water System
(Sketch)
7/11/88

VARIOUS VIEWS OF THE
DAVID STARLING PROPERTY
DISPOSAL AREA, 8/16/89.

APPENDIX B

LABORATORY ANALYSES

ANALYSIS SET 1

2 - 10 inorg (3)

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

SAMPLE ANALYSES REQUEST

State Laboratory of Public Healt
P. O. Box 2804
306 N. Wilmington Stree
Raleigh, 2761

Site Number NCD 003185311 Field Sample Number 11570

Name of Site DAVID STARLING PROPERTY Site Location Farmville, Pitt Co.

Collected By DURWAY ID# 35 Date Collected 8/16/89 Time

Type of Sample:

Environmental	Concentrate
✓ Groundwater (1)	___ Solid (5)
___ Surface Water (2)	___ Liquid (6)
___ Soil (3)	___ Sludge (7)
___ Other (4)	___ Other (8)

Comments: (1) Starlings drinking well

RECEIVED
SEP 25 1989
SUPERFUND BRANCH

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ Arsenic		✓ Arsenic	<0.01	✓ Silver	<0.05
___ Barium		✓ Barium	<0.1	___ Sulfates	
___ Cadmium		✓ Cadmium	<0.005	___ Zinc	
___ Chromium		___ Chloride		___ Ph	
___ Lead		✓ Chromium	<0.01	___ Conductivity	
___ Mercury		___ Copper		___ TDS	
___ Selenium		___ Fluoride		___ TOC	
___ Silver		___ Iron		___	
___		✓ Lead	<0.03	___	
___		___ Manganese		___	
___		✓ Mercury	<0.0002	___	
___		___ Nitrate		___	
___		✓ Selenium	<0.005	___	

ORGANIC CHEMISTRY

Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ P&T:GC/MS		___ EDB		___ Methoxychlor	
___ Acid:B/N Ext.		___ PCB's		___ Toxaphene	
___ TOX		___ Petroleum		___ 2,4-D	
___		___ Endrin		___ 2,4,5-TP (silvex)	
___		___ Lindane		___	

MICROBIOLOGY

Parameter
___ (MF) Coliform Colonies/100mls
___ (MPN) Coliform Colonies/100mls
___
___

RADIOCHEMISTRY

Parameter	Results PCi/1
___ Gross Alpha	
___ Gross Beta	
___	
___	

Date Received ___ Date Reported 9/19/89

Date Extracted ___ Date Analyzed ___

Reported By ___ Lab Number 16375 AUG 21 89

DHS 3191 (Revised 7/85)
Solid and Hazardous Waste (Review 7/87)

2 - VOAs organic

SUPERFUND BRANCH
401 OBERLIN ROAD

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

SAMPLE ANALYSES REQUEST

State Laboratory of Public Healt
P. O. Box 2804
306 N. Wilmington Stree
Raleigh, 2761

Site Number NCD 003185311 Field Sample Number 11740

Name of Site DAVID STARLING PROPERTY Site Location Farmville, Pitt Co.

Collected By DURWAY ID# 35 Date Collected 8/16/89 Time

Type of Sample:

Environmental	Concentrate
✓ Groundwater (1)	___ Solid (5)
___ Surface Water (2)	___ Liquid (6)
___ Soil (3)	___ Sludge (7)
___ Other (4)	___ Other (8)

Comments: (1) Starling's drinking well

VOA

RECEIVED
SEP 8 1989
SUPERFUND BRANCH

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ Arsenic		___ Arsenic		___ Silver	
___ Barium		___ Barium		___ Sulfates	
___ Cadmium		___ Cadmium		___ Zinc	
___ Chromium		___ Chloride		___ Ph	
___ Lead		___ Chromium		___ Conductivity	
___ Mercury		___ Copper		___ TDS	
___ Selenium		___ Fluoride		___ TOC	
___ Silver		___ Iron			
		___ Lead			
		___ Manganese			
		___ Mercury			
		___ Nitrate			
		___ Selenium			

ORGANIC CHEMISTRY

Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
✓ P&T:GC/MS		___ EDB		___ Methoxychlor	
___ Acid:B/N Ext.		___ PCB's		___ Toxaphene	
___ TOX		___ Petroleum		___ 2,4-D	
		___ Endrin		___ 2,4,5-TP (silvex)	
		___ Lindane			

MICROBIOLOGY

Parameter
___ (MF) Coliform Colonies/100mls
___ (MPN) Coliform Colonies/100mls

RADIOCHEMISTRY

Parameter	Results PCi/1
___ Gross Alpha	
___ Gross Beta	

Date Received AUG 18 1989 BD Date Reported 9-1-89

Date Extracted Date Analyzed VOC 8/25/89 4PM

Reported By John L. Neal Lab Number 902382

#902382 - 902383

DHS 3191 (Revised 7/85)
Solid and Hazardous Waste (Review 7/87)

1-2d

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

SAMPLE ANALYSES REQUEST

State Laboratory of Public Healt
P. O. Box 2804
306 N. Wilmington Stree
Raleigh, 2761

Site Number NCD 003185311 Field Sample Number 11741

Name of Site DAVID STARLING PROPERTY Site Location Farmville, Pitt Co

Collected By DURWAY ID# 35 Date Collected 8/16/89 Time

Type of Sample:

Environmental	Concentrate
✓ Groundwater (1)	___ Solid (5)
___ Surface Water (2)	___ Liquid (6)
___ Soil (3)	___ Sludge (7)
___ Other (4)	___ Other (8)

Comments: (1) Starling's drinking well

INORGANIC CHEMISTRY

Extractables		Total			
Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ Arsenic		___ Arsenic		___ Silver	
___ Barium		___ Barium		___ Sulfates	
___ Cadmium		___ Cadmium		___ Zinc	
___ Chromium		___ Chloride		___ Ph	
___ Lead		___ Chromium		___ Conductivity	
___ Mercury		___ Copper		___ TDS	
___ Selenium		___ Fluoride		___ TOC	
___ Silver		___ Iron			
		___ Lead			
		___ Manganese			
		___ Mercury			
		___ Nitrate			
		___ Selenium			

ORGANIC CHEMISTRY

Parameter	Results mg/1	Parameter	Results mg/1	Parameter	Results mg/1
___ P&T:GC/MS		___ EDB		___ Methoxychlor	
✓ Acid:B/N Ext.		___ PCB's		___ Toxaphene	
___ TOX		___ Petroleum		___ 2,4-D	
		___ Endrin		___ 2,4,5-TP (silvex)	
		___ Lindane			

MICROBIOLOGY

Parameter
___ (MF) Coliform Colonies/100mls
___ (MPN) Coliform Colonies/100mls

RADIOCHEMISTRY

Parameter	Results PCi/1
___ Gross Alpha	
___ Gross Beta	

Date Received AUG 18 1989 BQ Date Reported

Date Extracted 8-23-89 AA, JM, BD, VP Date Analyzed BNA 8-31-89 BD

Reported By Lab Number 902383

DHS 3191 (Revised 7/85)
Solid and Hazardous Waste (Review 7/87)

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

BASE/NEUTRAL AND ACID EXTRACTABLES	LAB NO	902383					
	FIELD #	11740					
COMPOUND	TYPE	(L)	( )	( )	( )	( )	( )
	UNITS	µg/l ~~µg/kg~~	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg
N-nitrosodimethylamine		10/330					
bis(2-chloroethyl)ether							
2-chlorophenol							
phenol							
1,3-dichlorobenzene							
1,4-dichlorobenzene							
1,2-dichlorobenzene							
bis(2-chloroisopropyl)ether							
hexachloroethane							
N-nitroso-di-n-propylamine							
nitrobenzene							
isophorone							
2-nitrophenol							
2,4-dimethylphenol							
bis(2-chloroethoxy)methane							
2,4-dichlorophenol							
1,2,4-trichlorobenzene							
naphthalene							
hexachlorobutadiene							
4-chloro-m-cresol							
hexachlorocyclopentadiene							
2,4,6-trichlorophenol							
2-chloronaphthalene							
acenaphthylene							
dimethyl phthalate							
2,6-dinitrotoluene							
acenaphthene		↓					
2,4-dinitrophenol		50/1650					
2,4-dinitrotoluene		10/330					
4-nitrophenol		50/1650					
fluorene		10/330					
4-chlorophenylphenylether		↓					
diethyl phthalate		↓					
4,6-dinitro-o-cresol		50/1650					
diphenylamine		↓					
azobenzene		↓					
4-bromophenylphenylether		10/330					
hexachlorobenzene		10/330					
pentachlorophenol		50/1650					
phenanthrene		10/330					
anthracene		↓					
dibutyl phthalate		↓					
fluoranthene		↓	↓				
		MDL					
		H_2O/SOIL					

RECEIVED
SEP 8 1989
SUPERFUND BRANCH

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit. MDL
NA - Not analyzed.
1/ - Tentative identification.
2/ - On NRDC List of Priority Pollutants.

N.C. Division of Health Services
DHS 3068-O (4/86 Laboratory)

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON, ST., RALEIGH, N.C. 27611

ORGANIC CHEMICAL ANALYSIS

BASE/NEUTRAL AND ACID EXTRACTABLES	LAB NO	902383					
	FIELD #	11740					
COMPOUND	TYPE	( )	( )	( )	( )	( )	( )
	UNITS	µg/l ~~µg/kg~~	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg	µg/l µg/kg
pyrene	10/330	U					
benzidine	50/1650						
butyl benzyl phthalate	10/330						
benz(a)anthracene	↓						
chrysene	↓						
3,3-dichlorobenzidine	50/1650						
bis(2-ethylhexyl)phthalate	10/330						
di-n-octyl phthalate	10/330						
benzo(b)fluoranthene	50/1650						
benzo(k)fluoranthene	↓						
benzo(a)pyrene	↓						
indeno(1,2,3-cd)pyrene	↓						
dibenzo(a,h)anthracene	↓						
benzo(g,h,i)perylene	↓	↓					
aniline	50/1650	U					
benzoic acid	↓						
benzyl alcohol	↓						
4-chloroaniline	↓						
dibenzofuran	10/330						
2-methylnaphthalene	↓						
2-methylphenol	↓						
4-methylphenol	↓						
2-nitroaniline	50/1650						
3-nitroaniline	↓						
4-nitroaniline	↓						
2,4,5-trichlorophenol	↓	↓					

MDL
H2O/501L

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected. The number is the Minimum Detection Limit. MDL
NA - Not analyzed.
1/ - Tentative identification.
2/ - On NRDC List of Priority Pollutants.

STATE LABORATORY OF PUBLIC HEALTH
DIVISION OF HEALTH SERVICES, N.C. DEPARTMENT OF HUMAN RESOURCES
P.O. BOX 28047 - 306 N. WILMINGTON ST, RALEIGH, N.C. 27611

Laboratory No. 902382 PURGEABLE COMPOUNDS Date of Analysis 8/25/89

COMPOUND	µg/l
Dichlorodifluoromethane	U
Chloromethane	
✓Vinyl Chloride	
Bromomethane	
Chloroethane	
Trichlorofluoromethane	
✓1,1-Dichloroethylene	
Methylene Chloride	
tert-Butyl Methyl Ether	
(Trans)1,2-Dichloroethylene	
Isopropyl ether	
1,1-Dichloroethane	
2,2-Dichloropropane	
(Cis) 1,2-Dichloroethylene	
Chloroform	
(BCM) Bromochloromethane	
✓1,1,1-Trichloroethane	
1,1-Dichloropropene	
✓Carbon Tetrachloride	
✓Benzene	
✓1,2-Dichloroethane	
✓Trichloroethylene	
1,2-Dichloropropane	
Bromodichloromethane	
Dibromomethane	
Toluene	
1,1,2-Trichloroethane	
Tetrachloroethene	
1,3-Dichloropropane	
Dibromochloromethane	
1,2-Dibromoethane (EDB)	
1-Chlorohexane	↓

COMPOUND	µg/l
Chlorobenzene	U
Ethylbenzene	
1,1,1,2-Tetrachloroethane	
p-Xylene	
m-Xylene	
o-Xylene	
Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
Bromobenzene	
n-Propylbenzene	
1,2,3-Trichloropropane	
2-Chlorotoluene	
1,3,5-Trimethylbenzene	
4-Chlorotoluene	
(Tert) Butyl Benzene	
Pentachloroethane	
1,2,4-Trimethylbenzene	
(Sec) Butyl Benzene	
p-Isopropyltoluene	
1,3-Dichlorobenzene	
✓1,4-Dichlorobenzene	
n-Butylbenzene	
1,2-Dichlorobenzene	
(Bis) 2 Chloroisopropyl Ether	
1,2-Dibromo-3 Chloropropane	
1,2,4-Trichlorobenzene	
Hexachlorobutadiene	
Naphthalene	
1,2,3-Trichlorobenzene	↓

COMMENTS:

MDL - Minimum Detection Limit for water (EPA Method 502.2), is 1.0 µg/l.

J - Estimated value.
K - Actual value is known to be less than value given.
L - Actual value is known to be greater than value given.
U - Material was analyzed for but not detected.
NA - Not analyzed.
1/ - Tentative identification.
✓ - Regulated VOC
T - Trihalomethane

Organic

DIVISION OF HEALTH SERVICES
SOLID AND HAZARDOUS WASTE MANAGEMENT BRANCH

Chain of Custody Record

Hazardous Waste Materials

Location of Sampling: ____Generator ____Transporter ____Treatment Facilit
____Storage Facility ____Disposal Facility ____Landfill
____Other: well

RECEIVED
SEP 8 1989
SUPERFUND BRANCH

Company's Name David Starling property Telephone( )

Address Hwy 258. Farmville Pitt Co

Collector's Name D. MARK DURWAY Telephone(919) 733 2801
signature

Date Sampled 8/16/89 Time Sampled

Type of Process Generating Waste

Field Information

Field Sample No. 11740 11741

Chain of Possession:

	signature	title	inclusive dates
1.	D. Mark Durway	Hydrogeol	8/16 - 8/18/89
2.	William DeMent	Chemist	8-18-89
3.			

Results reported

signature	title	date

Instructions: Complete all applicable information including signatures, and submit with analysis request forms.

ANALYSIS SET 2

COUNTY PITT

QUAD NO. M-27 m SERIAL NO. N/A

LAT. 35°38'43" LONG. 77°37'43"

N.C. DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT
DEM
GROUNDWATER FIELD/LAB FORM

SGW 1

LAB NUMBER 8 6G-868

DATE RECEIVED 11/4/86 Time 8:00

Rec'd by: JS From: Bus Courier

Other

DATA ENTRY BY: [illegible] CK: DF

DATE REPORTED: 12-2-86

Report to: ARO, FRO, MRO, RRO, WaRO, WiRO,
WSRO, Kinston FO Other

Shipped by: Bus, Courier, Other

SAMPLE PRIORITY

☒ ROUTINE ☐ EMERGENCY

COLLECTOR(S): R Powers DATE 11-3-86 TIME 1045 PURPOSE: BASELINE, COMPLAINT, COMPLIANCE, LUST, OTHER SPLIT
(circle one)

FIELD ANALYSES

pH_{400} _____ Spec. Cond.$_{94}$ _____ at 25°C

Temp.$_{10}$ _____ °C Odor _____

Appearance _____ Taste _____

Field Analysis By: _____

Owner EVEREADY BATTERY CO. / STARLING FARM SITE

Location or site WELL #1

Description of sampling point

Sampling Method BAILER (pump, bailer, etc.) Sample Interval 4'-24'

Remarks COPY TO: BOB CHEEK (pumping time, air temp, etc.)

LABORATORY ANALYSES

	BOD_5 310	mg/l
	COD High 340	mg/l
	COD Low 335	mg/l
	Coliform:MF Fecal 31616	/100ml
	Coliform:MF Total 31504	/100ml
	TOC 680	mg/l
	Turbidity 76	NTU
	pH 403	units
	Alkalinity to pH 4.5 410	mg/l
	Alkalinity to pH 8.3 415	mg/l
	Carbonate 445	mg/l
	Bicarbonate 440	mg/l
	Arsenic:Total 1002	ug/l
	Carbon dioxide 405	mg/l
	Chloride 940	mg/l
	Chromium:Hex 1032	ug/l
	Color:True 80	Pt-Co
	Cyanide 720	mg/l

	Diss. Solids 70300	mg/l
	Fluoride 951	mg/l
	Hardness:Total 900	mg/l
	Hardness (non-carb) 902	mg/l
	Phenols 32730	ug/l
	Specific Cond. 95	uMhos/cm²
	Sulfate 945	mg/l
	Sulfide 745	mg/l
	NH_3 as N 610	mg/l
	TKN as N 625	mg/l
	$NO_2 + NO_3$ as N 630	mg/l
	P:Total as P 665	mg/l

	Ag - Silver 1077	ug/l	
	Al - Aluminum 1105	ug/l	
X	Ba - Barium 1007 < 500	ug/l	
	Ca - Calcium 916	mg/l	
X	Cd - Cadmium 1027 <10	ug/l	
X	Chromium:Total 1034 170	ug/l	
X	Cu - Copper 1042 <10	ug/l	
	Fe - Iron 1045	ug/l	
	Hg - Mercury 71900	ug/l	
	K - Potassium 937	mg/l	
	Mg - Magnesium 927	mg/l	
	Mn - Manganese 1055	ug/l	
	Na - Sodium 929	mg/l	
	Ni - Nickel 1067	ug/l	
	Pb - Lead 1051	ug/l	
	Se - Selenium 1147	ug/l	
X	Zn - Zinc 1092 27	ug/l	

	Organochlorine Pesticides
	Organophosphorus Pesticides
	Acid Herdicides
	Base / Neutral Extractable Organics
	Acid Extractable Organics
	Purgeable Organics (VOA bottle)
	1,2 - Dibromoethane (EDB)

RECEIVED WASHINGTON OFFICE DEC 4 1986 DEM Ea Sec

Lab Comments:

GW-54 Revised 7/85

For Dissolved Analysis - submit filtered sample and write "DIS" in block
White copy - Headquarters Pink copy - Region Yellow copy - Lab

COUNTY PITT

QUAD. NO. M-27m SERIAL NO. N/A

LAT. 35°38'43" LONG. 77°37'43"

Report to: ARO, FRO, MRO, RRO, WaRO, WiRO, WSRO, Kinston FO Other

Shipped by: Bus, Courier, Other

COLLECTOR(S): R. POWERS DATE 11-3-86 TIME 1140 PURPOSE: BASELINE, COMPLAINT, COMPLIANCE, LUST, OTHER SPLIT (circle one)

N.C. DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT
DEM
GROUNDWATER FIELD/LAB FORM

SAMPLE PRIORITY
[X] ROUTINE [ ] EMERGENCY

5

LAB NUMBER 8 6G-876

DATE RECEIVED 11/4/86 Time 800

Rec'd by: [illegible] From: Bus Courier

Other

DATA ENTRY BY: [illegible] CK: DF

DATE REPORTED: 12-2-86

FIELD ANALYSES

pH_{400} Spec. Cond.$_{94}$ at 25°C

$Temp._{10}$ °C Odor

Appearance Taste

Field Analysis By:

Owner EVEREADY BATTERY CO.

Location or site STARLING FARM WELL #2

Description of sampling point

Sampling Method BAILER (pump, bailer, etc.) Sample Interval 3.5'-23.5'

Remarks COPY TO: BOB CHEEK (pumping time, air temp, etc.)

LABORATORY ANALYSES

	BOD_5 310	mg/l
	COD High 340	mg/l
	COD Low 335	mg/l
	Coliform:MF Fecal 31616	/100ml
	Coliform:MF Total 31504	/100ml
	TOC 680	mg/l
	Turbidity 76	NTU
	pH 403	units
	Alkalinity to pH 4.5 410	mg/l
	Alkalinity to pH 8.3 415	mg/l
	Carbonate 445	mg/l
	Bicarbonate 440	mg/l
	Arsenic:Total 1002	ug/l
	Carbon dioxide 405	mg/l
	Chloride 940	mg/l
	Chromium:Hex 1032	ug/l
	Color:True 80	Pt-Co
	Cyanide 720	mg/l

	Diss. Solids 70300	mg/l
	Fluoride 951	mg/l
	Hardness:Total 900	mg/l
	Hardness (non-carb) 902	mg/l
	Phenols 32730	ug/l
	Specific Cond. 95	uMhos/cm^2
	Sulfate 945	mg/l
	Sulfide 745	mg/l
	NH_3 as N 610	mg/l
	TKN as N 625	mg/l
	$NO_2 + NO_3$ as N 630	mg/l
	P:Total as P 665	mg/l

	Ag - Silver 1077		ug/l
	Al - Aluminum 1105		ug/l
X	Ba - Barium 1007	<500	ug/l
	Ca - Calcium 916		mg/l
X	Cd - Cadmium 1027	<10	ug/l
X	Chromium:Total 1034	<25	ug/l
X	Cu - Copper 1042	30	ug/l
	Fe - Iron 1045		ug/l
	Hg - Mercury 71900		ug/l
	K - Potassium 937		mg/l
	Mg - Magnesium 927		mg/l
	Mn - Manganese 1055		ug/l
	Na - Sodium 929		mg/l
	Ni - Nickel 1067		ug/l
	Pb - Lead 1051		ug/l
	Se - Selenium 1147		ug/l
X	Zn - Zinc 1092	36	ug/l

	Organochlorine Pesticides
	Organophosphorus Pesticides
	Acid Herdicides
	Base / Neutral Extractable Organics
	Acid Extractable Organics
	Purgeable Organics (VOA bottle)
	1,2 - Dibromoethane (EDB)

RECEIVED WASHINGTON OFFICE DEC 4 1986 D. E. & L.

Lab Comments:

GW-54 Revised 7/85

For Dissolved Analysis - submit filtered sample and write "DIS" in block
White copy - Headquarters Pink copy - Region Yellow copy - Lab

COUNTY PITT

QUAD NO. M-27m SERIAL NO. N/A

LAT. 35°38'43" LONG. 77°37'43"

N.C. DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT
DEM
GROUNDWATER FIELD/LAB FORM

GW 4

LAB NUMBER 8 6W-871

DATE RECEIVED 11/4/86 Time 8:00

Rec'd by: JC From: Bus Courier

Other

DATA ENTRY BY: bm CK: DF

DATE REPORTED: 12-2-86

Report to: ARO, FRO, MRO, RRO, WaRO, WiRO, WSRO, Kinston FO Other

Shipped by: Bus, Courier, Other

SAMPLE PRIORITY

[X] ROUTINE [ ] EMERGENCY

COLLECTOR(S): R. POWERS DATE 11-3-86 TIME 1125 PURPOSE: BASELINE, COMPLAINT, COMPLIANCE (circle one) LUST, OTHER SPLIT

FIELD ANALYSES

pH_{400} ____ Spec. Cond.$_{94}$ ____ at 25°C

Temp.$_{10}$ ____ °C Odor ____

Appearance ____ Taste ____

Field Analysis By: ____

Owner EVEREADY BATTERY CO.

Location or site STARLING FARM WELL # 3

Description of sampling point

Sampling Method RAILER (pump, bailer, etc.) Sample Interval 3'-23'

Remarks (pumping time, air temp, etc.)

COPY TO: BOB CHEEK

LABORATORY ANALYSES

	BOD_5 310	mg/l
	COD High 340	mg/l
	COD Low 335	mg/l
	Coliform:MF Fecal 31616	/100ml
	Coliform:MF Total 31504	/100ml
	TOC 680	mg/l
	Turbidity 76	NTU
	pH 403	units
	Alkalinity to pH 4.5 410	mg/l
	Alkalinity to pH 8.3 415	mg/l
	Carbonate 445	mg/l
	Bicarbonate 440	mg/l
	Arsenic:Total 1002	ug/l
	Carbon dioxide 405	mg/l
	Chloride 940	mg/l
	Chromium:Hex 1032	ug/l
	Color:True 80	Pt-Co
	Cyanide 720	mg/l

	Diss. Solids 70300	mg/l
	Fluoride 951	mg/l
	Hardness:Total 900	mg/l
	Hardness (non-carb) 902	mg/l
	Phenols 32730	ug/l
	Specific Cond. 95	uMhos/cm^2
	Sulfate 945	mg/l
	Sulfide 745	mg/l
	NH_3 as N 610	mg/l
	TKN as N 625	mg/l
	$NO_2 + NO_3$ as N 630	mg/l
	P:Total as P 665	mg/l

	Ag - Silver 1077		ug/l
	Al - Aluminum 1105		ug/l
X	Ba - Barium 1007	<500	ug/l
	Ca - Calcium 916		mg/l
X	Cd - Cadmium 1027	<10	ug/l
X	Chromium:Total 1034	<25	ug/l
X	Cu - Copper 1042	13	ug/l
	Fe - Iron 1045		ug/l
	Hg - Mercury 71900		ug/l
	K - Potassium 937		mg/l
	Mg - Magnesium 927		mg/l
	Mn - Manganese 1055		ug/l
	Na - Sodium 929		mg/l
	Ni - Nickel 1067		ug/l
	Pb - Lead 1051		ug/l
	Se - Selenium 1147		ug/l
X	Zn - Zinc 1092	15	ug/l

	Organochlorine Pesticides
	Organophosphorus Pesticides
	Acid Herdicides
	Base / Neutral Extractable Organics
	Acid Extractable Organics
	Purgeable Organics (VOA bottle)
	1,2 - Dibromoethane (EDB)

RECEIVED WASHINGTON OFFICE NOV 4 1986 DEM Env. Mgt.

Lab Comments:

GW-54 Revised 7/85

For Dissolved Analysis - submit filtered sample and write "DIS" in block
White copy - Headquarters Pink copy - Region Yellow copy - Lab

COUNTY PITT

N.C. DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT
DEM
GROUNDWATER FIELD/LAB FORM

GW 2

LAB NUMBER 8 6G-868

QUAD NO. M-27 m SERIAL NO. N/A

LAT. 35°38'43" LONG. 77°37'43"

DATE RECEIVED 11/4/86 Time 8:00

Rec'd by: JO From: Bus, Courier

Other

Report to: ARO, FRO, MRO, RRO, WaRO, WiRO, WSRO, Kinston FO Other

DATA ENTRY BY: CK: DF

Shipped by: Bus, Courier, Other

DATE REPORTED: 12-2-86

SAMPLE PRIORITY

[X] ROUTINE [ ] EMERGENCY

COLLECTOR(S): R. POWERS DATE 11-3-86 TIME 1055 PURPOSE: BASELINE, COMPLAINT, COMPLIANCE, LUST, OTHER SPLIT (circle one)

FIELD ANALYSES

pH 400 ____ Spec. Cond. 94 ____ at 25°C

Temp. 10 ____ °C Odor ____

Appearance ____ Taste ____

Field Analysis By: ____

Owner EVEREADY BATTERY CO.

Location or site STARLING FARM WELL# 4

Description of sampling point

Sampling Method BAILER (pump, bailer, etc.) Sample Interval 3'-23'

Remarks COPY TO: BOB CHEEK (pumping time, air temp, etc.)

LABORATORY ANALYSES

	BOD_5 310	mg/l
	COD High 340	mg/l
	COD Low 335	mg/l
	Coliform:MF Fecal 31616	/100ml
	Coliform:MF Total 31504	/100ml
	TOC 680	mg/l
	Turbidity 76	NTU
	pH 403	units
	Alkalinity to pH 4.5 410	mg/l
	Alkalinity to pH 8.3 415	mg/l
	Carbonate 445	mg/l
	Bicarbonate 440	mg/l
	Arsenic:Total 1002	ug/l
	Carbon dioxide 405	mg/l
	Chloride 940	mg/l
	Chromium:Hex 1032	ug/l
	Color:True 80	Pt-Co
	Cyanide 720	mg/l

	Diss. Solids 70300	mg/l
	Fluoride 951	mg/l
	Hardness:Total 900	mg/l
	Hardness (non-carb) 902	mg/l
	Phenols 32730	ug/l
	Specific Cond. 95	uMhos/cm²
	Sulfate 945	mg/l
	Sulfide 745	mg/l
	NH_3 as N 610	mg/l
	TKN as N 625	mg/l
	$NO_2 + NO_3$ as N 630	mg/l
	P:Total as P 665	mg/l

	Ag - Silver 1077		ug/l
	Al - Aluminum 1105		ug/l
X	Ba - Barium 1007	<500	ug/l
	Ca - Calcium 916		mg/l
X	Cd - Cadmium 1027	<10	ug/l
X	Chromium:Total 1034	<25	ug/l
X	Cu - Copper 1042	<10	ug/l
	Fe - Iron 1045		ug/l
	Hg - Mercury 71900		ug/l
	K - Potassium 937		mg/l
	Mg - Magnesium 927		mg/l
	Mn - Manganese 1055		ug/l
	Na - Sodium 929		mg/l
	Ni - Nickel 1067		ug/l
	Pb - Lead 1051		ug/l
	Se - Selenium 1147		ug/l
X	Zn - Zinc 1092	25	ug/l

	Organochlorine Pesticides
	Organophosphorus Pesticides
	Acid Herdicides
	Base / Neutral Extractable Organics
	Acid Extractable Organics
	Purgeable Organics (VOA bottle)
	1,2 - Dibromoethane (EDB)

RECEIVED WASHINGTON OFFICE NOV 4 1986 D.E.N.R.

Lab Comments:

GW-54 Revised 7/85

For Dissolved Analysis - submit filtered sample and write "DIS" in block
White copy - Headquarters Pink copy - Region Yellow copy - Lab

COUNTY PITT

QUAD NO. M-27m SERIAL NO. N/A

LAT. 35°38'43" LONG. 77°37'43"

N.C. DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT
DEM
GROUNDWATER FIELD/LAB FORM

GW 6

LAB NUMBER 8 6G-873

DATE RECEIVED 11/4/86 Time 8:00

Rec'd by: [illegible] From: Bus-Courier

Other

DATA ENTRY BY: bm CK: DF

DATE REPORTED: 12-2-86

Report to: ARO, FRO, MRO, RRO, WaRO, WIRO, WSRO, Kinston FO Other

Shipped by: Bus, Courier, Other

SAMPLE PRIORITY
☒ ROUTINE ☐ EMERGENCY

COLLECTOR(S): R. POWERS DATE 11-3-86 TIME 1215 PURPOSE: BASELINE, COMPLAINT, COMPLIANCE (circle one), LUST, OTHER SPLIT

FIELD ANALYSES

pH_{400} ____ Spec. Cond.$_{94}$ ____ at 25°C

Temp.$_{10}$ ____ °C Odor ____

Appearance ____ Taste ____

Field Analysis By: ____

Owner EVEREADY BATTERY CO.

Location or site STARLING FARM WELL # 11

Description of sampling point

Sampling Method BAILER (pump, bailer, etc.) Sample Interval 14.7' - 24.4'

Remarks COPY TO: BOB CHEEK (pumping time, air temp, etc.)

LABORATORY ANALYSES

	BOD_5 310	mg/l
	COD High 340	mg/l
	COD Low 335	mg/l
	Coliform:MF Fecal 31616	/100ml
	Coliform:MF Total 31504	/100ml
	TOC 680	mg/l
	Turbidity 76	NTU
	pH 403	units
	Alkalinity to pH 4.5 410	mg/l
	Alkalinity to pH 8.3 415	mg/l
	Carbonate 445	mg/l
	Bicarbonate 440	mg/l
	Arsenic:Total 1002	ug/l
	Carbon dioxide 405	mg/l
	Chloride 940	mg/l
	Chromium:Hex 1032	ug/l
	Color:True 80	Pt-Co
	Cyanide 720	mg/l

	Diss. Solids 70300	mg/l
	Fluoride 951	mg/l
	Hardness:Total 900	mg/l
	Hardness (non-carb) 902	mg/l
	Phenols 32730	ug/l
	Specific Cond. 95	uMhos/cm^2
	Sulfate 945	mg/l
	Sulfide 745	mg/l
	NH_3 as N 610	mg/l
	TKN as N 625	mg/l
	$NO_2 + NO_3$ as N 630	mg/l
	P:Total as P 665	mg/l

	Ag - Silver 1077		ug/l
	Al - Aluminum 1105		ug/l
X	Ba - Barium 1007	<500	ug/l
	Ca - Calcium 916		mg/l
X	Cd - Cadmium 1027	<10	ug/l
X	Chromium:Total 1034	<25	ug/l
X	Cu - Copper 1042	<10	ug/l
	Fe - Iron 1045		ug/l
	Hg - Mercury 71900		ug/l
	K - Potassium 937		mg/l
	Mg - Magnesium 927		mg/l
	Mn - Manganese 1055		ug/l
	Na - Sodium 929		mg/l
	Ni - Nickel 1067		ug/l
	Pb - Lead 1051		ug/l
	Se - Selenium 1147		ug/l
X	Zn - Zinc 1092	62	ug/l

	Organochlorine Pesticides
	Organophosphorus Pesticides
	Acid Herdicides
	Base / Neutral Extractable Organics
	Acid Extractable Organics
	Purgeable Organics (VOA bottle)
	1,2 - Dibromoethane (EDB)

RECEIVED WASHINGTON OFFICE NOV 4 1986 D.E.H.

Lab Comments:

GW-54 Revised 7/85

For Dissolved Analysis - submit filtered sample and write "DIS" in block
White copy - Headquarters Pink copy - Region Yellow copy - Lab

COUNTY PITT

QUAD NO. M-27m SERIAL NO. N/A

LAT. 35°38'43" LONG. 77°37'43"

N.C. DEPARTMENT OF NATURAL RESOURCES & COMMUNITY DEVELOPMENT
DEM
GROUNDWATER FIELD/LAB FORM

GW 3

LAB NUMBER # LW-870

DATE RECEIVED 11/4/86 Time 8:00

Rec'd by: [signature] From: Bus-Courier

Other

DATA ENTRY BY: [signature] CK: DF

DATE REPORTED: 12-2-86

Report to: ARO, FRO, MRO, RRO, (WaRO), WiRO, WSRO, Kinston FO Other

Shipped by: Bus, (Courier), Other

SAMPLE PRIORITY

☒ ROUTINE ☐ EMERGENCY

COLLECTOR(S): R. POWERS DATE 11-3-86 TIME 1115 PURPOSE: BASELINE, COMPLAINT, (COMPLIANCE), LUST, OTHER SPLIT (circle one)

FIELD ANALYSES

pH_{400} ____ Spec. Cond.$_{94}$ ____ at 25°C

Temp.$_{10}$ ____ °C Odor ____

Appearance ____ Taste ____

Field Analysis By: ____

Owner EVEREADY BATTERY CO.

Location or site STARLING FARM WELL # 12

Description of sampling point

Sampling Method BAILER (pump, bailer, etc.) Sample Interval 14.7'-24.3'

Remarks (pumping time, air temp, etc.)

COPY TO: BOB CHEEK

LABORATORY ANALYSES

	BOD_5 310	mg/l
	COD High 340	mg/l
	COD Low 335	mg/l
	Coliform:MF Fecal 31616	/100ml
	Coliform:MF Total 31504	/100ml
	TOC 680	mg/l
	Turbidity 76	NTU
	pH 403	units
	Alkalinity to pH 4.5 410	mg/l
	Alkalinity to pH 8.3 415	mg/l
	Carbonate 445	mg/l
	Bicarbonate 440	mg/l
	Arsenic:Total 1002	ug/l
	Carbon dioxide 405	mg/l
	Chloride 940	mg/l
	Chromium:Hex 1032	ug/l
	Color:True 80	Pt-Co
	Cyanide 720	mg/l

	Diss. Solids 70300	mg/l
	Fluoride 951	mg/l
	Hardness:Total 900	mg/l
	Hardness (non-carb) 902	mg/l
	Phenols 32730	ug/l
	Specific Cond. 95	uMhos/cm²
	Sulfate 945	mg/l
	Sulfide 745	mg/l
	NH_3 as N 610	mg/l
	TKN as N 625	mg/l
	$NO_2 + NO_3$ as N 630	mg/l
	P:Total as P 665	mg/l

	Ag - Silver 1077		ug/l
	Al - Aluminum 1105		ug/l
X	Ba - Barium 1007	<500	ug/l
	Ca - Calcium 916		mg/l
X	Cd - Cadmium 1027	<10	ug/l
X	Chromium:Total 1034	<25	ug/l
X	Cu - Copper 1042	10	ug/l
	Fe - Iron 1045		ug/l
	Hg - Mercury 71900		ug/l
	K - Potassium 937		mg/l
	Mg - Magnesium 927		mg/l
	Mn - Manganese 1055		ug/l
	Na - Sodium 929		mg/l
	Ni - Nickel 1067		ug/l
	Pb - Lead 1051		ug/l
	Se - Selenium 1147		ug/l
X	Zn - Zinc 1092	19	ug/l

	Organochlorine Pesticides
	Organophosphorus Pesticides
	Acid Herdicides
	Base / Neutral Extractable Organics
	Acid Extractable Organics
	Purgeable Organics (VOA bottle)
	1,2 - Dibromoethane (EDB)

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Lab Comments:

GW-54 Revised 7/85

For Dissolved Analysis - submit filtered sample and write "DIS" in block
White copy - Headquarters Pink copy - Region Yellow copy - Lab

ANALYSIS SET 3

COMPLIANCE MONITORING REPORT FORM

Environmental Management Division
Groundwater Section
P.O. Box 27687
Raleigh,N.C. 27611
(919)733-5083

Facility Name: Eveready Battery Co. Inc.
Address: P. O. Box 1547
Greenville, N. C. 27834
Well Location: Starling Farm, Farmville, N. C.
Well Identification Number: #1 Well Depth: 25 Ft.
Well Diameter: 2" Sample (Screened) Interval: 4 Ft. To: 24 Ft.
Depth to Water Level: 7.67 ft. below measuring point. (before sampling)
Measuring point is: 0.0 feet above land surface
Gallons of water pumped bailed before sampling: 7

County: Pitt
Permit Number: Variance by R.F. Helms 3/18/83
Non-Discharge:
NPDES:
Water Use:
Injection Well:
Well Construction:
Other:

Field Analysis: pH: ____ Specific Conductance: ____ uMhos Temp.: 18 °C Odor: None Appearance: Tan
Date Sample Collected: 7/28/86 Date Lab Sample Analyzed: 7/28/86
Laboratory Name: ENVIRONMENT I Certification No.: 10

COD	mg/l	NO_2 as N	mg/l	Ni - Nickel	mg/l
Coliform: MF Fecal	/100ml	NO_3 as N	mg/l	Pb - Lead	mg/l
Coliform: MF Total	/100ml	Phosphorus: Total as P	mg/l	Zn - Zinc	0.174 mg/l
Dissolved Solids: Total	225 mg/l	Al - Aluminum	mg/l	Pesticides/Herbicides (Specify Compounds)	
pH (when analyzed)	4.3 units	Ba - Barium	0.183 mg/l		ug/l
TOC	mg/l	Ca - Calcium	~~0.5654~~ mg/l		ug/l
Chloride	43 mg/l	Cd - Cadmium	~~0.048~~ mg/l		ug/l
Arsenic	mg/l	Chromium: Total	.0051 mg/l	Other (Specify)	ug/l
Grease and Oils	mg/l	Cu - Copper	.048 mg/l		ug/l
Hardness: Total	mg/l	Fe - Iron	mg/l		ug/l
Phenol	0.006 mg/l	Hg - Mercury	mg/l		ug/l
Sulfate	85 mg/l	K - Potassium	mg/l		ug/l
Specific Conductance	316 uMhos	Mg - Magnesium	mg/l		ug/l
Total Ammonia(NH_3 + NH_4)	0.51 mg/l	Mn - Manganese	mg/l		ug/l
TKN as N	mg/l	Na - Sodium	mg/l		

Note: Values should reflect total concentrations.

I CERTIFY THAT THIS REPORT IS TRUE AND ACCURATE.

NA OF PERMITTEE (OR AUTHORIZED AGENT*) 8/26/86 DATE

* See back for instructions.
** Submit blue and green copies to address above.

