PRELIMINARY ASSESSMENT

AND

SITE INVESTIGATION

SPRING LAKE PCB CONTAMINATION

SOUTH PLAINFIELD, MIDDLESEX COUNTY

EPA ID NO.: NJSFN0204213

New Jersey Department of Environmental Protection
Division of Publicly Funded Site Remediation
Environmental Measurements and Site Assessment Section

235443

SPRING LAKE PCB CONTAMINATION
SPRING LAKE PARK
SOUTH PLAINFIELD, MIDDLESEX COUNTY, NEW JERSEY
EPA ID NO. NJSFN0204213

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NARRATIVE

PRELIMINARY ASSESSMENT AND SITE INVESTIGATION REPORT

PART I: GENERAL INFORMATION

Site Name: Spring Lake PCB Contamination
Aka:
Address: Spring Lake Park
Municipality: South Plainfield **State:** NJ **Zip Code:** 07080
County: Middlesex
EPA ID No.: NJSFN0204213
Latitude: 40° 35′ 00″ **Longitude:** 74° 24′ 43″
USGS Quadrangle: Plainfield
Block: 185 **Lot(s):** 1
Block: 195 **Lot(s):** 19

Current Owner: Middlesex County Parks Department
Mailing Address: River Road
City: Piscataway **State:** NJ **Zip Code:** 08854
Telephone No.: (732)745-3900

Current Operator: Middlesex County Parks Department
Mailing Address: River Road
City: Piscataway **State:** NJ **Zip Code:** 08854
Telephone No.: (732)745-3900

Owner/Operator History:

NAME	OPERATOR/ OWNER	DATES	
		FROM	TO
Middlesex County Parks Dept	Owner/ operator		Present

Surrounding Land Use (zoning, adjacent properties):

Spring Lake is within a park with homes adjacent on all sides.

Distance to Nearest Residence or School: 250 feet
Direction: west and east
Population Density (residents per square mile): 2,452

PART II: SITE OPERATIONS

Discuss all current and past operations at the site. Include a description of the buildings or structures on site and their physical condition. In addition, tabulate all areas of concern (AOC) and provide the waste source type for each AOC. Include the physical state of waste at each AOC as stored or disposed, the condition of containers and the presence or absence of secondary containment and the volume of waste stored or disposed, or the volume or area of contaminated soil or water.

Prior to 1960, Spring Lake was a resort community in South Plainfield with summer homes surrounding the lake. In the 1960s and 1970s the lake silted up and became a marsh/swamp area with little water present. In 1983 the lake was drained, soil and sediments excavated and the area completely regraded. Several thousand truckloads of soil/sediments were removed. The lake is currently part of Middlesex County's Spring Lake Park. Cedar Brook, which originates in Plainfield to the north, is the feeder stream for Spring Lake. Spring Lake, which is dammed at its southern end, drains to Bound Brook. Cedar Brook is primarily dry north of Spring Lake Park, however, the stream bed is approximately 15 feet wide and the stream bank 7 feet high in places due to erosion by water flowing following a heavy rainfall. Another unnamed stream enters Spring Lake from the Maple Avenue area; the source of this stream is unknown.

Spring Lake was discovered to be contaminated with PCBs and pesticides in 1997 during an investigation of the Cornell-Dubilier Electronics site in South Plainfield. As part of the investigation conducted by EPA to determine the impact of Cornell-Dubilier on Bound Brook, Spring Lake was sampled as an upstream reference point. Sampling revealed only dieldrin in the sediments; however, fish tissue samples were discovered to be contaminated with PCBs and numerous pesticides including heptachlor epoxide, alpha and gamma-chlordane, 4,4'-DDE, 4,4'-DDD, dieldrin and endrin. The contamination in Spring Lake cannot be attributed to Cornell-Dubilier because Spring Lake is located upstream of the site and it is not possible for contaminated fish from Bound Brook to reach Spring Lake due to a dam at the end of Spring Lake. (Attachment A)

AOC SUMMARY TABLE

AOC Name	HRS Source Type	Physical State	Waste Quantity
Surface water sediments	Contaminated soil	Liquid	Unknown

PART III: PERMITS

A. NJPDES

Number	Date Issued	Expiration Date	Formation or Water Body Discharged To
N/A			

B. New Jersey Air Pollution Control Certificates

Plant ID No.: N/A
No. of Certificates:
Equipment Permitted:

C. BUST Registration

Registration No.: N/A
No. of Tanks:

Tank No.	Capacity (gallons)	Contents of Tank	Status
N/A			

D. RCRA Status (TSD, Generator, Protective Filer, etc.)

N/A

E. Other Permits (RCRA, NRC, etc.)

Issuing Agency	Permit Type	Permit No.	Date Issued	Expiration Date
N/A				

PART IV: SOIL EXPOSURE

Describe soil type. Include soil series, composition of the soil and permeability of the soil.

The entire streambed from Cedar Brook Lake to Spring Lake is classified as Rowland Series soils. The Rowland Series consists of deep, moderately well-drained or somewhat poorly-drained soils that are present in stream bottoms. (Attachment B)

Tabulate and discuss contaminants identified in the soil. Include sampling date, sampling agency or company, sample locations, depth and contaminant level. Identify samples collected from a residential property, school, daycare center, workplace, terrestrial sensitive environment or resource. Identify samples which establish background conditions, results above background and/or remediation standards, and provide the rationale for site attribution. State whether Level 1 or Level 2 contamination is present. For each sampling event, list the name, address and certification number of the lab which performed the analyses. State who conducted the quality assurance review of the data and summarize any data qualifications.

No soil samples were collected for this site, however, sediment samples were collected and will be discussed in the surface water section.

Total area of surficial contamination (square feet): 0

If no soil sampling has been conducted, discuss areas of potentially contaminated soil, areas that are visibly contaminated or results from soil gas surveys.

No areas of visibly contaminated soils were observed during the sampling event.

Number of people occupying residences or attending school or day care on or within 200 feet of the site: 0
Number of workers on or within 200 feet of the site: 5
Number of on-site employees: 5

Identify terrestrial sensitive environments on or within 200 feet of observed contamination.

There no terrestrial sensitive environments on or within 200 feet of the site.

Determine if any commercial agriculture, silviculture, livestock production or grazing are present on or within 200 feet of the site.

No commercial agriculture, silviculture, livestock production or grazing are present on or within 200 feet of the site.

PART V: GROUND WATER ROUTE

A. HYDROGEOLOGY

Describe geologic formations and aquifer(s) of concern. Include interconnections, confining layers, discontinuities, composition, hydraulic conductivity and permeability.

The entire area is underlain by the Passaic Formation of the Triassic Newark Group, which is 10,000 feet thick. Overlying the Passaic Formation is weathered bedrock, approximately 5 to 10 feet thick. The Passaic Formation is a dull red shale interbedded with siltstones and occassional layers of sandstone. Depth to the bedrock aquifer is approximately 20 feet deep and ground water generally flows to streams. (Attachment H)

Depth to water table: 5 feet
Depth to aquifer of concern: 10 feet (Attachment H)
Depth from lowest point of waste disposal/storage to highest seasonal level of the saturated zone of the aquifer of concern: 10 feet (Attachment H)
Thickness and permeability of the least permeable layer between the ground surface and the aquifer of concern: 10^{-4} (Attachment H)
Thickness of aquifer: 10,000 feet (Attachment H)
Direction of ground water flow: south
Net precipitation at the site: 11 inches
Karst (Y/N): N

Wellhead Protection Area within 4 miles of the site (Y/N): Y
Does a waste source overlie a Wellhead Protection Area (Y/N): Y

B. MONITORING WELL INFORMATION

Well No.	Screen Depth	Formation	Location
N/A			

Identify the upgradient well(s): N/A

Briefly discuss why the monitoring wells were installed. Tabulate and discuss contaminants identified in the monitoring wells. Include Well No., sampling date, sampling agency or company, contaminant levels and remediation standards. Discuss any other groundwater sampling that has occurred. For each sampling event, list the name, address and certification number of the lab which performed the analyses. State who conducted the quality assurance review of the data and summarize any data qualifications.

No monitoring wells are present on site.

C. POTABLE WELL INFORMATION

Distance to nearest potable well: 100 feet (Map 5)
Depth of nearest potable well: 504 feet (Map 5)

Identify all public supply wells within 4 miles of the site:

Water Company	Distance from Site (miles)	Depth (feet)	Formation
Middlesex Water Co. - 3 wells	0.05 to 0.1	500 - 504	Passaic
1 well	0.3	501	Passaic
16 wells	0.5 to 1	74 - 608	Passaic
2 wells	1.2, 1.5	101, 151	Passaic
8 wells	2.0 to 2.2	502 - 700	Passaic
Elizabethtown Water Co. - 2 wells	1.3, 1.5	350	Passaic
12 wells	2.4 to 3.0	300 - 550	Passaic
14 wells	3.4	300 - 500	Passaic

(Map 5, Attachments D and E)

State whether ground water is blended with surface water, ground water or both prior to distribution.

Both the Middlesex Water Company and the Elizabethtown Water Company blend ground water with surface water prior to distribution. (Attachments D and E)

Discuss private potable well use within 4 miles of the site. Include depth, formation and distance, if available.

There are no private potable wells in use within 4 miles of the site.

Discuss the site's source of potable water.

Water utilized at Spring Lake Park is derived from the Middlesex Water Company.

Discuss information regarding the population utilizing wells that are known to be contaminated with hazardous substances which are attributable to the site. Also include any other evidence of contaminated drinking water or wells closed due to contamination. State whether Level 1 or Level 2 contamination is present.

The Middlesex Water Company's wells are contaminated with volatile organic compounds, however, this contamination is not related to the pesticide/PCB contamination discovered in Spring Lake. (Attachment D)

Tabulate for each aquifer the population utilizing that aquifer for drinking purposes within 4 miles of the site. Include only those populations which utilize wells that have a potential to be impacted, not wells which are actually impacted.

Distance from site (miles)	Population/Aquifer		
	PASSAIC	B	C
0 - ¼	8,823		
> ¼ - ½	2,941		
> ½ - 1	47,056		
> 1 - 2	5,882		
> 2 - 3	23,528		
> 3 - 4	8,823		

(Attachments D and E)

Identify one of the following resource uses of ground water within 4 miles of the site (i.e. commercial livestock watering, ingredient in commercial food preparation, supply for commercial aquaculture, supply for major, or designated water recreation area, excluding drinking water use, irrigation of commercial food or commercial forage crops, unusable).

Numerous industrial wells as well as irrigation wells for the

Plainfield Country Club and the Metuchen Golf and Country Club are present within 4 miles of the site. (Map 5)

D. LIKELIHOOD OF RELEASE

Discuss the likelihood of a release of contaminants to ground water, including any other information concerning the ground water contamination route. Identify contaminants detected or suspected and provide a rationale for attributing them to the site.

The likelihood of a release to ground water due to pesticides migrating from the sediments during periods of high infiltration following a heavy rainfall is low. Pesticides are relatively immobile and migration would be slow.

PART VI: SURFACE WATER ROUTE

A. SURFACE WATER

Does a migration pathway to surface water exist? (Y/N): Y
Flood plain: 100-year
Size of drainage area for sources at the site (acres): 8
2-year, 24-hour rainfall (inches): 3.25
Does contaminated ground water discharge to surface water? (Y/N): Unknown

Identify known or potentially contaminated surface water bodies. Follow the pathway of the surface water and indicate all adjoining bodies of water along a route of 15 stream miles.

Surface Water Body	Distance from Site (miles)	Flow (cfs)	Usage(s)
Cedar Brook	0	<10	None
Spring Lake	0	N/A	Fishing
Bound Brook	0.4	30	Fishing
New Market Pond	1.9	N/A	Fishing
Bound Brook	2.9	50	Fishing
Green Brook	5.8	50	Fishing
Raritan River	8.4	150	Fishing, boating

(Map 1, Attachments C and G)

Identify drinking water intakes and fisheries within 15 miles downstream (or upstream in tidal areas) of the site. For each intake or fishery identify the distance from the point of surface water entry, the name of the fishery and/or supplier and population served.

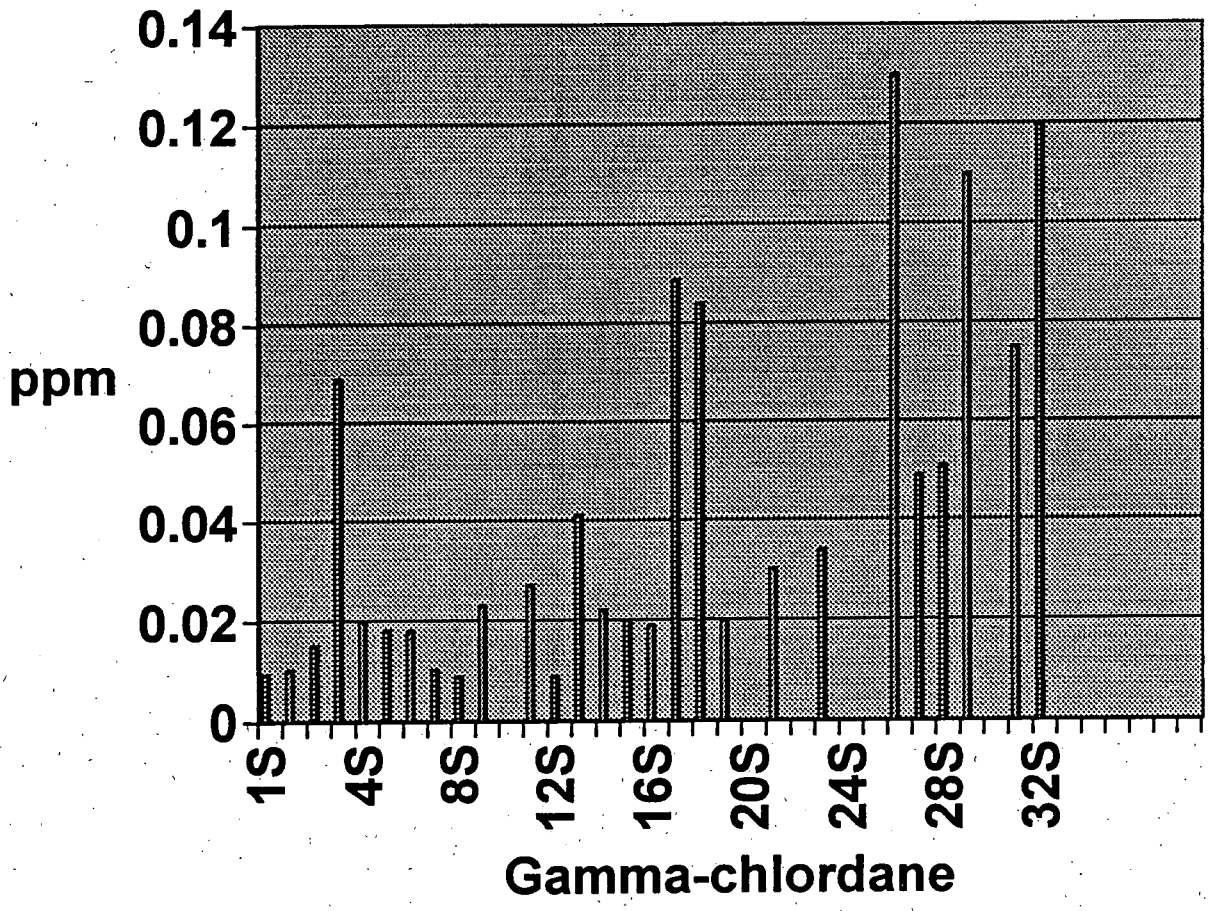
There are no drinking water intakes within 15 miles downstream of the site. Spring Lake was formerly used as a fishery, however, following the discovery of PCBs and pesticides in fish tissue samples from the lake, a fish advisory was issued for the lake. Currently, no fishing is allowed in the lake. Bound Brook and New Market Pond also have fish advisories issued for them due to PCB contamination. Green Brook and the Raritan River are known to be fished. (Attachments A and G)

Discuss surface water and/or sediment sampling conducted in relation to the site. Include surface water body, sampling date, sampling agency or company. State whether Level 1 or Level 2 contamination is present for surface water. State whether Level 2 contamination of sediments is present. For each sampling event, list the name, address and certification number of the lab which performed the analyses. State who conducted the quality assurance review of the data and summarize any data qualifications. Discuss visual obervations if analytical data are not available (include date of observation).

On April 20 and 21, 1999 the NJDEP, Environmental Measurements and Site Assessment Section (EMSA) conducted sediment sampling in Spring Lake and along Cedar Brook from Plainfield High School to the lake. Sediment samples were also collected along a feeder stream from Maple Avenue to Cedar Brook. All sampling locations can be viewed on Map 3. Samples were collected at a depth of 0 to 6 inches at all locations and at 18 to 24 inches as a deep sample at some of the locations. Sed-22S is the background sample. All samples were analyzed for pesticides/PCBs by Southwest Labs of Oklahoma, Broken Arrow, Oklahoma. EPA conducted QA review of the data and all results were deemed acceptable. No PCBs were detected in any of the samples collected. The analytical results for alpha and gamma-chlordane, DDT and DDD, the most prevalent pesticides detected, are summarized below. (Attachment F)

Sample No.	Alpha-chlordane	Gamma-chlordane	DDT	DDD
1S	0.0099	0.0092	0.0066	0.0057
1D	0.012	0.010	ND	ND
2S	0.016	0.015	0.033	ND
3S	0.099	0.069	0.690	ND
4S	ND	0.020	0.051	ND
5S	0.018	0.018	0.028	ND
6S	0.020	0.018	0.024	ND
6D	ND	ND	ND	ND
7S	0.012	0.010	0.016	ND
8S	0.0095	0.0087	0.019	ND
9S	0.027	0.023	0.079	0.014
10S	ND	ND	ND	ND
11S	0.029	0.027	0.110	0.024
11D	ND	ND	ND	ND
12S	0.010	0.0086	0.031	0.014
13S	0.051	0.041	0.066	0.040
14S	0.020	0.022	0.043	0.015
15S	0.021	0.020	0.061	0.029
16S	0.020	0.019	0.059	0.035
17S	0.100	0.089	0.160	0.091
18S	0.100	0.084	ND	ND
19S	0.025	0.020	ND	ND
19D	ND	ND	ND	ND
20S	ND	ND	ND	ND
21S	0.039	0.030	ND	ND
22S	ND	ND	ND	ND
23S	0.053	0.034	0.064	0.051
24S	ND	ND	ND	ND
25S	ND	ND	ND	ND
26S	0.170	0.130	ND	ND
27S	0.058	0.049	ND	ND
28S	0.057	0.051	ND	ND
29S	0.120	0.110	ND	ND
30S	ND	ND	ND	ND
31S	0.082	0.075	ND	ND
32S	0.130	0.120	ND	ND
Sediment guidance	***0.007 chlordane**	***0.007 chlordane**	**0.007**	**0.008**

Note: The sediment guidance is the lowest effects level at which benthic impact may begin to occur (level tolerated by most benthic organisms).
All results in ppm
ND = not detected
* = alpha- and gamma-chlordane isomers of chlordane are not distinguished
(Attachment F)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0.08
ppm
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0.02
0
1S
4S
8S
12S
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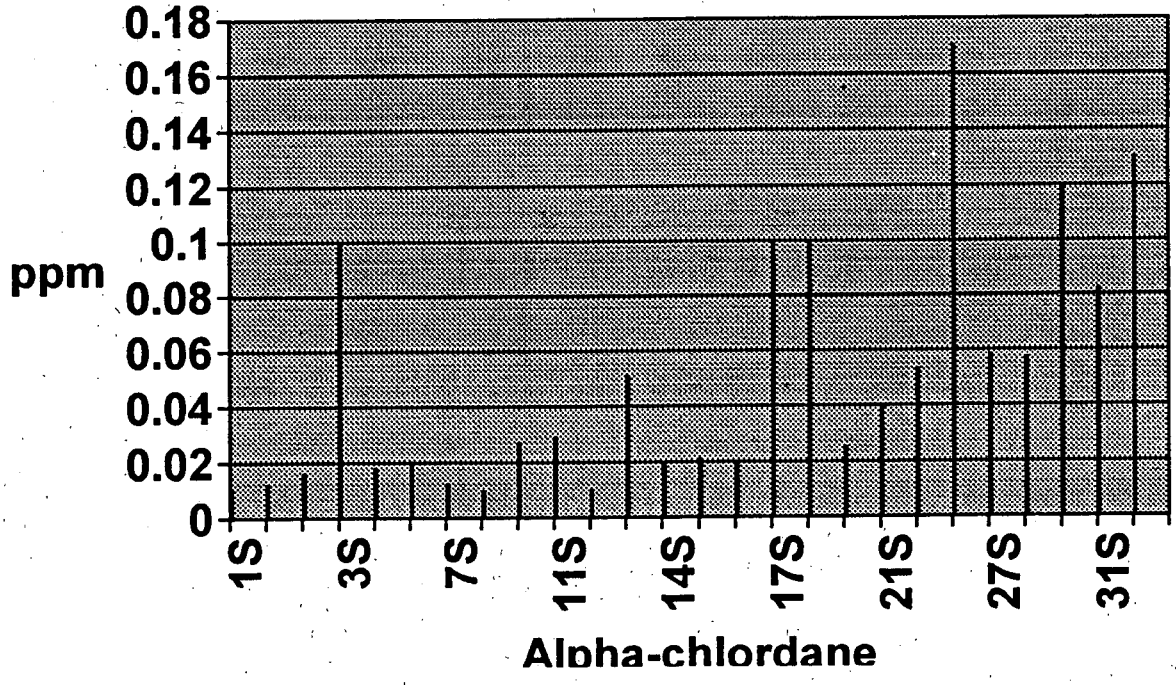
20S
24S
28S
32S
Gamma-chlordane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0.12
0.1
ppm
0.08
0.06
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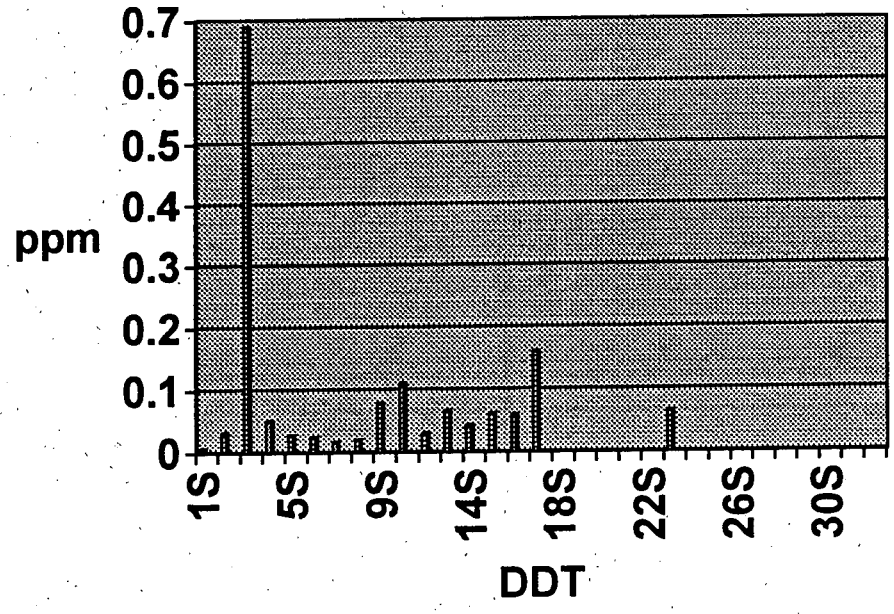
0.02
0
1S
3S
7S
11S
14S
17S
21S
27S
31S
Alpha-chlordane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0.4
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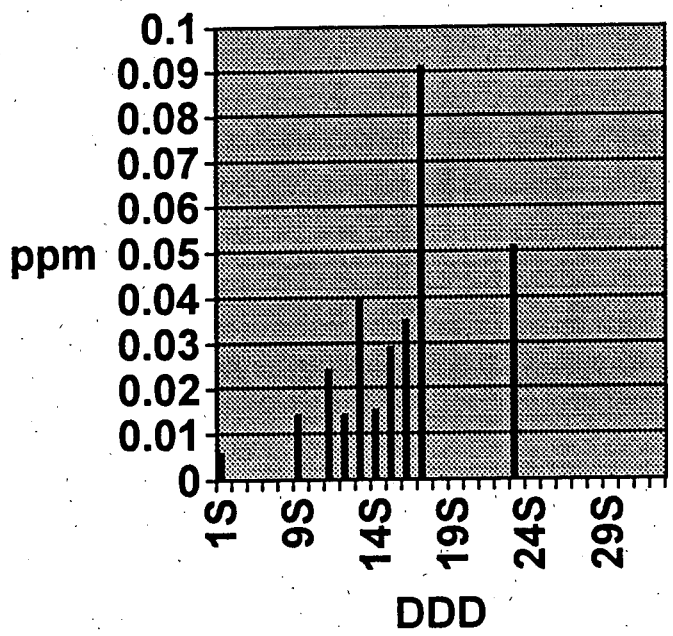
0
1S
5S
9S
14S
18S
22S
26S
30S
DDT


0.1
0.09
0.08
0.07
0.06
ppm 0.05
0.04
0.03
0.02
0.01
0
1S
9S
14S
19S
24S
29S
DDD

In general, alpha- and gamma-chlordane were detected in higher concentrations from Spring Lake upstream to Cedar Brook at the point where a large storm water drainage pipe at South Plainfield High School discharges to the brook. DDD was primarily detected in Cedar Brook on the Middlesex Water Company property (Block 50, Lot 1) located north of Spring Lake Park. DDT was detected throughout Cedar Brook, north of Spring Lake Park. A significantly higher concentration of DDT was detected in SED-3S, located at the southern end of the Belgian block streambed bottom present in the Cedar Brook Park section of Cedar Brook.

Other contaminants detected include heptachlor epoxide at **0.022** ppm in SED-3S, **0.013** in SED-13S and **0.023** ppm in SED-17S; dieldrin at **0.029** ppm in SED-3S; DDE at **0.031** ppm in SED-11S and **0.048** ppm in SED-17S; endrin aldehyde at 0.017 ppm in SED-9S, 0.022 ppm in SED-11S, 0.0094 ppm in SED-12S and 0.012 ppm in SED-13S. The lowest effects level in sediments for these contaminants is 0.005 ppm for heptachlor epoxide, 0.002 ppm for dieldrin and 0.005 ppm for DDE. Sediment guidance has not been established for endrin aldehyde. (Attachment F)

The fish tissue samples collected by EPA were above EPA's applicable benchmarks for benthic tissue (Level 1 contamination) and the sediment samples collected by both EPA and EMSA were above the NJDEP's sediment guidance for the lowest effects level at which benthic impact may begin to occur (Level 2 contamination).

Determine if a contaminant on site displays bioaccumulative properties. Identify all bioaccumulative substances that may impact the food chain.

PCBs and pesticides are bioaccumulative and have already impacted the food chain by being present in fish tissue. (Attachment A)

Determine if surface water is used for irrigation of commercial food or commercial forage crops, watering of commercial livestock, commercial food preparation or recreation.

Surface water is not used for irrigation of commercial food or commercial forage crops, watering of commercial livestock or commercial food preparation.

B. SENSITIVE ENVIRONMENTS

Identify all sensitive environments, including wetlands, along the 15 stream-mile pathway from the site:

Environment Type	Surface Water Body	Flow (cfs)	Distance from Site	Wetland Frontage
Wetlands	Cedar Brook	<10	0	1.2 miles
Wetlands	Spring Lake	N/A	0	0.5 mile
Wetlands	Bound Brook	50	0.4 mile	3.5 miles
Wetlands	Green Brook	50	5.8 miles	5.0 miles
Wetlands	Raritan River	150	8.4 miles	10 miles

(Map 1)

C. LIKELIHOOD OF RELEASE

Discuss the likelihood of a release of contaminants to surface water, include any additional information concerning the surface water route. Identify contaminants detected and provide a rationale for attributing them to the site. Identify any intakes, fisheries and sensitive environments, listed above, that are or may be actually contaminated by hazardous substances attributed to an observed release from the site.

Sediment samples collected along Cedar Brook and in Spring Lake have revealed pesticide contamination with alpha- and gamma-chlordane, DDD, DDT, heptachlor epoxide, dieldrin and endrin aldehyde above background. In general, alpha- and gamma-chlordane were detected in higher concentrations from Spring Lake upstream to Cedar Brook at the point where a large storm water drainage pipe at South Plainfield High School discharges to the brook. DDD was primarily detected in Cedar Brook on the Middlesex Water Company property (Block 50, Lot 1) located north of Spring Lake Park. DDT was detected throughout Cedar Brook, north of Spring Lake Park. A significantly higher concentration of DDT was detected in SED-3S, located at the southern end of the Belgian block streambed bottom present in the Cedar Brook Park section of Cedar Brook.

Fish tissue samples collected from Spring Lake have also revealed pesticide contamination with alpha- and gamma-chlordane, heptachlor epoxide, endrin, DDD, DDE and dieldrin as well as PCB contamination. The source of the contamination has not yet been determined, but is likely attributed to spraying operations which occurred in the past. A fish advisory has been issued for Spring Lake.

PART VII: AIR ROUTE

A. POPULATION AND SENSITIVE ENVIRONMENTS

Identify populations residing within 4 miles of the site.

Distance (miles)	Population
On site	0
0 - ¼	813
> ¼ - ½	2,019
> ½ - 1	9,079
> 1 - 2	31,677
> 2 - 3	62,394
> 3 - 4	74,791

(Map 8)

Identify sensitive environments and wetland acreage within 4 miles of the site.

Distance	Type of environment	Wetland acreage
0 - ¼	Wetlands	9
> ¼ - ½	Wetlands	76
> ½ - 1	Wetlands	330
> 1 - 2	Wetlands	1,580
> 2 - 3	Wetlands	1,816
> 3 - 4	Wetlands	2,083

(Map 6)

B. LIKELIHOOD OF RELEASE

Describe the likelihood of release of hazardous substances to air. Identify contaminants detected or suspected and provide a rationale for attributing them to the site. For an observed release, define the supporting analytical evidence and relationship to background.

There is no likelihood of a release of hazardous substances to air.

If a release to air is observed or suspected, determine the number of people that reside within the area of air contamination.

No observed or suspected release to air is present.

If a release to air is observed, identify any sensitive environments that are located within the area of air contamination.

No observed or suspected release to air is present.

PART VIII: REMOVAL ACTION AND/OR IEC CONDITION

Discuss conditions which constitute an Immediate Environmental Concern (IEC) or warrant EPA Removal Action consideration (improper storage of incompatible/reactive materials, leaking or unsound containers, inadequate site security, subsurface gas threat).

PCBs and pesticides have been discovered in fish and pesticides in sediment samples collected from Spring Lake and Cedar Brook. Following the discovery of the contamination, a fish advisory was issued for Spring Lake.

PART IX: ENFORCEMENT ACTIONS

No enforcement actions have been issued against this site.

PART X: CONCLUSIONS AND RECOMMENDATIONS

List each area of concern and state whether further remediation is required.

Fish tissue samples collected by EPA from Spring Lake in August 1997 revealed the presence of pesticides including heptachlor epoxide, alpha- and gamma-chlordane, DDE, DDD, dieldrin and endrin as well as PCB contamination. As a result, a fish advisory was issued for Spring Lake and all fishing was banned.

Sampling of sediments by the NJDEP in April 1999 in Spring Lake and Cedar Brook has revealed contamination with pesticides, primarily alpha-chlordane, gamma-chlordane, DDT and DDD above background and above the NJDEP declared lowest effects level at which benthic impact may occur. In general, alpha- and gamma-chlordane were detected in higher concentrations from Spring Lake upstream to Cedar Brook at the point where a large storm water drainage pipe at South Plainfield High School discharges to the

brook. DDD was primarily detected in Cedar Brook on the Middlesex Water Company property (Block 50, Lot 1) located north of Spring Lake Park. DDT was detected throughout Cedar Brook, north of Spring Lake Park. A significantly higher concentration of DDT was detected in SED-3S, located at the southern end of the Belgian block streambed bottom present in the Cedar Brook Park section of Cedar Brook. PCBs were not detected in the sediments during EPA's or NJDEP's sampling events.

The source of the pesticide contamination has not been determined; however, it is most likely attributable to spraying operations which occurred in the past. DDT and DDD were used in the past as a mosquito control. Chlordane was used for underground termite control.

NJDEP conducted extensive sampling of Spring Lake and Cedar Brook; however, no PCBs were detected. The source of the PCBs in fish tissue remains unknown.

Although the site may qualify, no further action under CERCLA is recommended. This finding does not equate to a No Further Action (NFA) determination by the NJDEP pursuant to the Technical Requirements for Site Remediation, N.J.A.C. 7:26E.

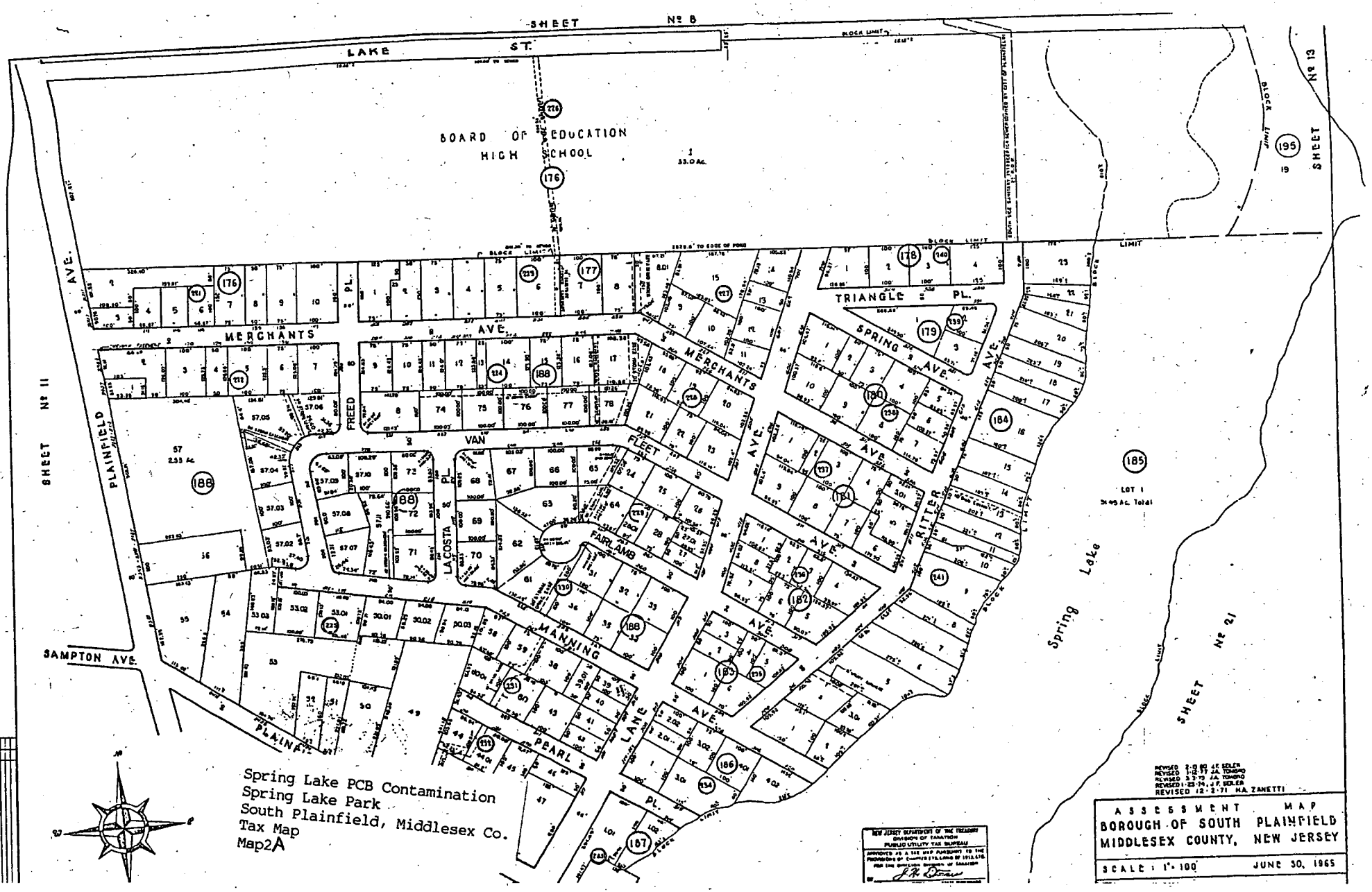
Submitted by: Donna J. van Veldhuisen
Title: HSMS 2
NJDEP, Division of Publicly Funded Site Remediation,
Bureau of Environmental Measurements and Quality Assurance
Environmental Measurements and Site Assessment Section
Date: September 1999

PART XI: POTENTIALLY RESPONSIBLE PARTIES

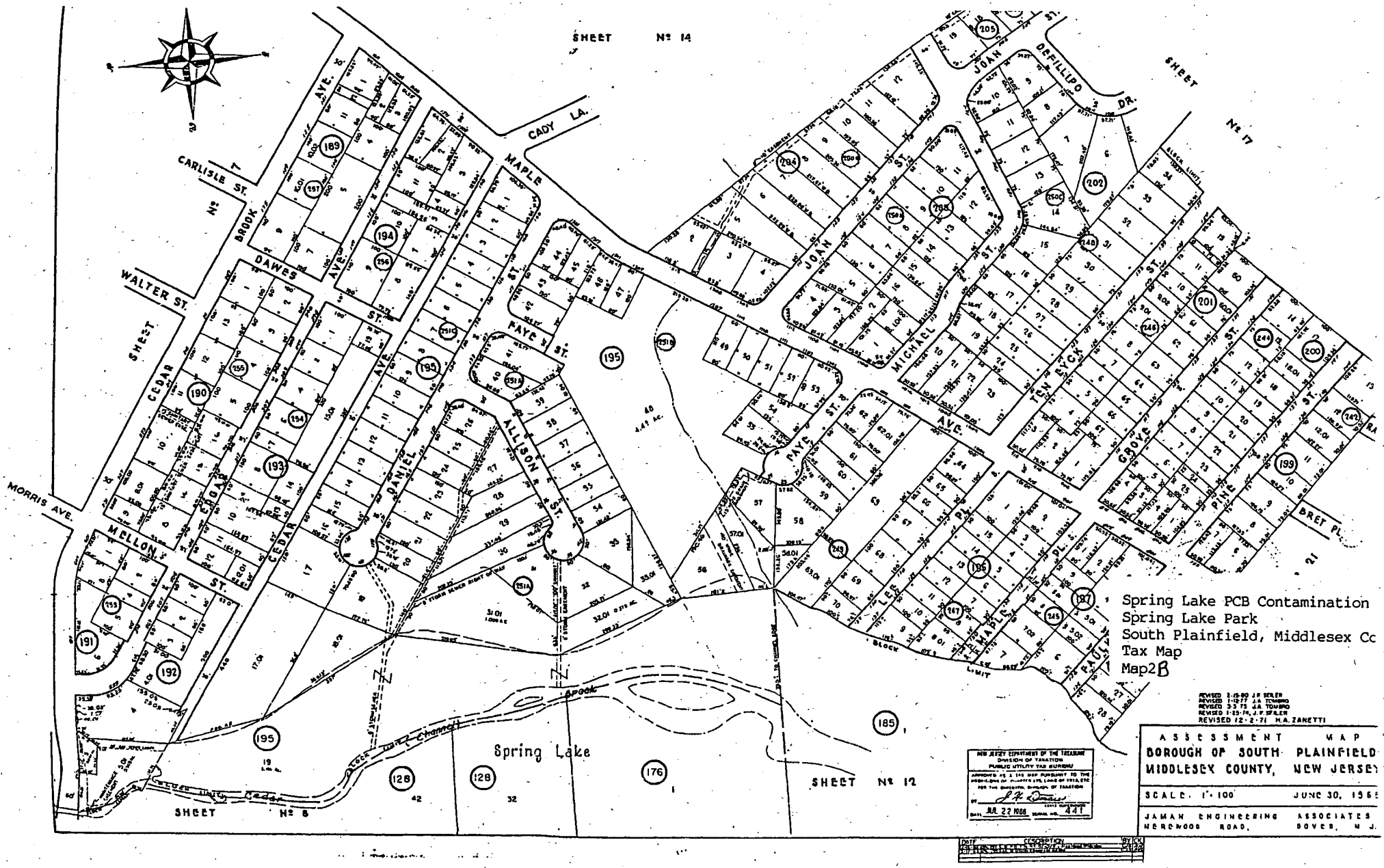
NAME	OWNER/OPERATOR/ KNOWN DISCHARGER	CURRENT ADDRESS

MAPS

Spring Lake PCB Contamination
Spring Lake Park
South Plainfield, Middlesex Co.
Plainfield Quadrangle
Latitude: 40°35'0"
Longitude: 74° 24'43"



Spring Lake PCB Contamination
Spring Lake Park
South Plainfield, Middlesex Co.
Tax Map
Map2A


SHEET Nº 14
SHEET Nº 17
SHEET Nº 12
SHEET Nº 8
CADY LA.
MAPLE
CARLISLE ST.
WALTER ST.
MORRIS AVE.
CEDAR
BROOK
DAWES
AVE.
ST.
FAYE
ALLISON
DANIEL
MELLON
JOAN
DEFILLIPO
DR.
MICHAEL
TEN EYCK
GROVE
PINE
BRET PL.
LEE
PL.
FAULK
Spring Lake
Channel
Brook
Spring Lake PCB Contamination
Spring Lake Park
South Plainfield, Middlesex Co
Tax Map
Map2B
REVISED 2-15-80 J.F. SEILER
REVISED 1-12-77 J.A. TOMBRO
REVISED 3-3-75 J.A. TOMBRO
REVISED 1-25-74, J.F. SEILER
REVISED 12-2-71 H.A. ZANETTI
ASSESSMENT MAP
BOROUGH OF SOUTH PLAINFIELD
MIDDLESEX COUNTY, NEW JERSEY
SCALE: 1"=100'
JUNE 30, 1965
JAMAN ENGINEERING ASSOCIATES
NEREWOOD ROAD, DOVER, N.J.
NEW JERSEY DEPARTMENT OF THE TREASURY
DIVISION OF TAXATION
PUBLIC UTILITY TAX BUREAU
JUL 22 1966
441

SPRING LAKE PCB CONTAMINATION
MAP 3A - SAMPLE LOCATIONS

SEDIMENT SAMPLES
COLLECTED
APRIL 20 AND 21, 1999

500 0 500 1000 1500 2000 2500 Feet

SPRING LAKE PCB CONTAMINATION
MAP 3B - SAMPLE LOCATIONS

N
W E
S

SEDIMENT SAMPLES
COLLECTED
APRIL 20 AND 21, 1999

500 0 500 1000 1500 2000 2500 3000 Feet

SPRING LAKE PCB CONTAMINATION
MAP 3C - SAMPLE LOCATIONS

N
W E
S

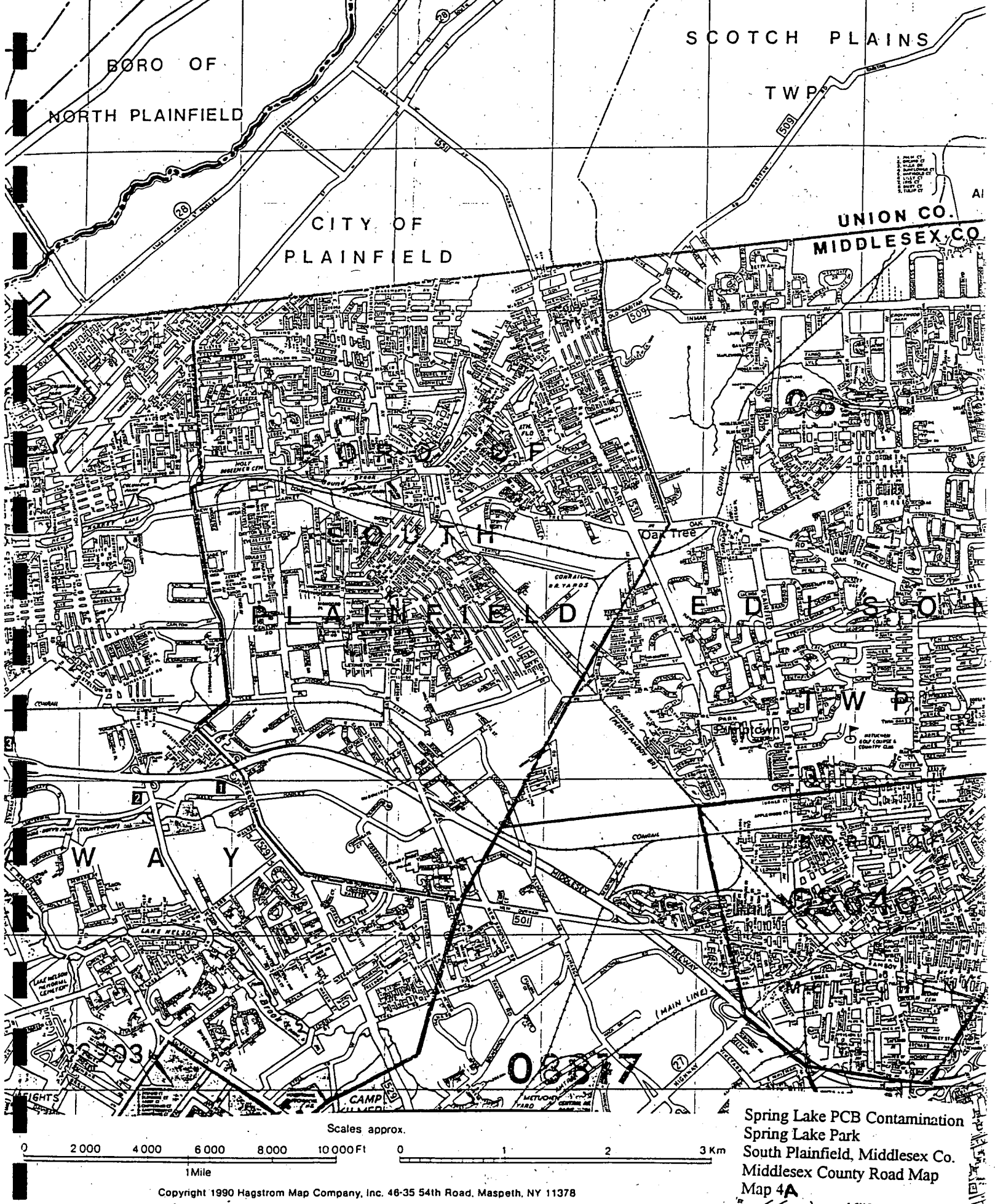
SEDIMENT SAMPLES
COLLECTED
APRIL 20 AND 21, 1999

500 0 500 1000 1500 2000 2500 Feet

SPRING LAKE PCB CONTAMINATION
MAP 3D - SAMPLE LOCATIONS

500 0 500 1000 1500 2000 2500 Feet

SEDIMENT SAMPLES
COLLECTED
APRIL 20 AND 21, 1999



Spring Lake PCB Contamination
Spring Lake Park
South Plainfield, Middlesex Co.
Middlesex County Road Map
Map 4A

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SUBJECT TO REVISION

100,000 GPD WATER WITHDRAWAL POINTS ONLY AND CONTAMINATED SITES WITHIN 5.0 MILES OF:

LATITUDE 403500
LONGITUDE 742443

DRAFT

SCALE: 1:63,360
(1 Inch = 1 Mile)

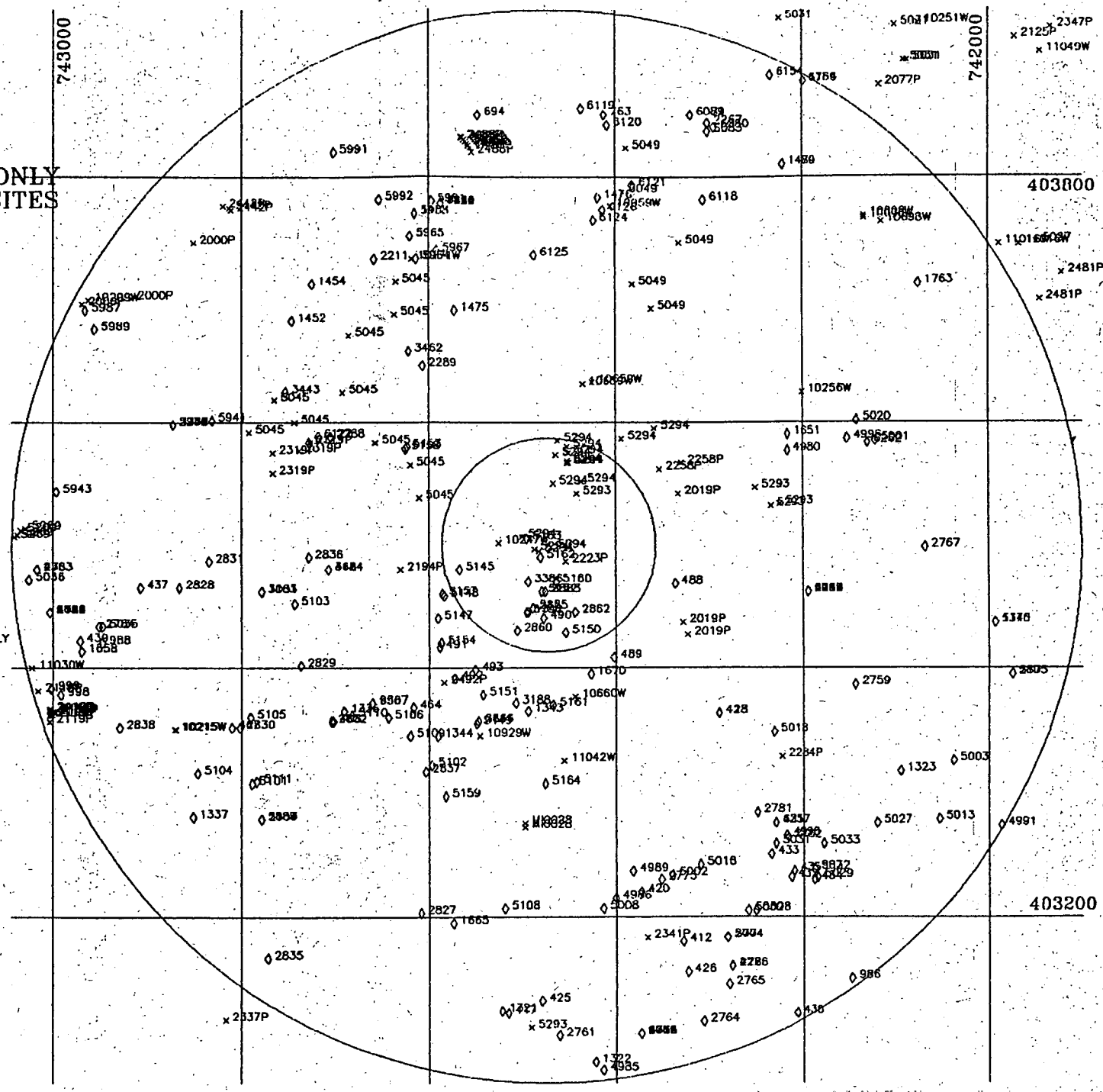
1 mile

× 100,000 GPD WATER WITHDRAWAL POINTS ONLY
◊ CONTAMINATED SITES
1 MILE AND 5 MILE RADII INDICATED

CONTAMINATED SITE LIST
AS OF 03/21/95

PLOT PRODUCED BY:
NJDEP
WATER SUPPLY ELEMENT
BUREAU OF WATER ALLOCATION
CN-426
TRENTON, NJ 08625

DATE: 03/12/99



MAP 5

SUBJECT TO REVISION

NUMBER	NAME	SOURCE	LOCID	LAT	LON	LLACC	DISTANCE	COUNTY	MUN	DEPTH	GEO1	GEO2	CAPACITY
10059W	1225 SOUTH CORPORATION	2513694	2	403746	742403	T	3.2	39	12	400	GTRB		200
10171W	STONY BROOK LAUNDRY, INC.	2519211	#1	403720	742611	T	3.0	35	14	70			75
10209W	WARRENVILLE ASSOCIATES, LTD	4546853	WELL 1	403700	742938	T	4.9	35	20	325			150
10215W	CAPTIVE PLASTICS	2515990	#1	403330	742842	T	3.9	23	17	240	GTRB		65
	CAPTIVE PLASTICS	2523677	#2	403330	742843	T	3.9	23	17	230	GTRB		130
10247W	KEYSTONE PLASTICS/CANCELLED	2512830	WELL 2	403501	742515	M	0.5	23	22	300	GTRB		48
10251W	WESTFIELD TOWN	2512169	WELL 1	403914	742045	T	6.0	39	20	246	GTRB		70
10256W	UNION CO DEPT OF PARKS & REC	WELL 1	ASH BROOK	403615	742200	U	2.8	39	16	263	GTREP		150
10659W	MUHLENBERG HOSPITAL	4500042	1	403619	742421	F	1.5	39	12	298	GTRB		160
	MUHLENBERG HOSPITAL	2510489	3	403620	742415	F	1.6	39	12	502	GTRB		320
10660W	JERSEY CONCRETE CO.	2523891	1	403346	742426		1.4	23	22	285	GTRB		87
	JERSEY CONCRETE CO.	2526404	2	403346	742426		1.4	23	22	340	GTRB		82
10698W	SHACKAMAXON GOLF & CNTRY CLUB	POND	01	403738	742109	M	4.3	39	16		SRYAH	SY	1000
	SHACKAMAXON GOLF & CNTRY CLUB	2503550	MACH SHOP	403740	742120	T	4.3	39	16	301	GTRB		250
	SHACKAMAXON GOLF & CNTRY CLUB	2503551	POOL WELL	403741	742120	T	4.3	39	16	300	GTRB		60
10929W	L.R. METAL TREATING	4549251	1	403327	742527	T	1.9	23	22	200	GTRBP		100
11016W	AUTOMATIC INDUSTRIES INC	2604724	WELL 1	403727	741953	T	5.1	39	16	207	GTREP		75
	AUTOMATIC INDUSTRIES INC	2604732	WELL 2	403727	741940	T	5.2	39	16	245	GTREP		75
11030W	SPRAY-TEK	2546237	WELL 2	403400	743013	T	4.9	23	11	250	GTREP		58
11042W	TINGLEY RUBBER CORPORATION	2509733	1	403315	742433	S	2.0	23	22	428	GTRB		200
11049W	PETRO PLASTICS	4652773	WELL 1	403900	741927	T	6.5	39	06	252	GTRB		140
	PETRO PLASTICS	4652772	WELL 2	403900	741927	T	6.5	39	06	148	GTRB		45
2000P	SOMERSET COUNTY PARK COMMISION	2512669	1	403658	742942	T	4.9	35	20	115	GTRB		236
	SOMERSET COUNTY PARK COMMISION	POND		403728	742831	T	4.4	35	20		SRLOW		1500
	SOMERSET COUNTY PARK COMMISION	2525878	2	403701	742911	T	4.5	35	20	300	GTRB		15
2019P	L.A. DREYFUS COMPANY	4500040	1	403416	742314	F	1.5	23	05	750	GTRB		550
	L.A. DREYFUS COMPANY	2521275	2	403422	742317	F	1.4	23	05	705	GTRB		460
	L.A. DREYFUS COMPANY	2521034	OBSERVATIO	403525	742320	U	1.3	23	05	900	GTRB		520
2077P	LORD & TAYLOR	2510521	1	403844	742110	F	5.3	39	20	600	GTRB		240
2119P	AIR PRODUCTS & CHEMICALS	2503866	4-NORTH	403339	743002	S	4.9	23	11	404	GTRB		250
	AIR PRODUCTS & CHEMICALS	2501478	3-SOUTH	403337	743002	S	4.9	23	11	340	GTRB		250
	AIR PRODUCTS & CHEMICALS	2526293	W-2	403338	742959	S	4.9	23	11	85	GTRB		5
	AIR PRODUCTS & CHEMICALS	2530486	R-1	403339	743000	S	4.9	23	11	9.5	GOGU		40
	AIR PRODUCTS & CHEMICALS	2530487	R-2	403339	742959	S	4.9	23	11	12.5	GOGU		40
	AIR PRODUCTS & CHEMICALS	2526298	W-7	403337	743001	S	4.9	23	11	85	GTRB		5
	AIR PRODUCTS & CHEMICALS	2530491	R-6	403334	743002	S	4.9	23	11	12	GOGU		40
	AIR PRODUCTS & CHEMICALS	2530492	R-7	403338	743001	S	4.9	23	11	11.5	GOGU		40
	AIR PRODUCTS & CHEMICALS	2530494	R-9	403337	743001	S	4.9	23	11	11.5	GOGU		40
	AIR PRODUCTS & CHEMICALS	2530495	R-10	403337	743000	S	4.9	23	11	12	GOGU		40
	AIR PRODUCTS & CHEMICALS	2534466	R-11	403349	743009	S	4.9	23	11	11.4	GOGU		40
	AIR PRODUCTS & CHEMICALS	2530488	R-3	403338	742959	S	4.9	23	11	9	GOGU		40
	AIR PRODUCTS & CHEMICALS	2530490	R-5	403340	743001	S	4.9	23	11	8.5	GOGU		40
	AIR PRODUCTS & CHEMICALS	2530489	R-4	403340	743002	S	4.9	23	11	12.5	GOGU		40
2125P	LERMER PACKAGING CORP.	2602649	WELL 1	403907	741943	U	6.4	39	06	302	GTRB		200
2194P	DESIGN AND MOLDING SERVICES	4500252	1	403448	742618	S	1.4	23	17	390	GTRB		120
	DESIGN AND MOLDING SERVICES	2522656	2	403448	742618	S	1.4	23	17	294	GTRB		120
2223P	KENTILE FLOORS/UNITED CAPITAL	2500845	1	403452	742432	S	0.2	23	22	240	GTRB		250
	KENTILE FLOORS/UNITED CAPITAL	2500846	2	403452	742432	S	0.2	23	22	174	GTRB		
2255P	PLAINFIELD COUNTRY CLUB	2506539	1	403537	742332	F	1.3	23	05	600	GTRB		300
	PLAINFIELD COUNTRY CLUB	4500307	2	403540	742318	S	1.5	23	05	204	GTRB		75
2294P	METUCHEN GOLF & COUNTRY CLUB	2512000	WELL NO. 1	403317	742214						[illegible]		[illegible]
2319P	NATIONAL STARCH & CHEMICAL	2500611[illegible]	1	403545	742740	F	2.7	23	03	304	GTRB		350
	NATIONAL STARCH & CHEMICAL	2500611P	2	403546	742723	F	2.5	39	12	304	GTRB		350
	NATIONAL STARCH & CHEMICAL	2511751	6	403550	742716	S	2.4	39	12	436	GTRB		700
	NATIONAL STARCH & CHEMICAL	2514906	7	403535	742740	S	2.7	23	03	600	GTRB		450