COMPLIANCE MONITORING REPORT FORM

Environmental Management Division
Groundwater Section
P.O. Box 27687
Raleigh,N.C. 27611
(919)733-5083

Facility Name: Eveready Battery Co. Inc. — County: Pitt
Address: P. O. Box 1547 — Permit Number: Variance by R.F. Helms 3/18/83
Greenville, N. C. 27834 — Non-Discharge:
Well Location: Starling Farm, Farmville, N. C. — NPDES:
Well Identification Number: #2 — Well Depth: 25 Ft. — Water Use:
Well Diameter: 2" — Sample (Screened) Interval: 3.5 Ft. To 23.5 Ft. — Injection Well:
Depth to Water Level: 7.25 ft. below measuring point. (before sampling) — Well Construction:
Measuring point is 0.5 feet above land surface — Other:
Gallons of water pumped bailed before sampling: 7
Field Analysis: pH ____ Specific Conductance ____ uMhos Temp. 18 °C Odor None Appearance Tan
Date Sample Collected: 7/28/86 — Date Lab Sample Analyzed: 7/28/86
Laboratory Name: Environment I — Certification No.: 10

COD	mg/l	NO_2 as N	mg/l	Ni - Nickel	mg/l
Coliform: MF Fecal	/100ml	NO_3 as N	mg/l	Pb - Lead	mg/l
Coliform: MF Total	/100ml	Phosphorus: Total as P	mg/l	Zn - Zinc	<0.010 mg/l
Dissolved Solids: Total	63 mg/l	Al - Aluminum	mg/l	Pesticides/Herbicides (Specify Compounds)	
pH (when analyzed)	4.3 units	Ba - Barium	0.119 mg/l		ug/l
TOC	mg/l	Ca - Calcium	mg/l		ug/l
Chloride	20 mg/l	Cd - Cadmium	mg/l		ug/l
Arsenic	mg/l	Chromium: Total	0.0023 mg/l	Other (Specify)	ug/l
Grease and Oils	mg/l	Cu - Copper	0.044 mg/l		ug/l
Hardness: Total	mg/l	Fe - Iron	mg/l		ug/l
Phenol	0.008 mg/l	Hg - Mercury	mg/l		ug/l
Sulfate	7.0 mg/l	K - Potassium	mg/l		ug/l
Specific Conductance	82.3 uMhos	Mg - Magnesium	mg/l		ug/l
Total Ammonia(NH_3 + NH_4)	0.06 mg/l	Mn - Manganese	mg/l		
TKN as N	mg/l	Na - Sodium	mg/l		

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RALEIGH, N. C.

Note:
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COMPLIANCE MONITORING REPORT FORM

Environmental Management Division
Groundwater Section
P.O. Box 27687
Raleigh,N.C. 27611
(919)733-5083

Facility Name: Eveready Battery Co. Inc.
Address: P. O. Box 1547
Greenville, N. C. 27834
Well Location: Starling Farm, Farmville, N. C.
Well Identification Number: #3 Well Depth: 25 Ft.
Well Diameter: 2" Sample (Screened) Interval: 3.0 Ft. To: 23 Ft.
Depth to Water Level: 8.33 ft. below measuring point. (before sampling)
Measuring point is: 0.8 feet above land surface
Gallons of water pumped bailed before sampling: 7

County: Pitt
Permit Number: Variance by R.F. Helms 3/18/83
Non-Discharge:
NPDES:
Water Use:
Injection Well:
Well Construction:
Other:

Field Analysis: pH: ____ Specific Conductance: ____ uMhos Temp.: 18 °C Odor: None Appearance: Tan
Date Sample Collected: 7/28/86 Date Lab Sample Analyzed: 7/28/86
Laboratory Name: Environment I Certification No.: 10

COD	mg/l	NO_2 as N	mg/l	Ni - Nickel	mg/l
Coliform: MF Fecal	/100ml	NO_3 as N	mg/l	Pb - Lead	mg/l
Coliform: MF Total	/100ml	Phosphorus: Total as P	mg/l	Zn - Zinc	0.022 mg/l
Dissolved Solids: Total	241 mg/l	Al - Aluminum	mg/l	Pesticides/Herbicides (Specify Compounds)	
pH (when analyzed)	5.6 units	Ba - Barium	0.307 mg/l		ug/l
TOC	mg/l	Ca - Calcium	mg/l		ug/l
Chloride	60 mg/l	Cd - Cadmium	mg/l		ug/l
Arsenic	mg/l	Chromium: Total	0.0016 mg/l	Other (Specify)	ug/l
Grease and Oils	mg/l	Cu - Copper	0.012 mg/l		ug/l
Hardness: Total	mg/l	Fe - Iron	mg/l		ug/l
Phenol	0.006 mg/l	Hg - Mercury	mg/l		ug/l
Sulfate	6.0 mg/l	K - Potassium	mg/l		ug/l
Specific Conductance	278 uMhos	Mg - Magnesium	mg/l		ug/l
Total Ammonia(NH_3 + NH_4)	0.09 mg/l	Mn - Manganese	mg/l		
TKN as N	mg/l	Na - Sodium	mg/l		

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RALEIGH, N. C.

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8/26/86
DATE

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COMPLIANCE MONITORING REPORT FORM

Environmental Management Division
Groundwater Section
P.O. Box 27687
Raleigh,N.C. 27611
(919)733-5083

Facility Name: Eveready Battery Co. Inc.
Address: P. O. Box 1547
Greenville, N. C. 27834
Well Location: Starling Farm, Farmville, N. C.
Well Identification Number: #4
Well Depth: 25 Ft.
Well Diameter: 2" Sample (Screened) Interval: 3.0 Ft. To 23 Ft.
Depth to Water Level: 8.33 ft. below measuring point. (before sampling)
Measuring point is: 0.5 feet above land surface
Gallons of water pumped bailed before sampling: 7

County: Pitt
Permit Number: Variance by R.F. Helm 3/18/83
Non-Discharge:
NPDES:
Water Use:
Injection Well:
Well Construction:
Other:

Field Analysis: pH _____ Specific Conductance _____ uMhos Temp. 18 °C Odor None Appearance Tan
Date Sample Collected: 7/28/86 Date Lab Sample Analyzed: 7/28/86
Laboratory Name: Environment I Certification No.: 10

COD	mg/l	NO_2 as N	mg/l	Ni - Nickel	mg/l
Coliform: MF Fecal	/100ml	NO_3 as N	mg/l	Pb - Lead	mg/l
Coliform: MF Total	/100ml	Phosphorus: Total as P	mg/l	Zn - Zinc 0.029	mg/l
Dissolved Solids: Total 902	mg/l	Al - Aluminum	mg/l	Pesticides/Herbicides (Specify Compounds)	
pH (when analyzed) 6.4	units	Ba - Barium 0.289	mg/l		ug/l
TOC	mg/l	Ca - Calcium	mg/l		ug/l
Chloride 37	mg/l	Cd - Cadmium	mg/l		ug/l
Arsenic	mg/l	Chromium: Total 0.011	mg/l	Other (Specify)	ug/l
Grease and Oils	mg/l	Cu - Copper 0.056	mg/l		ug/l
Hardness: Total	mg/l	Fe - Iron	mg/l		ug/l
Phenol 0.014	mg/l	Hg - Mercury	mg/l		ug/l
Sulfate 155	mg/l	K - Potassium	mg/l		ug/l
Specific Conductance 1282	uMhos	Mg - Magnesium	mg/l		ug/l
Total Ammonia(NH_3 + NH_4) 10.8	mg/l	Mn - Manganese	mg/l		
TKN as N	mg/l	Na - Sodium	mg/l		

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COMPLIANCE MONITORING REPORT FORM

Environmental Management Division
Groundwater Section
P.O. Box 27687
Raleigh,N.C. 27611
(919)733-5083

Facility Name: Eveready Battery Co. Inc. | County: Pitt
Address: P. O. Box 1547 | Permit Number: Variance by R.F. Helms 3/18/83
Greenville, N. C. 27834 | Non-Discharge:
Well Location: Starling Farm, Farmville, N. C. | NPDES:
Well Identification Number: #11 | Well Depth: 25 Ft. | Water Use:
Well Diameter: 2" | Sample (Screened) Interval: 14.7 Ft. To 24.4 Ft. | Injection Well:
Depth to Water Level: 8.14 ft. below measuring point. (before sampling) | Well Construction:
Measuring point is: 2.60 feet above land surface | Other:
Gallons of water pumped bailed before sampling: 7
Field Analysis: pH: | Specific Conductance: uMhos | Temp.: 18 °C | Odor: None | Appearance: Tan
Date Sample Collected: 7/28/86 | Date Lab Sample Analyzed: 7/28/86
Laboratory Name: Environment I | Certification No.: 10

COD	mg/l	NO_2 as N	mg/l	Ni - Nickel	mg/l
Coliform: MF Fecal	/100ml	NO_3 as N	mg/l	Pb - Lead	mg/l
Coliform: MF Total	/100ml	Phosphorus: Total as P	mg/l	Zn - Zinc	0.012 mg/l
Dissolved Solids: Total	1319 mg/l	Al - Aluminum	mg/l	Pesticides/Herbicides (Specify Compounds)	
pH (when analyzed)	5.8 units	Ba - Barium	0.537 mg/l		ug/l
TOC	mg/l	Ca - Calcium	mg/l		ug/l
* Chloride	740 mg/l	Cd - Cadmium	mg/l		ug/l
Arsenic	mg/l	Chromium: Total	<0.001 mg/l	Other (Specif	ug/l
Grease and Oils	mg/l	Cu - Copper	0.0067 mg/l		ug/l
Hardness: Total	mg/l	Fe - Iron	mg/l		ug/l
Phenol	0.057 mg/l	Hg - Mercury	mg/l		ug/l
Sulfate	3.0 mg/l	K - Potassium	mg/l		ug/l
Specific Conductance	1563 uMhos	Mg - Magnesium	mg/l		ug/l
Total Ammonia(NH_3 + NH_4)	0.84 mg/l	Mn - Manganese	mg/l		
TKN as N	mg/l	Na - Sodium	mg/l		

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GROUND WATER SECTION
RALEIGH, N. C.

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COMPLIANCE MONITORING REPORT FORM

Environmental Management Division
Groundwater Section
P.O. Box 27687
Raleigh,N.C. 27611
(919)733-5083

Facility Name: Eveready Battery Co. Inc.
Address: P. O. Box 1547
Greenville, N. C. 27834
Well Location: Starling Farm, Farmville, N. C.
Well Identification Number: #12 Well Depth: 25 Ft.
Well Diameter: 2" Sample (Screened) Interval: 14.7 Ft. To 24.3 Ft.
Depth to Water Level: 9.58 ft. below measuring point. (before sampling)
Measuring point is: 2.40 feet above land surface
Gallons of water pumped bailed before sampling: 7

County: Pitt
Permit Number: Variance by R.F. Helms 3/18/83
Non-Discharge:
NPDES:
Water Use:
Injection Well:
Well Construction:
Other:

Field Analysis: pH ____ Specific Conductance ____ uMhos Temp. 18 °C Odor None Appearance Tan
Date Sample Collected: 7/28/86 Date Lab Sample Analyzed: 7/28/86
Laboratory Name: Environment I Certification No.: 10

COD	mg/l	NO_2 as N	mg/l	Ni - Nickel	mg/l
Coliform: MF Fecal	/100ml	NO_3 as N	mg/l	Pb - Lead	mg/l
Coliform: MF Total	/100ml	Phosphorus: Total as P	mg/l	Zn - Zinc	<0.010 mg/l
Dissolved Solids: Total	88 mg/l	Al - Aluminum	mg/l	Pesticides/Herbicides (Specify Compounds)	
pH (when analyzed)	5.7 units	Ba - Barium	0.078 mg/l		ug/l
TOC	mg/l	Ca - Calcium	mg/l		ug/l
Chloride	16 mg/l	Cd - Cadmium	mg/l		ug/l
Arsenic	mg/l	Chromium: Total	0.001 mg/l	Other (Specify)	ug/l
Grease and Oils	mg/l	Cu - Copper	0.025 mg/l		ug/l
Hardness: Total	mg/l	Fe - Iron	mg/l		ug/l
Phenol	0.008 mg/l	Hg - Mercury	mg/l		ug/l
Sulfate	20 mg/l	K - Potassium	mg/l		ug/l
Specific Conductance	112.9 uMhos	Mg - Magnesium	mg/l		ug/l
Total Ammonia(NH_3 + NH_4)	0.15 mg/l	Mn - Manganese	mg/l		
TKN as N	mg/l	Na - Sodium	mg/l		

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GROUND WATER SECTION
RALEIGH, N. C.

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APPENDIX C

REFERENCES

REFERENCES

1) Preliminary Assessment form, David Starling Property, 11-21-84.

2) Durway, D.M., memo re. Farmville water system, 4-21-89.

3) Durway, D.M., memo re. Farmville area water supply, 4-21-89.

4) Durway, D.M., memo re. Preliminary Assessment Update site area visits for the David Starling Property and American Petrofina.

5) Soil Survey of Pitt County, North Carolina, USDA Soil Conservation Service, November 1984.

6) Parker, W.T., letter to P. DeRosa, 6-21-85, and attachments.

7) Classifications and Water Quality Standards Assigned to the Waters of the Neuse River Basin, Code 15 NCAC 2B .0315, N.C. NRCD Division of Environmental Management, current through 6-30-89.

8) Uncontrolled Hazardous Waste Site Ranking System: A Users Guide, originally published in the 7-16-82 Federal Register, U.S. EPA, 1984.

9) Nash, A.M., letter to D.M. Durway, 11-16-84, and attachments regarding the evaluation and proposed cleanup of the David Starling disposal site.

10) Final Report of Hydrogeological Assessment, David Starling Disposal Site, Pitt County, NC for Union Carbide Corporation, prepared by Law Engineering Testing Company, November 1983.

11) Durway, D.M., letter to R. Morris re. Screening Site Investigation Summary Trip Report, 8-21-89.

12) Durway, D.M., field notes, 8-16-89.

13) DeRosa, P. file memo re. David Starling Property, 5-6-88.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D003185311

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
David Starling Property	Route 2, Box 246 (Hwy. 258N)

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Farmville	NC	27828	Pitt	074	01

09 COORDINATES LATITUDE	LONGITUDE
35° 38' 29" N	077° 37' 45" W

10 DIRECTIONS TO SITE (Starting from nearest public road)
From Farmville, take Hwy. 258N for approximately 2 to 3 miles. At the entrance to Woodland Hills Mobile Homes Estates (on right), continue an additional 0.25 miles. At Starling's address (Box 246) go left 0.1 mile; go right 100', go left (west) 100 yds to site (Map attached).

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)
David Starling	Route 2, Box 246 (Hwy. 258 N)

03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Farmville	NC	27828	(919) 753-4124

07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)
Union Carbide Corporation	P.O. Box 1547 Evans Street Extension

09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
Greenville	NC	27834	(919) 756-2171

13 TYPE OF OWNERSHIP (Check one)
☒ A. PRIVATE ☐ B. FEDERAL: _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL
☐ F. OTHER: _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)
☐ A. RCRA 3001 DATE RECEIVED: ___/___/___ (MONTH DAY YEAR) ☒ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED: 6/9/81 (MONTH DAY YEAR) ☐ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION
☐ YES DATE ___/___/___ (MONTH DAY YEAR)
☒ NO

BY (Check all that apply)
☐ A. EPA ☐ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER: _____ (Specify)
CONTRACTOR NAME(S): _____

02 SITE STATUS (Check one)	03 YEARS OF OPERATION
☐ A. ACTIVE ☒ B. INACTIVE ☐ C. UNKNOWN	1-6-71 (BEGINNING YEAR) 3-31-71 (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED
Barium carbonate, barium chromate & chromic acid were disposed of at the site. Wastes from sources other than Union Carbide Corporation are unknown of. Alleged possibility of various heavy metals.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION
Law Engineering Testing Co. (Marietta, Georgia) completed a hydrogeological assessment of the David Starling disposal site in 1983, and concluded that waste "does not represent an environmental hazard for surface or ground-water resources outside the immediate disposal area."

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)
☐ A. HIGH (Inspection required promptly) ☒ B. MEDIUM (Inspection required) ☐ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NUMBER
Albert M. Nash	Union Carbide Corporation P.O. Box 16000, Rocky River, OH 44116	(216) 333-0500

04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
O.W. Strickland	DHR	S&HW	(919) 733-2178	11/21/84 (MONTH DAY YEAR)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D003185311

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☐ A. SOLID
- ☐ B. POWDER, FINES
- ☒ C. SLUDGE
- ☐ D. OTHER (Specify)
- ☐ E. SLURRY
- ☒ F. LIQUID
- ☐ G. GAS

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

- TONS
- CUBIC YARDS 10,000 gals.
- NO. OF DRUMS 542 and containers

03 WASTE CHARACTERISTICS (Check all that apply)

- ☒ A. TOXIC
- ☒ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☒ D. PERSISTENT
- ☒ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☒ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☒ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	10,000	gal.	
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS	Unknown		
BAS	BASES			
MES	HEAVY METALS	Unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
D005	Barium Chromate	-	Burial in drums	40-50%	% volume
D005	Barium Carbonate	-	and containers	50-60%	"
D002	Chromic Acid	11115745	"	Unknown	-
D009	Mercury	7439976	"	"	-
D008	Lead	7439921	"	"	-

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS	N/A		FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

1. Cercla Notficiation, 6-9-81, from F.M. Charles.
2. Albert M. Nash, Environmental Coordinator, Union Carbide Corp., Rocky River, OH
3. Lab Analysis Results from: Union Carbide Corporation; Environment I, Inc. (Greenville, NC); N.C. Div. of Health Services State Lab of Public Health.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NC	D003185311

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: None — 04 NARRATIVE DESCRIPTION

None detected in nearby drinking wells. Possible g-w contamination directly beneath site.

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

Lead: Exceeded EPA drinking water standards at surface puddle near site.
Barium: Exceeded EPA drinking water standards at surface puddle and drainage ditch near site.

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: None — 04 NARRATIVE DESCRIPTION

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

Chromic acid may explode on contact with reducing agents, and may ignite upon contact with organic materials.

01 ☐ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown — 04 NARRATIVE DESCRIPTION

Material is buried in drums or containers; accidental unearthing of these could occur in future.

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

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: None — 04 NARRATIVE DESCRIPTION

None detected in nearby drinking wells to date.

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

No known danger at present.

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

No known danger at present

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NC	D003185311

II. HAZARDOUS CONDITIONS AND INCIDENTS *(Continued)*

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

Unknown

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

Unknown

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

Unknown

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES *(Spills/runoff/standing liquids/leaking drums)* — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown — 04 NARRATIVE DESCRIPTION

10,000 gallons of sludge, and possibly liquids, are buried in 542 drums and containers. In time, drums and containers will leak or deteriorate.

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

Unknown

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

Unknown

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

Presumed legal during time period that site was active.

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

It is unknown as to whether wastes, other than those generated by Union Carbide Corporation, were ever buried on the site, or at other locations on David Starling's property.

III. TOTAL POPULATION POTENTIALLY AFFECTED: Unknown

IV. COMMENTS

Lab analysis results, which were achieved by a number of different independent labs, are often contradictory; thus their validity and usefulness is questionable.

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

1. Hydrogeological assessment report for David Starling Disposal Site by Law Engineering Testing Co., prepared for Union Carbide Corp., 1983.
2. The Condensed Chemical Dictionary, 10th edition, 1981.
3. As previously sited.

April 21, 1989

TO: FILE

FROM: D. MARK DURWAY DMD.

RE: FARMVILLE WATER SYSTEM

Current NC Public Water Supply Branch records indicate that the Farmville water system has 2380 connections, and serves a total of 5900 persons.

April 21, 1989

TO: FILE

FROM: D. MARK DURWAY DMD.

RE: FARMVILLE AREA WATER SUPPLY

On 8-2-88, Pat DeRosa, Ed Wallingford, and I spoke to William Baker of the town of Farmville (pop. 4,834), who told us the following regarding the Farmville municipal wells:

1) No city wells pump from depths less than 200'.

2) Some city wells are within 3 miles of the David Starling property.

3) City wells pump 250-400 gpm.

4) City well depths range from about 300'-350' deep.

5) It is not possible to know how many persons a given city well serves. Water from city wells located within 3 miles of the David Starling property may potentially be consumed by anyone served by the Farmville water system.

6) Fountain (pop. 473) purchases water from Farmville The person in charge of the Fountain water supply is Bob Drew (tel. 919/749-7311).

7) Surface water is not used for drinking in the Farmville area.

On the same day, Mike Bell of the NC Public Water Supply said that Highland, Contentnea, and Woodland Hills mobile home parks, located along NC 258 between Farmville and Fountain, no longer use their wells. These mobile home parks purchase water from the Farmville city water system.

August 3, 1988

TO: FILE

FROM: D. MARK DURWAY DMD

RE: PAU site area visits for the David Starling Property and American Petrofina

Yesterday, PAU site area visits were conducted for the David Starling Property (NCD 003185311) in Farmville and American Petrofina (NCD 000770032) in Selma by Mark Durway, Pat DeRosa, and Ed Wallingford. A summary of events in the order in which they occurred is as follows:

1) Departed for Greenville at 8:00AM. Met Mike Bell of the NC Public Water Supply Branch in Greenville. Bell showed us where all community water wells within 4 miles of the Starling site were located. He said there were no surface water drinking supplies within 4 miles of the site.

2) Drove west to Farmville, then drove by Starling property. We were unable to see the burial areas from the highway where we stopped. Continued north to Fountain.

3) In Fountain, I spoke to Bob Drew of the Town of Fountain. Drew showed me on my USGS map where the town's water lines were located. He said that the town purchases water from Farmville. The Fountain wells were no longer in use, he said. Afterwards, drove back to Farmville and got additional water supply info from William Baker of the Town of Farmville.

4) Drove west to Selma, located American Petrofina (now Fina), and the nearest well. The nearest well is located at an old home on HWY 70A at a distance of approximately 1200' southwest of the southern-most Fina bulk storage tank. Arrived at our point of departure at 5:10PM.

cc. Pat DeRosa
Grover Nicholson
Lois Walker

SOIL SURVEY

Pitt County North Carolina

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION
Issued November 1974

TABLE 10.—*Probabilities of last freezing temperatures in spring and first in fall*

[All data from records obtained at Greenville]

Probability	Dates for given probability and temperature				
	16° F. or lower	20° F. or lower	24° F. or lower	28° F. or lower	32° F. or lower
Spring:					
1 year in 10 later than	February 28	March 11	March 23	April 6	April 16
2 years in 10 later than	February 15	February 28	March 14	March 29	April 9
5 years in 10 later than	January 25	February 12	February 25	March 15	March 26
Fall:					
1 year in 10 earlier than	November 9	November 23	November 10	October 30	October 19
2 years in 10 earlier than	December 13	November 29	November 16	November 5	October 26
5 years in 10 earlier than	December 24	December 10	November 27	November 16	November 5

Cloudiness is variable. The sun shines, on the average, more than half the total number of daylight hours in winter and nearly two-thirds of the total number of daylight hours in other seasons. The average relative humidity is about 85 percent at sunrise, and it drops to about 50 percent by midafternoon.

Tropical storms only occasionally retain destructive force when they move inland as far as Pitt County. Highest winds more often result from thunderstorms in summer than from tropical storms. Such winds are local and are of brief duration. Direction of surface winds is variable in all seasons, but the direction of prevailing winds is from the southwest. In autumn, however, northeasterly winds are a close second. The average surface windspeed is about 8 miles per hour.

Industry and Transportation

In 1967, 75 industrial plants were located in Pitt County. In that year industries provided employment to about 4,200 persons. Tobacco, wearing apparel, lumber, plastics, and processed foods were among the products manufactured.[9]

Public transportation in the county is provided by railroads, buslines, and numerous interstate and intrastate trucking lines. In addition, a municipal airport serves the county.

Cultural Facilities

Among the cultural, recreational, educational, and religious facilities in the county are many civic clubs, an active wildlife club, several golf courses and country clubs, a riding academy, more than 100 churches, and numerous Home Demonstration and 4-H clubs. The Greenville Art Center, the summer and winter playhouses, and the theater at East Carolina University, and the educational courses available at that school and at Pitt Technical Institute all enhance the cultural development of the county. Clinics and rehabilitation facilities are available for health care.

[9] Facts about industrial development were supplied by the East Carolina University Regional Development Institute, East Carolina University, Greenville, N. C.

Farming

The growing season in Pitt County is long enough that tobacco, peanuts, corn, soybeans, cotton, cucumbers, and sweetpotatoes have time to mature. In 1969, income from sales of tobacco accounted for about 78 percent of all the income derived from the sale of farm products. Good markets for crops and timber are located within the county. Markets for livestock are located at Kinston, Rocky Mount, Wilson, Tarboro, Bethel, and Greenville.

Acreages of the principal crops harvested in 1969 were as follows (*11*):

	Acres
Tobacco	20,481
Peanuts	7,159
Corn	55,759
Soybeans	21,863
Cotton	1,082
Cucumbers	744

In 1969, a total of 7,848 head of cattle, 51,980 hogs and pigs, and 580,624 hens and pullets of laying age were in the county.

Literature Cited

(1) AMERICAN ASSOCIATION OF STATE HIGHWAY OFFICIALS.
1961. STANDARD SPECIFICATIONS FOR HIGHWAY MATERIALS AND METHODS OF SAMPLING AND TESTING. Ed. 8, 2 v., illus.

(2) BALDWIN, M., KELLOGG, C. E., and THORP, JAMES.
1938. SOIL CLASSIFICATION. U.S. Dept. Agr. Ybk.: 979–1001, illus.

(3) BROWN, PHILIP.
1959. GEOLOGY AND GROUND-WATER RESOURCES IN THE GREENVILLE AREA, NORTH CAROLINA. N.C. Dept. of Conservation and Development, Div. of Mineral Res., Bul. No. 73, 87 pp., illus.

(4) SCHUMACHER, F. X., and COILE, T. S.
1960. GROWTH AND YIELDS OF NATURAL STANDS OF THE SOUTHERN PINE. 115 pp., T. S. Coile, Inc., Durham, N.C.

(5) SIMONSON, ROY W.
1962. SOIL CLASSIFICATION IN THE UNITED STATES. Sci. 137: 1027–1034.

(6) THORP, JAMES, and SMITH, GUY D.
1949. HIGHER CATEGORIES OF SOIL CLASSIFICATION: ORDER, SUBORDER, AND GREAT SOIL GROUPS. Soil Sci. 67: 117–126.

(7) UNITED STATES DEPARTMENT OF AGRICULTURE.
1929. VOLUME, YIELD, AND STAND TABLES FOR SECOND-GROWTH SOUTHERN PINES. Misc. Pub. 50, 202 pp. [Out of print]

Combined thickness of the sandy horizons is more than 80 inches. The Ap or A1 horizon is dark gray to dark grayish brown and is 5 to 10 inches thick. The upper part of the C horizon ranges from light yellowish brown to very pale brown and from fine sand to coarse sand. Gray or white mottles are at a depth within 10 to 40 inches of the surface. The lower part of the C horizon is commonly white to light brownish-gray sand or coarse sand.

Chipley sand (Ch).—This is a moderately well drained soil on broad flats and on smooth side slopes of uplands and stream terraces. It occurs in areas of irregular shape that are 4 to 20 acres in size. Slopes range from 0 to 4 percent. The surface layer is dark grayish-brown sand about 9 inches thick. To a depth of about 42 inches, the underlying layers are light yellowish-brown and very pale brown, loose fine sand and sand mottled with white and brownish yellow. The next layers, to a depth of about 66 inches, are white and light brownish-gray, loose sand and coarse sand mottled with yellowish brown.

Included with this soil in mapping were a few areas of soils that have a similar profile but that have a surface layer of fine sand. Also included were small areas of Lakeland, Alaga, Pactolus, Osier, and Wagram soils.

Infiltration is rapid. Runoff is slow.

This soil is fairly easy to keep in good tilth and can be satisfactorily worked throughout a wide range of moisture content. It is fairly well suited to most of the locally grown crops, but natural fertility is very low. Also, infrequent flooding occurs for brief periods, and wetness is a severe limitation. About half of the acreage is cultivated or in pasture. The rest is chiefly in forest and in housing developments or other nonfarm uses. Some artificial drainage is needed in places for optimum returns from most crops. Capability unit IIIw-1; woodland suitability group 2w2.

Coxville Series

The Coxville series consists of poorly drained, nearly level soils on uplands. These soils formed in Coastal Plain sediment. A seasonal high water table is at or near the surface.

In a typical profile, the surface layer is dark-gray and gray fine sandy loam about 11 inches thick. The subsoil, about 51 inches thick, is dominantly gray, firm sandy clay mottled with yellowish brown, brownish yellow, and red. Below the subsoil and extending to a depth of about 70 inches is gray sandy clay mottled with reddish yellow.

Natural fertility and available water capacity are medium, and the content of organic matter is low. Permeability is moderately slow, and shrink-swell potential is moderate. In areas that have not received lime, reaction is very strongly acid or extremely acid.

Although most of the acreage is in forest, these soils are fairly important for farming. Areas not in trees are used mainly for cultivated crops and pasture. The major limitations to use of these soils are the seasonal high water table, frequent ponding for brief periods, and moderately slow permeability. Crops respond well to recommended applications of fertilizer and lime.

Representative profile of Coxville fine sandy loam, 0.2 mile south of the city limits of Greenville, 300 feet east of N. C. Highway No. 43, and 250 feet south of an apartment housing project:

Ap—0 to 9 inches, dark-gray (10YR 4/1) fine sandy loam; weak, fine, granular structure; very friable; many small roots; slightly acid; clear, wavy boundary.

A2—9 to 11 inches, gray (10YR 6/1) fine sandy loam; many, fine, distinct, grayish-brown mottles; weak, medium, granular structure; very friable; many small and medium roots and few large roots; few small and medium root channels; strongly acid; clear, smooth boundary.

B1g—11 to 13 inches, grayish-brown (10YR 5/2) sandy clay loam; few, fine, distinct, brownish-yellow mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few small roots; very strongly acid; clear, wavy boundary.

B21tg—13 to 25 inches, gray (10YR 6/1) sandy clay; few, medium, distinct, yellowish-brown (10YR 5/4) mottles; weak, medium, subangular blocky structure; firm, sticky and plastic; few small roots and root channels; thin clay films on vertical faces of peds and in root channels; very strongly acid; gradual, wavy boundary.

B22tg—25 to 62 inches, gray (10YR 6/1) sandy clay; many, medium, distinct, brownish-yellow (10YR 6/6) mottles and few, fine, prominent, red mottles; weak, medium, angular and subangular blocky structure; firm, sticky and plastic; thin, patchy clay films on faces of peds; extremely acid; gradual, wavy boundary.

Cg—62 to 70 inches, gray (10YR 6/1) sandy clay; few, medium, prominent, reddish-yellow (5YR 6/6) mottles; massive; firm, sticky and plastic; pockets and lenses of clay and loamy sand; extremely acid.

The solum is more than 60 inches thick. The A horizon is gray or dark gray and ranges from 8 to 20 inches in thickness. The B1 horizon is gray to grayish brown. The Bt horizon is gray sandy clay to clay loam and is 43 to 55 inches or more thick. The B horizon is commonly mottled with yellowish brown, brownish yellow, and red. The C horizon is gray and is sandy clay to clay.

Coxville fine sandy loam (Co).—This is a poorly drained soil on smooth flats and in slight depressions in the uplands. It occurs in areas of irregular shape that are 4 to more than 40 acres in size. Slopes are 0 to 1 percent. The surface layer is dark-gray and gray fine sandy loam about 11 inches thick. The subsoil, about 51 inches thick, is dominantly gray fine sandy clay mottled with yellowish brown, brownish yellow, and red.

Included with this soil in mapping were a few areas of soils that have a similar profile but that have a surface layer of sandy loam or loam. Also included were small areas of Lenoir, Bladen, and Rains soils.

Infiltration is moderate. Runoff is slow to ponded.

This soil is fairly easy to keep in good tilth, but it can be satisfactorily worked only within a fairly narrow range of moisture content. Most of the acreage is in forest, and the rest is chiefly cultivated or in pasture. If properly drained, this soil is suited to most of the locally grown crops. Wetness is a severe limitation, however, and frequent ponding occurs for brief periods. A complete drainage system is needed if cultivated crops are grown. In areas that are farmed, the crops are mainly corn, soybeans, small grain, and pasture. Capability unit IIIw-2; woodland suitability group 2w9.

Craven Series

The Craven series consists of moderately well drained, nearly level to sloping soils on uplands. These soils formed in Coastal Plain sediment. A seasonal high water table is at a depth of about 2½ feet. Gray mottles are within the zone affected by the high water table.

Norfolk sandy loam, 1 to 6 percent slopes, eroded (NrB2).—This is a well-drained soil on smooth side slopes in the uplands. It occurs in areas of irregular shape that are less than 3 to more than 8 acres in size. The surface layer is 5 to 8 inches thick. In most places it is a mixture of material from the remaining original surface layer and the subsoil. The present surface layer is light yellowish-brown in the more eroded areas and is grayish brown in the less eroded spots. The subsoil is olive-yellow to brownish-yellow, friable sandy clay loam to sandy loam and is 52 to more than 55 inches thick.

Included with this soil in mapping were a few areas of soils that have a similar profile but that are severely eroded and have a surface layer of sandy clay loam. Also included were small areas of soils that have a similar profile but that have slopes of more than 6 percent. Other inclusions consist of small areas of Aycock, Goldsboro, and Exum soils.

Infiltration is moderately slow. Runoff is medium.

Because its surface layer has been thinned by erosion, this soil is rather difficult to keep in good tilth. It can be satisfactorily worked throughout a fairly wide range of moisture content. After hard rains, a crust forms in the more eroded spots, however, and clods tend to form if this soil is worked when too wet. The crusting and clodding adversely affect germination. As a result, stands of crops are poor and uneven. For some crops replanting of these areas may be necessary. Where the stand is uneven, the tobacco ripens at different times, harvesting and curing are difficult, and the quality of the crop is reduced.

This soil is suited to all the locally grown crops, but further erosion is a moderate hazard because of the slope and runoff. Most of the acreage is in cultivated crops and pasture. The rest is chiefly in forest and in housing developments or other nonfarm uses. The cultivated areas are used mainly for row crops, especially for tobacco, peanuts, and cotton. Practices that effectively control runoff and that reduce erosion are needed in cultivated areas. Capability unit IIe–1; woodland suitability group 2o1.

Ocilla Series

The Ocilla series consists of somewhat poorly drained, nearly level and gently sloping soils on uplands and stream terraces. These soils formed in Coastal Plain and alluvial sediment. A seasonal high water table is at a depth of about 2½ feet. Gray mottles are within the zone affected by the high water table.

In a typical profile, the surface layer is loamy fine sand about 22 inches thick. The surface layer is dark gray in the upper part and is pale brown in the lower part. The subsoil is about 47 inches thick and is friable sandy clay loam. The upper part of the subsoil is yellow and is mottled with brownish yellow. The lower part is brownish yellow and is mottled with gray. Below the subsoil and extending to a depth of about 75 inches is gray sandy clay loam mottled with light yellowish brown.

Natural fertility, the content of organic matter, and available water capacity are all low. Permeability is moderate, and shrink-swell potential is low. In areas that have not received lime, reaction is strongly acid or very strongly acid.

The Ocilla soils in Pitt County are moderately important for farming. The seasonal high water table is the major limitation to their use. Most of the acreage is cultivated or in pasture, and the rest is in forest or in housing developments or other nonfarm uses. In areas that are farmed, crops respond well to applications of fertilizer and lime.

Representative profile of Ocilla loamy fine sand, 0 to 4 percent slopes, one-third mile south of Hanrahan, 660 feet west of Seaboard Coast Line Railroad, 20 feet west of a field path, and 42 feet southwest of telephone pole No. 602:

Ap—0 to 8 inches, dark-gray (10YR 4/1) loamy fine sand; weak, fine, granular structure; very friable; many small roots; medium acid; abrupt, smooth boundary.

A2—8 to 22 inches, pale-brown (10YR 6/3) loamy fine sand; weak, fine, granular structure; very friable; few small and medium roots; few medium root channels filled with material from the Ap horizon; medium acid; gradual, wavy boundary.

B1—22 to 28 inches, yellow (10YR 7/6) sandy clay loam; few, fine, distinct, brownish-yellow mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few medium roots and root channels; few, thin, patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B2t—28 to 69 inches, brownish-yellow (10YR 6/6) sandy clay loam; common, medium, distinct, gray (10YR 6/1) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few medium root channels in upper half of horizon; few, thin, patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

Cg—69 to 75 inches, gray (10YR 6/1) sandy clay loam; few coarse lenses of loamy sand and sand; few, medium, distinct, light yellowish-brown (10YR 6/4) mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid.

Thickness of the solum is 60 inches or more. Thickness of the A horizon is 20 to 40 inches. The Ap or A1 horizon is gray, dark gray, or dark grayish brown, and the A2 horizon is pale brown to light yellowish brown. The B horizon is yellow to brownish-yellow sandy clay loam to sandy loam. Gray mottles are within 30 inches of the surface. Thickness of the B horizon ranges from 20 to more than 40 inches. The C horizon has a grayish color. Texture of the C horizon ranges from loamy sand to sandy clay but is dominantly sandy clay loam.

Ocilla loamy fine sand, 0 to 4 percent slopes (OcB).—This is a somewhat poorly drained soil on broad flats and smooth side slopes in the uplands and on stream terraces. It occurs in areas of irregular shape that are less than 4 acres to as much as 20 acres in size. The surface layer is loamy fine sand about 22 inches thick. It is dark gray in the upper part and is pale brown in the lower part. The subsoil is about 47 inches thick and is friable sandy clay loam. The upper part of the subsoil is yellow and is mottled with brownish yellow. The lower part is brownish yellow and is mottled with gray.

Included with this soil in mapping were small areas of soils that have a similar profile but that have a surface layer of loamy sand. Also included were small areas of moderately well drained and of somewhat poorly drained soils in draws and depressions. Other inclusions consist of areas of Lynchburg and Rains soils.

Infiltration is rapid. Runoff is slow.

This soil is fairly easy to keep in good tilth and can be satisfactorily worked throughout a wide range of mois-

ture content. Most of the acreage is cultivated or in pasture, and the rest is chiefly in forest and in housing developments or other nonfarm uses. Wetness is a severe limitation, but this soil is suited to most of the locally grown crops. Artificial drainage is needed for most crops. Capability unit IIIw–1; woodland suitability group 3w2.

Olustee Series, Sandy Subsoil Variant

Soils of the Olustee series, sandy subsoil variant, are very poorly drained and are nearly level. They are on uplands and stream terraces, where they formed in Coastal Plain and alluvial sediment. A seasonal high water table is at or near the surface.

In a typical profile, the surface layer is black loamy sand about 12 inches thick. Beneath the surface layer and extending to a depth of about 18 inches is a layer of dark reddish-brown fine sand that is coated with organic matter. To a depth of about 42 inches, the next layers are grayish-brown and light brownish-gray fine sand. Below them and extending to a depth of about 85 inches are layers of light-gray sand and coarse sand.

Natural fertility is very low, and the content of organic matter is medium. Available water capacity is low. Permeability is rapid, and shrink-swell potential is low. In areas that have not received lime, reaction is strongly acid or very strongly acid.

These soils are of only minor importance for farming. The seasonal high water table, frequent flooding for brief periods, and very low natural fertility are the major limitations to their use. Most of the acreage is in forest, and the rest is chiefly in cultivated crops or pasture. Where crops are grown, response is fairly good to recommended applications of fertilizer and lime.

Representative profile of Olustee loamy sand, sandy subsoil variant, 2 miles east of Grifton, 200 feet south of State Road No. 1753, and 20 feet east of State Road No. 1915:

Ap—0 to 12 inches, black (10YR 2/1) loamy sand; weak; fine, granular structure; very friable; many small roots; very strongly acid; clear, smooth boundary.

Bh—12 to 18 inches, dark reddish-brown (5YR 2/2) fine sand; weak, fine, granular structure; friable; many small and few medium roots; sand grains well coated with organic matter; very strongly acid; clear, wavy boundary.

C1g—18 to 30 inches, grayish-brown (10YR 5/2) fine sand; single grain; loose; few medium roots; very strongly acid; gradual, wavy boundary.

C2g—30 to 42 inches, light brownish-gray (10YR 6/2) fine sand; single grain; loose; strongly acid; gradual, wavy boundary.

C3g—42 to 75 inches, light-gray (10YR 7/1) sand; single grain; loose; strongly acid; gradual, wavy boundary.

C4g—75 to 85 inches, light-gray (10YR 7/1) coarse sand; single grain; loose; few fine pebbles; strongly acid.

Combined thickness of the sandy horizons is more than 80 inches. The A horizon is black or very dark gray and is 10 to 20 inches thick. The Bh horizon is 4 to 8 inches thick. The sand grains in that horizon are well coated with organic matter, and they give the Bh horizon a dark reddish-brown color. The C horizon is grayish-brown and light brownish-gray to light-gray fine sand to coarse sand. It ranges from 60 to more than 70 inches in thickness.

These soils are variants to the Olustee series. Bt horizons are lacking beneath the Bh horizon, but the profile is otherwise similar to that of normal Olustee soils.

Olustee loamy sand, sandy subsoil variant (Oe).—This is a very poorly drained, sandy soil on smooth flats and in slight depressions in the uplands and on stream terraces. It occurs in areas of irregular shape that are 3 to 15 acres in size. Slopes are 0 to 1 percent. The surface layer is black loamy sand about 12 inches thick. It is underlain by a layer of dark reddish-brown fine sand that is coated with organic matter and is about 6 inches thick. To a depth of about 42 inches, the next layers are grayish-brown and light brownish-gray fine sand. Below these layers and extending to a depth of about 85 inches are layers of light-gray sand and coarse sand.

Included with this soil in mapping were a few areas of soils that have a similar profile but that have a surface layer of loamy fine sand. Also included were small areas of soils that have a similar profile but that lack the dark reddish-brown layer that is stained with organic matter. Other inclusions consist of small areas of Osier, Tuckerman, Pantego, and Portsmouth soils.

Infiltration is rapid. Runoff is slow.

This soil is fairly easy to keep in good tilth and can be satisfactorily worked throughout a wide range of moisture content. Most of the acreage is in forest, however, and the rest is chiefly in cultivated crops or pasture. Wetness is a very severe limitation, and use of this soil is limited by the seasonal high water table, frequent flooding, and very low natural fertility. Artificial drainage is needed for most uses. If properly drained, this soil is fairly well suited to a few of the locally grown crops. Areas that are farmed are used mainly for corn, soybeans, and pasture. Capability unit IVw–1; woodland suitability group 3w2.

Osier Series

The Osier series consists of poorly drained, nearly level soils on uplands and stream terraces. These soils formed in Coastal Plain and alluvial sediment. A seasonal high water table is at or near the surface.

In a typical profile, the surface layer is loamy sand and is about 19 inches thick. It is very dark grayish brown in the upper part and is dark grayish brown in the lower part. The next layers consist of gray and dark-gray fine sand over very dark grayish-brown sand and gray loamy sand that extends to a depth of about 62 inches. Underlying these layers is light brownish-gray sandy loam that extends to a depth of about 80 inches.

Natural fertility is very low, and the content of organic matter and available water capacity are low. Permeability is rapid, and shrink-swell potential is low. In areas that have not received lime, reaction is strongly acid or very strongly acid.

The Osier soils in Pitt County are of only minor importance for farming. Most of the acreage is in forest, and the rest is chiefly in cultivated crops or pasture. Major limitations to the use of these soils are the seasonal high water table, very low natural fertility, and frequent flooding for brief periods. In areas that are farmed, crops respond fairly well to recommended applications of fertilizer and lime.

Representative profile of Osier loamy sand, loamy substratum, 3 miles east of Belvoir, 1.75 miles southeast of

field path, and 65 feet southeast of power pole No. SPC–40–5:

Ap—0 to 8 inches, very dark gray (10YR 3/1) loam; weak, medium, granular structure; very friable; many small roots; strongly acid; clear, smooth boundary.

A12—8 to 15 inches, very dark grayish-brown (10YR 3/2) loam; weak, medium, granular structure; very friable; many small and few medium roots; strongly acid; clear, smooth boundary.

B1g—15 to 22 inches, dark-gray (10YR 4/1) sandy loam; many, fine, distinct, grayish-brown mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few medium roots and root channels; few, thin, patchy clay films on vertical faces of peds and in old root channels; very strongly acid; gradual, wavy boundary.

B2tg—22 to 39 inches, grayish-brown (10YR 5/2) sandy clay loam; few, fine, distinct, yellowish-brown mottles; weak, medium, subangular blocky structure; friable, sticky and plastic; few, thin, patchy clay films on faces of peds and in old root channels; very strongly acid; clear, wavy boundary.

IIC1g—39 to 52 inches, grayish-brown (10YR 5/2) sand; single grain; loose; very strongly acid; gradual, wavy boundary.

IIC2g—52 to 68 inches, light brownish-gray (10YR 6/2) coarse sand; single grain; loose; few fine pebbles and crushed oystershells; strongly acid.

Thickness of the solum is 40 inches or less. The A horizon is very dark gray or very dark grayish brown to black and is 10 to 20 inches thick. The B horizon is gray or dark-gray to grayish-brown sandy clay loam to sandy loam and is 20 to 30 inches thick. A few yellowish-brown or grayish-brown mottles are commonly in the B horizon. The C horizon is grayish-brown to light brownish-gray loamy sand to coarse sand. It commonly contains fine pebbles.

Portsmouth loam (Po).—This is a very poorly drained soil on broad, smooth flats and in slight depressions. It is on stream terraces and occurs in areas of irregular shape that are 3 to 20 acres in size. Slopes are 0 to 1 percent. The surface layer is very dark gray and very dark grayish-brown loam about 15 inches thick. The subsoil is about 24 inches thick. The upper part of the subsoil is dark-gray, friable sandy loam mottled with grayish brown. The lower part is grayish-brown, friable sandy clay loam mottled with yellowish brown.

Included with this soil in mapping were a few areas of soils that have a similar profile but that have a surface layer of fine sandy loam. Also included were small areas of Tuckerman, Cape Fear, and Olustee soils.

Infiltration is moderate. Runoff is very slow or ponded.

This soil is easy to keep in good tilth and can be satisfactorily worked throughout a wide range of moisture content. Most of the acreage is in forest, however, and the rest is chiefly in cultivated crops or pasture. Flooding frequently occurs for brief periods, and wetness is a severe limitation. A system of surface drains or tile drains is needed for most uses, and both surface drains and tile drains are needed in some places. If properly drained, this soil is well suited to a few locally grown crops. Areas that are farmed are used mainly for corn, soybeans, and pasture. Capability unit IIIw–3; woodland suitability group 1w9.

Rains Series

The Rains series consists of poorly drained, nearly level soils on uplands. These soils formed in Coastal Plain sediment. A seasonal high water table is at or near the surface.

In a typical profile, the surface layer is dark-gray and light brownish-gray fine sandy loam about 13 inches thick. The lower part of the surface layer is mottled with yellowish brown and pale brown. The subsoil, about 49 inches thick, is gray, friable sandy clay loam mottled with brownish yellow and yellowish brown. Gray sandy clay loam mottled with yellowish brown is beneath the subsoil and extends to a depth of about 74 inches.

Natural fertility and the content of organic matter are low. Available water capacity is medium. Permeability is moderate, and shrink-swell potential is low. In areas that have not received lime, reaction is strongly acid or very strongly acid.

The Rains soils in Pitt County are moderately important for farming. About half of the acreage is cultivated or in pasture, and the rest is chiefly in forest. Major limitations to the use of these soils are the seasonal high water table and frequent ponding for brief periods. Crops respond well to recommended applications of fertilizer and lime.

Representative profile of Rains fine sandy loam, 4 miles northeast of Farmville, 300 feet north of State Highway No. 121, and 150 feet west of State Road No. 1259:

Ap—0 to 8 inches, dark-gray (10YR 4/1) fine sandy loam; weak, fine, granular structure; very friable; many small roots; medium acid; abrupt, smooth boundary.

A2g—8 to 13 inches, light brownish-gray (10YR 6/2) fine sandy loam; few, medium, distinct, yellowish-brown (10YR 5/6) and pale-brown (10YR 6/3) mottles; weak, medium, granular structure; very friable; few medium roots and root channels; medium acid; abrupt, smooth boundary.

B21tg—13 to 32 inches, gray (10YR 6/1) sandy clay loam; few, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few medium roots; few medium and small root channels; few, thin, patchy clay films on faces of peds; very strongly acid; clear, wavy boundary.

B22tg—32 to 38 inches, gray (10YR 6/1) sandy clay loam; common, medium, distinct, yellowish-brown (10YR 5/8) mottles; weak, medium, subangular blocky structure; friable, slightly sticky and slightly plastic; few medium root channels; thin, patchy clay films on faces of peds; very strongly acid; clear, wavy boundary.

B23tg—38 to 62 inches, gray (10YR 5/1) sandy clay loam; few, medium, distinct, brownish-yellow (10YR 6/8) mottles; weak, medium, subangular blocky structure; friable; slightly sticky and slightly plastic; thin, patchy clay films on faces of peds; very strongly acid; clear, wavy boundary.

Cg—62 to 74 inches, gray (10YR 5/1) sandy clay loam; few, fine, distinct, yellowish-brown mottles; massive; friable, slightly sticky and slightly plastic; very strongly acid.

Thickness of the solum is 60 inches or more. Thickness of the A horizon is 10 to 20 inches. The Ap or A1 horizon is dark gray to dark grayish brown, and the A2 horizon is light brownish gray to gray. The B horizon is sandy clay loam to sandy loam, and it is about 50 inches thick. Mottles in the B horizon are yellowish brown and brownish yellow. The C horizon is gray loamy sand to clay, but it is dominantly sandy clay loam.

Rains fine sandy loam (Ra).—This is a poorly drained soil on broad flats and in slight depressions in the uplands. It occurs in areas of irregular shape that are 4 to 25 acres in size. Slopes are 0 to 1 percent. The surface

layer is dark-gray and light brownish-gray fine sandy loam about 13 inches thick. The lower part of the surface layer is mottled with yellowish brown and pale brown. The subsoil, about 49 inches thick, is gray, friable sandy clay loam mottled with brownish yellow and yellowish brown.

Included with this soil in mapping were small areas of soils that have a similar profile but that have a surface layer of loamy sand, sandy loam, or loam. Also included were small areas of Lynchburg and Pantego soils.

Infiltration is moderate. Runoff is slow or ponded.

This soil is easy to keep in good tilth and can be satisfactorily worked throughout a wide range of moisture content. About half of the acreage is cultivated or in pasture, and the rest is chiefly in forest. Wetness is a severe limitation, and ponding occurs frequently for brief periods. A system of surface drains or tile drains is needed where cultivated crops are grown, and both surface drains and tile drains are needed in some places. If properly drained, this soil is suited to most of the locally grown crops. Areas that are farmed are used mainly for corn, soybeans, small grain, and Ladino clover-fescue pasture. Capability unit IIIw-3; woodland suitability group 2w3.

Roanoke Series

The Roanoke series consists of poorly drained, nearly level soils on stream terraces. These soils formed in alluvial sediment. A seasonal high water table is at or near the surface.

In a typical profile, the surface layer is dominantly dark grayish-brown silt loam about 9 inches thick. Beneath the surface layer is a gray subsoil about 33 inches thick. The upper part of the subsoil is dominantly very firm clay mottled with very dark gray and brownish yellow. The lower part is firm silty clay loam mottled with brownish yellow and dark gray. Below the subsoil and extending to a depth of about 66 inches is gray loamy fine sand and loamy sand mottled with light gray and brownish yellow. Underlying this material and extending to a depth of about 74 inches is white sand mottled with olive yellow.

Natural fertility and available water capacity are medium, and the content of organic matter is low. Permeability is slow, and shrink-swell potential is high. In areas that have not received lime, reaction is very strongly acid.

The Roanoke soils in Pitt County are of only minor importance for farming. Most of the acreage is in forest, and the rest is chiefly in cultivated crops or pasture. The seasonal high water table, frequent flooding for brief periods, and slow permeability are major limitations to the use of these soils for farming and for other purposes. In areas that are farmed, crops respond well to recommended applications of fertilizer and lime.

Representative profile of Roanoke silt loam, 3 miles west of Grimesland on U.S. Highway No. 264, 0.4 mile north on State Road No. 1762, 30 feet east of road and 100 feet north of a wooded area:

Ap—0 to 7 inches, dark grayish-brown (10YR 4/2) silt loam; weak, medium, granular structure; very friable; many small roots; medium acid; abrupt, smooth boundary.

A2—7 to 9 inches, gray (10YR 5/1) very fine sandy loam; many, fine, distinct, brownish-yellow mottles; weak, medium, granular structure; friable; many small roots; few small root channels; very strongly acid; abrupt, smooth boundary.

B1tg—9 to 12 inches, gray (10YR 6/1) clay loam; few, fine, distinct, brownish-yellow mottles; weak, medium, subangular blocky structure; firm, sticky and plastic; few medium roots and root channels; some dark grayish-brown colors in root channels; few thin clay films on faces of peds; very strongly acid; abrupt, smooth boundary.

B21tg—12 to 26 inches, gray (10YR 6/1) clay; few, coarse, distinct, very dark gray (10YR 3/1) mottles and few, fine, distinct, brownish-yellow mottles; weak, medium, angular blocky structure; very firm, very sticky and very plastic; few medium roots and root channels; thin, patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B22tg—26 to 36 inches, gray (10YR 5/1) clay; few, medium, distinct, brownish-yellow (10YR 6/6) mottles; weak, medium, angular blocky structure; very firm, very sticky and very plastic; few, thin, patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

B3tg—36 to 42 inches, gray (10YR 6/1) silty clay loam; few, fine, distinct, brownish-yellow and dark-gray mottles; weak, medium, angular blocky structure; firm, sticky and plastic; few, thin, patchy clay films on faces of peds; very strongly acid; gradual, wavy boundary.

IIC1g—42 to 54 inches, gray (10YR 6/1) loamy fine sand; few, fine, faint, light-gray mottles; single grain; very friable; very strongly acid; gradual, wavy boundary.

IIC2g—54 to 66 inches, gray (10YR 6/1) loamy sand; few, fine, distinct, brownish-yellow mottles; single grain; very friable; very strongly acid; gradual, wavy boundary.

IIC3g—66 to 74 inches, white (N 8/0) sand; few, fine, distinct, olive-yellow mottles; single grain; loose; very strongly acid.

Thickness of the solum is 45 inches or less. Thickness of the A horizon is 5 to 20 inches. The Ap or A1 horizon is dark gray to dark grayish brown, and the A2 horizon is commonly gray. Texture of the B horizon is silty clay loam, clay loam, or clay, but it is dominantly clay. The B horizon is commonly mottled with brownish yellow, dark gray, and very dark gray. The C horizon is gray to white loamy fine sand to sand.

Roanoke silt loam (Ro).—This is a poorly drained soil on broad flats and in slight depressions. It is on stream terraces, where it occurs in areas of irregular shape. The areas range from 3 to more than 100 acres in size. Slopes are 0 to 1 percent. The surface layer is dominantly dark grayish-brown silt loam about 9 inches thick. The subsoil is gray and is about 33 inches thick. The upper part of the subsoil is dominantly very firm clay mottled with very dark gray and brownish yellow. The lower part is firm silty clay loam mottled with brownish yellow and dark gray. The underlying material is gray to white loamy fine sand to coarse sand.

Included with this soil in mapping were a few areas of soils that have a similar profile but that have a surface layer of very fine sandy loam or loam. Also included were small areas of Altavista, Bibb, and Cape Fear soils.

Infiltration is moderate. Runoff is slow or ponded.

This soil is fairly easy to keep in good tilth, but it can be satisfactorily worked only within a fairly narrow range of moisture content. Most of the acreage is in forest, and the rest is chiefly in cultivated crops or pasture. Flooding frequently occurs for brief periods, and wetness is a very severe limitation. A system of surface drains is needed for most uses. If properly drained, this soil is

TABLE 6.—*Estimated soil properties*

[The symbol > means greater

Soil series, land types, and map symbols	Flooding	Depth to seasonal high water table	Depth from surface (typical profile)	Classification
				USDA texture
		Ft.	*In.*	
Alaga: AgB	None	>5	0–72	Loamy sand
			72–85	Sand
Altavista: AlB	Infrequent and very brief.	2.5	0–14	Sandy loam
			14–37	Sandy clay loam, sandy loam
			37–92	Loamy coarse sand, loamy fine sand, coarse sand.
Aycock: AyA, AyB, AyB2	None	>5	0–10	Fine sandy loam
			10–72	Sandy clay loam, clay loam
			72–85	Sandy clay
Bibb: Bb	Very frequent and very brief.	0	0–21	Fine sandy loam
			21–36	Sandy loam
			36–72	Sand
Bladen: Bd	Frequent and very brief.	0	0–7	Fine sandy loam
			7–14	Sandy clay
			14–70	Clay
Byars: By	Infrequent and very brief.	0	0–13	Loam
			13–63	Silty clay
			63–72	Sandy clay loam
Cape Fear: Ca	Frequent and very brief.	0	0–14	Loam
			14–40	Clay
			40–60	Coarse sand
Chipley: Ch	Infrequent and very brief.	2.5	0–14	Sand
			14–52	Fine sand, sand
			52–86	Coarse sand
Coxville: Co	Frequent and very brief.	0	0–11	Fine sandy loam
			11–70	Sandy clay, clay loam
Craven: CrA, CrB, CrB2, CrC	None	2.5	0–12	Fine sandy loam
			12–78	Clay
Exum: ExA, ExB	None	2.5	0–12	Fine sandy loam
			12–62	Clay loam
			62–72	Sandy clay loam
Goldsboro: GoA, GoB	None	2.5	0–17	Sandy loam
			17–75	Sandy clay loam
Lakeland: LaB	None	>5	0–29	Sand, fine sand
			29–82	Coarse sand
Leaf: Le	Frequent and very brief.	0	0–6	Silt loam
			6–70	Silty clay, clay
			70–80	Sandy loam
Lenoir, thin solum variant: LnA	Infrequent and very brief.	1.5	0–7	Fine sandy loam
			7–36	Clay
			36–58	Loamy sand, coarse sand
Lenoir: LoA	None	1.5	0–8	Loam
			8–72	Clay, silty clay, sandy clay
			72–80	Loamy sand
Lynchburg: Ly	None	1.5	0–10	Fine sandy loam
			10–48	Sandy clay loam
			48–62	Sandy loam

See footnote at end of table.

significant to engineering

han; < means less than]

Classification—Continued		Material less than 3 inches in diameter passing sieve [1]—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
		Pct.	*Pct.*	*Pct.*	*In. per hr.*	*In. per in. of soil*	*pH*	
SM	A-2	100	50-75	15-30	6.3-20.0	0.06-0.08	4.5-6.0	Low.
SP-SM	A-3, A-2	95-100	51-70	5-12	6.3-20.0	0.05-0.07	5.6-6.0	Low.
SM	A-2, A-4	100	60-85	30-45	2.0-6.3	0.11-0.13	4.5-6.0	Low.
SC, CL	A-6, A-4	100	80-95	36-55	0.63-2.0	0.12-0.14	4.5-5.5	Low.
SM, SP-SM	A-2	90-100	50-75	5-30	2.0-6.3	0.07-0.09	4.5-5.5	Low.
ML	A-4	100	70-85	51-60	2.0-6.3	0.11-0.13	4.5-6.0	Low.
CL	A-6	100	80-100	55-80	0.63-2.0	0.16-0.18	4.5-5.5	Low to moderate.
CL	A-7	95-100	85-100	51-60	0.63-2.0	0.14-0.16	4.5-5.0	Low.
SM	A-4	95-100	60-70	40-50	0.63-2.0	0.12-0.14	4.5-6.0	Low.
SM	A-2, A-4	95-100	60-70	30-40	0.63-2.0	0.12-0.14	4.5-5.0	Low.
SP-SM	A-3, A-2	95-100	51-70	5-12	6.3-20.0	0.05-0.07	5.6-6.0	Low.
SM, ML	A-4	100	95-100	45-60	0.63-2.0	0.11-0.13	4.5-5.5	Low.
CL	A-7, A-6	100	85-95	51-60	0.06-0.20	0.10-0.12	4.5-5.0	Moderate.
CH	A-7	100	95-100	65-80	0.06-0.20	0.10-0.12	4.5-5.0	Moderate.
ML	A-4	100	85-95	60-75	0.63-2.0	0.15-0.17	<4.5-5.0	Low.
CH	A-7	100	90-100	75-95	0.06-0.20	0.13-0.15	<4.5-5.0	High.
CL	A-6	100	80-90	51-55	0.63-2.0	0.13-0.15	<4.5	Low.
ML	A-4	100	85-95	60-75	0.63-2.0	0.12-0.14	4.5-5.5	Low.
CL	A-7, A-6	100	90-100	75-90	0.06-0.20	0.14-0.16	4.5-5.0	High.
SP-SM	A-3, A-2	95-100	51-70	5-12	6.3-20.0	0.05-0.07	4.5-5.0	Low.
SP-SM	A-3, A-2	100	51-70	5-12	6.3-20.0	0.03-0.06	4.5-6.5	Low.
SP-SM	A-3, A-2	100	65-80	5-12	6.3-20.0	0.03-0.06	5.1-5.5	Low.
SP-SM	A-2, A-3	95-100	51-70	5-12	6.3-20.0	0.03-0.06	4.5-5.0	Low.
SM	A-4	100	70-85	40-50	0.63-2.0	0.15-0.17	<4.5-6.5	Low.
CL, SC	A-6, A-7	100	80-95	36-60	0.20-0.63	0.13-0.15	<4.5-5.0	Moderate.
SM	A-4	100	75-100	40-50	0.63-2.0	0.11-0.13	<4.5-6.0	Low.
CH	A-7	95-100	90-100	75-95	0.06-0.20	0.13-0.15	<4.5-5.0	High.
ML	A-4	100	85-100	51-75	2.0-6.3	0.11-0.13	4.5-6.0	Low.
CL	A-6, A-7	100	90-100	70-80	0.63-2.0	0.16-0.18	4.5-5.5	Moderate.
SC, CH	A-6, A-7	100	80-100	36-80	0.63-2.0	0.16-0.18	4.5-5.0	Low to moderate.
SM	A-2, A-4	100	60-70	30-40	2.0-6.3	0.10-0.12	4.5-6.0	Low.
SC, ML-CL	A-2, A-4	95-100	80-90	36-55	0.63-2.0	0.13-0.15	4.5-5.0	Low.
SP-SM	A-3, A-2	100	51-80	5-12	6.3-20.0	0.04-0.06	5.1-6.0	Low.
SP-SM	A-2, A-3	95-100	51-70	5-12	6.3-20.0	0.03-0.05	5.6-6.0	Low.
ML	A-4	100	90-100	70-90	0.63-2.0	0.14-0.16	<4.5-5.5	Moderate.
CH	A-7	100	90-100	75-95	0.06-0.20	0.15-0.17	<4.5-5.0	High.
SM, SC	A-4	95-100	60-70	40-50	2.0-6.3	0.11-0.13	<4.5	Low.
SM	A-2, A-4	100	70-85	30-50	2.0-6.3	0.11-0.13	4.5-6.5	Low.
CH	A-7	100	90-100	75-95	0.06-0.20	0.14-0.16	4.5-5.5	High.
SM, SP-SM	A-2, A-3	95-100	51-70	5-30	6.3-20.0	0.05-0.07	4.5-5.5	Low.
ML	A-4	100	85-100	60-80	0.63-2.0	0.13-0.15	4.5-6.0	Low.
CL, CH	A-7, A-6	100	80-100	55-95	0.06-0.20	0.15-0.17	4.5-5.0	High.
SM	A-2	95-100	50-100	15-30	2.0-6.3	0.09-0.11	4.5-5.0	Low.
SM	A-4	100	70-85	40-50	2.0-6.3	0.11-0.13	4.5-6.5	Low.
SC, CL	A-6, A-4	100	80-90	36-55	0.63-2.0	0.13-0.15	4.5-5.5	Low.
SM	A-2, A-4	95-100	60-70	30-40	2.0-6.3	0.11-0.13	4.5-5.0	Low.

Coxville

TABLE 6.—*Estimated soil properties*

Soil series, land types, and map symbols	Flooding	Depth to seasonal high water table	Depth from surface (typical profile)	Classification: USDA texture
		Ft.	*In.*	
Masada: MaB	None	>5	0–15	Sandy loam
			15–36	Sandy loam, sandy clay loam
			36–60	Sand, coarse sand
Nahunta: Na	None	1.5	0–20	Silt loam
			20–72	Silty clay loam
Norfolk: NrA, NrB, NrB2	None	>5	0–10	Sandy loam
			10–72	Sandy clay loam
			72–84	Sandy loam
Ocilla: OcB	None	2.5	0–22	Loamy fine sand
			22–75	Sandy clay loam
Olustee, sandy subsoil variant: Oe	Frequent and brief	0	0–12	Loamy sand
			12–85	Fine sand, sand, coarse sand
Osier: Os	Frequent and very brief.	0	0–19	Loamy sand
			19–54	Fine sand, sand, loamy sand
			54–80	Sandy loam, loamy sand
Pactolus: Pa	None	2.5	0–64	Loamy sand, loamy fine sand
			64–90	Coarse sand
Pantego: Pg	Frequent and very brief.	0	0–14	Loam
			14–69	Sandy clay loam
			69–80	Sandy loam
Portsmouth: Po	Frequent and very brief.	0	0–15	Loam
			15–39	Sandy loam, sandy clay loam
			39–68	Sand, coarse sand
Rains: Ra	Frequent and very brief.	0	0–13	Fine sandy loam
			13–74	Sandy clay loam
Roanoke: Ro	Frequent and very brief.	0	0–9	Silt loam
			9–42	Clay loam, silty clay loam, clay
			42–74	Loamy fine sand, loamy sand, sand
Swamp: Sw. Properties variable; not estimated.	Very frequent and long.			
Tuckerman: Tu	Infrequent and very brief.	0	0–20	Fine sandy loam
			20–36	Sandy clay loam, fine sandy loam
			36–72	Loamy sand, coarse sand
Wagram: WaB, WaC	None	>5	0–25	Loamy sand
			25–66	Sandy clay loam
			66–84	Loamy sand
Wickham: WkB	Infrequent and very brief.	>5	0–17	Sandy loam
			17–42	Sandy clay loam, sandy loam
			42–80	Loamy sand, sand

[1] 100 percent of the material less than 3 inches in diameter for all soils mapped passed through the No. 4 sieve.

significant to engineering.—Continued

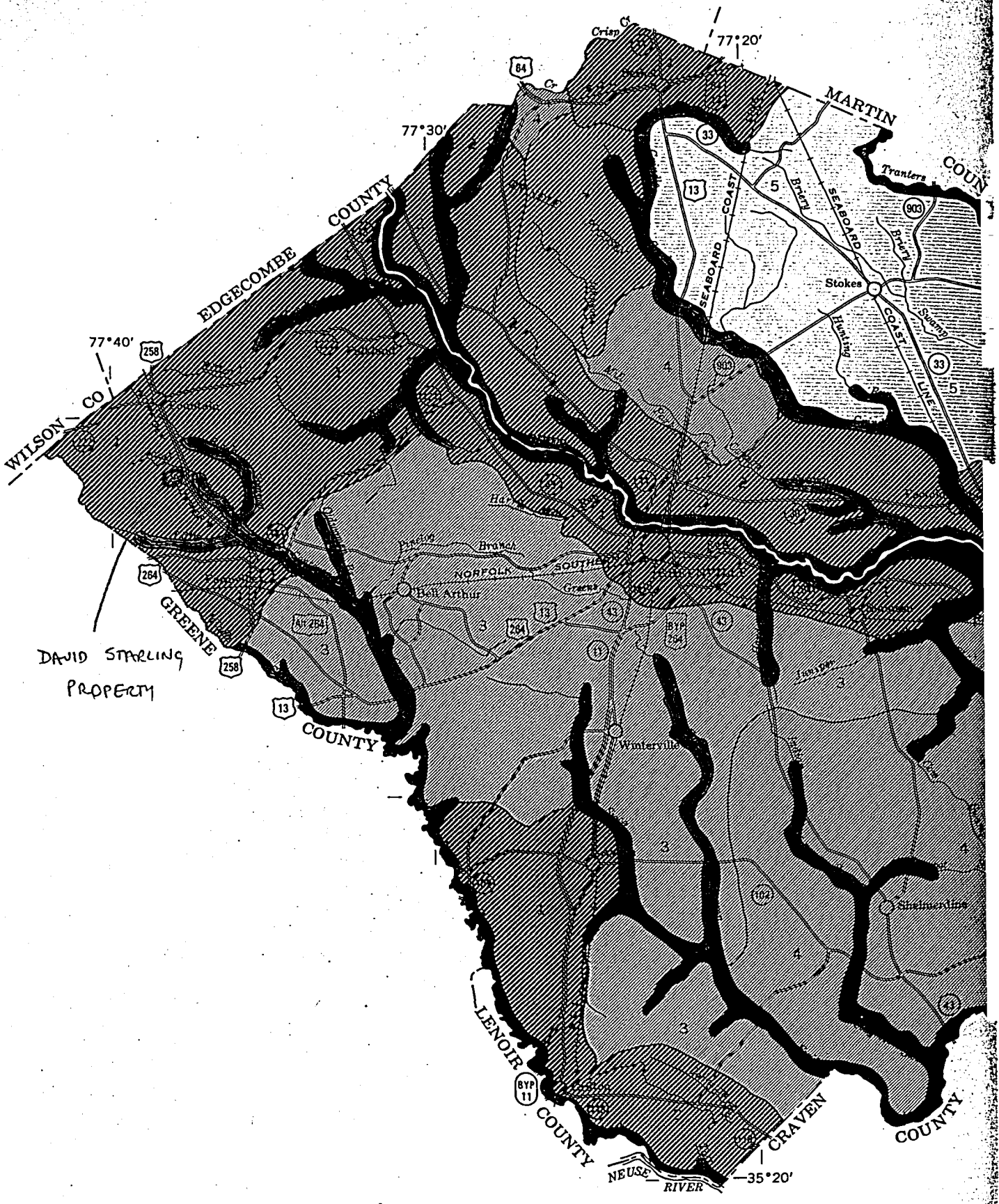
Classification—Continued		Material less than 3 inches in diameter passing sieve [1]—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
		Pct.	*Pct.*	*Pct.*	*In. per hr.*	*In. per in. of soil*	*pH*	
SM	A-2, A-4	100	60–85	30–40	2.0–6.3	0.11–0.13	4.5–6.0	Low.
SC	A-6	100	80–90	36–50	0.63–2.0	0.13–0.15	5.1–5.5	Low.
SP-SM	A-2, A-3	95–100	51–70	5–12	2.0–6.3	0.07–0.09	4.5–5.0	Low.
ML	A-4	100	90–100	70–90	0.63–2.0	0.15–0.17	<4.5–5.0	Low.
ML–CL, CL	A-6	100	95–100	85–95	0.63–2.0	0.15–0.17	<4.5–5.0	Low.
SM	A-2, A-4	100	60–70	30–40	2.0–6.3	0.11–0.13	4.5–6.5	Low.
SC, CL	A-6, A-4	100	80–90	36–55	0.63–2.0	0.13–0.15	4.5–5.5	Low.
SM	A-2, A-4	95–100	60–70	30–40	2.0–6.3	0.11–0.13	4.5–5.0	Low.
SM	A-2	100	50–75	15–30	2.0–6.3	0.06–0.08	4.5–6.0	Low.
SC	A-6	95–100	80–90	36–50	0.63–2.0	0.10–0.12	4.5–5.0	Low.
SM	A-2	100	51–75	15–30	6.3–20.0	0.06–0.08	4.5–5.5	Low.
SP-SM	A-3, A-2	95–100	51–80	5–12	6.3–20.0	0.05–0.07	4.5–5.5	Low.
SM	A-2	100	51–75	15–30	6.3–20.0	0.06–0.08	4.5–6.0	Low.
SP-SM, SM	A-3, A-2	100	51–80	5–30	6.3–20.0	0.03–0.05	5.1–5.5	Low.
SM	A-2	95–100	51–75	15–35	2.0–6.3	0.11–0.13	4.5–5.5	Low.
SM	A-2	100	51–75	15–30	6.3–20.0	0.06–0.08	4.5–6.5	Low.
SP-SM	A-2, A-3	95–100	51–75	5–12	6.3–20.0	0.05–0.07	5.6–6.0	Low.
ML	A-4	100	85–95	60–75	2.0–6.3	0.15–0.17	4.5–6.0	Low.
SC, CL	A-6, A-4	100	85–95	36–55	0.63–2.0	0.13–0.15	4.5–5.0	Low.
SM–SC, SC	A-2, A-4	95–100	60–70	30–40	2.0–6.3	0.11–0.13	4.5–5.0	Low.
ML	A-4	100	85–95	60–75	2.0–6.3	0.15–0.17	4.5–5.5	Low.
SM, SC	A-2, A-6, A-4	100	60–90	30–50	0.63–2.0	0.13–0.15	4.5–5.0	Low.
SP-SM	A-3, A-2	95–100	51–70	5–12	6.3–20.0	0.05–0.07	4.5–5.5	Low.
SM	A-4	100	70–85	40–50	2.0–6.3	0.10–0.12	4.5–6.0	Low.
SC, CL	A-6, A-4	95–100	80–90	36–55	0.63–2.0	0.13–0.15	4.5–5.0	Low.
ML	A-4	100	85–100	70–90	0.63–2.0	0.12–0.14	4.5–6.0	Low.
CH	A-7	100	90–100	70–95	0.06–0.20	0.14–0.16	4.5–5.0	High.
SM, SP-SM	A-2	95–100	51–75	5–30	6.3–20.0	0.07–0.09	4.5–5.0	Low.
SM	A-4	100	70–85	36–50	0.63–2.0	0.11–0.13	5.6–6.5	Low.
CL, SM, SC	A-6, A-4	100	70–90	36–55	0.63–2.0	0.14–0.16	5.6–6.0	Moderate.
SM, SP-SM	A-2	95–100	51–75	5–30	6.3–20.0	0.05–0.07	5.6–6.5	Low.
SM	A-2	100	51–75	15–30	6.3–20.0	0.07–0.09	<4.5–6.0	Low.
SC, CL	A-6, A-2	100	80–90	30–55	2.0–6.3	0.14–0.16	4.5–5.0	Low.
SM	A-2	95–100	51–75	15–30	6.3–20.0	0.06–0.08	<4.5	Low.
SM	A-2	100	51–75	15–30	2.0–6.3	0.12–0.14	4.5–6.0	Low.
SC, SM, CL	A-6, A-4, A-2	100	60–90	30–55	0.63–2.0	0.13–0.15	4.5–5.0	Low.
SM, SP-SM	A-2, A-3	90–100	51–75	5–30	6.3–20.0	0.06–0.08	5.1–5.5	Low.

GUIDE TO MAPPING UNITS

For a complete description of a mapping unit, read both the description of the mapping unit and the soil series to which it belongs. A technical description of a profile that is representative of the series is described under the soil series. For complete information about a capability unit, refer to the subsection "Management by Capability Units" beginning on page 34. Other information is given in tables as follows:

Acreage and extent of soils, table 1, p. 5.
Estimated yields, table 2, p. 39.
Woodland suitability, table 3, p. 40.
Suitability of soils for wildlife, table 4, p. 46.
Engineering uses of soils, tables 5, 6, and 7, pp. 48 to 65.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland suitability group
			Symbol	Page	Symbol
AgB	Alaga loamy sand, banded substratum, 0 to 6 percent slopes	6	IIIs-1	37	3s2
AlB	Altavista sandy loam, 0 to 4 percent slopes	7	IIw-2	35	2w8
AyA	Aycock fine sandy loam, 0 to 1 percent slopes	7	I-1	34	2o1
AyB	Aycock fine sandy loam, 1 to 6 percent slopes	8	IIe-1	34	2o1
AyB2	Aycock fine sandy loam, 1 to 6 percent slopes, eroded	8	IIe-1	34	2o1
Bb	Bibb complex	9	IVw-4	38	2w9
Bd	Bladen fine sandy loam	9	IIIw-2	36	2w9
By	Byars loam	10	IIIw-2	36	2w9
Ca	Cape Fear loam	11	IVw-2	37	2w9
Ch	Chipley sand	12	IIIw-1	36	2w2
Co	Coxville fine sandy loam	12	IIIw-2	36	2w9
CrA	Craven fine sandy loam, 0 to 1 percent slopes	13	IIw-1	35	3w2
CrB	Craven fine sandy loam, 1 to 6 percent slopes	13	IIe-3	34	3w2
CrB2	Craven fine sandy loam, 1 to 6 percent slopes, eroded	14	IIe-3	34	3w2
CrC	Craven fine sandy loam, 6 to 10 percent slopes	14	IIIe-2	35	3w2
ExA	Exum fine sandy loam, 0 to 1 percent slopes	15	IIw-1	35	2w8
ExB	Exum fine sandy loam, 1 to 6 percent slopes	15	IIe-2	34	2w8
GoA	Goldsboro sandy loam, 0 to 1 percent slopes	16	IIw-1	35	2w8
GoB	Goldsboro sandy loam, 1 to 6 percent slopes	16	IIe-2	34	2w8
LaB	Lakeland sand, 0 to 6 percent slopes	17	IVs-1	38	4s2
Le	Leaf silt loam	17	IIIw-2	36	2w9
LnA	Lenoir fine sandy loam, thin solum variant, 0 to 3 percent slopes	19	IIIw-4	37	2w8
LoA	Lenoir loam, 0 to 1 percent slopes	18	IIIw-4	37	2w8
Ly	Lynchburg fine sandy loam	20	IIw-2	35	2w8
MaB	Masada sandy loam, 0 to 4 percent slopes	21	IIe-1	34	3o7
Na	Nahunta silt loam	22	IIw-2	35	2w8
NrA	Norfolk sandy loam, 0 to 1 percent slopes	22	I-1	34	2o1
NrB	Norfolk sandy loam, 1 to 6 percent slopes	23	IIe-1	34	2o1
NrB2	Norfolk sandy loam, 1 to 6 percent slopes, eroded	24	IIe-1	34	2o1
OcB	Ocilla loamy fine sand, 0 to 4 percent slopes	24	IIIw-1	36	3w2
Oe	Olustee loamy sand, sandy subsoil variant	25	IVw-1	37	3w2
Os	Osier loamy sand, loamy substratum	26	IVw-1	37	3w3
Pa	Pactolus loamy sand	26	IIIw-1	36	3w2
Pg	Pantego loam	27	IIIw-3	36	1w9
Po	Portsmouth loam	28	IIIw-3	36	1w9
Ra	Rains fine sandy loam	28	IIIw-3	36	2w3
Ro	Roanoke silt loam	29	IVw-2	37	2w9
Sw	Swamp	30	VIIw-1	38	---
Tu	Tuckerman fine sandy loam	30	IVw-4	38	2w9
WaB	Wagram loamy sand, 0 to 6 percent slopes	31	IIs-1	35	3s2
WaC	Wagram loamy sand, 6 to 10 percent slopes	31	IIIe-3	36	3s2
WkB	Wickham sandy loam, 0 to 6 percent slopes	33	IIe-1	34	2o7



Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.

N

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NORTH CAROLINA AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

PITT COUNTY, NORTH CAROLINA

Scale 1:253,440

1 0 1 2 3 4 Miles

SOIL ASSOCIATIONS

1. Norfolk-Exum-Goldsboro association: Moderately well drained and well drained soils that have a subsoil of dominantly friable sandy clay loam or clay loam; on uplands
2. Roanoke-Lakeland-Altavista association: Poorly drained to excessively drained soils that have a subsoil of dominantly friable sandy clay loam or very firm clay, or that are underlain by loose sand; on stream terraces and uplands
3. Lynchburg-Rains-Goldsboro association: Moderately well drained to poorly drained soils that have a subsoil of dominantly friable sandy clay loam; on uplands
4. Lenoir-Bladen-Craven association: Moderately well drained to poorly drained soils that have a subsoil of very firm and firm sandy clay to clay; on uplands
5. Coxville-Exum association: Poorly drained and moderately well drained soils that have a subsoil of dominantly firm sandy clay or friable clay loam; on uplands
6. Bibb-Portsmouth association: Poorly drained and very poorly drained soils that are underlain by very friable fine sandy loam, or that have a subsoil of friable sandy loam and sandy clay loam; on flood plains and stream terraces
7. Bladen-Byars association: Poorly drained and very poorly drained soils that have a subsoil of firm and very firm sandy clay to clay; on uplands

Compiled 1973

OLINA — SHEET NUMBER 30

DISPOSAL AREA @ STARLING PROPERTY

(Joins sheet 22)

Bb 2 410 000 FEET

695 000 FEET

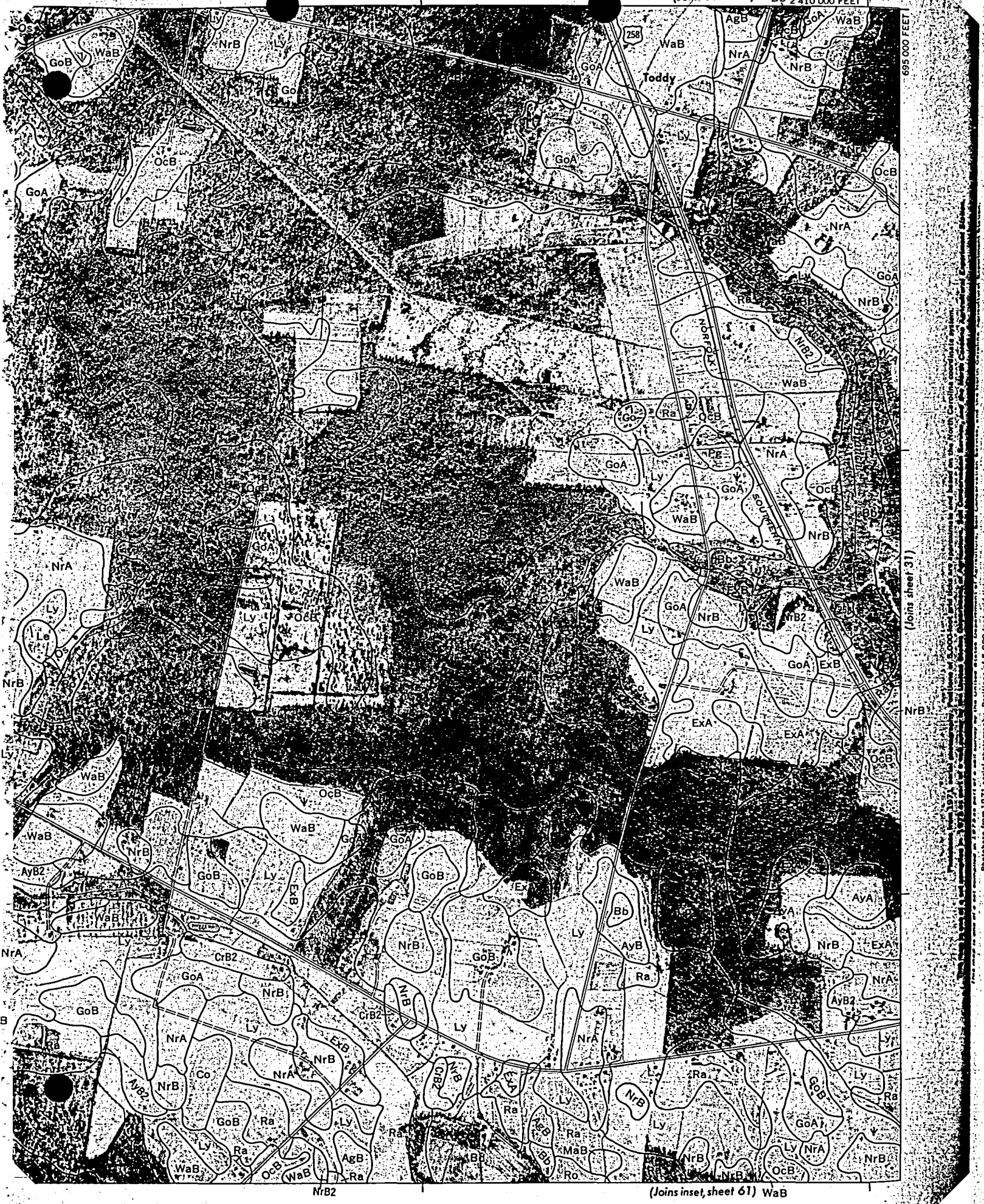
Toddy

NORFOLK SOUTHERN

(Joins sheet 31)

NrB2

(Joins inset, sheet 61)



Photobase from 1971 aerial photography. Positions of 5,000-foot grid ticks are approximate and based on the North Carolina coordinate system.