NUMBER	NAME	SOURCEID	LOCID	LAT	LON	LLACC	DISTANCE	COUNTY	MUN	DEPTH	GED1	GED2	CAPACITY
2337P	RUTGERS UNIVERSITY GOLF COURSE	2521440	1	403110	742910	F	5.3	23	17	300	GTRB		300
	RUTGERS UNIVERSITY GOLF COURSE	STORAGE POND		403110	742910	F	5.3	23	17	14	SR		500
2341P	AMERCHOL CORP.	2504515	1	403150	742340		3.7	23	05	525	GTRB		150
2347P	GARWOOD PAPERBOARD MILL	4600192	1	403912	741920		6.7	39	06	126	GTRB		150
	GARWOOD PAPERBOARD MILL	4600193	2	403912	741920		6.7	39	06	194	GTRB		
	GARWOOD PAPERBOARD MILL	4600194	3	403912	741920		6.7	39	06	225	GTRB		300
	GARWOOD PAPERBOARD MILL	4600195	4	403912	741920		6.7	39	06	235	GTRB		300
2443P	TWIN BROOKS COUNTRY CLUB	2512540	WELL 1	403745	742808	F	4.3	35		210	GTRBS		100
	TWIN BROOKS COUNTRY CLUB	LOWER	LOWER IMP.	403744	742807	F	4.3	35		12	GTRBS		750
	TWIN BROOKS COUNTRY CLUB	UPPER	UPPER IMP.	403746	742812	F	4.4	35			GTRBS		0
2481P	KODAK-POLYCHROME GRAPHICS CO.	2604663	WELL 1	403700	741927	U	5.1	39	02	300	GTREP		240
	KODAK-POLYCHROME GRAPHICS CO.	2604667	RW-1	403700	741927	U	5.1	39	02	300	GTREP		
	KODAK-POLYCHROME GRAPHICS CO.	2604671	RW-2	403713	741913	U	5.4	39	02	300	GTREP		
2485P	SANDERS, A LOCKHEED MARTIN CO.	PROPOSED	EW-411	403819	742539	U	3.9	35	21		GTREP		20
	SANDERS, A LOCKHEED MARTIN CO.	PROPOSED	EW-412	403819	742538	U	3.9	35	21		GTREP		20
	SANDERS, A LOCKHEED MARTIN CO.	PROPOSED	EW-413	403818	742537	I	3.9	35	21		GTREP		20
	SANDERS, A LOCKHEED MARTIN CO.	PROPOSED	EW-414	403817	742536	U	3.8	35	21		GTREP		20
	SANDERS, A LOCKHEED MARTIN CO.	PROPOSED	EW-415	403816	742535	U	3.8	35	21		GTREP		20
	SANDERS, A LOCKHEED MARTIN CO.	PROPOSED	EW-416	403815	742534	U	3.8	35	21		GTREP		20
	SANDERS, A LOCKHEED MARTIN CO.	PROPOSED	EW-417	403814	742533	U	3.8	35	21		GTREP		20
	SANDERS, A LOCKHEED MARTIN CO.	PROPOSED	EW-418	403812	742532	U	3.7	35	21		GTREP		20
2492P	DEGUSSA CORP.	4549678	FW	403353	742550	U	1.6	23	22	350	GTREP		325
	DEGUSSA CORP.	2521892	IW	403353	742550	U	1.6	23	22	200	GTREP		325
5027	ELIZABETHTOWN WATER COMPANY	2604751	ELKS CLUB	403728	741929	F	5.4	39	02	59	GOSD		288
5031	ELIZABETHTOWN WATER COMPANY	2509281	MORSE AVE.	403917	742215	F	5.4	39	16	400	GTREP		300
	ELIZABETHTOWN WATER COMPANY	2508087	ELM STREET	403913	742100	F	5.8	39	20	525	GTREP		350
	ELIZABETHTOWN WATER COMPANY	2500873	WESTFIELD1	403856	742052	F	5.6	39	20	523	GTREP		400
	ELIZABETHTOWN WATER COMPANY	4500005	WESTFIELD2	403856	742054	F	5.6	39	20	502	GTREP		350
5045	ELIZABETHTOWN WATER COMPANY	2513106	ROKVW TERR	403709	742621		2.9	39	12	400	GTREP		200
	ELIZABETHTOWN WATER COMPANY	2513898	ROKVW AVE	403653	742622		2.6	39	12	220	GTRB		300
	ELIZABETHTOWN WATER COMPANY	4500022	BD. OF ED.	403643	742651		2.7	39	12	300	GTREP		400
	ELIZABETHTOWN WATER COMPANY	2513248	ROK AVE-PS	403600	742726		2.6	23	17	350	GTREP		150
	ELIZABETHTOWN WATER COMPANY	2512665	ROK AV.GR	403611	742739		2.9	35	09	350	GTREP		350
	ELIZABETHTOWN WATER COMPANY	4500023	GR BRK #1	403555	742755		3.0	35	09	451	GTREP		310
	ELIZABETHTOWN WATER COMPANY	4500024	GR BRK #2	403555	742755		3.0	35	09	376	GTRB		650
	ELIZABETHTOWN WATER COMPANY	4500025	GR BRK #3	[illegible]	[illegible]		3.0	35	09	550	GTREP		60
	ELIZABETHTOWN WATER COMPANY	4500026	GR BRK #4	[illegible]	[illegible]		3.0	35	09	400	GTREP		350
	ELIZABETHTOWN WATER COMPANY	2500572	GR BRK #5	[illegible]	[illegible]		3.0	35	09	454	GTREP		315
	ELIZABETHTOWN WATER COMPANY	2500632	GR BRK #6	[illegible]	[illegible]		3.0	35	09	473	GTREP		600
	ELIZABETHTOWN WATER COMPANY	2500633	GR BRK #7	[illegible]	[illegible]		3.0	35	09	545	GTREP		80
	ELIZABETHTOWN WATER COMPANY	2502715	GR BRK #8	[illegible]	[illegible]		3.0	35	09	445	GTREP		150
	ELIZABETHTOWN WATER COMPANY	2502716	GR BRK #9	[illegible]	[illegible]		3.0	35	09	507	GTREP		500
	ELIZABETHTOWN WATER COMPANY	4500027	PLNFLD CTY	403615	742655		2.4	39	12	305	GTREP		400
	ELIZABETHTOWN WATER COMPANY	2512961	STH ST	[illegible]	[illegible]		1.9	39	12	350	GTREP		240
	ELIZABETHTOWN WATER COMPANY	2512632	STH ST	[illegible]	[illegible]		1.5	23	22	350	GTREP		240
	ELIZABETHTOWN WATER COMPANY	2513354	CLINTON AV	[illegible]	[illegible]		1.3	23	22	350	GTREP		475
	ELIZABETHTOWN WATER COMPANY	2502717	GR BRK #11	[illegible]	[illegible]		3.0	35	09	433	GTREP		200
5049	ELIZABETHTOWN WATER COMPANY	4500009	NW #1	[illegible]	[illegible]		3.4	39	12	350	GTREP		225
	ELIZABETHTOWN WATER COMPANY	4500010	NW #2	[illegible]	[illegible]		3.4	39	12	500	GTREP		225
	ELIZABETHTOWN WATER COMPANY	4500011	NW #3	[illegible]	[illegible]		3.4	39	12	350	GTREP		450
	ELIZABETHTOWN WATER COMPANY	4500012	NW #4	[illegible]	[illegible]		3.4	39	12	400	GTREP		300
	ELIZABETHTOWN WATER COMPANY	4500013	NW #5	[illegible]	[illegible]		3.4	39	12	350	GTREP		350
	ELIZABETHTOWN WATER COMPANY	4500014	NW #6	[illegible]	[illegible]		3.4	39	12	300	GTREP		
	ELIZABETHTOWN WATER COMPANY	4500015	NW #7	[illegible]	[illegible]		3.4	39	12	350	GTREP		350
	ELIZABETHTOWN WATER COMPANY	4500016	NW #8	[illegible]	[illegible]		3.4	39	12	304	GTREP		350
	ELIZABETHTOWN WATER COMPANY	4500017	NW #9	[illegible]	[illegible]		3.4	39	12	350	GTREP		350

NUMBER	NAME	SOURCEID	LOCID	LAT	LON	LLACC	DISTANCE	COUNTY	MUN	DEPTH	GEO1	GEO2	CAPACITY
	ELIZABETHTOWN WATER COMPANY	4500018	NW #10	403753	742355		3.4	39	12	350	GTRBP		350
	ELIZABETHTOWN WATER COMPANY	4500019	NW #11	403753	742355		3.4	39	12	350	GTRBP		250
	ELIZABETHTOWN WATER COMPANY	4500020	NW #12	403753	742355		3.4	39	12	350	GTRBP		250
	ELIZABETHTOWN WATER COMPANY	2508185	WATCHUNG A	403708	742349		2.6	39	12	605	GTRBP		300
	ELIZABETHTOWN WATER COMPANY	2509037	PROSPECT A	403456	742337		2.4	39	12	350	GTRBP		300
	ELIZABETHTOWN WATER COMPANY	2512631	ABERDEEN R	403726	742319		3.1	39	16	350	GTRBP		390
	ELIZABETHTOWN WATER COMPANY	4500021	GEORGE ST.	403814	742353		3.8	39	12	350	GTRBP		225
5269	ELIZABETHTOWN WATER COMPANY	2511582	4	403504	743024	F	5.0	23	11	300	GTRB		300
	ELIZABETHTOWN WATER COMPANY	4500043	6	403505	743022	F	4.9	23	11	412	GTRB		400
	ELIZABETHTOWN WATER COMPANY	2511367	7	403507	743020	F	4.9	23	11	255	GTRB		300
	ELIZABETHTOWN WATER COMPANY	2513397	8	403508	743017	F	4.9	23	11	430	GTRB		300
5293	MIDDLESEX WATER COMPANY	2500408	1	403528	742231		2.0	23	05	502	GTRB		567
	MIDDLESEX WATER COMPANY	2503970	2	403528	742231	U	2.0	23	05	560	GTRB		200
	MIDDLESEX WATER COMPANY	2502008	3	403528	742231	U	2.0	23	05	507	GTRB		450
	MIDDLESEX WATER COMPANY	2502009	4	403528	742231		2.0	23	05	508	GTRB		750
	MIDDLESEX WATER COMPANY	2504516	5	403528	742231		2.0	23	05	532	GTRB		300
	MIDDLESEX WATER COMPANY	2513518	THERMAL	403106	742454		4.5	23	05	566	GTRB		200
	MIDDLESEX WATER COMPANY	2504517	6	403528	742231		2.9	23	05	540	GTRB		400
	MIDDLESEX WATER COMPANY	2505432	7	403525	742425		0.5	23	05	608	GTRB		300
	MIDDLESEX WATER COMPANY	2505637	8	403520	742215		2.2	23	05	629	GTRB		500
	MIDDLESEX WATER COMPANY	2505965	9	403519	742221		2.1	23	05	700	GTRB		300
5294	MIDDLESEX WATER COMPANY	2509603	SPRAGUE #1	403552	742356		1.2	23	22	101	GOSD		790
	MIDDLESEX WATER COMPANY	2511464	SPRAGUE #2	403557	742335		1.5	23	22	151	GOSD		790
	MIDDLESEX WATER COMPANY	2511823	SPRNG LK 5	403458	742452		0.1	23	22	500	GTRB		600
	MIDDLESEX WATER COMPANY	2511828	SPRNG LK 6	403459	742441		0.0	23	22	504	GTRB		500
	MIDDLESEX WATER COMPANY	2512364	SPRNG LK 8	403504	742500		0.3	23	22	501	GTRB		650
	MIDDLESEX WATER COMPANY	2512365	SPRNG LK 9	403457	742449		0.1	23	22	500	GTRB		350
	MIDDLESEX WATER COMPANY	4500274	PARK AV 18	403540	742430	U	0.8	23	22	74	GOSD		1400
	MIDDLESEX WATER COMPANY	4500275	PARK AV 19	403540	742430	U	0.8	23	22	76	GOSD		1100
	MIDDLESEX WATER COMPANY	4500276	PARK AV 20	403540	742430	U	0.8	23	22	82	GOSD		1450
	MIDDLESEX WATER COMPANY	4500277	PARK AV 21	403540	742430	U	0.8	23	22	73	GOSD		1000
	MIDDLESEX WATER COMPANY	4500278	PARK AV 22	403540	742430	U	0.8	23	22	514	GTRB		320
	MIDDLESEX WATER COMPANY	2509763	PARK AV 23	403551	742437		1.0	23	22		GOSD		700
	MIDDLESEX WATER COMPANY	4500279	PARK AV 24	403540	742430	U	0.8	23	22	110	GOSD		450
	MIDDLESEX WATER COMPANY	2511815	PARK AV 25	403531	742422		0.7	23	22		GTRB		850
	MIDDLESEX WATER COMPANY	2511816	PARK AV 26	403530	742440		0.6	23	22	495	GTRB		400
	MIDDLESEX WATER COMPANY	2511822	PARK AV 27	403540	742431		0.8	23	22	501	GTRB		
	MIDDLESEX WATER COMPANY	2512119	PARK AV 28	403541	742431		0.8	23	22	500	GTRB		250
	MIDDLESEX WATER COMPANY	2512120	PARK AV 29	403544	742438		0.8	23	22	500	GTRB		730
	MIDDLESEX WATER COMPANY	2512130	PARK AV 30	403548	742431		0.9	23	22	500	GTRB		350
	MIDDLESEX WATER COMPANY	2512461	PARK AV 31	403540	742430	U	0.8	23		500	GTRB		425
	MIDDLESEX WATER COMPANY	2512131	PARK AV 32	403545	742430		0.9	23	22	501	GTRB		250
MI0028	COFFOLA, FRANK	POND	1	403243	742458	F	2.6	23	22	17	GTRB		300
	COFFOLA, FRANK	4500356	WELL 1	403245	742458	F	2.6	23	22	310	GTRB		100

Number of Observations: 155

WATER WITHDRAWAL POINTS
REFERENCE SHEET

THE FOLLOWING CODES DENOTE THE TYPE OF WELL OR SURFACE WATER INTAKE AS LISTED ON WATER WITHDRAWAL POINTS MAPS.

1000D - DEWATERING PERMIT OR TEMPORARY PUMPING PERMIT
2000 - INDUSTRIAL PERMITS, GOLF COURSES AND REMEDIATION PUMPING PERMITS
4000 - SURFACE DIVERSION AND SURFACE WATER INTAKES
5000 - PUBLIC WATER SUPPLY WELLS
10000 - WELLS WITH THE CAPACITY TO PUMP >100,000 GALLONS BUT DO NOT
XX0000 - AGRICULTURAL CERTIFICATION, FIRST TWO LETTERS ARE THE FIRST TWO LETTERS OF THE COUNTY IN WHICH THE PERMIT IS ISSUED.

P - PRIVATE WELL
PS - PRIVATE SURFACE INTAKE

DESCRIPTION OF WATER WITHDRAWAL POINTS

The Water Withdrawal Points listing contains the following fields:

CAPACITY: the pump capacity in gallons per minute
COUNTY: county the withdrawal point is in
DEPTH: depth of the well or pond
DISTANCE: distance in miles from center of circle
GEO1: the ground or surface water source
GEO2: a secondary source of the water
LAT: latitude of the withdrawal point
LLACC: accuracy of the latitude and longitude estimates
LOCID: the local identification of the withdrawal point, or a continuation of the SOURCEID field for surface water
LON: longitude of the withdrawal point
MUN: the municipality the withdrawal point is in
NAME: name of the permit, certificate, or registration holder
NUMBER: Water Allocation permit, Agricultural Certification, or Registration number
SOURCEID: the well permit number or other identifier for the water withdrawal

The listing that you have requested includes most wells and surface intakes that are in the Water Allocation Permits, and representative sources from most of the Agricultural Certificates. Recognizing the fact that the list will contain errors and omissions, it is advisable to use this resource as a guide and to verify all data. We try to maintain an accurate database; however, we can not yet guarantee reliability. If you spot any errors we would be very grateful to hear about them. Please call or write to us in reference to the "Radius Program" at:

NJDEP
Division of Water Resources
Bureau of Water Allocation
CN-029
Trenton, NJ 08625

(609) 292-2957

Thank you.

Please see the attached sheets for definitions of the codes used in the Water Withdrawal Points listing.

CODES USED IN THE WATER WITHDRAWAL POINTS LISTING

This packet contains information on the database codes that the Bureau of Water Allocation uses in the Water Withdrawal Points Listing.

COUNTY:

01 - Atlantic	15 - Gloucester	29 - Ocean
03 - Bergen	17 - Hudson	31 - Passaic
05 - Burlington	19 - Hunterdon	33 - Salem
07 - Camden	21 - Mercer	35 - Somerset
09 - Cape May	23 - Middlesex	37 - Sussex
11 - Cumberland	25 - Monmouth	39 - Union
13 - Essex	27 - Morris	41 - Warren

GEO:

RECENT	
Surficial Deposits	GRS
PLEISTOCENE	
Glacial Undifferentiated	GQGU
Stratified Drift	GQSD
Terminal Moraine	GQTM
Bridgeton	GQBS
Cape May	GQCM
Holly Beach Mbr.	GQCHB
Estuarine Sand	GQES
Pennsauken	GQPS
TERTIARY	
Beacon Hill	GTBH
Cohansey	GTCH
Cohansey & Kirkwood	GTCK
Kirkwood	GTKW
Upper	GTKWU
Rio Grande	GTKRG
Lower	GTKWL
Piney Point Mbr.	GTKPP
Shark River Marl	GTSR
Manasquan Marl	GTMQ
Vincentown Sand	GTVT
Hornerstown Marl	GTHT
CRETACEOUS	
Red Bank	GKRB
Navesink	GKNS
Mount Laurel	GKML
Wenonah	GKWE
Mount Laurel & Wenonah	GKMW
Marshalltown	GKMT
Englishtown	GKET
Woodbury	GKWB
Merchantville	GKMV
Magothy	GKM

Old Bridge	GKROB
Raritan	GKR
Sayreville Sand	GKRSS
Farrington	GKRF
Raritan/Magothy	GKMR
Potomac	GKP
TRIASSIC	
Brunswick Formation	GTRB
Lockatong Formation	GTRL
Stockton Formation	GTRS
Basalt	GTRBS
Diabase	GTRDB
Conglomerate	GTRCG
DEVONIAN	
Undifferentiated	GD
SILURIAN	
Bossardville Limestone	GSBD
Decker Formation	GSDK
Longwood Shale	GSLS
Poxono Island Fm	GSPI
Greenpond Conglomerate	GSGP
High Falls	GSHF
Shawangunk Fm	GSSG
ORDOVICIAN	
Martinsburg Fm	GOMB
Jacksonburg Fm	GOJB
Kittatinny Group	GOK
Outleaunee Fm	GOKO
Harmonyvale Mbr	GOKOH
Beaver Run Mbr	GOKOB
Epler	GOKE
Rickenbach	GOKR
CAMBRO ORDOVICIAN	
Kittatinny Fm	GCOK
CAMBRIAN	
Hardyston Quartzite	GCH
Allentown Fm	GCKA
Upper Mbr	GCKU
Limeport Mbr	GCKLP
Leithsville Fm	GCKL
Walkill Mbr	GCKLW
Hamburg Mbr	GCKLH
Califon Mbr	GCKLC
PRECAMBRIAN	
Granite	GPCGR
Gneiss	GPCGN
Undifferentiated	GPC

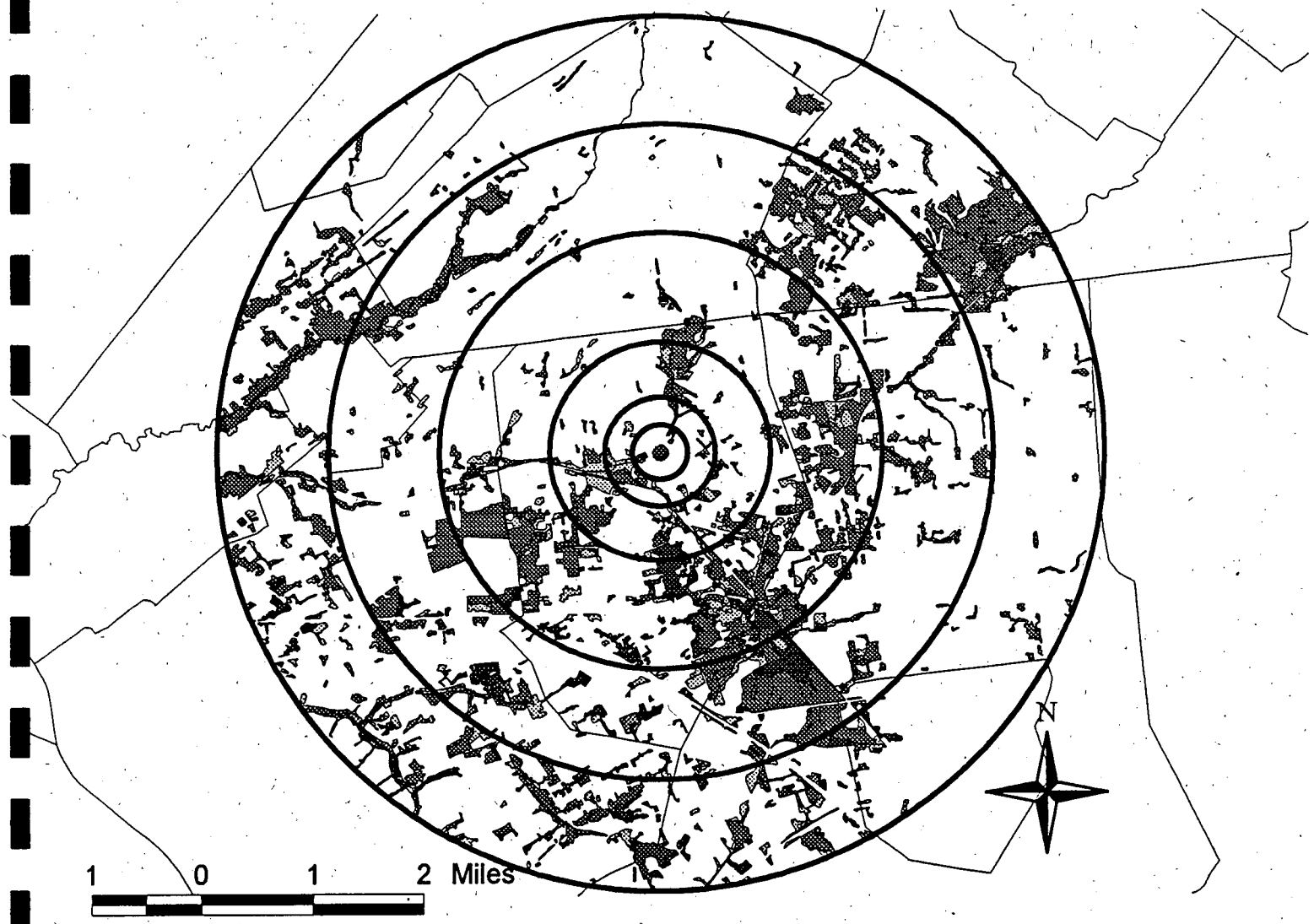
Upper Mid-Passaic River	SPUMP
Upper Passaic River	SPUPP
Wanaque River	SPWAN
Whippany River	SPWHI
ATLANTIC COASTAL BASIN	
Unknown or Non-Specific	SC
Atlantic County Coastal	SCATL
Cape May County Coastal	SCCAP
Cedar Creek	SCCED
Great Egg Harbor River	SCGRE
Manasquan River	SCMSQ
Metedeconk River	SCMET
Monmouth County Coastal	SCMON
Mullica River	SCMUL
Navesink River	SCNAV
Ocean County Coastal	SCOCE
Raritan Bay	SCRAR
Shark River	SCSHA
Shrewsbury River	SCSHR
Toms River	SCTOM
Tuckahoe River	SCTUC
HUDSON RIVER BASIN	
Unknown or Non-Specific	SH
Hudson River	SHHUD
Papakating Creek	SHPAP
Pochuck Creek	SHPOC
Wallkill River	SHWAL
HACKENSACK RIVER BASIN	
Unknown or Non-Specific	SK
Hackensack River	SKHAC
RAHWAY RIVER BASIN	
Unknown or Non-Specific	SY
Rahway River	SYRAH
ELIZABETH RIVER BASIN	
Unknown or Non-Specific	SE
Elizabeth River	SEELI
DELAWARE BAY BASIN	
Unknown or Non-Specific	SB
Cohansey River	SBCOH
Maurice River	SBMAU
Stow Creek	SBSTO

LLACC:

S - accurate to +- 1 second
F - accurate to +- 5 seconds
T - accurate to +- 10 seconds
M - accurate to +- 1 minute
U - accuracy unknown

Franklin Lms	GPCFL
DELAWARE RIVER BASIN	
Unknown or Non-Specific	SD
Alloways Creek	SDALL
Alexsocken Creek	SDALE
Assiscunk Creek	SDASC
Assunpink Creek	SDASP
Big Timber Creek	SDBIG
Blacks Creek	SDBLA
Cooper's Creek	SDCOO
Crafts Creek	SDCRA
Crosswicks Creek	SDCRO
Delaware River	SDDEL
Flat Brook	SDFLA
Hakihokake Creek	SDHAK
Harihokake Creek	SDHAR
Jacob's Creek	SDJAC
Lockatong Creek	SDLOC
Lopatcong Creek	SDLOP
Mantua Creek	SDMNT
Musconetcong River	SDMUS
Nichisakawick Creek	SDNIC
Old Man's Creek	SDOLD
Paulins Kill	SDPAU
Pennsauken Creek	SDPEN
Pequest River	SDPST
Pohatcong Creek	SDPOH
Raccoon Creek	SDRAC
Rancocas Creek	SDRAN
Salem River	SDSAL
Wickecheoke Creek	SDWIC
RARITAN RIVER BASIN	
Unknown or Non-Specific	SR
Lawrence Brook	SRLAW
Lower Raritan	SRLOW
Millstone River	SRMIL
North Branch Raritan	SRNBR
South Branch Raritan	SRSBR
South River	SRSRV
PASSAIC RIVER BASIN	
Unknown or Non-Specific	SP
Canoe Brook	SPCAN
Lower Mid-Passaic River	SPLMP
Lower Passaic	SPLOW
Passaic River	SPPAS
Peckman River	SPPEC
Pequannock River	SPPNK
Pompton River	SPPOM
Ramapo River	SPRAM
Rockaway River	SPROC
Saddle River	SPSAD

MAP 6 - WETLANDS MAP
SPRING LAKE PCB CONTAMINATION
SOUTH PLAINFIELD, MIDDLESEX COUNTY
Lat: 40° 35' 00.00" , Long: -74° 24' 43.00"



Ring	1	(0.00- 0.25)	has Wetlands Acres:	9
Ring	2	(0.25- 0.50)	has Wetlands Acres:	76
Ring	3	(0.50- 1.00)	has Wetlands Acres:	330
Ring	4	(1.00- 2.00)	has Wetlands Acres:	1580
Ring	5	(2.00- 3.00)	has Wetlands Acres:	1816
Ring	6	(3.00- 4.00)	has Wetlands Acres:	2083

*Based on 1986 Land Use/Land Cover Data

NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP

BOROUGH OF
SOUTH PLAINFIELD, NEW JERSEY
MIDDLESEX COUNTY

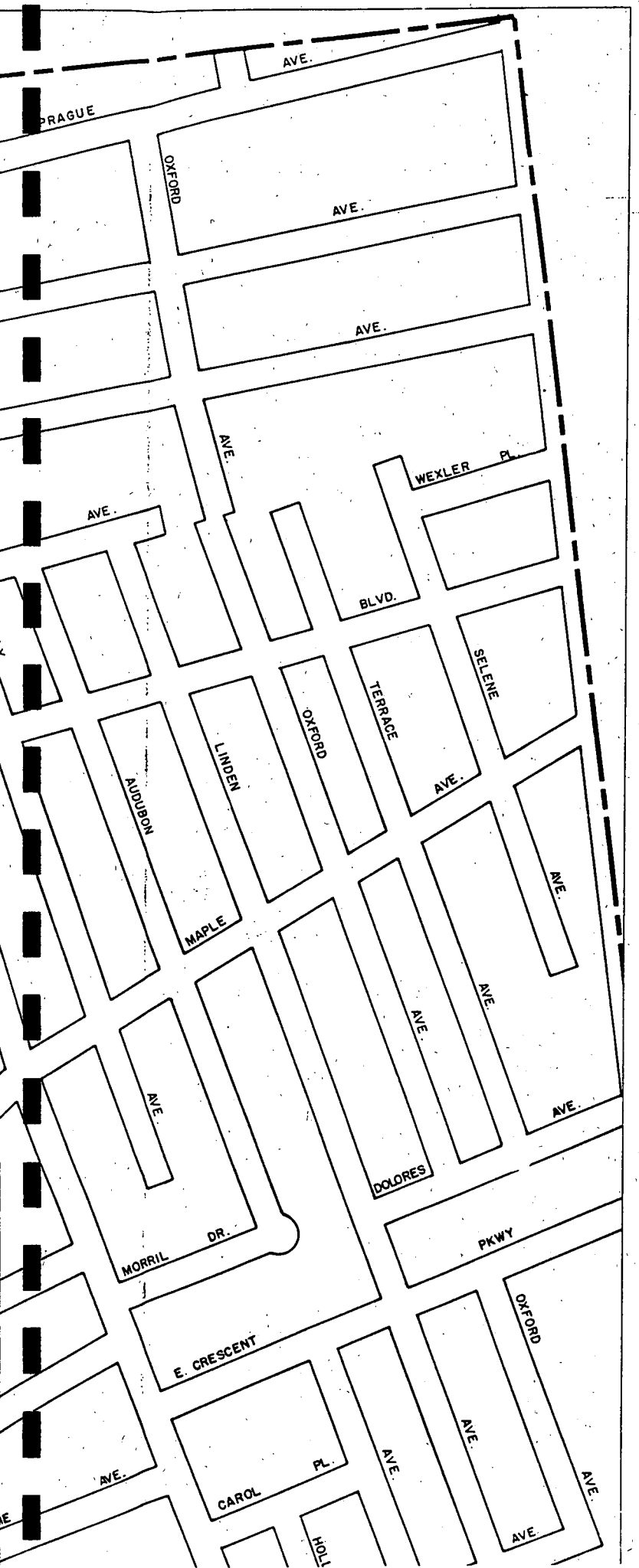
PANEL 1 OF 5
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
340279 0001 B

EFFECTIVE DATE:
AUGUST 1, 1980

U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

MAP 7



KEY TO MAP

500-Year Flood Boundary
100-Year Flood Boundary
Zone Designations* With Date of Identification e.g., 12/2/74
100-Year Flood Boundary
500-Year Flood Boundary

ZONE B
ZONE A1 DATE
ZONE A2 DATE
ZONE B

Base Flood Elevation Line With Elevation In Feet** — 513

Base Flood Elevation in Feet Where Uniform Within Zone** — (EL 987)

Elevation Reference Mark — RM7 ×

River Mile — • M1.5

**Referenced to the National Geodetic Vertical Datum of 1929

*EXPLANATION OF ZONE DESIGNATIONS

ZONE	EXPLANATION
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; average depths of inundation are shown, but no flood hazard factors are determined.
AH	Areas of 100-year shallow flooding where depths are between one (1) and three (3) feet; base flood elevations are shown, but no flood hazard factors are determined.
A1-A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Areas between limits of the 100-year flood and 500-year flood; or certain areas subject to 100-year flooding with average depths less than one (1) foot or where the contributing drainage area is less than one square mile; or areas protected by levees from the base flood. (Medium shading)
C	Areas of minimal flooding. (No shading)
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V1-V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

NOTES TO USER

Certain areas not in the special flood hazard areas (zones A and V) may be protected by flood control structures.

This map is for flood insurance purposes only; it does not necessarily show all areas subject to flooding in the community or all planimetric features outside special flood hazard areas.

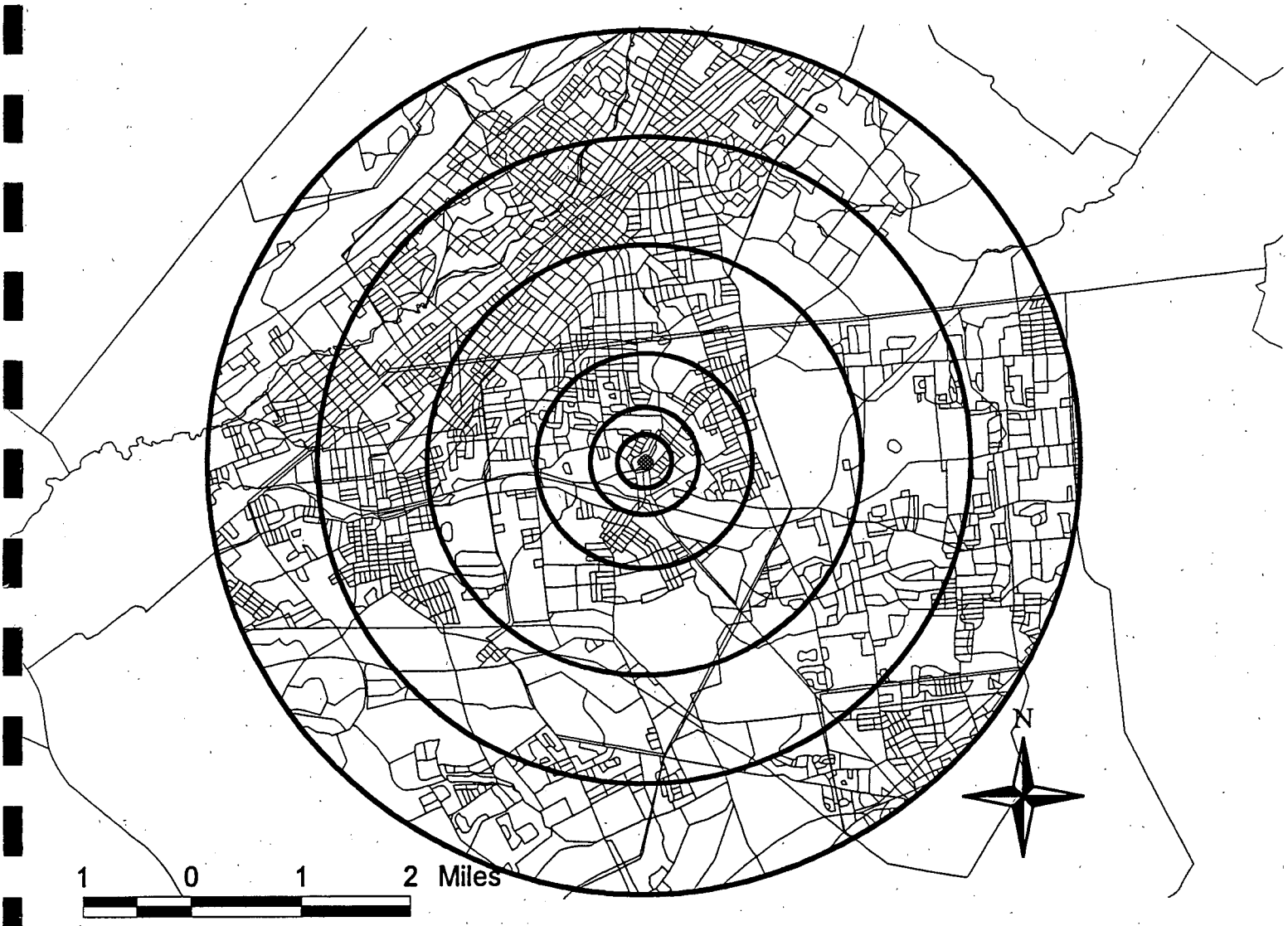
For adjoining map panels, see separately printed Index To Map Panels.

INITIAL IDENTIFICATION:
FEBRUARY 22, 1974

FLOOD HAZARD BOUNDARY MAP REVISIONS:
MARCH 5, 1976

RISOLI
TER.
AVE.
LIBOUREL
RD.
ZONE B
CROMWELL
PL.
N. MADISON
DR.
SON DR.
ZONE B
S. MADISON
DR.
LAKE
ST.
ZONE B
MERCHANTS
AVE.
TRIANGLE
PL.
SAMPTON AVE
SPRING AVE
AVE.
ZONE B
VAN FLEET
AVE
RITTER
LEE
PL.
MAPLE
PL.
PINE
LOWDEN
WILLOW
RM2
AVE.
OAKLAND
AVE.
LEONARD
LINCOLN
AVE.
AVE.
MAPLE
WARD PL.
FRONT
RANDOLPH
ELM ST
LAKEVIEW
HAMILTON
KAINE AVE
PLAINFIELD

MAP 8 - POPULATION MAP
SPRING LAKE PCB CONTAMINATION
SOUTH PLAINFIELD, MIDDLESEX COUNTY
Lat: 40° 35' 00.00" , Long: -74° 24' 43.00"



Ring	1	(0.00- 0.25)	has Population:	813
Ring	2	(0.25- 0.50)	has Population:	2019
Ring	3	(0.50- 1.00)	has Population:	9079
Ring	4	(1.00- 2.00)	has Population:	31677
Ring	5	(2.00- 3.00)	has Population:	62394
Ring	6	(3.00- 4.00)	has Population:	74791

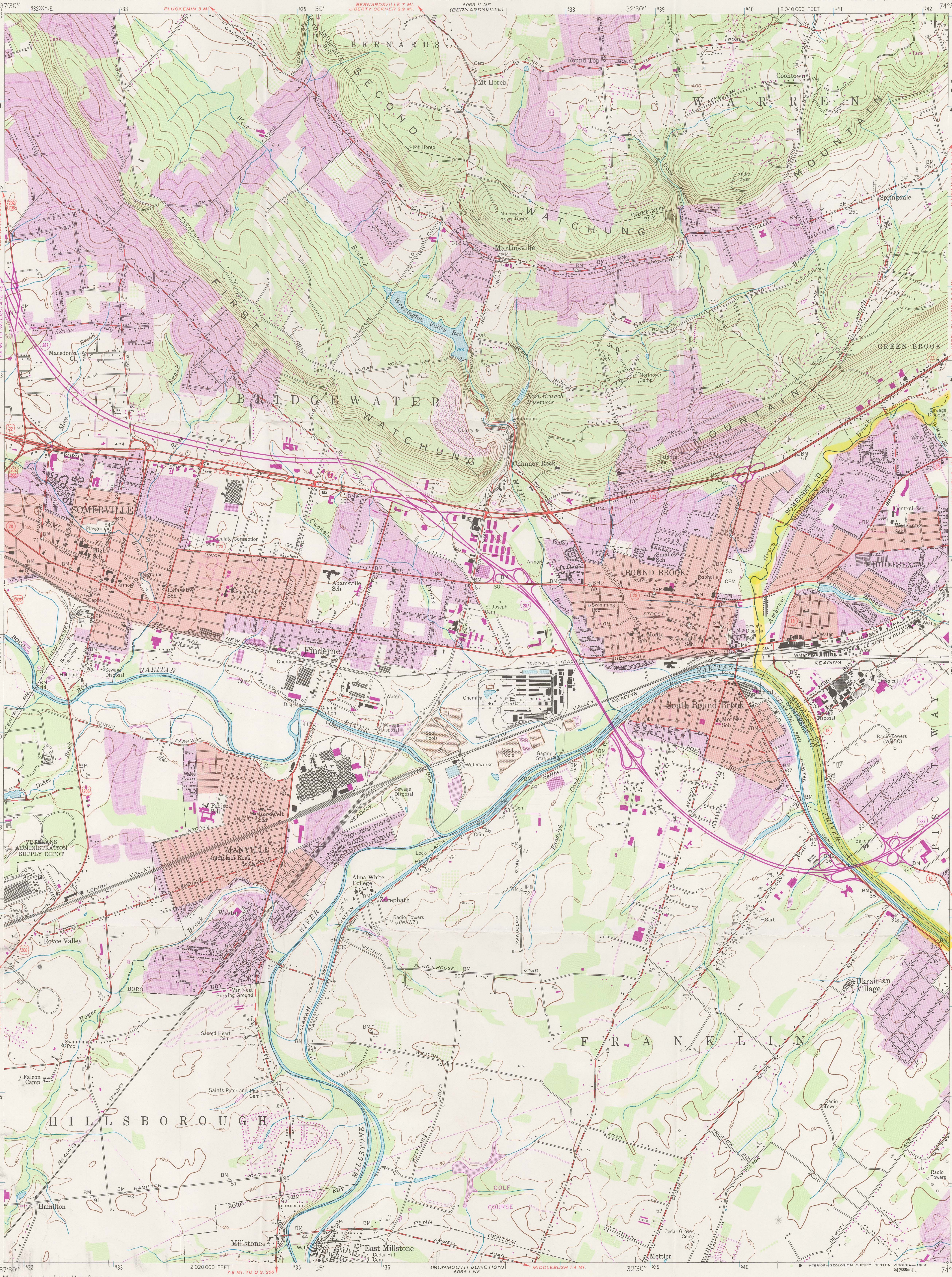
*Based on 1990 Census Data.

GIS-60

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

BOUND BROOK QUADRANGLE
NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped by the Army Map Service
Edited and published by the Geological Survey

Control by USC&GS and New Jersey Geodetic Survey

Topography from aerial photographs by photogrammetric methods. Aerial photographs taken 1943. Field check 1943
Culture revised by the Geological Survey 1955

Polyconic projection. 1927 North American Datum
10,000-foot grid based on New Jersey coordinate system
1,000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue

To place on the predicted North American Datum 1983 move the projection lines 6 meters south and 33 meters west as shown by dashed corner ticks

UTM GRID AND 1970 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

There may be private inholdings within the boundaries of the National or State reservations shown on this map

Red tint indicates areas in which only landmark buildings are shown

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

Revisions shown in purple compiled by the Geological Survey from aerial photographs taken 1970. This information not field checked.
Purple tint indicates extension of urban areas
Map photoinspected 1977
No major culture or drainage changes observed

ROAD CLASSIFICATION
Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
U. S. Route — State Route
Interstate Route

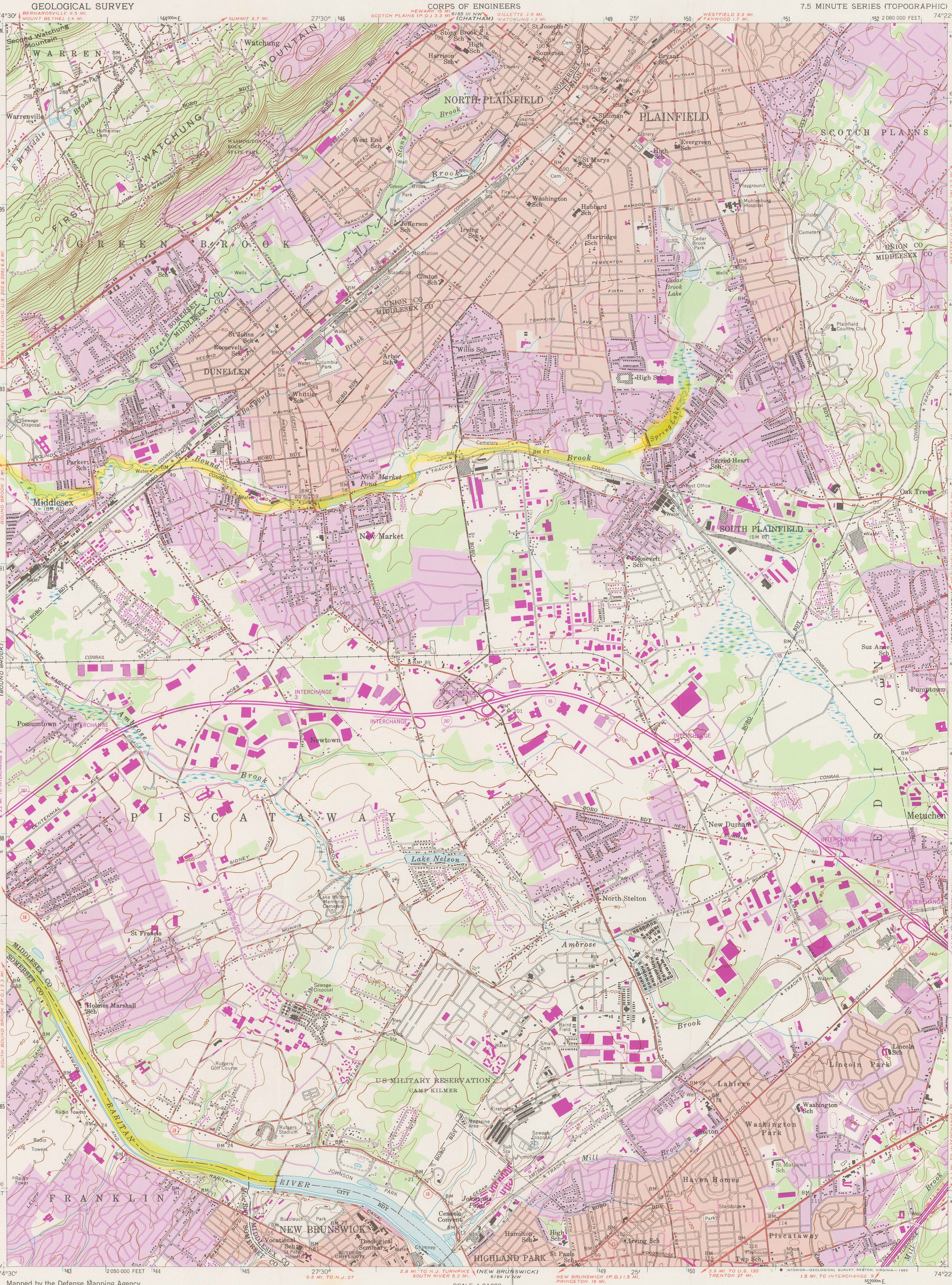
BOUND BROOK, N. J.
N4030—W7430/7.5
PHOTOINSPECTION 1977
1955
PHOTOREVISED 1970
AMS 6065 II SE—SERIES V822

Spring Lake PCBs
Map 9B

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

PLAINFIELD QUADRANGLE
NEW JERSEY
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped by the Defense Mapping Agency
Edited and published by the Geological Survey

Control by NOS/NOAA and New Jersey Geodetic Survey

Topography by photogrammetric methods from aerial photographs taken 1942 and 1943. Field checked 1943. Culture revised by the Geological Survey 1955

Polyconic projection. 10,000-foot grid ticks based on New Jersey coordinate system. 1000-meter Universal Transverse Mercator grid ticks, zone 18, shown in blue. 1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 6 meters south and 34 meters west as shown by dashed corner ticks

Red tint indicates areas in which only landmark buildings are shown

There may be private inholdings within the boundaries of the National or State reservations shown on this map

UTM GRID AND 1981 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY
DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

Revisions shown in purple compiled by the Geological Survey from aerial photographs taken 1976 and other sources
This information not field checked. Map edited 1981

Purple tint indicates extension of urban areas

ROAD CLASSIFICATION

Primary highway, all weather, hard surface
Light-duty road, all weather, improved surface
Secondary highway, all weather, hard surface
Unimproved road, fair or dry weather

Interstate Route
U. S. Route
State Route

PLAINFIELD, N. J.
N4030—W7422.5/7.5

1955
PHOTOREVISED 1981
DMA 6165 III SW—SERIES V822

Spring Lake PCBs
MAP 9A

ATTACHMENT A

DRAFT

CORNELL-DUBILIER ELECTRONICS SUPERFUND SITE
SOUTH PLAINFIELD, NJ
APRIL 1998

U.S. EPA Work Assignment No: 2-274
Weston Work Order No: 03347-142-001-2274-01
U.S. EPA Contract No.: 68-C4-0022

A'

EXECUTIVE SUMMARY

There were three objectives incorporated into the investigation of contamination associated with the Cornell-Dubilier Electronics site in South Plainfield, New Jersey: 1) to investigate the nature and extent of contamination within the Bound Brook downstream of the Cornell-Dubilier site; 2) to conduct an ecological risk assessment of a portion of the Bound Brook and its associated floodplain downstream of the Cornell-Dubilier site, according to the Ecological Risk Assessment Guidance for Superfund (U.S. EPA 1997a); and 3) to present data from the analysis of fish fillets collected from the Bound Brook downstream of the Cornell-Dubilier site for the purposes of assessment of risk to human health.

The Cornell-Dubilier Electronics Site is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey (Figure 1). The site occupies approximately 25 acres in an industrial, commercial, and residential area. During its years of operation at the site (1936 to 1962), Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, including capacitors. It is alleged that during their operations, Cornell-Dubilier Electronics, Inc. dumped polychlorinated biphenyl (PCB) contaminated materials and other hazardous substances directly onto site soils. Through the years, dozens of companies have operated at the site as tenants. The site is currently known as the Hamilton Industrial Park and is occupied by an estimated 15 commercial businesses (U.S. EPA 1997b).

The Bound Brook traverses the southeast corner of the site property, and stream width varies from 10 to 20 feet across the site, with a varying depth of approximately 1 to 4 feet. The Bound Brook then flows northwest for approximately 0.5 miles before joining with the Cedar Brook (which drains Spring Lake to the northeast). The Bound Brook flows approximately 0.75 miles before emptying into the east end of New Market Pond. At the west end of New Market Pond, water flows over a spillway and continues west as the Bound Brook for approximately 4 miles before joining with the Green Brook. The Green Brook continues southwest for another 3 miles before flowing into the Raritan River. All of the above-mentioned water bodies are designated by the State of New Jersey for the maintenance, migration, and propagation of the natural and established biota. There are no surface water intakes along this flow path for at least 15 miles. However, these water bodies are reportedly utilized as freshwater fisheries (U.S. EPA 1997b). In addition, there are approximately 34 acres of wetlands within 0.5 miles of the site (U.S. EPA 1997b). Wetlands that border the site to the southeast diminish significantly as the creek heads downstream toward the northwest.

A preliminary investigation (Phase I) was conducted between 28 and 30 May 1997 to determine the downstream extent of PCBs and metals in the sediment and floodplain soils using screening methods. This data was utilized to select sampling locations between the site and New Market Pond (Phase II). Phase II was conducted on 16 through 20 and 27 June 1997. Samples collected for Phase II included surface water, sediment, soil, small mammals, crayfish, forage fish, and edible fish (fillets). Phase II sampling was conducted at a total of seven locations within the Bound Brook for the aquatic samples and at three locations adjacent to the Bound Brook for the terrestrial samples. In addition, an aquatic reference area was selected in the Bound Brook upstream of the site, and a terrestrial reference area was selected adjacent to the Cedar Brook between Spring Lake and the Cedar Brook's confluence with the Bound Brook.

For Phase II, all surface water, sediment, and soil samples were analyzed for PCBs, pesticides, target analyte list (TAL) metals, volatile organic compounds (VOCs), and base-, neutral-, and acid-extractable compounds (BNAs). In addition, soil and sediment samples were analyzed for grain size and total organic carbon (TOC). Sediment samples were also analyzed for total petroleum hydrocarbons, and ammonia, and they were evaluated in a 14-day toxicity test using the amphipod, *Hyalella azteca*. All crayfish samples were analyzed for BNAs, TAL metals, pesticides, and PCBs. All fish samples were analyzed for TAL metals, pesticides, and PCBs. All small mammal samples were analyzed for pesticides and PCBs. In addition, livers and kidneys from the small mammals were submitted for histopathological evaluation. The resulting data were used to support an ecological risk assessment, an extent of contamination evaluation, and a presentation of data for the purposes a human health risk assessment, which was performed separately by U.S. EPA's Region II office.

Preliminary data from Phase II indicated that PCBs, as well as other contaminants, were detected in fish collected as far downstream as New Market Pond. Therefore, an additional round of sampling (Phase III) was conducted on 7 August 1997 to evaluate the downstream extent of contamination in the Bound Brook Only edible fish tissue and sediments were collected during Phase III. These samples were collected from three locations within the Bound Brook between New Market Pond and the confluence with the Green Brook, and from one location in the Green Brook just upstream of its confluence with the Raritan River.

A2

The nature and extent of contamination evaluation revealed the following:

- Many contaminants are present at relatively high levels adjacent to and/or immediately down gradient of the site. These concentrations progressively decrease toward location A14, near the confluence of the Green Brook and the Raritan River, with the exception of a sharp increase either immediately upstream of New Market Pond or within New Market Pond. The increase in concentrations of many contaminants immediately upstream or within New Market Pond may be the result of a slower rate of flow, resulting in greater deposition of particles onto which the contaminants are adsorbed. Regardless, the high concentrations adjacent to and directly downstream of the Cornell-Dubilier Electronics site indicates that the site is the primary source of many of the contaminants of concern within the section of the Bound Brook corridor investigated for this study.

- The presence of contaminants up gradient of the site (at the reference and in Spring Lake) suggest that, in addition to the Cornell-Dubilier Electronics site, other sources of contamination exist within the Bound Brook stream corridor.

The results of the ecological risk assessment resulted in the following overall conclusions:

- The structure and function of the Bound Brook and its stream corridor adjacent to and downstream of the Cornell-Dubilier Electronics site is at risk from chemical contamination. First, a risk is posed to the benthic community and is potentially due to a variety of VOCs and BNAs, silver, calcium, copper, vanadium, zinc, and dieldrin. The fish within the stream were determined to be at risk from exposure to selenium, but the risk posed to fish by the other bioaccumulative COPCs could not be determined. Birds utilizing the stream were determined to be at risk from lead, PCBs, total endrin, total chlordane, and total DDT. A risk to omnivorous mammals using the stream was found to be posed by methoxychlor, arsenic, mercury, PCBs and selenium. Finally, a risk to carnivorous mammals was also found to be posed by PCBs.

- Of the contaminants determined to pose a risk to the assessment endpoints evaluated in the risk assessment, the most significant risk is posed by those contaminants which resulted in a hazard quotient greater than one using the mean contaminant concentrations and the LOAEL in the food chain models. This occurred for PCBs using the omnivorous mammal and piscivorous bird models and for selenium using the omnivorous mammal model. However, for these two contaminants, a preliminary ecotoxicologically-based sediment remedial goal could not be determined because their sediment concentrations did not correlate with their resulting hazard quotients in the food chain models. In addition, it is probable that other sources, in addition to the Cornell-Dubilier site, exist and are contributing to the risk posed by these two contaminants. Therefore, source control at the Cornell-Dubilier site is recommended at a minimum in order to decrease risk to the assessment endpoints evaluated in the risk assessment.

The main points elucidated from the data for the human health risk assessment are as follows:

- In general, the highest PCB and pesticide concentrations were found in the carp, followed by white sucker, pumpkin seed, and largemouth bass. The concentrations of these compounds may be linked to the percent lipids in each of these species.

- With the exception of carp, the highest PCB concentrations were noted in the fish collected in the Bound Brook from the reference area downstream to New Market Pond. The concentration of PCBs were higher in carp collected downstream of New Market Pond. This is most likely due to the large size (and therefore age) of the carp collected below New Market Pond and the limited number of carp collected, resulting in high variability in the data.

- Of particular note is the presence of PCBs and many pesticides in the fish collected from Spring Lake. Since this lake receives water from a different drainage, it appears as if another source, in addition to the Cornell-Dubilier Electronics site, may be contributing to the contamination within the Bound Brook. Nevertheless, the Cornell-Dubilier Electronics site appears to be a significant source of PCBs detected in the edible fish tissue collected from the Bound Brook downstream of the site.

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1.0 INTRODUCTION

1.1 Objective

There were three objectives incorporated into the investigation of contamination associated with the Cornell-Dubilier Electronics site in South Plainfield, New Jersey: 1) to investigate the nature and extent of contamination within the Bound Brook downstream of the Cornell-Dubilier site; 2) to conduct an ecological risk assessment of a portion of the Bound Brook and its associated floodplain downstream of the Cornell-Dubilier site, according to the Ecological Risk Assessment Guidance for Superfund (U.S. EPA 1997a); and 3) to present data from the analysis of fish fillets collected from the Bound Brook downstream of the Cornell-Dubilier site for the purposes of assessment of risk to human health.

1.2 Site Background

The Cornell-Dubilier Electronics Site is located at 333 Hamilton Boulevard in South Plainfield, Middlesex County, New Jersey (Figure 1). The site occupies approximately 25 acres in an industrial, commercial, and residential area. It is bordered by commercial businesses and residences from the south to the north, and wetlands and the Bound Brook from the southeast. Conrail railroad tracks crisscross the Bound Brook just north of the site. Other industries are scattered to the northeast and east of the site on the opposite side of the railroad tracks (U.S. EPA 1997b).

During its years of operation at the site (1936 to 1962), Cornell-Dubilier Electronics, Inc. manufactured electronic parts and components, including capacitors. It is reported that transformer oils were tested for an unknown period of time during their operations until they vacated the site. It is alleged that during their operations, Cornell-Dubilier Electronics, Inc. dumped polychlorinated biphenyl (PCB) contaminated materials and other hazardous substances directly onto site soils (U.S. EPA 1997b).

Historical aerial photographs reveal evidence that extensive filling operations were underway at the site in the 1940's possibly to support construction of a railroad spur to the operating facility at that time. A title search indicates that the Spicer Manufacturing Corporation, later known as Dana Corporation, owned the property during this period (U.S. EPA 1997b).

The site is currently known as the Hamilton Industrial Park and is occupied by an estimated 15 commercial businesses. Through the years, dozens of companies have operated at the site as tenants (U.S. EPA 1997b). Currently, the property is secured by a fence with posted warning signs which were installed during the site stabilization removal action initiated in July 1997.

1.3 Site Description

It is estimated that approximately 540 persons reside within 0.25 miles of the site, with the nearest residential homes being located on Spicer Avenue and on the opposite side of Hamilton Boulevard, less than 200 feet from the site. The total population estimated to live within one mile of the site is 8,700 persons (U.S. EPA 1997b).

The Bound Brook traverses the southeast corner of the site property. Stream width varies from 10 to 20 feet across the site, with a varying depth of approximately 1 to 4 feet. The Bound Brook flows northwest for approximately 0.5 miles before joining with the Cedar Brook (which drains Spring Lake to the northeast). The Bound Brook flows approximately 0.75 miles before emptying into the east end of New Market Pond. After flowing over a spillway at the west end of New Market Pond, the Bound Brook

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continues west for approximately 4 miles before joining with the Green Brook. The Green Brook continues southwest for another 3 miles before flowing into the Raritan River. All of the above-mentioned water bodies are designated by the State of New Jersey for the maintenance, migration, and propagation of the natural and established biota. There are no surface water intakes along this flow path for at least 15 miles. However, these water bodies are reportedly utilized as freshwater fisheries (U.S. EPA 1997b).

As reported by U.S. EPA (1997b), there are approximately 34 acres of wetlands within 0.5 miles of the site. Wetlands that border the site to the southeast diminish significantly as the creek heads downstream toward the northwest.

An unknown source investigation conducted by the NJ Department of Environmental Protection (DEP) in the vicinity of Hamilton Boulevard during the period of 1988-1991 revealed significant ground water contamination consisting of mainly trichloroethene (TCE) and tetrachloroethene (PCE). Samples collected from a shallow (70 feet) residential potable well located approximately 500 feet west of the site revealed TCE (6,850 micrograms per liter [μg/L]) and PCE (12.6 μg/L) contamination. Due to widespread contamination, all residential wells in the area were reportedly closed and residences were hooked up to a water main providing potable water from another location. Although the site was considered to be one of several potential sources, to date, the source of the contamination has not been identified (U.S. EPA 1997b).

2.0 TECHNICAL APPROACH

The results of the Screening Level Risk Assessment for the site prepared by the U.S. EPA Region II (1996), indicated that a field investigation was appropriate to collect additional site information. This involved the collection of soil, sediment, surface water, and biota. In addition to chemical analyses, selected sediment samples were also evaluated using toxicity tests.

A preliminary investigation (Phase I) was conducted between 28 and 30 May 1997 to determine the downstream extent of PCBs and metals in the sediment and floodplain soils using screening methods. This data [summarized in Bound Brook Sampling and Edible Fish Tissue Data Report (U.S. EPA 1997c)] was utilized to select sampling locations between the site and New Market Pond (Phase II). Phase II was conducted on 16 through 20 and 27 June 1997. Samples collected for Phase II included surface water, sediment, soil, small mammals, crayfish, forage fish, and edible fish (fillets). This data was used to support an ecological risk assessment, an extent of contamination evaluation, and a presentation of data for the purposes a human health risk assessment, which was performed by Region II U.S. EPA. Preliminary data from Phase II indicated that PCBs, as well as other contaminants, were detected in fish collected as far downstream as New Market Pond. Therefore, an additional round of sampling (Phase III) was conducted on 7 August 1997 to evaluate the downstream extent of contamination in the Bound Brook. Only edible fish tissue and sediments were collected during Phase III. To get fish of similar size and species composition, Spring Lake was utilized as a reference area for Phase III. All fish collections were performed in conjunction with U.S. EPA Region II Division of Environmental Science and Assessment under the direction of Jim Kurtenbach and Christopher Stitt.

The work performed for this investigation follows the methods summarized in the Work Plan (U.S. EPA 1997d) and the appropriate SOPs (see Section 2.10), with the exception that small mammals were not analyzed for TAL metals. A copy of all field and laboratory documentation is contained in Appendix A. A description of the methods used for this investigation is provided below:

2.1 Preliminary Sampling - Phase I

Prior to this field investigation, preliminary soil and sediment sampling was conducted downstream of the Cornell-Dubilier Electronics Site to the east end of New Market Pond. The objective of the preliminary sampling was to evaluate the downstream extent of PCB and metals contamination. The data

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were analyzed using gas chromatography/electron capture detection (GC/ECD) screening methods for PCBs and x-ray fluorescence (XRF) for metals; no validation of the data was performed and data was considered as Quality Assurance Level 1 (QA-1) screening data. The results of the preliminary sampling was used to select sample locations for this current investigation and are summarized in the Bound Brook Sampling and Edible Fish Tissue Data Report (U.S. EPA 1997c).

2.2 Soil Sampling - Phase II

Replicate soil samples were collected from each of the four terrestrial sample areas (T1, T2, T3, and T4 [reference area]) (Figure 2). These samples were used to characterize the chemical concentrations in the soil for each of the four sample areas. The locations of the soil samples were randomly selected within the small mammal trapping grids (Section 2.8). Soil samples were analyzed for PCBs, pesticides, metals, volatiles, semivolatiles, grain size, and total organic carbon (TOC).

Soil samples were collected in accordance with the Environmental Response Team Center/Response Engineering and Analytical Contract (ERTC/REAC) SOP #2012, *Soil Sampling*. Soil was collected using a decontaminated stainless steel trowel or bucket auger to a depth of 6 inches. The soil within a 1.5 foot by 1.5 foot area was collected and accumulated into a labeled 5-gallon decontaminated stainless steel bucket until sufficient sample volume was obtained for all required toxicity testing and chemical analyses. The sample was transported to the staging area, mixed, and divided among the appropriate sample containers. Samples for volatile organic carbon (VOC) analyses were obtained from the bulk sample prior to mixing. The soil samples were maintained and shipped on wet ice prior to analysis.

2.3 Sediment Sampling - Phase II and III

For Phase II, two replicate sediment samples were collected from each of the eight sample locations [A1 (adjacent to the site), A2 (below Veterans Park), A3 (Clinton Avenue Bridge), A4 (New Brunswick Avenue Bridge), A5 (east New Market Pond), A6 (west New Mark Pond), A7 (below spillway), and A9 (upstream reference area)]. Aquatic sample locations for Phase II are specified in Figure 3. For Phase III, two replicate sediment samples were collected from each of the five sample locations [A11 (below spillway, same location as A7), A12 (Prospect Street Bridge), A13 (South Avenue Bridge), A14 (Lincoln Boulevard Bridge), and A10 (Spring Lake reference area)]. Aquatic sample locations for Phase III are specified in Figure 4. These samples were used to characterize the chemical concentrations in the sediment for each of the sample areas. Sediment samples were analyzed for PCBs, pesticides, metals, semivolatiles, volatiles, grain size, and TOC. At sample locations where toxicity tests were going to be performed (A1, A2, A3, A4, A5, A6, and A9), sediment samples were also analyzed for ammonia and total petroleum hydrocarbons (TPH).

Sediment samples were collected in accordance with ERTC/REAC SOP #2016, *Sediment Sampling*. Sediment samples were collected from a depositional area using a decontaminated Ponar dredge or stainless steel trowels and accumulated into a stainless steel bucket until the volume was sufficient to meet analytical and toxicity testing volume requirements. The bulk sample was then covered and returned to the staging area. Samples of VOC analyses were taken from the bulk sample prior to homogenization. After the remaining sediment was homogenized, the sample was placed in appropriately labeled sample containers for chemical analyses and toxicity testing. The samples were maintained on wet ice until they were shipped to the specified laboratory via overnight courier for analysis.

2.4 Surface Water Sampling - Phase II

A surface water sample was collected from each of the eight sample locations [A1 (adjacent to the site), A2 (below Veterans Park), A3 (Clinton Avenue Bridge), A4 (New Brunswick Avenue Bridge), A5 (east New Market Pond, A6 (west New Mark Pond), A7 (below spillway) and A9 (reference area)]. Aquatic sample locations are specified in Figure 3. Surface water samples were analyzed for PCBs, pesticides,

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metals (total and dissolved), semivolatiles, and VOCs. Surface water samples could not be collected during the original week of the site investigation (16 through 20 June 1997) due to high turbidity levels caused by heavy rains. Surface water sampling was postponed until 27 June 1997.

Surface water samples were collected directly into the sampling container following ERTC/REAC SOP #2013, *Surface Water Sampling*. Water samples were collected upstream of any river disturbances being caused by the sampler. The surface water samples being analyzed for dissolved metals were filtered prior to preservation and analysis. All samples were maintained and shipped on wet ice prior to analysis. Samples being analyzed for metals were preserved using 40 percent nitric acid to a pH of less than 2 units.

Water quality parameters were measured using a Horiba U-10. The water quality parameters evaluated included temperature, pH, dissolved oxygen, conductivity, turbidity, and salinity. The instrument was calibrated prior to data collection as per the manufacturer's operating manual.

2.5 Amphipod Toxicity Test - Phase II

The amphipod toxicity tests were subcontracted to a laboratory with documented experience of performing the test. The toxicity tests were fourteen days in duration and included six replicates per sample. Six sample locations adjacent to and downstream of the site (A1, A2, A3, A4, A5, A6), a reference location (A9), and a laboratory control were evaluated during this test. Each replicate contained twenty 2nd or 3rd instar amphipods. Toxicity were evaluated for 100 percent site sediment only; no sediment dilutions were used. Approximately 40 percent of the overlying water volume was replaced with laboratory water on days 2, 4, 6, 8, 10 and 12 in a way that minimized turbulence and disturbance of the sediment. Dissolved oxygen and pH were measured in each replicate immediately before and after each renewal. The organisms were fed periodically with a suitable food at a rate sufficient to support growth without resulting in fungal production. Control mortality must not have exceeded 20 percent. The endpoints measured by the subcontract laboratory included mortality (percent mortality) and growth (total length). The toxicity test followed ERT/REAC DRAFT SOP, *10-Day Chronic Toxicity Test Using Amphipods (Hyalella azteca)*. Any deviation from the SOP was reported by the subcontract laboratory in the toxicity evaluation report.

Statistical comparisons will be used to determine if there was a significant difference ($\alpha = 0.10$) in any of the measurement endpoints (e.g., growth, mortality) between either the laboratory control or a reference locations and any of the on-site sample locations. A Dunnett's one-sided test was utilized for the analyses. If any of the assumptions required for the Dunnett's test were not met (i.e., normality and homogeneity of variances), a Dunnett's test on the ranks was used to provide a non-parametric, distribution-free comparison of the means.

If significant differences are observed between any of the sampling locations adjacent to the site and either the laboratory control or the upstream reference locations, the test species was considered to be impacted at that sample location. The impact may be related to exposure to contaminants or to differences in sediment matrices or physical characteristics. Correlation analyses was used to determine if the impacts were related to the concentrations of any of the contaminants or physical characteristics of the sample that were measured.

2.6 Fish Collection

2.6.1 Edible Fish - Phase II and III

Fish were collected in conjunction with U.S. EPA Region II from ten locations adjacent to and downstream of the site, an upstream reference area (A9) and Spring Lake (A10). Samples were collected from the Bound Brook, New Market Pond, Spring Lake, and the Green Brook (below

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the confluence with the Bound Brook) using electrofishing techniques (Figures 3 and 4). Phase III (i.e., below New Market Pond) sampling was conducted as a result of the contaminant levels detected in the fillet tissue in Phase II.

The objective of the sampling was to collect edible-size bottom feeding fish (bullheads, carp, and white suckers) and predatory fish (sunfish and largemouth bass) of similar size between the sample locations. A maximum number of three replicates were collected for each species from each sample location but not all species were caught at all locations (e.g., bullheads were only collected at locations A5, A11, A12, and A14).

The sampling crew taxonomically identified the fish, measured the length and weight of the fish, and performed a gross pathology evaluation. The fish were prepared following the U.S. EPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories (U.S. EPA 1993a). Fish were scaled prior to filleting. Each fillet sample represented a single fish; no sample compositing was required to meet analytical mass requirements. The fillets were weighed, wrapped in aluminum foil, placed in a plastic bag, and maintained on wet ice. Fish were delivered to the REAC Biological Assessment Laboratory in Edison, NJ for chemical analysis. Fish tissues were analyzed for metals, PCBs, pesticides, percent lipids, and percent moisture. The data will be used by Region II U.S. EPA for a human health risk assessment.

2.6.2 Forage Fish - Phase II

Forage fish were collected from six locations (A1, A2, A3, A4, A5, and A6) adjacent to and downstream of the site and from an upstream reference area (A9) using electrofishing. Based on electrofishing results, the sunfish (pumpkinseed at all locations except Spring Lake (A10) in which bluegills were used) were selected as the forage fish as it was most consistently captured at each of the sample locations.

Captured fish were placed on wet ice and transported to the REAC Biological Assessment Laboratory, Edison, NJ. Up to eight replicates were collected from each of the sample locations. The digestive tract was removed, and the fish was weighed and placed in aluminum foil. Fish were not composited, each sample represents a single fish. The fish were submitted to a subcontract laboratory for chemical analyses (PCBs, metals, pesticides, percent lipids). In some instances sunfish fillets were analyzed separately from the carcass so the fillet data could be used for the human health risk assessment. In these cases the fillet data and the carcass data were recombined to provide whole body concentrations (Appendix B). Voucher specimens for taxonomic identification were also collected and preserved in 2-propanol (isopropyl alcohol).

2.7 Crayfish Sampling - Phase II

Crayfish were collected from six locations (A1, A2, A3, A4, A5, A6) adjacent to and downstream of the site and from an upstream reference area (A9). Crayfish were collected using electrofishing and crayfish traps baited with cat food. The taxon and weight were determined for each specimen collected. All captured crayfish were placed in 2-gallon decontaminated plastic buckets (hereafter referred to as depuration chambers) per location and maintained live in reference water for depuration. Aeration was provided to each chamber with an aquarium air pump and air stone. The crayfish were allowed to depurate in this manner for 18 to 20 hours after capture to remove sediments entrained in the digestive tract.

Depending upon trapping success, up to eight specimens were retained per location for chemical analyses (PCB, metals, pesticides, semivolatiles, and percent lipids). After the depuration, each specimen was sacrificed, weighed, measured, and wrapped in aluminum foil. Crayfish were only composited for laboratory quality assurance samples (e.g., matrix spikes) due to the larger mass requirements.

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4.0 NATURE AND EXTENT OF CONTAMINATION WITHIN THE BOUND BROOK

4.1 Introduction

This section of the report examines the nature and extent of all contaminants found in sediment and fish along the course of the Bound Brook. The objectives of evaluating these data sets are to (1) uncover any trends in contamination along the course of the Bound Brook in relation to the site and downstream of New Market Pond, (2) to make comparisons between contaminant concentrations along the Bound Brook to those in the reference area(s), and (3) to evaluate the relationships between contaminant concentrations in sediment and fish on a location-specific basis.

4.2 Nature and Extent of PCB Contamination in Sediment and Fish

4.2.1 PCBs in Sediment

Aroclor 1254 was the only PCB mixture detected in sediment. Mean concentrations (dry weight basis) were highest at location A2 (14 mg/kg; downstream of the site) and lowest (not detected) at locations A7 (downstream end of New Market Pond), A9 (upstream reference), A10 (Spring Lake), and A14 (furthest downstream location). Mean Aroclor 1254 concentrations were relatively high at locations A1 (2.2 mg/kg; adjacent to the site), location A13 (5.9 mg/kg; downstream of New Market Pond), location A5 (2.8 mg/kg), and location A6 (3.4 mg/kg; within New Market Pond). Since the lowest concentrations detected along the Bound Brook were non-detects, these levels are comparable to those from the reference areas A9 and A10 (also non-detects).

There does not appear to be a clear PCB gradient in sediment of the Bound Brook. It becomes apparent, however, that PCBs are ubiquitous in sediments of the Bound Brook with relatively high concentrations present downstream of the site. In addition, there was high variability between PCB concentrations in sediment samples collected at the same location. PCB concentrations ranged from below the detection limit to 4.5 mg/kg (dry weight basis) in the six samples collected at location A1 and ranged from 0.55 to 5.1 mg/kg (dry weight basis) in the two samples collected at location A5.

4.2.2 PCBs in Fish

Aroclor 1248 and Aroclor 1254 were detected in all fillet samples tested; only Aroclor 1254 was detected in the sediment. Generally, Aroclor 1254 was detected at higher concentrations than Aroclor 1248. Variability in the number, species, size, and age of fish collected at each location would mask any trends that may exist. The purpose of the edible fish tissue collection was to collect data for human health risk assessment and was therefore not well suited to perform location by location comparisons or evaluate contaminant gradients. The data was collected using methods that were suited for human health risk assessment and not evaluations of contaminant gradients (e.g., largest fish were used as opposed to a common size range between areas and large number of species with few replicates as opposed to few species with a larger number of replicates).

For location by location comparisons, an attempt was made to normalize the data by fish size and lipid content but neither of these methods seemed to be valid since there were no correlations between contaminant levels and fish size and/or lipid content. The results (based on mean concentration for each species collected from each location) indicate that the highest PCB concentrations are located in the length of the Bound Brook that extends from the reference area downstream to New Market Pond. Here, the mean total PCB concentrations in white sucker fillets for each location range from 3.9 to 9.5 mg/kg, wet weight. White suckers were

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also collected from Spring Lake and downstream of New Market Pond to the Raritan River. The mean total PCB concentrations in white sucker fillets for each location in this length of the Bound Brook were lower and range from 0.4 to 2.0 mg/kg. This same trend is also noted with the mean total PCB results for the pumpkinseed. Fillets of pumpkinseeds collected from the stretch of the Bound Brook located from location A1 downstream to New Market Pond range from 1.9 to 5.5 mg/kg, wet weight. The mean concentration of total PCBs in pumpkinseed fillet downstream of New Market Pond to the Raritan River range from 0.17 to 0.86 mg/kg, wet weight. The PCB results for largemouth bass and bullhead are not clear due to the few number of samples collected from each of the locations.

The results for the PCBs in carp fillet do not follow the same trend as those found in the pumpkinseed and white sucker. The lowest concentrations of PCBs were noted in the carp collected from the Reference Area (A9) and from Spring Lake (A10). Both of these locations are up gradient of the site. However, the fish from the reference area were much smaller than those collected downstream. The highest mean concentrations of total PCBs in carp fillet were detected in the fish collected from the two locations within New Market Pond, A5 and A6 (22 to 24 mg/kg, wet weight, respectively) and from two of the downstream locations, A12 and A13 (27 and 31 mg/kg, wet weight, respectively). The PCB results for the carp collected from A13 are the highest of any fish collected during this study.

When the PCB residue results are examined across all species combined (i.e., one broad category of "edible fish tissue" instead of on a per species basis), the results for Aroclor 1248, Aroclor 1254, and total PCBs exhibit a trend similar to each other. Aroclor 1248, Aroclor 1254, and total PCBs increase from the locations up gradient of the site (A9 and A10) to location A1, and again from location A1 to location A2, then decrease toward location A4. The levels then increase toward location A6 and decrease progressively toward location A14.

The presence of Aroclors 1248 and 1254 in fish tissue collected up gradient of the site suggests that PCB contamination is not limited to areas down gradient of the site. Furthermore, the presence of Aroclors 1248 and 1254 in the fish collected from Spring Lake suggests that there may be a source of PCBs leading into this lake, such as the Cedar Brook. The possibility that the fish collected from Spring Lake had spent a portion of their life span in the Bound Brook down gradient from the site is unlikely due to a high retaining wall (spillway) at the downstream end of Spring Lake, making it unlikely that fish would be able to migrate from downstream locations into Spring Lake except under extremely high flow conditions. Since PCBs were detected in every fish sample collected from Spring Lake, it remains unlikely that the PCBs in the tissues of these fish are the result of exposure to PCBs in the Bound Brook downstream of the Cornell-Dubilier site.

4.3 Nature and Extent of Pesticides Contamination in Sediment and Fish

4.3.1 Pesticides in Sediment

Due to the small number of detections of pesticides in sediment, pesticides were not examined for trends in their nature and extent in sediment along the Bound Brook.

4.3.2 Pesticides in Fish

Nine pesticides (heptachlor epoxide, g-chlordane, a-chlordane, p, p'-DDE, p, p'-DDD, endrin, endrin aldehyde, dieldrin, and methoxychlor) were detected in the edible fish samples. Methoxychlor was mostly likely a laboratory contaminant since it was detected in the laboratory blanks and only in one sample at a concentration near the detection limit.

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The compound 4,4'-DDE was the most frequently detected pesticide found in the fish fillets. Approximately 85 percent of the fish captured contained detectable levels of this pesticide. However, there are no distinct trends among species with the exception that carp contained the highest concentrations compared to the other species collected. When the mean concentrations of 4,4'-DDE were calculated for each location across all species, trends among the locations were observed. The mean 4,4'-DDE concentration in edible fish tissue was low at the two locations up gradient of the site (A9 and A10), increased toward locations A1 and A2, and drastically decreased toward location A5. The mean 4,4'-DDE tissue concentration then increased again at location A6 (the upstream New Market Pond location) and gradually decreased from there toward location A14. Heptachlor epoxide was detected most frequently in the samples collected from the reference area downstream to New Market Pond (85 percent). The frequency of detection of this pesticide drops below New Market Pond and heptachlor epoxide is only detected in one pumpkinseed collected at location A12. This pesticide was detected in 5 of the eleven fish collected from Spring Lake.

Chlordane was detected in samples collected both upstream and downstream of New Market Pond. However, this pesticide was only detected in white sucker, carp, and catfish. It was not detected in any pumpkinseed or largemouth bass. It should be noted that technical grade chlordane was detected in the 3 carp and the 3 white suckers collected from Spring Lake. Technical grade chlordane is defined as the presence of both a-chlordane and g-chlordane. It should also be noted that dieldrin was only detected in 4 fish and these fish were also captured in Spring Lake.

Endrin aldehyde was only detected in largemouth bass, carp, white sucker, and pumpkinseed collected from New Market Pond. Endrin was only detected in one carp collected from the Bound Brook (A12) downstream of New Market Pond.

The presence of dieldrin in the fish and sediment collected from Spring Lake, and the presence of chlordane in the fish but not in the sediment collected from Spring Lake, suggests that there may be a source for these contaminants leading into Spring Lake, such as the Cedar Brook.

4.4 Nature and Extent of VOC Contamination in Sediment and Fish

4.4.1 VOCs in Sediment

Due to the small number of VOC detections in sediment, these compounds were not examined for trends in its nature and extent along the Bound Brook.

4.4.2 VOCs in Fish

Volatile organic compounds were not evaluated in fish tissue. It is speculated that any VOCs accumulated into living fish tissue are rapidly biodegraded.

4.5 Nature and Extent of BNA Compounds Contamination in Sediment

4.5.1 Low/High Molecular Weight PAHs

Low molecular weight PAHs were highest at location A5 (upstream end of New Market Pond) and lowest at location A14 (furthest downstream location); high molecular weight PAHs were highest at location A11 (downstream end of New Market Pond) and lowest at location A14 (furthest downstream location). With the exception of location A5, the low molecular weight compounds remain low in the Bound Brook upstream of New Market Pond, although the high molecular weight PAHs show an incremental increase from locations A1 to A3 (adjacent to and

A11

downstream of the site). Both low and high molecular weight PAHs are high in the upstream end of New Market Pond, low near the downstream end of New Market Pond, and fluctuate downstream of New Market Pond, until reaching the lowest concentrations at location A14.

For both low and high molecular weight PAHs, the concentrations detected at reference locations A9 (Bound Brook up gradient of the site) and A10 (Spring Lake) are higher than several of the concentrations detected in the Bound Brook down gradient of the site. The presence of low and high molecular weight PAHs in the sediment collected from Spring Lake suggests that there may be a source for these contaminants leading into Spring Lake, such as the Cedar Brook. In addition, the presence of relatively high concentrations of both low and high molecular weight PAHs up gradient of the site compared to some locations down gradient of the site suggests that PAH contamination is not limited to those areas down gradient of the site.

4.5.2 Remaining BNA Compounds

The BNA compounds that do not fall into the category of low or high molecular weight PAHs were grouped together as "remaining BNA compounds". Similar to the high molecular weight PAHs, the remaining BNA compounds were highest at location A1 (upstream of the site) and lowest at location A14 (furthest downstream location). However, unlike the PAH compounds, the remaining BNA compounds show high concentrations around the site area, immediately upstream of New Market Pond, and the upstream end of New Market Pond. These concentrations progressively decrease downstream of New Market Pond to "non-detect" at location A14.

Similar to the low and high molecular weight PAHs, the concentrations of the remaining BNA compounds detected at reference locations A9 (Bound Brook) and A10 (Spring Lake) are higher than several of the concentrations detected in the Bound Brook down gradient of the site. The presence of other BNA compounds in the sediment collected from Spring Lake suggests that there may be a source for these contaminants leading into Spring Lake, such as the Cedar Brook. In addition, the presence of relatively high concentrations of other BNA compounds up gradient of the site suggests that this contamination is not limited to those areas down gradient of the site.

4.5.3 Total BNAs

When the BNA compounds are totaled and examined as one class of compounds, the characteristics of both the PAH compounds and the remaining BNA compounds are evident. Total BNAs are highest at location A5 (upstream end of New Market Pond) and are lowest at location A14 (furthest downstream location). The concentrations of total BNAs are high around the site area, at the upstream end of New Market Pond, and immediately downstream of the New Market Pond. With the exception of location A14, the lower concentrations in the Bound Brook are comparable to those of locations A9 (Bound Brook reference) and A10 (Spring Lake). Total BNAs were lower at location A9 than at location A10.

4.6 Nature and Extent of Metals Contamination in Sediment and Fish

4.6.1 Metals in Sediment

All of the metals, with some variation, exhibit the following general trend. Concentrations tend to be high adjacent to (location A1) and downstream of the site (usually more so at location A3 than location A2). Concentrations decrease to relatively low levels upstream of New Market Pond (location A4) and at the upstream end of New Market Pond (location A5), but then increase sharply toward the downstream end of New Market Pond (locations A6). Progressing downstream of New Market Pond, metals concentrations are generally lower at location A7,

A12

then they increase slightly at location A11, decrease at A12, increase sharply at A13, and finally attenuate by location A14 (furthest downstream location). Metals levels at location A9 (the upstream reference) tend to be greater than the metal levels detected at locations A4 and A5 (downstream of the site), and metal levels at location A10 (Spring Lake) tend to be lower than those detected at location A9 (Bound Brook reference).

Mean total organic carbon follows a similar trend to that of the metals. Mean TOC concentrations are high adjacent to the site (16 percent at location A1) and progressively decrease towards location A5 (4.82 percent). Like the metal concentrations, mean total organic carbon levels increase sharply at location A6 (20.8 percent) and progressively decrease toward location A14 (1.96 percent).

4.6.2 Metals in Fish

Although the results for metals in edible fish tissue were variable, when all of the fish species are grouped together into one category (as "edible fish tissue"), some general trends appear. The first trend exhibits a general decrease in metal concentrations from location A1 to A14. However, two peaks appear along this gradient, one around location A6 and the other around location A13. The following metals fall into this category: iron, selenium, and zinc.

Another trend also exhibits two peaks, however, these are around locations A4 and A13. The overall end result at location A14 are metal concentrations that are not much different or are greater than that of location A1. The following metals fall into this category: barium, calcium, magnesium, potassium, and sodium.

Aluminum and arsenic exhibit three peaks (around locations A1, A6, and A13) and ends at location A14 with a concentration lower than that of location A1. Three metals, chromium, mercury, and nickel, show an increase in concentration from location A1 to location A14, although the levels are highly variable. Copper and manganese do not appear to exhibit any trend along the course of the Bound Brook.

4.7 Conclusions

Based on this evaluation, the following conclusions about the contamination of sediment and edible fish tissue along the Bound Brook are apparent:

- Many contaminants are present at relatively high levels adjacent to and/or immediately down gradient of the site. These concentrations progressively decrease toward location A14, near the confluence of the Green Brook and the Raritan River, with the exception of a sharp increase either immediately upstream of New Market Pond or within New Market Pond. The increase in concentrations of many contaminants immediately upstream or within New Market Pond may be the result of a slower rate of flow, resulting in greater deposition of particles onto which the contaminants are adsorbed. Regardless, the high concentrations adjacent to and directly downstream of the Cornell-Dubilier Electronics site indicates that the site is the primary source of many of the contaminants of concern within the section of the Bound Brook corridor investigated for this study.

- The presence of contaminants up gradient of the site (at the reference and in Spring Lake) suggest that, in addition to the Cornell-Dubilier Electronics site, other sources of contamination exist within the Bound Brook stream corridor.

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a hazard quotient of greater than one was only established for these contaminants when the maximum contaminant concentrations were used. Therefore, their sediment concentrations are already below what would have been the preliminary ecotoxicologically-based sediment remedial goal had one been established. For PCBs and selenium, a preliminary ecotoxicologically-based sediment remedial goal range could not be determined because the mean sediment PCB and selenium concentrations did not correlate with their resulting hazard quotients. Therefore, source control of PCBs and selenium is recommended at a minimum for the protection of omnivorous mammals from the risk posed by PCBs and selenium downstream of the site.

5.5.9 Protection of carnivorous mammals

The results of this risk assessment indicate that a potential risk is posed to carnivorous mammals utilizing the Bound Brook stream corridor downstream of the Cornell-Dubilier site from total PCBs. The lower boundary of the preliminary ecotoxicologically-based soil remedial goal range was determined to be 39 mg/kg, dry weight, for the protection of carnivorous mammals. However, the mean soil PCB concentrations within the stream corridor downstream of the site are already currently within the preliminary ecotoxicologically-based remedial range.

5.5.10 Overall recommendations from the ecological risk assessment

The most significant risk determined by this risk assessment is posed by those contaminants which resulted in a hazard quotient greater than one using the mean contaminant concentrations and the LOAEL in the food chain models. This occurred for total PCBs using the omnivorous mammal and piscivorous bird models and for selenium using the omnivorous mammal model. However, for these two contaminants, a preliminary ecotoxicologically-based sediment remedial goal could not be determined because their sediment concentrations did not correlate with their resulting hazard quotients in the food chain models. Therefore, for these contaminants, source control is recommended at a minimum in order to minimize risk to the assessment endpoints evaluated in this risk assessment.

A note should be made about the site-relatedness of selenium and PCBs. When the extent of contamination was evaluated, it became evident that other sources, in addition to the Cornell-Dubilier site, probably exist for these two contaminants. In the case of PCBs, this is evident because PCBs were detected in fish collected from Spring Lake (Figure 3 and Table 37). Since it is unlikely that fish could migrate upstream from the Bound Brook into Spring Lake, due to the existence of a high retaining wall (spillway) at the downstream end of the lake, it is evident that another source of PCBs probably exists upstream of Spring Lake. Nonetheless, the Cornell-Dubilier site appears to be a significant source of PCBs due to the high PCB concentrations detected in the sediment samples collected adjacent to the site (location A1) and the rapid decrease in PCB concentrations at locations further downstream of the site.

With regard to selenium, the reference area (A9) contained a mean sediment concentration of 1.8 mg/kg, dry weight, of selenium, which is greater than the mean sediment concentrations at both locations A4 and A5, where a risk from selenium (above the LOAEL) was calculated. Therefore, an additional source of selenium potentially exists along the Bound Brook upstream of the Cornell-Dubilier Electronics site. Nonetheless, the Cornell-Dubilier Electronics site may also be a potential source of selenium because the concentrations of selenium detected in the samples collected adjacent to (location A1) and immediately downstream of (locations A2 and A3) the site are greater than the concentrations detected at the reference (location A9). Then, the sediment selenium concentrations generally decrease further downstream of location A3, although this effect is not nearly as pronounced as it is for PCBs.

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6.0 PRESENTATION OF EDIBLE FISH DATA FOR THE ASSESSMENT OF RISK TO HUMAN HEALTH

6.1 Project Scope

The objective of this phase of the project was to collect fish tissue data relevant to human health evaluations for the Bound Brook adjacent to and downstream of the Cornell-Dubilier Electronics site. A reference station was established upstream of the site which exhibited similar habitat as the potentially impacted areas. Sample stations were selected based upon similar habitat between sample stations. The fish were analyzed for target compound list (TCL) pesticides/PCBs and target analyte list (TAL) metals. Both bottom feeding and predatory fish species were collected, analyzed for chemical contaminants, and the results provided to the U.S. EPA Region II for the purposes of human health exposure evaluation. The results of the metals analyses of fish tissue were discussed in Section 3.3.8.1 for Phase II data and 3.4.2.1 for Phase III data, and were not included as part of the results for the human health evaluation.

6.2 Fish Collection

Fish were collected in conjunction with U.S. EPA Region II from a total of twelve locations from the Bound Brook, New Market Pond, and Spring Lake using electrofishing techniques (Figures 3 and 4). The objective of the sampling was to collect edible-sized bottom feeding fish (carp and white suckers) and predatory fish (sunfish, bullhead, and largemouth bass) of similar size between the sample locations. A maximum of three fish were collected of each species from each location but not all species were collected at all locations (e.g., bullhead were only collected at A5, A11, A12, and A14).

The sampling crew taxonomically identified the fish, measured the length and weight of the fish, and performed a gross pathology evaluation. The fish were prepared following the U.S. EPA Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories (1993a). Fish were scaled prior to filleting (for catfish, the skin was removed prior to analysis). Each fillet sample represented a single fish; no sample compositing was required to meet analytical mass requirements. The fillets were weighed, then wrapped in aluminum foil, placed in a plastic bag, and frozen. Fish were delivered to the REAC Biological Assessment Laboratory in Edison, NJ for chemical analysis. Fish tissue were analyzed for TAL metals, TCL pesticides and PCBs, percent lipids, and percent moisture. The data will be used by Region II U.S. EPA for a human health risk assessment.

6.3 Results

Edible fish were collected from ten locations adjacent to and downstream of the Cornell-Dubilier Electronics site, as well as from an upstream reference area and from Spring Lake (Figures 2 and 3). Complete analytical results are included in Appendix C, *Final Analytical Report*. Tables 78 and 79 provide summary statistics (mean, cv, minimum, and maximum) for each compound in each species at each location for PCBs and pesticides, respectively.

6.3.1 Polychlorinated Biphenyls

Aroclors 1248 and 1254 were detected in all fillet samples in all species (Table 28 for Phase II data and Table 37 for Phase III data). Generally, Aroclor 1254 was detected at higher concentrations than Aroclor 1248. For the purposes of the human health evaluation, the U.S. EPA (1993a) recommends that PCBs be reported as the sum of all Aroclors analyzed, with a value of one-half the detection limit assigned to those Aroclors not detected. For this study, total PCBs represents the sum of Aroclor 1248 and 1254 only, and does not include the addition of the other Aroclors that were not detected.

The results (mg/kg, wet weight) indicate that the highest PCB concentrations are located in the

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length of the Bound Brook that extends from the reference area downstream to New Market Pond. The mean total PCB concentrations in white sucker fillet range from 3.9 to 9.5 mg/kg, wet weight. White sucker were also collected from Spring Lake, and downstream of New Market Pond to the Raritan River. The mean concentrations of total PCBs in white sucker for the locations in this length of the Bound Brook ranged from 0.4 to 2.0 mg/kg, wet weight. The same trend is noted for the mean PCB concentrations in pumpkinseed. The mean total PCB concetnrations in fillets from pumpkinseeds collected from the reference area downstream to New Market Pond range from 1.9 to 5.5 mg/kg, wet weight. The mean total PCB concentrations in fillets from pumpkinseeds collected downstream of New Market Pond to the Raritan River range from 0.2 to 0.9 mg/kg, wet weight.

The results for largemouth bass and bullhead are not clear due to the limited number of samples collected from each location.

The concentrations of total PCBs in carp do not follow the same trend as the pumpkinseed and white sucker. The lowest concentration of PCBs were noted in carp collected from the Reference Area (A9) and from Spring Lake (A10). Both of these locations are up gradient of the site. The highest mean concentrations of total PCBs in carp fillet were detected in the fish collected from New Market Pond, locations A5 and A6, (22 to 24 mg/kg, wet weight) and from two of the downstream locations, locations A12 and A13, (27 to 31 mg/kg, wet weight).

6.3.2 Pesticides

Nine pesticides (heptachlor epoxide, g-chlordane, a-chlordane, p, p'-DDE, p, p'-DDD, endrin, endrin aldehyde, dieldrin, and methoxychlor) were detected in the edible fish samples (Table 28 for Phase II data and Table 37 for Phase III data). Methoxychlor was mostly likely a laboratory contaminant since it was detected in the laboratory blanks and only in one sample at a concentration near the detection limit.

The compound 4,4'-DDE was the most frequently detected pesticide found in the fish fillets. Approximately 85 percent of the fish captured contained detectable levels of this pesticide. However, there are no distinct trends among species with the exception that carp contained the highest concentrations compared to the other species collected. When the mean concentrations of 4,4'-DDE were calculated for each location across all species, trends among the locations were observed. The mean 4,4'-DDE concentration in edible fish tissue was low at the two locations up gradient of the site (A9 and A10), increased toward locations A1 and A2, and drastically decreased toward location A5. The mean 4,4'-DDE tissue concentration then increased again at location A6 (the upstream New Market Pond location) and gradually decreased from there toward location A14. Heptachlor epoxide was detected most frequently in the samples collected from the reference area downstream to New Market Pond (85 percent). The frequency of detection of this pesticide drops below New Market Pond and heptachlor epoxide is only detected in one pumpkinseed collected at location A12. This pesticide was detected in five of the eleven fish collected from Spring Lake.

Chlordane was detected in samples collected both upstream and downstream of New Market Pond. However, this pesticide was only detected in white sucker, carp, and catfish and was not detected in pumpkinseed or largemouth bass. It should be noted that technical grade chlordane was detected in 3 carp and 3 white suckers collected from Spring Lake. Technical grade chlordane is defined as the presence of both a-chlordane and g-chlordane. It should also be noted that dieldrin was only detected in four fish, and these fish were also captured in Spring Lake.

Endrin aldehyde was only detected in largemouth bass, carp, white sucker, and pumpkinseed

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collected from New Market Pond. Endrin was only detected in one carp collected from the Bound Brook (A12) downstream of New Market Pond.

6.4 Discussion

In general, the highest PCB and pesticide concentrations were found in the carp, followed by white sucker, pumpkin seed, and largemouth bass. The concentrations of these compounds may be linked to the percent lipids in each of these species. A review of the lipid content indicates that carp have the highest lipid content (25 percent) followed by white sucker (11 percent), bullhead (6 percent), pumpkinseed (5 percent), and largemouth bass (3 percent). Organochlorine pesticides are usually insoluble in water but are very soluble in lipids. This allows these compounds to be stored in fatty tissue, with the higher concentrations found in those species with a higher lipid content.

With the exception of carp, the highest PCB concentrations were noted in the fish collected in the Bound Brook from the reference area downstream to New Market Pond, indicating that the Cornell-Dubilier Electronics site is a significant source of PCBs in the Bound Brook. On the other hand, the concentration of PCBs were higher in carp collected downstream of New Market Pond. This may be due to several factors. The size (and therefore the age) of the fish may play an important role in the accumulation of organochlorine pesticides and PCBs. The older the fish, the longer the exposure duration and the higher the concentration that may accumulate in the tissue. The carp collected below New Market Pond were larger than those collected upstream of New Market Pond. Another potential explanation for why PCBs in carp were higher in fish collected downstream of New Market Pond is that there may be another source of PCBs, in addition to the Cornell-Dubilier Electronics site, downstream of New Market Pond. This does not appear likely, however, because of the low levels of PCBs found in the other fish species collected below New Market Pond. Another explanation is that there were a limited number of carp collected. The limited number of fish allows for a wide range in the standard deviation, and there is some overlap with the concentrations of PCBs detected in fish throughout the extent of the fish sampling effort.

Of particular note is the presence of PCBs and many pesticides in the fish collected from Spring Lake. Since this lake receives water from a different drainage, it appears as if another source, in addition to the Cornell-Dubilier Electronics site, may be contributing to the contamination within the Bound Brook. Nevertheless, the Cornell-Dubilier Electronics site appears to be a significant source of PCBs detected in the edible fish tissue collected from the Bound Brook downstream of the site.

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7.0 OVERALL CONCLUSIONS

7.1 Nature and Extent of Contamination

When the nature and extent of contamination was evaluated in this study, three overall conclusions were drawn:

- Many contaminants are present at relatively high levels adjacent to and/or immediately down gradient of the site. These concentrations progressively decrease toward location A14, near the confluence of the Green Brook and the Raritan River, with the exception of a sharp increase either immediately upstream of New Market Pond or within New Market Pond. The increase in concentrations of many contaminants immediately upstream or within New Market Pond may be the result of a slower rate of flow, resulting in greater deposition of particles onto which the contaminants are adsorbed. Regardless, the high concentrations adjacent to and directly downstream of the Cornell-Dubilier Electronics site indicates that the site is the primary source of many of the contaminants of concern within the section of the Bound Brook corridor investigated for this study.

- The presence of contaminants up gradient of the site (at the reference and in Spring Lake) suggest that, in addition to the Cornell-Dubilier Electronics site, other sources of contamination exist within the Bound Brook stream corridor.

7.2 Ecological Risk Assessment

The results of the ecological risk assessment resulted in the following overall conclusions:

- The structure and function of the Bound Brook and its stream corridor adjacent to and downstream of the Cornell-Dubilier Electronics site is at risk from chemical contamination. First, a risk is posed to the benthic community and is potentially due to a variety of VOCs and BNAs, silver, calcium, copper, vanadium, zinc, and dieldrin. The fish within the stream were determined to be at risk from exposure to selenium, but the risk posed to fish by the other bioaccumulative COPCs could not be determined. Birds utilizing the stream were determined to be at risk from lead, PCBs, total endrin, total chlordane, and total DDT. A risk to omnivorous mammals using the stream was found to be posed by methoxychlor, arsenic, mercury, PCBs and selenium. Finally, a risk to carnivorous mammals was also found to be posed by PCBs.

- Of the contaminants determined to pose a risk to the assessment endpoints evaluated in the risk assessment, the most significant risk is posed by those contaminants which resulted in a hazard quotient greater than one using the mean contaminant concentrations and the LOAEL in the food chain models. This occurred for PCBs using the omnivorous mammal and piscivorous bird models and for selenium using the omnivorous mammal model. However, for these two contaminants, a preliminary ecotoxicologically-based sediment remedial goal could not be determined because their sediment concentrations did not correlate with their resulting hazard quotients in the food chain models. In addition, it is probable that other sources, in addition to the Cornell-Dubilier site, exist and are contributing to the risk posed by these two contaminants. Therefore, source control at the Cornell-Dubilier site is recommended at a minimum in order to decrease risk to the assessment endpoints evaluated in the risk assessment.

7.3 Presentation of Data for Human Health

- In general, the highest PCB and pesticide concentrations were found in the carp, followed by white sucker, pumpkin seed, and largemouth bass. The concentrations of these compounds may be linked to the percent lipids in each of these species.

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- With the exception of carp, the highest PCB concentrations were noted in the fish collected in the Bound Brook from the reference area downstream to New Market Pond. The concentration of PCBs were higher in carp collected downstream of New Market Pond. This is most likely due to the large size (and therefore age) of the carp collected below New Market Pond and the limited number of carp collected, resulting in high variability in the data.

- Of particular note is the presence of PCBs and many pesticides in the fish collected from Spring Lake. Since this lake receives water from a different drainage, it appears as if another source, in addition to the Cornell-Dubilier Electronics site, may be contributing to the contamination within the Bound Brook. Nevertheless, the Cornell-Dubilier Electronics site appears to be a significant source of PCBs detected in the edible fish tissue collected from the Bound Brook downstream of the site.

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TABLE 1A

Summary of Parameters Evaluated and Number of Replicates by Sample Type and Location for Aquatic Samples

Cornell-Dubilier Site

South Plainfield, New Jersey

April 1998

	PHASE II, 16 - 20 June 1997* and 27 June 1997**								PHASE III, 7 August 1997				
	A1	A2	A3	A4	A5	A6	A7	A9	A10	A11	A12	A13	A14
Matrix and Parameter	Site	Veterans Memorial Park	Clinton Ave. Bridge	New Brunswick Ave. Bridge	East New Market Pond	West New Market Pond	Spillway	Upstream Reference	Spring Lake	Spillway	Prospect St. Bridge	South Ave. Bridge	Lincoln Blvd. Bridge
Surface Water													
Water Quality	1	1	1	1	1	1	1	1					
TCL VOCs	1	1	1	1	1	1	1	1					
TCL BNAs	1	1	1	1	1	1	1	1					
TAL Metals (Unfiltered)	1	1	1	1	1	1	1	1					
TAL Metals (Filtered)	1	1	1	1	1	1	1	1					
TCL Pesticides/PCBs	1	1	1	1	1	1	1	1					
Sediments													
TCL VOCs	6	2	2	2	2	2	1	2	2	2	2	1	2
TCL BNAs	6	2	2	2	2	2	1	2	2	2	2	1	2
TAL Metals	6	2	2	2	2	2	1	2	2	2	2	1	2
TCL Pesticides/PCBs	6	2	2	2	2	2	1	2	2	2	2	1	2
Ammonia	1	1	1	1	1	1		1					
Total Petroleum Hydrocarbons	1	1	1	1	1	1		1					
Grain Size	6	2	2	2	2	2	1	2	2	2	2	2	2
Total Organic Carbon	6	2	2	2	2	2	1	2	2	2	2	2	2
Amphipod Toxicity	1	1	1	1	1	1		1					
Crayfish													
TCL BNAs	2	1	3	2	3			4					
Metals	2	8	11	4	3			10					
Pesticides/PCBs	2	8	11	4	3			10					
Forage Fish													
TAL Metals	6	5	8	7	7	8		5					
TCL Pesticides/PCBs	6	5	8	7	7	8		5					
Edible Fish (Fillets)													
TAL Metals									A10	A11	A12	A13	A14
Carp	3				(1)	3		3	3	3	3	1	
White Sucker	3	3	3		(3)			3	3	3	3	3	3
Pumpkin Seed	3	2	3	3	(3)	3			2	3	3	2	2
Bass					(3)	(3)			3	3	2	2	1
Catfish					(1)					3	1		1
TCL Pesticides/PCBs													
Carp	3				1	3		3	3	3	3	1	
White Sucker	3	3	3		3			3	3	3	3	3	3
Pumpkin Seed	3	2	3	3	3	3			2	3	3	2	2
Bass					3	3			3	3	2	2	1
Catfish										3	1		1

*All samples except for surface water samples.

**Surface water samples only.

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TABLE 30
Results of Analysis for Volatile Organic Compounds Concentrations in Sediment - PHASE III
Cornell-Dubilier Site
South Plainfield, New Jersey
April 1998

(Results reported in mg/kg, dry weight)

Sample Number Sample Location Sample Collected	2274-1009 A10-1 08/08/97	2274-1010 A10-2 08/08/97	2274-1007 A11-1 08/07/97	2274-1008 A11-2 08/07/97	2274-1001 A12-1 08/07/97	2274-1002 A12-2 08/07/97	2274-1003 A13-1 08/07/97	2274-1004 A13-2 08/07/97	2274-1005 A14-1 08/07/97	2274-1006 A14-2 08/07/97
Acetone	0.01	0.02	0.01	0.03	ND	ND	0.03	ND	ND	ND
Methyl-tertiary-butylether	ND	0.01 J	0.002	ND	ND	ND	ND	ND	ND	ND
2-Butanone	0.004 J	ND	ND	0.01	ND	ND	0.01	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	0.002	ND	ND
Toluene	0.002	0.09	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltouene	ND	0.01	0.001 J	ND	ND	ND	ND	ND	ND	ND

mg/kg = milligrams per kilogram
ND indicates below quantitation limit
J indicates value is estimated

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TABLE 31
Results of Base, Neutral and Acid Concentrations in Sediment - PHASE III
Cornell-Dubilier Site
South Plainfield, NJ
April 1998

(Based on mg/kg, dry weight)

Sample Location	A10-1	A10-2	A11-1	A11-2	A12-1	A12-2	A13-1	A13-2	A14-1	A14-2
Sample Number	2274-1009	2274-1010	2274-1007	2274-1008	2274-1001	2274-1002	2274-1003	2274-1004	2274-1005	2274-1006
Sample Collection	08/08/97	08/08/97	08/07/97	08/07/97	08/07/97	08/07/97	08/07/97	08/07/97	08/07/97	08/07/97
Naphthalene	ND	ND	ND	0.97	ND	ND	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	3.1	ND	ND	ND	ND	ND	ND
Phenanthrene	1.1	4.1	2.6	5.9	ND	1.6 (J)	3.5	1.5 (J)	ND	ND
Anthracene	ND	ND	ND	2.1	ND	ND	ND	ND	ND	ND
Fluoranthene	2.3	9.3	5.4	16	ND	3.7	6.8	3.9	ND	0.2
Pyrene	2.1	8.2	5.0	15	ND	3.3	6.2	3.1	ND	0.18
Benzo(a)anthracene	1.0	3.9	2.2	8.3	ND	1.7 (J)	2.5 (J)	1.5 (J)	ND	ND
Chrysene	1.4	4.9	2.8	9.4	ND	1.9 (J)	3.6	1.6 (J)	ND	ND
Bis(2-Ethylhexyl)phthalate	0.87	1.6	1.2	ND	ND	1.4 (J)	ND	0.95 (J)	ND	ND
Benzo(b)fluoranthene	1.5	5.4	2.4	11	ND	1.7 (J)	3.2	1.2 (J)	ND	ND
Benzo(k)fluoranthene	1.4	5.2	2.5	9.1	ND	1.7 (J)	3.3	1.2 (J)	ND	ND
Benzo(a)pyrene	1.4	5.8	3.0	13	ND	2.1 (J)	3.5	1.4 (J)	ND	0.14
Indeno(1,2,3-cd)pyrene	0.97	3.2	1.4	7.5	ND	1.1 (J)	2.1 (J)	ND	ND	ND
Dibenzo(a,h)anthracene	ND	1.3	ND	2.4	ND	ND	ND	ND	ND	ND
Benzo(g,h,i)perylene	1.0	3.5	1.7	9.0	ND	1.2 (J)	2.3 (J)	ND	ND	ND
Total BNAs	15	56	30	113	0	21	37	16	0	0.5

mg/kg = milligrams per kilogram
ND indicates below quantitation limit
J indicates value is estimated

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TABLE 32
Results of Metal Concentrations in Sediment - PHASE III
Cornell-Dubilier Site
South Plainfield, NJ
April 1998

(Based on mg/kg, dry weight)

Location	A10-1	A10-2	A11-1	A11-2	A12-1	A12-2	A13-1	A13-2	A14-1	A14-2
Client ID	C2274-1009	C2274-1010	C2274-1007	C2274-1008	C2274-1001	C2274-1002	C2274-1003	C2274-1004	C2274-1005	C2274-1006
Sample Collection	08/08/97	08/08/97	08/07/97	08/07/97	08/07/97	08/07/97	08/07/97	08/07/97	08/07/97	08/07/97
% Solids	61	41	68	69	79	78	50	73	68	78
Aluminum	5300	9800	8400	17000	6700	4600	18000	3400	17000	3600
Arsenic	2.4	3.3	1.5	3.0	0.82	1.3	23	1.5	2.4	0.96
Barium	87	110	110	220	62	43	320	62	230	26
Beryllium	ND	ND	0.58	1.3	0.47	ND	1.4	ND	0.92	ND
Cadmium	0.67	2.5	1.6	0.75	ND	0.76	3.4	1.4	ND	ND
Calcium	4000	5300	2800	5000	1100	2400	3500	930	2500	670
Chromium	16	41	38	24	12	12	24	12	35	8.9
Cobalt	3.6	8.0	11	21	5.7	5.1	30	6	11	4.0
Copper	20	81	57	74	13	23	120	38	12	7.9
Iron	9200	19000	24000	25000	14000	12000	24000	8500	18000	10000
Lead	53	290	170	260	68	54	190	47	9.2	17
Magnesium	2700	3600	4300	6900	2700	2400	3200	1300	3200	1600
Manganese	130	220	400	370	240	210	650	180	260	110
Mercury	0.08	0.43	0.04	0.54	0.04	ND	0.36	0.05	0.04	ND
Nickel	8.5	25	26	38	13	13	46	15	18	8.4
Potassium	370	870	1100	1500	920	530	1100	440	510	280
Selenium	ND	ND	ND	ND	ND	ND	0.67	ND	ND	ND
Silver	ND	1.1	0.47	ND	ND	ND	1.7	0.6	ND	ND
Sodium	74	200	160	480	62	180	160	74	93	50
Vanadium	20	39	26	41	18	17	35	9.5	47	12
Zinc	73	300	200	430	130	99	600	100	58	51

mg/kg = milligrams per kilogram
ND indicates below quantitation limit

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TABLE 33
Results of Pesticides/PCB Concentrations in Sediment - PHASE III
Cornell-Dubilier Site
South Plainfield, New Jersey
April 1998

(Results reported in mg/kg, dry weight)

Sample Location	Sample Number	Sample Collection	Aroclor 1254
A10-1	2274-1009	08/08/97	ND
A10-2	2274-1010	08/08/97	ND
A11-1	2274-1007	08/07/97	1.2 W
A11-2	2274-1008	08/07/97	ND
A12-1	2274-1001	08/07/97	0.03 JW
A12-2	2274-1002	08/07/97	0.3 W
A13-1	2274-1003	08/07/97	11 W
A13-2	2274-1004	08/07/97	0.7 W
A14-1	2274-1005	08/07/97	ND
A14-2	2274-1006	08/07/97	ND

mg/kg = milligrams per kilogram
ND indicates below quantitation limit
J indicates value is estimated
W indicates sample was weathered, value is estimated

A24

TABLE 34
Particle Size Distribution of Sediment - PHASE III
Cornell-Dubilier Site
South Plainfield, New Jersey
April 1998

(reported as percent)

Sample Location	Sample Number	Sample Collection	Gravel	Sand	Silt	Clay	Soil Family
A10-1	2274-1009	08/08/97	11	84	2.4	2.5	loamy sand
A10-2	2274-1010	08/08/97	0	60	27	13	sandy loam
A11-1	2274-1007	08/07/97	7	92	0.3	0.7	sand
A11-2	2274-1008	08/07/97	2	87	3.9	7.1	loamy sand
A12-1	2274-1001	08/07/97	2	43	24	31	clay loam
A12-2	2274-1002	08/07/97	0	95	2.4	2.7	sand
A13-1	2274-1003	08/07/97	0	65	14	21	sandy clay loam
A13-2	2274-1004	08/07/97	0	92	3.5	4.1	sand
A14-1	2274-1005	08/07/97	0	25	29	46	clay
A14-2	2274-1006	08/07/97	0	99.7	0.11	0.17	sand

A25

TABLE 35
Results of Total Organic Carbon Concentrations in Sediment - PHASE III
Cornell-Dubilier Site
South Plainfield, New Jersey
April 1998

Sample Number	Sample Location	Sample Collection	TOC
2274-1009	A10-1	08/08/97	4.8
2274-1010	A10-2	08/08/97	15
2274-1007	A11-1	08/07/97	4.5
2274-1008	A11-2	08/07/97	5.7
2274-1001	A12-1	08/07/97	1.2
2274-1002	A12-2	08/07/97	1.7
2274-1003	A13-1	08/07/97	8.8
2274-1004	A13-2	08/07/97	1.6
2274-1005	A14-1	08/07/97	3.6
2274-1006	A14-2	08/07/97	0.32

A2(

TABLE 36
Results of Metal Concentrations in Edible Fish Tissue - PHASE III
Cornell-Dubilier Site
South Plainfield, New Jersey
April 1998

(Results reported mg/kg, wet weight)