United States Department of the Interior
FISH AND WILDLIFE SERVICE
ENDANGERED SPECIES FIELD STATION
100 OTIS STREET, ROOM 224
ASHEVILLE, NORTH CAROLINA 28801

June 21, 1985

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

Dear Ms. Derosa,

In response to your telephone conversation with John Fridell on May 30, 1985, we are enclosing the following items of information:

A. North Carolina county distribution records of Federally listed, proposed and status review species,

B. map of the critical habitat of the threatened spotfin chub (Hybopsis monacha),

C. map of the critical habitat of mountain golden heather (Hudsonia montana), and

D. copy of the U.S. Fish and Wildlife Service interagency Section 7 consultation process guidelines (included for your information)

The abbreviations following the species names on the North Carolina species distribution records (A. above) indicate Federal status, i.e., E - endangered, T - threatened, PE - proposed endangered, PT - proposed threatened and SR - under status review. Status review species are not legally protected under the Endangered Species Act. However, they are subject to being listed and agencies should be cognizant of their potential presence in a project area.

Since additions and deletions are made to the list of species on a regular basis, questions regarding updates of the list should be made to this office.

We hope this information will be of use to you. If we can be of any further assistance, please call John Fridell or Nora Murdock at (704) 259-0321.

Sincerely yours,

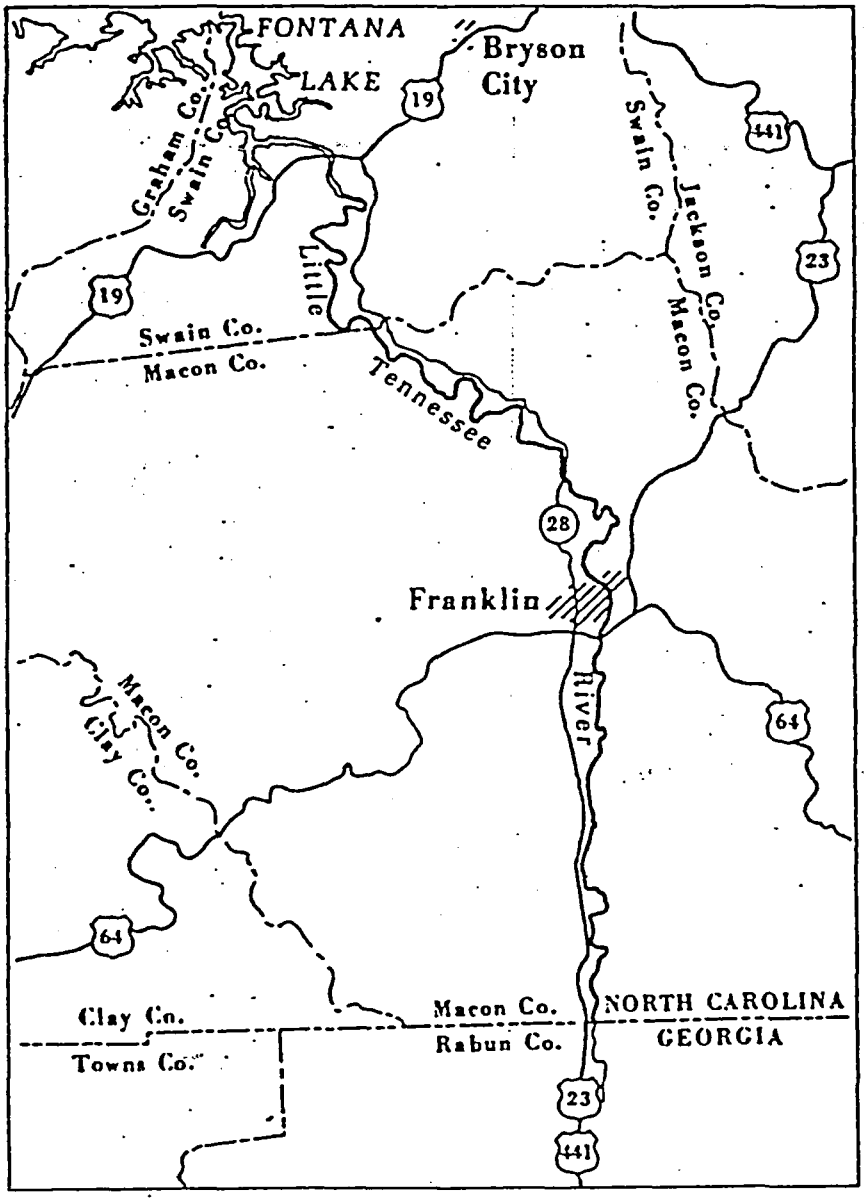
Warren T. Parker

Warren T. Parker
Field Supervisor

NORTH CAROLINA - Critical Habitat

Hybopsis monacha, "spotfin chub"

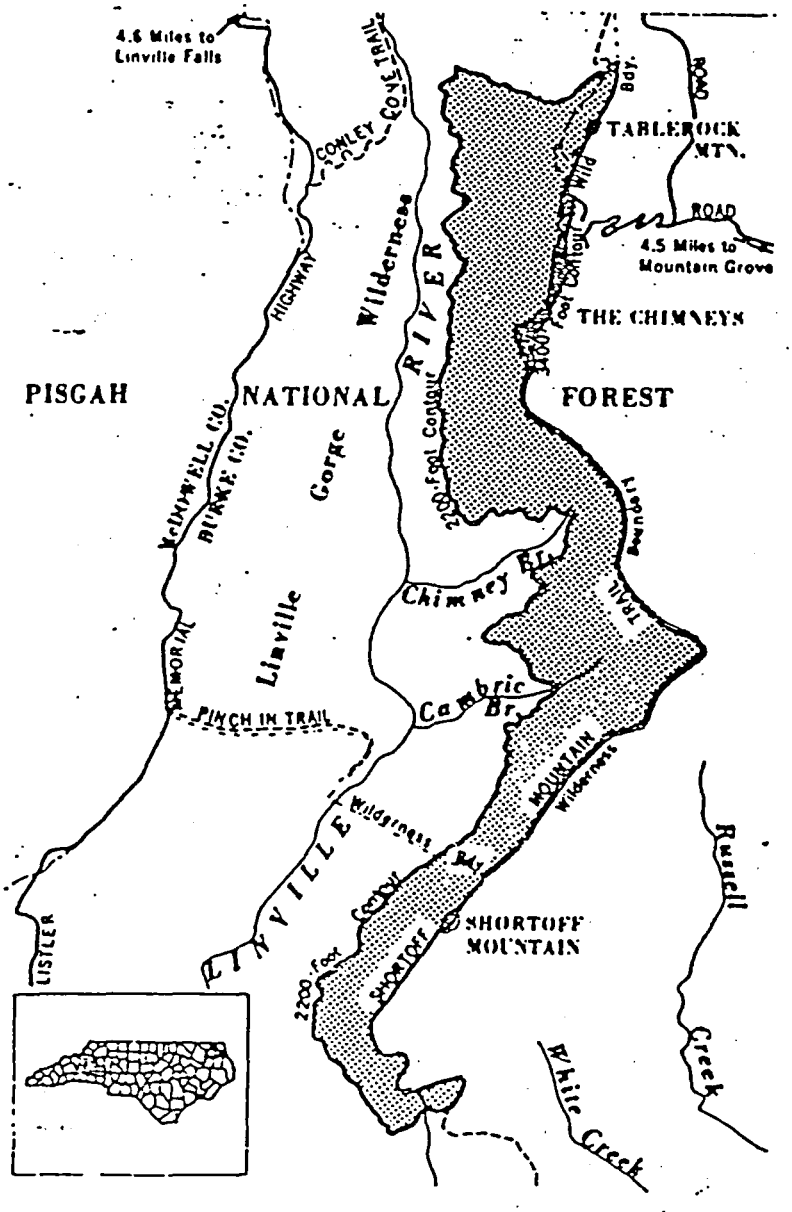
Macon and Swain Counties. Little Tennessee River, main channel from the backwaters of Fontana Lake upstream to the North Carolina-Georgia state line.



NORTH CAROLINA - Critical Habitat

Hudsonia montana, "mountain golden heather"

Burke County. The area bounded by the following: on the west by the 2200' contour; on the east by the Linville Gorge Wilderness Boundary north from the intersection of the 2200' contour and the Shortoff Mountain Trail to where it intersects the 3400' contour at "The Chimneys"--then follow the 3400' contour north until it reintersects the Wilderness Boundary--then follow the Wilderness Boundary again northward until it intersects the 3200' contour extending west from its intersection with the Wilderness Boundary until it begins to turn south--at this point the Boundary extends due east until it intersects the 2200' contour.



May 18, 1989

TO: Superfund Branch Staff

FROM: Pat DeRosa PD

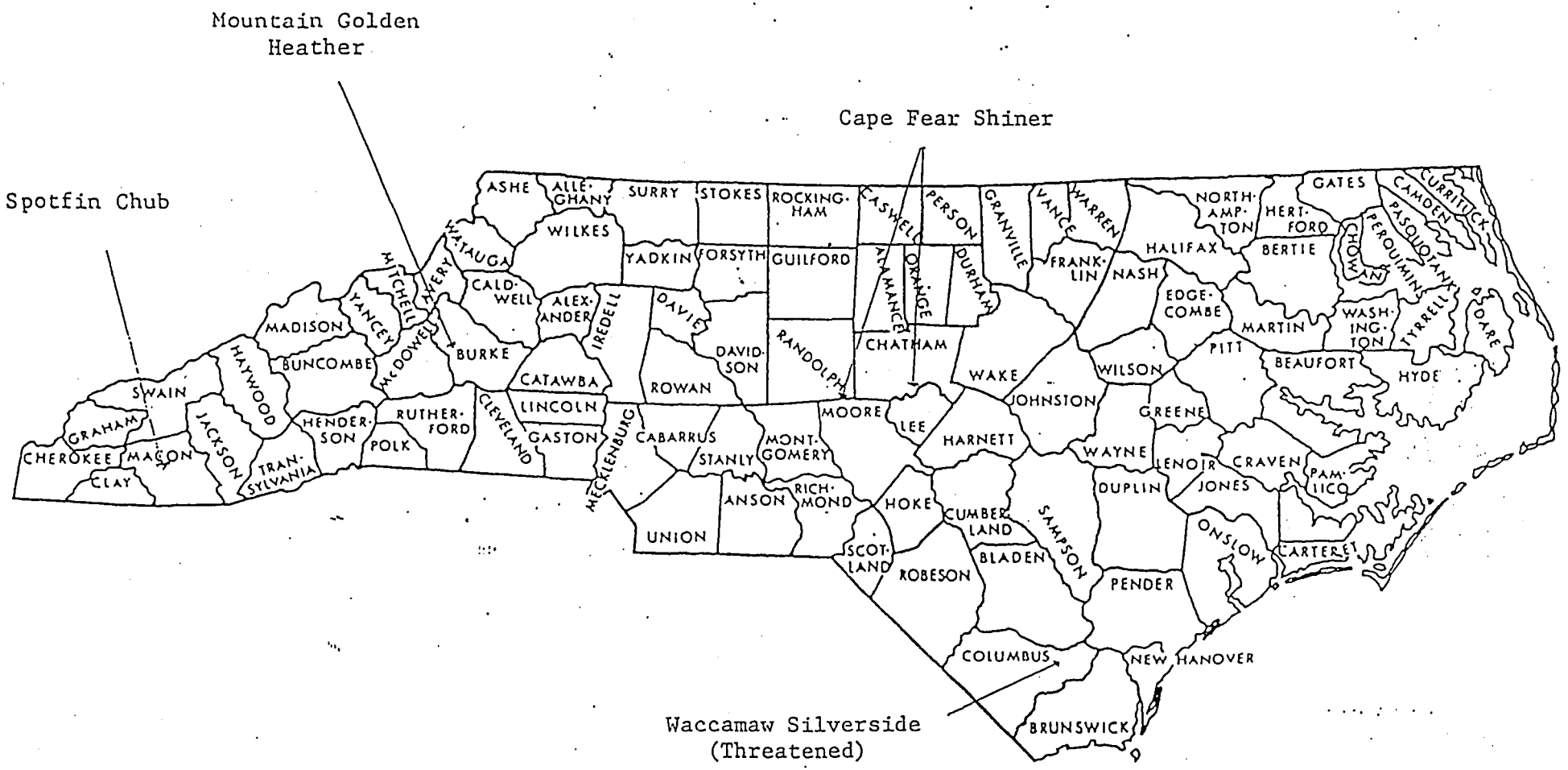
RE: Critical Habitats of Federally Listed Endangered Species in North Carolina

On May 18, 1989, I spoke by telephone with John Fridell, US Fish and Wildlife Service, Asheville, NC (704) 259-0321 to request an update on critical habitats in North Carolina. Mr. Fridell said the Fish and Wildlife Service has been reorganized into a western and eastern office in North Carolina. His office now handles only western North Carolina. He said there have been no changes in the designated critical habitats identified in western North Carolina.

I then spoke by telephone with Debby Mignogno, US Fish and Wildlife Service, Raleigh, NC (919) 856-4520 regarding critical habitats in eastern North Carolina. Ms. Mignogno sent the attached maps of the 2 critical habitats designated in eastern North Carolina. Please note that the Waccamaw Silverside is listed as threatened, not endangered.

PD/pb/critical.hab

CRITICAL HABITATS OF FEDERALLY LISTED ENDANGERED SPECIES IN NC



1 inch = approx. 53 miles

15 June 1987

TO: File

FROM: Pat DeRosa PD

RE: Critical Habitats of Federally Listed Endangered Species in N.C.

I spoke by telephone today with John Fridell, US Fish and Wildlife Service (704) 259-0321 to request an update on critical habitats in NC. Mr. Fridell informed me that there have been no changes since our previous correspondence of August 12, 1986. The "Proposal to List the Cape Fear Shiner as an Endangered Species with Critical Habitats" in NC (FR Vol. 51, No. 133, July 11, 1986) is expected to be finalized in the next month or so.

PD/tb/0338b

12 August 1986

TO: CERCLA Unit Staff

FROM: Pat DeRosa

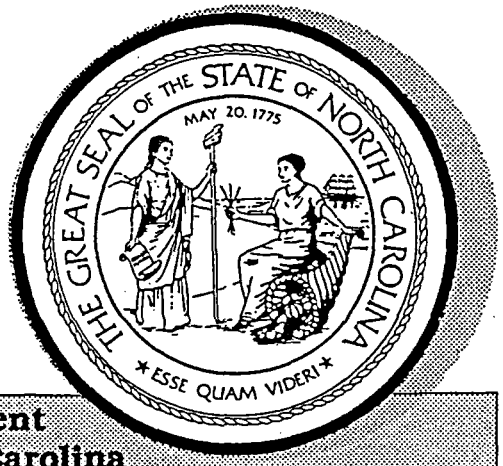
RE: Critical Habitats of Federally Listed Endangered Species in N.C.

I spoke by telephone today with John Fridell, US Fish and Wildlife Service (704) 259-0321 to request an update on critical habitats in NC. Mr. Fridell informed me that the only change since our previous correspondence of June 21, 1985 has been a "Proposal to List the Cape Fear Shiner as an Endangered Species with Critical Habitats" in NC. (FR Vol. 51, No. 133, July 11, 1986). A copy of the proposed rule is attached for your information.

PD/tb/0221b

STATE OF NORTH CAROLINA
DEPARTMENT OF
NATURAL RESOURCES AND
COMMUNITY DEVELOPMENT

Classifications and Water Quality Standards Assigned to The Waters of The Neuse River Basin



Division of Environmental Management
Raleigh, North Carolina

Reprint from North Carolina Administrative Code: 15 NCAC 2B .0315
Current through: June 30, 1989

SECTION .0300 - ASSIGNMENT OF STREAM CLASSIFICATIONS

.0301 CLASSIFICATIONS: GENERAL

(a) Schedule of Classifications. The classifications assigned to the waters of the State of North Carolina are set forth in the schedules of classifications and water quality standards assigned to the waters of the river basins of North Carolina, 15 NCAC 2B .0302 to .0317 which are on file in the Office of the Attorney General of North Carolina. These classifications are based upon the existing or contemplated best usage of the various streams and segments of streams in the basin, as determined through studies and evaluations and the holding of public hearings for consideration of the classifications proposed.

(b) Stream Names. The names of the streams listed in the schedules of assigned classifications were taken as far as possible from United States Geological Survey topographic maps. Where topographic maps were unavailable, U.S. Corps of Engineers maps, U.S. Department of Agriculture soil maps, and North Carolina highway maps were used for the selection of stream names.

(c) Classifications. The classifications assigned to the waters of North Carolina are denoted by the letters WS-I, WS-II, WS-III, B, C, SA, SB, and SC in the column headed "class." A brief explanation of the "best usage" for which the waters in each class must be protected is given as follows:

Fresh Waters

Class WS-I:	waters protected as water supplies which are in natural and uninhabited or predominantly undeveloped (not urbanized) watersheds; no point source discharges are permitted and local land management programs to control nonpoint source pollution are required; suitable for all Class C uses;
Class WS-II:	waters protected as water supplies which are in low to moderately developed (urbanized) watersheds; discharges are restricted to primarily domestic wastewaters or industrial non-process waters specifically approved by the commission; local land management programs to control nonpoint source pollution are required; suitable for all Class C uses;
Class WS-III:	water supply segment with no categorical restrictions on watershed development or discharges; suitable for all Class C uses;
Class B:	primary recreation and any other usage specified by the "C" classification;
Class C:	fish and wildlife propagation, secondary recreation, agriculture, and other uses requiring waters of lower quality.

Tidal Salt Waters

Class SA:	shellfishing for market purposes and any other usage specified by the "SB" and "SC" classification;
Class SB:	primary recreation and any other usage specified by the "SC" classification;
Class SC:	fish and wildlife propagation, secondary recreation, and other uses requiring waters of lower quality.

Supplemental Classifications

Trout Waters:	Suitable for natural trout propagation and maintenance of stocked trout;
Swamp Waters:	Waters which have low velocities and other natural characteristics which are different from adjacent streams;
NSW:	Nutrient sensitive waters which require limitations on nutrient inputs;
ORW:	outstanding resource waters which are unique and special waters of exceptional state or national recreational or ecological significance which require special protection to maintain existing uses.

(d) Water Quality Standards. The water quality standards applicable to each classification assigned are those established in 15 NCAC 2B .0200, Classifications and Water Quality Standards Applicable to the Surface Waters of North Carolina, as adopted by the North Carolina Environmental Management Commission.

(e) Index Number

.0315 NEUSE RIVER BASIN

Name of Stream	Description	Class	Classification Date	Classification Index No.
Beaman Run	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-13
Howell Swamp	From source to Beaman Run	C Sw NSW	5/1/88	27-86-13-1
Nahunta Swamp	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-14
Perkins Old Mill Br.	From soure to Nahunta Swamp	C Sw NSW	5/1/88	27-86-14-0.5
The Slough	From source to Nahunta Swamp	C Sw NSW	5/1/88	27-86-14-1
Granny Branch	From source to The Slough	C Sw NSW	5/1/88	27-86-14-1-1
Moccasin Run	From source to The Slough	C Sw NSW	5/1/88	27-86-14-1-2
Exum Mill Branch	From source to The Slough	C Sw NSW	5/1/88	27-86-14-1-3
Beaver Dam	From source to Nahunta Swamp	C Sw NSW	5/1/88	27-86-14-2
Button Branch	From source to Nahunta Swamp	C Sw NSW	5/1/88	27-86-14-3
Mill Branch	From source to Nahunta Swamp	C Sw NSW	5/1/88	27-86-14-4
Beetle Branch (Beaver Branch)	From source to Nahunta Swamp	C Sw NSW	5/1/88	27-86-14-5
Cow Branch	From source to Nahunta Swamp	C Sw NSW	5/1/88	27-86-14-6
Appletree Swamp	From source to Nahunta Swamp	C Sw NSW	5/1/88	27-86-14-7
Fort Run	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-15
Lang Branch	From source to Fort Run	C Sw NSW	5/1/88	27-86-15-1
Lewis Branch	From source to Fort Run	C Sw NSW	5/1/88	27-86-15-2
Mill Run	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-16
Tyson Marsh	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-17
Jacks Fork	From source to Tyson Marsh	C Sw NSW	5/1/88	27-86-17-1
Reeders Fork	From source to Tyson Marsh	C Sw NSW	5/1/88	27-86-17-2
Spring Branch	From source to Tyson Marsh	C Sw NSW	5/1/88	27-86-17-3
Panther Swamp Creek	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-18
Poorhouse Run	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-19
Shepherd Run	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-20
Rainbow Creek	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-21
Horsepen Branch	From source to Rainbow Creek	C Sw NSW	5/1/88	27-86-21-1
Sowell Run	From source to Rainbow Creek	C Sw NSW	5/1/88	27-86-21-2
Beaverdam Run	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-22
Mussel Run	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-23
Wheat Swamp Creek	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-24
Hallam Branch	From source to Wheat Swamp Creek	C Sw NSW	5/1/88	27-86-24-1
Polecat Branch	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-25
Little Contentnea Creek	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-26
Ward Run	From source to Little Contentnea Creek	C Sw NSW	5/1/88	27-86-26-1
Black Swamp	From source to Little Contentnea Creek	C Sw NSW	5/1/88	27-86-26-2
Langs Mill Run	From source to Black Swamp	C Sw NSW	5/1/88	27-86-26-2-1
Jacob Branch	From source to Black Swamp	C Sw NSW	5/1/88	27-86-26-2-2
Oldwoman Branch	From source to Little Contentnea Creek	C Sw NSW	5/1/88	27-86-26-3
Pinelog Branch	From source to Little Contentnea Creek	C Sw NSW	5/1/88	27-86-26-4
Middle Swamp	From source to Little Contentnea Creek	C Sw NSW	5/1/88	27-86-26-5
Sandy Run	From source to Middle Swamp	C Sw NSW	5/1/88	27-86-26-5-1
Eagle Swamp	From source to Contentnea Creek	C Sw NSW	5/1/88	27-86-27
Grinnel Slough	From soruce to Neuse River	C Sw NSW	5/1/88	27-87
Halfmoon Creek	From source to Neuse River	C Sw NSW	5/1/88	27-88
Village Creek	From source to Neuse River	C Sw NSW	5/1/88	27-89
Core Creek	From source to Neuse River	C Sw NSW	5/1/88	27-90

Uncontrolled Hazardous Waste Site Ranking System

A[illegible]ers Manual

(H[illegible])

Originally Published in
the July 16, 1982, *Federal Register*

United States
Environmental Protection
Agency

1984

UNION CARBIDE CORPORATION
20575 CENTER RIDGE ROAD
ROCKY RIVER, OHIO 44116
Battery Products Division

TELEPHONE: (216) 333-1212
TELEX: UCCONSPRO [illegible] 5591
ADDRESS REPLY TO: P.O. BOX 16000
ROCKY RIVER, OHIO 44116

November 16, 1984

Mr. D. Mark Durway
North Carolina Dept. of Human Resources
Solid and Hazardous Waste Management Branch
P. O. Box 2091
Raleigh, N. C. 27602-2091

Subject: David Starling
Disposal Site

Dear Mr. Durway:

This letter is in response to your 10/4/84 request for information about the Starling disposal site in Farmville, N. C. In 1970, Union Carbide Corporation (UCC) was awarded a contract to produce a magnesium battery for the Federal government. Part of the production operation involved chrome coating. Excess barium carbonate was added to spent coating solution to precipitate chromium such that the remaining wastewater could be safely discharged to the local POTW. The sludge generated from this treatment step consisted of 40% to 50% barium carbonate and 50% to 60% barium chromate. Between 1/6/71 and 3/31/71, approximately 542 containers were shipped to the Starling disposal site. The containers consisted of 55-gallon drums and 5-gallon pails and the total volume of sludge disposed of is estimated to be 10,000 gallons. The containers were transported to the disposal site by Mr. Starling; approximately 30 trips were made during that time period. This sludge was the only UCC material disposed of at the Starling site.

In late 1982, UCC hired Law Engineering to conduct a site environmental reconnaissance and preliminary site assessment. A copy of their report is provided with this letter. That document summarizes most of our actions to date and answers most of your questions relating to chronology, waste disposal practices, and site investigation information. The Law Engineering report concludes that the waste disposal on the Starling property does not represent an environmental hazard to surface or groundwater resources outside the immediate disposal area at this time (page 25).

Based on discussions with Law Engineering and several hazardous waste handling and disposal firms, we have concluded that the risks associated with disturbing the waste at this time outweigh the risks of leaving it in place. With proper site grading, there is no definite indication that the site is or will ever be an environmental or health problem. Our plan, therefore, is to adequately define the site, implement a monitoring program, and establish a contingency plan describing actions to be taken based on predetermined levels of surface water or groundwater degradation. Contingency plan remedial actions being considered include slurry wall construction, waste stabilization, in-place fixation, and waste excavation.

Law Engineering has been hired to complete the Starling site assessment and to develop both the monitoring program and the contingency plan. Attachment No. 1 of this letter is a copy of our criteria for the above work. Our UCC action plan is shown in Attachment No. 2. The dates are approximations shown only for current planning purposes; they are not meant to be binding commitments. Please keep in mind that this is a voluntary effort being done with the cooperation of Mr. Starling, the site owner and operator.

I believe that this letter has responded to all of your concerns. If you have any questions, please call me at 216/333-0500.

AMN:ps
Attachs.

Very truly yours,

Albert M Nash

A. M. Nash

ATTACHMENT No.

SITE EVALUATION-5-25-84

This order is to complete the David Starling disposal site evaluation and assessment. It is broken into several key tasks as listed below. Where appropriate, references are made to recommendations contained in Contractor's November 1983 Hydrogeological Assessment Report.

1) To obtain a better understanding of ground-water flow in the immediate vicinity of the waste disposal area, Contractor shall install several shallow (less than 5-foot deep) standpipes per recommendation 9.3. The standpipes would only be used for waterlevel measurements and could probably be installed by hand techniques. The standpipes would particurlarly be important along the northern and eastern side of the waste fill area where the hydraulic relationships to the existing hog pond are not well understood. This task includes topographic surveying and submission of a report of findings.

2) The surface of the waste disposal area shall be graded to prevent direct runoff of contaminants into the northern drainage ditchand to minimize exposure of animals to contaminated standing water. Recommedation 9.4 refers to this task. UCC-Greenville will provide labor, equipment, and any necessary material to accomplish this task. The grading operation shall be supervised by Contractor's soils engineer or geologist familiar with the site conditions and safety considerations.

3) To delineate the approximate limits (widths and depth) of the disposal trench, Contractor shall conduct a geophysical survey using electrical techniques (electromagnetic and/or resistivity) and a magnetometer to traverse the disposal area. This task corresponds to recommendation 9.5. A report of findings is included in this task.

4 A) Contractor shall develop an annual groundwater monitoring program based on eight(8) sampling stations- 4 wells, 2 to 3 surface water samples, 1 contingency. Surface and groundwater samples collected from the site shall be analyzed for total barium and chromium. Field measurements of PH and conductivity are to be obtained at the time of sample collection. The results of water quality shall be statistically compared to the existing data base to determine if significant changes have occured in the water quality conditions. Ground and surface-water elevations shall be obtained in the vicinity of the waste disposal area at the time of sample collection. The water level data shall be compared to the past potentiometric surfaces to determine if significant changes in flow or gradients have occcurred. Contractor shall conduct one annual groundwater monitoring check (as described above) under this order. The report of findings is to include:

(a) description of groundwater monitoring program

(b) description of sample collection techniques and sample preservation, as appropriate

(continued on page 2)

(c) description of on-site tests (equipment, procedures)

(d) description of off-site analysis (equipment, test method)

(e) other descriptive information considered pertinent by the Contractor

(f) summary, discussion, and evaluation of monitoring results

4B) In developing the above groundwater monitoring program, the Contractor is to evaluate and report on the adequacy of the existing four(4) wells for sampling purposes. If due to hydrogeological or other condsiderations additional wells are recommended by the Contractor and approved by the Owner, the Contractor shall install said wells using similar techniques as in Contractors original study and to depths not exceeding 25 feet. In any event, no more than two(2) additional wells should be required. Well installation includes all materials, well development, supervision, surveying, and transmitting soil test boring/monitoring well records.

5) Contractor shall prepare a contingency plan describing what levels of degradation in surface or ground-water samples collected over the monitoring period require action by Union Carbide. The plan would be developed with Union Carbide's input, recognizing the current remedial measure alternatives being considered by Union Carbide. The action could include resampling if relatively low concentrations are detected, or implementation of a pre-specified remedial measure alternative if the concentrations are determined to represent statistically significant increases. The concentration levels will be based on drinking water standards or other applicable criteria.

ATTACHMENT No. 2

ACTION PLAN

DAVID STARLING DISPOSAL SITE

	Action	Responsibility	Timing
1)	Receive and review final Hydrogeological Assessment Report.	UCC	Complete
2)	Review Hydrogeological Assessment Report with David and Francis Starling.	UCC	Complete
3)	Obtain permission from David Starling allowing UCC to do the site work outlined in the Hydrogeological Assessment Report and UCC's 5/25/84 criteria.	UCC	Complete
4)	Obtain quotes for removal and disposal of surface trash and for site grading.	UCC	December 1984
5)	Complete surface trash removal and disposal.	UCC	January 1985
6)	Complete site grading under Law Engineering supervision.	UCC Law Engineering	February 1985
7)	Perform geophysical survey.	Law Engineering	March 1985
8)	Install shallow standpipes and begin water level monitoring.	Law Engineering	April 1985
9)	Law Eng. issues report on grading, geophysical survey, and standpipe study. Report includes assessment of adequacy of existing wells for groundwater monitoring program.	Law Engineering	June 1985
10)	Installation of additional wells (if necessary and approved).	UCC Law Engineering	July 1985
11)	Complete draft Monitoring Program and Contingency Plan.	Law Engineering	Sept. 1985
12)	Review written Monitoring Program and Contingency Plan with: (a) UCC internal (b) David Starling (c) North Carolina Solid & Hazardous Waste Management Branch and/or U.S. EPA	UCC	 Oct. 1985 Nov. 1985 Dec. 1985
13)	Modify Monitoring Program & Contingency Plan as appropriate.	UCC	Jan. 1986
14)	Approval of Monitoring Program & Contingency Plan	UCC	Feb. 1986
15)	Implement	UCC	March 1986

FINAL REPORT OF

HYDROGEOLOGICAL ASSESSMENT

DAVID STARLING DISPOSAL SITE

PITT COUNTY, NORTH CAROLINA

FOR

UNION CARBIDE CORPORATION

NOVEMBER 1983

LAW ENGINEERING TESTING COMPANY

LAW ENGINEERING TESTING COMPANY
geotechnical, environmental & construction materials consultants
2749 DELK ROAD, S.E.
MARIETTA, GEORGIA 30067
(404) 952-9005

November 28, 1983

Union Carbide Corporation
20575 Center Ridge Road
P.O. Box 16000
Rocky River, Ohio 44116

Attention: Mr. Albert M. Nash
General Engineering Department

Subject: Final Report of Hydrogeological Assessment
David Starling Disposal Site
Pitt County, North Carolina
Law Engineering Project No. MH2303

Dear Mr. Nash:

Law Engineering has completed a hydrogeological assessment of the David Starling disposal site as outlined in Union Carbide's Order No. 732-97521. Our report is based on various phases of study we have conducted on the site between September 1982 and May 1983.

We have concluded on the basis of our studies that the waste disposal on the David Starling property does not represent an environmental hazard at this time for surface or ground-water resources outside the immediate disposal area. We have provided recommendations for subsequent monitoring which should be evaluated before closure plans are implemented.

We would be happy to answer any questions you have regarding this report. Law Engineering looks forward to continued work on this assessment program.

Sincerely,

LAW ENGINEERING TESTING COMPANY

W. Joseph Alexander, P.G.
Senior Hydrogeologist
Project Manager

for Larry A. Neal, P.E.
Senior Environmental Engineer

WJA-LAN/pc

cc: G. A. Babcock

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1.0 INTRODUCTION

Law Engineering was contracted by Union Carbide Corporation's Battery Products Division to evaluate potential environmental impacts associated with sludge disposal at the David Starling disposal site. The battery sludge was produced by Union Carbide's Greenville, North Carolina plant in 1970. In early 1971 the sludge was shipped to the property of Mr. David Starling located halfway between Farmville and Fountain, North Carolina. In June 1981 the disposal site was listed by Union Carbide in EPA's CERCLA list of inactive sites.

Law Engineering's site assessment program was conducted in a sequence of tasks generally between September 1982 and May 1983. Our studies have basically included collection of area data, site reconnaissance, construction of a base map, soil test borings, monitoring well installation, collection and analysis of soil and water samples, and evaluation of data. Our study approach is described in more detail in Section 2.0 (Methodology). The purpose of our hydrogeological assessment was to determine if the disposal site represents an environmental hazard from the standpoint of water resources.

2.0 METHODOLOGY

2.1 Collection of Existing Data

Data were collected from the following sources for use in this hydrogeological assessment:

Union Carbide:

- various information regarding the sludge disposal activities at the David Starling site
- information regarding the quantities and characteristics of the waste material
- analytical results of water and sludge analyses

Property Owner:

In our interviews with Mr. Starling over the course of this assessment we obtained information on:

- drainage features
- water-well locations and usage
- general methods of excavation and sludge burial

North Carolina Division of Environmental Management (Ground Water Section):

- hydrogeologic data from wells in the vicinity of Farmville

Pitt County Soil Conservation Service:

- various aerial photographs of the site and surrounding area reviewed
- soil survey of Pitt County

North Carolina Department of Human Resources (Division of Health Services):

- representative water quality data for wells in the vicinity of the site

Publications:

- various State, County, and USGS publications and maps

2.2 Reconnaissance of Site Area

We have conducted the following types of activities over the study period:

- observations in the sludge disposal area
- observations of the general setting with particular emphasis on drainage ditches
- observations of nearby streams
- inventory of existing water wells on site
- photographic coverage of pertinent site features

2.3 Construction of Base Map

Law Engineering arranged for photogrammetric mapping and ground surveying to prepare a base map of the site including the following features:

- general property lines
- drainage ditches and ponds
- water-well locations
- roads, buildings, and other pertinent features

- elevations of selected features such as wells, ponds, drainage ditches, and land surface at selected locations

The aerial survey of the site was conducted by Piedmont Aerial Surveys, Inc. in December, 1982. This base map is provided in the pocket of the report (Plate 1). The ground surveying was performed by McDavid Associates, Inc. in April 1983. The immediate sludge disposal area was surveyed in more detail than the surrounding site features (Plate 1).

2.4 Exploratory Drilling

Law Engineering drilled two exploratory borings outside the waste disposal area. Upon completion the borings were grouted closed from their termination depth to the ground surface. Soil samples were collected at regular intervals and were classified to determine the subsurface geological conditions. The data collected were used to characterize the material comprising the water-table aquifer, the confining bed, and the upper section of the principal aquifer. This information was used to determine the actual depths of subsequent monitoring wells installed within the sludge disposal area. The soil test boring records are provided in Appendix 1.

2.5 Installation of Monitoring Wells

After completion of the two exploratory borings, Law Engineering installed four shallow monitoring wells (approximately 25 feet deep) in the immediate vicinity of the sludge

disposal area (Appendix 2). These wells terminated above the confining layer to prevent downward movement of potential contaminants. Soil samples were collected on a regular basis and compared with subsurface information collected in the initial two borings. Grain size analyses were performed on selected soil samples (Appendix 3).

The shallow wells consist of 2-inch diameter PVC and manufacturer-slotted screens with .010 inch slot widths. The well construction utilized sand packing, bentonite seals, and surficial grout seals. The drilling equipment exposed to the subsurface was washed between each well location to minimize potential cross contamination. The shallow wells were installed under a variance from the State of North Carolina (Appendix 4). The monitoring wells are installed with protective, lockable covers and are marked "Ground-Water Monitoring Well - Not for Drinking Purposes."

2.6 Collection of Ground and Surface Water Data

After completion of the monitoring well installation, the wells were developed by over-pumping and bailing techniques. Hydraulic tests were performed in selected wells (slug tests and bailing tests) to obtain estimates of the permeability of the water-table aquifer. Representative ground-water levels were measured in the four monitoring wells and other selected water wells to produce potentiometric surface maps of the aquifer system. All development and testing equipment was thoroughly washed between well locations.

Ground-water samples were collected from the four monitoring wells with a PVC bailer and analyzed for constituents likely to be associated with the sludge disposal. Surface water samples were also collected for analysis. All sampling equipment was thoroughly washed between sampling locations. Field measurements of pH and conductivity were obtained. The water samples were filtered within a few hours after collection using a .45 micron pore filter and a vacuum pump system. The samples for metals analyses were then preserved with nitric acid to a pH of less than 2. The remaining samples were iced and shipped overnight to our laboratory in Marietta, Georgia for analysis.

3.0 SITE CONDITIONS

3.1 Topography and Drainage

The site is located in western Pitt County, North Carolina (Figure 1), midway between Farmville and Fountain. The sludge disposal area of the site is approximately 1400 feet west of N.C. Highway 258 on the property of Mr. David Starling.

The site has relatively little relief (about 4 feet) and slopes toward the southeast. Ground-surface elevations at the site range from elevation 94 feet, msl along the western portion of the Starling property to 90 feet, msl in the vicinity of the Starling residences (Plate 1). The site is drained primarily by man-made ditches. The flow in the ditches as determined by the April 5, 1983 survey is indicated on Plate 1. These ditches generally drain eastward toward Jacob Branch which is a tributary to Little Contentnea Creek (Figure 2). Contentnea Creek joins the Neuse River in southern Pitt County. It was learned in our meeting with Mr. Starling that subsurface-drain lines exist in fields just east of the sludge disposal area (Plate 1).

3.2 Existing Water Wells

Several wells exist at or near the site at locations shown on Plate 1. The information reported on these wells (from interviews with Mr. Starling) and our measurements are presented in Table 1. The small-diameter wells were washed down and no seals were reported in the installation process. Several of the water wells were installed around 1950. Several of the nearby

residences to the site are reported to be using water from a municipal water supply system (which is also derived from ground water) since spring of 1982.

Ground-water levels were measured in the accessible water wells (Table 2). Of these wells, only Well No. 2 was considered useful for monitoring water levels in the immediate sludge disposal area.

4.0 WASTE DISPOSAL

4.1 Sludge Disposal Activities

The Greenville, North Carolina Plant of Union Carbide Corporation produced a magnesium-can battery for the Federal Government in 1970. The plating operation produced a sludge with a composition of 40-50 percent barium carbonate and 50-60 percent barium chromate. Between January 6, 1971 and March 31, 1971, approximately 542 containers of the sludge were shipped to the David Starling disposal site (this number is based on Mr. Starling's memory). The containers consisted of 55 gallon drums and 5 gallon chromic acid pails. The total volume of sludge is estimated by Union Carbide Corporation to be approximately 10,000 gallons.