Sample Number	Species	Sample Location	Sample Collection	Percent Solids	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Vanadium	Zinc
BS-A10-1	Bass	A10	08/06/97	21	4.9	ND	ND	ND	180	ND	ND	ND	2.8	ND	230	ND	0.2	ND	3200	0.4	ND	400	ND	6.8
BS-A10-2	Bass	A10	08/06/97	20	5.4	ND	ND	ND	820	0.7	ND	0.5	3.0	ND	260	ND	0.2	ND	3400	0.3	ND	380	ND	6.8
BS-A10-3	Bass	A10	08/06/97	23	11.0	ND	ND	ND	1600	0.7	ND	0.4	4.0	0.2	280	0.3	0.1	ND	3300	0.3	ND	520	ND	9.8
CC-A10-1	Carp	A10	08/06/97	29.82	6.6	ND	ND	ND	170	0.4	ND	3.6	7.5	ND	230	0.3	0.1	1.6	2800	0.2	ND	380	ND	20
CC-A10-2	Carp	A10	08/06/97	22.87	6.9	ND	ND	ND	230	0.3	ND	0.3	7.3	ND	250	0.3	0.1	ND	3200	0.3	ND	340	ND	17
CC-A10-3	Carp	A10	08/06/97	21	5.5	ND	0.3	ND	510	0.5	ND	0.4	12	ND	250	0.3	0.1	ND	3400	0.4	ND	380	ND	14
PS-A10-1	Pumpkin Seed	A10	08/06/97	20	5.9	ND	0.3	ND	3700	0.6	ND	0.6	5.3	ND	310	1.0	0.1	ND	3100	0.3	ND	470	ND	13
PS-A10-2	Pumpkin Seed	A10	08/06/97	19	4.1	ND	0.3	ND	2700	0.9	ND	1.9	6.0	0.2	290	1.0	0.1	ND	3100	0.3	ND	480	ND	14
WS-A10-1	White Sucker	A10	08/06/97	20	6.3	ND	ND	ND	170	0.6	0.4	0.6	4.0	ND	260	ND	0.1	ND	3800	0.4	ND	300	0.4	8.5
WS-A10-2	White Sucker	A10	08/06/97	18	4.5	ND	ND	ND	350	ND	ND	0.5	5.0	0.2	280	0.3	0.1	ND	3900	0.3	ND	410	ND	11
WS-A10-3	White Sucker	A10	08/06/97	20	5.0	0.2	ND	ND	310	0.6	0.3	0.6	5.5	ND	230	0.1	0.2	ND	3300	0.3	ND	370	0.4	10
BS-A11-1	Bass	A11	08/06/97	18.82	ND	ND	ND	ND	1400	0.5	ND	0.5	6.0	ND	250	0.6	0.2	ND	3000	0.2	ND	410	ND	12
BS-A11-2	Bass	A11	08/06/97	21.06	3.6	ND	ND	ND	970	ND	ND	0.5	3.8	ND	250	0.3	0.2	ND	3200	0.3	ND	440	ND	12
BS-A11-3	Bass	A11	08/06/97	20.80	4.6	ND	ND	ND	970	ND	ND	0.6	3.3	ND	270	0.3	0.2	ND	3500	0.3	ND	430	ND	11
BH-A11-1	Catfish	A11	08/06/97	17.49	6.6	ND	ND	ND	530	1.1	ND	1.0	8.6	ND	250	0.5	0.1	0.6	3900	ND	ND	370	ND	4.4
BH-A11-2	Catfish	A11	08/06/97	18.20	24.0	ND	0.3	ND	1000	ND	ND	0.1	7.6	ND	270	0.6	0.1	ND	3800	0.2	ND	310	ND	22
BH-A11-3	Catfish	A11	08/06/97	18.74	15.0	ND	ND	ND	540	0.6	ND	1.0	5.2	ND	280	0.7	0.0	ND	3800	0.2	0.3	360	ND	5.1
CC-A11-1	Carp	A11	08/06/97	22.11	9.1	ND	0.2	ND	880	0.5	ND	1.1	10	ND	220	0.3	0.0	ND	2900	0.6	ND	400	ND	12
CC-A11-2	Carp	A11	08/06/97	21.97	3.7	ND	ND	ND	370	ND	ND	0.4	9.2	ND	220	0.3	ND	ND	3500	0.5	ND	440	ND	7.7
CC-A11-3	Carp	A11	08/06/97	22.87	20	ND	ND	ND	410	0.3	ND	0.6	13	ND	200	0.3	0.0	ND	3000	0.6	ND	390	ND	15
PS-A11-1	Pumpkin Seed	A11	08/06/97	20.39	10	ND	0.2	ND	1600	0.5	ND	0.6	3.7	0.2	290	2.2	0.0	ND	3300	0.3	0.3	450	ND	17
PS-A11-2	Pumpkin Seed	A11	08/06/97	20.31	7.1	ND	0.2	ND	2000	ND	ND	0.3	3.6	ND	280	0.9	0.1	ND	3100	0.4	ND	450	ND	15
PS-A11-3	Pumpkin Seed	A11	08/06/97	19.47	5.6	ND	0.3	ND	2900	0.4	ND	0.6	3.7	ND	310	2.3	0.1	ND	2900	0.4	ND	470	ND	21
WS-A11-1	White Sucker	A11	08/06/97	19.11	5.9	ND	0.3	ND	550	0.4	ND	0.5	5.2	ND	250	1.1	0.0	ND	3600	0.3	ND	340	ND	11
WS-A11-2	White Sucker	A11	08/06/97	15.76	6.5	ND	0.3	ND	570	0.4	ND	0.6	6.1	ND	220	0.6	0.0	ND	3200	0.3	ND	320	ND	19
WS-A11-3	White Sucker	A11	08/06/97	18.30	3.3	ND	0.3	ND	660	0.4	ND	0.5	4.6	ND	260	1.6	0.1	ND	3500	0.3	ND	350	ND	15
BS-A12-1	Bass	A12	08/06/97	17.00	5.6	ND	ND	ND	500	0.6	0.4	0.5	4.0	ND	270	0.3	0.2	ND	3400	0.4	0.3	430	ND	12
BS-A12-2	Bass	A12	08/06/97	19.55	15	ND	ND	0.2	290	0.5	ND	0.5	4.3	ND	250	0.3	0.1	ND	3100	0.4	ND	410	ND	10
BH-A12-1	Catfish	A12	08/06/97	17	5	ND	ND	ND	89	0.6	0.4	1.7	4.9	ND	290	0.2	0.1	ND	3700	0.2	0.4	300	0.5	4
CC-A12-1	Carp	A12	08/06/97	35.34	8.2	0.1	ND	ND	230	0.4	ND	0.9	7.8	ND	210	0.2	0.1	ND	2700	0.3	ND	290	ND	12
CC-A12-2	Carp	A12	08/06/97	25.57	3.3	ND	ND	ND	380	0.5	ND	0.6	9.7	ND	220	0.2	0.1	ND	3100	0.6	ND	360	ND	11
CC-A12-3	Carp	A12	08/06/97	22.88	16	ND	ND	ND	280	0.5	ND	0.7	8.7	ND	220	0.3	0.1	ND	3200	0.6	ND	390	ND	14
PS-A12-1	Pumpkin Seed	A12	08/06/97	19.45	6	ND	0.2	ND	1700	0.4	ND	2.3	5.1	ND	290	0.9	0.1	ND	3300	0.4	ND	550	ND	15
PS-A12-2	Pumpkin Seed	A12	08/06/97	19.13	9.4	ND	0.2	ND	1500	ND	ND	0.4	4.2	ND	290	0.9	0.0	ND	3200	0.3	ND	610	ND	14
PS-A12-3	Pumpkin Seed	A12	08/06/97	19.36	8.3	ND	0.2	ND	1500	ND	ND	0.6	4.3	ND	270	0.6	0.2	ND	3300	0.4	ND	640	ND	19
WS-A12-1	White Sucker	A12	08/06/97	20.02	4.2	ND	0.2	ND	300	0.4	ND	0.6	4.4	ND	240	0.5	0.1	ND	3400	0.4	ND	360	ND	11
WS-A12-2	White Sucker	A12	08/06/97	18.35	3.9	ND	0.5	ND	680	ND	ND	0.5	4.6	ND	260	1.1	0.0	ND	3300	0.2	ND	400	ND	13
WS-A12-3	White Sucker	A12	08/06/97	20.14	6.4	ND	0.3	ND	670	ND	ND	0.4	4.6	ND	280	1.3	0.0	ND	3700	0.3	ND	380	ND	14
BS-A13-1	Bass	A13	08/06/97	19	6.6	ND	ND	ND	550	2.7	ND	0.6	13	ND	270	0.4	0.2	1.4	3300	0.4	ND	410	ND	12
BS-A13-2	Bass	A13	08/06/97	21	10.5	ND	ND	ND	250	0.5	ND	0.5	4.1	ND	270	0.2	0.4	ND	3500	0.3	ND	370	ND	10
CC-A13-1	Carp	A13	08/06/97	29	6.1	0.2	ND	ND	350	0.4	ND	0.6	16	ND	210	0.2	0.1	ND	2800	0.5	ND	320	ND	12
PS-A13-1	Pumpkin Seed	A13	08/06/97	19	4.6	ND	0.4	ND	3200	1.4	ND	0.4	12	ND	280	1.7	0.1	ND	2800	0.5	ND	470	ND	12
PS-A13-2	Pumpkin Seed	A13	08/06/97	21	4.6	ND	0.6	ND	6500	1.5	0.4	0.6	10	ND	280	2.0	0.1	0.9	3100	0.4	ND	500	0.4	16
WS-A13-1	White Sucker	A13	08/06/97	20	12.4	ND	0.3	ND	480	0.5	0.3	0.4	3.6	ND	260	0.6	0.1	ND	3600	0.3	ND	320	ND	13
WS-A13-2	White Sucker	A13	08/06/97	19	250	ND	ND	ND	160	0.4	ND	0.6	5.1	ND	230	0.3	0.1	ND	3300	0.5	ND	350	0.3	12
WS-A13-3	White Sucker	A13	08/06/97	21	5	ND	0.4	ND	1300	0.6	ND	0.7	5.6	ND	250	1.0	0.0	ND	2900	0.4	ND	380	ND	13
BS-A14-1	Bass	A14	08/06/97	20	4.6	ND	ND	ND	220	1.2	ND	1.7	6.2	ND	280	0.3	0.2	0.8	3800	0.3	ND	440	ND	9
BH-A14-1	Catfish	A14	08/06/97	17	6.7	ND	ND	ND	90	0.7	ND	0.3	8.1	ND	250	0.3	0.1	ND	3500	0.1	ND	380	ND	4
PS-A14-1	Pumpkin Seed	A14	08/06/97	19	3.0	ND	0.3	ND	3000	1.6	ND	0.6	6.4	ND	280	1.3	0.1	0.8	2800	0.4	ND	480	0.3	16
PS-A14-2	Pumpkin Seed	A14	08/06/97	19	3.1	ND	0.7	ND	6800	0.7	ND	0.5	3.9	ND	310	3.3	0.1	ND	2700	0.3	ND	550	ND	14
WS-A14-1	White Sucker	A14	08/06/97	23	ND	ND	ND	ND	400	0.6	ND	0.6	5.3	ND	260	0.6	0.1	ND	3500	0.2	ND	280	ND	16
WS-A14-2	White Sucker	A14	08/06/97	21	7.5	ND	0.2	ND	150	0.4	ND	3.4	5.4	ND	220	0.2	0.1	ND	3000	0.3	ND	340	ND	15
WS-A14-3	White Sucker	A14	08/06/97	21	4.5	ND	0.2	ND	540	0.4	ND	0.6	5.0	0.3	250	0.5	0.1	ND	3300	0.3	ND	310	ND	13

mg/kg = milligrams per kilogram
ND indicates below quantitation limit

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TABLE 37
Results of Pesticide/PCB Concentrations in Edible Fish Tissue - PHASE III
Cornell-Dubilier Site
April 1998

(Results reported in mg/kg, wet weight)

Sample Number	Species	Sample Location	Sample Collection	Percent Solid	Percent Lipid	Aroclor 1248		Aroclor 1254		Heptachlor Epoxide		g-chlordane		a-chlordane		4,4'-DDE		Dieldrin		Endrin		4,4'-DDD	
BS-A10-1	Bass	A-10	08/06/97	21	4	0.08	W	1.3	W	0.01	MI	ND	MI	ND	MI	0.020	MI	ND	MI	ND	MI	ND	MI
BS-A10-2	Bass	A-10	08/06/97	20	3	0.02	W	0.19	W	ND	MI	ND	MI	ND	MI	0.0040	MI	ND	MI	ND	MI	ND	MI
BS-A10-3	Bass	A-10	08/06/97	20	3	0.02	W	0.09	W	ND	MI	ND	MI	ND	MI	0.0070	MI	ND	MI	ND	MI	ND	MI
CC-A10-1	Carp	A-10	08/06/97	30	45	0.6	W	2	W	0.05	MI	0.16	MI	0.25	MI	0.11	MI	0.06	MI	ND	MI	0.1	MI
CC-A10-2	Carp	A-10	08/06/97	23	14	0.13	W	0.76	W	0.01	MI	0.05	MI	0.09	MI	0.050	MI	ND	MI	ND	MI	0.04	MI
CC-A10-3	Carp	A-10	08/06/97	21	12	0.06	W	0.38	W	0.01	MI	0.04	MI	0.07	MI	0.040	MI	0.01	MI	ND	MI	0.04	MI
PS-A10-1	Pumpkin Seed	A-10	08/06/97	20	5	0.05	W	0.22	W	0.01	MI	ND	MI	ND	MI	0.010	MI	0.01	MI	ND	MI	0.01	MI
PS-A10-2	Pumpkin Seed	A-10	08/06/97	19	3	0.02	W	0.07	W	ND	MI	ND	MI	ND	MI	0.010	MI	ND	MI	ND	MI	ND	MI
WS-A10-1	White Sucker	A-10	08/06/97	20	13	0.15	W	1.3	W	ND	MI	0.04	MI	0.06	MI	0.030	MI	ND	MI	ND	MI	ND	MI
WS-A10-2	White Sucker	A-10	08/06/97	19	11	0.11	W	0.63	W	ND	MI	0.03	MI	0.07	MI	0.030	MI	0.01	MI	ND	MI	ND	MI
WS-A10-3	White Sucker	A-10	08/06/97	20	15	0.2	W	0.92	W	ND	MI	0.04	MI	0.07	MI	0.030	MI	ND	MI	ND	MI	ND	MI
BS-A11-1	Bass	A-11	08/06/97	19	2	0.05	W	0.3	W	ND	MI	ND	MI	ND	MI	0.02	MI	ND	MI	ND	MI	ND	MI
BS-A11-2	Bass	A-11	08/06/97	21	8	0.4	W	2.9	W	ND	MI	ND	MI	ND	MI	0.06	MI	ND	MI	ND	MI	0.03	MI
BS-A11-3	Bass	A-11	08/06/97	21	5	0.19	W	1.9	W	ND	MI	ND	MI	ND	MI	0.04	MI	ND	MI	ND	MI	ND	MI
CC-A11-1	Carp	A-11	08/06/97	22	17	1.9	W	16	W	ND	MI	ND	MI	0.07	MI	0.15	MI	ND	MI	ND	MI	ND	MI
CC-A11-2	Carp	A-11	08/06/97	22	11	0.31	W	1.3	W	ND	MI	ND	MI	0.03	MI	0.03	MI	ND	MI	ND	MI	ND	MI
CC-A11-3	Carp	A-11	08/06/97	23	21	1.7	W	16	W	ND	MI	ND	MI	0.09	MI	0.15	MI	ND	MI	ND	MI	ND	MI
BH-A11-1	Catfish	A-11	08/06/97	17	2	0.06	W	0.19	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
BH-A11-2	Catfish	A-11	08/06/97	18	9	0.16	W	1.1	W	ND	MI	ND	MI	ND	MI	0.03	MI	ND	MI	ND	MI	ND	MI
BH-A11-3	Catfish	A-11	08/06/97	19	10	0.3	W	1.8	W	ND	MI	ND	MI	0.05	MI	0.04	MI	ND	MI	ND	MI	ND	MI
PS-A11-1	Pumpkin Seed	A-11	08/06/97	20	4	0.09	W	0.84	W	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI
PS-A11-2	Pumpkin Seed	A-11	08/06/97	20	3	0.06	W	0.44	W	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI
PS-A11-3	Pumpkin Seed	A-11	08/06/97	19	4	0.05	W	0.27	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
WS-A11-1	White Sucker	A-11	08/06/97	19	6	0.25	W	1.7	W	ND	MI	ND	MI	0.02	MI	0.03	MI	ND	MI	ND	MI	ND	MI
WS-A11-2	White Sucker	A-11	08/06/97	16	3	0.06	W	1.3	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
WS-A11-3	White Sucker	A-11	08/06/97	18	6	0.16	W	1	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
BS-A12-1	Bass	A-12	08/06/97	18	5	0.14	W	1.3	W	ND	MI	ND	MI	ND	MI	0.02	MI	ND	MI	ND	MI	ND	MI
BS-A12-2	Bass	A-12	08/06/97	20	2	0.07	W	0.72	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
CC-A12-1	Carp	A-12	08/06/97	35	58	7.7	W	42	W	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI
CC-A12-2	Carp	A-12	08/06/97	25	33	2.5	W	17	W	ND	MI	ND	MI	0.12	MI	ND	MI	ND	MI	ND	MI	ND	MI
CC-A12-3	Carp	A-12	08/06/97	23	18	1.2	W	12	W	ND	MI	ND	MI	0.06	MI	ND	MI	ND	MI	0.04	MI	ND	MI
BH-A12-1	Catfish	A-12	08/06/97	17	6	0.12	W	0.58	W	ND	MI	ND	MI	0.02	MI	0.01	MI	ND	MI	ND	MI	ND	MI
PS-A12-1	Pumpkin Seed	A-12	08/06/97	19	4	0.05	W	0.8	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
PS-A12-2	Pumpkin Seed	A-12	08/06/97	19	4	0.06	W	0.8	W	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI
PS-A12-3	Pumpkin Seed	A-12	08/06/97	19	3	0.06	W	0.82	W	0.01	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
WS-A12-1	White Sucker	A-12	08/06/97	20	10	0.28	W	1.6	W	ND	MI	ND	MI	0.03	MI	0.03	MI	ND	MI	ND	MI	ND	MI
WS-A12-2	White Sucker	A-12	08/06/97	18	9	0.32	W	2.3	W	ND	MI	ND	MI	ND	MI	0.04	MI	ND	MI	ND	MI	ND	MI
WS-A12-3	White Sucker	A-12	08/06/97	20	9	0.3	W	1.2	W	ND	MI	ND	MI	0.02	MI	0.02	MI	ND	MI	ND	MI	ND	MI
BS-A13-1	Bass	A-13	08/06/97	19	2	0.08	W	0.49	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
BS-A13-2	Bass	A-13	08/06/97	21	4	0.06	W	0.57	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
CC-A13-1	Carp	A-13	08/06/97	29	39	3.2	W	28	W	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI	ND	MI
PS-A13-1	Pumpkin Seed	A-13	08/06/97	19	5	0.1	W	0.72	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
PS-A13-2	Pumpkin Seed	A-13	08/06/97	21	7	0.1	W	0.78	W	ND	MI	ND	MI	ND	MI	0.02	MI	ND	MI	ND	MI	ND	MI
WS-A13-1	White Sucker	A-13	08/06/97	20	8	2.4	W	1.6	W	ND	MI	0.02	MI	ND	MI	0.03	MI	ND	MI	ND	MI	ND	MI
WS-A13-2	White Sucker	A-13	08/06/97	19	16	0.07	W	0.12	W	ND	MI	0.01	MI	ND	MI	0.01	MI	ND	MI	ND	MI	0.004	MI
WS-A13-3	White Sucker	A-13	08/06/97	21	10	0.61	W	1.4	W	ND	MI	ND	MI	0.02	MI	0.02	MI	ND	MI	ND	MI	ND	MI
BS-A14-1	Bass	A-14	08/06/97	20	3	0.02	W	0.096	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
BH-A14-1	Catfish	A-14	08/06/97	17	3	0.02	W	0.12	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
PS-A14-1	Pumpkin Seed	A-14	08/06/97	19	4	0.03	W	0.17	W	ND	MI	ND	MI	ND	MI	0.01	MI	ND	MI	ND	MI	ND	MI
PS-A14-2	Pumpkin Seed	A-14	08/06/97	19	4	0.03	W	0.1	W	ND	MI	ND	MI	ND	MI	0.004	MI	ND	MI	ND	MI	ND	MI
WS-A14-1	White Sucker	A-14	08/06/97	23	20	0.08	W	0.35	W	ND	MI	0.01	MI	ND	MI	0.04	MI	ND	MI	ND	MI	0.01	MI
WS-A14-2	White Sucker	A-14	08/06/97	21	21	0.05	W	0.32	W	ND	MI	ND	MI	ND	MI	0.03	MI	ND	MI	ND	MI	0.01	MI
WS-A14-3	White Sucker	A-14	08/06/97	21	10	0.06	W	0.32	W	ND	MI	0.01	MI	ND	MI	0.01	MI	ND	MI	ND	MI	0.01	MI

mg/kg = milligrams per kilogram
ND indicates below quantitation limit
MI indicates matrix interference
W indicates sample was weathered, value is estimated

A2

TABLE 78
Summary Pesticide and PCB Concentrations in Edible Fish Tissue
Cornell-Dubilier Site
South Plainfield, NJ
April 1998

(Results reported in mg/kg, wet weight)

Aroclor 1248

	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A9	0.07	0.3	3	100%									0.69	1.1	3	100%				
A10	0.26	1.1	3	100%	0.041	0.8	3	100%	0.035	0.47	2	100%	0.15	0.29	3	100%				
A1	1.4	0.19	3	100%					0.67	1.3	3	100%	0.83	0.88	3	100%				
A2									1.7	0.3	2	100%	2.5	0.5	3	100%				
A3									0.87	0.33	3	100%	2.7	0.21	3	100%				
A4									0.73	0.93	3	100%								
A5	6.1	NA	1	100%	0.36	0.19	3	100%	0.89	0.33	3	100%					0.28	NA	1	100%
A6	7.2	0.55	3	100%	0.4	0.48	3	100%	0.53	0.11	3	100%								
A11	1.3	0.66	3	100%	0.21	0.83	3	100%	0.066	0.34	3	100%	0.16	0.61	3	100%	0.17	0.72	3	100%
A12	3.8	0.91	3	100%	0.11	0.44	2	100%	0.054	0.056	3	100%	0.3	0.067	3	100%	0.12	NA	1	100%
A13	3.2	NA	1	100%	0.06	0.024	2	100%	0.1	0.0071	2	100%	1	1.2	3	100%				
A14					0.02	NA	1	100%	0.03	0.024	2	100%	0.061	0.23	3	100%	0.024	NA	1	100%

Aroclor 1254

	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A9	0.28	0.34	3	100%									3.2	0.94	3	100%				
A10	1	0.81	3	100%	0.53	1.3	3	100%	0.15	0.73	2	100%	0.95	0.35	3	100%				
A1	7.2	0.13	3	100%					1.9	1.3	3	100%	3.5	0.69	3	100%				
A2									3.9	0.42	2	100%	5.7	0.45	3	100%				
A3									1.7	0.24	3	100%	6.5	0.16	3	100%				
A4									1.4	0.73	3	100%								
A5	16	NA	1	100%	0.89	0.21	3	100%	1.8	0.23	3	100%					1.7	NA	1	100%
A6	17	0.52	3	100%	1.1	0.49	3	100%	1.3	0.087	3	100%								
A11	11	0.76	3	100%	1.7	0.77	3	100%	0.52	0.57	3	100%	1.3	0.26	3	100%	1	0.78	3	100%
A12	24	0.68	3	100%	1	0.41	2	100%	0.81	0.014	3	100%	1.7	0.33	3	100%	0.58	NA	1	100%
A13	28	NA	1	100%	0.53	0.11	2	100%	0.75	0.057	2	100%	1	0.77	3	100%				
A14					0.096	NA	1	100%	0.13	0.37	2	100%	0.33	0.052	3	100%	0.12	NA	1	100%

Heptachlor Epoxide

	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A9	0.0026	0.42	3	100%									0.013	0.78	3	100%				
A10	0.022	0.93	3	100%	0.0026	1.5	3	33%	0.0027	1.2	2	50%	0.00039	0.03	3	0%				
A1	0.036	0.25	3	100%					0.017	1.3	3	100%	0.0018	1.4	3	33%				
A2									0.026	0.36	2	100%	0.035	0.48	3	100%				
A3									0.014	0.31	3	100%	0.037	0.45	3	100%				
A4									0.014	0.72	3	100%								
A5	0.00038	NA	1	0%	0.0022	1.4	3	33%	0.02	0.34	3	100%					0.0004	NA	1	0%
A6	0.072	0.62	3	100%	0.0041	0.84	3	67%	0.0083	0.21	3	100%								
A11	0.00038	0.026	3	0%	0.00038	0.05	3	0%	0.0004	0.0014	3	0%	0.00039	0.028	3	0%	0.00039	0.027	3	0%
A12	0.00038	0.023	3	0%	0.0004	0.0071	2	0%	0.0018	1.3	3	33%	0.00039	0.032	3	0%	0.00041	NA	1	0%
A13	0.00041	NA	1	0%	0.00039	0.038	2	0%	0.0004	0	2	0%	0.00038	0.057	3	0%				
A14					0.00038	NA	1	0%	0.0004	0	2	0%	0.00038	0.041	3	0%	0.00041	NA	1	0%

Blank fields indicate no fish were collected at that location
cv = coefficent of variation
n = sample size
freq det = frequency of detection

A29

TABLE 78 (Cont'd)
Summary Pesticide and PCB Concentrations in Edible Fish Tissue
Cornell-Dubilier Site
South Plainfield, NJ
April 1998

(Results reported in mg/kg, wet weight)

g-Chlordane

	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A9	0.018	0.54	3	100%									0.0021	1.4	3	33%				
A10	0.067	1.2	3	67%	0.00038	0.003	3	0%	0.00039	0.036	2	0%	0.038	0.11	3	100%				
A1	0.18	0.28	3	100%					0.00039	0.029	3	0%	0.0056	1.6	3	33%				
A2									0.00041	0.12	2	0%	0.0004	0.0014	3	0%				
A3									0.00038	0.026	3	0%	0.00039	0.027	3	0%				
A4									0.0004	0.012	3	0%								
A5	0.00038	NA	1	0%	0.00038	0.003	3	0%	0.00039	0.032	3	0%					0.0004	NA	1	0%
A6	0.00038	0.041	3	0%	0.00039	0.024	3	0%	0.00039	0.027	3	0%								
A11	0.00038	0.026	3	0%	0.00038	0.05	3	0%	0.0004	0.0014	3	0%	0.00039	0.028	3	0%	0.00039	0.027	3	0%
A12	0.00038	0.023	3	0%	0.0004	0.0071	2	0%	0.00039	0.028	3	0%	0.00039	0.032	3	0%	0.00041	NA	1	0%
A13	0.00041	NA	1	0%	0.00039	0.038	2	0%	0.0004	0	2	0%	0.0099	1.3	3	67%				
A14					0.00038	NA	1	0%	0.0004	0	2	0%	0.005	0.83	3	67%	0.00041	NA	1	0%

a-Chlordane

	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A9	0.043	0.74	3	100%									0.0039	1.6	3	33%				
A10	0.14	0.69	3	100%	0.00039	0.032	3	0%	0.00039	0.036	2	0%	0.067	0.12	3	100%				
A1	0.1	1.7	3	33%					0.00039	0.029	3	0%	0.0099	1.7	3	33%				
A2									0.00041	0.12	2	0%	0.0004	0.0014	3	0%				
A3									0.00038	0.026	3	0%	0.00039	0.027	3	0%				
A4									0.0004	0.012	3	0%								
A5	0.00038	NA	1	0%	0.00038	0.003	3	0%	0.00039	0.032	3	0%					0.0004	NA	1	0%
A6	0.00038	0.041	3	0%	0.00039	0.024	3	0%	0.00039	0.027	3	0%								
A11	0.061	0.5	3	100%	0.00038	0.05	3	0%	0.0004	0.0014	3	0%	0.0079	1.6	3	33%	0.017	1.7	3	33%
A12	0.061	0.98	3	67%	0.0004	0.0071	2	0%	0.00039	0.028	3	0%	0.015	0.87	3	67%	0.02	NA	1	100%
A13	0.00041	NA	1	0%	0.00039	0.038	2	0%	0.0004	0	2	0%	0.0062	1.6	3	33%				
A14					0.00038	NA	1	0%	0.0004	0	2	0%	0.00038	0.041	3	0%	0.00041	NA	1	0%

4,4'-DDE

	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A9	0.0082	0.91	3	67%									0.031	0.74	3	100%				
A10	0.068	0.53	3	100%	0.009	0.62	3	100%	0.0077	0.4	2	100%	0.031	0.034	3	100%				
A1	0.14	0.071	3	100%					0.025	1.1	3	100%	0.04	0.53	3	100%				
A2									0.039	0.42	2	100%	0.063	0.38	3	100%				
A3									0.019	0.32	3	100%	0.074	0.17	3	100%				
A4									0.022	0.47	3	100%								
A5	0.00038	NA	1	0%	0.00038	0.003	3	0%	0.00039	0.032	3	0%					0.044	NA	1	100%
A6	0.13	1.2	3	67%	0.01	0.93	3	67%	0.012	0.2	3	100%								
A11	0.11	0.62	3	100%	0.037	0.52	3	100%	0.0021	1.4	3	33%	0.018	0.66	3	100%	0.023	0.68	3	100%
A12	0.00038	0.023	3	0%	0.017	0.39	2	100%	0.007	0.82	3	67%	0.031	0.29	3	100%	0.014	NA	1	100%
A13	0.00041	NA	1	0%	0.011	0.083	2	100%	0.014	0.095	2	100%	0.017	0.52	3	100%				
A14					0.0062	NA	1	100%	0.005	0.29	2	100%	0.024	0.53	3	100%	0.0046	NA	1	100%

Blank fields indicate no fish were collected at location
cv = coefficent of variation
n = sample size
freq det = frequency of detection

A36

TABLE 78 (Cont'd)
Summary Pesticide and PCB Concentrations in Edible Fish Tissue
Cornell-Dubilier Site
South Plainfield, NJ
April 1998

(Results reported in mg/kg, wet weight)

4,4'-DDD

	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A9	0.0054	0.44	3	100%									0.00093	0.99	3	33%				
A10	0.081	0.54	3	100%	0.00039	0.032	3	0%	0.0061	1.3	2	50%	0.00039	0.03	3	0%				
A1	0.16	0.36	3	100%					0.0015	1.3	3	33%	0.00039	0.027	3	0%				
A2									0.00041	0.12	2	0%	0.0004	0.0014	3	0%				
A3									0.00038	0.026	3	0%	0.00039	0.027	3	0%				
A4									0.0037	1.5	3	33%								
A5	0.00038	NA	1	0%	0.00038	0.003	3	0%	0.00039	0.032	3	0%					0.0004	NA	1	0%
A6	0.00038	0.041	3	0%	0.00039	0.024	3	0%	0.00039	0.027	3	0%								
A11	0.00038	0.026	3	0%	0.012	1.7	3	33%	0.0004	0.0014	3	0%	0.00039	0.028	3	0%	0.00039	0.027	3	0%
A12	0.00038	0.023	3	0%	0.0004	0.0071	2	0%	0.00039	0.028	3	0%	0.00039	0.032	3	0%	0.00041	NA	1	0%
A13	0.00041	NA	1	0%	0.00039	0.038	2	0%	0.0004	0	2	0%	0.0017	1.4	3	33%				
A14					0.00038	NA	1	0%	0.0004	0	2	0%	0.0086	0.41	3	100%	0.00041	NA	1	0%

Endrin Aldehyde

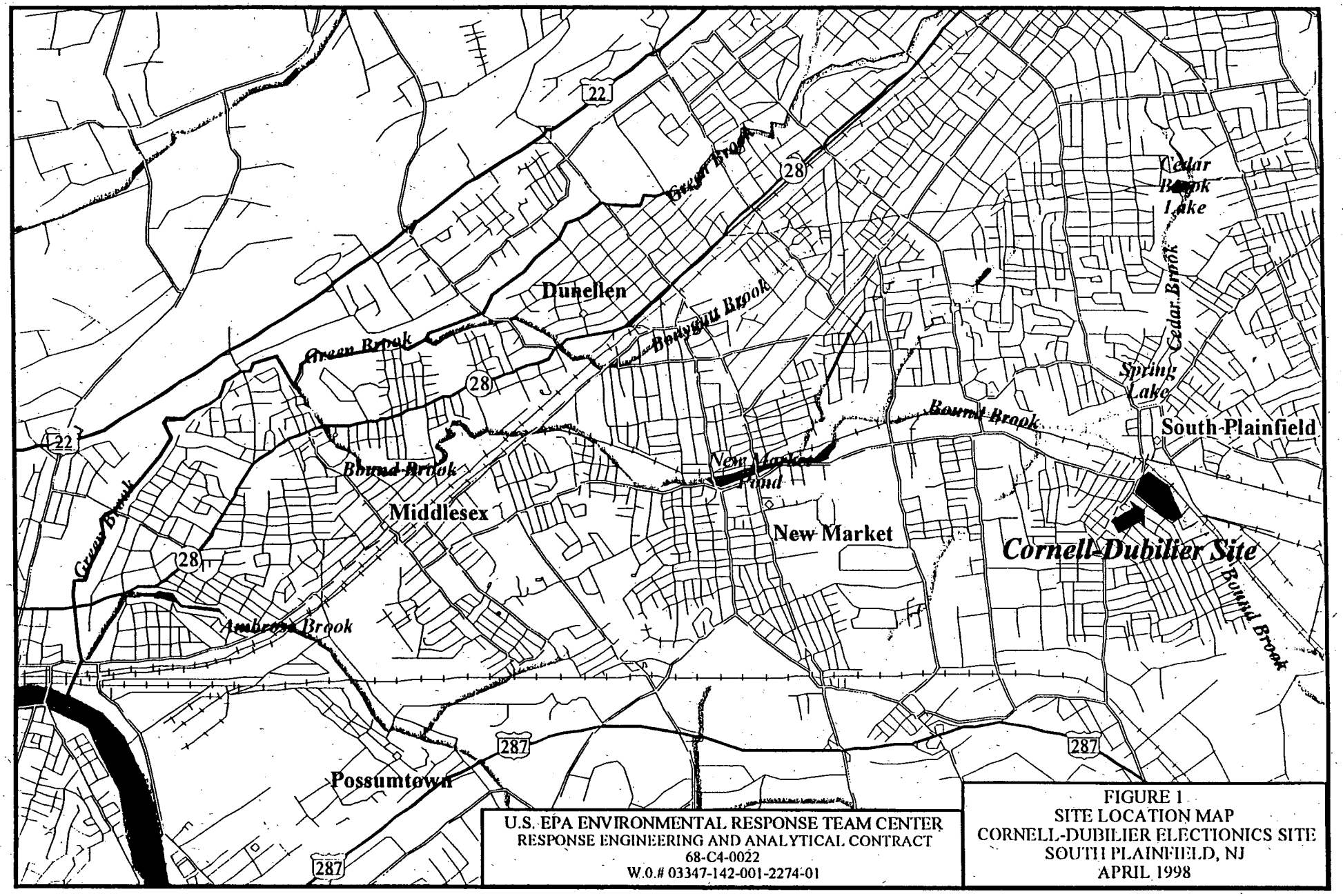
	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A9	0.00042	0.13	3	0%									0.0004	0.0044	3	0%				
A10	0.00039	0.019	3	0%	0.00039	0.032	3	0%	0.00039	0.036	2	0%	0.00039	0.03	3	0%				
A1	0.0004	0.022	3	0%					0.00039	0.029	3	0%	0.00039	0.027	3	0%				
A2									0.00041	0.12	2	0%	0.0004	0.0014	3	0%				
A3									0.00038	0.026	3	0%	0.00039	0.027	3	0%				
A4									0.0004	0.012	3	0%								
A5	0.11	NA	1	100%	0.0062	0.12	3	100%	0.0064	0.84	3	67%					0.0004	NA	1	0%
A6	0.00038	0.041	3	0%	0.0018	1.4	3	33%	0.00039	0.027	3	0%								
A11	0.00038	0.026	3	0%	0.00038	0.05	3	0%	0.0004	0.0014	3	0%	0.00039	0.028	3	0%	0.00039	0.027	3	0%
A12	0.013	1.7	3	33%	0.0004	0.0071	2	0%	0.00039	0.028	3	0%	0.00039	0.032	3	0%	0.00041	NA	1	0%
A13	0.00041	NA	1	0%	0.00039	0.038	2	0%	0.0004	0	2	0%	0.00038	0.056	3	0%				
A14					0.00038	NA	1	0%	0.0004	0	2	0%	0.00038	0.041	3	0%	0.00041	NA	1	0%

Dieldrin

	Carp				Bass				Sunfish				White Sucker				Catfish			
Location	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det	mean	cv	n	freq det
A10	0.023	1.3	3	67%	0.00039	0.032	3	0%	0.0041	1.3	2	50%	0.0043	1.8	3	33%				
A11	0.00038	0.026	3	0%	0.00038	0.05	3	0%	0.0004	0.0014	3	0%	0.00039	0.028	3	0%	0.00039	0.027	3	0%
A12	0.00038	0.023	3	0%	0.0004	0.0071	2	0%	0.00039	0.028	3	0%	0.00039	0.032	3	0%	0.00041	NA	1	0%
A13	0.00041	NA	1	0%	0.00039	0.038	2	0%	0.0004	0	2	0%	0.00038	0.056	3	0%				
A14					0.00038	NA	1	0%	0.0004	0	2	0%	0.00038	0.041	3	0%	0.00041	NA	1	0%

Blank fields indicate no fish were collected at location
cv = coefficent of variation
n = sample size
freq det = frequency of detection

A31



U.S. EPA ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O.# 03347-142-001-2274-01

FIGURE 1
SITE LOCATION MAP
CORNELL-DUBILIER ELECTIONICS SITE
SOUTH PLAINFIELD, NJ
APRIL 1998

A32

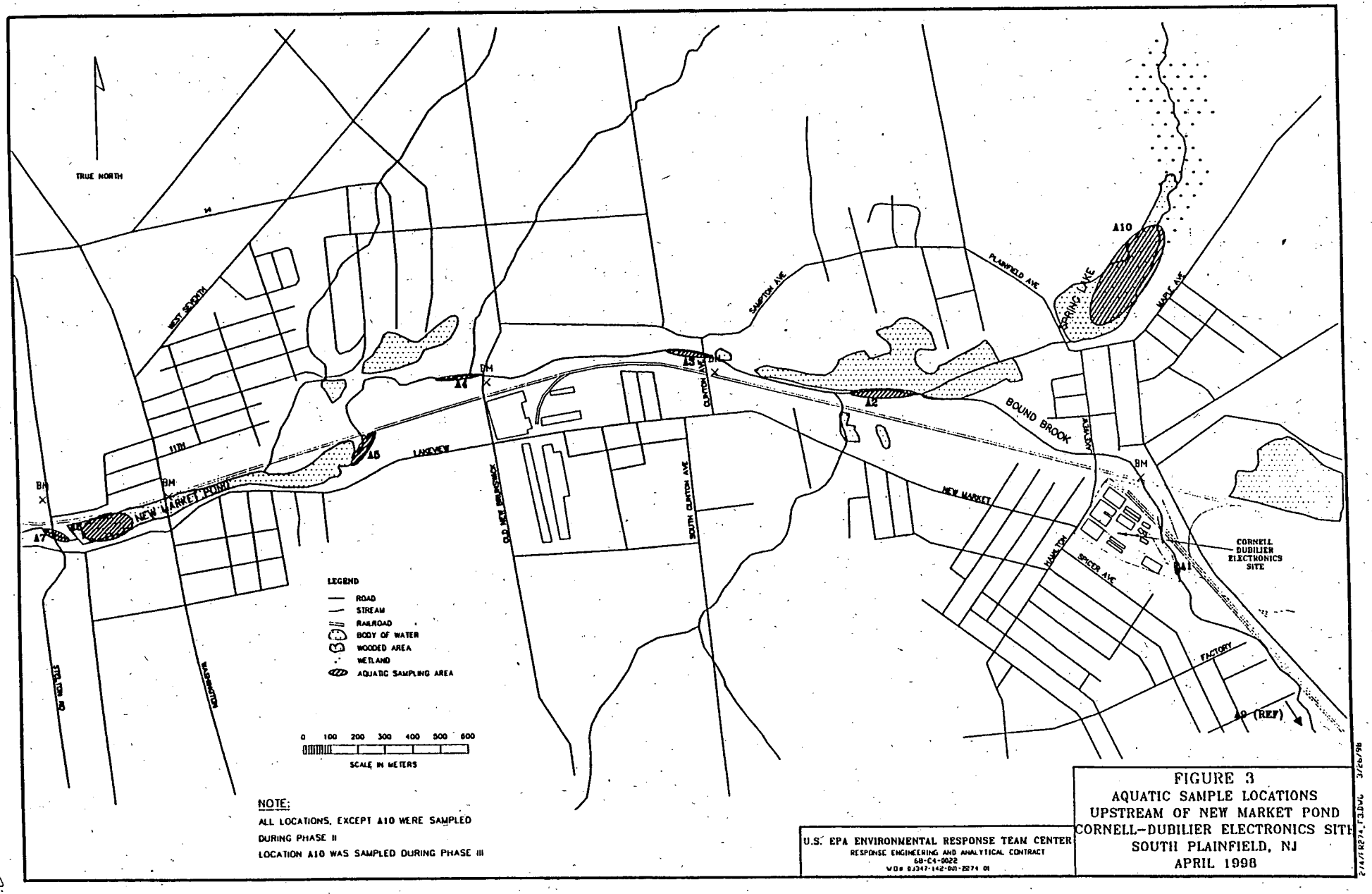


FIGURE 3
AQUATIC SAMPLE LOCATIONS
UPSTREAM OF NEW MARKET POND
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NJ
APRIL 1998

2747R274.T3DWG 3/26/98

A3

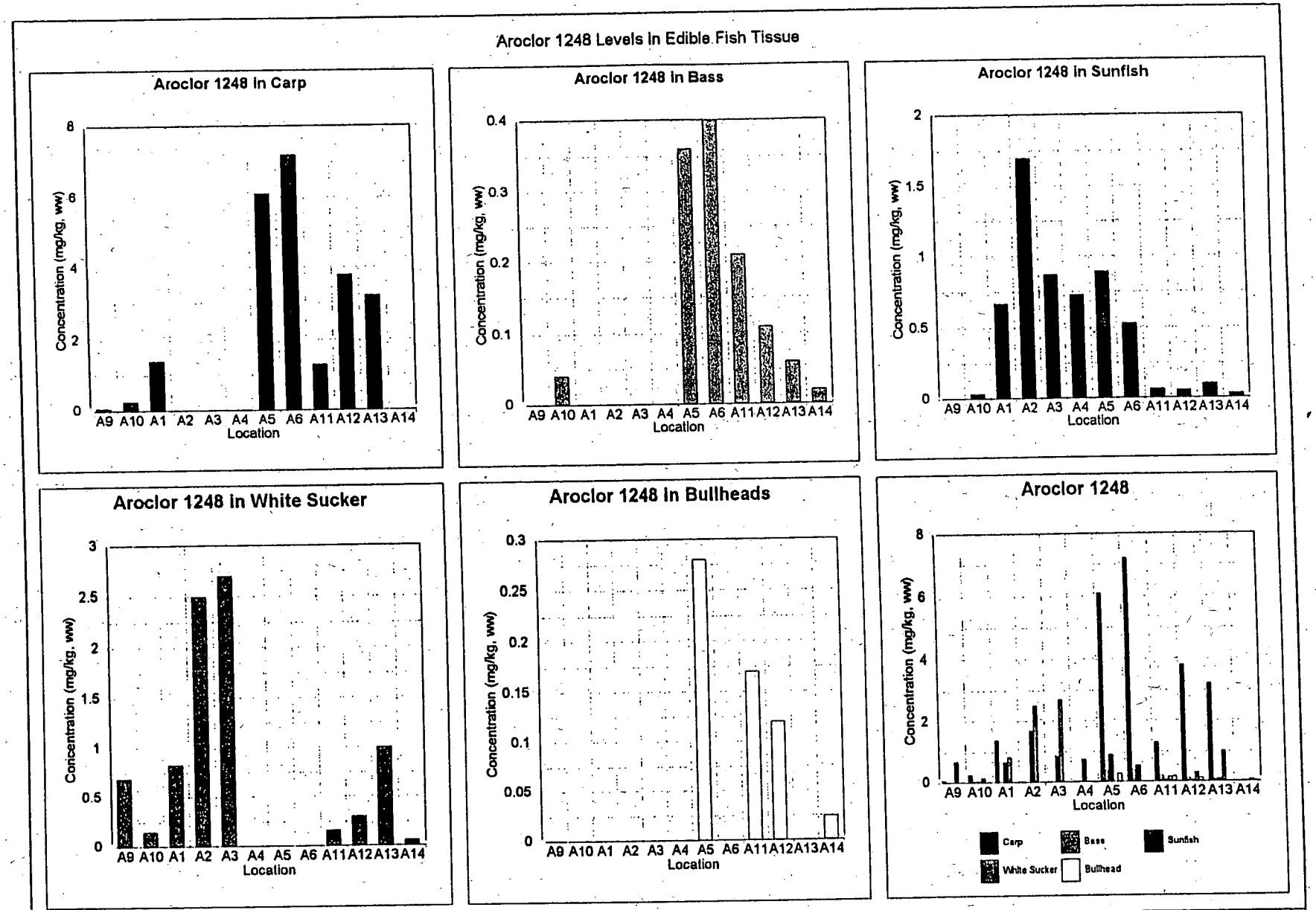


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FIGURE 5
AROCLOR 1248 IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
APRIL 1998

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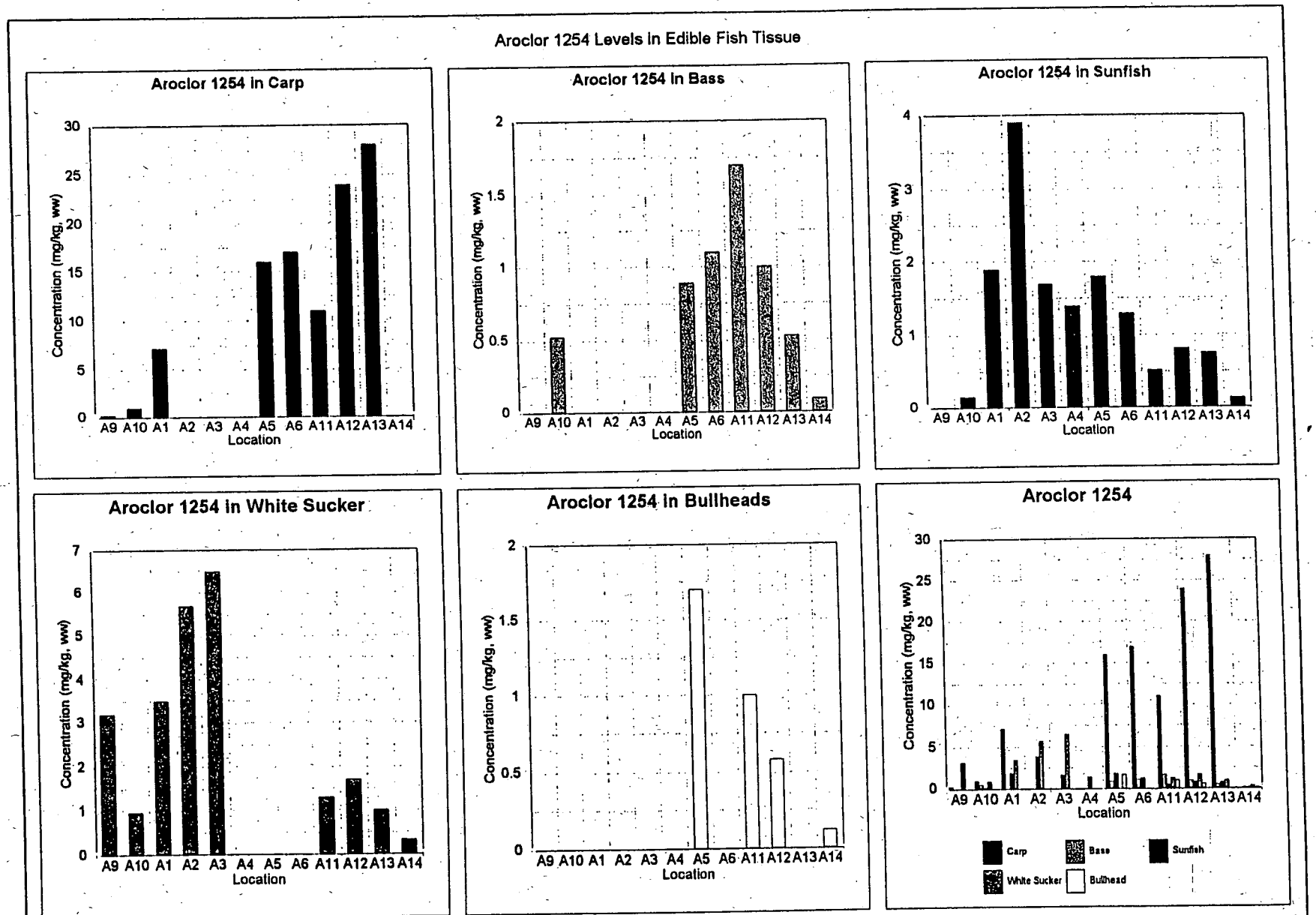

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68-C4-0022
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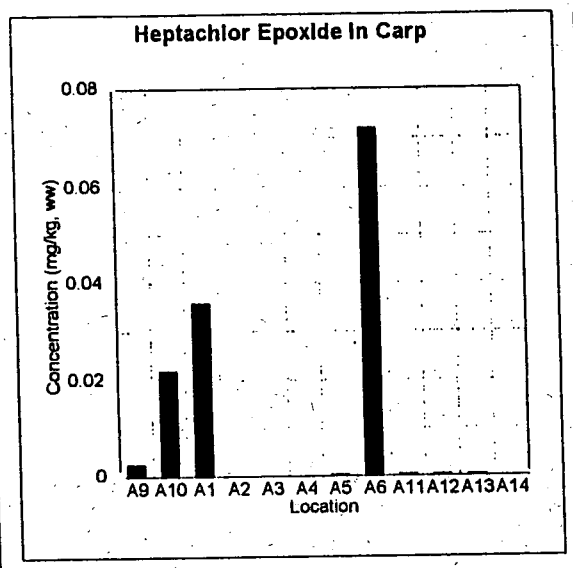
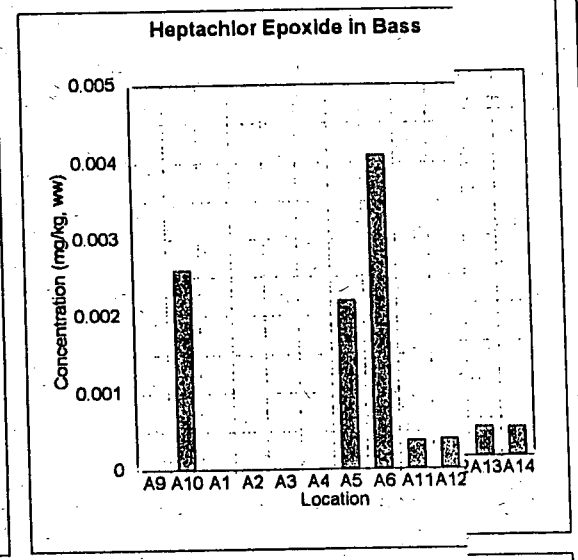
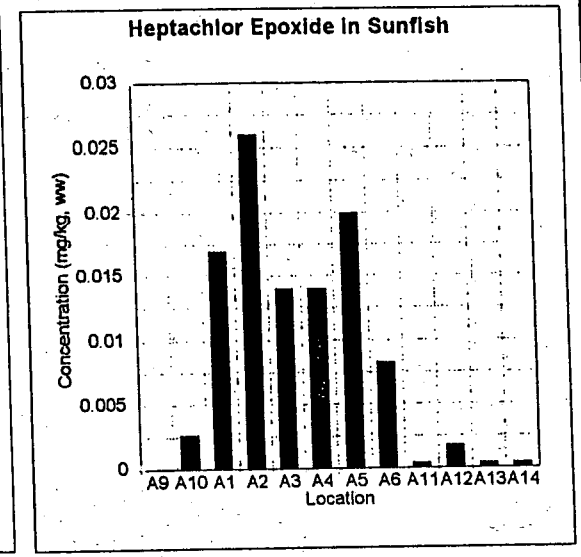
FIGURE 6
AROCLOR 1254 IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
APRIL 1998

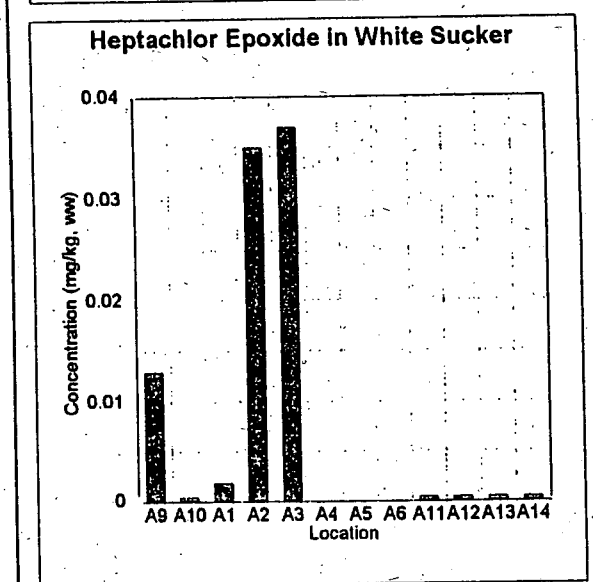
A35

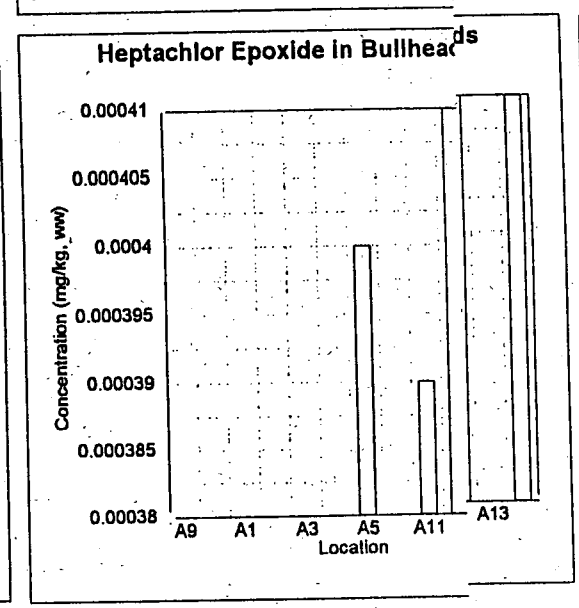
Heptachlor Epoxide Levels in Edible Fish Tissue

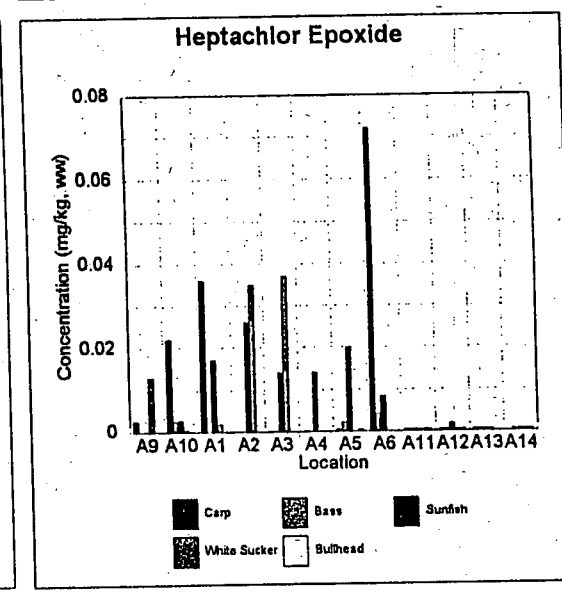










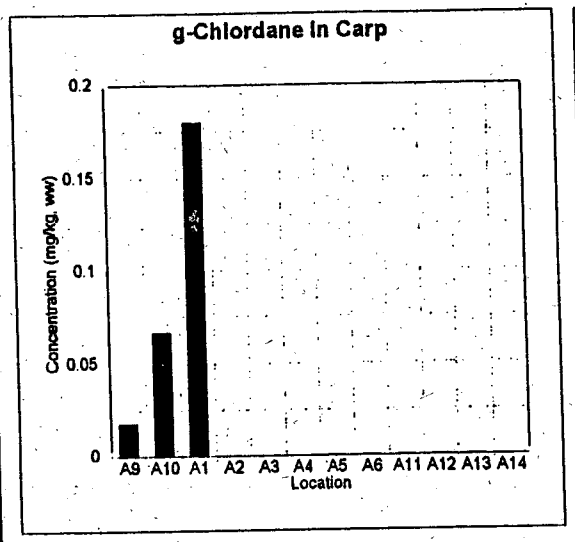


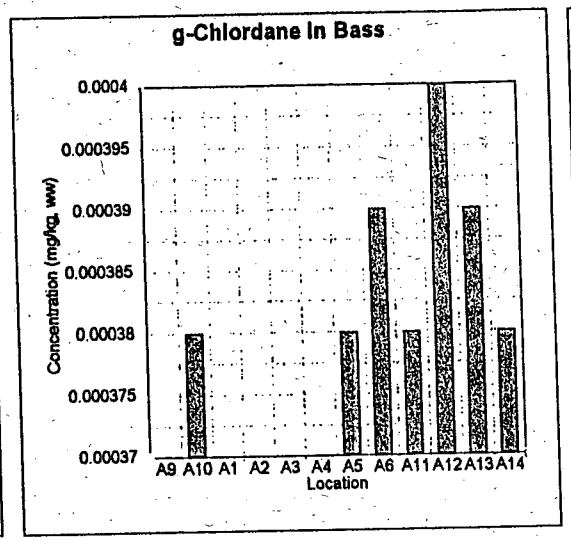
U.S. ENVIRONMENTAL PROTECTION AGENCY/ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O. # 03347-142-001-2274-01

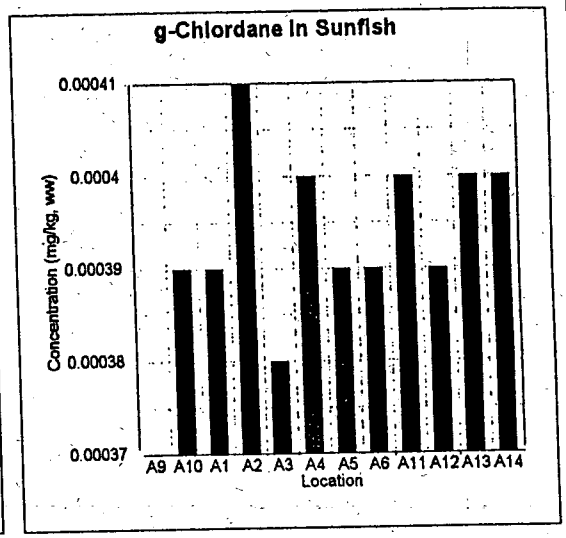
FIGURE 7
HEPTACHLOR EPOXIDE IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
APRIL 1998

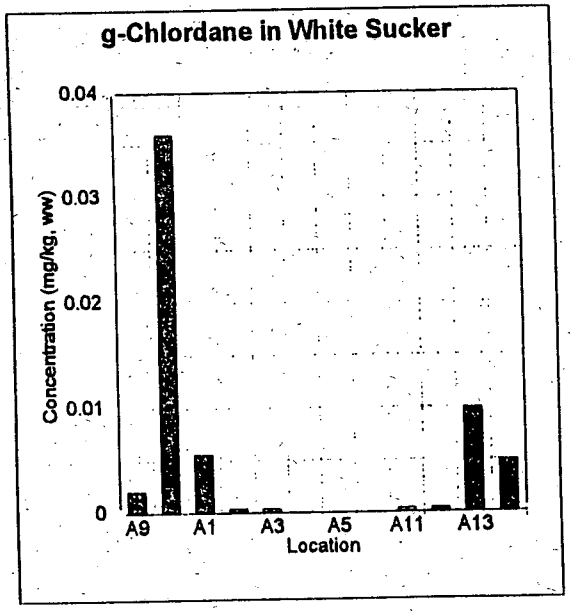
A36

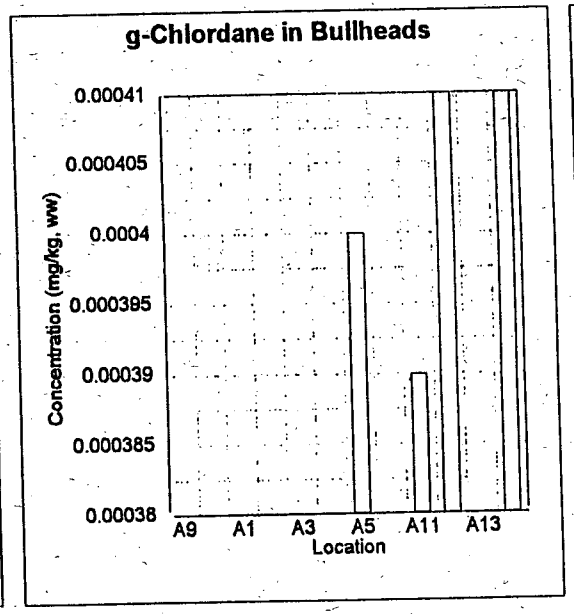
g-Chlordane Levels in Edible Fish Tissue

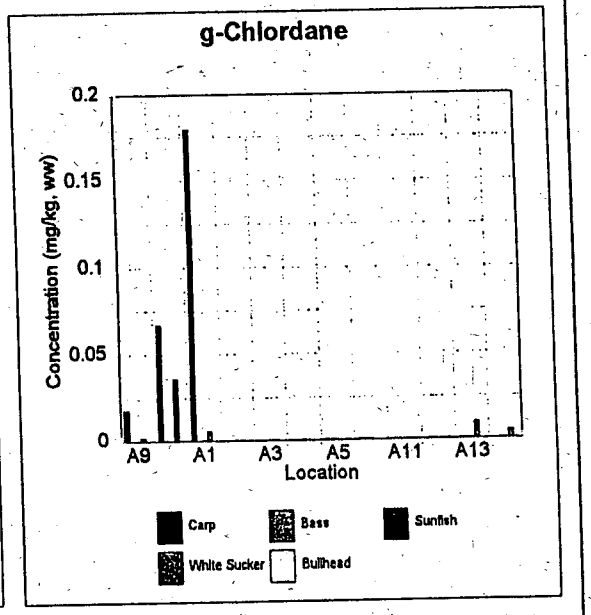








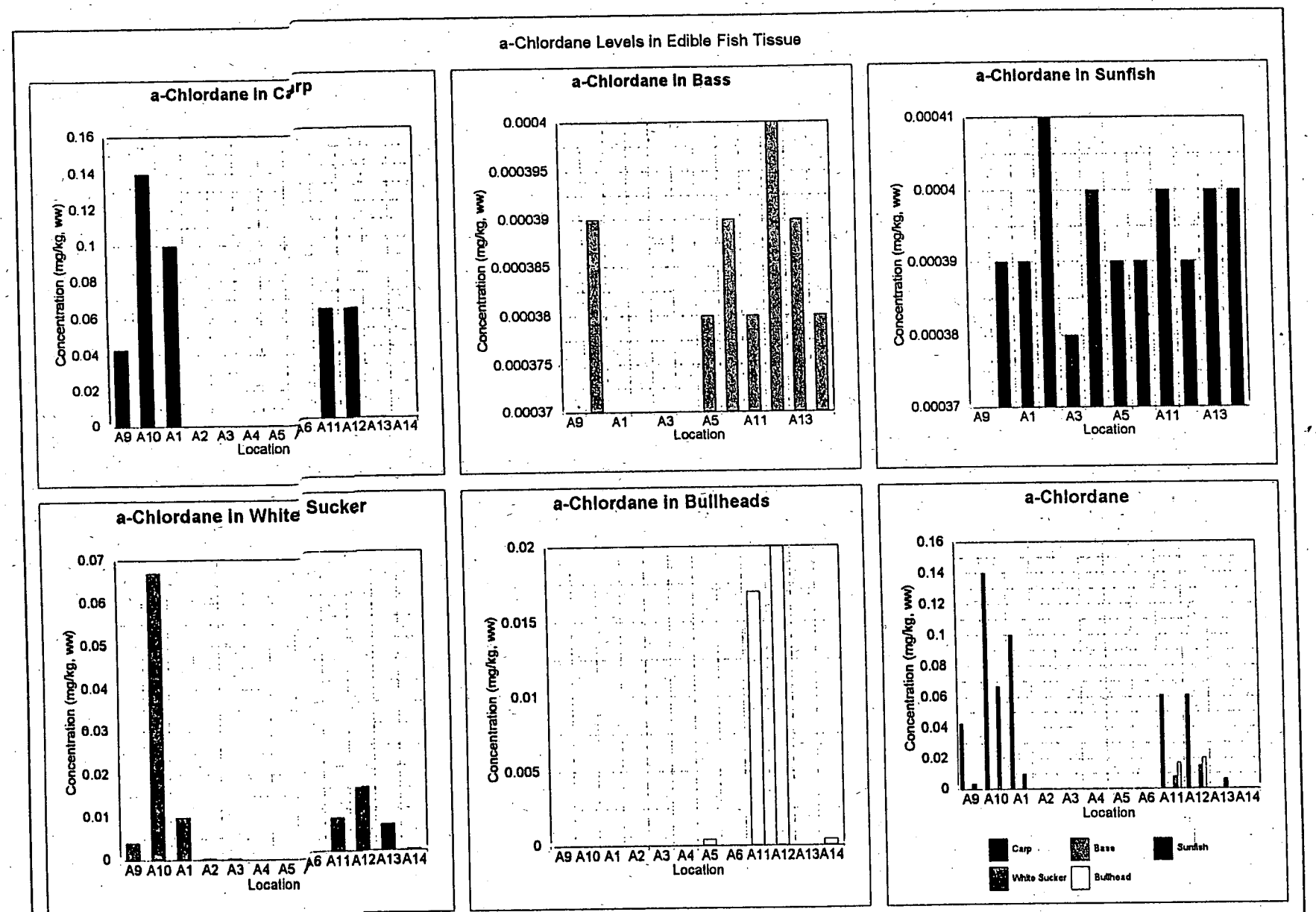




U.S. ENVIRONMENTAL PROTECTION AGENCY/ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O. # 03347-142-001-2274-01

FIGURE 8
g-CHLORDANE IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
APRIL 1998

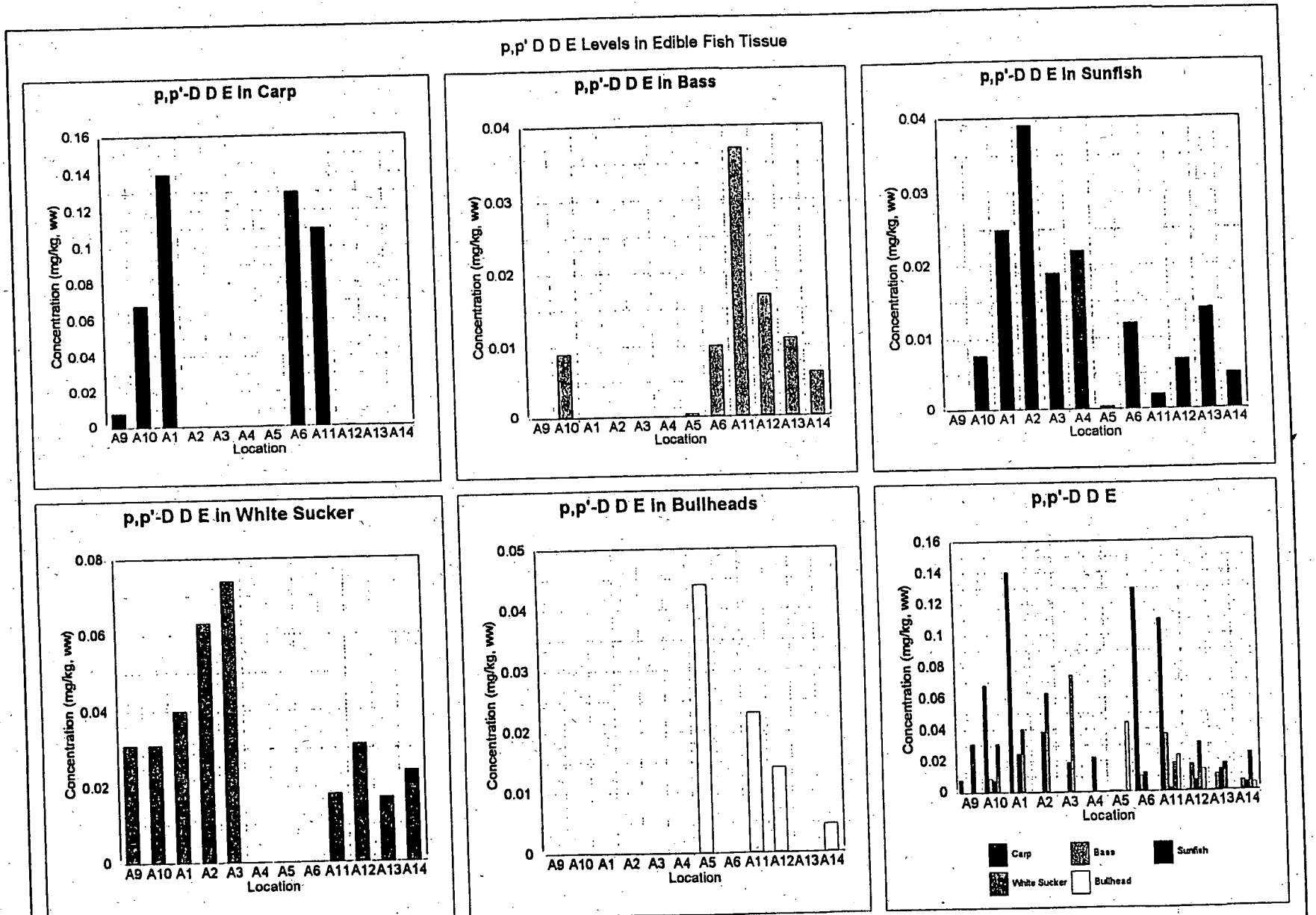
A32



U.S. ENVIRONMENTAL PROTECTION AGENCY/ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O. # 03347-142-001-2274-01

FIGURE 9
a-CHLORDANE IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
APRIL 1998

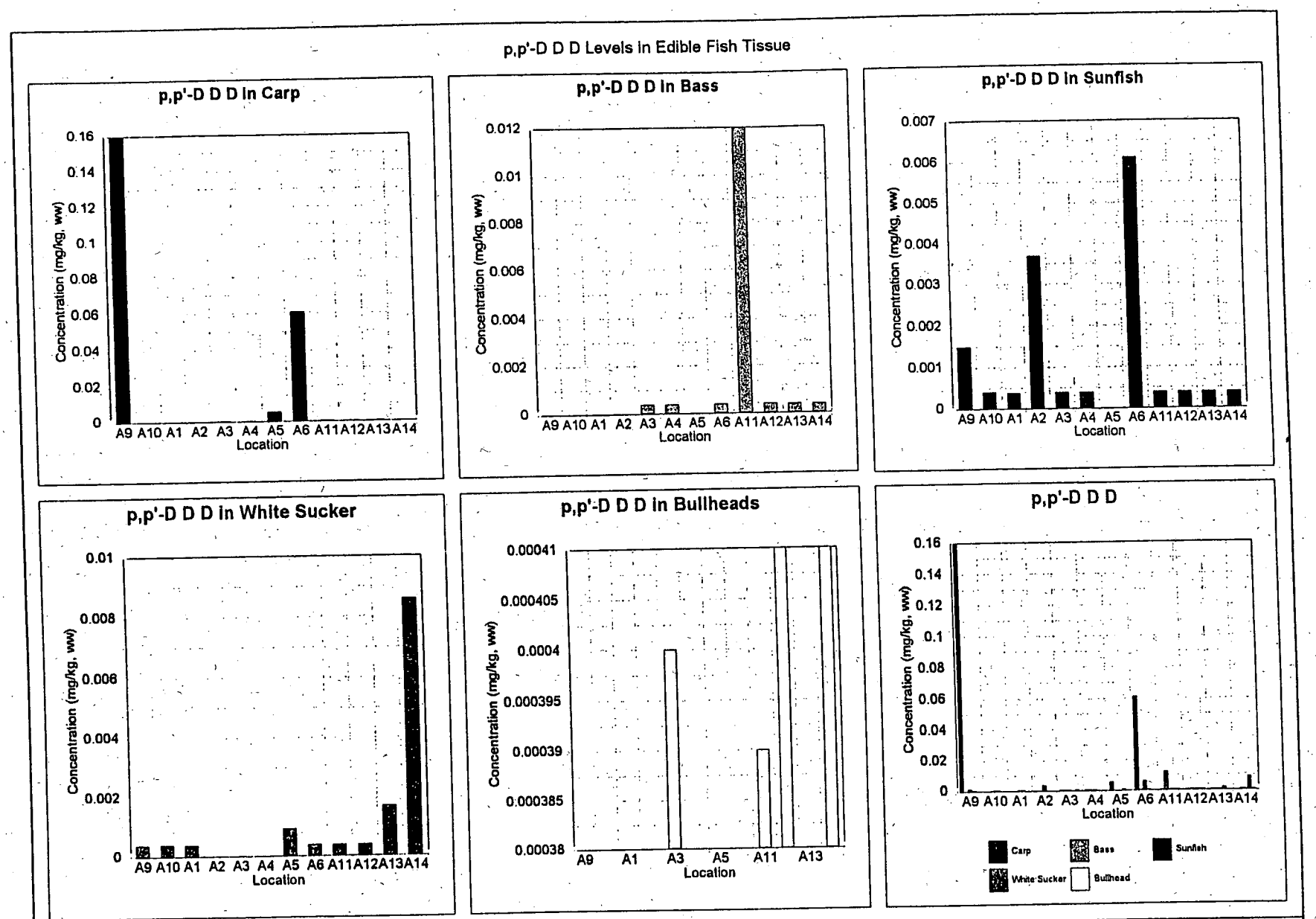
A38



U.S. ENVIRONMENTAL PROTECTION AGENCY/ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O. # 03347-142-001-2274-01

FIGURE 10
p,p'-D D E IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
APRIL 1998

A39

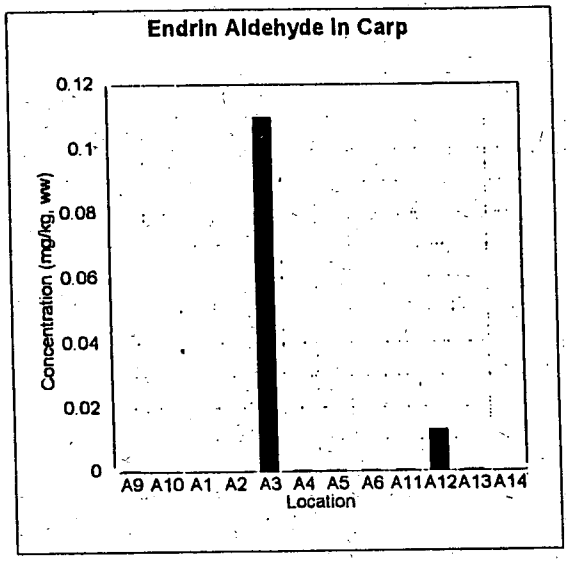


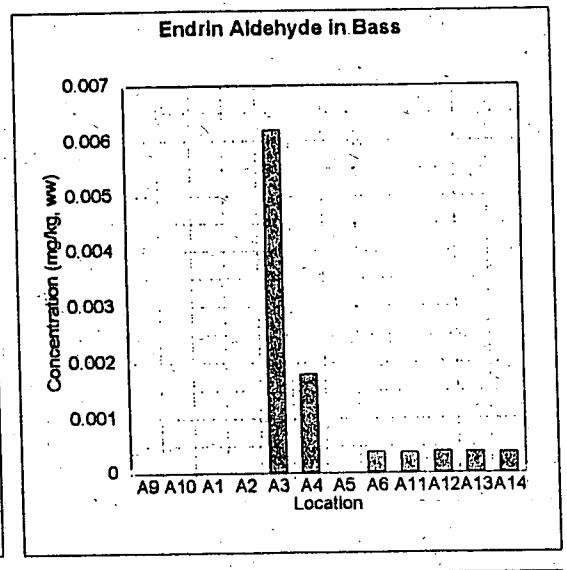
U.S. ENVIRONMENTAL PROTECTION AGENCY/ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O. # 03347-142-001-2274-01

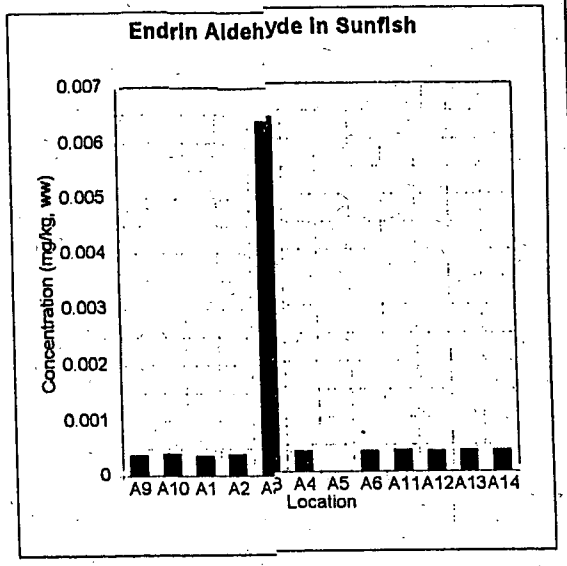
FIGURE 11
p,p'-D D D IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
APRIL 1998

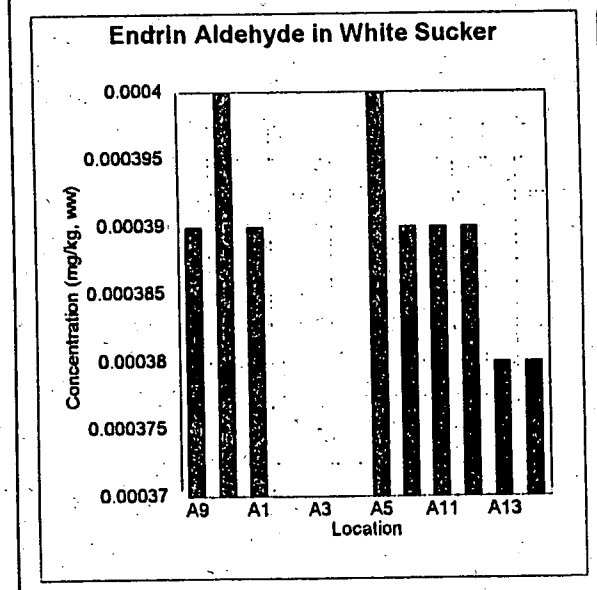
A40

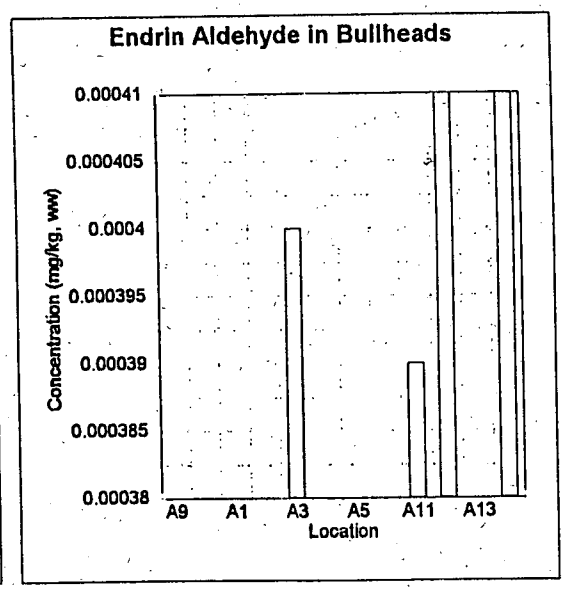
Endrin Aldehyde Levels in Edible Fish Tissue

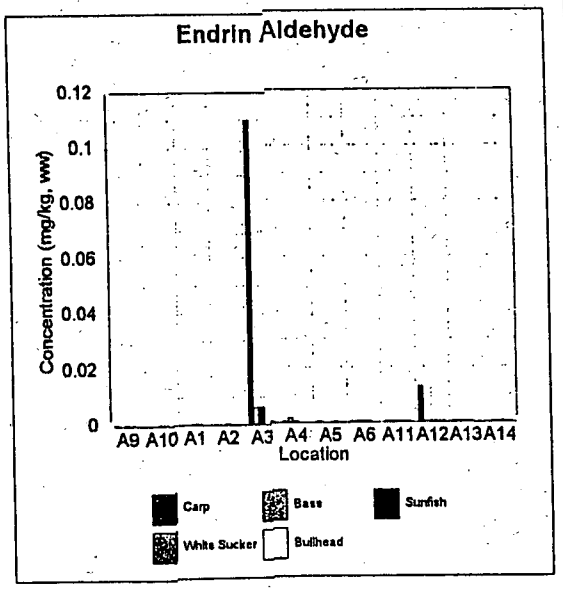








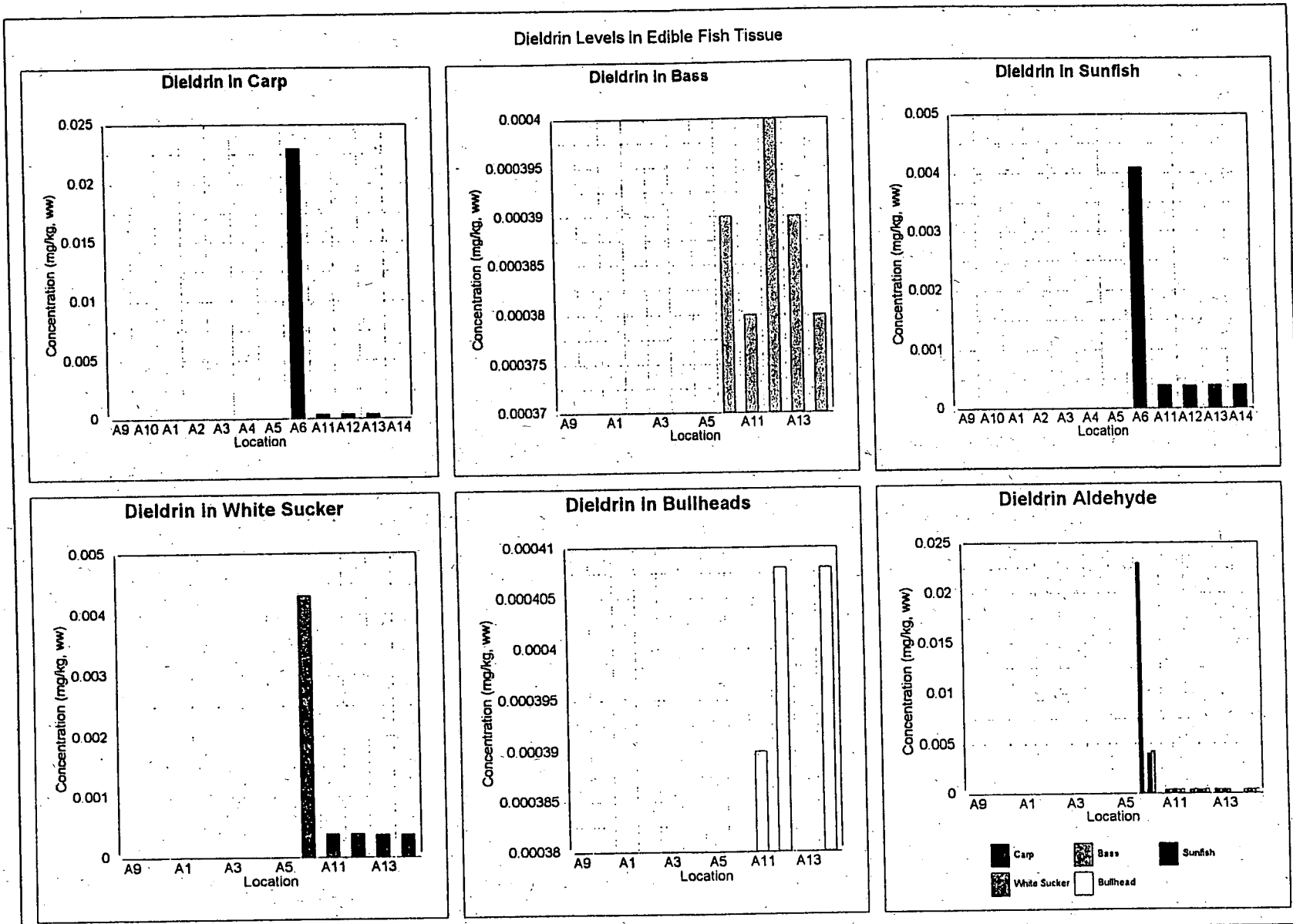




U.S. ENVIRONMENTAL PROTECTION AGENCY/ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O. # 03347-142-001-2274-01

FIGURE 12
ENDRIN ALDEHYDE IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
April 1998

A41



U.S. ENVIRONMENTAL PROTECTION AGENCY/ENVIRONMENTAL RESPONSE TEAM CENTER
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
68-C4-0022
W.O. # 03347-142-001-2274-01

FIGURE 13
DIELDRIN IN EDIBLE FISH
CORNELL-DUBILIER ELECTRONICS SITE
SOUTH PLAINFIELD, NEW JERSEY
April 1998

A-42

ATTACHMENT B

United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
New Jersey Agricultural
Experiment Station,
Cook College,
Rutgers,
the State University,
and the
New Jersey Department of
Agriculture

Soil Survey of Middlesex County New Jersey

6/12/87

DHWM BPA

B

C—22 to 28 inches, reddish brown (2.5YR 4/4) very shaly silt loam; fine to medium common to many distinct dark reddish brown (2.5YR 3/4) and reddish brown (5YR 5/3) mottles; massive; firm; 50 percent red shale fragments; slightly acid; gradual irregular boundary.

R—28 inches, dark reddish brown (2.5YR 3/4) jointed and partially weathered shale bedrock.

The solum thickness ranges from 12 to 24 inches. The content of coarse fragments ranges from 2 to 35 percent in the solum. Reaction ranges from slightly acid to strongly acid.

The Ap horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 2 to 4. It is silt loam or shaly silt loam.

The B horizon has hue of 2.5YR or 5YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam or shaly silt loam. Consistence is friable or firm. The edges of peds and the shale fragments are mottled gray.

The C horizon has hue of 2.5YR or 5YR, value of 3 to 5, and chroma of 3 or 4.

Reaville Variant

The Reaville Variant consists of moderately deep, poorly drained soils that formed in residuum from siltstone or shale. The Reaville Variant soils are in drainageways of the Piedmont. Slope ranges from 0 to 2 percent.

Reaville Variant soils are on the landscape with Reaville, Lansdowne Variant, and Parsippany soils. The Reaville Variant soils are more gray than the Reaville, Lansdowne, or Lansdowne Variant soils; are deeper to bedrock than the Reaville or Lansdowne Variant soils; and have less clay than the Parsippany soils.

Typical pedon of Reaville Variant silt loam, 0 to 2 percent slopes, 100 yards south of New Jersey highway 27 and 100 yards east of Sand Hills Road, in South Brunswick Township:

Ap—0 to 8 inches, dark brown (10YR 3/3) silt loam; weak fine and medium subangular blocky structure; friable; many fine roots; medium acid; gradual irregular boundary.

B21tg—8 to 20 inches, gray (10YR 6/1) silty clay loam; common to many fine to medium prominent yellowish brown (10YR 5/6) and dark brown (10YR 3/3) mottles; strong fine and medium subangular blocky structure; firm; few fine roots; common clay films on faces of peds; slightly acid; clear irregular boundary.

B22tg—20 to 25 inches, reddish brown (5YR 4/3) silty clay loam; common to many fine to medium distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; medium subangular blocky structure; common clay films on faces of peds; very firm; few fine roots; strongly acid; clear wavy boundary.

C—25 to 30 inches, dark reddish brown (2.5YR 3/4) very shaly silty clay loam; massive; very firm; 50 percent shale fragments; strongly acid; clear smooth boundary.

R—30 inches, dark reddish brown (2.5YR 3/4) shale bedrock.

The solum thickness ranges from 20 to 35 inches. The depth to bedrock is 20 to 40 inches. The content of coarse fragments ranges from 0 to 5 percent in the solum and 50 to 75 percent in the C horizon. Reaction ranges from slightly acid to strongly acid.

The Ap horizon has value of 3 or 4 and chroma of 3 or 4.

The B horizon has hue of 10YR to 5YR, value of 5 or 6, and chroma of 1 to 3. It has strong blocky structure, or the horizon is massive. Consistence is firm or very firm. Texture is silty clay loam or clay loam.

The C horizon has hue of 2.5YR or 5YR, value of 3 or 4, and chroma of 4 to 6. It is silt loam or very shaly silty clay loam, and is loosely bedded in place in some areas.

Rowland Series

The Rowland series consists of deep, moderately well drained or somewhat poorly drained soils that formed in medium-textured alluvium. The Rowland soils are in stream bottoms on the northwestern side of the county. Slope ranges from 0 to 2 percent.

Rowland soils are on the landscape with Reaville Variant, Klinesville, Lansdowne, Dunellen, Ellington, and Reaville soils. The Rowland soils are less developed than the Reaville Variant, Lansdowne, Dunellen, or Reaville soils; have a thicker solum than the Klinesville or Reaville; and are finer textured than the Ellington soils.

Typical pedon of Rowland silt loam, on the east bank of Green Brook, 100 yards north of Union Bound Brook Road:

A1—0 to 3 inches, dark brown (7.5YR 3/2) silt loam; moderate fine and medium granular structure; friable; many fine roots; medium acid; gradual wavy boundary.

A2—3 to 7 inches, dark brown (7.5YR 4/4) silt loam; moderate fine and medium granular structure; friable; many fine roots; medium acid; gradual wavy boundary.

B21—7 to 15 inches, dark brown (7.5YR 4/4) silt loam; common fine prominent yellowish red (5YR 4/8) mottles; moderate medium subangular blocky structure; firm; common medium roots; strongly acid; gradual wavy boundary.

B22—15 to 36 inches, reddish brown (5YR 4/4) silt loam; many coarse prominent light gray (10YR 6/1)

B2

mottles; moderate fine and medium subangular blocky structure; friable; common medium roots; moderate continuous clay coats on peds; strongly acid; gradual wavy boundary.

B3—36 to 40 inches, reddish brown (5YR 4/4) silt loam; common to many medium prominent light gray (10YR 6/1) mottles; moderate medium subangular blocky structure; friable; few fine roots; strongly acid; gradual wavy boundary.

C1—40 to 50 inches, gray (10YR 6/1) silt loam; massive; friable; medium acid; abrupt smooth boundary.

C2—50 to 60 inches, dark gray (10YR 4/1) sandy loam; massive; friable; medium acid.

The solum thickness ranges from 24 to 40 inches. The content of coarse fragments ranges from 0 to 10 percent in the solum and 0 to 40 percent in the C horizon. Reaction ranges from very strongly acid to medium acid.

The A horizon has hue of 7.5YR to 5YR, value of 3 or 4, and chroma of 2 to 4.

The B horizon has hue of 7.5YR to 5YR, value of 3 to 5, and chroma of 3 to 6. It is loam, silt loam, or clay loam. Consistence is friable or firm.

The C horizon has hue of 10YR to 5YR, value of 4 to 6, and chroma of 1 or 2. The texture of the C horizon above a depth of 40 inches mainly is sandy loam, sandy clay loam, silt loam, or silty clay loam; below 40 inches it mainly is stratified sand or gravelly sand and finer textured lenses or strata. Some pedons have different types of gravel, some of which is red shale.

Sassafras Series

The Sassafras series consists of deep, well drained soils that formed in acid, moderately fine textured Coastal Plain sediments. The Sassafras soils are on uplands and side slopes. Slope ranges from 0 to 15 percent.

Sassafras soils are on the landscape with Woodstown, Downer, Matapeake, and Mattapex soils. The Sassafras soils do not have the mottles in the Bt horizon that are common to the Woodstown and Mattapex soils, contain more sand in the solum than the Mattapex or Matapeake soils, and contain more clay in the Bt horizon than the Downer soils.

Typical pedon of Sassafras sandy loam, 2 to 5 percent slopes, 75 feet east of the intersection of County Road 535 and Davidson Mill Road at Rhode Hall, South Brunswick Township:

Ap—0 to 8 inches, dark brown (10YR 3/3) sandy loam; weak medium granular structure; very friable; many fine roots; 5 percent fine and medium quartz pebbles; very strongly acid; abrupt smooth boundary.

A2—8 to 17 inches, yellowish brown (10YR 5/6) sandy loam; weak medium granular structure; very friable; many fine roots; 5 percent fine and medium [illegible] pebbles; very strongly acid; gradual wavy bo[illegible]

B1t—17 to 25 inches, yellowish brown (10YR 5/6) [illegible] clay loam; weak medium subangular blocky structure; friable; 8 percent fine and medium [illegible] pebbles; few fine roots; continuous modera[illegible] clay films on faces of peds and in pores; ve[illegible] strongly acid; gradual wavy boundary.

B2t—25 to 37 inches, strong brown (7.5YR 5/6) [illegible] clay loam; moderate medium and coarse sub[illegible] blocky structure; friable; 5 to 10 percent fine [illegible] medium quartz pebbles; few fine roots; many [illegible] moderately thick clay films on faces of peds; [illegible] strongly acid; gradual wavy boundary.

B3—37 to 42 inches, strong brown (7.5YR 5/8) [illegible] loam; weak medium and coarse subangular blo[illegible] structure; friable; 5 to 10 percent fine and medi[illegible] quartz pebbles; very strongly acid; gradual wavy boundary.

C—42 to 60 inches, stratified strong brown (7.5YR 5/[illegible] gravelly loamy sand; single grain; loose; 20 perc[illegible] rounded quartz pebbles; very strongly acid.

The solum thickness ranges from 26 to 45 inches. [illegible] content of rounded quartzose pebbles ranges from 5 [illegible] 20 percent in the solum and 5 to 30 percent in the C horizon. Reaction in unlimed areas ranges from strong[illegible] acid to extremely acid.

The Ap horizon has hue of 10YR, value of 3 or 4, [illegible] chroma of 2 to 4. The A2 horizon has hue of 10YR [illegible] value and chroma of 4 to 6. The A horizon is sandy [illegible] or loam.

The B horizon has hue of 10YR or 7.5YR, value o[illegible] or 5, and chroma of 4 to 8. The hue of 10YR is restric[illegible] to the upper part of the B horizon. The B horizon is [illegible] sandy loam or sandy clay loam.

The C horizon has hue of 7.5YR or 10YR and value [illegible] and chroma of 4 to 8. It is dominantly sand or loamy [illegible] sand or their gravelly analogs but contains some thin [illegible] strata of sandy loam in most pedons and ranges from [illegible] loam to sandy clay at a depth of more than 40 inches in some pedons.

Shrewsbury Series

The Shrewsbury series consists of deep and moderately deep, poorly drained soils that formed in [illegible] glauconite marine sediments. Shrewsbury soils are on [illegible] flats, in broad depressions, and near the base of steep [illegible] slopes. Slope ranges from 0 to 2 percent.

Shrewsbury soils are in the landscape with Downer, Holmdel, Pemberton, and Tinton soils. The Shrewsbury soils have small amounts of glauconite, and the Downer soils do not. The Shrewsbury soils are gray in the [illegible] subsurface layer, and the Holmdel, Pemberton, and Tinton soils are not.

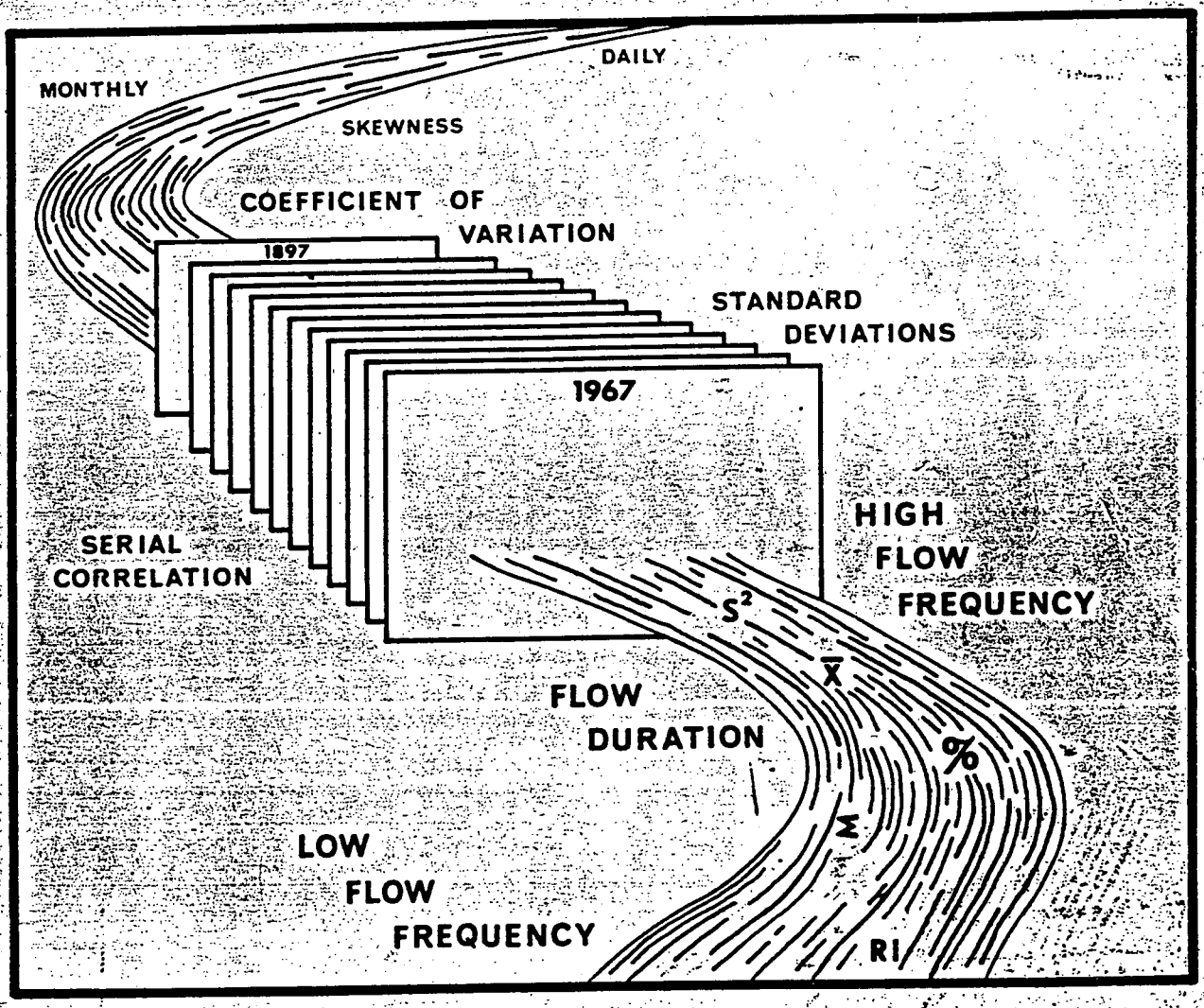
ins sheet 6)

B4

ATTACHMENT C

STATISTICAL SUMMARIES OF NEW JERSEY STREAMFLOW RECORDS

WATER RESOURCES CIRCULAR 23



STATE OF NEW JERSEY

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER RESOURCES

Prepared in cooperation with
United States Department of the Interior
Geological Survey

1970

1-4020.00 MILLSTONE RIVER AT BLACKWELLS MILLS, N. J.

	STATISTICS OF MONTHLY MEANS, 1922-1967						STATISTICS OF LOGS OF MONTHLY MEANS, 1922-1967					
	MEAN	STD DEV	SKEW	C OF VAR	PCT MEAN YR VOL	SER CORR	MEAN	STD DEV	SKEW	C OF VAR	PCT MEAN YR VOL	SER CORR
OCT	176.0	164.2	2.632	.9328	4.092	.175	2.127	.3026	.7100	.1423	7.366	.452
NOV	313.8	228.5	1.167	.7283	7.295	.128	2.381	.3316	-.1048	.1393	8.245	.369
DEC	396.6	223.3	.7565	.5630	9.221	.287	2.524	.2707	-.4640	.1072	8.741	.379
JAN	468.4	255.3	.7879	.5450	10.89	.403	2.602	.2578	-.4282	.0991	9.012	.442
FEB	590.0	246.7	.3889	.4181	13.72	-.191	2.727	.2105	-.9607	.0772	9.445	-.182
MAR	692.2	248.6	.6905	.3591	16.09	-.084	2.814	.1536	.1164	.0546	9.744	-.081
APR	505.9	247.3	.5321	.4888	11.76	.499	2.649	.2272	-.2723	.0858	9.175	.464
MAY	317.2	172.7	1.043	.5445	7.375	.383	2.441	.2328	.0158	.0954	8.454	.333
JUN	203.9	163.6	1.890	.8024	4.739	.480	2.204	.2949	.4153	.1338	7.634	.516
JUL	215.3	242.6	2.982	1.127	5.006	.487	2.138	.4209	-.0206	.1969	7.403	.560
AUG	209.2	219.9	2.094	1.051	4.865	.131	2.126	.4171	.1466	.1961	7.364	.447
SEP	212.7	237.2	2.642	1.115	4.946	.062	2.142	.3927	.4179	.1834	7.417	.270

1-4030.00 RARITAN RIVER AT BOUND BROOK, N. J.

Location.--Lat 40°33'00", long 74°33'05", 120 ft upstream from Calco Dam.

Drainage area.--779 sq mi.

Remarks.--Regulation reduces flood peaks. Diversions and inflow significant at all flows.

DURATION TABLE OF DAILY DISCHARGE

CLASS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	CFS_DAYS
YEAR	NUMBER OF DAYS IN CLASS																																			
1934													1	21	32	57	80	42	38	25	13	17	7	3	6	5	8	3	1	2	1	1	2	1		557697.0
1935											5	20	12	54	36	33	45	42	41	15	17	3	10	12	2	5	3	2	5	2		1					459067.0
1936												2	16	70	43	35	51	37	28	28	16	9	7	8	1	6	3		3			1	1				421695.0
1937									1	3	1	18	4	31	27	34	58	78	22	26	16	14	9	6	1	4	3	2	4	1	1	1				461579.0
1938											8	11	22	35	25	17	23	24	29	48	30	23	10	22	7	8	9	5	5	2	3					631628.0
1945							3	19	11	4	2	6	27	20	37	36	35	37	24	23	15	14	11	12	9	7	4	4	2	2	1					482731.0
1946									3	8	9	9	36	51	34	47	23	28	21	22	18	15	8	8	6	5	1	5	2	4	1		1			470939.0
1947								1	4	21	56	25	23	22	29	34	26	36	15	20	15	9	9	6	3	6	3	2								339961.0
1948								7	19	10	9	11	4	28	28	27	29	36	26	24	25	20	17	14	7	10	5	3	4	3						541785.0
1949							9	23	27	38	32	13	22	19	11	13	16	33	17	20	21	13	10	11	3	5	1	4			2	1			1	410012.0
1950								15	23	34	24	24	24	24	35	40	25	31	19	13	8	8	3	7	3	1	1	1	1	1						285927.0
1951								2	7	15	29	13	23	33	28	23	22	29	30	37	21	13	5	8	7	5	7	2	2	1	1	2				470524.0
1952									1	3	6	21	23	32	15	19	35	31	45	21	31	22	18	9	9	8	6	4	2	2	3					700540.0
1953					1	8	14	15	10	13	43	24	13	13	8	5	16	28	30	29	19	15	11	15	4	13	5	4	3	3	3					520976.0
1954					2	14	24	30	18	16	23	22	26	25	27	25	24	35	11	9	10	8	6	5	1	1	2	1								245740.0
1955		2	9	8	4	5	3	7	3	22	23	35	25	24	19	25	25	38	18	17	8	11	7	10	6		3		1	3		1	2	1		409545.0
1956									7	13	20	39	30	35	25	20	17	32	24	27	17	11	13	14	7	4	4	1	2	1	1		1	1		464833.0
1957		1	8	25	20	15	17	8	5	21	11	9	17	19	24	24	27	26	20	18	15	10	8	4	5	2	2	1		2		1				318992.0
1958				4	2	8	14	20	22	13	19	17	15	24	26	22	20	16	18	17	10	18	14	9	6	11	7	5	2	2	3	1				496321.0
1959					2	7	7	8	18	25	24	14	31	37	38	30	25	25	22	12	8	6	5	9	1	3	2	4	2							314979.0
1960								3	6	16	20	23	25	26	23	25	34	36	21	33	17	16	11	10	2	7	3	7	4	2		1				457996.0
1961									4	21	20	14	38	33	39	24	20	29	14	19	18	20	15	11	6	2	10	4		2	2					474640.0
1962						7	9	22	17	43	46	27	34	23	18	24	15	12	8	12	11	7	6	5	3	2	5	3	2	1	2	1				332835.0
1963			5	10	11	19	16	18	13	19	24	11	39	34	26	27	13	18	11	8	7	12	9	5	2	3	3		1	1						268444.0
1964		3	10	4	12	33	13	17	12	8	25	23	14	17	12	15	30	38	10	16	14	9	8	7	6	3	4	2			1					319454.0
1965			3	8	8	13	38	48	37	24	22	13	9	24	17	20	20	23	16	7	3	3	3	1	2	1			1		1					191127.0
1966			2		2	12	55	64	52	19	29	18	16	14	13	16	12	7	7	6	4	3	5	1	2	1	2	1		1		1				188056.0

CLASS	CFS	TOTAL	ACCUM	PERCT	CLASS	CFS	TOTAL	ACCUM	PERCT	CLASS	CFS	TOTAL	ACCUM	PERCT	CLASS	CFS	TOTAL	ACCUM	PERCT
0	0.00	0	9862	100.0	9	180.00	407	8687	88.1	18	1100.0	571	2934	29.8	27	6300	67	208	2.1
1	37.00	6	9862	100.0	10	220.00	527	8280	84.0	19	1300.0	576	2363	24.0	28	7600	51	141	1.4
2	45.00	37	9856	99.9	11	270.00	447	7753	78.6	20	1600.0	397	1787	18.1	29	9300	38	90	.9
3	55.00	59	9819	99.6	12	320.00	567	7306	74.1	21	1900.0	338	1390	14.1	30	11000	25	57	.5
4	67.00	64	9760	99.0	13	390.00	779	6739	68.3	22	2300.0	249	1052	10.7	31	14000	16	27	.2
5	81.00	141	9696	98.3	14	480.00	712	5960	60.4	23	2800.0	241	803	8.1	32	17000	7	11	.1
6	99.00	222	9555	96.9	15	590.00	713	5248	53.2	24	3500.0	117	562	5.7	33	20000	3	4	.0
7	120.00	327	9333	94.6	16	710.00	750	4535	46.0	25	4200.0	129	445	4.5	34	25000	1	1	.0
8	150.00	319	9006	91.3	17	870.00	851	3785	38.4	26	5100.0	108	316	3.2					

C2

1-4030.00

LOWEST MEAN DISCHARGE, IN CFS, AND RANKING, FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR BEGINNING APRIL 1

RARITAN RIVER AT BOUND BROOK, N. J.

YEAR	1	3	7	14	30	60	90	120	183	ANNUAL
1934	350.0 26	377.0 26	401.0 26	465.0 26	612.0 26	636.0 26	676.0 24	788.0 25	1080.0 26	1430.0 22
1935	240.0 22	240.0 22	266.0 23	278.0 23	308.0 23	371.0 20	413.0 18	479.0 19	702.0 17	1080.0 11
1936	312.0 25	325.0 25	339.0 25	350.0 24	423.0 25	555.0 24	678.0 25	727.0 24	785.0 20	1280.0 17
1937	172.0 18	194.0 19	225.0 20	269.0 22	304.0 22	438.0 23	487.0 21	573.0 21	960.0 24	1720.0 25
1908*	240.0 23	240.0 23	250.0 22	265.0 21	298.0 21	420.0 21	465.0 20	468.0 18	618.0 16	1220.0 16
1945	296.0 24	311.0 24	334.0 24	379.0 25	418.0 24	589.0 25	831.0 26	1000.0 26	1060.0 25	1400.0 21
1946	148.0 15	172.0 17	182.0 17	196.0 15	232.0 17	239.0 12	274.0 12	285.0 8	486.0 13	922.0 6
1947	136.0 13	142.0 13	148.0 12	153.0 12	163.0 9	242.0 13	327.0 14	396.0 16	744.0 19	1330.0 19
1948	179.0 19	183.0 18	187.0 18	197.0 17	210.0 14	234.0 11	273.0 11	355.0 13	505.0 14	1540.0 23
1949	103.0 11	105.0 11	110.0 11	129.0 11	143.0 8	186.0 8	193.0 6	204.0 6	211.0 5	775.0 4
1950	144.0 14	151.0 14	164.0 13	191.0 14	219.0 15	260.0 14	296.0 13	331.0 11	445.0 11	1120.0 13
1951	210.0 20	219.0 20	220.0 19	230.0 18	269.0 19	426.0 22	632.0 23	684.0 23	710.0 18	1630.0 24
1952	228.0 21	229.0 21	236.0 21	240.0 19	252.0 18	313.0 17	626.0 22	640.0 22	851.0 22	1730.0 26
1953	76.0 6	83.3 7	93.4 8	101.0 6	104.0 6	110.0 5	152.0 5	183.0 5	249.0 6	849.0 5
1954	79.0 8	87.3 9	102.0 9	104.0 8	119.0 7	158.0 7	196.0 7	343.0 12	426.0 10	942.0 8
1955	43.0 3	48.3 3	52.6 4	53.7 2	67.6 2	156.0 6	197.0 8	326.0 10	917.0 23	1330.0 20
1956	150.0 16	153.0 15	165.0 14	196.0 16	222.0 16	324.0 19	347.0 16	360.0 14	469.0 12	970.0 9
1957	40.0 2	43.3 2	45.7 1	61.9 3	62.8 1	68.7 1	77.0 1	87.4 1	133.0 1	1130.0 15
1958	101.0 10	105.0 10	110.0 10	118.0 10	184.0 12	261.0 15	338.0 15	392.0 15	588.0 15	1120.0 14
1959	77.0 7	82.3 6	88.1 7	113.0 9	182.0 11	288.0 16	371.0 17	409.0 17	416.0 8	1000.0 10
1960	123.0 12	137.0 12	178.0 15	247.0 20	284.0 20	319.0 18	439.0 19	540.0 20	806.0 21	1320.0 18
1961	153.0 17	163.0 16	179.0 16	184.0 13	200.0 13	222.0 9	252.0 10	301.0 9	426.0 9	1110.0 12
1962	82.0 9	84.0 9	87.6 6	102.0 7	170.0 10	226.0 10	250.0 9	262.0 7	302.0 7	927.0 7
1963	47.0 5	49.3 4	51.4 3	70.7 5	78.0 4	104.0 3	113.0 2	142.0 4	178.0 3	682.0 2
1964	37.0 1	39.3 1	46.3 2	49.4 1	69.6 3	93.0 2	123.0 4	126.0 2	195.0 4	702.0 3
1965	46.0 4	50.7 5	57.1 5	62.4 4	78.8 5	110.0 4	120.0 3	131.0 3	137.0 2	457.0 1
MEAN	146.692	154.377	166.084	184.734	218.184	282.642	351.769	405.092	553.615	1142.923
VARIANCE	7929.148	8562.074	9502.996	11514.219	16471.141	23848.055	41047.027	50880.520	83675.000	105546.687
STD DEV	89.046	92.531	97.483	107.304	128.340	154.428	202.601	225.567	289.266	324.879
SKEWNESS	.711	.759	.724	.836	1.246	.765	.755	.845	.212	.020
SE OF SKEW	.456	.456	.456	.456	.456	.456	.456	.456	.456	.456
SER CORR	.599	.614	.635	.599	.557	.511	.368	.290	.287	.274
C OF VAR	.607	.599	.587	.581	.588	.546	.576	.557	.523	.284
LOGS										
MEAN OF	2.080	2.106	2.140	2.190	2.266	2.384	2.471	2.537	2.671	3.039
VAR OF	.085	.082	.079	.074	.070	.066	.074	.071	.075	.018
STD DEV OF	.292	.286	.281	.273	.265	.257	.271	.266	.275	.136
SKEW OF	-.295	-.292	-.309	-.277	-.254	-.367	-.328	-.478	-.642	-.823
SE OF SKEW OF	.456	.456	.456	.456	.456	.456	.456	.456	.456	.456
SER CORR OF	.580	.600	.591	.587	.523	.462	.397	.368	.369	.372
C OF VAR OF	.140	.136	.131	.124	.117	.108	.110	.105	.103	.045

C3

1-4030.00

HIGHEST MEAN DISCHARGE, IN CFS, AND RANKING, FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

RARITAN RIVER AT BOUND BROOK, N. J.

YEAR	1		3		7		15		30		60		90		120		183		ANNUAL	
1904	24900.0	2	16000.0	3	9170.0	3	5210.0	4	3140.0	13	2380.0	13	2130.0	13	2010.0	12	1940.0	9	1520.0	3
1905	16400.0	9	9590.0	12	6030.0	15	4430.0	12	3170.0	12	2130.0	17	2150.0	11	1990.0	13	1760.0	11	1260.0	12
1906	17700.0	5	9410.0	14	5230.0	21	3470.0	20	2780.0	18	2530.0	12	2010.0	16	1990.0	14	1650.0	16	1160.0	15
1907	14900.0	13	11000.0	7	8810.0	5	5470.0	3	3360.0	10	2300.0	14	2130.0	12	1940.0	15	1700.0	13	1260.0	13
1908	13700.0	16	7850.0	22	5380.0	20	4370.0	14	3460.0	8	3060.0	8	2850.0	5	2820.0	7	2470.0	3	1730.0	2
1945	11600.0	21	8220.0	19	6560.0	13	5020.0	6	3390.0	9	2740.0	16	2020.0	15	1810.0	18	1690.0	14	1320.0	7
1946	19300.0	5	12600.0	5	6710.0	11	4100.0	15	3070.0	15	2540.0	11	1950.0	17	1830.0	16	1650.0	15	1290.0	9
1947	4460.0	27	4880.0	27	4270.0	25	2730.0	25	2470.0	23	2060.0	19	1930.0	18	1760.0	19	1480.0	20	931.0	18
1948	10700.0	22	8270.0	18	5810.0	16	4580.0	9	3660.0	7	3100.0	6	2840.0	6	2580.0	5	2160.0	5	1480.0	4
1949	27430.0	1	17400.0	1	9550.0	2	6690.0	2	4800.0	1	3620.0	2	2930.0	4	2560.0	7	1990.0	7	1120.0	16
1950	9610.0	24	6880.0	23	4300.0	24	2920.0	22	2140.0	24	2020.0	22	1640.0	22	1440.0	22	1220.0	24	783.0	23
1951	15200.0	11	8520.0	16	6210.0	14	4070.0	16	3000.0	16	2740.0	10	2500.0	9	2210.0	8	1980.0	8	1290.0	10
1952	16700.0	7	12600.0	6	6820.0	9	4400.0	13	3120.0	14	3090.0	7	2830.0	7	2660.0	4	2650.0	1	1910.0	1
1953	13430.0	17	8610.0	15	7040.0	8	4900.0	8	4070.0	3	3260.0	3	2950.0	3	2790.0	3	2510.0	2	1430.0	5
1954	5890.0	26	4940.0	26	3240.0	27	2190.0	27	1650.0	27	1280.0	27	1210.0	27	1080.0	27	1020.0	25	673.0	25
1955	23030.0	3	14100.0	4	10400.0	1	6990.0	1	3800.0	5	2050.0	20	1570.0	23	1550.0	21	1400.0	21	1120.0	17
1956	22600.0	4	17300.0	2	9160.0	4	4920.0	7	3290.0	11	2820.0	9	2520.0	8	2130.0	9	1930.0	10	1270.0	11
1957	14400.0	15	10600.0	9	6620.0	12	4070.0	17	2740.0	19	2090.0	18	1890.0	19	1760.0	20	1520.0	18	874.0	20
1958	16500.0	8	10900.0	8	6740.0	10	4440.0	11	3730.0	6	3210.0	4	2980.0	2	2850.0	1	2400.0	4	1360.0	6
1959	8940.0	25	6290.0	25	3730.0	26	2490.0	26	2100.0	25	1570.0	24	1400.0	24	1270.0	24	1270.0	22	863.0	22
1960	15030.0	12	9860.0	10	5680.0	17	3610.0	19	2500.0	22	2280.0	15	2110.0	14	2120.0	10	1740.0	12	1250.0	14
1961	12100.0	19	8180.0	21	7280.0	6	5180.0	5	4190.0	2	3850.0	1	3140.0	1	2570.0	6	2030.0	6	1300.0	8
1962	14600.0	14	9770.0	11	7120.0	7	4490.0	10	3880.0	4	3110.0	5	2300.0	10	2080.0	11	1540.0	17	912.0	19
1963	10300.0	23	8470.0	17	5440.0	18	3810.0	18	2810.0	17	2040.0	21	1680.0	21	1420.0	23	1250.0	23	735.0	24
1964	12100.0	20	6560.0	24	4490.0	23	2820.0	23	2510.0	21	1870.0	23	1690.0	20	1810.0	17	1500.0	19	873.0	21
1965	12700.0	18	8200.0	20	4960.0	22	2770.0	24	1960.0	26	1540.0	25	1280.0	25	1140.0	25	904.0	26	524.0	26
1966	15500.0	10	9540.0	13	5420.0	19	2960.0	21	2660.0	20	1530.0	26	1270.0	26	1130.0	26	825.0	27	515.0	27
MEAN	14912.590		9849.629		6374.812		4189.629		3088.889		2455.926		2144.444		1973.704		1711.074		1139.000	
VARIANCE	26519888.000		10958788.000		3326835.000		1423100.000		538602.125		445717.000		339548.375		285593.000		228916.250		118829.062	
STD DEV	5149.746		3310.406		1823.961		1192.937		733.895		667.620		582.708		534.409		478.452		344.716	
SKEWNESS	.699		.924		.508		.421		.159		.259		.125		.031		.141		.053	
SE OF SKEW	.448		.448		.448		.448		.448		.448		.448		.448		.448		.448	
SER CORR	-.159		-.064		-.120		-.101		-.147		.067		.078		.009		.160		.308	
C OF VAR	.345		.336		.286		.285		.238		.272		.272		.271		.280		.303	
LOGS																				
MEAN OF	4.148		3.971		3.787		3.605		3.477		3.374		3.315		3.279		3.216		3.035	
VAR OF	.023		.020		.016		.016		.012		.015		.015		.016		.017		.021	
STD DEV OF	.153		.142		.126		.127		.108		.122		.123		.125		.130		.144	
SKEW OF	-.271		.071		-.167		-.270		-.481		-.290		-.300		-.460		-.560		-.696	
SE OF SKEW OF	.448		.448		.448		.448		.448		.448		.448		.448		.448		.448	
SER CORR OF	-.184		-.117		-.169		-.093		-.161		.084		.128		.047		.220		.373	
C OF VAR OF	.037		.036		.033		.035		.031		.036		.037		.038		.040		.048	

STATISTICS OF MONTHLY MEANS, 1904-08; 1945-1966

	MEAN	STD DEV	SKEW	C OF VAR	PCT MEAN YR VOL	SER CORR
OCT	649.5	775.3	2.083	1.194	4.740	.352d
NOV	1033.	785.2	1.214	.7603	7.537	.251
DEC	1312.	725.0	.4335	.5527	9.574	.499
JAN	1551.	845.5	.7010	.5452	11.32	.619
FEB	1738.	686.0	.1951	.3948	12.68	.077
MAR	2193.	677.7	.2037	.3090	16.00	.080
APR	1653.	809.4	.2075	.4897	12.06	.444
MAY	1159.	712.1	1.021	.6147	8.455	.169
JUN	630.2	529.5	1.859	.8402	4.599	.650
JUL	533.9	417.1	1.552	.7812	3.896	.593
AUG	648.7	712.6	2.968	1.099	4.734	.179
SEP	602.7	577.2	1.348	.9576	4.399	.245

STATISTICS OF LOGS OF MONTHLY MEANS, 1904-08; 1945-1966

	MEAN	STD DEV	SKEW	C OF VAR	PCT MEAN YR VOL	SER CORR
OCT	2.602	.4046	.8307	.1555	7.474	.594d
NOV	2.875	.3834	-.4434	.1334	8.257	.465
DEC	3.041	.2852	-.7564	.0938	8.732	.473
JAN	3.121	.2637	-.5195	.0845	8.964	.679
FEB	3.203	.1902	-.5268	.0594	9.199	.049
MAR	3.320	.1391	-.1734	.0419	9.535	.099
APR	3.159	.2422	-.4477	.0767	9.074	.349
MAY	2.987	.2655	.0528	.0889	8.579	.221
JUN	2.684	.3125	.3896	.1164	7.709	.702
JUL	2.593	.3697	-.3186	.1426	7.447	.784
AUG	2.625	.4180	-.0502	.1593	7.539	.495
SEP	2.608	.3908	.2755	.1499	7.490	.537

d Serial correlation coefficient computed from non-continuous arrays of monthly mean discharges.