The containers of sludge remained above ground at the site until early fall of 1971. At this time Mr. Starling excavated a large trench, placed the containers in the trench and backfilled the trench with soil. Mr. Starling reported trench dimensions to Law Engineering as follows: width 15 to 25 feet; length 80 to 100 feet; and depth 12 to 14 feet. The trench is reported (by Mr. Starling) to have been open about two weeks before a tractor pushed soil back into the trench.

4.2 Observations

It was difficult for us to determine the actual dimensions of the sludge disposal trench by observation in the field although the approximate layout of the area is indicated in Figure 3. The surface of the immediate disposal area has about 4 feet of relief

caused by remnant piles of excavated soil. The original ground-surface elevation is interpreted to be approximately 93 feet, msl. Some unlabeled drums were exposed along the northern end of the trench and are in standing water. A small willow tree marks this location. On the southern end of the disposal area several chromic acid pails are exposed. We observed dark yellow-brown puddles of standing water along the eastern and southern end of the disposal area in December, 1982. The surface of the waste disposal area has scattered metal scraps, cross ties, and other miscellaneous debris. The area is overgrown with weeds.

4.3 Previous Chemical Data

Samples of ground water, surface water, and sludge were collected from the site or nearby areas prior to this study and analyzed by various laboratories in the time period between March and June, 1982. The majority of the sample analyses have been performed by the Edgewater Technology Laboratory of Union Carbide Corporation and compare favorably with results from other laboratories (Appendix 5). The ground-water samples typically had barium concentrations of less than 0.5 mg/l and chromium concentrations of less than 0.1 mg/l. The water samples from the drainage ditch adjacent to the sludge disposal area and a surface puddle at the disposal area had higher concentrations of barium than ground water (from 1.2 to 20 mg/l respectively). The sludge sample obtained from an exposed barrel at the site had a significantly higher concentration of extractable barium (between 6300 and 8500 ppm) than chromium (between 0.1 to 3.7 ppm).

5.0 AREA HYDROGEOLOGY

This section of the report provides a brief description of the hydrogeologic framework of Western Pitt County. The information is primarily based upon published data.

5.1 Area Physiography

The site is in the Central Coastal Plain province. The mean annual precipitation in the area of the site is about 48 inches. Evapotranspiration in the area is probably on the order of 35 inches, leaving excess water for ground-water recharge. The topography in the site area is characterized by a flat upland, generally between 90 and 100 feet above mean sea level (msl). The upland topography near the site has been dissected by Little Contentnea Creek and its tributaries (Figure 2).

The Coastal Plain is comprised of a wedge-shaped sequence of stratified deposits which thicken seaward. The deposits overlie the crystalline basement surface which is interpreted to occur near elevation -300 feet, msl in the site area. (Estimated to be about 400 feet below land surface). The bedrock surface is irregular, being exposed at land surface just north of the site at the Fountain quarry.

5.2 Hydrogeologic Units

A summary of hydrogeologic units formed by the unconsolidated deposits in the Central Coastal Plain of North Carolina is

provided in Table 4. Hydrogeologic units of significance in the area of the site include in descending order:

Water-table aquifer

Yorktown confining bed

Lower Unit of Cretaceous aquifer system

The general thickness of these hydrogeologic units near the site is depicted by Figure 4.

5.3 Water-Table Aquifer

The water-table aquifer is recharged by precipitation and discharges primarily into streams. Water levels are typically highest in the aquifer between January and March and lowest in late summer and between November and December. The water-table aquifer also recharges the underlying confined aquifer system through induced leakage. The water-table aquifer is a limited source of supply to a small number of domestic users. Water in this aquifer is typically soft, low in total dissolved solids, corrosive, and commonly contains high concentrations of iron.

5.4 Yorktown Formation

The lithology of the Yorktown Formation varies widely. Where present in the western parts of Pitt County the formation commonly occurs as a gray silty clay. Lenticular layers of sand occur in the formation. The fine texture of the formation precludes its use as a major aquifer although some small supplies are developed from the sand layers. In general the Yorktwon Formation serves as a semi-pervious confining bed for underlying aquifer systems.

5.5 Cretaceous Lower Sand Unit

The Cretaceous Lower Sand Unit comprises the lower part of the Cretaceous aquifer system and includes the water-bearing sands of the Black Creek and Tuscaloosa stratigraphic units. The aquifer is probably about 200 feet thick in the vicinity of the site. Ground water in the aquifer is primarily under confined conditions. Ground water in the aquifer moves from the site area to the southeast (Figure 5). Extensive cones of depression exist within the unit and are associated with major pumping centers such as Greenville and Kinston. A notable cone of depression also exists at Farmville, a few miles southeast of the site (Figure 5). Ground-water usage in the Farmville area range between 10 and 20 mgd.

Significant changes have occurred in the decline of the potentiometric surface of the aquifer near Greenville and Farmville. Between 1965 and 1979, the decline near Farmville has been as great as 60 feet and near Greenville 80 feet. The depth to the ground-water level in this principal aquifer in the vicinity of the site is estimated to be at least 70 feet. The quality of water from the Cretaceous Lower Sand is excellent, typically requiring little or no treatment.

5.6 Ground-Water Usage Near Site

The closest known community well to the site is located at the Woodland Hills Motor Court (Plate 1). The well is within 1 mile southeast of the site near Highway 258. Highland Motor Court is located about 2 miles southeast of the site on Highway 258 and

also uses ground water. No treatment is required for these two water supplies, apparently developed in the Cretaceous Lower Sand Unit. Basic chemical analyses of these ground water supplies were obtained from the North Carolina Division of Health Services. No analyses for total barium or chromium are performed in these wells.

The closest well to the site known to be in use is the Starling Well No. 4 (Table 1). This well is approximately 1100 feet east of the disposal area and apparently developed in the Cretaceous Lower Sand Unit. The shallow wells in the immediate vicinity of the disposal area (Wells 1, 2, and 3 in Table 1) are no longer in use.

6.0 SITE HYDROGEOLOGY

This section of the report is primarily based on the two exploratory borings and four monitoring wells drilled by Law Engineering.

6.1 Geology

The records of the two exploratory borings (located in Figure 6) are provided in Appendix 1. Boring B-1 terminated at a depth of 100 feet and boring B-2 terminated at a depth of 59 feet. The borings encountered similar strata as depicted by the hydrogeological profile in Figure 7. Four strata were identified by the two borings, described in descending order below (Figure 7).

6.1.1 Silty/Clayey Fine Sand Stratum

This sand stratum was encountered in all borings (the two exploratory borings and the four monitoring well borings). The sand stratum typically occurs to a depth of about 22 feet below land surface (elevation 71, msl). The stratum is predominantly composed of fine sand but also contains interbedded layers of very silty or clayey sand. The stratum is usually light gray or tan colored with some orange sands in the lower sections of borings MW-3 and MW-4 (Appendix 2). Penetration resistances in the sand stratum are typically between 10 and 30 blows per foot (bpf). The disposal trench was excavated within this stratum but apparently not into underlying strata (Figure 7).

6.1.2 Gray Sand/Silt Stratum

The gray sand/silt stratum was encountered in all borings at a depth of about 22 feet. The stratum has an average thickness of about 14 feet as measured in borings B-1 and B-2. The borings for the shallow wells terminated in the top of this stratum. The stratum is distinguished from the overlying stratum by its darker gray color and greater percentage of silt (20 and 25 percent silt as measured in samples from MW-3 and MW-4, respectively, Appendix 3). The stratum is interbedded with thin layers of fine sand and silt and contains some phosphate pebbles and wood fragments. In borings B-1 and MW-1 the stratum is composed almost entirely of silt. Penetration resistances in the stratum are typically less than 15 bpf.

6.1.3 Silty-Shell Stratum

The silty-shell stratum was encountered in the two exploratory borings between the depths of 34 and 47 feet in boring B-1 and 37 and 44.5 feet in boring B-2. The stratum is predominantly composed of shell fragments in a dark gray silt matrix. The stratum also contains fine to medium sand. Penetration resistances in the stratum are typically between 10 and 20 bpf.

6.1.4 Lower Gray Silt Stratum

The lower gray silt stratum underlies the shell stratum in borings B-1 and B-2. Boring B-2 terminated in the stratum at 59 feet. Boring B-1 encountered 52.8 feet of the gray silt before terminating in a coarse silty sand and gravel at 99.8 feet. The

silt stratum is predominantly composed of silt but also contains a small percentage of fine sand, clay, and shell fragments. The penetration resistance of the lower gray silt stratum is typically between 30 and 60 bpf.

6.2 Shallow Aquifer System

The saturated portion of the silty/clayey fine sand stratum (Section 6.1.1) forms a shallow aquifer under water-table conditions. The gray sand/silt stratum (Section 6.1.2) and underlying strata probably represent the base of the water-table aquifer. These strata have a lower permeability than the water-table aquifer and serve as a confining layer to deeper, more permeable aquifers. These low-permeability deposits probably correlate to the Yorktown confining bed. The sand and gravel encountered near 100 feet in boring B-1 may represent the top of the Cretaceous Lower Sand Unit (Section 5.5).

The four monitoring wells were installed within the water-table aquifer. The wells terminated within the top of the gray sand/silt stratum. The wells essentially screen the entire saturated thickness of the aquifer (Appendix 2).

Ground-water levels were measured in the monitoring wells and other nearby water wells on at least two occasions (Tables 2 and 3). The water elevations measured on May 26, 1983 are considered to be representative of stabilized ground-water conditions at the site. These measurements were used to construct a potentiometric surface map of the water-table aquifer (Figure 8). Water Well No. 2 is also considered to be representative of water levels in

the aquifer and was used in construction of Figure 8. As indicated by the potentiometric surface, ground-water flow is toward the northeast where discharge primarily occurs in the drainage ditch that forms the northern property line of the Starling property.

The presence of the hog ponds complicate the hydraulic flow conditions. Both ponds were apparently excavated into the water-table aquifer. The west hog pond appears to serve as a discharge point for ground water at the time of the May 1983 readings. The east hog pond appears to serve as a ground-water recharge area based on elevations measured in May 1983. Both ponds were apparently ground-water recharge areas in April 1983. This flow system is influenced by washing operations that discharge into one or both ponds, and direct response of the pond levels to rainfall.

The water table declined about 1/2 foot between the April and May readings (Table 3). Surface water level data are provided in Table 5.

6.3 Aquifer Properties

The permeability of the water-table aquifer was determined by slug tests or bailing tests in selected monitoring wells (Table 6). The aquifer has an average permeability of about 3 x 10-4 centimeters per second (cm/sec). This value is representative of very silty or clayey fine sands. The aquifer is anisotropic on a small scale due to the statification observed and relatively thin zones of higher and lower permeability likely exist. Taken as a

composite section, however, the aquifer essentially behaves as a homogeneous-isotropic medium in which flow is predominantly horizontal. As previously discussed, the strata underlying the sand stratum probably serve as a base to the water-table aquifer because of lower permeability.

The hydraulic gradient of the water-table aquifer is quite low (.005 feet per feet) on the basis of the potentiometric surfaces measured over the period of this study. The gradient may steepen slightly near the principal discharge area (northern property ditch). The gradient did not change sigificantly between April and May, 1983.

The velocity of the ground water moving in the water-table aquifer can be estimated on the basis of the following equation:

$$V = \frac{Ki}{ne}$$

where V = velocity of ground water (feet per year)

K = permeability of aquifer (3×10^{-4} cm/sec or 310 feet per year)

i = hydraulic gradient of water table (.005)

ne = effective porosity of the aquifer (assumed to be about 15 percent)

The ground-water velocity is, therefore, estimated to be quite low, less than 10 feet per year.

7.0 GEOCHEMISTRY

This section of the report is primarily based on samples collected and analyzed by Law Engineering. Our evaluation was based on analyses of ground water, surface water, and soil samples.

7.1 Ground-Water Quality

Well MW-2 is representative of background water quality conditions on the basis of ground-water hydraulics and water quality observed. Wells MW-1, MW-3 and MW-4 are in locations that could measure impacts from the disposal operation. Four ground-water samples were collected on April 7, 1983, and analyzed for total barium and chromium as well as other indicator parameters (Table 7). With the exception of water from well MW-1, the results were less than detection limits for barium (0.3 mg/l) and chromium (.005 mg/l).

The April 7 sample from well MW-1 indicated an elevated concentration of total barium (6.4 mg/l) and total chromium (0.010 mg/l). The well was resampled on May 26, 1983, and indicated a lower concentration of total barium (0.5 mg/l) but essentially the same concentration of total chromium (0.012 mg/l). The high initial concentration of barium could be a result of near-surface contamination carried down in the drilling operation. The ground surface in the southeastern corner of the waste disposal area was noted to have dark yellow-brown puddles of standing water. Well MW-1 is situated in a location that could be impacted by the

disposal area (Figure 8) and may be indicative of contaminant migration in the subsurface. We anticipate that the barium could have mobilized from the barium carbonate portion of the waste sludge which is more soluble than barium chromate. The chromium could be derived from the barium chromate or residual chromic acid from the pails observed on site (Section 4.2).

The results of other parameters tested in the wells indicate that total magnesium and dissolved sulfate were lowest in wells MW-1 and MW-2 and highest in wells MW-3 and MW-4 (Table 7). The conductivity of the ground water is lowest in the background well (MW-2) ranging from 75 to 95 umhos/cm over the two sample collections. The conductivity of the ground water was highest in wells MW-3 (560 umhos/cm) and MW-4 (about 1000 umhos/cm). The pH of the ground water is acidic in the range of 5 to less than 7.

The results of the ground-water samples indicate some contamination may have reached well MW-1 as a result of sludge disposal. The higher conductivity values in wells MW-3 and MW-4 compared to background conditions may also be indicative of ground-water quality degradation from the disposal area.

7.2 Surface-Water Quality

The results of the surface-water quality analyses are presented in Table 8. These results indicate that no contamination by barium or chromium was detected in the northern drainage ditch in April, 1983. This ditch forms the principal discharge feature for the water-table aquifer, however, it is not likely for contaminants in the ground water to have migrated to this point (at

this time) based on the estimated velocity of ground water and the low solubility of the waste. The results of previous surface-water samples (Appendix 5) indicate some chromium (0.2 mg/l) and barium (1.2 mg/l) may have been encountered in the drainage ditch at the time of earlier sampling (April 1982). High barium and chromium concentrations exist in the exposed sludge and surface puddle in the disposal area (refer to Section 3.3). It is not unlikely that during intense rainfall events some contamination could reach the northern drainage ditch via over-land flow from the exposed portions of the disposal area. The surface water conditions were observed by Law Engineering during a heavy rainfall event on April 6, 1983. Although direct over-land flow to the ditch was not observed on this occasion, the existing topographic setting could permit this condition for storms of longer duration.

7.3 Soil Chemistry

Soil samples were collected from the soil test borings for analysis of background concentrations and determination of the cation exchange capacity of the soils.

7.3.1 Background Conditions

Borings B-1 and B-2 were drilled in areas thought to be out of the direct impact of the waste disposal area (Figure 3). Soil samples were collected within the soils constituting the water-table aquifer (between depths of 8 to 15 feet). Background concentrations of barium in the soil are noted to range between 4

and 13 ppm and chromium is in the range of 5 to 7 ppm (Table 9). Hexavalent chromium was not detected as a constituent of the total chromium measured in the soils.

7.3.2 Cation Exchange Capacity

Soil samples were collected from strata in the four borings in the immediate vicinity of the disposal area for analysis of cation exchange capacity (Table 10). Although the soils selected were fine-grained materials, the resulting cation exchange capacities were relatively low (4 to 10 meq/100 gm). This is an indication that the shallow soils will provide little capacity to attenuate potential contaminant migration from the standpoint of cation exchange.

8.0 CONCLUSIONS

The sludge disposal trench on the Starling property contains barium carbonate and barium chromate from Union Carbide's plating operation in 1970. The general disposal area is easily recognized although the actual layout of the trench is not known.

The site is underlain by a relatively low permeability aquifer composed of silty clayey fine sand. The apparent base of the aquifer is about 22 feet below land surface at which depth a thick sequence of low permeability silty materials are encountered to a depth of about 100 feet. This thick sequence of silty material probably correlates with the Yorktown confining bed that overlies the lower unit of the Cretaceous aquifer system.

The water table is shallow (2 to 3 feet below land surface) and fluctuates in response to recharge by precipitation and discharge into surface-water features. The water-table aquifer primarily discharges into a northern drainage ditch that coincides with the Starling property line. This ditch drains to Jacob Branch, a tributary to Little Contentnea Creek. Ground-water flow and discharge/recharge relationships are complicated by the operation of the adjacent hog ponds. Because of the low permeability of the aquifer and relatively flat hydraulic gradients, the ground-water velocity in the vicinity of the waste disposal area is probably less than 10 feet per year.

The water-quality analyses from well MW-1 indicate some barium/chromium contamination is present in the ground water. It

is not known if the elevated concentrations are a result of contamination near the land surface carried downward in the drilling process, or from subsurface migration from the disposal trench. Relatively high values of conductivity measured in wells MW-3 and MW-4 may also be an indication of ground-water degradation from the disposal area. The shallow subsurface materials have a relatively low cation exchange capacity for attenuating potential contaminants. The water wells in the immediate vicinity of the waste disposal area (Wells No. 1 and 2) are no longer used by the property owner, however, these wells should be clearly designated for monitoring purposes only. The underlying Cretaceous aquifer is protected by the thick Yorktown confining bed and is very unlikely to be impacted by potential contamination from the water-table aquifer in the site area.

No surface-water contamination by barium or chromium was detected in the northern drainage ditch at the time of this study. Some potential exists for over-land flow of contaminated water to enter the northern drainage ditch under intense rainfall periods. It is also likely that some contaminated ground water will ultimately discharge into the northern drainage ditch.

Law Engineering concludes that the waste disposal on the Starling property does not represent an environmental hazard at this time for surface or ground-water resources outside the immediate disposal area.

9.0 RECOMMENDATIONS

Law Engineering makes the following recommendations on the basis of our studies to date:

9.1 Water-Quality Monitoring

A second suite of surface and ground-water samples should be collected and analyzed for total barium and chromium. Field measurements of pH, conductivity, and oxidation reduction potential should be obtained at the time of sample collection. The results of these analyses should be used to determine the frequency (or need) of further sampling.

9.2 Water-Level Monitoring (Existing Stations)

Ground and surface-water elevations should be obtained in the vicinity of the waste disposal area at the time of sample collection. These data should be compared to the past potentiometric surfaces to determine if significant changes in flow or gradients have occurred.

9.3 Water-Level Monitoring (New Stations)

To obtain a better understanding of ground-water flow in the immediate vicinity of the waste disposal area, we recommend the installation several shallow (less than 5-foot deep) standpipes. The standpipes would only be used for water-level measurements and could probably be installed by hand techniques. The standpipes would particularly be important along the northern and

eastern side of the waste fill area where the hydraulic relationships to the existing hog pond are not well understood.

9.4 Surface Grading

The surface of the waste disposal area should be graded to prevent direct runoff of contaminants into the northern drainage ditch. The grading should also minimize exposure of animals to contaminated standing water.

The grading should be considered as a temporary control measure and not necessarily a permanent closure alternative. The surface grading is not intended to represent a low-permeability cover over the disposal area. Because the waste is largely buried within the water table, there is no obvious technical reason for using a cover material in the traditional sense of preventing infiltration of precipitation into the waste. It should be recognized that soils brought into the waste fill area may become contaminated and require incorporation in closure design. The trench area is probably not stable for heavy construction equipment and consideration will have to be given for the use of a low pressure front-end loader. The grading operation should be supervised by a soils engineer or geologist familiar with the site conditions and safety considerations.

9.5 Trench Definition by Geophysics

We recommend that the disposal area be geophysically surveyed to delineate the approximate limits (widths and depth) of the trench. We recommend the use of electrical techniques

(electromagnetic and/or resistivity) and a magnetometer to traverse the disposal area. The magnetometer should detect buried metallic objects in the trench. The electrical techniques should be able to detect contrasts in soil characteristics or pore fluids resulting from the excavation/backfill operation. The combination of magnetics and electrical techniques also has the potential for providing some relative indication of contaminant migration beyond the trench limits. The geophysical survey should be performed after the grading operation for access and safety considerations. In addition it would be desirable to remove the majority of surficial scrap metal to prevent interference with the survey.

10.0 BIBLIGRAPHY

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TABLES

Table 1. Water Well Information Near Site [1]

Well Number [2]	Well Details (Reported)	Well Details (Measured) [3]	Usage or Comments
1	2" galvanized 200 to 210' deep	2" galvanized 39.2' deep [4]	Not in use since 1975. Formerly use for hog operation.
2	24" terra-cotta 15 feet deep	24" terra-cotta 13' deep	Not in use. Installed 1960.
3	24" concrete 16-18 feet deep	24" concrete 27.5' deep	Not in use since 1960. Formerly used for hog operation.
4	4" irrigation well with concrete slab 180 feet deep.	4" steel with submersible pump (not accessible)	Used for irrigation (nursery) and drinking water supply.
5 *	2" galvanized 65 feet deep	2" galvanized 40.9' deep	Used for drinking water supply.
6 **	2" galvanized 200 deet deep	(not accessible)	Used to water yard and garden.
7	1-1/4" well 15 feet deep	(not accessible)	Not in use.

Notes:
1) Information from Starling, 1982
2) Refer to Plate 1 for locations of wells
3) By Law Engineering
4) Below ground surface
* Formerly referred to as John Starling house well
** Formerly referred to as David Starling house well

Table 2. Summary of Ground-Water Level Data (Water Wells)

Well Designation[1]	Reference Elevation[2] (feet, msl)	Date Measured	Depth Below Reference (feet)	Water Surface Elevation (feet, msl)
No. 1	93.03	12-23-82	38.1	54.93
		4-6-83	37.6	55.43
No. 2	93.68	12-23-82	3.35	90.33
		4-6-83	3.15	90.53
		5-26-83	3.4	90.28
No. 3	95.67	12-23-82	4.15	91.52
		4-6-83	4.15	91.52
No. 5	91.83	12-23-82	18.67	73.16

Notes:

1) Refer to Figure 3 for location of wells.
2) Top of casing; marked in field and surveyed.

Table 3. Summary of Ground-Water Level Data (Monitoring Wells)

Well Designation[1)]	Reference Elevation[2)] (feet, msl)	Date Measured	Depth Below Reference (feet)	Water Surface Elevation (feet, msl)
MW-1	92.98	4-6-83	2.66	90.32
		5-26-83	3.44	89.55
MW-2	93.32	4-6-83	2.44	90.88
		5-26-83	2.93	90.39
MW-3	93.91	4-6-83	3.53	90.38
		5-26-83	4.26	89.65
MW-4	93.76	4-6-83	3.45	90.31
		5-26-83	4.14	89.62

Notes:

1) Refer to Figure 3 for location of wells.
2) Top of casing; marked in field and surveyed.

TABLE 4

HYDROGEOLOGIC UNITS CENTRAL COASTAL PLAIN

SYSTEM	SERIES	STRATIGRAPHIC UNIT	HYDROGEOLOGIC UNIT		HYDROGEOLOGIC PROPERTIES	DESCRIPTION AND EXTENT
QUATERNARY	RECENT / PLEISTOCENE	SURFICIAL	WATER TABLE		The deposits serve as an unconfined aquifer. The water table is shallow, ranging from land surface to within 20 feet of land surface even during dry periods. Water from this unit is soft and low in total dissolved solids. It is commonly corrosive and contains objectionable amounts of iron.	Surficial deposits consisting chiefly of sand, clay and gravel. Shell material is also present in the eastern part of the region. The relatively thin deposits overlie the entire area and range in thickness from a few feet to approximately 35 feet.
TERTIARY	MIOCENE	YORKTOWN	YORKTOWN		In the west, the Yorktown serves as a confining bed for those units below the water table aquifer. Small amounts of water are available from lenticular sand beds within the unit. In the east, the unit acts as a permeable semi-confined aquifer capable of yielding moderate amounts of good quality water.	In the western part of the study area, the Yorktown unit consists of a dark blue, massive clay matrix containing abundant shells. In the eastern part, the unit consists of loose shells and limestone in a sand matrix. Some amounts of yellow to gray clay are also present. The unit occurs as scattered remnants in the west, and as a continuous unit east of Greenville, New Bern, Pollocksville and Jacksonville. The thickness of the unit ranges from 0 to 15 feet in the west to about 60 feet in the eastern part
	OLIGOCENE	UNNAMED	CASTLE HAYNE AQUIFER SYSTEM	CASTLE HAYNE	The Castle Hayne Unit is a highly permeable semi-confined aquifer capable of yielding large amounts of water. It is an important aquifer in the eastern part of the area, but remains relatively undeveloped in the western part where better quality water is available at slightly greater depth. The unit yields a hard, calcium bicarbonate - type water.	The Castle Hayne Unit varies in lithology and consolidation from shell limestone to sand with shell fragments. It occurs as a continuous unit throughout Craven, Jones and Onslow counties, and also in southeastern Duplin and eastern Pitt Counties. The unit thickens to the south and east from its western limit to more than 400 feet in the eastern part of the shady area.
	EOCENE	CASTLE HAYNE				
	PALEOCENE	BEAUFORT				
CRETACEOUS	UPPER CRETACEOUS	PEEDEE	CRETACEOUS AQUIFER SYSTEM	CRETACEOUS UPPER SAND	This unit is a semi-confined aquifer whose water-bearing sands yield moderate amounts of water to municipal, industrial or agricultural wells. The water is a soft, sodium bicarbonate-type except in those areas where indurated calcareous beds cause it to be moderately hard. Heavy withdrawals from the Cretaceous Lower Sand Unit are reflected in leakage from the Upper Sand Unit.	The Cretaceous Upper Sand Unit consists of dark green or gray glauconitic or clayey sands interbedded with massive dark gray clay beds. Indurated shell beds are present throughout. The unit outcrops or is near the surface in Duplin, Greene, Lenoir and Pitt counties. It thickens to the east from its origin to between 60 and 80 feet. The unit is overlain unconformably by the Surficial, Yorktown or Castle Hayne Units and separated from them by a massive clay layer 20 to 30 feet thick.
		BLACK CREEK		CRETACEOUS LOWER SAND	The Cretaceous Lower Sand Unit is the principal aquifer in the area. It is a semi-confined aquifer capable of supplying large amounts of excellent quality water. The water is a soft sodium bicarbonate-type except in those areas where indurated calcareous beds cause it to be moderately hard. Heavy withdrawals have resulted in declining water levels and expanding cones of depression.	The Cretaceous Lower Sand Unit consists of glauconitic sand and dark gray massive clays. Lenticular gravel deposits are also present. The unit outcrops in the extreme western parts of Lenoir, Greene and Pitt Counties. It dips and thickens to the east ranging from 140 feet in the west to more than 700 feet in the east. It is separated from the Cretaceous Upper Sand Unit by a massive clay confining bed.
		TUSCALOOSA				

Modified after Narkunas, 1980

Table 5. Summary of Surface-Water Level Data

Station Location[1]	Reference Elevation[2] (feet, msl)	Date Measured	Depth Below Reference (feet)	Water Surface Elevation (feet, msl)
A	88.19	4-5-83	0.89	87.3
B	89.29	4-5-83	1.25	88.04
		5-26-83	1.55	87.74
C	90.18	4-5-83	0.95	89.23
		5-26-83	1.26	88.92
D	90.34	4-5-83	0.86	89.48
E	90.58	4-5-83	0.80	89.78
F	93.02	4-5-83	1.20	91.82
G	92.96	4-5-83	1.55	91.41
H	92.73	4-5-83	0.95	91.78
I	92.13	4-5-83	1.43	90.70
J	91.63	4-5-83	1.62	90.01
K	90.38	4-5-83	1.35	89.03
L	87.04	4-5-83	1.18	85.86
M	87.65	4-5-83	1.27	86.38
N	89.04	4-5-83	1.33	87.71
O	92.83	4-5-83	1.13	91.70
		5-26-83	1.36	91.47
P	91.70	4-5-83	1.29	90.41
		5-26-83	2.42	89.28

Notes:

1) Refer to Plate 1 for station locations.
2) Top of stake; marked in field and surveyed.

Table 6. Results of Permeability Tests

Monitoring Well	Type of Test	Estimated Permeability (cm/sec)
MW-1	Slug Out	4.6×10^{-4}
MW-3	Bailing	2.2×10^{-4}
MW-4	Slug Out	1.4×10^{-4}

Table 7. Results of Chemical Analyses - Ground Water

Well Number[1)]	Sample Date (1983)	Total Barium (mg/l)	Total Chromium (mg/l)	Total Magnesium (mg/l)	Dissolved Sulfate (mg/l)	pH (S.U.)	Conductivity (umhos/cm)
MW-1	4-7	6.4	0.010	2.4	6.	4.8	145
	5-26	0.5	0.012	-	-	4.9	290
MW-2	4-7	< 0.3	< 0.005	2.8	< 5.	4.7	75
	5-26	-	-	-	-	5.2	95
MW-3	4-7	< 0.3	< 0.005	16.	84.	6.9	560
	5-26	-	-	-	-	6.7	560
MW-4	4-7	< 0.3	< 0.005	34.	92.	5.6	1000
	5-26	-	-	-	-	6.4	1100

Notes:

1) Refer to Figure 3 for location of wells.
< indicates less than detection limit.
- indicates no analysis performed.
pH and conductivity measured in field.
Samples for metal analyses were filtered in field.

Table 8. Results of Chemical Analyses - Surface Water

Sample Location[1)]	Total Barium (mg/l)	Total Chromium (mg/l)	Total Magnesium (mg/l)	Dissolved Sulfate (mg/l)	pH (S.U.)	Conductivity (umhos/cm)
SW-A	< 0.3	< 0.005	-	-	-	-
SW-B	< 0.3	< 0.005	-	-	-	-
SW-B/C	< 0.3	< 0.005	2.0	10.	3.4	50
SW-C	< 0.3	< 0.005	-	-	-	-
SW-D	< 0.3	< 0.005	-	-	3.2	-

Notes:

1) Refer to Plate 1 for location of surface-water stations.
< indicates less than detection limit.
- indicates no analysis performed.
Samples collected and preserved on April 7, 1983.
Station SW-B/C is half way between Stations B and C.

Table 9. Results of Chemical Analyses - Soil

Boring Number	Soil Sample Depth Below Land Surface (Feet)	Total Barium (ppm)	Total Chromium (ppm)	Hexavalent Chromium (ppm)
B-1	13.5 - 15.0	4.4	6.7	< 0.3
B-2	8.5 - 10.0	13.	5.0	< 0.3

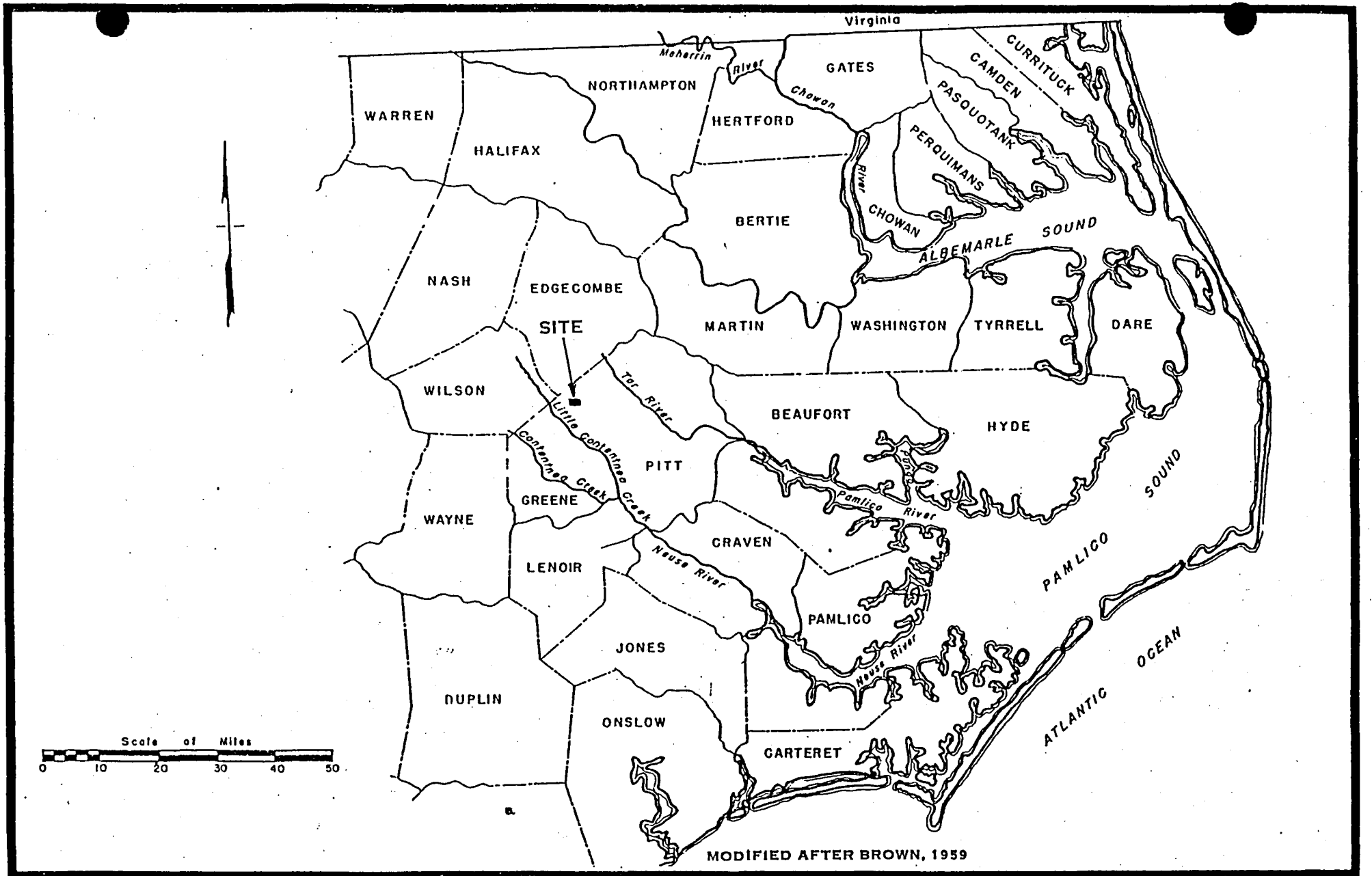
Table 10. Results of Cation Exchange Capacity Tests

Boring Number[1)]	Soil Sample Depth Below Land Surface (Feet)	Cation Exchange Capacity (meq/100 gm)	Soil Description
MW-1	10	10.	Gray slightly silty very clayey medium to fine sand
MW-2	15	4.1	Light gray slightly silty and clayey medium to fine sand
MW-3	25	6.3	Dark gray very silty fine sand
MW-4	25	7.4	Gray very silty medium to fine sand

Notes:

1) Refer to Figure 3 for location of borings.

FIGURES



MODIFIED AFTER BROWN, 1959

UNION CARBIDE CORPORATION

DAVID STARLING DISPOSAL SITE

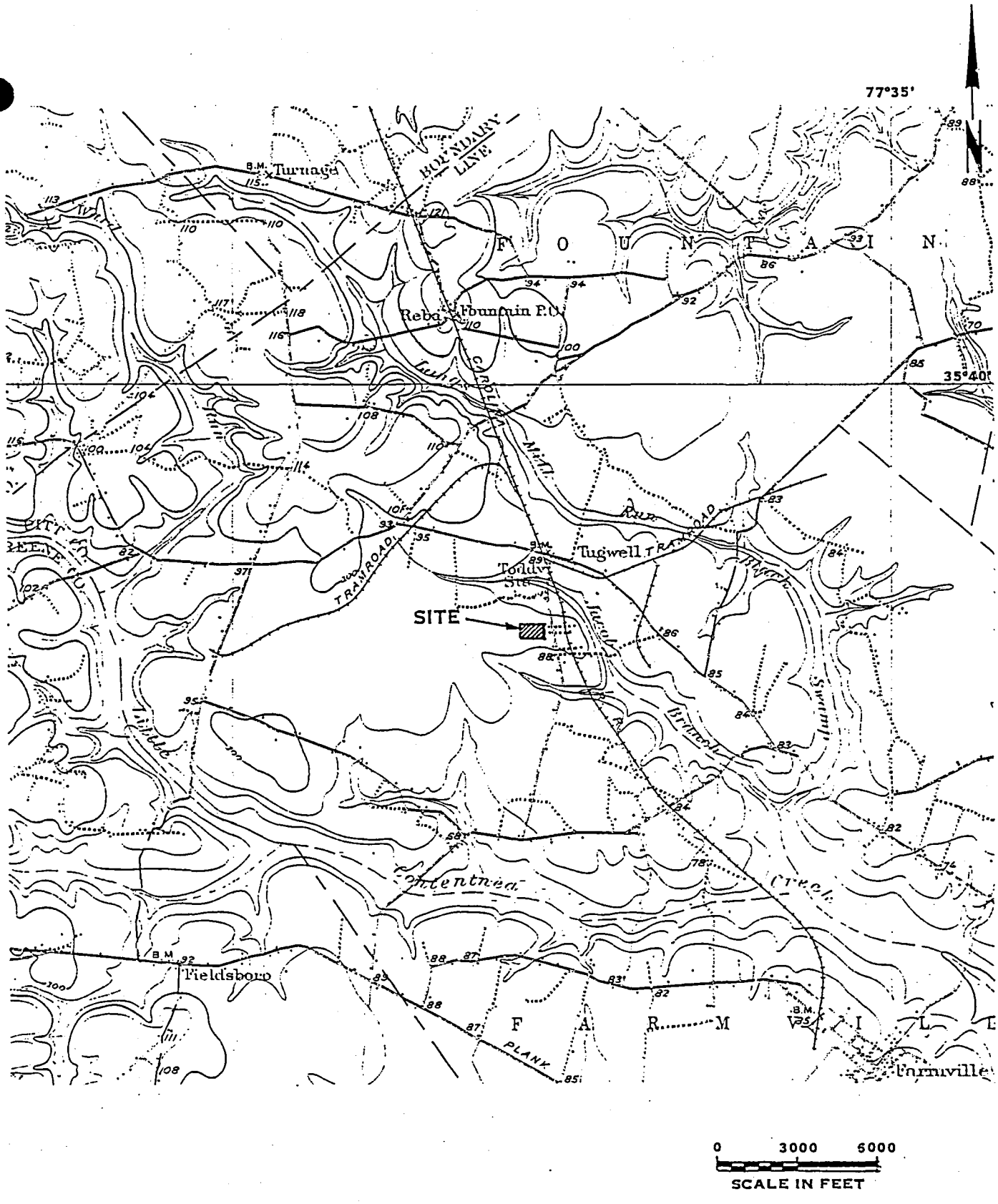
LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

GENERAL LOCATION MAP

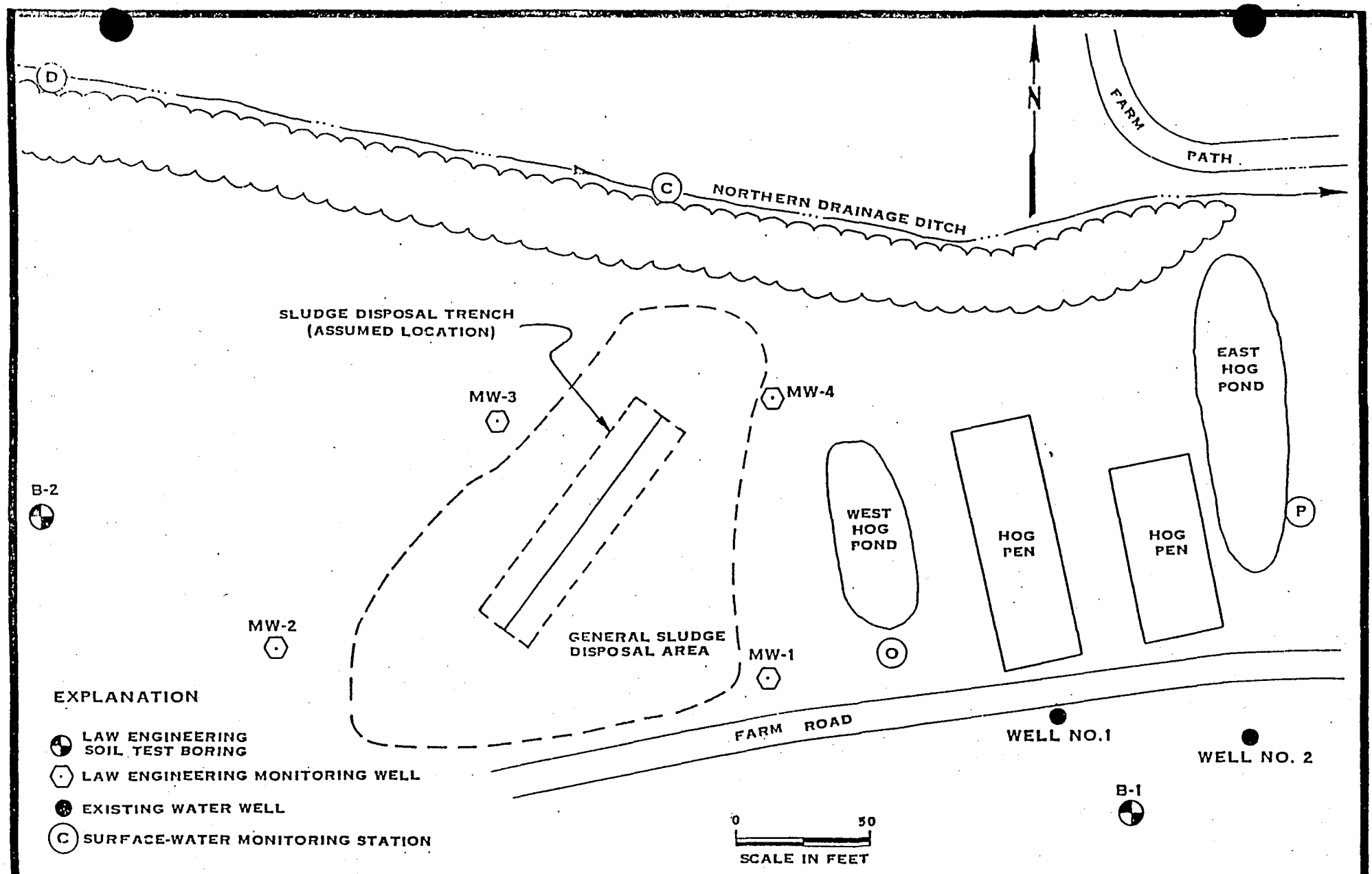
JOB NO. MH2303

FIGURE 1



MODIFIED AFTER FALKLAND, N.C. 1904 15 MINUTE QUADRANGLE

UNION CARBIDE CORPORATION DAVID STARLING DISPOSAL SITE	LAW ENGINEERING TESTING COMPANY MARIETTA, GEORGIA	TOPOGRAPHY OF SITE AREA JOB NO. MH2303 FIGURE 2