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1-4035.00 GREEN BROOK AT PLAINFIELD, N. J.

	STATISTICS OF MONTHLY MEANS, 1939-1967						STATISTICS OF LOGS OF MONTHLY MEANS, 1939-1967					
	MEAN	STD DEV	SKEW	C OF VAR	PCT MEAN YR VOL	SER CORR	MEAN	STD DEV	SKEW	C OF VAR	PCT MEAN YR VOL	SER CORR
OCT	4.561	5.173	2.014	1.134	3.229	.167	.4196	.4796	-.0582	1.143	3.997	.322
NOV	9.608	7.097	.6582	.7387	6.802	.153	.8111	.4699	-1.266	.5793	7.726	.302
DEC	12.04	7.844	.4658	.6513	8.527	.182	.9671	.3522	-.7510	.3642	9.212	.309
JAN	13.62	9.082	1.161	.6666	9.645	.525	1.045	.2866	.0136	.2743	9.954	.545
FEB	18.04	8.415	.5872	.4665	12.77	.104	1.205	.2248	-.5736	.1865	11.48	.184
MAR	24.73	9.626	.3870	.3892	17.51	.009	1.360	.1770	-.2037	.1302	12.95	.024
APR	20.54	10.85	.3708	.5282	14.54	.507	1.245	.2585	-.3385	.2077	11.86	.408
MAY	14.09	8.897	.7884	.6314	9.976	.183	1.061	.2893	-.0820	.2727	10.10	.162
JUN	6.993	6.384	2.018	.9129	4.951	.625	.7126	.3344	.3468	.4693	6.787	.580
JUL	5.115	3.221	.3572	.6299	3.621	.402	.5904	.3721	-1.014	.6303	5.623	.481
AUG	6.677	9.544	3.066	1.429	4.727	.091	.5626	.4919	-.2656	.8743	5.359	.330
SEP	5.226	5.000	1.516	.9567	3.700	.261	.5193	.4479	-.1897	.8624	4.947	.379

1-4040.00 GREEN BROOK AT BOUND BROOK, N. J.

Location.--Lat 40°33'55", long 74°31'30", 300 ft downstream from State Highway 28.

Drainage area.--49 sq mi approximately.

Remarks.--Diversion from wells and sewage inflow significant at low flow.

DURATION TABLE OF DAILY DISCHARGE

CLASS	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	CFS_DAYS
YEAR	NUMBER OF DAYS IN CLASS																																			
1924					14	8	2	14	19	36	8	15	14	29	37	40	20	18	20	25	9	5	10	11	4	3	3	1			1					29159.0
1925					6	16	17	26	33	51	20	24	45	30	30	15	14	4	6	5	7	3	3	4	1	1		1	1	1	1					19009.0
1926			2		2	8	14	30	25	12	8	26	51	40	35	38	18	15	4	8	4	9	5	1	3	1	3	1			1		1			23542.0
1927						1	3	8	5	6	12	19	30	36	39	42	50	35	26	12	6	9	5	3	6	4	1	2		1	1	1		1	1	34188.0
1928											1	4	26	67	68	51	42	42	20	13	9	5	3	1		4	3		2	1	2	1		1		39313.0
1929			1	2	2	9	4	6	9	17	9	43	72	45	34	27	41	7	7	9	2	3	4	3	1	4	1		2		1					23315.0
1930		2	6	2	5	8	14	14	46	10	7	17	16	24	80	42	24	15	13	7	2	5	2		2	1	1									20097.0

CLASS	CFS	TOTAL	ACCUM	PERCT	CLASS	CFS	TOTAL	ACCUM	PERCT	CLASS	CFS	TOTAL	ACCUM	PERCT	CLASS	CFS	TOTAL	ACCUM	PERCT
0	0.00	0	2557	100.0	9	23.00	132	2174	85.0	18	100.0	118	423	16.5	27	440	8	29	1.1
1	4.00	2	2557	100.0	10	27.00	64	2042	79.9	19	120.0	86	305	11.9	28	520	3	21	.8
2	7.10	9	2555	99.9	11	31.00	145	1978	77.4	20	140.0	43	219	8.6	29	610	4	18	.7
3	8.40	4	2546	99.6	12	37.00	232	1833	71.7	21	160.0	43	176	6.9	30	720	6	14	.5
4	9.90	29	2542	99.4	13	44.00	230	1601	62.6	22	190.0	34	133	5.2	31	850	3	8	.3
5	12.00	50	2513	98.3	14	51.00	322	1371	53.6	23	230.0	25	99	3.9	32	1000	2	5	.1
6	14.00	54	2463	96.3	15	61.00	272	1049	41.0	24	270.0	18	74	2.9	33	1200	1	3	.1
7	16.00	98	2409	94.2	16	72.00	218	777	30.4	25	320.0	14	56	2.2	34	1400	2	2	.0
8	19.00	137	2311	90.4	17	84.00	136	559	21.9	26	370.0	13	42	1.6					

LOWEST MEAN DISCHARGE, IN CFS, AND RANKING, FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR BEGINNING APRIL 1

GREEN BROOK AT BOUND BROOK, N. J.

YEAR	1		3		7		14		30		60		90		120		183		ANNUAL	
1924	19.0	5	18.0	5	19.6	5	21.9	5	24.1	4	26.8	4	32.4	4	35.1	4	38.2	2	78.4	4
1925	10.0	3	11.3	3	12.0	3	13.6	3	16.0	2	19.0	2	22.3	1	22.2	1	26.1	1	52.8	1
1926	8.0	1	8.7	1	11.3	2	13.3	2	14.5	1	17.5	1	25.2	2	29.5	2	53.0	4	74.7	3
1927	13.0	4	15.0	4	18.3	4	20.7	4	26.2	5	41.5	5	51.0	6	59.4	6	93.2	6	103.0	6
1928	32.0	6	34.0	6	34.6	6	36.4	6	38.8	6	41.6	6	43.1	5	50.0	5	59.5	5	86.9	5
1929	8.0	2	9.3	2	10.6	1	11.6	1	18.0	3	22.3	3	26.2	3	31.6	3	44.7	3	67.9	2
MEAN	14.833		16.050		17.733		19.583		22.933		28.117		33.367		37.967		52.117		77.283	
VARIANCE	84.967		89.851		82.687		85.686		81.462		118.462		129.427		194.643		545.669		289.845	
STD DEV	9.218		9.479		9.093		9.257		9.026		10.884		11.377		13.951		23.360		17.025	
SKEWNESS	1.660		1.753		1.591		1.437		1.215		.627		.843		.749		1.123		.145	
SE OF SKEW	.845		.845		.845		.845		.845		.845		.845		.845		.845		.845	
SER CORR	-.293		-.248		-.225		-.247		-.006		.118		.094		.185		.257		.092	
C OF VAR	.621		.591		.513		.473		.394		.387		.341		.367		.448		.220	
LOGS																				
MEAN OF	1.113		1.154		1.209		1.257		1.335		1.423		1.503		1.556		1.682		1.879	
VAR OF	.055		.049		.039		.035		.025		.027		.020		.025		.036		.010	
STD DEV OF	.234		.221		.197		.186		.160		.164		.142		.157		.190		.098	
SKEW OF	.998		1.046		.975		.828		.670		.397		.562		.262		.170		-.412	
SE OF SKEW OF	.845		.845		.845		.845		.845		.845		.845		.845		.845		.845	
SER CORR OF	-.291		-.237		-.230		-.269		.031		.105		.100		.203		.333		.065	
C OF VAR OF	.211		.191		.163		.148		.119		.116		.094		.101		.113		.052	

C5

1-4040.00

HIGHEST MEAN DISCHARGE, IN CFS, AND RANKING, FOR THE FOLLOWING NUMBER OF CONSECUTIVE DAYS IN YEAR ENDING SEPTEMBER 30

GREEN BROOK AT BOUND BROOK, N. J.

YEAR	1	3	7	15	30	60	90	120	183	ANNUAL
1924	800.0 5	498.0 5	346.0 4	247.0 4	174.0 4	156.0 2	145.0 1	129.0 1	118.0 1	79.7 3
1925	800.0 6	663.0 2	429.0 2	278.0 3	201.0 3	141.0 4	113.0 5	96.0 5	76.2 7	52.1 7
1926	1100.0 3	547.0 4	302.0 6	204.0 6	156.0 5	107.0 6	93.1 6	90.0 6	78.4 6	64.5 4
1927	1400.0 2	660.0 3	375.0 3	316.0 1	235.0 1	178.0 1	129.0 3	112.0 3	97.9 3	93.7 2
1928	1500.0 1	867.0 1	459.0 1	301.0 2	206.0 2	144.0 3	132.0 2	117.0 2	117.0 2	107.0 1
1929	800.0 4	451.0 6	307.0 5	225.0 5	154.0 6	137.0 5	123.0 4	110.0 4	92.3 4	63.9 5
1930	410.0 7	296.0 7	181.0 7	141.0 7	118.0 7	91.6 7	91.3 7	84.5 7	78.8 5	55.1 6
MEAN	972.857	568.857	342.714	244.571	177.714	136.371	118.057	105.500	94.086	73.714
VARIANCE	147157.062	33316.457	8517.566	3694.284	1539.570	844.232	404.813	253.083	319.048	423.015
STD DEV	383.610	182.528	92.291	60.781	39.237	29.056	20.120	15.909	17.862	20.567
SKEWNESS	.135	.222	-.621	-.627	-.051	-.331	-.319	.059	.516	.719
SE OF SKEW	.794	.794	.794	.794	.794	.794	.794	.794	.794	.794
SER CORR	.420	.069	.028	.056	.072	-.233	-.046	-.067	-.050	.184
C OF VAR	.394	.321	.269	.249	.221	.213	.170	.151	.190	.279
LOGS										
MEAN OF	2.955	2.734	2.519	2.375	2.240	2.126	2.066	2.019	1.967	1.854
VAR OF	.036	.022	.018	.015	.010	.010	.006	.004	.007	.014
STD DEV OF	.191	.149	.134	.121	.100	.098	.077	.066	.081	.117
SKEW OF	-.745	-.634	-1.299	-1.127	-.497	-.731	-.518	-.141	.377	.432
SE OF SKEW OF	.794	.794	.794	.794	.794	.794	.794	.794	.794	.794
SER CORR OF	.456	.216	.151	.100	.138	-.220	-.062	-.064	-.030	.175
C OF VAR OF	.065	.055	.053	.051	.045	.046	.037	.033	.041	.063

STATISTICS OF MONTHLY MEANS, 1924-1930

	MEAN	STD DEV	SKEW	C OF VAR	PCT MEAN YR VOL	SER CORR
OCT	61.97	44.08	2.017	.7114	6.976	.402
NOV	61.17	35.30	.5310	.5770	6.886	.461
DEC	78.32	28.36	.1918	.3622	8.817	.761
JAN	74.58	29.28	1.210	.3926	8.396	.217
FEB	121.0	36.54	.4103	.3020	13.62	-.771
MAR	99.86	14.73	.5786	.1475	11.24	-.310
APR	93.99	45.22	.8887	.4811	10.58	.824
MAY	67.82	35.80	1.347	.5278	7.635	.858
JUN	46.34	27.59	1.504	.5954	5.217	.316
JUL	55.78	60.61	2.068	1.086	6.280	.936
AUG	70.85	74.89	1.961	1.057	7.977	.193
SEP	56.58	36.56	.4065	.6462	6.370	.697

STATISTICS OF LOGS OF MONTHLY MEANS, 1924-1930

	MEAN	STD DEV	SKEW	C OF VAR	PCT MEAN YR VOL	SER CORR
OCT	1.720	.2578	.8606	.1499	8.015	.505
NOV	1.717	.2754	-.2277	.1604	8.002	.583
DEC	1.867	.1682	-.4201	.0901	8.704	.739
JAN	1.847	.1597	.5187	.0865	8.607	.369
FEB	2.065	.1347	-.2589	.0652	9.627	-.820
MAR	1.995	.0629	.4096	.0315	9.302	-.368
APR	1.933	.1994	.5401	.1032	9.008	.784
MAY	1.786	.2086	.7174	.1168	8.324	.820
JUN	1.611	.2271	.8909	.1410	7.508	.450
JUL	1.573	.3984	.8324	.2532	7.335	.910
AUG	1.677	.4071	.6223	.2428	7.816	.379
SEP	1.663	.3130	-.1155	.1882	7.751	.838

C6

ATTACHMENT D

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMPLIANCE EVALUATION AND ASSISTANCE INSPECTION
PUBLIC COMMUNITY WATER SYSTEM

ENTERED
JUN 15 1998
Water Supply Element
Safe Drinking Water Bur.

GENERAL INFORMATION

PW ID #: 1225001 **DATE:** 5/19/98

PURVEYOR: Middlesex Water Company

TYPE: Surface Water, Groundwater, Bulk Purchase **CLASS:** 3

FACILITY LOCATION ADDRESS: Carl J. Olson WTP, Fairview Avenue, Edison Township

MAILING ADDRESS: 1500 Ronson Road, Iselin

MUNICIPALITY: Edison Township **COUNTY:** Middlesex

ADMINISTRATOR/MANAGER: Richard Risoldi **Phone #:** (732) 634-1500 x610
Director of Production and Treatment

LICENSED OPERATOR (S): Richard Russo **LICENSES HELD:** **W:** 4 **T:** 4
Richard Risoldi **W:** 3 **T:** 4
PHONE #: (732) 634-1500 **SYSTEM REQUIREMENTS:** **W:** 4 **T:** 4

EMERGENCY #: (732) 985-2255 **CONTACT:** Frank Falco

COMMENTS/DEFICIENCIES

SOURCE/TREATMENT:

STORAGE/DISTRIBUTION: 1. Undersized mains exist in the system. All mains, when replaced, must b replaced with at least 6" mains.

INTERCONNECTION/AUXILIARY POWER:

MONITORING/REPORTING/M.C.L./PUBLIC NOTICE:

GENERAL COMMENTS:

OVERALL RATING: *ACCEPTABLE* [x] *CONDITIONALLY ACCEPTABLE* [ ] *UNACCEPTABLE* [ ]

INSPECTOR: Greg Schussler **FACILITY REP:** Frank Falco

TITLE: Sr. Environmental Specialist **TITLE:** Asst. Director of Production & Treatment

SIGNATURE: _____ **ORGANIZATION:** Middlesex Water Company

D'

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMPLIANCE EVALUATION AND ASSISTANCE INSPECTION
PUBLIC COMMUNITY WATER SYSTEM

DELIVERY INFORMATION

PW ID #: 1225001 **DATE:** 5/19/98

PLANT DELIVERED WATER **(Calendar Year 1997)** **ANNUAL** ***(1997)***
(MGD, month, year) **MIN:** 38.00 MGD, December 1997 **AVERAGE:** 45.85 MGD
MAX: 69.80 MGD, July 1997

CURRENT/RECENT WATER USE RESTRICTIONS: None

BULK PURCHASES: Elizabethtown Water Company, contracted for 3.0 MGD

BULK SALES:

Customer	ID#	MGD
Edison Township WD	1205001	0.71
Highland Park WD	1207001	2.75
East Brunswick WD	1204001	7.33
Old Bridge MUA	1209002	2.50
Sayreville WD	1219001	2.00
South Amboy WD	1220001	0.80
Marlboro MUA	1328002	2.86

PERMITTED DIVERSION AMOUNT (MGM-MGY): See Water Allocation Permit # 5294

MUNICIPALITY(IES) SERVED: Edison, Woodbridge, Carteret, South Plainfield, Metuchen, portions of Clark

TOTAL SERVICE CONNECTIONS: 53,604 **%METERED:** 100% **% UNACCOUNTED WATER:** 5.5%

TOTAL ESTIMATED POPULATION SERVED: 212,000

NEW CONSTRUCTION (Project Numbers): W-12-96-5357 = Carl J. Olson WTP expansion

DISTRIBUTION MAINS: **Sizing:** 4 inches **(min)** **to:** 48 inches **(max)**
Pressure: 30 psi **(min)** **to:** 115 psi **(max)**

HYDRANTS: 4153 **FLUSHING PROGRAM:** annual **CROSS CONNECTION PROGRAM PLAN:** N/A

DISTRIBUTION BOOSTER PUMPS LOCATION(S): None **PRESSURE(S)** N/A

D2

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMPLIANCE EVALUATION AND ASSISTANCE INSPECTION
PUBLIC COMMUNITY WATER SYSTEM

AUXILIARY POWER

PW ID #: 1225001 **DATE:** 5/19/98

LOCATION	TYPE	CAPACITY(MGD)
Carl J. Olson WTP	Diesel Generator	CJO WTP storage tanks and D&R Canal intake
Carl J. Olson WTP	Dual Power Lines	Treatment facilities
Park Avenue Well Field	Diesel Generator	Wells and treatment facilities @ Park Avenue WTP
Carteret Storage Tank	Diesel Generator	Storage tank and associated equipment

POINT OF ENTRY INFORMATION

SURFACE WATER SOURCES:

POINT OF ENTRY ID#: 01

SOURCE: Delaware and Raritan Canal Intake @ Johnson & Johnson Building, New Brunswick
CAPACITY: 25 MGD **TREATMENT LOCATION:** Carl J. Olson WTP, Edison
TREATMENT: Chemical addition = alum, caustic soda, carbon, polymer (if needed) → flash mixer
Pre-chlorination (gas) + polymer addition, flocculation, 4 settling basins, tube settlers,
Filter aid polymer addition, 8 multi-media filters
Chemical addition = zinc orthophosphate, caustic soda, gas chlorination

GROUNDWATER SOURCES:

POINT OF ENTRY ID#: 02 - Park Avenue Well Field & WTP, South Plainfield

WELL	CAPACITY (MGD)	TREATMENT / CHEMICAL ADDITION
18	2.016	WTP treats all wells via:
19	1.584	Air Stripper (VOC removal)
20	2.088	NaOCl addition
21	1.44	Calsequest addition (Calcium sequestration)
22	0.46	Gas Chlorination
23	1.008	
24	0.648	
25	1.224	
26	0.576	
27	0.504	
28	0.360	
29	1.051	
30	0.504	
31	0.612	
32	0.360	
1	1.138	Wells 1 and 2 are located on Sprague Avenue, South Plainfield
2	1.138	

D3

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMPLIANCE EVALUATION AND ASSISTANCE INSPECTION
PUBLIC COMMUNITY WATER SYSTEM

POINT OF ENTRY INFORMATION

PW ID #: 1225001 **DATE:** 5/19/98

POINT OF ENTRY ID#: 05 - Maple Avenue Well Field & WTP, South Plainfield

WELL	CAPACITY (MGD)	TREATMENT / CHEMICAL ADDITION
1	0.864	Gas Chlorination

POINT OF ENTRY ID#: 06 - Spring Lake Park Well Field & WTP, South Plainfield

WELL	CAPACITY (MGD)	TREATMENT / CHEMICAL ADDITION
5	0.864	Air Stripper
6	0.720	Gas Chlorination
8	0.936	
9	0.504	

POINT OF ENTRY ID#: 07 - North Tingley Lane Well Field & WTP, Edison

WELL	CAPACITY (MGD)	TREATMENT / CHEMICAL ADDITION
1	0.816	Gas chlorination
2	0.288	
3	0.648	
4	1.08	

POINT OF ENTRY ID#: 08 - South Tingley Lane Well Field & WTP, Edison

WELL	CAPACITY (MGD)	TREATMENT / CHEMICAL ADDITION
5	0.432	Gas Chlorination
6	0.576	
7	0.432	
8	0.720	
9	0.432	

D4

ATTACHMENT E

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SYSTEM

W ID #: 2004002 GENERAL INFORMATION DATE: 6/17/97

RVEYOR: Elizabethtown Water Company TYPE: SW/GW CLASS: 3
CATION ADDRESS: 1341 North Avenue

LING ADDRESS: P.O. Box 111 MUNICIPALITY: Plainfield COUNTY: Union

DMINISTRATOR/MANAGER: Norbert Wagner PHONE NUMBER(S): (908) 654-1234

ENSED OPERATOR (S) Edward Mullen LICENSE(S) HELD: W: 4 T: 4
HONE #: (908) 654-1234 SYSTEM REQUIREMENT(S): W: 4 T: 4

RGENCY #: (908) 654-1234 CONTACT: any of several operators

COMMENTS/DEFICIENCIES

SOURCE/TREATMENT: No deficiencies were noted. The Canal Road surface water treatment plant went on line in October 1996. Oleg Kostin is the superintendent of operations. Phone# (732) 271-1379.

STORAGE/DISTRIBUTION: Contact Persons: Eastern Division - Richard Sadowski, Sup. Wells and stations. Western Division (Montgomery and Hillsborough Twp.) John Grabowski, Supervisor Wells and Stations.

The following wells are located less than 50 feet from property not Owned by E-Town Water: N. Plainfield - Rockview Avenue, Rockview Terrace, Board of Ed, Greenbrook Twp. - Rock Avenue and Montgomery Twp. - Well #2.

X] MONITORING/REPORTING/MCL/PUBLIC NOTICE: see pages 7, 8 and 9 for Secondary MCL exceedances.

ENERAL COMMENTS: inspection dates included: 6/17, 6/24 and 6/26/1997

OVERALL RATING: ACCEPTABLE [X] CONDITIONALLY ACCEPTABLE [ ] UNACCEPTABLE [ ]

NSPECTOR: Christopher Bolka FACILITY REPRESENTATIVE: Ernest Gratz, Oleg Kostin, John Grabowski

ITLE: Principal Environmental Specialist TITLE: Water Quality Specialist, see above

IGNATURE: ORGANIZATION: Elizabethtown Water Company

E1

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SYSTEM

DELIVERY INFORMATION

PW ID #: 2004002

DATE: 6/17/97

PLANT DELIVERED WATER
(MGD,month,year) MIN: 106 MGD, 12/96 MAX: 122.3 MGD, 8/96

ANNUAL
AVERAGE: 113 MGD, 1996

CURRENT/RECENT WATER USE RESTRICTIONS: NONE

BULK PURCHASES (Prov., ID#, MGD): SEE ATTACHED APPENDIX C

BULK SALES (Customer, ID#, MGD): SEE ATTACHED APPENDIX C

PERMITTED DIVERSION AMOUNT (MGM-MGY):

MUNICIPALITY(IES)SERVED: SEE ATTACHED APPENDIX E

TOTAL SERVICE CONNECTIONS: 178,453 | %METERED: 100 | % UNACCOUNTED WATER: NA

TOTAL ESTIMATED POPULATION SERVED: 535,335

NEW CONSTRUCTION (Project Numbers): NA

DISTRIBUTION MAINS: Sizing: 4" (min) to: 60" (max)
Pressure: 60 PSI (min) to: 120 PSI (max)

HYDRANTS/FLUSHING PROGRAM: ~11,600 CROSS CONNECTION PROGRAM PLAN: YES

DISTRIBUTION BOOSTER PUMPS:

location(s)	Pressure(s)
SEE ATTACHED APPENDIX D	

LABORATORY INFORMATION

LABORATORY
NAME: ELIZABETHTOWN WATER COMPANY LAB CERT.#: 18024

ADDRESS: CHIMNEY ROCK ROAD, P.O. BOX 102, BOUND BROOK, 08805

LABORATORY
NAME: ENVIRONMENTAL HEALTH LABS CERT.#: 55598

ADDRESS: 110 SOUTH HILL STREET, SOUTH BEND, INDIANA, 46617

E2

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SYSTEM

POINT OF ENTRY INFORMATION

PWID #: 2004002

BULK PURCHASE INTERCONNECTION(S) (if applicable)

DATE: 6/17/97

PURVEYOR	LOCATION	SIZE	CAPACITY	PUMP STATION (Y/N)
SEE ATTACHED APPENDIX C				

SURFACE WATER SOURCES (if applicable)

SURFACE WATER ID#: 59

PLANT	CAPACITY(MGD)	LOCATION	TREATMENT/CHEMICAL ADDITION (list in Order)
Raritan-Millstone	155 (MAX)	Chimney Rock Road	Screening Aluminum Sulfate (Coagulat) Lime or Sulfuric Acid (pH) Potassium Permanganate Powdered Activated Carbon Mixed media filters Sodium hypochlorite Zinc Orthophosphate Flouridation - "west" supply

SURFACE WATER ID# 73

PLANT	CAPACITY (MGD)	LOCATION	TREATMENT/CHEMICAL ADDITION
CANAL ROAD PLANT	60 (MAXIMUM)	RANDOLPH ROAD OFF WESTON CANAL RD	SCREENING OZONE CONTACT SULFURIC ACID OR CAUTSIC (pH) Alum (flocculation) OZONE CONTACT GAC MULTIMEDIA FILTERS SODIUM HYPOCHLORITE AMMONIA CAUSTIC ZINC ORPHOPHOSPHATE

E3

COMPLIANCE EVALUATION INSPECTION
PUBLIC COMMUNITY WATER SYSTEM

POINT OF ENTRY INFORMATION

PW ID #: 2004002
(GROUND WATER SOURCES)

DATE: 6/17/97

POINT OF ENTRY ID#: 01

WELL#	CAPACITY (MGD)	LOCATION	TREATMENT/CHEMICAL ADDITION: (list in order)
Mt. Station #1	0.936	Bound Brook	Sodium hypochlorite
POE ID# 03			
Green Brook Plant	4.53	Jefferson Avenue	Air Stripper Sodium hypochlorite - ZnOrthc
POE ID# 07			
Papen Road	0.317	Bridgewater Twp.	Sodium hypochlorite
POE ID# 08			
Well Road Plant	0.216	Bridgewater Twp.	Sodium hypochlorite
POE ID# 12			
Board of Education	0.576	North Plainfield	Sodium hypochlorite
POE ID# 13			
Rockview Avenue	0.432	North Plainfield	Sodium hypochlorite
POE ID# 14			
Rockview Terrace	0.288	North Plainfield	Sodium hypochlorite
POE ID# 15			
Montgomery Twp. #2	0.648	Montgomery Twp.	Sodium hypochlorite
POE ID# 40			
Maple Glenn	0.360	Raritan Twp.	Sodium hypochlorite
POE ID# 44			
Pottersville Road	0.144	Tewksbury Twp.	Sodium hypochlorite
POE ID# 47			
Montgomery Township Well #1 & 2	0.432	Montgomery Twp.	Sodium hypochlorite

Stony Brook [illegible] (Princeton)
Jefferson [illegible] (West Windsor)
Cranbury Village Plant (Cranbury)
Plainsboro Well No. 1
Plainsboro [illegible]
[illegible] (Piscataway)
Clinton Ave (Scotch Plains)
8th St Well "
Netherwood Station (Plainfield)
Prospect Ave. Well "

Hummocks Station (Union)
Aberdeen Road (Scotch Plains)
Glenside Ave Well " "
Charles St Station (Mountainside)
Clinton Ave (Kenilworth)
Jerusalem Wells 1 & 3 (Scotch Plains)
Well Road No. 2 (Bridgewater)
Papen Road
Pottersville Well (Tewksbury)
Maple Glen Well (Fanwood)

NOTE: 37 Additional Wells/Stations OFF-LINE

E4

APPENDIX A

ELIZABETHTOWN WATER COMPANY 8/04/92

WELL LIST

Town	County	Facility Name	Well Depth	Well Permit Number	Effective Date	Formation	Pump Cap. (GPM)	Motor HP	Type
Bound Brook	Somerset	Mountain Sta. #1	366				300	60	Turbine
Bound Brook	Somerset	Mountain Sta. #2	404				350	40	Turbine
Bridgewater	Somerset	Papen Road	225	25-13435	7/12/83	Basalt	220	40	Turbine
Bridgewater	Somerset	Wells Road #1	130	25-5803	7/12/83	Basalt	75	10	Turbine
Bridgewater	Somerset	Wells Road #2	130	25-11512	7/12/83	Basalt	75	10	Turbine
Clark	Union	Elks Well	59	26-4751	7/12/83	Brunswick	300	30	Turbine
Green Brook	Somerset	Green Brook #1	451	45-23	6/7/83	Brunswick	310	25	Turbine
Green Brook	Somerset	Green Brook #2	376	45-24	6/7/83	Brunswick	650	50	Turbine
Green Brook	Somerset	Green Brook #3	550	45-25	6/7/83	Brunswick	60	7.5	Submersible
Green Brook	Somerset	Green Brook #4	400	45-26	6/7/83	Brunswick	350	30	Turbine
Green Brook	Somerset	Green Brook #5	373	25-572	6/7/83	Brunswick	315	25	Turbine
Green Brook	Somerset	Green Brook #6	373	25-632	6/7/83	Brunswick	280	25	Turbine
Green Brook	Somerset	Green Brook #7	238	25-633	6/7/83	Brunswick	180	15	Turbine
Green Brook	Somerset	Green Brook #8	445	25-2715	6/7/83	Brunswick	500	40	Turbine
Green Brook	Somerset	Green Brook #9	507	25-2716	6/7/83	Brunswick	500	50	Turbine
Green Brook	Somerset	Green Brook #11	510	25-2718	6/7/83	Brunswick	340	25	Submersible
Green Brook	Somerset	Rock Avenue	350	25-12665	6/7/83	Brunswick	330	40	Submersible
Kenilworth	Union	Quinton Avenue	502	46-14	7/31/83	Brunswick	185	40	Turbine
Kenilworth	Union	Richfield Avenue	401	46-15	7/31/83	Brunswick	250	30	Turbine
Middlesex	Middlesex	Sebrings Mill #4	300	25-11582	8/17/84	Brunswick	200	25	Submersible
Middlesex	Middlesex	Sebrings Mill #6	412	45-43	8/17/84	Brunswick	400	40	Submersible
Middlesex	Middlesex	Sebrings Mill #7	285	25-11367	8/17/84	Brunswick	300	30	Submersible
Middlesex	Middlesex	Sebrings Mill #8	430	25-13397	8/17/84	Brunswick	200	25	Submersible
Montgomery	Somerset	Montgomery #1	305	28-5407	6/7/83	Stockton	450	50	Submersible
Montgomery	Somerset	Montgomery #2	335	28-5511	6/7/83	Stockton	300	30	Submersible
Mountainside	Union	Bristol Road	315	25-9206	6/7/83	Brunswick	330	40	Submersible
Mountainside	Union	Central Avenue	300	25-9083	6/7/83	Brunswick	475	60	Submersible
Mountainside	Union	Charles Street #1	454	25-872	6/7/83	Brunswick	300	40	Submersible
Mountainside	Union	Charles Street #2	572	45-4	6/7/83	Brunswick	150	25	Submersible
N. Plainfield	Somerset	Board of Education	311	45-22	6/7/83	Brunswick	400	50	Turbine
N. Plainfield	Somerset	Rockview Avenue	400	25-13898	6/7/83	Brunswick	300	30	Submersible
N. Plainfield	Somerset	Rockview Terrace	400	25-13106	6/7/83	Brunswick	200	25	Submersible
Piscataway	Middlesex	Rock Avenue	350	25-13248	6/7/83	Brunswick	150	20	Submersible
Plainfield	Union	Fifth Street	350	25-12961	6/7/83	Brunswick	300	40	Submersible
Plainfield	Union	George Street	89	45-21	6/7/83	Brunswick	125	20	Turbine
Plainfield	Union	Netherwood #1	350	45-9	6/7/83	Brunswick	220	15	Turbine
Plainfield	Union	Netherwood #2	500	45-10	6/7/83	Brunswick	225	15	Turbine
Plainfield	Union	Netherwood #3	350	45-11	6/7/83	Brunswick	600	40	Turbine
Plainfield	Union	Netherwood #4	400	45-12	6/7/83	Brunswick	300	20	Turbine
Plainfield	Union	Netherwood #5	350	45-13	6/7/83	Brunswick	300	15	Submersible
Plainfield	Union	Netherwood #6	300	45-14	6/7/83	Brunswick	325	20	Turbine
Plainfield	Union	Netherwood #7	350	45-15	6/7/83	Brunswick	350	20	Submersible
Plainfield	Union	Netherwood #8	304	45-16	6/7/83	Brunswick	300	20	Turbine
Plainfield	Union	Netherwood #9	350	45-17	6/7/83	Brunswick	300	25	Turbine
Plainfield	Union	Netherwood #10	350	45-18	6/7/83	Brunswick	300	25	Submersible
Plainfield	Union	Netherwood #11	350	45-19	6/7/83	Brunswick	250	15	Turbine
Plainfield	Union	Netherwood #12	352	45-20	6/7/83	Brunswick	400	25	Turbine
Plainfield	Union	City of Plainfield	300	45-27	6/7/83	Brunswick	400	50	Turbine
Plainfield	Union	Prospect Avenue	350	25-9037	6/7/83	Brunswick	300	40	Submersible
Plainfield	Union	Watchung Avenue	605	25-8185	6/7/83	Brunswick	280	30	Submersible
Plainsboro	Middlesex	Plainsboro #1	120	28-9278	7/12/83	Raritan	350	30	Submersible
Plainsboro	Middlesex	Plainsboro #2	208	28-11477	7/12/83	Raritan	295	40	Submersible
Princeton	Mercer	Edgerstoune		28-5000	7/12/83	Stockton	95	20	Submersible

APPENDIX A

Town	County	Facility Name	Well Depth	Well Permit Number	Effective Date	Formation	Pump Cap. (GPM)	Motor HP	Type
Princeton	Mercer	Grover Avenue	439	28-2607	7/12/83	Raritan	100	15	Submersible
Princeton	Mercer	Harrison Street #1	503	48-5	7/12/83	Stockton	100	15	Submersible
Princeton	Mercer	Harrison Street #3	301	28-4371	7/12/83	Stockton	110	7.5	Submersible
Princeton	Mercer	Harrison Street #4	302	48-6	7/12/83	Stockton	150	15	Submersible
Princeton	Mercer	Harrison Street #5	320	48-7	7/12/83	Stockton	240	20	Turbine
Princeton	Mercer	Harrison Street #6	335	28-1886	7/12/83	Stockton	390	40	Submersible
Princeton	Mercer	Harrison Street #7	300	28-4999	7/12/83	Stockton	65	15	Submersible
Princeton	Mercer	Harrison Street #8	347	28-5073	7/12/83	Stockton	400	40	Submersible
Princeton	Mercer	Stony Brook #2	279	48-8	7/12/83	Stockton	300	40	Turbine
Princeton	Mercer	Stony Brook #3	353	48-9	7/12/83	Stockton	400	30	Turbine
Princeton	Mercer	Stony Brook #4	382	48-10	7/12/83	Stockton	300	40	Submersible
Princeton	Mercer	Stony Brook #6	304	48-11	7/12/83	Stockton	450	40	Turbine
Princeton	Mercer	Stony Brook #7	350	48-12	7/12/83	Stockton	600	25	Submersible
Princeton	Mercer	Stony Brook #8	302	48-13	7/12/83	Stockton	600	40	Turbine
Raritan Township	Hunterdon	Maple Glen	355				250	15	Submersible
Roselle	Union	Chandler Avenue	350	26-2393	7/31/83	Brunswick	300	30	Submersible
Roselle	Union	First Avenue	509	26-1696	7/31/83	Brunswick	450	50	Turbine
Roselle	Union	Walburga #1	350	26-2302	7/31/83	Brunswick	200	40	Submersible
Roselle	Union	Walburga #2	348	26-2360	7/31/83	Brunswick	200	60	Submersible
Roselle	Union	Walburga #3	321	26-2412	7/31/83	Brunswick	350	40	Submersible
Roselle	Union	Walburga #4	321	26-2463	7/31/83	Brunswick	300	50	Submersible
Scotch Plains	Union	Aberdeen Road	350	25-12631	6/7/83	Brunswick	250	30	Submersible
Scotch Plains	Union	Glenside Avenue	540	25-7173	7/12/83	Brunswick	200	25	Submersible
Scotch Plains	Union	Jerusalem Road #1	650	25-130	7/12/83	Brunswick	275	30	Turbine
Scotch Plains	Union	Jerusalem Road #2	665	25-649	7/12/83	Brunswick	350	30	Turbine
Scotch Plains	Union	Jerusalem Road #3	708	25-800	7/12/83	Brunswick	150	15	Turbine
Scotch Plains	Union	Morse Avenue	400	25-9281	7/12/83	Brunswick	295	30	Submersible
South Plainfield	Middlesex	Clinton Avenue	350	25-13354	6/7/83	Brunswick	475	50	Submersible
South Plainfield	Middlesex	Eighth Street	350	25-12632	6/7/83	Brunswick	450	50	Submersible
Springfield (U)	Union	Springfield #1	124	46-39	7/12/83	Brunswick	50	3	Submersible
Springfield (M)	Union	Springfield #1A	138	46-40	7/12/83	Brunswick	100	7.5	Turbine
Springfield (U)	Union	Springfield #2L	220				150	7.5	Submersible
Springfield (M)	Union	Springfield #2A	158	46-41	7/12/83	Brunswick	100	7.5	Turbine
Springfield (M)	Union	Springfield #5A	140	46-42	7/12/83	Brunswick	75	5	Turbine
Springfield (U)	Union	Springfield #6L	200	26-4082	7/12/83	Brunswick	160	7.5	Submersible
Springfield (M)	Union	Springfield #6A	141	46-43	7/12/83	Brunswick	300	10	Turbine
Springfield (M)	Union	Springfield #7A	140	46-45	7/12/83	Brunswick	75	7.5	Turbine
Springfield (U)	Union	Springfield #8R	130	46-46	7/12/83	Brunswick	100	10	Submersible
Springfield (U)	Union	Springfield #9R	130	46-47	7/12/83	Brunswick	200	7.5	Turbine
Springfield (U)	Union	Springfield #11	162	46-48	7/12/83	Brunswick	125	7.5	Submersible
Springfield (U)	Union	Springfield #12R	200				110	7.5	Submersible
Springfield (U)	Union	Springfield #17	200				100	5	Turbine
Springfield (U)	Union	Springfield #21R	130	46-50	7/12/83	Brunswick	150	5	Turbine
Springfield (U)	Union	Springfield #23	130				50	5	Turbine
Springfield	Union	Springfield #24	200	46-51	7/12/83	Brunswick	100	3	Submersible
Springfield (U)	Union	Springfield #25	130				100	5	Turbine
Springfield (U)	Union	Springfield #29	200				100	10	Submersible
Springfield	Union	Springfield #32	190				100	5	Submersible
Springfield (U)	Union	Springfield #36	200	46-52	7/12/83	Brunswick	125	5	Submersible
Springfield (U)	Union	Springfield #41	200				200	7.5	Submersible
Springfield (U)	Union	Springfield #42	200	46-53	7/12/83	Brunswick	125	5	Submersible
Springfield (U)	Union	Springfield #43							
Springfield (U)	Union	Springfield #44	200				150	5	Turbine

APPENDIX A

Town	County	Facility Name	Well Depth	Well Permit Number	Effective Date	Formation	Pump Cap. (GPM)	Motor HP	Type
Springfield	Union	Springfield #47		46-54	7/12/83	Brunswick	125	5	Submersible
Springfield (U)	Union	Springfield #48		46-55	7/12/83	Brunswick	100	5	Submersible
Springfield (M)	Union	Springfield #50		46-56	7/12/83	Brunswick	150	5	Submersible
Springfield (U)	Union	Springfield #52							
Springfield (M)	Union	Springfield #53		46-57	7/12/83	Brunswick	175	7.5	Turbine
Springfield (M)	Union	Springfield #54		46-58	7/12/83	Brunswick	150	7.5	Turbine
Springfield (M)	Union	Springfield #55		46-59	7/12/83	Brunswick	175	7.5	Turbine
Tewksbury	Somerset	Pottersville	400	25-15051	6/7/83	Pre-Cambrian	100	30	Submersible
Union	Union	Hummocks #4A	117.5	46-21	7/12/83	Brunswick	70	5	Submersible
Union	Union	Hummocks #5A	128	46-23	7/12/83	Brunswick	100	7.5	Submersible
Union	Union	Hummocks #6AR	130	46-24	7/12/83	Brunswick	300	20	Turbine
Union	Union	Hummocks #7A	233	46-25	7/12/83	Brunswick	85	5	Submersible
Union	Union	Hummocks #8A	114	46-26	7/1/83	Brunswick	200	10	Turbine
Union	Union	Hummocks #17	99.6	46-32	7/12/83	Brunswick	250	15	Submersible
Union	Union	Hummocks #H2		26-4830	7/12/83	Brunswick	150	7.5	Turbine
Union	Union	Ranney Well Pump #1	96			Brunswick	2500	150	Turbine
Union	Union	Ranney Well Pump #2	96			Brunswick	2500	125	Turbine
Watchung	Somerset	Two Guys #1	325	25-8131	6/7/83	Brunswick	400	40	Submersible
Watchung	Somerset	Two Guys #2	350	25-8132	6/7/83	Brunswick	60	20	Submersible
Westfield	Union	Elm Street	525	25-8087	7/12/83	Brunswick	350	40	Submersible
Westfield	Union	Prospect Street	500	25-12960	7/12/83	Brunswick	150	20	Submersible
Westfield	Union	Westfield Office #1	523	25-873	7/12/83	Brunswick	500	50	Turbine
Westfield	Union	Westfield Office #2	502	45-5	7/12/83	Brunswick	350	40	Turbine
Westfield	Union	Wittke #1	506	25-4639	7/12/83	Brunswick	425	50	Turbine
Westfield	Union	Wittke #2	511	25-5083	7/12/83	Brunswick	525	75	Turbine
West Windsor	Mercer	Jefferson Park #1	121	28-5368	6/7/83	Raritan	600	20	Turbine
West Windsor	Mercer	Jefferson Park #2	126	28-6455	6/7/83	Raritan	600	20	Turbine

Springfield (M): wells located in Millburn but part of the Springfield Wellfield.
Springfield (U): wells located in Union but part of the Springfield Wellfield.

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APPENDIX B

--- ELIZABETHTOWN STORAGE FACILITIES ---

8/26/92

TOWN	FACILITY NAME	TYPE OF FACILITY	CONSTRUCTION MATERIAL	OPEN OR CLOSED	CAPACITY (MG)	DIMENSIONS HT'	DIA'	ELEVATION TOP OF END'	OVERFLOW (HGL)	METHOD OF MONITORING	MG/FT. DRAWDOWN	MGD/FT DRAWDOWN PER HOUR	YEAR IN SERVICE	DATE LAST INSPECTED	DATE L PAINT
Bound Brook	Mountain Station	Clearwell	Steel	Closed	0.060	16'	25'	70'	86'	Telemetric	0.004	0.096	1965	1983	1983
Branchburg	Cedar Grove	Standpipe	Steel	Closed	1.000	96'	42'	223'	318'	Telemetric	0.010	0.240	1967	1991	1991
Bedminster	Pottersville	Tank	Steel	Closed	1.000	32'	73'	482'	514'	Telemetric	0.031	0.744	1981		1981
Bridgewater	R.C.A.	Standpipe	Steel	Closed	0.350	96'	25'	168'	263.5'	Telemetric	0.004	0.096	1959		198
Bridgewater	Thompson Avenue	Tank	Steel	Closed	1.610	64'	66'	215'	279'	Telemetric	0.025	0.600	1988		198
Bridgewater	Logan Road	Tank	Steel	Closed	1.000	24'	85'	414'	437.5'	Telemetric	0.041	0.984	1987		198
Bridgewater	Rector Road	Standpipe	Steel	Closed	0.200	48'	27'	478'	526'	Telemetric	0.004	0.096	1962		198
Bridgewater	Route 206	Tank	Steel	Closed	1.750	48'	80'	272'	319'	Telemetric	0.036	0.875	1974	1992	197
Bridgewater	Washington Avenue	Standpipe	Steel	Closed	0.110	50'	18'	440'	490'	Telemetric	0.002	0.048	1900		198
Bridgewater	Washington Valley	Standpipe	Steel	Closed	1.000	80'	47'	635'	714'	Telemetric	0.013	0.312	1969	1987	198
Bridgewater	Martinsville	Tank	Steel	Closed	0.952	45.5'	60'	594'	639'	Telemetric	0.021	0.504	1990	1990	198
Cranbury	Cranbury Tank	Hydropillar	Steel	Closed	1.502	42.5'*	86'*	123'	288'	Telemetric	0.043		1990	1990	199
Edison	Oak Tree	Tank	Steel	Closed	10.000	60'	169'	156'	215.5'	Telemetric	0.167	4.008	1968		198
Edison	Oak Tree	Tank	Steel	Closed	10.000	60'	169'	156'	215.5'	Telemetric	0.167	4.008	1963		198
Edison	Oak Tree	Standpipe	Steel	Closed	0.900	96'	40'	156'	252'	Telemetric	0.009	0.216	1958		198
Edison	Oak Tree	Tank	Steel	Closed	5.000	56'	124'	160'	216'	Telemetric	0.089	2.136	1955	1989	199
Hillsborough	Starview Drive	Tank	Steel	Closed	0.200	32'	33'	453'	484.5'	Telemetric	0.006	0.144	1984		198
Kenilworth	Kenilworth	Standpipe	Steel	Closed	2.000	105'	57'	171'	276'	Telemetric	0.019	0.460	1940		198
Montgomery	Kildee	Standpipe	Steel	Closed	1.000	120'	38'	153'	273'	Telemetric	0.008	0.192	1967	1991	199
Mountainside	Coles Avenue	Standpipe	Steel	Closed	0.200	48'	27'	515'	562'	Telemetric	0.004	0.096	1941	1990	199
Mountainside	Prospect Street	Standpipe	Steel	Closed	0.500	88'	32'	545'	632.5'	Telemetric	0.006	0.144	1968		198
Peapack	Sheephill	Standpipe	Steel	Closed	1.184	88'	48'	583'	670.5'	Telemetric	0.013	0.323	1990	1990	199
Plainfield	Netherwood	Clearwell	Concrete	Closed	0.500	13'	250'x22'	120'	133'	SCADA	0.038	0.912	1910		n/a
Plainfield	Netherwood	Clearwell	Concrete	Closed	1.000	13'	200'x50'	120'	133'	SCADA	0.077	1.848	1913		n/a
Princeton Twp.	Drakes Corner	Standpipe	Steel	Closed	0.070	40'	16'	397'	437'	SCADA	0.002	0.048	1931		197
Princeton Twp.	Drakes Corner	Standpipe	Steel	Closed	0.145	40'	25'	397'	437'	SCADA	0.004	0.096	1954		197
Princeton Twp.	Harrison Street	Clearwell	Concrete	Closed	1.000	17'	##	69'	86'	SCADA	0.057	1.368	1930	1988	n/a
Princeton Boro	John Street	Elev. Tank	Steel	Closed	0.535	53'*	45'*	213'	319'	SCADA	0.010	0.240	1913		196
Princeton Twp.	Stony Brook	Clearwell	Steel	Closed	0.235	16'	50'	57'	72'	SCADA	0.015	0.360	1987		198
Princeton Twp.	Stony Brook	Clearwell	Steel	Closed	0.385	16'	64'	57'	72'	SCADA	0.024	0.576	1987		198
Princeton Twp.	Terhune Tank	Elev. Tank	Steel	Closed	0.500	39'*	50'*	222'	319'	SCADA	0.013	0.312	1957	1986	
Princeton Twp.	Mount Lucas	Tank	Steel	Closed	3.000	24'	146'	295'	319'	SCADA	0.125	3.000	1982		198
Readington	Readington Tank	Tank	Steel	Closed	3.141	80'	82'	239'	318.5'	Telemetric	0.039	0.942	1991	1991	199
Scotch Plains	Jerusalem Road	Reservoir	Concrete	Closed	12.500	28'	200'x300	246'	274'	Telemetric	0.450	10.800	1914		n/a
Scotch Plains	Jerusalem Road	Standpipe	Steel	Closed	1.500	100'	50'	265'	365'	Telemetric	0.015	0.360	1961		198
Springfield	Springfield	Clearwell	Concrete	Closed	1.000	13'	116'	106'	119'	Telemetric	0.077	1.848	1933		n/a
Union	Hummocks	Clearwell	Concrete	Closed	1.000	10'	140'x100	61'	71'	SCADA	0.100	2.400	1951		n/a
Union	Hummocks	Clearwell	Steel	Closed	5.000	40'	147'	55'	95'	SCADA	0.125	3.000	1967	1988	198
Union	Hummocks	Watersphere	Steel	Closed	0.250	211'	40'	72'	283'	SCADA			1965		197
Warren	Mt. Horeb	Standpipe	Steel	Closed	0.490	64'	36'	575'	649'	Telemetric	0.008	0.192	1963		198
Watchung	Hi-Tor	Standpipe	Steel	Closed	0.350	96'	25'	549'	645'	Telemetric	0.004	0.096	1963		198
Watchung	Johnston Dr. (H)	Standpipe	Steel	Closed	0.500	92'	31'	487'	579'	Telemetric	0.005	0.120	1956		198
Watchung	Johnston Dr. (L)	Tank	Steel	Closed	0.800	25'	75'	239'	264'	Telemetric	0.032	0.768	1899	1991	199
West Windsor	Jefferson Park	Clearwell	Steel	Closed	0.100	20'	30'	73'	93'	SCADA	0.005	0.120	1969	1991	196
West Windsor	Jefferson Park	Clearwell	Steel	Closed	0.460	22'	60'	71'	93'	SCADA	0.021	0.504	1985	1991	198

SYSTEM STORAGE (Capacity)..... 65.239
CLEARWELL STORAGE (Capacity)..... 10.740
TOTAL STORAGE (Capacity)..... 75.979

= Five Sided Clearwell; 107' x 107' x 107' x 31.5' x 31.5
* = Elevated Tank; Bowl Dimensions

APPENDIX C

SERVICE TO OTHER SYSTEMS --- INTERCONNECTIONS

Interconnection With:	Interconnection Location:	Flow Direction: To/From EWC	Type of Interconnection:	Meter Size:	Contracted Consumption	Contract Expires:	Facility Number:	Book Map:	Contact Personnel:
Edison Township Water Dept.	Talmadge Rd - Edison Twp Line	From	Normal	16" Venturi	4.5 mgd	1/01/98	3518	H-12	1) Matt Bolger
	Truman Dr. - Edison Twp Line	From	Normal	20" Venturi	"	"	3516	H-14	2) Pete Schnattauf
	Stelton Rd - Edison Twp Line	From	Emergency	8"	"	"	3517	H-14	(Office) 287-09
									3) Police / 24 Hrs 287-19
Elizabeth Water Department	Morris Avenue	From	Normal	20" Venturi	6.8 mgd	1/01/17	3528	A-5	24 hours/820-4108
	Lidgerwood Avenue	From	Normal	16" Venturi	but see	"	3526	A-6	1) Bill Connelly
	Westfield - Galloping Hill Rd	From	Normal	8"	contract	"	3534	B-6	2) Matty Chuck
	Brunswick Ave. & Allen St.	To	Emergency	8"	for more	"	3504	A-7	3) Roger Kilgore
	Waterfront & Kohler Way	From	Normal	6"	details	"	3532	A-7	4) Kevin Glacken
	Clay Ave - Galloping Hill Rd	From	Normal	6"	"	"	3524	B-5	
	Salem Ave - Galloping Hill Rd	From	Emergency	6"	"	"	3536	A-4	
	Palisades Rd - Hillside Ave	From	Normal	8"	"	"	3530	B-5	
Flemington Water Dept.	Reaville Avenue	From	Emergency	8"	?	None	2622	X-16	1) John Gorman
	Main Street	To	Emergency	6"	?	None	2620	Y-14	(Office) 782-3400
									(Home) 782-9574
Franklin Township	River Road	From	Normal	6"	4.8 mgd	01/01/22	3590	J-15	1) Police / 24 Hr - 873-2
	River Road - (Elizabethtown)	To	Emergency	6"	"	"	3588	J-15	2) Jim Sutton
	Weston Canal Road	From	Normal	10"	"	"	3594	M-12	(Office) 249-7800
	Amwell Road	From	Normal	16" Venturi	"	"	1582	N-15	(Home) 249-4933
	Driver Harris	From	Normal	6"	"	"	1584	M-13	(Pager) 632-5477
	East Millstone	From	Normal	8"	"	"	1586	N-15	3) Andy Twiford (H) 249-7
	Schoolhouse	From	Normal	8"	"	"	1592	M-14	4) Doug Murray (H) 873-2
Highland Park	River Road	From	Normal	10" Venturi	1.0 mgd	5/01/16	3540	I-15	1) Boro - 819-3788
									(Home) 246-1917
Lawrenceville	Laurel Wood Road	From	Normal	4"	0.5 mgd	11/01/16	1633	S-8	1) (Office) 896-0919
									2) Marvin Rule
									(Home) 466-3947
Manville Water	Finderne Avenue	From	Normal	6"	0.5 mgd	8/01/18	2608	N-12	1) Bruce Kosensky
									(Office) 725-0241
Monroe Township	Prospect Plains Road	From	Normal	6"	0.5 mgd	10/21/17	1645	K-26	
Middlesex Water Co.	Randolph Road	From	Normal	16" Venturi	2.0 mgd	01/01/96	3548	C-10	24 hours/634-1500
	Woodbridge Avenue	From	Normal	8"	"	"	3553	C-10	1) Rick Risoldi
	Menlo Park (Currier St.)	From	Emergency	Venturi	"	"	3546	E-12	(H) 609-585-7950
	Robinson's Branch	From	Emergency	8"	"	"	3550	D-9	
	Tingley Lane	From	Normal	16" Venturi	"	"	3552	G-10	2) Joe Baginsky
New Brunswick	Easton Avenue	From	Emergency	6"	none	none	3591	J-15	Shawn Maloney (O) 745-5109

APPENDIX C

SERVICE TO OTHER SYSTEMS ---- INTERCONNECTIONS

Interconnected System	Interconnection Location	Flow Direction (To)EWC/(From)EWC	Type of Interconnection	Meter Size	Contracted Consumption	Contract Expires	Facility Number	Book Map	Contact Personnel
New Jersey American Water Company	Liberty Corners (Mt. Moreb)	From	Normal	6"		12/31/99	3502	M-8	24 hours/(201) 376-8800
	Main Street	From	Normal	8"		None	2465	P-4	1) Tom Schink
	Ski-Hill (in)		Normal	6"		None	2602	P-4	(H) 889-7456
	Ski-Hill (out)		Normal	8"		None	2604	P-4	
	Route 202/206 (Chambers Brook)	From	Normal	12"		12/31/99	2600	P-7	2) Bill Oesterle
	Diamond Hill	From	Normal	30" Venturi		4/01/95	3510	M-5	
	Burnett Avenue	To	Normal	6"		None	3507	C-2	3) Paul Martellius
	Carnegie Place	To	Normal	6"		None	3501	C-2	(H) 322-7268
	Ramsey Ave/Colt Street	From	Normal	Venturi		04/01/95	3508	B-3	
	High Point Drive	To	Emergency	6"		None	3506	F-4	4) Mike Roberti
	Plfd. Rd. - Passaic River	To	Normal	3"		None	3509	J-5	ext. 288
									5) Nick Pinto ext. 286
Newark	Summit Avenue	To	Normal	6"			3503	A-3	
	Pennsylvania R.R.	From	Normal	Venturi			3556	B-6	
Princeton Nursery	Lake Road	From	Emergency	8"		None		P-24	Allen Jones (Office) 924-1776
Rahway Water Department	Leesville Road (Inman)	From	Emergency	8"		12/01/99	3562	C-10	24 hours/388-0086
	Woodbridge Avenue	From	Normal	6"		"	3568	C-10	1) Tom Schimmel
	Westfield Ave/Madison Hil Rd.	From	Emergency	8"		"	3566	D-8	2) George Hulnik
	Merck - Linden Avenue	From	Normal	8"		"	3564	C-8	3) Paul Kozakiewicz
	E. Hazelwood - Lakewood	From	Emergency	8"		"	3548	C-10	
Rocky Hill	Washington St. - Young Dr.	From	Emergency	6"		None	1620	Q-22	1) Peggy Harris (Office) 924-5107
South Brunswick	Independence Way	From	Normal	6"	0.75 mgd	5/01/17	1630	O-24	(Office) 329-4000
Trenton Water	Princeton Pike	From	Emergency	8"		None	1624	S-29	1) Reno Cassarini (Office) 989-3208
Winfield Park	Union City Pkwy - Spray Terr.	From	Normal	4"		None	3574	D-7	
	N. Stiles & Seafoam	From	Normal	6"		None	3573	D-7	

E10

APPENDIX E

TERRITORY SERVED DURING YEAR

1. Column (b) should show the estimated permanent population at end of year for area served.
2. If there was a significant change in population for summer months see two lines for the municipality involved indicating "permanent" and "summer".

NAME OF UTILITY ELIZABETHTOWN WATER COMPANY

LINE	NAME OF MUNICIPALITY OR OTHER POLITICAL SUBDIVISION (a)	ESTIMATED PERMANENT POPULATION SERVED (b)	NO. OF CUSTOMERS END OF YEAR (c)	NO. OF FIRE HYDRANTS (d)	FEET OF MAINS TOTAL (e)	ON PUBLIC WAYS (f)	ON PRIVATE RIGHT OF WAY (g)
1	Bedminster	219	73	26	50,055	43,982	6,073
2	Bound Brook	8,124	2,708	133	141,417	129,969	11,448
3	Branchburg	7,275	2,425	362	292,913	278,535	14,379
4	Bridgewater	23,532	7,844	873	907,216	746,878	160,338
5	Clark	14,787	4,929	320	338,599	303,148	35,451
6	Cranbury	57	19	2	8,634	8,634	---
7	Cranford	12	4	50	68,767	61,714	7,053
8	Dunellen	22,794	7,598	671	438,745	424,349	14,396
9	Edison	6,465	2,155	104	101,941	100,570	1,371
10	Elizabeth	3,891	1,297	172	164,956	111,227	53,729
11	Fanwood	0	0	0	239	239	---
12	Flemington	2,632	2,544	142	157,760	152,614	5,146
13	Franklin	0	0	0	3,220	3,220	---
14	Garwood	678	226	28	53,570	51,719	1,851
15	Greenbrook	4,623	1,541	86	68,828	66,721	2,107
16	Hillsborough	3,795	1,265	136	150,171	136,437	13,734
17	Hillside	18,936	6,312	801	647,791	497,502	150,289
18	Kenilworth	18,063	6,021	0	285,211	275,780	9,431
19	Lawrence	9,120	3,040	166	176,034	166,054	11,980
20	Linden	3,546	1,182	140	136,498	95,871	40,627
21	Middlesex	36,155	11,385	25	721,886	621,508	100,378
22	Millstone	12,879	4,293	224	300,591	278,207	22,384
23	Montgomery	231	77	11	11,143	11,143	---
24	Mountainside	3,990	1,330	300	277,754	227,723	50,031
25	Passaic	7,608	2,536	206	244,046	227,765	16,281
26	Peapack Gladstone	0	0	0	368	368	---
27	North Plainfield	2,019	673	99	95,127	90,432	4,695
28	Piscataway	14,916	4,972	310	272,374	255,815	16,559
29	Plainfield	29,643	9,881	715	927,417	818,317	109,100
30	Plainsboro	31,305	10,435	704	376,661	364,860	11,801
31	Princeton Borough	7,107	2,369	300	299,741	159,591	140,150
32	Princeton Township	7,119	2,373	188	173,179	148,361	24,818
33	Rahway	12,612	4,204	214	524,280	436,186	88,094
34	Raritan Borough	0	0	0	12,062	7,188	4,874
35	Raritan Township	6,048	2,016	102	133,287	125,748	7,539
36	Total Summer Population Only	7,218	2,406	208	198,256	153,803	[illegible]
37	Totals (Lines [illegible])						

APPENDIX E

TERRITORY SERVED DURING YEAR

1. Column (b) should show the estimated permanent population at end of year for area served.
2. If there was a significant change in population for summer months use two lines for the municipality involved indicating "permanent" and "summer".

LINE	NAME OF MUNICIPALITY OR OTHER POLITICAL SUBDIVISION (a)	ESTIMATED PERMANENT POPULATION SERVED (b)	NO. OF CUSTOMERS END OF YEAR (c)	NO. OF FIRE HYDRANTS (d)	FEET OF MAINS TOTAL (e)	FEET OF MAINS ON PUBLIC WAYS (f)	FEET OF MAINS ON PRIVATE RIGHT OF WAY (g)
1	Readington	1,161	387	94	86,040	68,270	17,770
2	Roselle	16,149	5,383	356	256,407	250,675	5,732
3	Roselle Park	10,392	3,464	157	170,513	167,638	2,875
4	Scotch Plains	20,985	6,995	431	559,450	513,186	46,264
5	Somerville	10,389	3,463	181	238,122	194,817	43,305
6	South Bound Brook	3,591	1,197	70	63,779	58,741	5,038
7	South Brunswick	612	204	5	19,684	15,537	4,147
8	South Plainfield	11,160	3,720	342	362,062	317,665	44,397
9	Springfield	0	0	8	10,338	2,613	7,725
10	Tewksbury	309	103	5	11,850	11,232	618
11	Union	49,593	16,531	19	913,413	863,617	49,796
12	Warren	6,033	2,011	411	343,462	329,860	13,602
13	Watchung	3,747	1,249	241	205,612	188,700	16,912
14	Westfield	29,298	9,766	691	626,989	607,959	19,030
15	West Windsor	13,599	4,533	628	611,058	544,260	66,798
16	Woodbridge	0	0	4	19,784	14,594	5,190
17	Manville	0	0	0	12,948	8,776	4,172
18							
19							
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31							
32							
33							
34							
35							
36							
37	Total Summer Population Only						
	Sale (Do not include summer population)	507,41	169,139	11,616	13,452,279	11,938,348	1,513

NAME OF UTILITY Elizabethtown Water Company YEAR 12/31/91

TOTAL PAGE.003

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ATTACHMENT F

CLP DATA ASSESSMENT

Functional Guidelines for Evaluating Organic Analysis

CASE No.: 26944 SDG No.:BYC18, BYC38
LABORATORY: SWOK SITE: Spring Lake PCB Contamination

DATA ASSESSMENT

The current SOP HW-6 (Revision 11) June 1996, USEPA Region II Data Validation SOP for Statement of Work OLMO 3.2. for evaluating organic data have been applied.

All data are valid and acceptable except those analytes rejected "R"(unusable). Due to the detection of QC problems, some analytes may have the "J" (estimated), "N"(presumptive evidence for the presence of the material, "U" (non-detect) or "JN" (presumptive evidence for the presence of the material at an estimated value) flag. All action is detailed on the attached sheets.

The "R" flag means that the associated value is unusable. In other words, significant data bias is evident and the reported analyte concentration is unreliable.

Reviewer's Signature: Maureen Hammill Date: June 1, 1999

Verified By: G Karas Date: 6/2/1999

F'

CLP DATA ASSESSMENT

BYC18

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes shown due to excessive holding time.
See Attached CADRE Holding Time Report for list of samples/analytes that were qualified for technical holding time.

2. SURROGATES

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.
See Attached CADRE Surrogate Report for list of samples/analytes that were qualified for surrogate recovery exceedance.

3. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for additional qualification of data.
No qualification based on MS/MSD data.

4. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, or rinse blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for common contaminants), the analytes are qualified as non-detects, "U". The following analytes in the sample shown were qualified with "U" for

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CLP DATA ASSESSMENT

these reasons:

A) Method blank contamination:
See attached CADRE Laboratory Blanks Report for list of samples/analytes that were qualified "U".

B) Field or rinse blank contamination:
Not applicable.

C) Trip blank contamination for VOA aqueous samples:
Not applicable.

D) Storage Blank associated with VOA samples only
Not applicable.

E) Tics "R" rejected
Not applicable.

5. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is (BFB) Bromofluorobenzene and for semi-volatiles Decafluorotriphenylphosphine (DFTPP).

If the mass calibration is in error, all associated data will be classified as unusable "R".
Not applicable.

6. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Response Factor GC/MS:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound

F3

CLP DATA ASSESSMENT

List (TCL) must be ≥ 0.05 in both initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected "R".

B) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be < 30% and %D must be < 25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ". If %RSD and %D grossly exceed QC criteria, non-detects data may be qualified "R".

For the PEST/PCB fraction, if %RSD exceeds 20% for all analytes except for the two surrogates (which must not exceed 30% RSD), qualify all associated positive results "J" and non-detects "UJ".

The following analytes in the sample shown were qualified for %RSD and %D:
See attached CADRE Sysytem Performance Report for list of samples/analytes qualified for PEM and/or % breakdown criteria.

See attached CADRE Calibration Report for list of samples/analytes qualified for %RSD and/or %D criteria.

8. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than ±30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a severe loss of sensitivity.

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CLP DATA ASSESSMENT

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgement to determine either partial or total rejection of the data for that sample fraction.
Not applicable.

9. COMPOUND IDENTIFICATION:

A) Volatile and Semi-Volatile Fractions:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within ± 0.06 RRT units of the standard compound and have an ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

B) Pesticide Fraction:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10ng/ml in the final sample extract.
See attached CADRE Quantitation Limit Report for list of samples/analytes that were qualified for %Difference between columns.

10. CONTRACT PROBLEMS NON-COMPLIANCE:

11. FIELD DOCUMENTATION:

12. OTHER PROBLEMS
See attached Percent Moisture Report for list of soil samples that were qualified for percent moisture greater than 50%.

13. This package contains reextractions, reanalyses or dilutions. Upon reviewing the QA results, the following Form 1(s) are identified not to be used.
C18DL, C19DL, C20DL, C21DL, C22DL, C23DL, C24DL, C25DL, C26DL, C27DL, C28DL, C29DL, C30DL, C31DL, C32DL, C33DL, C34DL, C35DL, C36DL, C37DL

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CLP DATA ASSESSMENT

BYC38

1. HOLDING TIME:

The amount of an analyte in a sample can change with time due to chemical instability, degradation, volatilization, etc. If the specified holding time is exceeded, the data may not be valid. Those analytes detected in the samples whose holding time has been exceeded will be qualified as estimated, "J". The non-detects (sample quantitation limits) will be flagged as estimated, "J", or unusable, "R", if the holding times are grossly exceeded.

The following action was taken in the samples and analytes shown due to excessive holding time.
See Attached CADRE Holding Time Report for list of samples/analytes that were qualified for technical holding time.

2. SURROGATES

All samples are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. If the measured surrogate concentrations were outside contract specifications, qualifications were applied to the samples and analytes as shown below.
See Attached CADRE Surrogate Report for list of samples/analytes that were qualified for surrogate recovery exceedance.

3. MATRIX SPIKE/SPIKE DUPLICATE, MS/MSD:

The MS/MSD data are generated to determine the long term precision and accuracy of the analytical method in various matrices. The MS/MSD may be used in conjunction with other QC criteria for additional qualification of data.
No qualification based on MS/MSD data.

4. BLANK CONTAMINATION:

Quality assurance (QA) blanks, i.e., method, trip, field, or rinse blanks are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Trip blanks measure cross-contamination of samples during shipment. Field and rinse blanks measure cross-contamination of samples during field operations. If the concentration of the analyte is less than 5 times the blank contaminant level (10 times for common contaminants), the analytes are qualified as non-detects, "U". The

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CLP DATA ASSESSMENT

following analytes in the sample shown were qualified with "U" for these reasons:

A) Method blank contamination:
See attached CADRE Laboratory Blanks Report for list of samples/analytes that were qualified "U".

B) Field or rinse blank contamination:
Not applicable.

C) Trip blank contamination for VOA aqueous samples:
Not applicable.

D) Storage Blank associated with VOA samples only
Not applicable.

E) Tics "R" rejected
Not applicable.

5. MASS SPECTROMETER TUNING:

Tuning and performance criteria are established to ensure adequate mass resolution, proper identification of compounds and to some degree, sufficient instrument sensitivity. These criteria are not sample specific. Instrument performance is determined using standard materials. Therefore, these criteria should be met in all circumstances. The tuning standard for volatile organics is (BFB) Bromofluorobenzene and for semi-volatiles Decafluorotriphenylphosphine (DFTPP).

If the mass calibration is in error, all associated data will be classified as unusable "R".
Not applicable.

6. CALIBRATION:

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of giving acceptable performance at the beginning of an experimental sequence. The continuing calibration checks document that the instrument is giving satisfactory daily performance.

A) Response Factor GC/MS:

The response factor measures the instrument's response to specific chemical compounds. The response factor for the Target Compound

F7

CLP DATA ASSESSMENT

List (TCL) must be ≥ 0.05 in both initial and continuing calibrations. A value < 0.05 indicates a serious detection and quantitation problem (poor sensitivity). Analytes detected in the sample will be qualified as estimated, "J". All non-detects for that compound will be rejected "R".

B) Percent Relative Standard Deviation (%RSD) and Percent Difference (%D):

Percent RSD is calculated from the initial calibration and is used to indicate the stability of the specific compound response factor over increasing concentration. Percent D compares the response factor of the continuing calibration check to the mean response factor (RRF) from the initial calibration. Percent D is a measure of the instrument's daily performance. Percent RSD must be < 30% and %D must be < 25%. A value outside of these limits indicates potential detection and quantitation errors. For these reasons, all positive results are flagged as estimated, "J" and non-detects are flagged "UJ". If %RSD and %D grossly exceed QC criteria, non-detects data may be qualified "R".

For the PEST/PCB fraction, if %RSD exceeds 20% for all analytes except for the two surrogates (which must not exceed 30% RSD), qualify all associated positive results "J" and non-detects "UJ".

The following analytes in the sample shown were qualified for %RSD and %D:
See attached CADRE Sysytem Performance Report for list of samples/analytes qualified for PEM and/or % breakdown criteria.

See attached CADRE Calibration Report for list of samples/analytes qualified for %RSD and/or %D criteria.
No problems.

8. INTERNAL STANDARDS PERFORMANCE GC/MS:

Internal standards (IS) performance criteria ensure that the GC/MS sensitivity and response are stable during every experimental run. The internal standard area count must not vary by more than a factor of 2 (-50% to +100%) from the associated continuing calibration standard. The retention time of the internal standard must not vary more than ±30 seconds from the associated continuing calibration standard. If the area count is outside the (-50% to +100%) range of the associated standard, all of the positive results for compounds quantitated using that IS are qualified as estimated, "J", and all non-detects as "UJ", or "R" if there is a

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CLP DATA ASSESSMENT

severe loss of sensitivity.

If an internal standard retention time varies by more than 30 seconds, the reviewer will use professional judgement to determine either partial or total rejection of the data for that sample fraction.
Not applicable.

9. COMPOUND IDENTIFICATION:

A) Volatile and Semi-Volatile Fractions:

TCL compounds are identified on the GC/MS by using the analyte's relative retention time (RRT) and by comparison to the ion spectra obtained from known standards. For the results to be a positive hit, the sample peak must be within ± 0.06 RRT units of the standard compound and have an ion spectra which has a ratio of the primary and secondary m/e intensities within 20% of that in the standard compound. For the tentatively identified compounds (TIC) the ion spectra must match accurately. In the cases where there is not an adequate ion spectrum match, the laboratory may have provided false positive identifications.

B) Pesticide Fraction:

The retention times of reported compounds must fall within the calculated retention time windows for the two chromatographic columns and a GC/MS confirmation is required if the concentration exceeds 10ng/ml in the final sample extract.
See attached CADRE Quantitation Limit Report for list of samples/analytes that were qualified for %Difference between columns.

10. CONTRACT PROBLEMS NON-COMPLIANCE:

11. FIELD DOCUMENTATION:

12. OTHER PROBLEMS
See attached Percent Moisture Report for list of soil samples that were qualified for percent moisture greater than 50%.

13. This package contains reextractions, reanalyses or dilutions. Upon reviewing the QA results, the following Form 1(s) are identified not to be used.
C38DL, C39DL, C40DL, C41DL, C42DL, C43DL, C44DL, C46DL, C47DL, C48DL, C50DL, C51DL, C52DL, C54DL, C55DL, C56DL, C58DL, C59DL,

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC18 IS

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.01

Sample wt/vol: 31.7 (g/mL) G Lab File ID: _____

% Moisture: 19 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	3.8	U
72-55-9	4,4'-DDE	3.8	U
72-20-8	Endrin	3.8	U J
33213-65-9	Endosulfan II	3.8	U
72-54-8	4,4'-DDD	~~5.7~~	~~P~~ R
1031-07-8	Endosulfan sulfate	3.8	U
50-29-3	4,4'-DDT	6.6	~~P~~ J N
72-43-5	Methoxychlor	20	U J
53494-70-5	Endrin ketone	3.8	U
7421-93-4	Endrin aldehyde	3.8	U
5103-71-9	alpha-Chlordane	9.9	
5103-74-2	gamma-Chlordane	9.2	~~P~~ J
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	38	U
11104-28-2	Aroclor-1221	78	U
11141-16-5	Aroclor-1232	38	U
53469-21-9	Aroclor-1242	38	U
12672-29-6	Aroclor-1248	38	U
11097-69-1	Aroclor-1254	38	U
11096-82-5	Aroclor-1260	38	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC19 1D

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.02

Sample wt/vol: 32.4 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.9	U
319-85-7	beta-BHC	1.9	U
319-86-8	delta-BHC	1.9	U
58-89-9	gamma-BHC (Lindane)	1.9	U
76-44-8	Heptachlor	1.9	U
309-00-2	Aldrin	1.9	U
1024-57-3	Heptachlor epoxide	1.9	U
959-98-8	Endosulfan I	1.9	U
60-57-1	Dieldrin	3.7	U
72-55-9	4,4'-DDE	14	~~P~~ JN
72-20-8	Endrin	3.7	U
33213-65-9	Endosulfan II	3.7	U
72-54-8	4,4'-DDD	~~12~~	~~P~~ R
1031-07-8	Endosulfan sulfate	3.7	U
50-29-3	4,4'-DDT	26	J
72-43-5	Methoxychlor	19 ~~13~~	~~PJ~~ 4J
53494-70-5	Endrin ketone	3.7	U
7421-93-4	Endrin aldehyde	3.7	U
5103-71-9	alpha-Chlordane	12	
5103-74-2	gamma-Chlordane	10	~~P~~ J
8001-35-2	Toxaphene	190	U
12674-11-2	Aroclor-1016	37	U
11104-28-2	Aroclor-1221	76	U
11141-16-5	Aroclor-1232	37	U
53469-21-9	Aroclor-1242	37	U
12672-29-6	Aroclor-1248	37	U
11097-69-1	Aroclor-1254	37	U
11096-82-5	Aroclor-1260	37	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC20 25

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.03

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 22 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U J
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	~~14~~	~~P~~ R
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	33	J
72-43-5	Methoxychlor	20 ~~10~~	~~PJ~~ 4J
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	16	~~P~~ J
5103-74-2	gamma-Chlordane	15	~~P~~ J
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	81	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC21 3S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.04

Sample wt/vol: 30.2 (g/mL) G Lab File ID: _____

% Moisture: 35 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.5 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.6	U
319-85-7	beta-BHC	2.6	U
319-86-8	delta-BHC	2.6	U
58-89-9	gamma-BHC (Lindane)	2.6	U
76-44-8	Heptachlor	2.6	U
309-00-2	Aldrin	2.6	U
1024-57-3	Heptachlor epoxide	22	~~P~~ J
959-98-8	Endosulfan I	2.6	U
60-57-1	Dieldrin	~~29~~	~~P~~ R
72-55-9	4,4'-DDE	39	~~P~~ JN
72-20-8	Endrin	5.0	U
33213-65-9	Endosulfan II	5.0	U
72-54-8	4,4'-DDD	~~86~~	~~PE~~ R
1031-07-8	Endosulfan sulfate	31	~~P~~ J
50-29-3	4,4'-DDT	*690 ~~490~~	~~E~~ J
72-43-5	Methoxychlor	26	U
53494-70-5	Endrin ketone	*90 ~~78~~	~~E~~ J
7421-93-4	Endrin aldehyde	30	~~P~~ J
5103-71-9	alpha-Chlordane	* 99 ~~78~~	~~PE~~
5103-74-2	gamma-Chlordane	* 69 ~~76~~	~~E~~
8001-35-2	Toxaphene	260	U
12674-11-2	Aroclor-1016	50	U
11104-28-2	Aroclor-1221	100	U
11141-16-5	Aroclor-1232	50	U
53469-21-9	Aroclor-1242	50	U
12672-29-6	Aroclor-1248	50	U
11097-69-1	Aroclor-1254	50	U
11096-82-5	Aroclor-1260	50	U

* Value Transferred from dilution analysis

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC22 4S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.05

Sample wt/vol: 32.7 (g/mL) G Lab File ID: _____

% Moisture: 17 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
319-84-6	alpha-BHC	1.9	U	
319-85-7	beta-BHC	1.9	U	
319-86-8	delta-BHC	1.9	U	
58-89-9	gamma-BHC (Lindane)	1.9	U	
76-44-8	Heptachlor	1.9	U	
309-00-2	Aldrin	1.9	U	
1024-57-3	Heptachlor epoxide	6.9	~~P~~	J
959-98-8	Endosulfan I	1.9	U	
60-57-1	Dieldrin	~~11~~	~~P~~	R
72-55-9	4,4'-DDE	~~4.5~~	~~P~~	R
72-20-8	Endrin	3.6	U	
33213-65-9	Endosulfan II	3.6	U	
72-54-8	4,4'-DDD	~~20~~	~~P~~	R
1031-07-8	Endosulfan sulfate	3.6	U	
50-29-3	4,4'-DDT	51	~~P~~	J
72-43-5	Methoxychlor	~~90~~	~~P~~	R
53494-70-5	Endrin ketone	3.6	U	
7421-93-4	Endrin aldehyde	3.6	U	
5103-71-9	alpha-Chlordane	20	~~P~~	NJ
5103-74-2	gamma-Chlordane	20		
8001-35-2	Toxaphene	190	U	
12674-11-2	Aroclor-1016	36	U	
11104-28-2	Aroclor-1221	74	U	
11141-16-5	Aroclor-1232	36	U	
53469-21-9	Aroclor-1242	36	U	
12672-29-6	Aroclor-1248	36	U	
11097-69-1	Aroclor-1254	36	U	
11096-82-5	Aroclor-1260	36	U	

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC23 5S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.06

Sample wt/vol: 31.1 (g/mL) G Lab File ID: _____

% Moisture: 22 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4'-DDE	4.1 ~~3.3~~	~~PJ~~ M
72-20-8	Endrin	4.1	U
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4'-DDD	~~14~~	~~P~~ R
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4'-DDT	28	J
72-43-5	Methoxychlor	21 ~~19~~	~~PJ~~ MJ
53494-70-5	Endrin ketone	14	~~P~~ J
7421-93-4	Endrin aldehyde	4.1	U
5103-71-9	alpha-Chlordane	18	~~P~~ J
5103-74-2	gamma-Chlordane	18	
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC24 6S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.07

Sample wt/vol: 31.0 (g/mL) G Lab File ID: _____

% Moisture: 17 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q	
319-84-6	alpha-BHC	2.0	U	
319-85-7	beta-BHC	2.0	U	
319-86-8	delta-BHC	2.0	U	
58-89-9	gamma-BHC (Lindane)	2.0	U	
76-44-8	Heptachlor	2.0	U	
309-00-2	Aldrin	2.0	U	
1024-57-3	Heptachlor epoxide	2.0	U	
959-98-8	Endosulfan I	2.0	U	
60-57-1	Dieldrin	3.8	U	
72-55-9	4,4'-DDE	3.8	U	
72-20-8	Endrin	3.8	U	J
33213-65-9	Endosulfan II	3.8	U	
72-54-8	4,4'-DDD	~~18~~	~~P~~	R
1031-07-8	Endosulfan sulfate	3.8	U	
50-29-3	4,4'-DDT	24		J
72-43-5	Methoxychlor	~~88~~	~~P~~	P
53494-70-5	Endrin ketone	12	~~P~~	JN
7421-93-4	Endrin aldehyde	3.8	U	
5103-71-9	alpha-Chlordane	20	~~P~~	JN
5103-74-2	gamma-Chlordane	18		
8001-35-2	Toxaphene	200	U	
12674-11-2	Aroclor-1016	38	U	
11104-28-2	Aroclor-1221	78	U	
11141-16-5	Aroclor-1232	38	U	
53469-21-9	Aroclor-1242	38	U	
12672-29-6	Aroclor-1248	38	U	
11097-69-1	Aroclor-1254	38	U	
11096-82-5	Aroclor-1260	38	U	

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC25 6D

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.08

Sample wt/vol: 32.4 (g/mL) G Lab File ID: _____

% Moisture: 13 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.8	U
319-85-7	beta-BHC	1.8	U
319-86-8	delta-BHC	1.8	U
58-89-9	gamma-BHC (Lindane)	1.8	U
76-44-8	Heptachlor	1.8	U
309-00-2	Aldrin	1.8	U
1024-57-3	Heptachlor epoxide	1.8	U
959-98-8	Endosulfan I	1.8	U
60-57-1	Dieldrin	3.5	U
72-55-9	4,4'-DDE	3.5	U
72-20-8	Endrin	3.5	U J
33213-65-9	Endosulfan II	3.5	U
72-54-8	4,4'-DDD	3.5 ~~3.4~~	~~PU~~ 4
1031-07-8	Endosulfan sulfate	3.5	U
50-29-3	4,4'-DDT	~~3.5~~	~~U~~ J R
72-43-5	Methoxychlor	18	U J
53494-70-5	Endrin ketone	3.5	U
7421-93-4	Endrin aldehyde	3.5	U
5103-71-9	alpha-Chlordane	1.8	U
5103-74-2	gamma-Chlordane	1.8	U
8001-35-2	Toxaphene	180	U
12674-11-2	Aroclor-1016	35	U
11104-28-2	Aroclor-1221	71	U
11141-16-5	Aroclor-1232	35	U
53469-21-9	Aroclor-1242	35	U
12672-29-6	Aroclor-1248	35	U
11097-69-1	Aroclor-1254	35	U
11096-82-5	Aroclor-1260	35	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC26 7S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.09

Sample wt/vol: 32.2 (g/mL) G Lab File ID: _____

% Moisture: 14 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.8	U
319-85-7	beta-BHC	1.8	U
319-86-8	delta-BHC	1.8	U
58-89-9	gamma-BHC (Lindane)	1.8	U
76-44-8	Heptachlor	1.8	U
309-00-2	Aldrin	1.8	U
1024-57-3	Heptachlor epoxide	1.8	U
959-98-8	Endosulfan I	1.8	U
60-57-1	Dieldrin	3.6	U
72-55-9	4,4'-DDE	3.6	U
72-20-8	Endrin	3.6	U
33213-65-9	Endosulfan II	3.6	U
72-54-8	4,4'-DDD	~~10~~	~~P~~ R
1031-07-8	Endosulfan sulfate	3.6	U
50-29-3	4,4'-DDT	16	
72-43-5	Methoxychlor	18	U
53494-70-5	Endrin ketone	3.6	U
7421-93-4	Endrin aldehyde	3.6	U
5103-71-9	alpha-Chlordane	12	~~P~~ JN
5103-74-2	gamma-Chlordane	10	~~P~~ J
8001-35-2	Toxaphene	180	U
12674-11-2	Aroclor-1016	36	U
11104-28-2	Aroclor-1221	72	U
11141-16-5	Aroclor-1232	36	U
53469-21-9	Aroclor-1242	36	U
12672-29-6	Aroclor-1248	36	U
11097-69-1	Aroclor-1254	36	U
11096-82-5	Aroclor-1260	36	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC27 8S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.10

Sample wt/vol: 31.9 (g/mL) G Lab File ID: _____

% Moisture: 22 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	4.0	U
72-20-8	Endrin	4.0	U J
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	~~9.8~~	~~P~~ R
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	19	J
72-43-5	Methoxychlor	20 ~~6.6~~	~~PJ~~ MJ
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	9.5	~~P~~ J
5103-74-2	gamma-Chlordane	8.7	~~P~~ J
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	81	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC28 9S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.11

Sample wt/vol: 32.5 (g/mL) G Lab File ID: _____

% Moisture: 24 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U J
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	~~9.3~~	~~P~~ R
72-20-8	Endrin	~~4.0~~	~~U~~ * R
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	14	NJ
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	* 79 ~~80~~	~~E~~ J
72-43-5	Methoxychlor	34	~~PB~~ NJ
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	17	~~P~~ JN
5103-71-9	alpha-Chlordane	27	~~P~~ JN
5103-74-2	gamma-Chlordane	23	
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	81	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

* Value transferred from dilution analysis

F20

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC29 105

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.12

Sample wt/vol: 33.1 (g/mL) G Lab File ID: _____

% Moisture: 16 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.8	U
319-85-7	beta-BHC	1.8	U
319-86-8	delta-BHC	1.8	U
58-89-9	gamma-BHC (Lindane)	1.8	U
76-44-8	Heptachlor	1.8	U
309-00-2	Aldrin	1.8	U
1024-57-3	Heptachlor epoxide	1.8	U
959-98-8	Endosulfan I	1.8	U
60-57-1	Dieldrin	3.6	U
72-55-9	4,4'-DDE	3.6	U
72-20-8	Endrin	3.6	U
33213-65-9	Endosulfan II	3.6	U
72-54-8	4,4'-DDD	3.6	U
1031-07-8	Endosulfan sulfate	3.6	U
50-29-3	4,4'-DDT	17	~~P~~
72-43-5	Methoxychlor	18	U
53494-70-5	Endrin ketone	3.6	U
7421-93-4	Endrin aldehyde	3.6	U
5103-71-9	alpha-Chlordane	1.8	U
5103-74-2	gamma-Chlordane	1.8	U
8001-35-2	Toxaphene	180	U
12674-11-2	Aroclor-1016	36	U
11104-28-2	Aroclor-1221	72	U
11141-16-5	Aroclor-1232	36	U
53469-21-9	Aroclor-1242	36	U
12672-29-6	Aroclor-1248	36	U
11097-69-1	Aroclor-1254	36	U
11096-82-5	Aroclor-1260	36	U

J

J

N

F21

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC30 115

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.13

Sample wt/vol: 32.6 (g/mL) G Lab File ID: _____

% Moisture: 13 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.8	U
319-85-7	beta-BHC	1.8	U
319-86-8	delta-BHC	1.8	U
58-89-9	gamma-BHC (Lindane)	1.8	U
76-44-8	Heptachlor	1.8	U
309-00-2	Aldrin	1.8	U
1024-57-3	Heptachlor epoxide	~~7.7~~	~~P~~ R
959-98-8	Endosulfan I	1.8	U
60-57-1	Dieldrin	~~27~~	~~P~~ P
72-55-9	4,4'-DDE	31	~~P~~ NJ
72-20-8	Endrin	~~12~~	~~P~~ R
33213-65-9	Endosulfan II	3.5	U
72-54-8	4,4'-DDD	24	~~P~~ JN
1031-07-8	Endosulfan sulfate	3.5	U
50-29-3	4,4'-DDT	*110	~~PE~~ J
72-43-5	Methoxychlor	33	~~PB~~ NJ
53494-70-5	Endrin ketone	3.5	U
7421-93-4	Endrin aldehyde	22	~~P~~ NJ
5103-71-9	alpha-Chlordane	29	~~P~~ J
5103-74-2	gamma-Chlordane	*27 ~~37~~	~~PE~~ JN
8001-35-2	Toxaphene	180	U
12674-11-2	Aroclor-1016	35	U
11104-28-2	Aroclor-1221	71	U
11141-16-5	Aroclor-1232	35	U
53469-21-9	Aroclor-1242	35	U
12672-29-6	Aroclor-1248	35	U
11097-69-1	Aroclor-1254	35	U
11096-82-5	Aroclor-1260	35	U

* value transferred from dilution analysis

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC31 11D

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.14

Sample wt/vol: 30.5 (g/mL) G Lab File ID: _____

% Moisture: 15 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 7.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.0	U
319-85-7	beta-BHC	2.0	U
319-86-8	delta-BHC	2.0	U
58-89-9	gamma-BHC (Lindane)	2.0	U
76-44-8	Heptachlor	2.0	U
309-00-2	Aldrin	2.0	U
1024-57-3	Heptachlor epoxide	2.0	U
959-98-8	Endosulfan I	2.0	U
60-57-1	Dieldrin	3.8	U
72-55-9	4,4'-DDE	3.8	U
72-20-8	Endrin	3.8	U
33213-65-9	Endosulfan II	3.8	U
72-54-8	4,4'-DDD	3.8	U
1031-07-8	Endosulfan sulfate	3.8	U
50-29-3	4,4'-DDT	3.8	U
72-43-5	Methoxychlor	20	U
53494-70-5	Endrin ketone	3.8	U
7421-93-4	Endrin aldehyde	3.8	U
5103-71-9	alpha-Chlordane	2.0	U
5103-74-2	gamma-Chlordane	2.0	U
8001-35-2	Toxaphene	200	U
12674-11-2	Aroclor-1016	38	U
11104-28-2	Aroclor-1221	78	U
11141-16-5	Aroclor-1232	38	U
53469-21-9	Aroclor-1242	38	U
12672-29-6	Aroclor-1248	38	U
11097-69-1	Aroclor-1254	38	U
11096-82-5	Aroclor-1260	38	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC32 125

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.15

Sample wt/vol: 33.1 (g/mL) G Lab File ID: _____

% Moisture: 23 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG		Q	
319-84-6	alpha-BHC		2.0	U	
319-85-7	beta-BHC		2.0	U	
319-86-8	delta-BHC		2.0	U	
58-89-9	gamma-BHC (Lindane)		2.0	U	
76-44-8	Heptachlor		2.0	U	
309-00-2	Aldrin		2.0	U	J
1024-57-3	Heptachlor epoxide		2.0	U	
959-98-8	Endosulfan I		2.0	U	
60-57-1	Dieldrin		3.9	U	
72-55-9	4,4'-DDE	3.9	~~3.3~~	~~PU~~	~~U~~ J
72-20-8	Endrin		~~3.9~~	~~U~~	~~J~~ R
33213-65-9	Endosulfan II		3.9	U	
72-54-8	4,4'-DDD		14		NJ
1031-07-8	Endosulfan sulfate		3.9	U	
50-29-3	4,4'-DDT		31		J
72-43-5	Methoxychlor		20	U	J
53494-70-5	Endrin ketone		3.9	U	
7421-93-4	Endrin aldehyde		9.4	~~P~~	JN
5103-71-9	alpha-Chlordane		10	~~P~~	J
5103-74-2	gamma-Chlordane		8.6		
8001-35-2	Toxaphene		200	U	
12674-11-2	Aroclor-1016		39	U	
11104-28-2	Aroclor-1221		79	U	
11141-16-5	Aroclor-1232		39	U	
53469-21-9	Aroclor-1242		39	U	
12672-29-6	Aroclor-1248		39	U	
11097-69-1	Aroclor-1254		39	U	
11096-82-5	Aroclor-1260		39	U	

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC33 135

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.16

Sample wt/vol: 31.4 (g/mL) G Lab File ID: _____

% Moisture: 23 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.8 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U J
1024-57-3	Heptachlor epoxide	13	
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.1	U
72-55-9	4,4'-DDE	~~17~~	~~P~~ R
72-20-8	Endrin	~~4.1~~	~~U~~ JR
33213-65-9	Endosulfan II	4.1	U
72-54-8	4,4'-DDD	40	NJ
1031-07-8	Endosulfan sulfate	4.1	U
50-29-3	4,4'-DDT	*66 ~~110~~	~~E~~ J
72-43-5	Methoxychlor	21	U
53494-70-5	Endrin ketone	4.1	U J
7421-93-4	Endrin aldehyde	12	NJ
5103-71-9	alpha-Chlordane	*51 ~~55~~	~~PE~~ NJ
5103-74-2	gamma-Chlordane	*41 ~~52~~	~~E~~
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	41	U
11104-28-2	Aroclor-1221	83	U
11141-16-5	Aroclor-1232	41	U
53469-21-9	Aroclor-1242	41	U
12672-29-6	Aroclor-1248	41	U
11097-69-1	Aroclor-1254	41	U
11096-82-5	Aroclor-1260	41	U

*Value + qualifier transferred from dilution analysis

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC34 145

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.17

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 15 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.9	U
319-85-7	beta-BHC	1.9	U
319-86-8	delta-BHC	1.9	U
58-89-9	gamma-BHC (Lindane)	1.9	U
76-44-8	Heptachlor	1.9	U
309-00-2	Aldrin	1.9	U J
1024-57-3	Heptachlor epoxide	1.9	U
959-98-8	Endosulfan I	1.9	U
60-57-1	Dieldrin	3.7	U
72-55-9	4,4'-DDE	~~4.7~~	~~P~~ R
72-20-8	Endrin	~~3.7~~	~~U~~ ~~J~~ R
33213-65-9	Endosulfan II	3.7	U
72-54-8	4,4'-DDD	15	NJ
1031-07-8	Endosulfan sulfate	3.7	U
50-29-3	4,4'-DDT	43	~~P~~ J
72-43-5	Methoxychlor	19	U
53494-70-5	Endrin ketone	3.7	U
7421-93-4	Endrin aldehyde	~~7.3~~	~~P~~ R
5103-71-9	alpha-Chlordane	20	~~P~~ NJ
5103-74-2	gamma-Chlordane	22	
8001-35-2	Toxaphene	190	U
12674-11-2	Aroclor-1016	37	U
11104-28-2	Aroclor-1221	74	U
11141-16-5	Aroclor-1232	37	U
53469-21-9	Aroclor-1242	37	U
12672-29-6	Aroclor-1248	37	U
11097-69-1	Aroclor-1254	37	U
11096-82-5	Aroclor-1260	37	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC35 155

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.18

Sample wt/vol: 31.6 (g/mL) G Lab File ID: _____

% Moisture: 22 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	2.1	U
319-85-7	beta-BHC	2.1	U
319-86-8	delta-BHC	2.1	U
58-89-9	gamma-BHC (Lindane)	2.1	U
76-44-8	Heptachlor	2.1	U
309-00-2	Aldrin	2.1	U
1024-57-3	Heptachlor epoxide	2.1	U
959-98-8	Endosulfan I	2.1	U
60-57-1	Dieldrin	4.0	U
72-55-9	4,4'-DDE	~~8.9~~	~~P~~ P
72-20-8	Endrin	4.0	U J
33213-65-9	Endosulfan II	4.0	U
72-54-8	4,4'-DDD	29	NJ
1031-07-8	Endosulfan sulfate	4.0	U
50-29-3	4,4'-DDT	61	J
72-43-5	Methoxychlor	21 ~~16~~	~~PJB~~ MJ
53494-70-5	Endrin ketone	4.0	U
7421-93-4	Endrin aldehyde	4.0	U
5103-71-9	alpha-Chlordane	21	~~P~~ NJ
5103-74-2	gamma-Chlordane	20	
8001-35-2	Toxaphene	210	U
12674-11-2	Aroclor-1016	40	U
11104-28-2	Aroclor-1221	82	U
11141-16-5	Aroclor-1232	40	U
53469-21-9	Aroclor-1242	40	U
12672-29-6	Aroclor-1248	40	U
11097-69-1	Aroclor-1254	40	U
11096-82-5	Aroclor-1260	40	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC36 16S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.19

Sample wt/vol: 31.4 (g/mL) G Lab File ID: _____

% Moisture: 14 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 04/29/99

Injection Volume: 0.5(uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	1.9	U
319-85-7	beta-BHC	1.9	U
319-86-8	delta-BHC	1.9	U
58-89-9	gamma-BHC (Lindane)	1.9	U
76-44-8	Heptachlor	1.9	U
309-00-2	Aldrin	1.9	U J
1024-57-3	Heptachlor epoxide	1.9	U
959-98-8	Endosulfan I	1.9	U
60-57-1	Dieldrin	3.7	U
72-55-9	4,4'-DDE	14	~~P~~ JN
72-20-8	Endrin	~~3.7~~	~~U~~ JR
33213-65-9	Endosulfan II	3.7	U
72-54-8	4,4'-DDD	35	NJ
1031-07-8	Endosulfan sulfate	3.7	U
50-29-3	4,4'-DDT	59	J
72-43-5	Methoxychlor	20	~~PB~~ NJ
53494-70-5	Endrin ketone	3.7	U
7421-93-4	Endrin aldehyde	~~4.7~~	~~P~~ R
5103-71-9	alpha-Chlordane	20	~~P~~ NJ
5103-74-2	gamma-Chlordane	19	~~P~~ J
8001-35-2	Toxaphene	190	U
12674-11-2	Aroclor-1016	37	U
11104-28-2	Aroclor-1221	74	U
11141-16-5	Aroclor-1232	37	U
53469-21-9	Aroclor-1242	37	U
12672-29-6	Aroclor-1248	37	U
11097-69-1	Aroclor-1254	37	U
11096-82-5	Aroclor-1260	37	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC37 17S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC18

Matrix: (soil/water) SOIL Lab Sample ID: 38206.20

Sample wt/vol: 31.6 (g/mL) G Lab File ID: _____

% Moisture: 51 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (~~Sep~~F/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 04/29/99

Injection Volume: 0.5 (uL) Dilution Factor: 1.0

GPC Cleanup: (Y/N) Y pH: 6.0 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	3.3	U
319-85-7	beta-BHC	3.3	U
319-86-8	delta-BHC	3.3	U
58-89-9	gamma-BHC (Lindane)	3.3	U
76-44-8	Heptachlor	3.3	U
309-00-2	Aldrin	3.3	U
1024-57-3	Heptachlor epoxide	23	
959-98-8	Endosulfan I	3.3	U
60-57-1	Dieldrin	6.4	U
72-55-9	4,4'-DDE	48	~~P~~ N
72-20-8	Endrin	6.4	U
33213-65-9	Endosulfan II	6.4	U
72-54-8	4,4'-DDD	91	N
1031-07-8	Endosulfan sulfate	6.4	U
50-29-3	4,4'-DDT	*160 ~~130~~	~~P~~
72-43-5	Methoxychlor	33	U
53494-70-5	Endrin ketone	6.4	U
7421-93-4	Endrin aldehyde	6.4	U
5103-71-9	alpha-Chlordane	*100 ~~110~~	~~P~~
5103-74-2	gamma-Chlordane	*89 ~~110~~	~~P~~
8001-35-2	Toxaphene	330	U
12674-11-2	Aroclor-1016	64	U
11104-28-2	Aroclor-1221	130	U
11141-16-5	Aroclor-1232	64	U
53469-21-9	Aroclor-1242	64	U
12672-29-6	Aroclor-1248	64	U
11097-69-1	Aroclor-1254	64	U
11096-82-5	Aroclor-1260	64	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC38 18S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.21

Sample wt/vol: 30.4 (g/mL) G Lab File ID: _____

% Moisture: 34 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 05/01/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	25	U
319-85-7	beta-BHC	25	U
319-86-8	delta-BHC	25	U
58-89-9	gamma-BHC (Lindane)	25	U
76-44-8	Heptachlor	25	U
309-00-2	Aldrin	25	U
1024-57-3	Heptachlor epoxide	25	U
959-98-8	Endosulfan I	25	U
60-57-1	Dieldrin	49	U
72-55-9	4,4'-DDE	49	U
72-20-8	Endrin	49	U
33213-65-9	Endosulfan II	49	U
72-54-8	4,4'-DDD	~~60~~	~~P~~ R
1031-07-8	Endosulfan sulfate	49	U
50-29-3	4,4'-DDT	49	U
72-43-5	Methoxychlor	250	U
53494-70-5	Endrin ketone	49	U
7421-93-4	Endrin aldehyde	49	U
5103-71-9	alpha-Chlordane	100	~~P~~ JN
5103-74-2	gamma-Chlordane	84	
8001-35-2	Toxaphene	2500	U
12674-11-2	Aroclor-1016	490	U
11104-28-2	Aroclor-1221	1000	U
11141-16-5	Aroclor-1232	490	U
53469-21-9	Aroclor-1242	490	U
12672-29-6	Aroclor-1248	490	U
11097-69-1	Aroclor-1254	490	U
11096-82-5	Aroclor-1260	490	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC39 19S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.22

Sample wt/vol: 31.6 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 05/01/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	20	U
319-85-7	beta-BHC	20	U
319-86-8	delta-BHC	20	U
58-89-9	gamma-BHC (Lindane)	20	U
76-44-8	Heptachlor	20	U
309-00-2	Aldrin	20	U
1024-57-3	Heptachlor epoxide	20	U
959-98-8	Endosulfan I	20	U
60-57-1	Dieldrin	38	U
72-55-9	4,4'-DDE	38	U
72-20-8	Endrin	38	U
33213-65-9	Endosulfan II	38	U
72-54-8	4,4'-DDD	38	U
1031-07-8	Endosulfan sulfate	38	U
50-29-3	4,4'-DDT	38	U
72-43-5	Methoxychlor	200	U
53494-70-5	Endrin ketone	38	U
7421-93-4	Endrin aldehyde	38	U
5103-71-9	alpha-Chlordane	25	~~P~~ NJ
5103-74-2	gamma-Chlordane	20	
8001-35-2	Toxaphene	2000	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	780	U
11141-16-5	Aroclor-1232	380	U
53469-21-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC40 19D

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.23

Sample wt/vol: 33.1 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/01/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	19	U
319-85-7	beta-BHC	19	U
319-86-8	delta-BHC	19	U
58-89-9	gamma-BHC (Lindane)	19	U
76-44-8	Heptachlor	19	U
309-00-2	Aldrin	19	U
1024-57-3	Heptachlor epoxide	19	U
959-98-8	Endosulfan I	19	U
60-57-1	Dieldrin	36	U
72-55-9	4,4'-DDE	36	U
72-20-8	Endrin	36	U
33213-65-9	Endosulfan II	36	U
72-54-8	4,4'-DDD	36	U
1031-07-8	Endosulfan sulfate	36	U
50-29-3	4,4'-DDT	36	U J
72-43-5	Methoxychlor	190	U J
53494-70-5	Endrin ketone	36	U
7421-93-4	Endrin aldehyde	36	U
5103-71-9	alpha-Chlordane	19 ~~15~~	~~PJ~~ 4
5103-74-2	gamma-Chlordane	12	J
8001-35-2	Toxaphene	1900	U
12674-11-2	Aroclor-1016	360	U
11104-28-2	Aroclor-1221	740	U
11141-16-5	Aroclor-1232	360	U
53469-21-9	Aroclor-1242	360	U
12672-29-6	Aroclor-1248	360	U
11097-69-1	Aroclor-1254	360	U
11096-82-5	Aroclor-1260	360	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC41 205

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.24

Sample wt/vol: 32.0 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/01/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	19	U
319-85-7	beta-BHC	19	U
319-86-8	delta-BHC	19	U
58-89-9	gamma-BHC (Lindane)	19	U
76-44-8	Heptachlor	19	U
309-00-2	Aldrin	19	U
1024-57-3	Heptachlor epoxide	19	U
959-98-8	Endosulfan I	19	U
60-57-1	Dieldrin	38	U
72-55-9	4,4'-DDE	38	U
72-20-8	Endrin	38	U
33213-65-9	Endosulfan II	38	U
72-54-8	4,4'-DDD	38 ~~25~~	~~PJ~~ 4
1031-07-8	Endosulfan sulfate	38	U
50-29-3	4,4'-DDT	38	U
72-43-5	Methoxychlor	190	U
53494-70-5	Endrin ketone	38	U
7421-93-4	Endrin aldehyde	38	U
5103-71-9	alpha-Chlordane	19	U
5103-74-2	gamma-Chlordane	19	U
8001-35-2	Toxaphene	1900	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	770	U
11141-16-5	Aroclor-1232	380	U
53469-21-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC42 215

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.25

Sample wt/vol: 31.6 (g/mL) G Lab File ID: _____

% Moisture: 20 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/01/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	20	U
319-85-7	beta-BHC	20	U
319-86-8	delta-BHC	20	U
58-89-9	gamma-BHC (Lindane)	20	U
76-44-8	Heptachlor	20	U
309-00-2	Aldrin	20	U
1024-57-3	Heptachlor epoxide	20	U
959-98-8	Endosulfan I	20	U
60-57-1	Dieldrin	39	U
72-55-9	4,4'-DDE	39	U
72-20-8	Endrin	39	U
33213-65-9	Endosulfan II	39	U
72-54-8	4,4'-DDD	39	U
1031-07-8	Endosulfan sulfate	39	U
50-29-3	4,4'-DDT	39	U
72-43-5	Methoxychlor	200	U
53494-70-5	Endrin ketone	39	U
7421-93-4	Endrin aldehyde	39	U
5103-71-9	alpha-Chlordane	39	~~P~~ JN
5103-74-2	gamma-Chlordane	30	~~P~~ J
8001-35-2	Toxaphene	2000	U
12674-11-2	Aroclor-1016	390	U
11104-28-2	Aroclor-1221	800	U
11141-16-5	Aroclor-1232	390	U
53469-21-9	Aroclor-1242	390	U
12672-29-6	Aroclor-1248	390	U
11097-69-1	Aroclor-1254	390	U
11096-82-5	Aroclor-1260	390	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC43 22S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.26

Sample wt/vol: 31.1 (g/mL) G Lab File ID: _____

% Moisture: 69 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/01/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	53	U
319-85-7	beta-BHC	53	U
319-86-8	delta-BHC	53	U
58-89-9	gamma-BHC (Lindane)	53	U
76-44-8	Heptachlor	53	U
309-00-2	Aldrin	53	U
1024-57-3	Heptachlor epoxide	53	U
959-98-8	Endosulfan I	53	U
60-57-1	Dieldrin	100	U
72-55-9	4,4'-DDE	100	U
72-20-8	Endrin	100	U
33213-65-9	Endosulfan II	100	U
72-54-8	4,4'-DDD	100	U
1031-07-8	Endosulfan sulfate	100	U
50-29-3	4,4'-DDT	100	U
72-43-5	Methoxychlor	530	U
53494-70-5	Endrin ketone	100	U
7421-93-4	Endrin aldehyde	100	U
5103-71-9	alpha-Chlordane	53	U
5103-74-2	gamma-Chlordane	53	U
8001-35-2	Toxaphene	5300	U
12674-11-2	Aroclor-1016	1000	U
11104-28-2	Aroclor-1221	2100	U
11141-16-5	Aroclor-1232	1000	U
53469-21-9	Aroclor-1242	1000	U
12672-29-6	Aroclor-1248	1000	U
11097-69-1	Aroclor-1254	1000	U
11096-82-5	Aroclor-1260	1000	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC44 23S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.27

Sample wt/vol: 32.5 (g/mL) G Lab File ID: _____

% Moisture: 40 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 05/01/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	26	U
319-85-7	beta-BHC	26	U
319-86-8	delta-BHC	26	U
58-89-9	gamma-BHC (Lindane)	26	U
76-44-8	Heptachlor	26	U
309-00-2	Aldrin	26	U
1024-57-3	Heptachlor epoxide	26	U
959-98-8	Endosulfan I	26	U
60-57-1	Dieldrin	51	U
72-55-9	4,4'-DDE	51	U
72-20-8	Endrin	51	U
33213-65-9	Endosulfan II	51	U
72-54-8	4,4'-DDD	51 ~~34~~	~~PJ~~ U
1031-07-8	Endosulfan sulfate	51	U
50-29-3	4,4'-DDT	64	J
72-43-5	Methoxychlor	260	U
53494-70-5	Endrin ketone	51	U
7421-93-4	Endrin aldehyde	51	U
5103-71-9	alpha-Chlordane	53	~~P~~ J
5103-74-2	gamma-Chlordane	34	
8001-35-2	Toxaphene	2600	U
12674-11-2	Aroclor-1016	510	U
11104-28-2	Aroclor-1221	1000	U
11141-16-5	Aroclor-1232	510	U
53469-21-9	Aroclor-1242	510	U
12672-29-6	Aroclor-1248	510	U
11097-69-1	Aroclor-1254	510	U
11096-82-5	Aroclor-1260	510	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC46 245

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.28

Sample wt/vol: 31.7 (g/mL) G Lab File ID: _____

% Moisture: 16 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 05/01/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	19	U
319-85-7	beta-BHC	19	U
319-86-8	delta-BHC	19	U
58-89-9	gamma-BHC (Lindane)	19	U
76-44-8	Heptachlor	19	U
309-00-2	Aldrin	19	U
1024-57-3	Heptachlor epoxide	19	U
959-98-8	Endosulfan I	19	U
60-57-1	Dieldrin	37	U
72-55-9	4,4'-DDE	37	U
72-20-8	Endrin	37	U
33213-65-9	Endosulfan II	37	U
72-54-8	4,4'-DDD	37	U
1031-07-8	Endosulfan sulfate	37	U
50-29-3	4,4'-DDT	37	U
72-43-5	Methoxychlor	190	U J
53494-70-5	Endrin ketone	37	U
7421-93-4	Endrin aldehyde	37	U
5103-71-9	alpha-Chlordane	19	U
5103-74-2	gamma-Chlordane	19	U
8001-35-2	Toxaphene	1900	U
12674-11-2	Aroclor-1016	370	U
11104-28-2	Aroclor-1221	750	U
11141-16-5	Aroclor-1232	370	U
53469-21-9	Aroclor-1242	370	U
12672-29-6	Aroclor-1248	370	U
11097-69-1	Aroclor-1254	370	U
11096-82-5	Aroclor-1260	370	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC47 25S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.29

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 14 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 05/04/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	19	U
319-85-7	beta-BHC	19	U
319-86-8	delta-BHC	19	U
58-89-9	gamma-BHC (Lindane)	19	U
76-44-8	Heptachlor	19	U
309-00-2	Aldrin	19	U
1024-57-3	Heptachlor epoxide	19	U
959-98-8	Endosulfan I	19	U
60-57-1	Dieldrin	36	U
72-55-9	4,4'-DDE	36	U
72-20-8	Endrin	36	U
33213-65-9	Endosulfan II	36	U
72-54-8	4,4'-DDD	36	U
1031-07-8	Endosulfan sulfate	36	U
50-29-3	4,4'-DDT	36	U
72-43-5	Methoxychlor	190	U
53494-70-5	Endrin ketone	36	U
7421-93-4	Endrin aldehyde	36	U
5103-71-9	alpha-Chlordane	19	U
5103-74-2	gamma-Chlordane	19	U
8001-35-2	Toxaphene	1900	U
12674-11-2	Aroclor-1016	360	U
11104-28-2	Aroclor-1221	730	U
11141-16-5	Aroclor-1232	360	U
53469-21-9	Aroclor-1242	360	U
12672-29-6	Aroclor-1248	360	U
11097-69-1	Aroclor-1254	360	U
11096-82-5	Aroclor-1260	360	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC48 265

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.30

Sample wt/vol: 32.2 (g/mL) G Lab File ID: _____

% Moisture: 60 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 05/04/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	40	U
319-85-7	beta-BHC	40	U
319-86-8	delta-BHC	40	U
58-89-9	gamma-BHC (Lindane)	40	U
76-44-8	Heptachlor	40	U
309-00-2	Aldrin	40	U
1024-57-3	Heptachlor epoxide	40	U
959-98-8	Endosulfan I	40	U
60-57-1	Dieldrin	77	U
72-55-9	4,4'-DDE	77	U
72-20-8	Endrin	77	U
33213-65-9	Endosulfan II	77	U
72-54-8	4,4'-DDD	~~140~~	~~P~~ R
1031-07-8	Endosulfan sulfate	77	U
50-29-3	4,4'-DDT	77	U
72-43-5	Methoxychlor	400	U
53494-70-5	Endrin ketone	77	U
7421-93-4	Endrin aldehyde	77	U
5103-71-9	alpha-Chlordane	170	~~P~~ N
5103-74-2	gamma-Chlordane	130	~~P~~ N
8001-35-2	Toxaphene	4000	U
12674-11-2	Aroclor-1016	770	U
11104-28-2	Aroclor-1221	1600	U
11141-16-5	Aroclor-1232	770	U
53469-21-9	Aroclor-1242	770	U
12672-29-6	Aroclor-1248	770	U
11097-69-1	Aroclor-1254	770	U
11096-82-5	Aroclor-1260	770	U

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PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC50 275

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.31

Sample wt/vol: 30.9 (g/mL) G Lab File ID: _____

% Moisture: 45 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/04/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.2 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	30	U
319-85-7	beta-BHC	30	U
319-86-8	delta-BHC	30	U
58-89-9	gamma-BHC (Lindane)	30	U
76-44-8	Heptachlor	30	U
309-00-2	Aldrin	30	U
1024-57-3	Heptachlor epoxide	30	U
959-98-8	Endosulfan I	30	U
60-57-1	Dieldrin	58	U
72-55-9	4,4'-DDE	58	U
72-20-8	Endrin	58	U
33213-65-9	Endosulfan II	58	U
72-54-8	4,4'-DDD	58 ~~30~~	~~PJ~~ 4
1031-07-8	Endosulfan sulfate	58	U
50-29-3	4,4'-DDT	58	U
72-43-5	Methoxychlor	300	U
53494-70-5	Endrin ketone	58	U
7421-93-4	Endrin aldehyde	58	U
5103-71-9	alpha-Chlordane	58	~~P~~ JN
5103-74-2	gamma-Chlordane	49	
8001-35-2	Toxaphene	3000	U
12674-11-2	Aroclor-1016	580	U
11104-28-2	Aroclor-1221	1200	U
11141-16-5	Aroclor-1232	580	U
53469-21-9	Aroclor-1242	580	U
12672-29-6	Aroclor-1248	580	U
11097-69-1	Aroclor-1254	580	U
11096-82-5	Aroclor-1260	580	U

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC51 28S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.32