UNION CARBIDE CORPORATION

DAVID STARLING DISPOSAL SITE

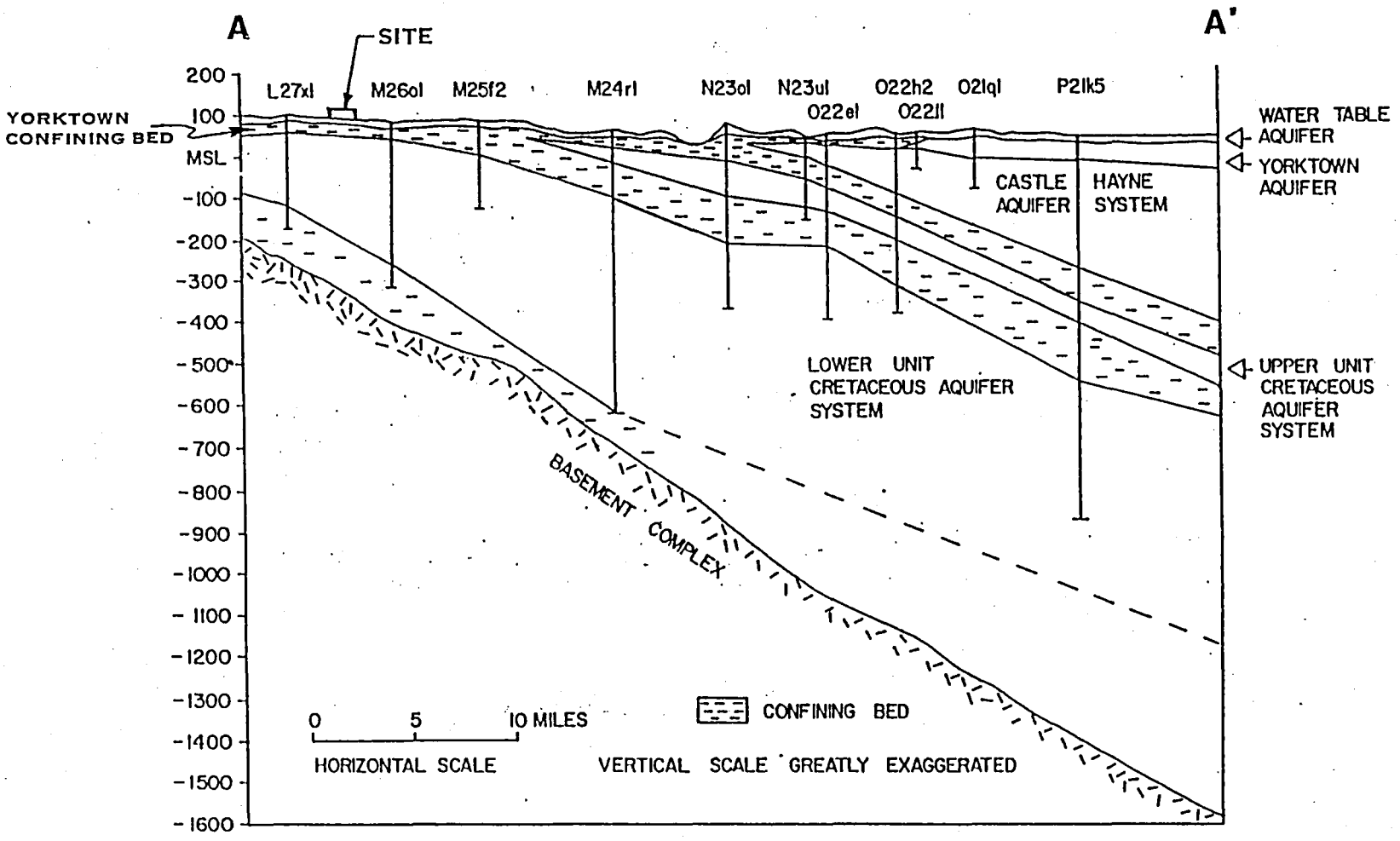
LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

GENERAL SLUDGE DISPOSAL AREA AND LAYOUT OF BORINGS

JOB NO. MH2303

FIGURE 3



NOTE
REFER TO FIGURE 5 FOR LOCATION OF CROSS SECTION

MODIFIED AFTER NARKUNAS, 1980

UNION CARBIDE CORPORATION

DAVID STARLING DISPOSAL SITE

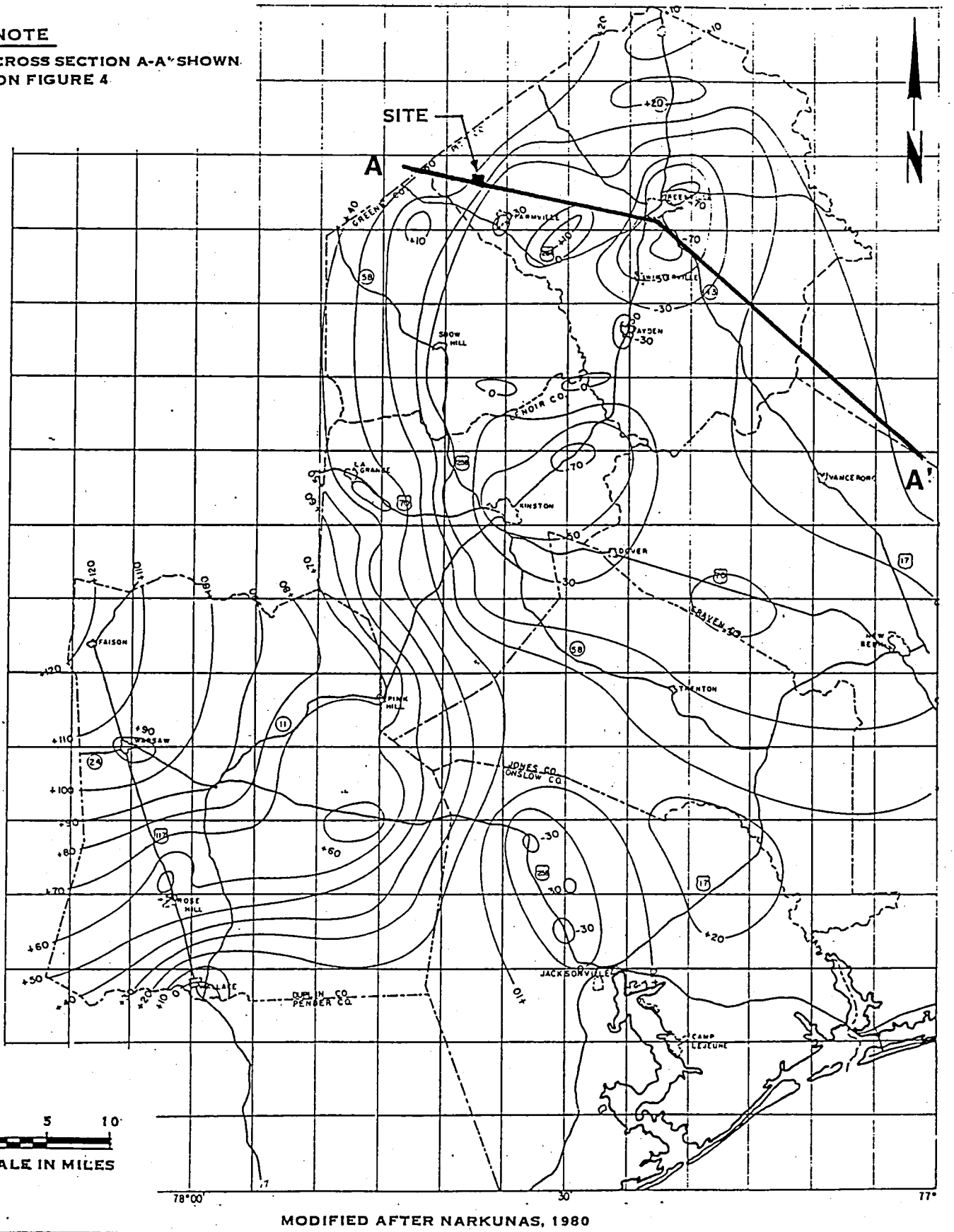
LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

GENERALIZED HYDROGEOLOGIC CROSS SECTION

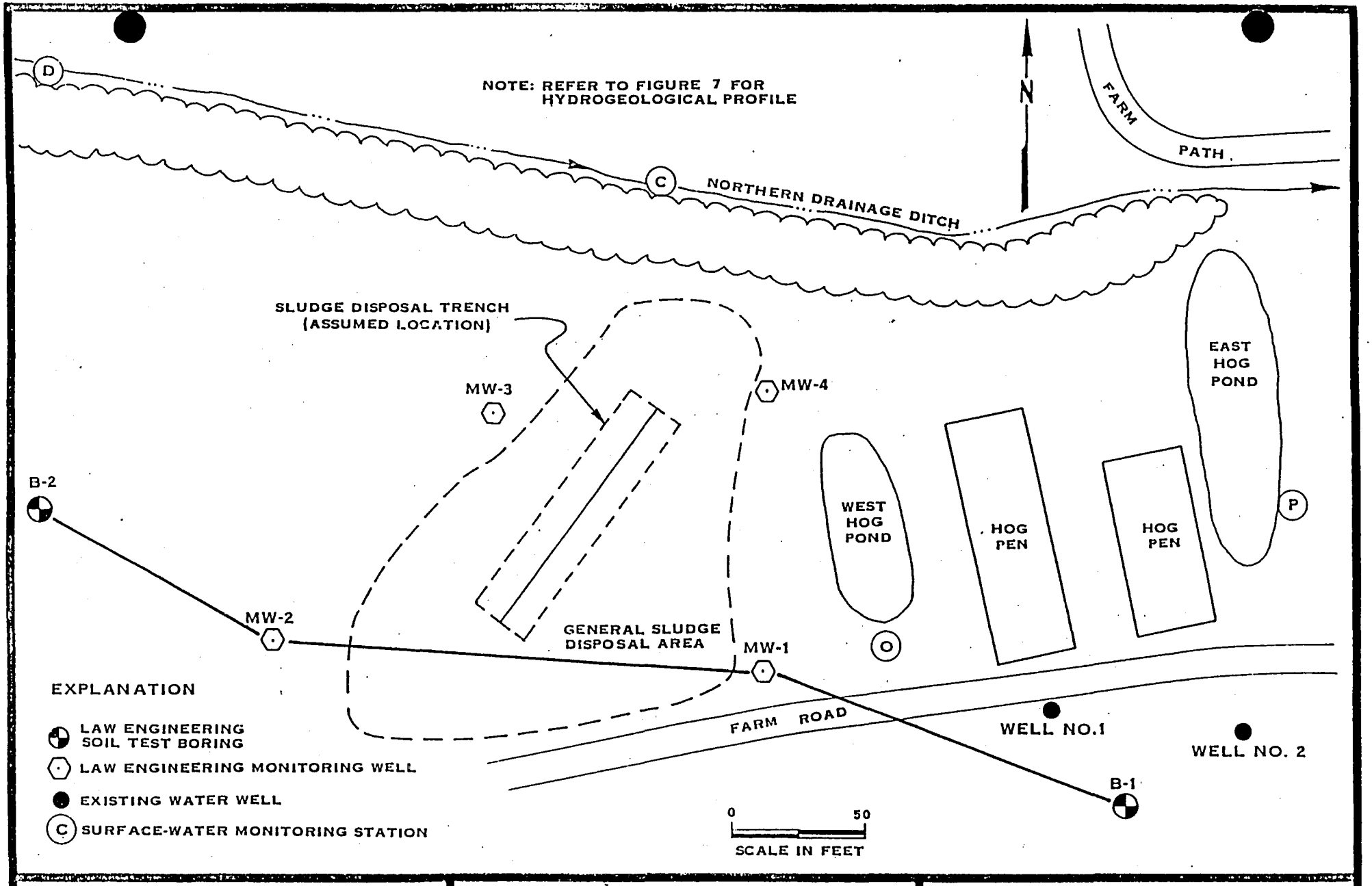
JOB NO. MH2303

FIGURE 4



MODIFIED AFTER NARKUNAS, 1980

UNION CARBIDE CORPORATION DAVID STARLING DISPOSAL SITE	LAW ENGINEERING TESTING COMPANY MARIETTA, GEORGIA	POTENTIOMETRIC SURFACE CRETACEOUS LOWER SAND UNIT - 1979 JOB NO. MH2303 FIGURE 5



UNION CARBIDE CORPORATION

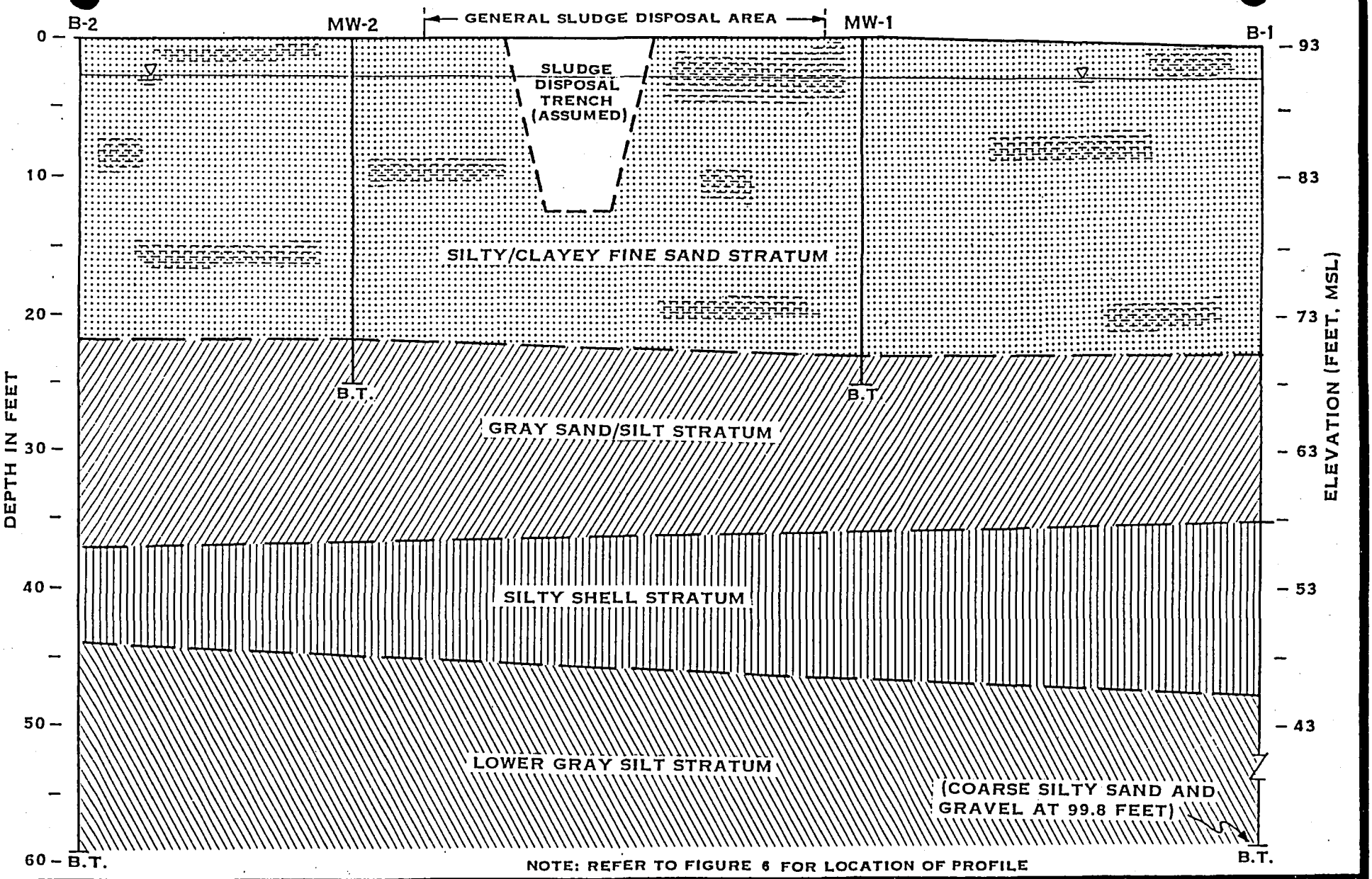
DAVID STARLING DISPOSAL SITE

LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

LOCATION OF HYDROGEOLOGICAL PROFILE

JOB NO. MH2303 FIGURE 6



NOTE: REFER TO FIGURE 6 FOR LOCATION OF PROFILE

UNION CARBIDE CORPORATION

DAVID STARLING DISPOSAL SITE

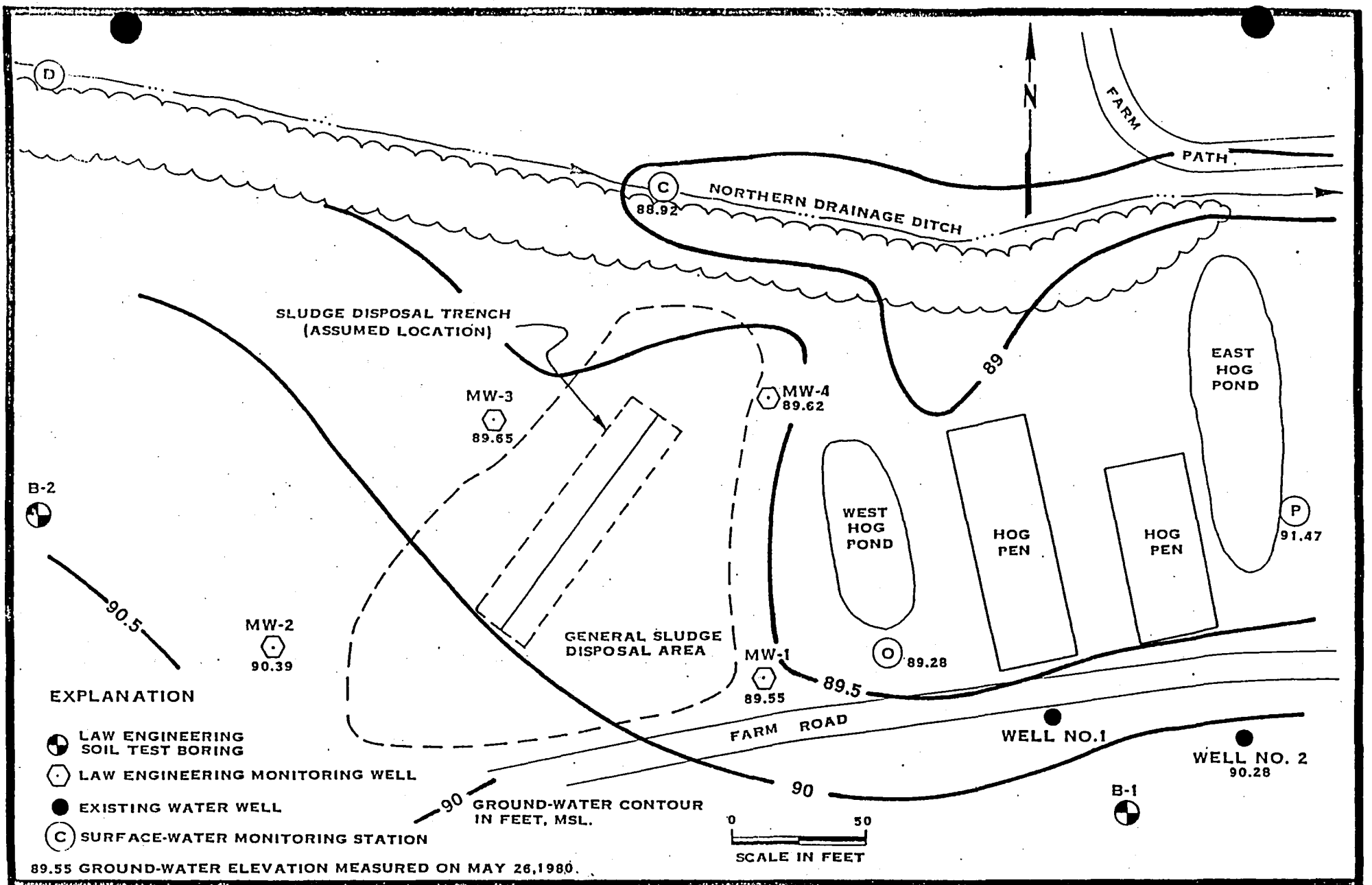
LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

HYDROGEOLOGICAL PROFILE OF DISPOSAL AREA

JOB NO. MH2303

FIGURE 7



UNION CARBIDE CORPORATION

DAVID STARLING DISPOSAL SITE

LAW ENGINEERING TESTING COMPANY

MARIETTA, GEORGIA

POTENTIOMETRIC SURFACE OF WATER - TABLE AQUIFER (MAY 26,1983)

JOB NO. MH2303

FIGURE 8

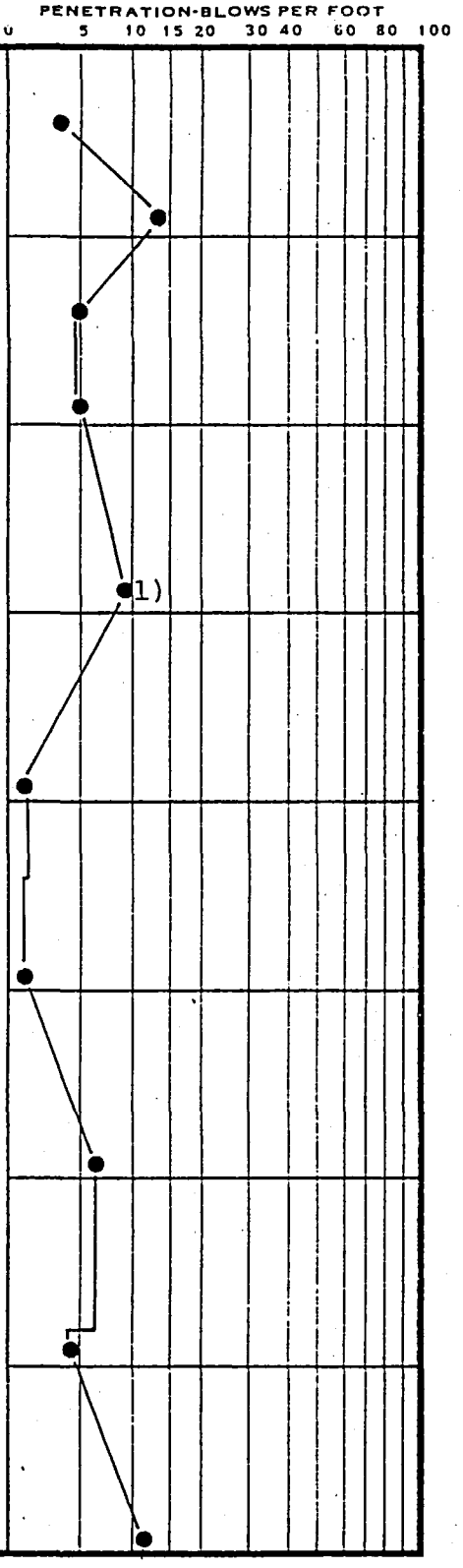
APPENDIX 1

SOIL TEST BORING RECORDS

(EXPLORATORY DRILLING)

TEST BORING RECORD

ELEV.	DEPTH FEET	DESCRIPTION
91.8		Topsoil
	1.5	Brown Silty Fine SAND
	3.5	
86.8		Gray Silty Fine SAND with Some Medium to Coarse Sand.
	6.0	
81.8		Gray Mottled Very Silty Fine SAND with Some Clay and Wood Fragments.
	12.0	
76.8		Gray-Green Fine SAND Interbedded with Silty Clay.
	17.0	
71.8		Gray to Light Brown Fine SAND with Some Clayey Silt.
	22.0	
66.8		Gray SILT Interbeded with Medium to Fine Sand. Contains Some Wood Fragments.
61.8		
56.8	34.0	
		Shell Fragments in Dark Gray Silt Matrix with Some Fine to Coarse Sand.
51.8		



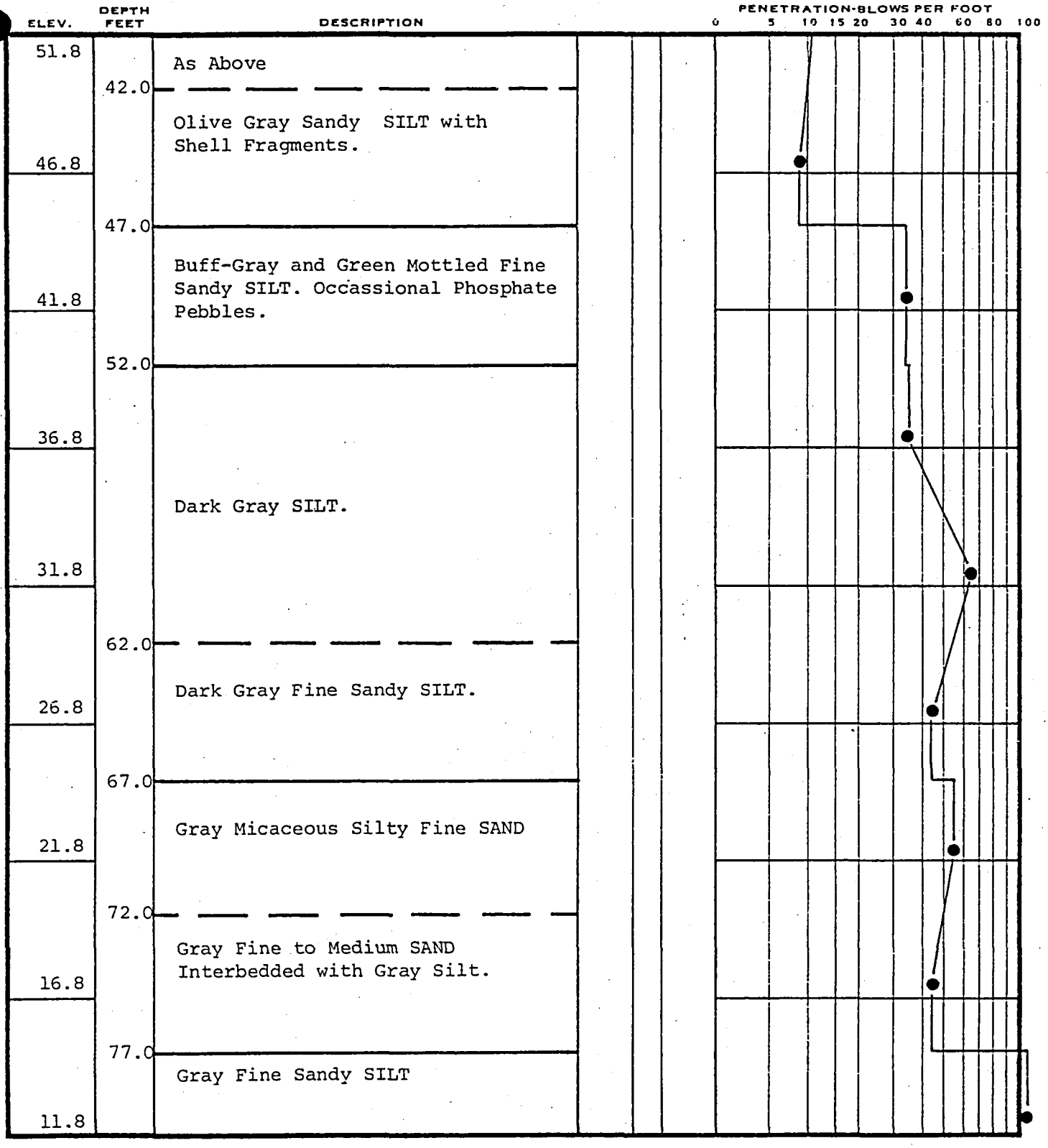
REMARKS:

Mud-Wash Boring Using 4.5 Inch Diameter Bit. No Water Level Measured. No Monitoring Well Installed. Grouted boring.
1) Laboratory Analysis of Barium and Chromium

DRILLED BY Pendley
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER B-1
DATE STARTED 12-22-82
DATE COMPLETED 12-23-82
JOB NUMBER MH2303

TEST BORING RECORD

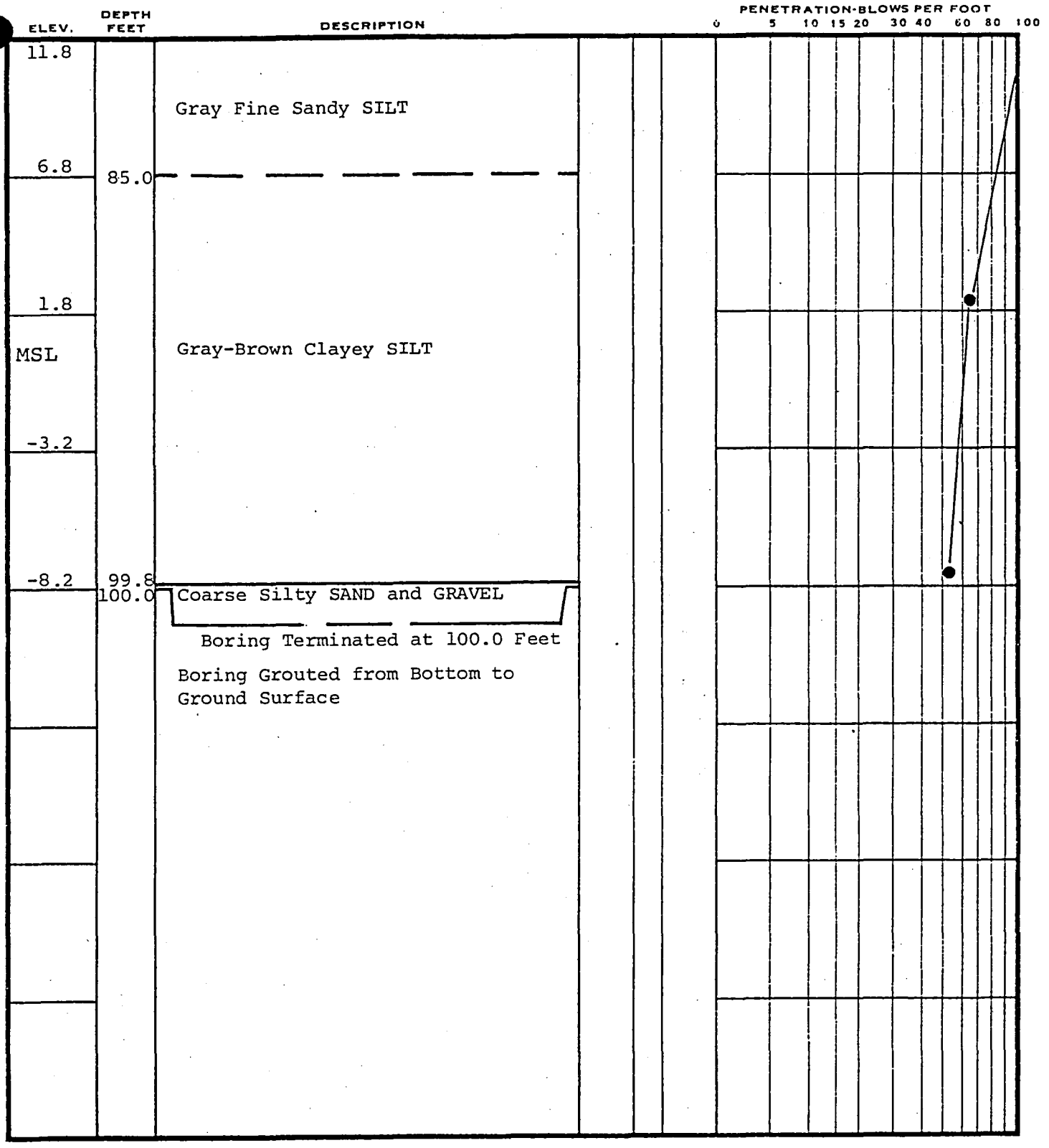


REMARKS:

DRILLED BY Pendley
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER B-1
DATE STARTED 12-22-82
DATE COMPLETED 12-23-82
JOB NUMBER MH2303

TEST BORING RECORD



REMARKS:

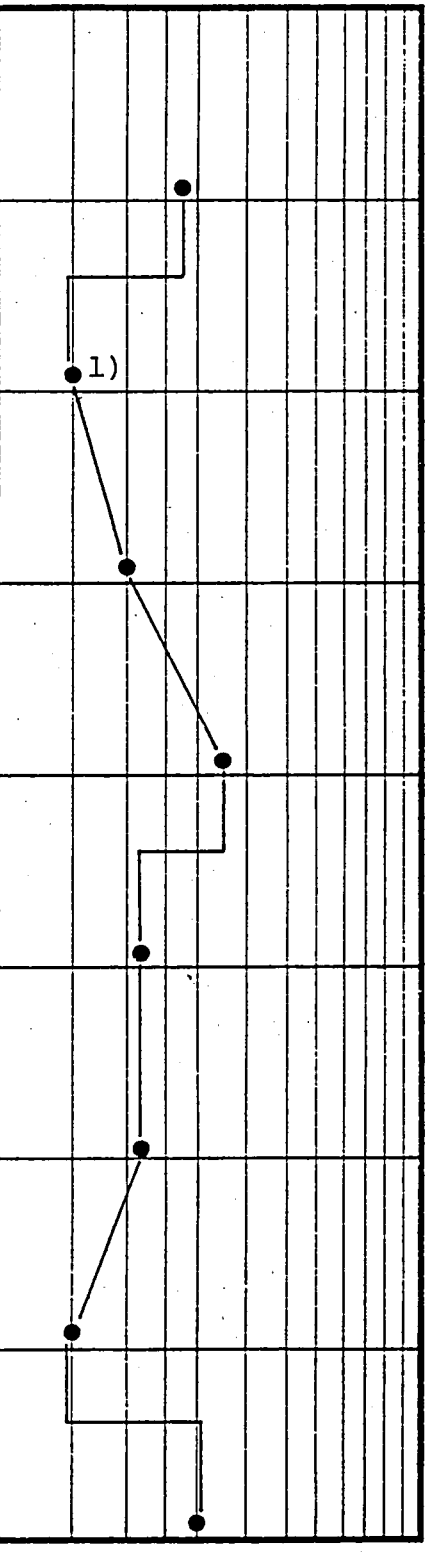
DRILLED BY Pendley
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER B-1
DATE STARTED 12-22-82
DATE COMPLETED 12-23-82
JOB NUMBER MH2303

TEST BORING RECORD

ELEV.	DEPTH FEET	DESCRIPTION
93.0		Topsoil
	1.5	
		Light Gray Silty Fine SAND
88.0		
	7.0	
		Light Gray and Brown Fine Sandy SILT
83.0		
	12.0	
		Gray-Green Clayey Silt Interbedded with Fine to Medium SAND.
78.0		
	17.0	
		Gray-Green Fine to Medium SAND Interbedded with Clayey SILT
73.0		
	22.0	
		Dark Gray Silty Fine Sand Interbedded with SILT
68.0		
63.0		
	32.0	
		Dark Gray Silty Coarse to Fine SAND Interbedded with SILT. Occassional Phosphate Pebbles.
58.0		
	37.0	
		SHELL Fragments in Dark Gray Silty Fine to Medium SAND.
53.0		

PENETRATION-BLOWS PER FOOT
0 5 10 15 20 30 40 60 80 100



REMARKS:
Mud-Wash Boring Using 4.5 Inch Diameter Bit. No Water Level Measured. No Monitoring Well Installed. Grouted Boring.
1) Laboratory Analysis of Barium and Chromium.

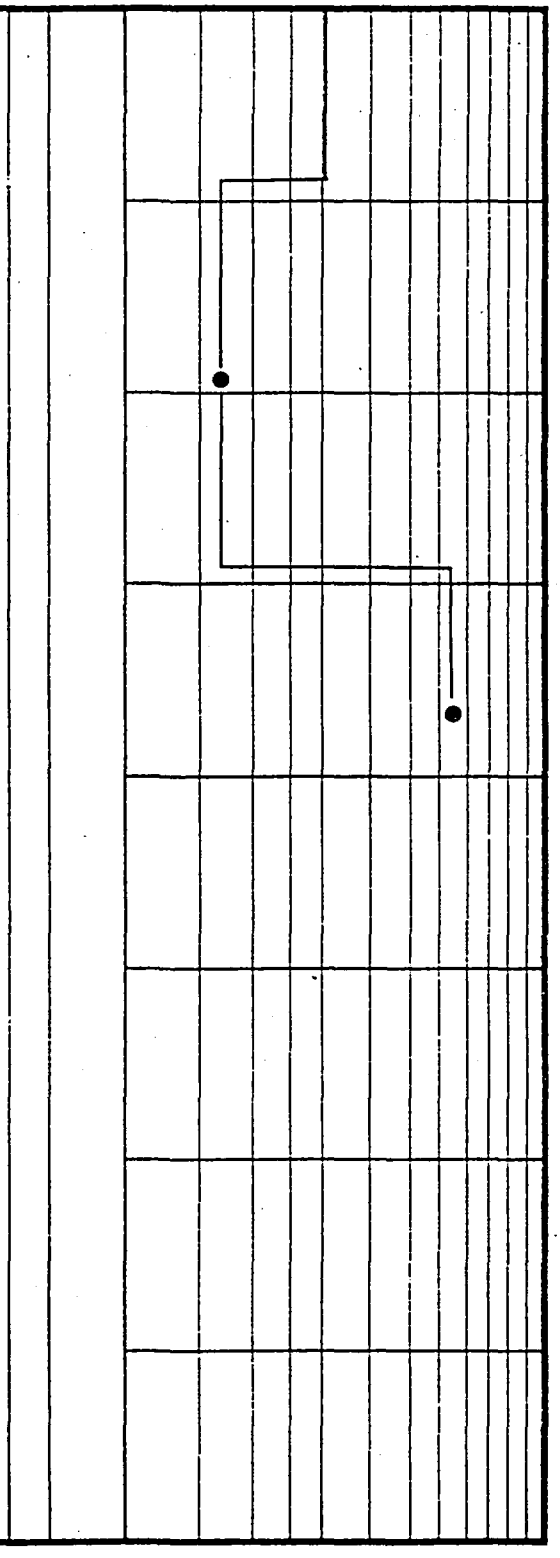
DRILLED BY Pendley
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER B-2
DATE STARTED 12-23-82
DATE COMPLETED 12-23-82
JOB NUMBER MH2303

TEST BORING RECORD

ELEV. FT.	DEPTH FEET	DESCRIPTION
53.0		SHELL Fragments in Dark Gray Silty Fine to Medium SAND
48.0	44.5	
43.0		Gray-Green SILT with Some Fine to Coarse Sand and Shell Fragments
38.0	54.5	
		Dark Gray SILT
33.0	59.0	Boring Terminated at 59.0 FEET Boring Grouted from Bottom to Ground Surface

PENETRATION-BLOWS PER FOOT
0 5 10 15 20 30 40 60 80 100



REMARKS:

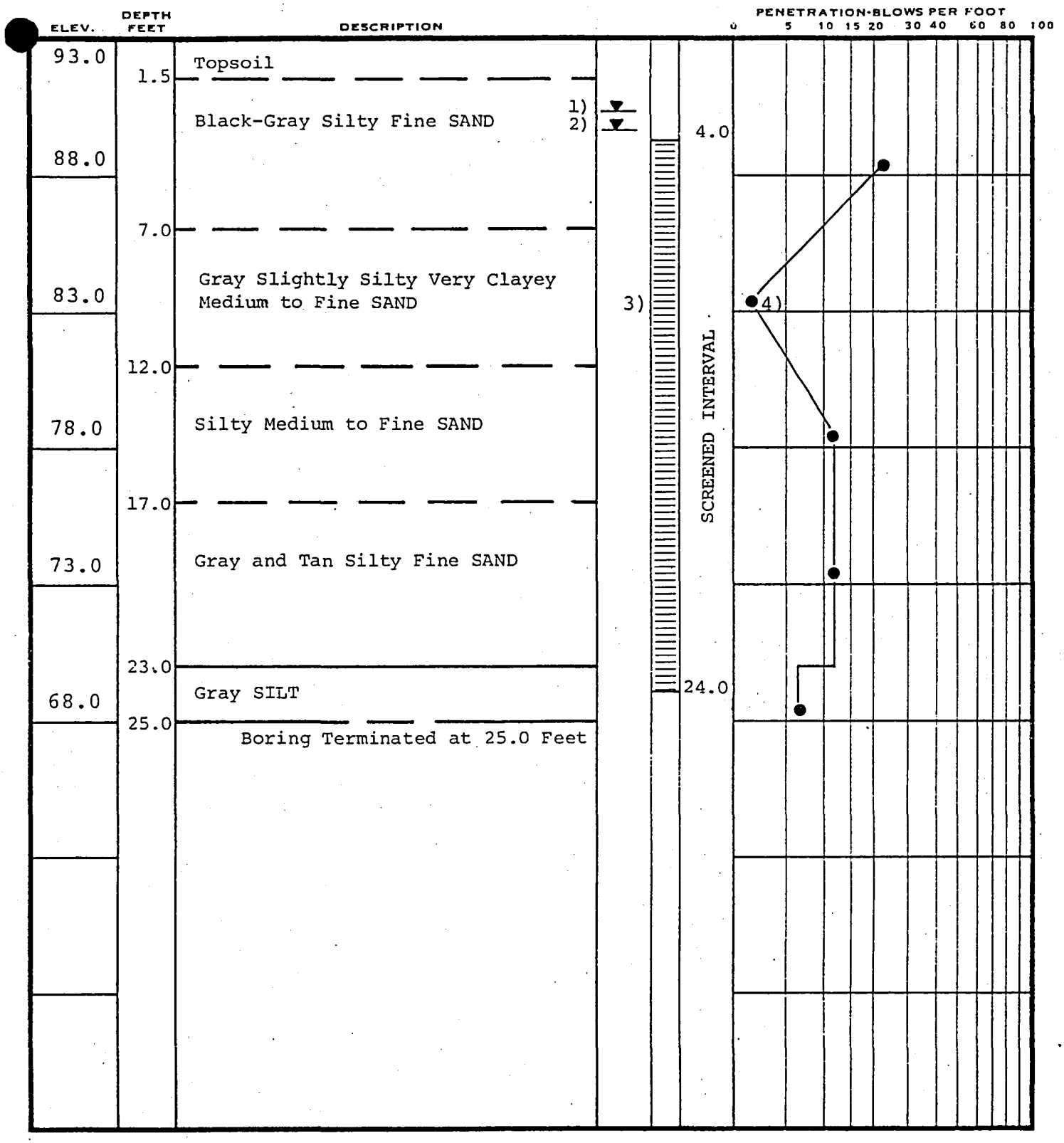
DRILLED BY Pendley
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER B-2
DATE STARTED 12-23-82
DATE COMPLETED 12-23-82
JOB NUMBER MH2303

APPENDIX 2

SOIL TEST BORINGS AND MONITORING WELL DETAILS

TEST BORING RECORD



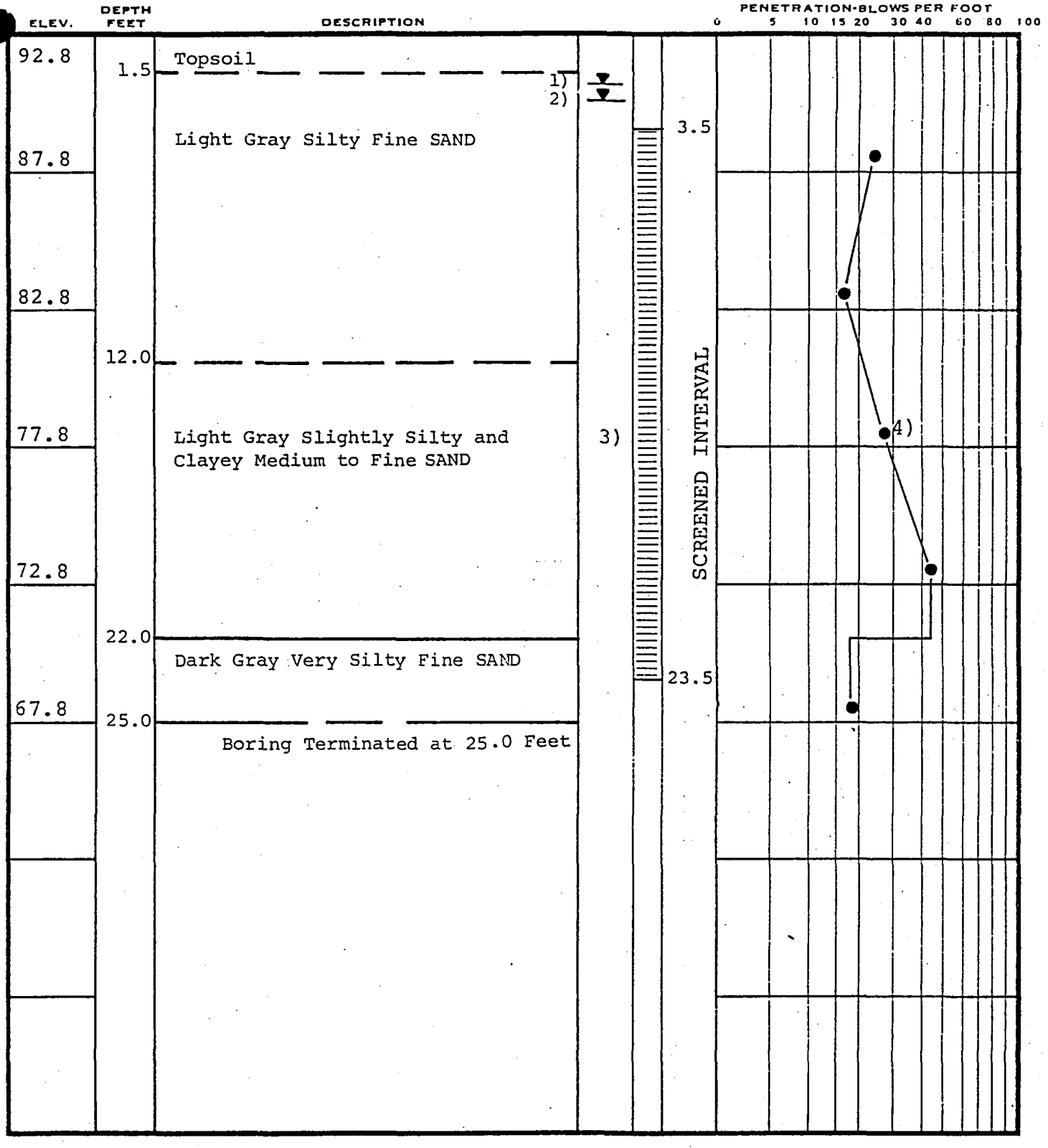
REMARKS:

1) Ground-Water Elevation 90.32 on 4-6-83
2) Ground-Water Elevation 89.55 on 5-26-83
3) Cation Exchange Capacity 10 meq/100gm
4) Grain Size Analysis

DRILLED BY Corbin
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER MW-1
DATE STARTED 4-4-83
DATE COMPLETED 4-5-83
JOB NUMBER MH2303

TEST BORING RECORD



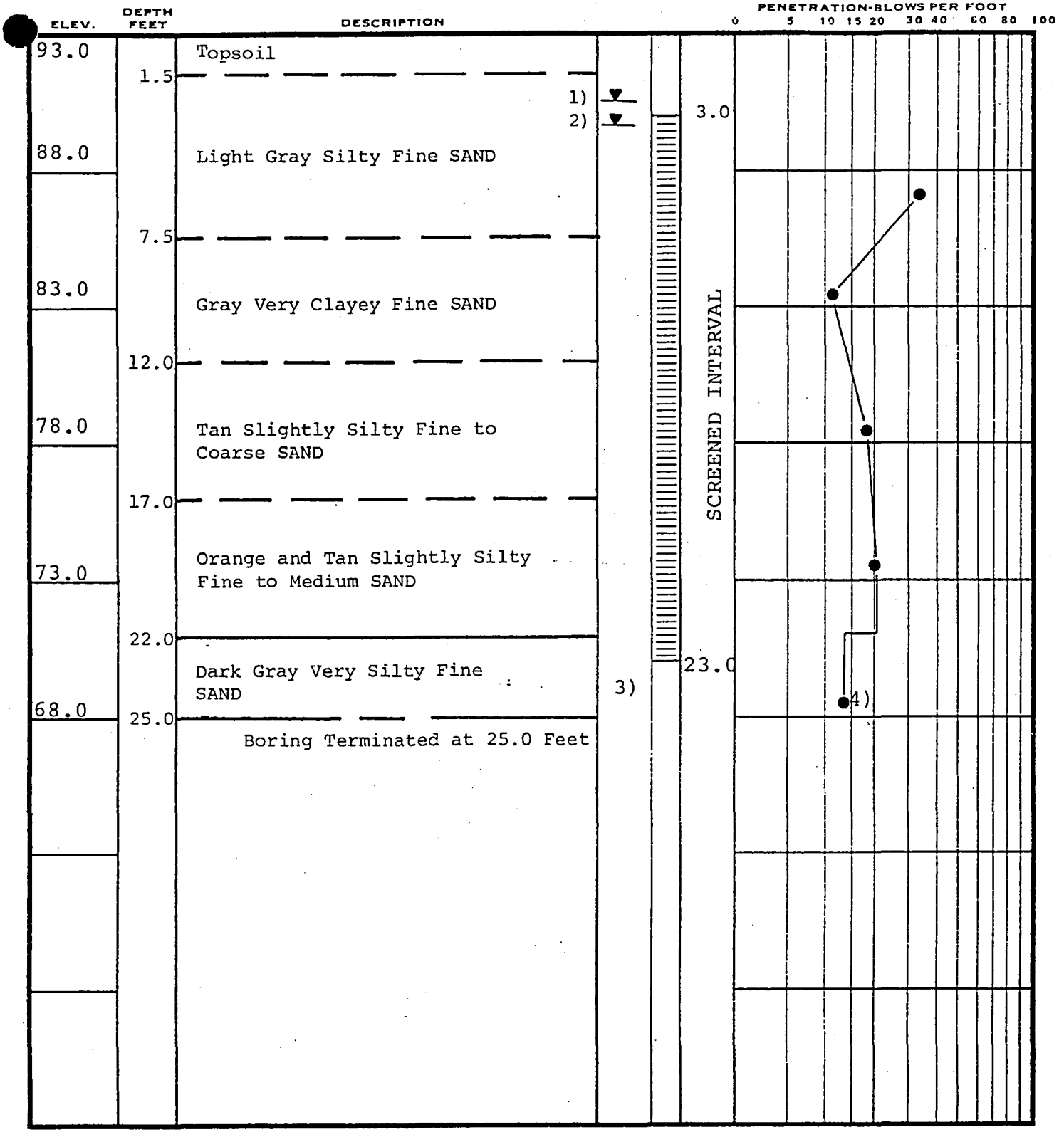
REMARKS:

1) Ground-Water Elevation 90.88 on 4-6-83
2) Ground-Water Elevation 90.39 on 5-26-83
3) Cation Exchange Capacity 4.1 meq/100gm
4) Grain Size Analysis

DRILLED BY Corbin
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER MW-2
DATE STARTED 4-5-83
DATE COMPLETED 4-6-83
JOB NUMBER MH2303

TEST BORING RECORD



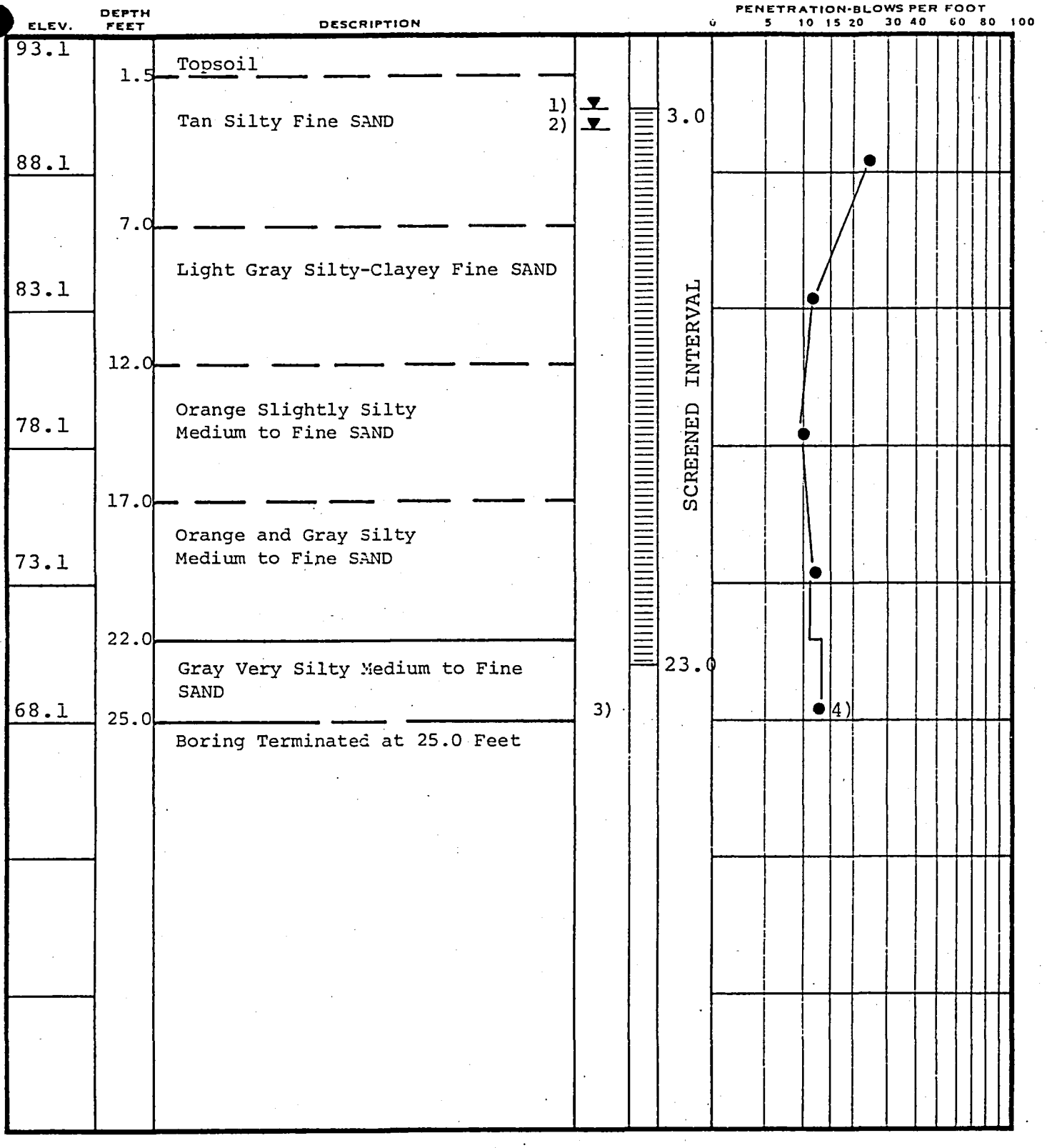
REMARKS:

1) Ground-Water Elevation 90.38 on 4-6-83
2) Ground-Water Elevation 89.65 on 5-26-83
3) Cation Exchange Capacity 6.3 meq/100gm
4) Grain Size Analysis

DRILLED BY Corbin
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER MW-3
DATE STARTED 4-5-83
DATE COMPLETED 4-6-83
JOB NUMBER MH2303

TEST BORING RECORD



REMARKS:

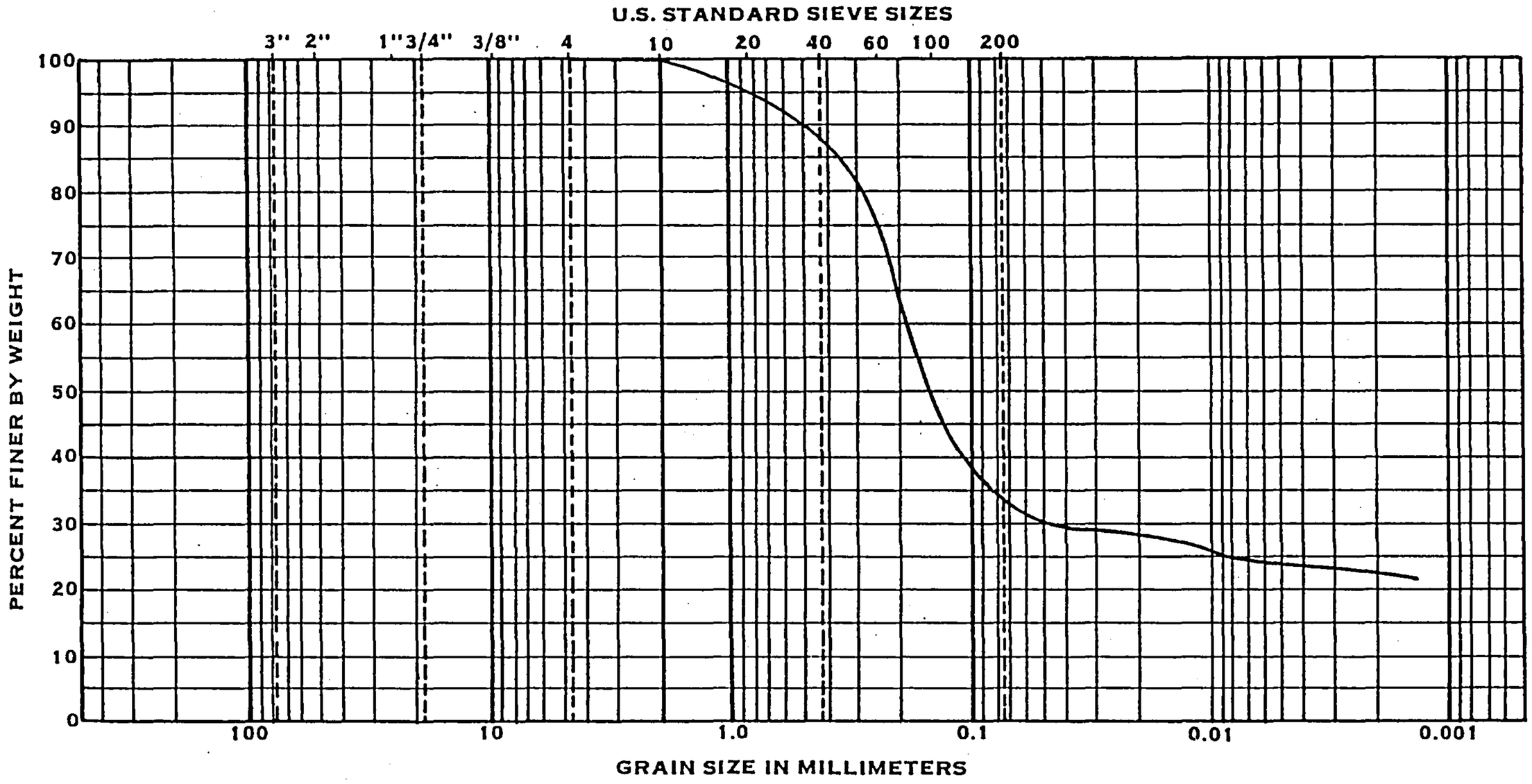
1) Ground-Water Elevation 90.31 on 4-6-83
2) Ground-Water Elevation 89.62 on 5-26-83
3) Cation Exchange Capacity 7.4 meq/100 gm
4) Grain Size Analysis

DRILLED BY Corbin
LOGGED BY Alexander
CHECKED BY Seymour

BORING NUMBER MW-4
DATE STARTED 4-5-83
DATE COMPLETED 4-6-83
JOB NUMBER MH2303

APPENDIX 3

GRAIN SIZE ANALYSES



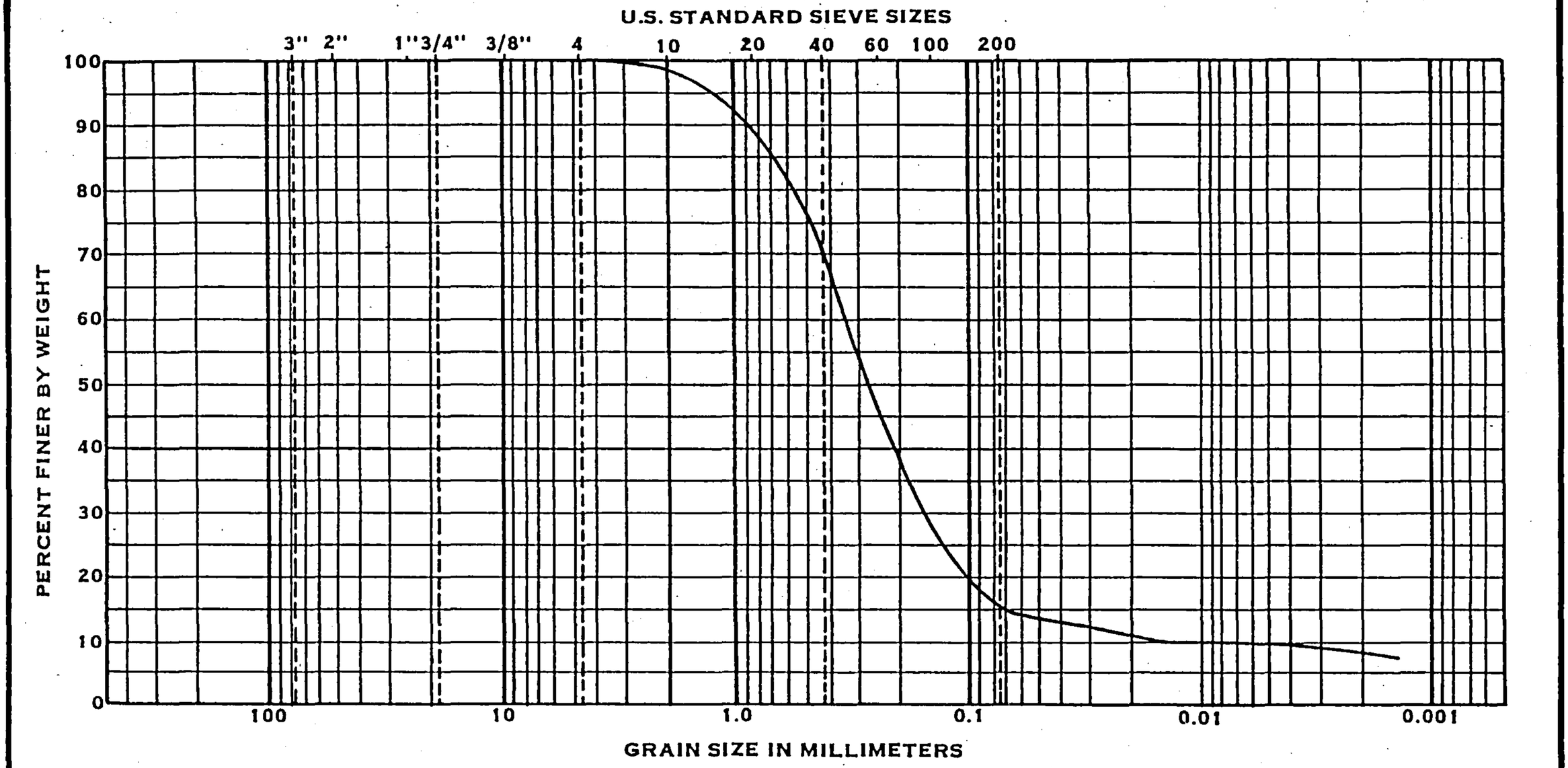
BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
MW-1 S-2	10.0'					Slightly Silty Very Clayey Medium To Fine SAND

GRAIN SIZE DISTRIBUTION

JOB NO. MH2303

LAW ENGINEERING
TESTING COMPANY



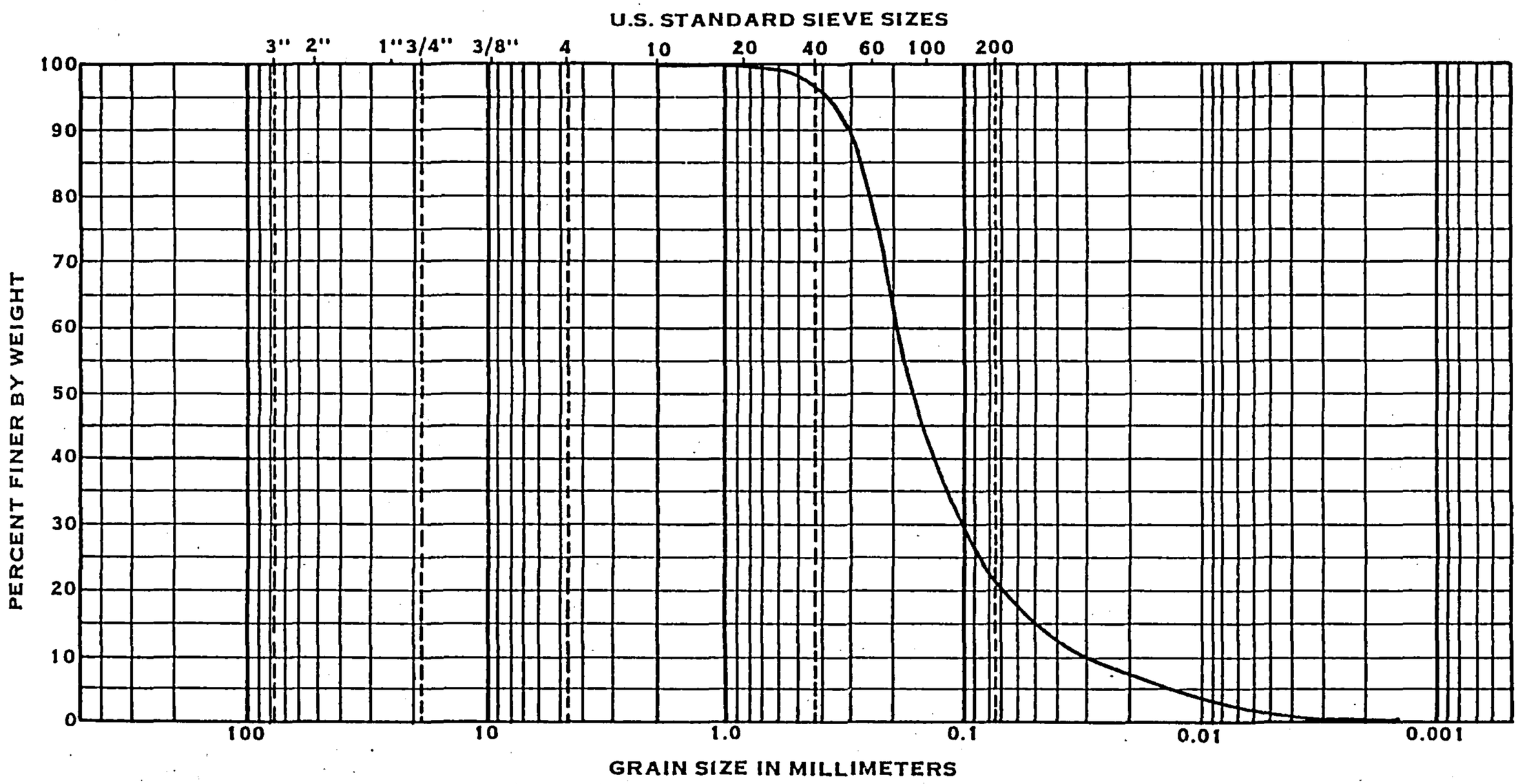
BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
MW-2 S-3	15.0'					Slightly Silty and Clayey Medium to Fine SAND

GRAIN SIZE DISTRIBUTION

JOB NO. MH2303

LAW ENGINEERING
TESTING COMPANY



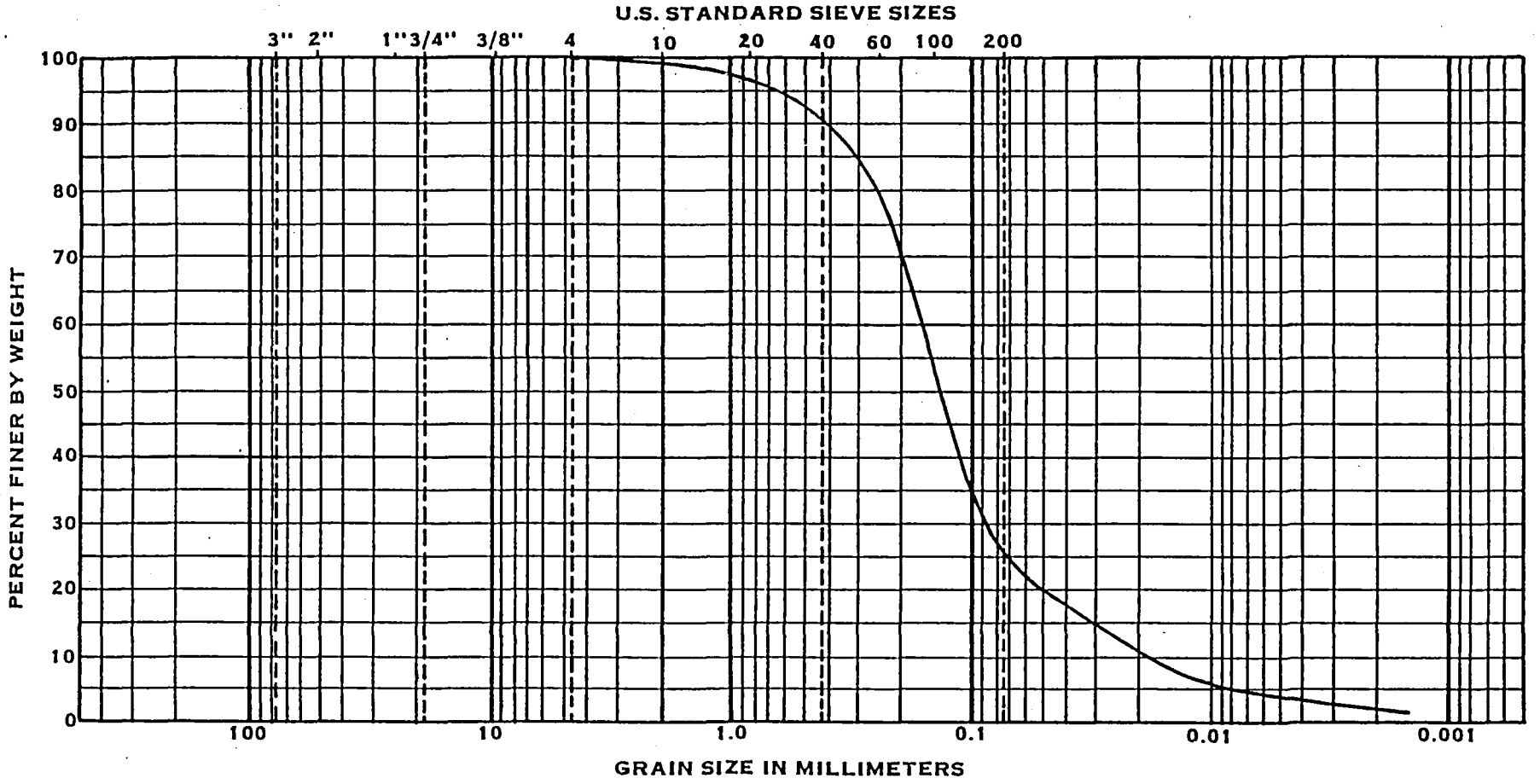
BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
MW-3 S-5	25.0'					Very Silty Fine SAND

GRAIN SIZE DISTRIBUTION

JOB NO. MH2303

LAW ENGINEERING
TESTING COMPANY



BOULDERS	COBBLES	GRAVEL		SAND			FINES	
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT SIZES	CLAY SIZES

BORING NO.	ELEV. OR DEPTH	NAT WC	LL	PL	PI	DESCRIPTION OR CLASSIFICATION
MW-4 S-5	25.0'					Very Silty Medium to Fine SAND

GRAIN SIZE DISTRIBUTION

JOB NO. MH2303

LAW ENGINEERING
TESTING COMPANY

APPENDIX 4

MONITORING WELL VARIANCE

North Carolina Department of Natural Resources & Community Development
James B. Hunt, Jr., Governor
Joseph W. Grimsley, Secretary

DIVISION OF ENVIRONMENTAL MANAGEMENT
Robert F. Helms
Director
Telephone 919 733-7015

March 18, 1983

Mr. W. J. Alexander, P.G.
Law Engineering Testing Company
2749 Delk Road, S.E.
Marietta, Georgia, 30067

Dear Mr. Alexander:

Reference is made to your request on behalf of the Union Carbide Corporation for a variance to 15 NCAC 2C .0108(b)(2) for the construction of six (6) permanent observation wells to be located on their disposal site near Farmville, Pitt County.

Permission is granted to construct the observation wells at the facility in variance to 15 NCAC 2C .0108(b)(2) based on the following conditions:

1. The entrance into each wall casing shall be secured with a lockable top and lock.

2. Each well shall be labeled to show that it is for monitoring only and not to be used for drinking purposes.

If you have any questions or require any additional information concerning this matter, please contact Jim Mulligan, Regional Supervisor, or Bill Jeter, Regional Hydrologist, Washington Regional Office, PO Box 1507, Washington, NC 27889, telephone 919/946-6481.

Sincerely yours,

for Robert F. Helms
Director

cc: Washington Regional Office

APPENDIX 5

PREVIOUS CHEMICAL DATA

(SURFACE AND GROUND-WATER ANALYSES)

EAST CAROLINA UNIVERSITY

GREENVILLE, NORTH CAROLINA 27834

SCHOOL OF
ALLIED HEALTH AND SOCIAL PROFESSIONS
TELEPHONE 919-757-6961

Office of the Dean

Biostatistics/Epidemiology
Community Health
Environmental Health
Medical Record Science
Medical Technology
Occupational Therapy
Physical Therapy
Rehabilitation Counseling
Social Work and Correctional Services
Speech, Language and Auditory Pathology

MEMORANDUM

TO: Willie Pate
Sanitarian Supervisor
Pitt County Health Department

FROM: Barney Kane
Lab Director
Department of Environmental Health

DATE: April 9, 1982

SUBJECT: Results of Analyses for toxic metals in water samples

Samples received April 2, 1982, submitted by: Mr. Willie Pate

Source All concentrations reported as mg/l (ppm)

	Cadmium	Chromium	Silver	Lead
Nursery	$\leq$ 0.025	$\leq$ 0.15	$\leq$ 0.10	$\leq$ 0.2
Hog Pen	$\leq$ 0.025	$\leq$ 0.15	$\leq$ 0.10	$\leq$ 0.2
Mercer Res.	$\leq$ 0.025	$\leq$ 0.15	$\leq$ 0.10	$\leq$ 0.2
Fulford Res.	$\leq$ 0.025	$\leq$ 0.15	$\leq$ 0.10	$\leq$ 0.2
Starling Res.	$\leq$ 0.025	$\leq$ 0.15	$\leq$ 0.10	$\leq$ 0.2

Method: Air/Acetylene Flame Atomic Spectrophotometry

Comment: These levels indicate that the presence of metals was below detection level for the method used. Time did not permit use of the Carbon Rod method which would have been roughly 10 times more sensitive.

STARLING FARM SUPERFUND INVESTIGATION

PERSONAL WELL MONITORING SUMMARY

STATE LABS

CONTAMINANT	EPA STANDARD	FULFORD WELL	MERCEL WELL	NURSERY WELL	HOG PEN	STARLING HOUSE WELL
Barium	1.0 mg/l	.2 mg/l	<.1	<.1	<.1	.2
Cadmium	.01 mg/l	<.005	<.005	<.005	<.005	<.005
Chromium	.05 mg/l	<.01	<.01	<.01	<.01	<.01
Lead	.05 mg/l	<.03	<.03	<.03	<.03	<.03
Silver	.05 mg/l	<.02	<.02	<.02	<.02	<.02
Iron	--	1.07	.24	.53	.14	.38
Manganese	--	<.06	<.03	<.03	<.03	<.03
Arsenic	.05 mg/l	--	--	--	--	--
Mercury	.002 mg/l	<.0002	<.0002	<.0002	<.0002	<.0002
Selenium	.01 mg/l	--	--	--	--	--
Sulfate	--	<1	18	4	6	4
PH	--	7.4	5.0	7.4	7.0	7.9
Fluoride	1-42-4 mg/l	.23	<.1	.23	.23	.40
Phosphate	--	.75	.06	1.13	.87	.45
Nitrate	--	1.95	1.05	<.05	<.05	<.05
Sodium	--	4.7	17.9	47.8	49.9	14.6

STARLING FARM SUPERFUND INVESTIGATION

PERSONAL WELL MONITORING SUMMARY

EDGEWATER LABS

CONTAMINANT	EPA STANDARD	FULFORD WELL	MERCER WELL	NURSERY WELL	HOG PEN	STARLING HOUSE WELL
Barium	1.0 mg/l	.2 mg/l	.5 mg/l	.1 mg/l	.1 mg/l	.3 mg/l
Cadmium	.01 mg/l	<.02	<.02	<.02	<.02	<.02
Chromium	.05 mg/l	<.1	<.1	<.1	<.1	<.1
Lead	.05 mg/l	<.03	<.03	<.03	<.03	<.03
Silver	.05 mg/l	.09	<.07	<.07	<.07	<.07
Iron	--	.93	.10	.65	.18	.25
Manganese	--	.05	<.01	.02	<.01	.02
Arsenic	.05 mg/l	<.001	<.001	<.001	<.001	<.001
Mercury	.002 mg/l	<.0001	<.0001	<.0001	.0002	<.0001
Selenium	.01 mg/l	<.001	<.001	<.001	<.001	<.001
Sulfate	--	2.1	11	4.5	3.8	3.5
PH	--	6.95	4.65	6.85	6.66	7.28
Fluoride	1.4-2.4	.4	.4	1.0	.4	.7
Phsophate	--	<1	<1	1.3	<1	<1
Nitrate	--	<.6	4.6	<.6	1.1	<.6
Sodium	--	6.5	22	53	57	18

SURFACE WATER

ANALYSIS

STARLING FARM

EDGEWATER LAB

CONTAMINANT	EPA STANDARD	SURFACE PUDDLE	LAGOON	DRAINAGE DITCH
Lead	.05 mg/1	.10 mg/1	<.01 mg/1	.03 mg/1
Chromium	.05 mg/1	.03	<.01	.02
Barium	1.0 mg/1	20	.04	1.2
Mercury	.002 mg/1	<.0001	<.0001	.0001

E 2,405,000 | E 2,406,000 | E 2,407,000 | E 2,408,000 | E 2,409,000 | E 2,410,000 | E 2,411,000

N 692,000

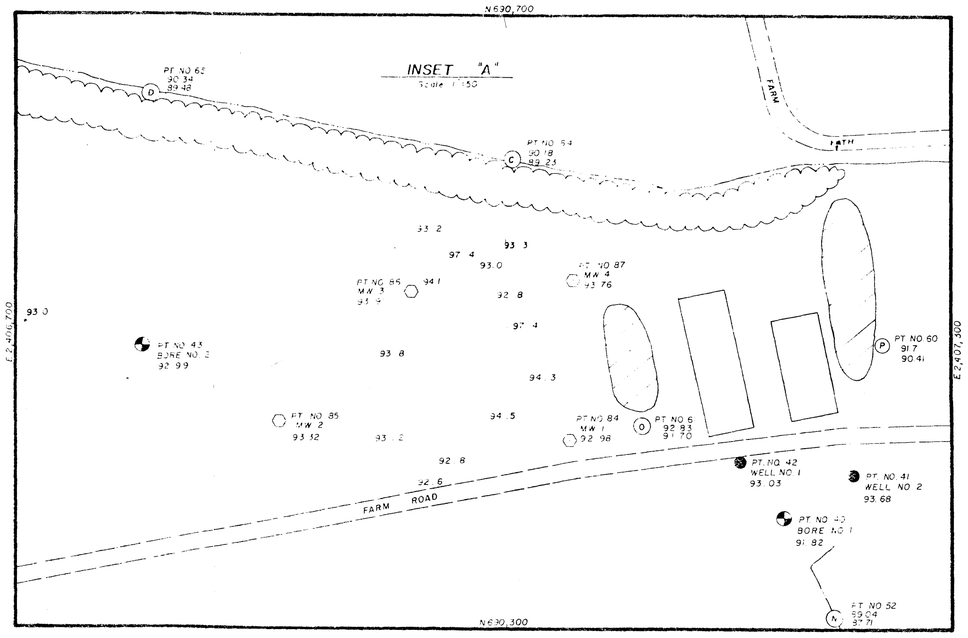
See Inset "A" for Detail

SUBSURFACE DRAINS

well no. 6 (not surveyed)

RUINS

WOODLAND HILLS SUBDIVISION ESTATES



LEGEND

- = BORING
- = WELL
- = MONITORING WELL
- = STAKE IN DITCH WITH TOP OF STAKE ELEVATION & WATER LEVEL AS OF SURVEY DATE
- = HORIZONTAL CONTROL POINT
- 100.0 = SPOT ELEVATION
- = FLOW DIRECTION IN DITCH (APRIL 5,1983)

NOTE

PLANIMETRIC MAP

FARMVILLE, N C SITE

Piedmont Aerial Surveys

North Carolina Department of Human Resources
Division of Health Services
P.O. Box 2091 • Raleigh, North Carolina 27602-2091

James G. Martin, Governor
David T. Flaherty, Secretary

Ronald H. Levine, M.D., M.P.H.
State Health Director

August 21, 1989

Mr. Robert Morris
EPA NC CERCLA Project Officer
EPA Region IV Waste Division
345 Courtland Street, NE
Atlanta, GA 30365

SUBJECT: Screening Site Investigation Summary Trip Report

SITE: David Starling Property
NCD 003185311
Route 2, Box 246 (Hwy 258)
Farmville, Pitt County, NC 27828

Dear Mr. Morris:

On 8-16-89, a screening site investigation was conducted at the David Starling property located midway between the towns of Farmville and Fountain. Present for the investigation were the following:

D. Mark Durway, NC Superfund
Jack Butler, NC Superfund
Phil Starling, son of David Starling

Upon arriving at the site, Starling provided a tour of the area in which 10,000 gallons of barium chromate, barium carbonate, and chromic acid were buried in 1971. This waste was generated by Union Carbide of Greenville, NC, which payed David Starling to accept it and dispose of it on his property. At the time, David Starling did contract work for Union Carbide, such as mowing and landscaping. Phil Starling said that the reason Union Carbide needed the waste disposed of was that the Pitt County Landfill, which had been receiving the waste, refused to continue accepting it. David Starling was told by Union Carbide that the waste was completely harmless, and that it would "make the grass green," according to Phil Starling; on the contrary, he said, it killed some of Starling's cows and hogs. (It is assumed that these animals ingested the waste prior to its being completely buried). Phil Starling described the waste as an orange-yellow, chalky solid, though some of the waste was also liquid, he said.

It was observed that the disposal area was situated approximately 800' west of the nearest residence. This residence and several others on the Starling property were using water from a 180' deep well located approximately 1100' east of the burial area. A sample was collected from this well for laboratory analysis.

Since many samples had been previously collected at and in the vicinity of the burial area, additional samples were not collected during the site screening investigation.

Please contact me at (919) 733-2801, if you have questions or comments regarding the investigation.

Sincerely,

DMD

D. Mark Durway, Hydrogeologist
Superfund Section
Solid Waste Management Division

DMD/starling.1

cc: Kelly Cain

SOURCE: Field Notebook, D. Mark Durway, 8-16-89.

DAVID STARLING PROPERTY 8/16/89

nearest well ~100 yds W of 258; (ie. midway between the 2 houses)
owner David Starling family
depth (see Law Eng. report.)

Met Phil Starling @ 10:15 Am.
He showed us burial area + then led us to nearest drinking well.

According to him;
1) Union Carbide said waste was safe + that it would make grass green, etc.
2) However, cows (& hogs) got into waste area + were killed. they apparently got into/ate (?) unburied wastes.
3) waste color - orangish yellow/chalky.
4) some liquids went into ground.

OVER →

REF 12

Starling Property 8/16/89

Phil Starling testimony, cont'd

5) David Starling was doing property maintenance (mowing, etc.) at Union Carbide during time he began taking waste.

6) Phil Starling believes Greenville Co. DOT had begun to refuse the waste that it had stockpiled at Union Carbide. At this point, they paid Starling to take the waste.

---

conduct general site/area survey;
depart area ~ 2:00 PM

6 May 1988

TO: File

FROM: Pat DeRosa PD

RE: David Starling Property, NCD003185311
Farmville, NC

On May 4, 1988, I spoke by telephone with Bill Jeter, Groundwater Section, DEM, (919) 733-3221 to get an update on activity at the subject site. Bill referred me to Richard Powers in the Washington Regional Office (919) 946-6481. I called and left a message for Mr. Powers.

I then called Al Nash, Corporate Environmental Coordinator, Union Carbide Corporation, (216) 835-7500 for additional information. Mr. Nash said that since the 1983 report by Law Engineering (in file), there has been some surface cleanup, grading, and landscaping at the site. A magnetometer survey has been done and the disposal area has been more clearly identified. Two additional monitoring wells (total 6) were installed in 1985. Monitoring wells have been sampled 3-4 times a year by a contractor (Environment I) and sample results have been sent to the Raleigh Office Groundwater Section, DEM, since about 1984. Results were originally sent to Bob Cheek at that office. Parameters monitored are pH, specific conductivity, dissolved solids, chlorides, phenols, sulfates, total ammonia, chromium, copper, barium, and zinc. The last sampling was done on February 6, 1988. Results are currently mailed from Everready Battery Co., Greenville, NC, through Russell Gibbs at the Greenville Plant, to DEM, Raleigh, NC. Mr. Nash said that he would send me the results if I could not get them from DEM.

Richard Powers called me back and we discussed the subject site. Mr. Powers said that since the sludges were generated as part of a wastewater pre-treatment process permitted by DEM, DEM could require monitoring of the sludge disposal area as a non-discharge land disposal unit. Union Carbide (Everready) is conducting self-monitoring and submitting the report (GW-59) to Raleigh for review. Ms. Nargis Toma reviews the data and forwards a copy to Richard in Washington, NC. Richard is sending me a copy of his file.

PD/ds/0572b.63

APPENDIX D

SITE INSPECTION FORM

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NCD	003185311

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
David Starling Property	Rt. 2, Box 246/US Highway 258

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Farmville	NC	27828	Pitt	74	01

09 COORDINATES		10 TYPE OF OWNERSHIP (Check one)
LATITUDE	LONGITUDE	
35° 38' 29"	77° 37' 45"	☒ A. PRIVATE ☐ B. FEDERAL _____ ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL ☐ F. OTHER _____ ☐ G. UNKNOWN

III. INSPECTION INFORMATION

01 DATE OF INSPECTION	02 SITE STATUS	03 YEARS OF OPERATION
8 / 16 / 89 (MONTH, DAY, YEAR)	☐ ACTIVE ☒ INACTIVE	1-6-71 (BEGINNING YEAR) 3-31-71 (ENDING YEAR) ___ UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A. EPA ☐ B. EPA CONTRACTOR _____ (Name of firm) ☐ C. MUNICIPAL ☐ D. MUNICIPAL CONTRACTOR _____ (Name of firm)
☒ E. STATE ☐ F. STATE CONTRACTOR _____ (Name of firm) ☐ G. OTHER _____ (Specify)

05 CHIEF INSPECTOR	06 TITLE	07 ORGANIZATION	08 TELEPHONE NO.
D. Mark Durway	Hydrogeologist	NC Superfund	(919) 733-2801
09 OTHER INSPECTORS	10 TITLE	11 ORGANIZATION	12 TELEPHONE NO.
Jack Butler	Environmental Engineer	NC Superfund	(919) 733-2801
			( )
			( )
			( )
			( )

13 SITE REPRESENTATIVES INTERVIEWED	14 TITLE	15 ADDRESS	16 TELEPHONE NO
Phil Starling	resident	same as site address	919) 753-3362
			( )
			( )
			( )
			( )
			( )

17 ACCESS GAINED BY (Check one)	18 TIME OF INSPECTION	19 WEATHER CONDITIONS
☒ PERMISSION ☐ WARRANT	morning	warm, clear

IV. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NO.
Mrs. David Starling	address same as site	(919) 753-3362

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NO.	08 DATE
D. Mark Durway	NC DEHNR	Superfund	919/733-2801	12 / 12 / 89 (MONTH, DAY, YEAR)

EPA FORM 2070-13 (7-81)

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NCD	003185311

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- ☐ A. SOLID
- ☐ B. POWDER, FINES
- ☒ C. SLUDGE
- ☐ D. OTHER _____ (Specify)
- ☐ E. SLURRY
- ☒ F. LIQUID
- ☐ G. GAS

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

- TONS 10,000 gals.
- CUBIC YARDS _____
- NO. OF DRUMS 542 and containers

03 WASTE CHARACTERISTICS (Check all that apply)

- ☒ A. TOXIC
- ☒ B. CORROSIVE
- ☐ C. RADIOACTIVE
- ☒ D. PERSISTENT
- ☒ E. SOLUBLE
- ☐ F. INFECTIOUS
- ☐ G. FLAMMABLE
- ☒ H. IGNITABLE
- ☐ I. HIGHLY VOLATILE
- ☒ J. EXPLOSIVE
- ☐ K. REACTIVE
- ☐ L. INCOMPATIBLE
- ☐ M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	10,000	gal.	
OLW	OILY WASTE			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS			
IOC	INORGANIC CHEMICALS			
ACD	ACIDS	unknown		
BAS	BASES			
MES	HEAVY METALS	unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
D005	Barium Chromate	--	Burial in drums	40-50%	% volume
D005	Barium Carbonate	--	and containers	50-60%	% volume
D002	Chromic Acid	11115745	"	unknown	-
D009	Mercury	7439976	"	unknown	-
D008	Lead	7439921	"	unknown	-

V. FEEDSTOCKS (See Appendix for CAS Numbers)

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

References refer to those in Appendix C of site investigation report.
1,9,10,11

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NCD	003185311

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 ☐ A. GROUNDWATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: none — 04 NARRATIVE DESCRIPTION

None detected in nearby drinking wells, but .014 ug/l phenol and 170 ug/l chromium detected in monitoring wells.

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

Lead: Exceeded EPA drinking water standards at surface puddle near site.

Barium: Exceeded EPA drinking water standards at surface puddle and drainage ditch near site.

01 ☐ C. CONTAMINATION OF AIR — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: None — 04 NARRATIVE DESCRIPTION

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

Chromic acid may explode on contact with reducing agents, and may ignite upon contact with organic materials. Material is now buried.

01 ☐ E. DIRECT CONTACT — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: Unknown — 04 NARRATIVE DESCRIPTION

Material is buried in drums or containers; accidential unearthing of these could occur in future.

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

01 ☐ G. DRINKING WATER CONTAMINATION — 02 ☐ OBSERVED (DATE: _____) ☒ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: None — 04 NARRATIVE DESCRIPTION

None detected in nearby drinking wells to date.

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

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

EPA

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

I. IDENTIFICATION

01 STATE: NCD | 02 SITE NUMBER: 003185311

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 [X] J. DAMAGE TO FLORA — 02 [X] OBSERVED (DATE: 8-16-89) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

Tall vegetation was absent over burial area.

01 ☐ K. DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION (Include name(s) of species)

Unknown

Phil Starling claims farm animals were killed by waste in 1971 before it was buried.

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

04 NARRATIVE DESCRIPTION

Unknown

01 ☐ M. UNSTABLE CONTAINMENT OF WASTES (Spills/Runoff/Standing liquids, Leaking drums) — 02 ☐ OBSERVED (DATE: _____) ☐ POTENTIAL ☐ ALLEGED

03 POPULATION POTENTIALLY AFFECTED: Unknown

04 NARRATIVE DESCRIPTION

10,000 gallons of sludge, and possibly liquids, are buried in 542 drums and containers. In time, drums and containers will leak or deteriorate.

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

04 NARRATIVE DESCRIPTION

Unknown

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

04 NARRATIVE DESCRIPTION

Unknown

01 [X] P. ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE: _____) [X] POTENTIAL ☐ ALLEGED

04 NARRATIVE DESCRIPTION

Unknown

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

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

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

Refs. 1,9,10,11

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NCD	003185311

II. PERMIT INFORMATION

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

III. SITE DESCRIPTION

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE
☐ A. SURFACE IMPOUNDMENT		
☐ B. PILES		
☐ C. DRUMS, ABOVE GROUND		
☐ D. TANK, ABOVE GROUND		
☐ E. TANK, BELOW GROUND		
☒ F. LANDFILL	10,000	gallons
☐ G. LANDFARM		
☐ H. OPEN DUMP		
☐ I. OTHER (Specify)		

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

05 OTHER
- ☒ A. BUILDINGS ON SITE

06 AREA OF SITE
1± (Acres)

07 COMMENTS

IV. CONTAINMENT

01 CONTAINMENT OF WASTES (Check one) No liner

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

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

V. ACCESSIBILITY

01 WASTE EASILY ACCESSIBLE: ☒ YES ☐ NO

02 COMMENTS

Site is unfenced; soil cover over buried waste could easily be removed.

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

Refs. 1,9,10,11,12

EPA

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

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
NCD	003185311

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY (Check as applicable)

	SURFACE	WELL
COMMUNITY	A. ☐	B. ☒
NON-COMMUNITY	C. ☐	D. ☒

02 STATUS

ENDANGERED	AFFECTED	MONITORED
A. ☐	B. ☐	C. ☐
D. ☐	E. ☐	F. ☐

03 DISTANCE TO SITE (Farmville well #12)

A. 1.2 (mi)
B. 0.15 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

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

02 POPULATION SERVED BY GROUND WATER 6606

03 DISTANCE TO NEAREST DRINKING WATER WELL 0.15 (mi)

04 DEPTH TO GROUNDWATER	05 DIRECTION OF GROUNDWATER FLOW	06 DEPTH TO AQUIFER OF CONCERN	07 POTENTIAL YIELD OF AQUIFER	08 SOLE SOURCE AQUIFER
< 20 (ft)	SSE (est.)	< 20 (ft)	unknown (gpd)	☒ YES ☐ NO

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

Shallow monitor wells; shallow and deep domestic wells

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

IV. SURFACE WATER

01 SURFACE WATER USE (Check one)

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

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME:	AFFECTED	DISTANCE TO SITE
Jacob Creek	☐	0.46 (mi)
	☐	(mi)
	☐	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE	TWO (2) MILES OF SITE	THREE (3) MILES OF SITE
A. 160 NO. OF PERSONS	B. 520 NO. OF PERSONS	C. 1500 NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION 0.15 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE 100+

04 DISTANCE TO NEAREST OFF-SITE BUILDING 0.15 (mi)

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

Site is located in rural area midway between Farmville and Fountain. While these towns lie just outside 3 miles of the site, some if the community wells serving these towns exist within this distance. This explains why the population served by groundwater derived from within 3 miles of the site is high.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NCD	003185311

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

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

02 PERMEABILITY OF BEDROCK (Check one)

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

03 DEPTH TO BEDROCK	04 DEPTH OF CONTAMINATED SOIL ZONE	05 SOIL pH	
>100' (ft)	unknown (ft)	4.5-6	Soil belongs to Norfolk-Exum-Goldsboro Soil Association

06 NET PRECIPITATION	07 ONE YEAR 24 HOUR RAINFALL	08 SLOPE: SITE SLOPE	DIRECTION OF SITE SLOPE	TERRAIN AVERAGE SLOPE
7 (approx) (in)	3.4 (in)	<3 %	SSE	<3 %

09 FLOOD POTENTIAL

SITE IS IN N/A YEAR FLOODPLAIN

10 N/A

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

11 DISTANCE TO WETLANDS (5 acre minimum)

ESTUARINE: A. N/A (mi)

OTHER: B. 2 (mi) Black Swamp Wetlands

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

1 (mi)

ENDANGERED SPECIES: _____

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES	AGRICULTURAL LANDS: PRIME AG LAND	AGRICULTURAL LANDS: AG LAND
A. 0.15 (mi) (Phil Starling's Shop)	B. 0.15 (mi)	C. _____ (mi)	D. _____ (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

Site is located in the coastal plain on a broad, essentially flat interstream divide. Site elevation is about 90' above mean sea level.

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

Appendix A, Map 1; 2,3,4-8,10,12

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NCD	003185311

II. SAMPLES TAKEN

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER	1	NC DEHNR Public Health Laboratory	present
SURFACE WATER			
WASTE			
AIR			
RUNOFF			
SPILL			
SOIL			
VEGETATION			
OTHER			

III. FIELD MEASUREMENTS TAKEN

01 TYPE	02 COMMENTS
	photographs

IV. PHOTOGRAPHS AND MAPS

01 TYPE ☒ GROUND ☐ AERIAL

02 IN CUSTODY OF NC Superfund, Raleigh
(Name of organization or individual)

03 MAPS ☒ YES ☐ NO

04 LOCATION OF MAPS NC Superfund, Raleigh

V. OTHER FIELD DATA COLLECTED (Provide narrative description)

None

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

Appendixes A and B

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NCD	003185311

II. CURRENT OWNER(S)

01 NAME	02 D+B NUMBER		
David Starling			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		
Rt. 2, Box 246			
05 CITY	06 STATE	07 ZIP CODE	
Farmville	NC	27828	
01 NAME	02 D+B NUMBER		
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		
05 CITY	06 STATE	07 ZIP CODE	
01 NAME	02 D+B NUMBER		
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		
05 CITY	06 STATE	07 ZIP CODE	
01 NAME	02 D+B NUMBER		
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE		
05 CITY	06 STATE	07 ZIP CODE	

PARENT COMPANY (If applicable)

08 NAME	09 D+B NUMBER	
10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	
12 CITY	13 STATE	14 ZIP CODE
08 NAME	09 D+B NUMBER	
10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	
12 CITY	13 STATE	14 ZIP CODE
08 NAME	09 D+B NUMBER	
10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	
12 CITY	13 STATE	14 ZIP CODE
08 NAME	09 D+B NUMBER	
10 STREET ADDRESS (P.O. Box, RFD #, etc.)	11 SIC CODE	
12 CITY	13 STATE	14 ZIP CODE

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

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

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

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

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

As previously cited

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NCD	003185311

II. CURRENT OPERATOR (Provide if different from owner)

01 NAME	02 D+B NUMBER
Union Carbide Corporation	

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
Evans Street Ext. and 264 Bypass	

05 CITY	06 STATE	07 ZIP CODE
Greenville	NC	

08 YEARS OF OPERATION	09 NAME OF OWNER

OPERATOR'S PARENT COMPANY (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

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

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

01 NAME	02 D+B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE

05 CITY	06 STATE	07 ZIP CODE

08 YEARS OF OPERATION	09 NAME OF OWNER DURING THIS PERIOD

10 NAME	11 D+B NUMBER

12 STREET ADDRESS (P.O. Box, RFD #, etc.)	13 SIC CODE

14 CITY	15 STATE	16 ZIP CODE

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

As previously cited.

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NCD	003185311

II. ON-SITE GENERATOR

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

III. OFF-SITE GENERATOR(S)

01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
Union Carbide Corporation			
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
Evans Street Ext. and 264 Bypass			
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE
Greenville	NC		
01 NAME	02 D+B NUMBER	01 NAME	02 D+B NUMBER
03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE	03 STREET ADDRESS (P.O. Box, RFD #, etc.)	04 SIC CODE
05 CITY	06 STATE / 07 ZIP CODE	05 CITY	06 STATE / 07 ZIP CODE

IV. TRANSPORTER(S)

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

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

As previously cited

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NCD	003185311

II. PAST RESPONSE ACTIVITIES

01 ☐ A. WATER SUPPLY CLOSED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ B. TEMPORARY WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ C. PERMANENT WATER SUPPLY PROVIDED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ D. SPILLED MATERIAL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ E. CONTAMINATED SOIL REMOVED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ F. WASTE REPACKAGED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ G. WASTE DISPOSED ELSEWHERE — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ H. ON SITE BURIAL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ I. IN SITU CHEMICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ J. IN SITU BIOLOGICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ K. IN SITU PHYSICAL TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ L. ENCAPSULATION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ M. EMERGENCY WASTE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ N. CUTOFF WALLS — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ O. EMERGENCY DIKING/SURFACE WATER DIVERSION — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ P. CUTOFF TRENCHES/SUMP — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ Q. SUBSURFACE CUTOFF WALL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NCD	003185311

II PAST RESPONSE ACTIVITIES *(Continued)*

01 ☐ R. BARRIER WALLS CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ S. CAPPING/COVERING — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ T. BULK TANKAGE REPAIRED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ U. GROUT CURTAIN CONSTRUCTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ V. BOTTOM SEALED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ W. GAS CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ X. FIRE CONTROL — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ Y. LEACHATE TREATMENT — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ Z. AREA EVACUATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ 1. ACCESS TO SITE RESTRICTED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ 2. POPULATION RELOCATED — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

01 ☐ 3. OTHER REMEDIAL ACTIVITIES — 02 DATE _____ — 03 AGENCY _____
04 DESCRIPTION
None

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

As previously cited

EPA

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

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
NCD	003185311

II. ENFORCEMENT INFORMATION

01 PAST REGULATORY/ENFORCEMENT ACTION ☐ YES ☒ NO

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

None

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

As previously cited.

APPENDIX E

SITE SAFETY PLAN AND TOXICOLOGICAL DATA

SITE HEALTH AND SAFETY PLAN

A. General Information

Site Name David Starling Property ID # NCD 003 185 311

Location Route 2, Box 246 (Hwy. 258N), Date August 3, 1989

Farmville, Pitt County, NC

Proposed Date of Investigation August 16, 1989

Date of Briefing August 15, 1989

Date of Debriefing August 17, 1989

Site Investigation Team: All site personnel have read the Site Health and Safety Plan and are familiar with its provisions.

	Personnel	Responsibilities	Signature
Team 1	Mark Durway	team leader, sampling	
Team 1	Jack Butler	sampling	
Team 2			
Team 2			

Plan Preparation:

Prepared By: David Lilley, Industrial Hygienist

Reviewed By: Jack Butler, Environmental Engineer

B. SITE/WASTE CHARACTERISTICS

Waste Type(s) __X__ Liquid __X__ Solid __X__ Sludge _____ Gas

Characteristics __X__ Corrosive __X__ Ignitable _____ Radioactive

_____ Volatile __X__ Toxic _____ Reactive _____ Other

List Known or Suspected Hazards (physical, chemical biological or radioactive) on Site and their toxicological effects. Also, if known, list chemical amounts

HAZARD	WARNING PROPERTIES	TLV
Barium Chromate	Odor Threshold (OT)=no data	no data
Barium Carbonate	OT=no data	0.5mg/m^3
Chromic Acid	OT=no data PEL=	1mg/10m^3
Mercury	OT=no data	0.01mg/m^3
Lead	OT=no data PEL=	0.05mg/m^3

ID # NCD 003 185 311

Facility Description: Size unknown Buildings unknown
Disposal Methods Being Investigated Burial of 10,000 gallons of sludge in pits 15 to 25 feet wide, 80 to 100 feet long, and 12 to 14 feet deep.
Unusual Features on Site (dike integrity, power lines, terrain, etc.):
none known

History of the Site: From January 6, 1971 to March 31, 1971, a burial area at the David Starling property was used for disposal of 10,000 gallons of barium chromate, barium carbonate, and chromic acid in 55 gallon drums and 5 gallon pails. This waste was generated by the Union Carbide plant in Greenville, NC. The site is now inactive as a waste disposal area.

C. HAZARD EVALUATION

The site can be toured and sampled in level D. PE or PVC gloves will be worn while collecting water samples and soil samples. Tyvek suits (saranex in wet conditions) are recommended to keep clothing clean.

D. WORK PLAN INSTRUCTION

Map or Sketch Attached? yes
Perimeter Identified? no
Command Post Identified? no
Zones of Contamination Identified? no

Personal Protective Equipment/Level of Protection: C X D

Modifications Wear goggles and PVC gloves while preparing acid preserved samples. Avoid breathing acid vapors.

ID # NCD 003 185 311

Surveillance Equipment:

_____ HNU	_____ Detector Tubes and Pumps
_____ OVA	_____ 02 Meter
_____ Explosimeter	_____ Radiation Monitor

Decontamination Procedures

_____Level C Respirator wash, respirator removal, suit wash (if needed,) suit removal, boot wash, boot removal and glove removal.

__X__Level D Boot wash and rinse and boot removal, suit removal, glove and goggle removal.

Modifications Dispose of trash properly, on-site if possible.

Work Schedule/Visit Objectives The purpose of this visit is to determine if this site poses a hazard to the public health or the environment. Sampling will consist of drinking water well sampling, and possibly surface soil sampling.

EMERGENCY PRECAUTIONS

Route of Exposure	First Aid
Eyes	irrigate immediately
Skin	soap and water wash
Inhalation	fresh air and artificial respiration
Ingestion	get medical attention immediately

ID # NCD 003 185 311

Location of Nearest Phone: nearby residences

Hospital (Address and Phone Number)

Pitt County Memorial Hospital, 200 Stantonsburg Road, Greenville, NC 27835 (919) 551-4100-can handle chemically contaminated patients

Emergency Transportation Systems (Phone Numbers)

Fire 911

Ambulance 911

Rescue Squad 911

Emergency Route to Hospital Take a left onto SR 1230, then take a right route 258 East to Farmville. Take route 264 East out of Farmville and stay on 264 approximately 12-15 miles. The hospital is well marked.

PREVAILING WEATHER CONDITIONS AND FORECAST Partially cloudy, chance of showers, high of 86°F.

EQUIPMENT CHECKLIST

____	Air purifying respirator	X	First Aid Kit
____	Cartridges for respirator	X	3 gal. Distilled H20
X	Rainsuit	X	Gloves (PE/PVC/nitrile/cloth)
____	02 Indicator	X	Boots/Boot Covers
X	Eye Wash Unit	X	Coveralls (tyvek/saranex)
____	H Nu	X	Eye Protection
____	pH Meter	X	Hard Hat
____	Explosimeter	X	Decontamination
____	Radioactive Monitor		Materials.
____	Detector Tubes and Pump		

Poison Control Center - State Coordinator
Duke University Medical Center
Telephone: 1-800-672-1697
Box 3024
Durham, NC 27710

ASHEVILLE 704-255-4490	Western NC Poison Control Center Memorial Mission Hosp. 509 Biltmore Ave. 28801	HENDERSONVILLE 704-693-6522 Ext. 555,556	Margaret R. Pardee Memorial Hospital Fleming St., 28739
CHARLOTTE 704-379-5827	Mercy Hospital 2001 Vail Ave, 28207	HICKORY 704-322-6649	Catawba Mem. Hosp. Fairgrove Chur. Rd 28601
DURHAM 1-800-672-1697	Duke Univ. Med. Center Box 3007, 27710	JACKSONVILLE 919-577-2555	Onslow Mem. Hospital Western Blvd. 28540
GREENSBORO [illegible]-379-4105	Moses Cone Hospital 1200 N. Elm St. 27420	WILMINGTON 919-343-7046	New Hanover Mem. Hospital 2131 S. 17th St. 28401

TO BE COMPLETED BY PROJECT MANAGER

PROJECT MANAGER: Mark Durway PROJECT: David Starling Prop.

Materials Used

_____ Air Purifying respirator cartridges
_____ Detector tubes
_____ Eye Wash Units
_____ First Aid Kit
_____ Gloves (polyethylene)
_____ Gloves(PVC)
_____ Gloves (nitrile)
_____ Gloves (cloth)
_____ Boot covers
_____ Coveralls (tyvek)
_____ Coveralls (saranex)
_____ Auger Brushes

Respirator Worn By

Approximate Time in Respirator

Air Monitoring Data (Include Calibration Reading)

HNU:

OVA:

Explosimter:

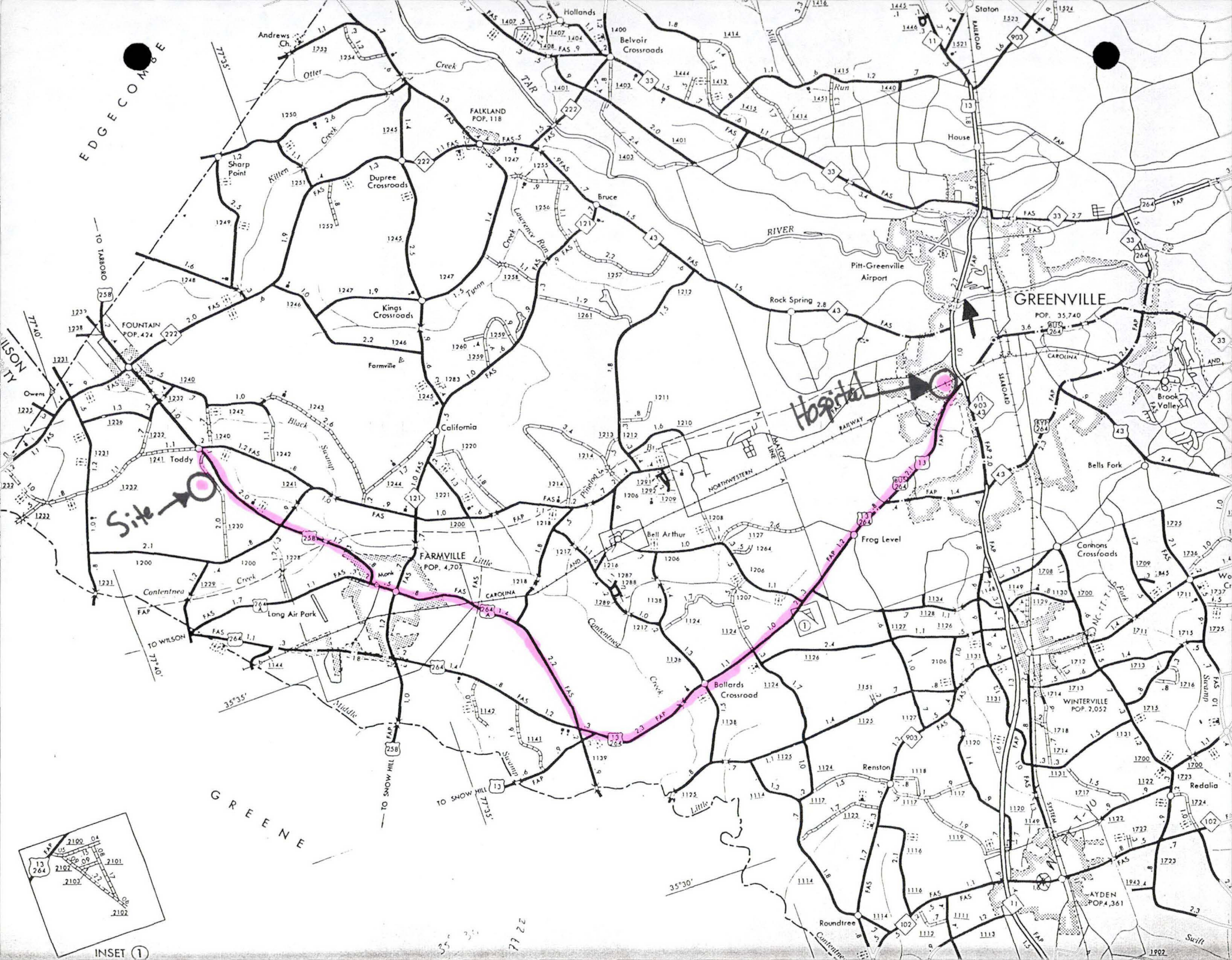
Radiation Meter:

If the maximum personal protective equipment as outlined in the Hazard Evaluation Section was not used, please justify:

Visitors Present

Orginazation Represented

DL/ds/Revised 11-88


Site
Hospital
EDGECOMBE
GREENE
GREENVILLE
POP. 35,740
FARMVILLE
POP. 4,707
FALKLAND
POP. 118
FOUNTAIN
POP. 474
WINTERVILLE
POP. 2,052
AYDEN
POP. 4,361
Andrews Ch.
Otter Creek
Sharp Point
Kittlen Creek
Dupree Crossroads
Kings Crossroads
Formville
Hollands
Belvoir Crossroads
Bruce
Lawrence Run
Turnn Creek
Rock Spring
Pitt-Greenville Airport
TAR RIVER
Staton House
Run
California
Toddy
Black Swamp
Pinelog
Bell Arthur
Frog Level
Bollards Crossroad
Renston
Roundtree
Brook Valley
Bells Fork
Canons Crossroads
Redalia
Swift
Contentnea Creek
Little Contentnea Creek
Middle
Monk
Long Air Park
Owen
Fork
Swamp
NORTHWESTERN RAILWAY
SEABOARD RAILROAD
CAROLINA AND
MATCH LINE
TO TARBORO
TO WILSON
TO SNOW HILL
TO SNOW HILL
77°35'
77°40'
35°35'
35°30'
INSET (1)

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Barium as $BaCrO4$

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula given above	1
Natural Physical State at 25°C solids	
Vapor Pressure _____ mm Hg at 20°C	
Melting Point _____ °F/°C Boiling Point _____ °F/°C	
Flash Point (open or closed cup) _____ °C/°F	
Solubility - H_2O partially insoluble	1,2
Other _____	

Physical Features: (odor, color, etc.) yellow, heavy crystals

II. TOXICOLOGICAL DATA

Standards: no data TLV no data PEL no data IDLH

Routes of Exposure: inhalation, ingestion

Acute/Chronic Symptoms: respiratory tract irritation, muscle spasms, GI tract infection

First Aid: Eyes: irrigate immediately; Skin: water flush immediately; Inhalation: fresh air and artificial respiration; Ingestion: medical attention promptly.

Chemical Name: BaCr04

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X — 1,2,3
Toxic by-products _____ _____
_____ _____

B. Flammability LEL _____ UEL _____ _____

C. Reactivity Hazard _____ _____
_____

D. Corrosivity Hazard yes/no pH: _____ 1,2,3

Neutralizing agent: _____ _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

1. The Merck Index, 1985
2. Documentation of the TLV's, Fourth Edition, 1980
3. Pocket Guide to Chemical Hazards, NIOSH, 1985

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Barium Carbonate

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula $BaCO_3$	1
Natural Physical State at 25°C solid	1
Vapor Pressure _____ mm Hg at 20°C	
Melting Point 811 °F/°C Boiling Point _____ °F/°C	1
Flash Point (open or closed cup) NA °C/°F	
Solubility - H_2O 0.024g/liter	2
Other hydrochloric, nitric, and acetic acid, ammonium nitrate, ammonium chloride	2

Physical Features: (odor, color, etc.) white, heavy powder (2)

II. TOXICOLOGICAL DATA as barium

Standards: 0.5mg/m^3 (3) TLV 0.5mg/m^3 (4) PEL 250mg/m^3 (5) IDLH

Routes of Exposure: Ingestion, Inhalation, Skin/Eye contact

Acute/Chronic Symptoms: Upper respiratory irritant, gastrointestional distress, muscle spasms, heart problems, irritation of the eyes, skin burns

First Aid: Ingestion: get medical attention; Inhalation: fresh air, artifical respiration; Skin contact: soap and water wash; Eye contact: flush with water

Chemical Name: Barium Carbonate

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X — _____
Toxic by-products _____ — _____
_____ — _____

B. Flammability LEL _____ UEL _____ — _____

C. Reactivity Hazard _____ — _____

D. Corrosivity Hazard yes/no pH: _____ — _____

Neutralizing agent: _____ — _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

1. The Condensed Chemical Dictionary, 11th Edition, 1987
2. The Merck Index, 10th Edition, 1983.
3. Threshold Limit Values and Biological Exposure Indices for 1988-1989
4. Air Contaminants-Permissible Exposure Limits, 29 CFR 1910.1000, 1989
5. NIOSH Pocket Guide to Chemical Hazards, 1987

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Chromic Acid

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula Cr 03	1
Natural Physical State at 25°C solid	1
Vapor Pressure _____ mm Hg at 20°C	
Melting Point _____ °F/°C Boiling Point _____ °F/°C	
Flash Point (open or closed cup) _____ °C/°F	
Solubility - H_2O soluble	1
Other _____	

Physical Features: (odor, color, etc.) dark red, bypyramidal crystals (1).

II. TOXICOLOGICAL DATA

Standards: none TLV 1mg/10m^3 (2) PEL 30mg/m3 (3) IDLH

Routes of Exposure: Ingestion, Inhalation, Skin/Eye contact

Acute/Chronic Symptoms: Skin contact: irritation & ulceration of skin. Inhalation: irritation & perforation of nasal system & pulmonary irritation.

First Aid: Eye: irrigate immediately, Skin: water flush immediately, Inhalation: artificial respiration, Ingestion: immediate medical attention.

Chemical Name: Chromic Acid

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes x No ____ — 1

Toxic by-products contact with combustible material may cause fire.

B. Flammability LEL _____ UEL _____

C. Reactivity Hazard oxidizes most other organic substances. Sometimes violently.

D. Corrosivity Hazard yes/no pH: _____

Neutralizing agent: _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

1. The Merck Index, 10th Edition, 1983.
2. Air Contaminants-Permissible Exposure Limits, 29 CFR 1910.1000, 1989
3. NIOSH Pocket Guide to Chemical Hazards, 1987

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Mercury-inorganic

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula Hg	1
Natural Physical State at 25°C liquid	2
Vapor Pressure 0.0012 mm Hg at 20°C	2
Melting Point -38 °F/°C Boiling Point 674 °F/°C	2
Flash Point (open or closed cup) None °C/°F	2
Solubility - H_2O 0.002%	2
Other	

Physical Features: (odor, color, etc.) Silvery, mobile odorless liquid (2)

II. TOXICOLOGICAL DATA

Standards: 0.01 mg/m^3(3) TLV 1 $mg/10m^3$(4) PEL 28 mg/m^3(2) IDLH

Routes of Exposure: Inhalation, skin and/or eye absorption, Ingestion (2)

Acute/Chronic Symptoms: Acute: soluble salts have violent corrosive effect on skin and mucous membranes, severe nausea, vomiting, abdominal pains, blood, diarrhea, kidney damage, death usually with 10 days; Chronic: inflammation of mouth and gums, excessive salivation, loosening of teeth, kidney damage, muscle tension, jerky gait, spasms of extremities, personality changes, depression, irritability, nervousness(1).

First Aid: Eyes: irrigate immediately; Skin: wash with soap and water immediately; Inhalation: artificial respiration; Ingestion: get medical attention immediately (2).

Chemical Name: Mercury-inorganic

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X — 2

Toxic by-products _____

_____

B. Flammability LEL none UEL none — 2

C. Reactivity Hazard Incompatible with acetylenes, ammonia gases — 2

(insoluable salts)

D. Corrosivity Hazard yes/no pH: _____ — 1

Neutralizing agent: _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

(1) The Merck Index, 10th Edition, 1983

(2) Pocket Guide to Chemical Hazards, NIOSH, 1985

(3) Threshold Limit Values and Biological Exposure Indices for 1988-89, ACGIH.

(4) Air Contaminants-Permissible Exposure Limits, 29 CFR 1910.1000, 1989.

HAZARDOUS SUBSTANCE INFORMATION FORM

Chemical Name: Lead, inorganic dusts

I. PHYSICAL/CHEMICAL PROPERTIES

	Reference
Chemical Formula Pb	1
Natural Physical State at 25°C solid	1
Vapor Pressure N/A mm Hg at 20°C	1
Melting Point 600 °F/°C Boiling Point 900 °F/°C	1
Flash Point (open or closed cup) N/A °C/°F	
Solubility - H_2O N/A	
Other N/A	

Physical Features: (odor, color, etc.) appearance and odor vary depending upon specific compound.

II. TOXICOLOGICAL DATA

Standards: .15 mg/m^3 (2) TLV 0.05 mg/m^3 (3) PEL N/A IDLH 3

Routes of Exposure: inhalation, ingestion, eye contact, skin contact(3)

Acute/Chronic Symptoms: Acute: lassitude, pallor, constipation, abdominal pain, gingival gum line, tremors. Target organs: GI tract, CNS, kidneys, blood.(3)

First Aid: Eyes: irrigate immediately; Skin: soap and water wash promptly; Inhalation: fresh air and artificial respiration; Ingestion: medical attention immediately.

Chemical Name: Lead, inorganic dusts

III. HAZARDOUS CHARACTERISTICS — Reference

A. Combustibility Yes ___ No X — _____

Toxic by-products _____ — _____

_____ — _____

B. Flammability LEL N/A UEL _____ — _____

C. Reactivity Hazard None — _____

_____

D. Corrosivity Hazard yes/no pH: _____ — _____

Neutralizing agent: _____ — _____

E. Radioactive Hazard — Exposure Rate

Background	yes/no	_____	_____
Alpha particles	yes/no	_____	_____
Beta particles	yes/no	_____	_____
Gamma radiation	yes/no	_____	_____

IV. REFERENCES

(1) The Merck Index, 10th Edition, 1985

(2) Threshold Limit Values and Biological Exposure Indices for 1988-1989, ACGIH.

(3) Pocket Guide to Chemical Hazards, NIOSH, 1987.