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 52 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 05/04/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.9 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	33	U
319-85-7	beta-BHC	33	U
319-86-8	delta-BHC	33	U
58-89-9	gamma-BHC (Lindane)	33	U
76-44-8	Heptachlor	33	U
309-00-2	Aldrin	33	U
1024-57-3	Heptachlor epoxide	33	U
959-98-8	Endosulfan I	33	U
60-57-1	Dieldrin	65	U
72-55-9	4,4'-DDE	65	U
72-20-8	Endrin	65	U
33213-65-9	Endosulfan II	65	U
72-54-8	4,4'-DDD	65	U
1031-07-8	Endosulfan sulfate	65	U
50-29-3	4,4'-DDT	65	U
72-43-5	Methoxychlor	330	U
53494-70-5	Endrin ketone	65	U
7421-93-4	Endrin aldehyde	65	U
5103-71-9	alpha-Chlordane	57	~~P~~ JN
5103-74-2	gamma-Chlordane	51	
8001-35-2	Toxaphene	3300	U
12674-11-2	Aroclor-1016	650	U
11104-28-2	Aroclor-1221	1300	U
11141-16-5	Aroclor-1232	650	U
53469-21-9	Aroclor-1242	650	U
12672-29-6	Aroclor-1248	650	U
11097-69-1	Aroclor-1254	650	U
11096-82-5	Aroclor-1260	650	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC52 29S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.33

Sample wt/vol: 30.6 (g/mL) G Lab File ID: _____

% Moisture: 61 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (~~SepF~~/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/04/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.3 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	43	U
319-85-7	beta-BHC	43	U
319-86-8	delta-BHC	43	U
58-89-9	gamma-BHC (Lindane)	43	U
76-44-8	Heptachlor	43	U
309-00-2	Aldrin	43	U
1024-57-3	Heptachlor epoxide	43	U
959-98-8	Endosulfan I	43	U
60-57-1	Dieldrin	83	U
72-55-9	4,4'-DDE	83	U
72-20-8	Endrin	83	U
33213-65-9	Endosulfan II	83	U
72-54-8	4,4'-DDD	83 ~~70~~	~~PJ~~ UJ
1031-07-8	Endosulfan sulfate	83	U
50-29-3	4,4'-DDT	83	U
72-43-5	Methoxychlor	430	U
53494-70-5	Endrin ketone	83	U
7421-93-4	Endrin aldehyde	83	U
5103-71-9	alpha-Chlordane	120	~~P~~ JN
5103-74-2	gamma-Chlordane	110	
8001-35-2	Toxaphene	4300	U
12674-11-2	Aroclor-1016	830	U
11104-28-2	Aroclor-1221	1700	U
11141-16-5	Aroclor-1232	830	U
53469-21-9	Aroclor-1242	830	U
12672-29-6	Aroclor-1248	830	U
11097-69-1	Aroclor-1254	830	U
11096-82-5	Aroclor-1260	830	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC54 305

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.34

Sample wt/vol: 31.6 (g/mL) G Lab File ID: _____

% Moisture: 17 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/04/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.6 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	19	U
319-85-7	beta-BHC	19	U
319-86-8	delta-BHC	19	U
58-89-9	gamma-BHC (Lindane)	19	U
76-44-8	Heptachlor	19	U
309-00-2	Aldrin	19	U
1024-57-3	Heptachlor epoxide	19	U
959-98-8	Endosulfan I	19	U
60-57-1	Dieldrin	38	U
72-55-9	4,4'-DDE	38	U
72-20-8	Endrin	38	U
33213-65-9	Endosulfan II	38	U
72-54-8	4,4'-DDD	38	U
1031-07-8	Endosulfan sulfate	38	U
50-29-3	4,4'-DDT	38	U
72-43-5	Methoxychlor	190	U J
53494-70-5	Endrin ketone	38	U
7421-93-4	Endrin aldehyde	38	U
5103-71-9	alpha-Chlordane	19	U
5103-74-2	gamma-Chlordane	19	U
8001-35-2	Toxaphene	1900	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	770	U
11141-16-5	Aroclor-1232	380	U
53469-21-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC55 31S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.35

Sample wt/vol: 32.1 (g/mL) G Lab File ID: _____

% Moisture: 59 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000 (uL) Date Analyzed: 05/04/99

Injection Volume: 0.5 (uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.4 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	39	U J
319-85-7	beta-BHC	39	U
319-86-8	delta-BHC	39	U
58-89-9	gamma-BHC (Lindane)	39	U
76-44-8	Heptachlor	39	U
309-00-2	Aldrin	39	U
1024-57-3	Heptachlor epoxide	39	U
959-98-8	Endosulfan I	39	U
60-57-1	Dieldrin	75	U
72-55-9	4,4'-DDE	75	U
72-20-8	Endrin	75	U
33213-65-9	Endosulfan II	75	U
72-54-8	4,4'-DDD	75 ~~40~~	~~PJ~~ YJ
1031-07-8	Endosulfan sulfate	75	U J
50-29-3	4,4'-DDT	75	U
72-43-5	Methoxychlor	390	U
53494-70-5	Endrin ketone	75	U
7421-93-4	Endrin aldehyde	75	U
5103-71-9	alpha-Chlordane	82	~~P~~ J N
5103-74-2	gamma-Chlordane	75	J
8001-35-2	Toxaphene	3900	U
12674-11-2	Aroclor-1016	750	U
11104-28-2	Aroclor-1221	1500	U
11141-16-5	Aroclor-1232	750	U
53469-21-9	Aroclor-1242	750	U
12672-29-6	Aroclor-1248	750	U
11097-69-1	Aroclor-1254	750	U
11096-82-5	Aroclor-1260	750	U

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1D

PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC56 325

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.36

Sample wt/vol: 32.6 (g/mL) G Lab File ID: _____

% Moisture: 67 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/04/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	47	U
319-85-7	beta-BHC	47	U
319-86-8	delta-BHC	47	U
58-89-9	gamma-BHC (Lindane)	47	U
76-44-8	Heptachlor	47	U
309-00-2	Aldrin	47	U
1024-57-3	Heptachlor epoxide	47	U
959-98-8	Endosulfan I	47	U
60-57-1	Dieldrin	92	U
72-55-9	4,4'-DDE	92	U
72-20-8	Endrin	92	U
33213-65-9	Endosulfan II	92	U
72-54-8	4,4'-DDD	92 ~~70~~	~~P~~ 4
1031-07-8	Endosulfan sulfate	92	U
50-29-3	4,4'-DDT	92	U
72-43-5	Methoxychlor	470	U
53494-70-5	Endrin ketone	92	U
7421-93-4	Endrin aldehyde	92	U
5103-71-9	alpha-Chlordane	130	~~P~~ N
5103-74-2	gamma-Chlordane	120	
8001-35-2	Toxaphene	4700	U
12674-11-2	Aroclor-1016	920	U
11104-28-2	Aroclor-1221	1900	U
11141-16-5	Aroclor-1232	920	U
53469-21-9	Aroclor-1242	920	U
12672-29-6	Aroclor-1248	920	U
11097-69-1	Aroclor-1254	920	U
11096-82-5	Aroclor-1260	920	U

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1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC58 33S

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.37

Sample wt/vol: 32.1 (g/mL) G Lab File ID:

% Moisture: 16 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/04/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.5 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	19	U
319-85-7	beta-BHC	19	U
319-86-8	delta-BHC	19	U
58-89-9	gamma-BHC (Lindane)	19	U
76-44-8	Heptachlor	19	U
309-00-2	Aldrin	19	U
1024-57-3	Heptachlor epoxide	19	U
959-98-8	Endosulfan I	19	U
60-57-1	Dieldrin	37	U
72-55-9	4,4'-DDE	37	U
72-20-8	Endrin	37	U
33213-65-9	Endosulfan II	37	U
72-54-8	4,4'-DDD	37	U
1031-07-8	Endosulfan sulfate	37	U
50-29-3	4,4'-DDT	37	U
72-43-5	Methoxychlor	190	U
53494-70-5	Endrin ketone	37	U
7421-93-4	Endrin aldehyde	37	U
5103-71-9	alpha-Chlordane	19	U
5103-74-2	gamma-Chlordane	19	U
8001-35-2	Toxaphene	1900	U
12674-11-2	Aroclor-1016	370	U
11104-28-2	Aroclor-1221	740	U
11141-16-5	Aroclor-1232	370	U
53469-21-9	Aroclor-1242	370	U
12672-29-6	Aroclor-1248	370	U
11097-69-1	Aroclor-1254	370	U
11096-82-5	Aroclor-1260	370	U

1D
PESTICIDE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

BYC59 33D

Lab Name: SWL-TULSA Contract: 68-D5-0026

Lab Code: SWOK Case No.: 26944 SAS No.: SDG No.: BYC38

Matrix: (soil/water) SOIL Lab Sample ID: 38206.38

Sample wt/vol: 31.8 (g/mL) G Lab File ID: _____

% Moisture: 18 decanted: (Y/N) N Date Received: 04/23/99

Extraction: (SepF/Cont/Sonc) SONC Date Extracted: 04/23/99

Concentrated Extract Volume: 5000(uL) Date Analyzed: 05/04/99

Injection Volume: 0.5(uL) Dilution Factor: 10.0

GPC Cleanup: (Y/N) Y pH: 6.7 Sulfur Cleanup: (Y/N) N

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
319-84-6	alpha-BHC	20	U
319-85-7	beta-BHC	20	U
319-86-8	delta-BHC	20	U
58-89-9	gamma-BHC (Lindane)	20	U
76-44-8	Heptachlor	20	U
309-00-2	Aldrin	20	U
1024-57-3	Heptachlor epoxide	20	U
959-98-8	Endosulfan I	20	U
60-57-1	Dieldrin	38	U
72-55-9	4,4'-DDE	38	U
72-20-8	Endrin	38	U
33213-65-9	Endosulfan II	38	U
72-54-8	4,4'-DDD	38	U
1031-07-8	Endosulfan sulfate	38	U
50-29-3	4,4'-DDT	38	U J
72-43-5	Methoxychlor	200	U J
53494-70-5	Endrin ketone	38	U
7421-93-4	Endrin aldehyde	38	U
5103-71-9	alpha-Chlordane	20	U
5103-74-2	gamma-Chlordane	9.8	~~PU~~ J
8001-35-2	Toxaphene	2000	U
12674-11-2	Aroclor-1016	380	U
11104-28-2	Aroclor-1221	770	U
11141-16-5	Aroclor-1232	380	U
53469-21-9	Aroclor-1242	380	U
12672-29-6	Aroclor-1248	380	U
11097-69-1	Aroclor-1254	380	U
11096-82-5	Aroclor-1260	380	U

ATTACHMENT G

Places to Fish

List of New Jersey Lakes, Ponds, Reservoirs and Streams Open to Public Angling

1994

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Division of Fish, Game and Wildlife
Bureau of Freshwater Fisheries

G'

LIST OF NEW JERSEY PONDS, LAKES AND RESERVOIRS OPEN TO PUBLIC ANGLING

At last count there were over 4,100 freshwater lakes, ponds, impoundments and reservoirs, one acre or greater, in New Jersey. These amount to over 61,000 acres. This sounds like an awful lot of fishing water, however because most of them are privately controlled the great majority of these waters are closed to the general angler. The following list of waters is designed to assist the fisherman in finding a place to fish and to give him a general idea of what facilities he will find when he gets there and what species of game and panfish are apt to be found. The list is probably not 100 percent complete and will never be 100 percent accurate, as conditions change constantly. We have included only those waters where a good population of desirable species of worthwhile sizes exists and where public access is assured.

—GOOD LUCK—

Legend

Ownership

F—Federal
S—State
C—County
M—Municipal
P—Private

Angler facilities

Y—Yes
N—No
Yf—10 h.p. maximum for motors
Yg—Electric outboards only

Fishing quality

1—Very good
2—Good
3—Fair
4—Poor or none
5—Trout available only during stocking season
6—Trout available during entire legal fishing season

Water	NearestTown	Owner	Acres	Shore Fishing	Car Top Launch	Boat Ramp	Boat Livery	Outboard Allowed	Bathing	Picnicking	Cabins/Campsites	Striped Bass Hybrid	Trout	Largemouth Bass	Smallmouth Bass	Pickerel	Catfish	Channel Catfish	Yellow Perch	Musky/No. Pike	Carp	Crappie	Sunfish	Walleye
ATLANTIC COUNTY																								
Birch Grove Park Ponds	Northfield	M	30	Y	N	N	N	N	N	Y	N	4	5	2	4	2	2	4	4	4	4	4	2	4
Corbin City Impoundment #1	Corbin City	S	104	Y	Y	N	N	Yg	N	N	N	4	4	4	4	2	2	4	2	4	4	4	2	4
Corbin City Impoundment #2	Corbin City	S	243	Y	Y	N	N	Yg	N	N	N	4	4	3	4	2	2	4	3	4	4	4	3	4
Corbin City Impoundment #3	Corbin City	S	284	Y	Y	N	N	Yg	N	N	N	4	4	2	4	2	2	4	3	4	4	4	3	4
Egg Harbor City Lake	Egg Harbor	M	30	Y	N	N	N	N	N	Y	N	4	4	4	4	2	3	4	4	4	4	4	4	4
Hammonton Lake	Hammonton	SM&P	75	Y	N	N	Y	N	Y	Y	N	4	5	2	4	2	2	4	2	4	2	4	2	4
Heritage Park Pond	Absecon	M	6	Y	N	N	N	N	N	Y	N	4	4	2	4	4	3	4	4	4	4	4	1	4
Lenape Lake	Mays Landing	CM&P	350	Y	Y	Y	N	Yf	Y	Y	Y	4	4	2	4	2	2	4	3	4	4	2	2	4
Maple Lake	Estelle Manor	S	35	Y	Y	N	N	N	N	N	N	4	4	3	4	1	3	4	2	4	3	2	2	4
BERGEN COUNTY																								
Crystal Lake	Englewood	M	3	Y	N	N	N	N	N	Y	N	4	4	4	4	4	3	4	4	4	2	4	2	4
Dahnerts Lake	Garfield	M	4	Y	N	N	N	N	N	Y	N	4	4	3	4	4	2	4	4	4	2	4	1	4
Darlington Park Pond	Ramsey	C	18	Y	N	N	Y	N	Y	Y	N	4	4	3	4	4	2	4	4	4	2	4	1	4
Indian Lake	Little Ferry	M	6	Y	N	N	N	N	N	Y	N	4	5	4	4	4	2	4	4	4	1	4	1	4
MacMillan Reservoir	Mahwah	C	12	Y	N	N	N	N	N	Y	N	4	4	3	4	2	2	4	2	4	4	4	1	4
Mill Pond	Park Ridge	M	9	Y	N	N	N	N	N	N	N	4	5	3	4	4	2	4	4	4	4	4	2	4
Oradell Reservoir*	Oradell	P	620	Y	N	N	N	N	N	N	N	4	4	2	3	2	2	4	2	4	2	4	1	4
Ramapo Lake	Oakland	S	120	Y	N	N	N	N	N	N	N	4	4	3	4	1	3	4	1	4	4	2	1	4
Scarlet Oak Pond	Ramapo Valley Reservation	C	22	Y	N	N	N	N	N	Y	N	4	4	1	4	2	2	4	4	4	2	4	1	4
Whites Pond	Waldwick	M	6	Y	N	N	N	N	N	Y	N	4	5	2	3	2	2	2	2	4	2	4	1	4
Wild Duck Pond	Ridgewood	C	4	Y	N	N	N	N	N	Y	N	4	4	4	4	4	2	4	4	4	2	4	1	4
Wooddale Park Pond	Woodcliff Lake	C	6	Y	N	N	N	N	N	Y	N	4	4	4	4	4	2	4	4	4	1	4	1	4
BURLINGTON COUNTY																								
Atsion Lake	Atsion	S	62	Y	Y	N	N	Yg	Y	Y	Y	4	4	4	4	2	2	4	4	4	4	4	3	4
Batsto Lake	Batsto	S	40	Y	Y	N	N	Yg	N	N	N	4	4	4	4	2	2	4	4	4	4	4	3	4
Crystal Lake	Willingboro	M	20	Y	N	N	N	N	N	Y	N	4	5	2	4	3	2	3	2	4	1	2	1	4
Harrisville Lake	Martha	S	40	Y	Y	N	N	Yg	N	N	N	4	4	4	4	2	2	4	4	4	4	4	3	4
Lake Oswego	Jenkins Neck	S	92	Y	Y	N	N	Yg	N	N	Y	4	4	4	4	2	2	4	4	4	4	4	2	4
Lake Absegami	Leektown	S	63	Y	Y	N	N	Yg	Y	Y	Y	4	4	4	4	2	2	4	4	4	4	4	2	4
Laurel Acres Pond	Mt. Laurel	M	2.5	Y	N	N	N	N	Y	N	N	4	4	1	4	4	3	4	4	4	3	2	1	4
Medford Park Ponds	Medford	M	5	Y	N	N	N	N	N	Y	N	4	4	2	4	2	3	4	4	4	4	3	2	4
Mirrow Lake	Browns Mills	M&P	250	Y	Y	N	N	N	N	N	N	4	4	2	4	2	1	3	3	4	3	2	1	4
Pakim Pond	Four Mile	S	5	Y	N	N	N	N	Y	Y	Y	4	4	4	4	2	2	4	4	4	4	4	2	4
Pemberton Lake	Pemberton	S	20	Y	Y	N	N	Yg	N	N	N	4	4	2	4	2	2	4	2	4	3	2	1	4
Smithville Lake	Ewanville	C	10	Y	Y	Y	N	Yg	N	Y	N	4	4	2	4	2	1	4	3	4	2	2	1	4
Swedes Lake	Riverside	M	45	Y	Y	N	N	N	N	Y	N	4	4	1	4	3	2	2	2	4	3	2	1	4
Sylvan Lake	Burlington	M&P	12	Y	Y	N	N	N	Y	Y	N	4	5	2	4	2	2	4	3	4	3	3	1	4
Whitesbog Pond	Whitesbog	S	39	Y	Y	N	N	Yg	N	N	N	4	4	4	4	2	1	4	4	4	4	4	2	4
Woolmans Lake	Mount Holly	M	5	Y	Y	N	N	Yg	N	Y	N	4	4	2	4	3	2	3	3	4	3	3	1	4

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Water	NearestTown	Owner	Acres	Shore Fishing	Car Top Launch	Boat Ramp	Boat Livery	Outboard Allowed	Bathing	Picnicking	Cabins/Campsites	Striped Bass Hybrid	Trout	Largemouth Bass	Smallmouth Bass	Pickerel	Catfish	Channel Catfish	Yellow Perch	Musky/No. Pike	Carp	Crappie	Sunfish	Walleye
MERCER COUNTY																								
Belle Mountain Pond	Lambertville	C	2	Y	N	N	N	N	N	Y	N	4	4	3	4	4	2	4	4	4	4	4	1	4
Carnegie Lake	Princeton	S&P	237	Y	Y	Y	N	Yg	N	Y	N	4	4	2	4	2	1	2	2	3	1	2	1	4
Colonial Lake	Trenton	M	10	Y	N	N	N	N	N	Y	N	4	5	2	4	4	1	3	4	4	3	4	2	4
Etra Lake	Etra	M	19	Y	Y	N	N	N	N	Y	N	4	4	2	4	2	2	4	4	4	2	4	1	4
Gropps Lake	White Horse	M	98	Y	Y	N	Yg	N	N	N	4	4	2	4	3	1	2	2	4	4	2	3	2	4
Grovers Mill Pond	Princeton Junction	M	28	Y	N	N	N	N	N	Y	N	4	4	2	4	2	1	4	2	4	3	4	1	4
Lake Mercer	Edinburg	C	275	Y	Y	Y	Y	Yg	N	Y	N	4	4	1	4	2	2	2	3	3	3	2	2	4
Log Basin Pond	Trenton	M	2	Y	N	N	N	N	N	Y	N	4	4	4	4	4	2	4	4	4	2	4	2	4
Peddie Lake	Hightstown	M&P	16	Y	Y	N	N	N	N	Y	N	4	4	2	4	2	2	2	2	4	1	3	1	4
Rosedale Lake	Rosedale	C	30	Y	N	N	N	N	N	Y	N	4	5	2	4	3	2	2	4	4	4	4	1	4
Whitehead Mill Pond	Trenton	M&P	12	Y	N	N	N	N	N	N	N	4	4	2	4	2	1	3	4	4	1	4	1	4
MIDDLESEX COUNTY																								
Brainerd Lake	Cranbury	M&P	15	Y	N	N	N	N	N	N	N	4	4	3	4	2	1	3	2	4	4	4	2	4
Carnegie Lake	Princeton	S&P	237	Y	Y	Y	N	Yg	N	Y	N	4	4	2	4	2	1	2	2	4	1	2	1	4
Davidsons Mill Pond	Deans	C	10	Y	Y	N	N	N	N	Y	N	4	4	2	4	1	1	3	3	4	4	3	1	4
DeVoe Lake	Spotswood	M	59	Y	Y	N	N	N	Y	Y	N	4	4	3	4	1	1	4	4	4	4	4	2	4
East Brunswick Park Lake	East Brunswick	M	40	Y	Y	N	N	N	Y	Y	N	4	4	2	4	1	1	3	2	4	4	4	1	4
Farrington Lake	Milltown	C&P	290	Y	Y	N	Y	Yg	N	Y	N	4	5	1	4	2	1	3	1	1	2	1	1	4
Helmetta Lake	Helmetta	C&P	20	Y	Y	N	N	N	N	Y	N	4	4	4	4	1	3	4	4	4	4	4	2	4
Hooks Creek Lake	Cheesequake	S	10	Y	N	N	N	N	Y	Y	N	4	5	3	4	4	4	1	4	4	4	4	1	4
Manalapan Lake	Jamesburg	C	40	Y	Y	N	N	N	Y	Y	N	4	4	3	4	3	1	4	2	4	4	2	1	4
Milltown Pond	Milltown	M&P	10	Y	Y	N	N	N	N	Y	N	4	4	2	4	2	1	4	2	4	1	2	2	4
New Market Pond	Piscataway	M&P	25	Y	N	N	N	N	N	Y	N	4	4	2	4	2	1	3	4	4	1	4	1	4
Plainsboro Pond	Plainsboro	M	23	Y	N	N	N	N	N	Y	N	4	4	2	4	2	1	4	3	4	2	3	1	4
Roosevelt Park Pond	Menlo Park	C	10	Y	N	N	N	N	N	Y	N	4	5	2	4	3	3	2	3	4	2	4	1	4
Spring Lake	S. Plainfield	M&P	19	Y	N	N	N	N	N	N	N	4	4	3	4	3	1	3	4	4	1	4	1	4
Willow Lake	Middlesex	M	4	Y	N	N	N	N	N	Y	N	4	4	3	4	3	2	4	3	4	1	4	1	4
Westons Mill Pond	New Brunswick	C&P	92	Y	Y	N	N	Y	N	N	N	4	4	1	4	1	1	3	1	3	2	2	1	4
MONMOUTH COUNTY																								
Allentown Pond	Allentown	M&P	35	Y	Y	N	N	Yg	N	Y	N	4	4	2	4	3	1	3	3	4	2	2	1	4
Assunpink Lake	Roosevelt	S	225	Y	Y	Y	N	Yg	N	N	N	2	4	1	4	1	2	2	3	4	4	1	2	4
Deal Lake	Asbury Park	M&P	158	Y	Y	Y	N	Y	N	Y	N	4	4	2	4	2	2	3	3	2	2	2	1	4
Englishtown Mill Pond	Englishtown	M&P	6	Y	Y	N	N	N	N	Y	N	4	5	2	4	2	1	4	4	4	2	4	1	4
Garveys Pond	Navesink	M	2	Y	N	N	N	N	N	N	N	4	5	2	4	4	2	4	4	4	4	4	1	4
Holmdel Park Pond	Holmdel	C	5	Y	N	N	N	N	N	Y	N	4	5	2	4	4	2	2	4	4	4	4	1	4
Lake Como	Spring Lake	M	30	Y	N	N	N	N	N	Y	N	4	4	2	4	3	2	3	4	4	4	4	2	4
Lefferts Lake	Matawan	M&P	69	Y	Y	N	N	N	Y	Y	N	4	3	2	4	3	2	4	4	4	4	4	2	4
Manasquan Res.****	Howell Twp.	C	720	Y	Y	Y	N	Yg	N	Y	N	4	5	2	2	2	3	4	4	4	4	2	2	4
Millhurst Mills Lake	Millhurst	M&P	22	Y	N	N	N	N	N	N	N	4	4	3	4	2	2	4	4	4	3	4	2	4
Mohawk Pond	Red Bank	M	2	Y	N	N	N	N	N	N	N	4	5	2	4	4	4	4	4	4	4	4	1	4
Poricy Pond	Red Bank	M&P	16	Y	N	N	N	N	N	Y	N	4	4	2	4	1	1	4	4	4	1	4	1	4
Rising Sun Lake	Roosevelt	S	38	Y	Y	Y	N	Yg	N	N	N	4	4	2	4	3	4	1	3	4	4	2	3	4
Shadow Lake	Red Bank	M&P	88	Y	Y	N	N	N	N	N	N	4	4	2	4	3	2	2	2	4	3	2	2	4
Shark River Park Pond	Glendola	M	3	Y	N	N	N	N	N	Y	N	4	4	2	4	4	3	4	3	4	4	4	2	4
Silver Lake	Belmar	M	15	Y	N	N	N	N	N	Y	N	4	4	2	4	4	2	4	4	4	4	4	2	4
Spring Lake	Spring Lake	M	16	Y	Y	N	N	N	N	Y	N	4	5	2	4	2	2	2	2	4	2	2	2	4
Stone Tavern Lake	Roosevelt	S	52	Y	Y	Y	N	Yg	N	N	N	4	4	2	4	2	3	1	3	4	4	2	2	4
Takanassee Lake	Long Branch	M	14	Y	Y	N	N	N	N	Y	N	4	5	2	4	2	2	1	2	4	2	2	2	4
Thompson Park Lake	Lincroft	C	22	Y	Y	Y	N	Yg	N	N	N	4	4	1	4	4	3	4	3	4	4	3	2	4
Topenemus Lake	Freehold	C	21	Y	Y	N	N	N	N	Y	N	4	5	3	4	3	3	3	3	4	2	3	2	4
Turkey Swamp Park Pond	Freehold	C	20	Y	N	N	Y	N	N	Y	Y	4	4	2	4	4	3	4	4	4	4	4	2	4
MORRIS COUNTY																								
Atwater Pond	Chester	S	2	Y	N	N	N	N	N	N	N	4	4	2	4	3	2	4	3	4	4	4	2	4
Budd Lake	Budd Lake	M&P	376	Y	Y	Y	Y	Y	Y	N	N	4	4	2	3	2	1	2	2	2	4	4	1	4
Burnham Park Pond	Morristown	M	4	Y	N	N	N	N	N	Y	N	4	5	2	4	3	1	4	4	4	3	4	1	4
Community Park Pond	Morris Plains	M	4	Y	N	N	N	N	N	Y	N	4	4	2	4	4	2	4	4	4	4	4	2	4
Hedden Park Lake	Dover	C	6	Y	N	N	Y	N	N	Y	N	4	4	3	4	4	2	4	3	4	3	3	2	4
Horseshoe Lake	Succasunna	M	20	Y	N	N	N	N	N	N	N	4	4	2	4	3	2	4	4	4	4	4	1	4
Kays Pond	Milltown	C	7	Y	N	N	N	N	N	N	N	4	5	1	4	2	1	4	3	4	4	4	1	4
Lake Ames	Hibernia	M	16	Y	N	N	N	N	Y	Y	N	4	4	2	4	2	3	3	2	4	3	4	2	4
Lake Hopatcong	Mt. Arlington	S	2685	Y	Y	Y	Y	Y	Y	Y	N	2	5	2	3	1	1	2	1	4	3	4	1	4
Lake Musconetcong	Stanhope	S	329	Y	Y	Y	Y	Y	N	Y	N	4	5	1	3	1	2	3	1	4	3	3	1	4
Mt. Hope Pond	Rockaway	P	18	Y	N	N	N	N	N	N	N	4	5	2	4	4	2	3	4	4	4	4	1	4
Ryans Pond	Chester	S	1	Y	N	N	N	N	N	N	N	4	4	2	4	2	2	4	4	4	4	4	2	4
Saffin's Pond	Milton	C	12	Y	Y	N	N	N	Y	Y	N	4	4	3	4	2	3	4	2	4	4	4	2	4
Silas Condict Park Lake	Kinnelon	C	10	Y	N	N	Y	N	N	Y	N	4	4	2	4	2	1	3	4	4	2	4	1	4
Speedwell Lake	Morristown	M	23	Y	N	N	N	N	N	Y	N	4	5	2	4	3	1	2	3	4	1	4	1	4
Sunrise Lake	Brookside	C	3	Y	N	N	Y	N	N	Y	N	4	4	2	4	4	2	4	4	4	2	4	2	4

Water	NearestTown	Owner	Acres	Shore Fishing	Car Top Launch	Boat Ramp	Boat Livery	Outboard Allowed	Bathing	Picnicking	Cabins/Campsites	Striped Bass Hybrid	Trout	Largemouth Bass	Smallmouth Bass	Pickerel	Catfish	Channel Catfish	Yellow Perch	Musky/No. Pike	Carp	Crappie	Sunfish	Walleye
SUSSEX COUNTY																								
Blue Mountain Lake	Five Points	F	20	Y	N	N	N	N	Y	Y	N	4	5	2	4	2	2	4	1	4	4	4	2	4
Canistear Reservoir**	Vernon Twp.	M	350	Y	Y	Y	N	Yg	N	N	N	4	4	2	3	1	2	4	1	4	4	4	2	4
Clove Lake	Sussex	M	35	Y	Y	N	N	N	N	N	N	4	4	1	4	2	2	4	2	4	3	2	2	4
Cranberry Lake	Lockwood	S	179	Y	Y	Y	Y	Y	N	N	N	2	5	2	3	2	1	4	2	4	4	4	1	4
Crater Lake	Five Points	F	16	Y	N	N	N	N	Y	Y	N	4	4	2	4	2	2	4	3	4	4	4	4	4
Franklin Pond	Franklin	M	15	Y	N	N	N	N	N	Y	N	4	4	2	4	3	2	4	4	4	2	4	2	4
Hainesville Pond	Hainesville	S	37	Y	N	N	N	N	N	N	N	4	5	1	4	2	2	4	3	4	4	3	1	4
Iliff Lake	Andover	M	37	Y	Y	N	N	N	N	N	N	4	6	2	4	2	2	4	3	4	4	4	2	4
Jefferson Lake	Lockwood	S & P	46	Y	Y	N	N	Yg	N	N	N	4	4	1	4	2	3	4	4	4	4	3	2	4
Kittatinny Camp Pond	Layton	F	10	Y	N	N	N	N	N	Y	N	4	4	3	4	4	3	4	4	4	4	4	3	4
Lake Hopatcong	Hopatcong	S	2685	Y	Y	Y	Y	Y	Y	Y	N	2	5	2	3	1	1	2	1	4	3	4	1	3
Lake Lookout	Highland Lake	S	8	Y	N	N	N	Yg	N	N	N	4	4	4	4	2	4	4	4	4	4	4	3	4
Lake Marcia	Colesville	S	19	Y	N	N	N	N	Y	Y	N	4	4	3	3	4	2	4	2	4	4	4	2	4
Lake Musconetcong	Stanhope	S	329	Y	Y	Y	Y	Y	N	Y	N	4	5	1	3	1	2	3	1	4	3	3	1	4
Lake Ocquittunk	Tuttles Corner	S	8	Y	Y	N	N	Yg	N	Y	N	4	5	2	4	3	2	4	4	4	4	4	2	4
Laurel Pond	Highland Lake	S	8	Y	N	N	N	N	N	N	N	4	4	2	4	3	3	4	3	4	4	4	3	4
Little Swartswood Lake	Swartswood	S	75	Y	Y	Y	N	Yg	N	Y	N	4	5	2	3	2	2	4	2	3	4	4	1	4
Long Pine Pond	Flatbrookville	F	20	Y	N	N	N	N	Y	Y	N	4	4	4	4	4	4	4	4	4	4	4	4	4
Saw Mill Lake	Colesville	S	20	Y	Y	N	N	Yg	Y	Y	Y	4	5	2	4	4	3	4	4	4	4	4	2	4
Silver Lake	Hamburg	S	21	Y	Y	N	N	Yg	N	N	N	4	4	2	4	3	3	4	3	4	4	4	2	4
Spring Lake	Swartswood	S	18	Y	N	N	N	N	N	N	N	4	4	2	4	2	2	4	3	4	4	3	2	4
Steenykill Lake	Colesville	S	30	Y	Y	N	N	Yg	N	N	Y	4	4	3	2	4	2	4	4	4	4	4	2	4
Stony Lake	Normanock	S	15	Y	N	N	N	N	Y	Y	N	4	5	3	3	3	3	4	4	4	4	4	3	4
Swartswood	Swartswood	S	494	Y	Y	Y	Y	Yg	Y	Y	N	4	6	2	2	2	2	4	2	4	3	4	1	3
Thunder Mtn. Lake	Walpack	F	20	Y	Y	N	N	N	N	Y	N	4	4	1	4	3	2	4	3	4	4	4	1	4
Wawayanda Lake	Highland Lake	S	255	Y	Y	Y	Y	Yg	Y	Y	N	4	6	2	3	2	2	4	2	4	4	4	2	4
UNION COUNTY																								
Briant Park Pond	Summit	M & P	6	Y	N	N	N	N	N	Y	N	4	4	3	4	4	3	4	4	4	2	4	1	4
Cedar Brook Park Pond	Plainfield	M & P	5	Y	N	N	N	N	N	Y	N	4	4	2	4	4	2	4	4	4	4	4	1	4
Lower Echo Park Pond	Mountainside	C	6	Y	N	N	N	N	N	Y	N	4	5	2	4	3	2	4	3	4	1	2	1	4
Upper Echo Park Pond	Mountainside	C	10	Y	N	N	Y	N	N	Y	N	4	4	2	4	3	2	2	3	4	1	2	1	4
Green Brook Pond	Plainfield	M & P	1	Y	N	N	N	N	N	Y	N	4	4	3	4	4	1	4	4	4	2	4	1	4
McGiluory's Pond	Linden	M & P	4	Y	N	N	N	N	N	Y	N	4	4	2	4	4	2	4	4	4	2	4	2	4
Milton Lake	Rahway	M	10	Y	N	N	N	N	N	Y	N	4	5	2	4	2	1	2	4	4	1	2	1	4
Mindowaskin	Westfield	C	2	Y	N	N	N	N	N	Y	N	4	4	3	4	4	1	4	4	4	1	4	1	4
Nomahegan	Cranford	C	7	Y	N	N	N	N	N	Y	N	4	4	3	4	3	1	4	4	4	1	4	1	4
Rahway River Park Pond	Rahway	C	6	Y	N	N	N	N	N	Y	N	4	4	2	4	4	1	4	4	4	1	4	1	4
Seely's Pond	Berkeley Hts.	C	3	Y	N	N	N	N	N	Y	N	N	4	3	4	4	2	4	4	4	1	2	1	4
Surprise Lake	Mountainside	C	25	Y	N	N	Y	N	N	Y	N	4	4	2	4	2	1	2	4	4	1	1	1	4
Wannanco Park Pond	Roselle	C	8	Y	N	N	N	N	N	Y	N	4	4	2	4	4	2	2	4	4	1	4	1	4
WARREN COUNTY																								
Allamuchy Pond	Allamuchy	S & P	50	Y	Y	N	N	Yg	N	N	N	4	4	2	4	4	3	4	3	4	2	1	2	4
Blair Lake	Blairstown	M	2	Y	N	N	N	N	N	N	N	4	5	3	2	2	2	4	4	4	4	3	2	4
Catfish Pond	Millbrook	F	31	Y	N	N	N	N	N	Y	Y	4	4	4	4	2	3	4	3	4	4	4	3	4
Columbia Lake	Columbia	S	55	Y	Y	Y	N	Yg	N	Y	N	4	5	2	4	3	1	2	2	4	1	4	1	4
Deer Park Pond	Allamuchy	S	46	Y	Y	N	Y	Yg	N	Y	N	4	4	2	4	2	2	4	2	4	4	4	2	4
Furnace Lake	Oxford	M	53	Y	Y	Y	N	Yg	Y	Y	N	4	5	3	2	2	1	2	4	4	4	2	1	4
Ghost Lake	Great Meadows	S	18	Y	Y	N	N	Yg	N	N	N	4	4	2	4	4	4	4	4	4	4	3	3	4
Merrill Cr. Reservoir	Stewartsville	P	650	Y	Y	Y	N	Yg	N	Y	N	4	6	2	1	3	3	4	3	4	4	3	2	4
Mountain Lake	Buttzville	P	122	Y	N	N	Y	N	Y	Y	N	4	5	2	4	2	1	4	2	4	2	3	1	4
Sunfish Pond	Columbia	S	41	Y	N	N	N	N	N	Y	N	4	4	4	4	4	3	4	4	4	4	4	4	4
Watergate Pond	Millbrook	F	4	Y	N	N	N	N	Y	Y	N	4	4	2	4	2	2	4	2	4	3	4	2	4

Footnotes

*Only by permit issued by:
Hackensack Water Company
Haworth Pumping Station
Lake Shore Drive
Haworth, New Jersey

**Only by permit issued by:
Newark Watershed Conservation & Development Corporation
60 Park Place
Suite 2105
Newark, New Jersey 07102
or
NWCDC
223 Echo Lake Road
Newfoundland, New Jersey 07435
(must apply in person—fee charged)
(201) 697-2850

***Only by permit issued by:
North Jersey District Water Supply Commission
Police Headquarters
Wanaque Reservoir
Ringwood Avenue
Wanaque, New Jersey

****All boats required to have a permit. Issued at: Manasquar Reservoir Boat Ramp—Fee
(908) 842-4000

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NEW JERSEY
Fish & Wildlife DIGEST

1995 FRESHWATER FISHING — FREE — ISSUE

A SUMMARY OF RULES AND MANAGEMENT INFORMATION

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION ■ DIVISION OF FISH, GAME, & WILDLIFE ■ VOL. 8 NO. 2 ■ JANUARY 1995

FRESH WATERS WHERE A LICENSE IS REQUIRED TO FISH WITH HANDLINE, ROD AND LINE OR LONG BOW AND ARROW

Listed by county and alphabetically by name of water. A license is required upstream of each location.

ATLANTIC COUNTY
Absecon Creek—Dam at Lower Atlantic City Reservoir
Great Egg Harbor River—Power lines at confluence of Gravelly Run
Middle River—None—all saline water
Mullica River—Line between Seventh Ave., Sweetwater, and ramp at Crowleys Landing
Nacote Creek—Port Republic Dam
Patcong Creek—Bargaintown Lake Dam
South River—Power lines immediately below Route 50
Tuckahoe River—First northerly tributary downstream of Rt. 49 Bridge (McNeals Branch)

BERGEN COUNTY
Hackensack River—Cedar Lane Bridge between Hackensack and Teaneck
Hudson River—None—all saline water
Passaic River—Required whole length

BURLINGTON COUNTY
Assiscunk Creek—Required whole length
Bass River—Fir Bridge on State Road in Bass River State Forest
Batsto River—Required whole length
Blacks Creek—Required whole length
Crosswicks Creek—Required whole length
Delaware River—Required whole length
Mullica River—Line between Seventh Ave., Sweetwater, and ramp at Crowleys Landing
Pennsauken Creek—Required whole length
Pompeston Creek—Required whole length
Rancocas Creek—Required whole length
Swedes Run—Required whole length
Wading River—Charcoal Landing, Chips Folly Campground

CAMDEN COUNTY
License Required on Delaware River and All Other Waters

CAPE MAY COUNTY
Bidwells Creek—None—all saline water
Cedar Swamp Creek—None—all saline water
Dennis Creek—None—all saline water
East Creek—100 ft. below East Creek Lake Dam, Eldora
Tuckahoe River—First northerly tributary downstream of lower Rt.49 Bridge (McNeals Br.)
West Creek—100 feet below West Creek Lake Dam (Pickle Factory Pond)

CUMBERLAND COUNTY
Andrews Creek—None—all saline water
Back Creek—None—all saline water
Cedar Creek—100 ft. downstream of Cedar Lake Dam
Cohansey River—Rt. 49 Bridge at Bridgeton
Dividing Creek—Route 555 Bridge
Fishing Creek—None—all saline water
Fortescue Cr./Bridge of Oranoken Cr.—None—all saline water
Manumuskin Creek—Required whole length
Maurice River—Mouth of Manumuskin Creek Near Port Elizabeth
Menantico Creek—Required whole length
Mill Creek—Tributary of Cohansey—Route 553 Bridge, Fairton
Muskee Creek—S. side of bridge on Weathersby Road.
Nantuxent Creek (Pages Run)—Route 553 north of Frames Corner
Oranoken Creek—Whitecar Mill, North of Beaver Dam
Oyster Creek—None—all saline water
Riggins Ditch—Route 47
Sow and Pigs Bridge Nantuxent—None—all saline water
Stow Creek—Buckhorn Rd. Bridge, Jericho
Straight Creek—None—all saline water
West Creek—100 ft. below West Creek Lake Dam (Pickle Factory Pond)

ESSEX COUNTY
Passaic River—Erie Railroad Bridge between Newark (at Verona Ave.) and Kearny
Peddie Ditch—None—all saline water

GLOUCESTER COUNTY
Big Timber Creek—Required whole length
Delaware River—Commodore Barry Bridge at Bridgeport
Mantua Creek—Required whole length
Oldmans Creek—Route I—295 Bridge
Raccoon Creek—Required whole length
Woodbury Creek—Required whole length

HUDSON COUNTY
Hackensack River—None—all saline water
Hudson River—None—all saline water
Passaic River—Railroad bridge between Newark (at Verona Ave.) and Kearny

HUNTERDON COUNTY
License Required on Delaware and All Other Waters

MERCER COUNTY
License Required on Delaware and All Other Waters

MIDDLESEX COUNTY
Cheesequake Creek—Dam at Cheesequake Lake, Cheesequake State Park
Lawrence Brook—N.J. Turnpike Bridge, East Brunswick
Raritan River—Landing Lane Bridge on Franklin Blvd., New Brunswick
South River—Route 527 Bridge (New Brunswick-Old Bridge Tpk.)
Woodbridge River—N.J. Turnpike Bridge

MONMOUTH COUNTY
Black Creek—Spillway at Ocean Rd.
Branchport Creek—Mouth of Turtle Mill Brook
Deal Lake—Top of Dam
Hockhockson (Pine) Brook—Garden State Parkway North bound Bridge
Little Silver Creek—Little Silver Creek Brook
Manasquan River—Bennetts Bridge, Manasquan Wildlife Management Area
Matawan Creek—Lefferts Lake Dam
Oceanport Creek—Mouth of Husky Brook
Parkers Creek—Mouth of Parkers Creek Brook
Shark River—Remsen Mills Road
Swimming River—Swimming River Road Bridge
Wreck Pond Creek—Rt. 71 Bridge

MORRIS COUNTY
License Required on All Waters

OCEAN COUNTY
Beaver Dam Creek—Route 88
Cedar Creek—Route 9
Cedar Run—Route 9
Dinner Point Creek—None—all saline water
Double Creek—None—all saline water
Forked River—All branches Route 9
Gunning River—None—all saline water
Jakes Branch—Above Atlantic City Blvd.
Jeffreys Creek—Ocean Gate Road to Ocean Gate
Kettle Creek—Route 549
Lake of the Lilies—Entire lake
Long Swamp Creek—Washington Street Bridge, Toms River
Manahawkin Creek—Dams for Manahawkin W.M.A. impoundments, bayside
Metedeconk River—Rt. 70 Bridge, Laurelton
Mill Creek—Mouth of Creek at lagoons in Beach Haven West
Mill Creek—Pine Beach—Ocean Gate Road
Oyster Creek—Route 9
Parkers Run—None—all saline water
Potters Creek—None—all saline water
Stouts Creek—None—all saline water
Stouts Creek S.Br.—Bayside East Parkway
Toms River—Garden State Parkway, Northbound Bridge
Tuckerton Creek—Dam at Route 9
Waretown Creek—Route 9
West Creek—Route 9

PASSAIC COUNTY
License Required on All Waters

SALEM COUNTY
Alloway Creek—Route 540 Bridge at Alloway
Black Ditch—None—all saline water
Delaware River—None—all saline water
Fishing Creek—None—all saline water
Hope Creek—None—all saline water
Mad Horse Creek—None—all saline water
Mill Creek—None—all saline water
Oldmans Creek—Route I-295 Southbound Bridge
Salem River—Dupont Dam near Cedar Crest Manor
Salem Canal—Dam at Deepwater
Stow Creek—Buckhorn Rd. Bridge, Jericho
Straight Ditch—None—all saline water

SOMERSET COUNTY
License Required on All Waters

SUSSEX COUNTY
License required on Delaware River and all other waters

UNION COUNTY
Elizabeth River—West Grand St., Elizabeth
Great Ditch—None—all saline water
Morses Creek—Old Morses Mill Rd.
Oyster Creek—None—all saline water
Peddie Ditch—None—all saline water
Piles Creek—None—all saline water
Rahway River—Lawrence St. (Rt 514), Rahway

WARREN COUNTY
License required on Delaware River and all other waters

IMPORTANT FOOTNOTES:
1. Absence of a river, creek, brook or other waterway from this list does not make it exempt from requiring a license to fish the freshwaters.
2. Names of waters conform to those given on the United States Geological Survey 7.5 Minute Topographic Series Maps.

OPERATION GAME THIEF
STOP WILDLIFE CRIME
1-800 222-0456
NEW JERSEY FEDERATION SPORTSMEN

Operation Game Thief

The Operation Game Thief hotline provides a toll-free phone line to report violations of laws protecting wildlife. If you know of incidents involving wildlife including the dumping of hazardous, toxic an solid waste; illegal harvesting of small lobsters; poisoning of birds; and violations of big game, turkey, bobcat and endangered species, call 800-222-0456. If the information you anonymously provide leads to the issue of a summons, you may be eligible for a cash reward. The OGT program is sponsored jointly by the division and the New Jersey Federation of Sportsmen's Clubs.

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NEW JERSEY DIVISION OF FISH, GAME AND WILDLIFE
1995 SPRING TROUT STOCKING SCHEDULE

WATERBODY	PRESEASON	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	TOTAL
Russia Brook	100	0	100	0	100	0	0	0	300
Saddle River - Lower	1310	0	520	520	520	520	0	0	3390
Saddle River - Upper	510	0	200	200	200	200	130	0	1440
Saw Mill Lake	420	0	320	320	320	0	0	0	1380
Schadler's Sand Wash Pond	390	0	290	290	290	0	0	0	1260
Seeley's Pond	250	0	190	190	190	0	0	0	820
Shark River	650	0	260	260	260	260	160	0	1850
Shaws Mill Pond	510	0	390	390	390	0	0	0	1680
Sheppard's Lake	560	0	560	0	560	0	560	0	2240
Shimers Brook	130	0	130	0	130	0	0	0	390
Speedwell Lake	520	0	390	390	390	390	0	0	2080
Spring Lake	480	0	360	360	360	0	0	0	1560
Spring Mills Brook	220	0	220	0	220	0	0	0	660
Spruce Run Creek	1490	0	600	600	600	600	370	0	4260
Spruce Run Reservoir	1650	0	1230	1230	1230	0	0	0	5340
Stony Brook	1690	0	680	680	680	680	0	0	4410
Stony Lake	320	0	240	240	240	0	0	0	1040
Swartswood Lake	990	0	990	0	990	0	990	0	3960
Swedesboro Lake	510	0	380	380	380	0	0	0	1650
Sydney Brook	120	0	0	120	0	0	0	0	240
Sylvan Lake	420	0	320	320	320	0	0	0	1380
Takanassee Lake	510	0	380	380	380	380	0	0	2030
Tienekill Creek	310	0	120	120	120	0	0	0	670
Toms River	1770	570	510	710	510	510	320	440	5340
Topenemus Lake	470	0	350	350	350	0	0	0	1520
Trout Brook (Hacketts.)	190	0	190	0	190	0	0	0	570
Trout Brook (Hope)	280	0	110	0	110	0	0	0	500
Trout Brook (Middleville)	160	0	160	0	160	0	0	0	480
Tuttles Corner Brook	260	0	260	0	260	0	0	0	780
Verona Park Lake	510	0	380	380	380	380	0	0	2030
Wallkill River - Lower	1030	460	410	410	410	410	260	260	3650
Wallkill River - Upper	1080	480	430	430	430	430	270	270	3820
Wanaque River - Lower	970	440	390	390	390	390	240	240	3450
Wanaque River - Upper	1070	480	430	430	430	430	270	270	3810
Wawayanda Lake	750	0	750	0	750	0	750	0	3000
West Pond	270	0	200	200	200	200	0	0	1070
Whippany River - Lower	340	0	340	340	0	0	0	0	1020
Whippany River - Upper	180	0	180	0	180	0	0	0	540
Whites Pond	430	0	320	320	320	320	0	0	1710
Wichecheoke Creek	290	0	290	290	0	0	0	0	870
Woodcliff Lake	520	0	390	390	390	390	0	0	2080
Yellow Brook	120	0	120	120	0	0	0	0	360
*** Total ***	172890	36230	90180	74690	87420	52350	39310	22200	575270

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STOCKED WATERS OF NEW JERSEY

1992

Listing of Fish Stocked In New Jersey's Lakes, Streams, Ponds and Rivers

The Division of Fish, Game and Wildlife is a professional, environmental organization dedicated to the protection, management and wise use of the state's fish and wildlife resources.

New Jersey Department of Environmental Protection & Energy
Division of Fish, Game and Wildlife

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1991-1992
STOCKED WATERS

Total Number of Fish Stocked from All Sources
Key to Abbreviations

Bc	Black Crappie
Bkt	Brook Trout
Bnt	Brown Trout
Bs	Bluegill Sunfish
Chc	Channel Catfish
Lkt	Lake Trout
Lmb	Largemouth Bass
Np	Northern Pike
Rbt	Rainbow Trout
Sbh	Striped Bass Hybrid
Smb	Smallmouth Bass
Tm	Tiger Muskellunge
Wa	Walleye

ATLANTIC COUNTY
Birch Grove Park Pond—Northfield—1,860 Bkt
Hammonton Lake—Hammonton—2,670 Bkt

BERGEN COUNTY
AT&T Pond—Rochelle Park—200 Bs
Bergen County Park Pond—Wallington—200 Bs
Hackensack River—Lake Tappan to Harriot Ave., Harrington Park—955 Bkt, 855 Rbt
Hohokus Brook—Forest Rd. to Whites Pond—340 Bkt, 430 Rbt, 140 Bnt
Indian Lake—Little Ferry—800 Bkt, 1,060 Rbt
Liberty Park Pond—Upper Saddle River—200 Bs
Mill Pond—Park Ridge—710 Bkt, 630 Rbt
Pascack Creek—Orchard St., Hillsdale to Lake St., Westwood—870 Bkt, 750 Rbt
Pondside Park—Harrington—200 Bs
Ramapo River—State line to Pompton Lake—4,225 Bkt, 9,140 Rbt, 2,885 Bnt
Saddle River, Lower—Commons Office Complex Parking Lot, downstream to Grove St.—1,805 Bkt, 1,585 Rbt
Saddle River, Upper—Old Stone Church Rd., downstream to Post Office—720 Bkt, 630 Rbt, 130 Bnt
Tienekill Creek—Closter, entire length—430 Bkt, 240 Rbt
Twinney Park—Ridgewood—200 Bs
Whites Pond—Waldwick—740 Bkt, 970 Rbt, 600 Chc
Zabriskie Pond—Wyckoff—200 Bs

BURLINGTON COUNTY
Crystal Lake—Willingboro—950 Bkt, 1,240 Rbt
Rancocas Creek, Southwest Branch—Medford, Mill St. Park to Branch St. Bridge—590 Bkt, 520 Rbt
Rancocas Creek—Downstream of junction of North Branch and South Branch—1,616 Tm
Swedes Lake—Riverside—975 Chc
Sylvan Lake—Burlington—730 Bkt, 650 Rbt

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Neshanic River—Kuhl Rd. to Hunterdon County Rt. 514—390 Bkt, 110 Rbt
Raritan River, South Branch Lower—Rt. 31 Bridge, downstream to S/Br.—4,000 Bkt, 5,345 Rbt, 1,955 Brt
Raritan River, South Branch Middle—Ramsey Farm, downstream to Rt. 31 Bridge—12,460 Bkt, 14,675 Rbt, 6,025 Bnt
Rockaway Creek—Readington Twp., entire length—330 Bkt, 300 Rbt
Round Valley Reservoir—Lebanon—3,880 Rbt, 7,760 Bnt
Spring Mill Brook—Spring Mills, entire length—440 Bkt, 220 Rbt
Spruce Run Creek—Glen Gardner and Lebanon Twp., entire length—4,010 Rbt
Spruce Run Reservoir—Clinton—2,860 Bkt, 2,510 Rbt, 4,580 Sbh, 13,000 Np
Sydney Brook—Sydney, entire length—120 Bkt, 120 Rbt
Wickecheoke Creek—Covered Bridge, Sergeantsville to Delaware River—580 Bkt, 290 Rbt

MERCER COUNTY

Assunpink Creek—Assunpink Site 5 Dam upstream of Rt. 130 Bridge to Carnegie Rd.—Hamilton Twp.—1,420 Bkt
Colonial Lake—Lawrence Twp.—710 Bkt, 630 Rbt
Delaware Raritan Canal—Mulberry St., Trenton to Alexander St., Princeton—3,235 Bkt, 2,865 Rbt
Delaware Raritan Feeder Canal, Lower—Hunterdon/Mercer County Line to Upper Ferry Rd. Bridge—2,070 Bkt, 3,270 Rbt
Delaware Raritan Canal (3 mile stretch)—740 Chc
Delaware Raritan Canal (10 mile stretch)—1,150 Chc
Gropps Lake—Hamilton Twp.—1,200 Chc
Mercer Lake—Mercerville—808 Tm
Rosedale Lake—Rosedale—900 Bkt, 790 Rbt, 1,025 Chc
Stony Brook—Woodsville to Port Mercer—2,345 Bkt, 2,075 Rbt

MIDDLESEX COUNTY

Boyds Pond—North Brunswick—200 Bs
Carteret Park Pond—Carteret—200 Bs
Dailys Pond—South River—200 Bs
East Brunswick Park Pond—East Brunswick—910 Chc
Farrington Lake—North Brunswick—1,480 Bkt, 1,300 Rbt, 1,590 Chc, 3,025 Np
Hook's Creek Lake—Cheesequake State Park—1,700 Bkt, 390 Rbt, 600 Chc
Ireland Brook—Farrington Lake to point 500 feet upstream of Riva Ave.—300 Bkt
Kennedy Park Pond—Sayreville—200 Bs
Lawrence Brook—Dam at Farrington Lake to second RR bridge (Raritan RailRd.) below Main St., Milltown—385 Bkt, 335 Rbt
Roosevelt Park Pond—Edison Twp.—780 Bkt, 690 Rbt, 600 Chc
Spring Lake—South Plainfield—400 Bs
Weston's Mill Pond—New Brunswick—1,360 Chc
Woodlet Pond—South Brunswick—200 Bs

MONMOUTH COUNTY

Conines Mill Pond—Allentown—200 Bs, 1,025 Chc
Deal Lake—Deal—1,600 Np, 1,410 Chc
Englishtown Mill Pond—Englishtown—1,390 Bkt
Garvey's Pond—Navesink—295 Bkt, 265 Rbt

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HACKETTSTOWN HATCHERY STOCKING RECORDS

	Date	Name	Species	#_F	F/lb	lb_F	XL	YEAR
	7/2/79	MILLTOWN POND	BLUEGILLS	190				1979
	7/13/79	BERKLEY TOWNSHIP POND	BLUEGILLS	220				1979
	7/17/79	WATCHUNG SCOUT RESERVATION POND	BLUEGILLS	150				1979
	7/27/79	SOUTH BRUNSWICK PARK POND	BLUEGILLS	150				1979
	8/14/79	LOG BASIN POND	BLUEGILLS	200				1979
	8/24/79	SUNSET LAKE	BLUEGILLS	250				1979
				1160				1979
	7/2/79	MILLTOWN POND	BROWN BULLHEAD	60				
	7/13/79	BERKLEY TOWNSHIP POND	BROWN BULLHEAD	30				1979
				90				1979
	8/31/79	BARBOURS POND	CHANNEL CATFISH	500				
	8/31/79	DIAMOND MILL POND	CHANNEL CATFISH	500				1979
	8/31/79	ROOSEVELT PARK POND	CHANNEL CATFISH	500				1979
	8/31/79	SPOOKY BROOK LAKE	CHANNEL CATFISH	500				1979
	8/31/79	SURPRISE LAKE	CHANNEL CATFISH	500				1979
	8/31/79	VERONA LAKE	CHANNEL CATFISH	500				1979
	9/18/79	AMWELL LAKE	CHANNEL CATFISH	500				1979
	9/18/79	DENNISVILLE LAKE	CHANNEL CATFISH	500				1979
	9/18/79	GREENWICH LAKE	CHANNEL CATFISH	500				1979
	9/18/79	HARRISONVILLE LAKE	CHANNEL CATFISH	500				1979
	9/18/79	POMPTON LAKE	CHANNEL CATFISH	500				1979
	9/18/79	RARITAN RIVER SOUTH BRANCH	CHANNEL CATFISH	500				1979
	9/18/79	SHADOW LAKE	CHANNEL CATFISH	50				1979
	9/18/79	TOPENEMUS LAKE	CHANNEL CATFISH	500				1979
			CHANNEL CATFISH	500				1979
	9/14/79	ASSUNPINK LAKE		6550				1979
	9/14/79	CAMP WATCHUNG	LARGEMOUTH BASS	1500				
	9/14/79	CONVENT ST JOHN BAPTIST	LARGEMOUTH BASS	50				1979
	9/14/79	FORDS PARK POND	LARGEMOUTH BASS	50				1979
WA	9/14/79	OXFORD FURNACE LAKE	LARGEMOUTH BASS	75				1979
			LARGEMOUTH BASS	1500				1979
	7/21/79	BELLE MOUNTAIN PARK POND		3175				1979
	9/7/79	BEST LAKE	SUNFISH	200				
	9/14/79	BROOKSIDE PARK POND	SUNFISH	100				1979
	9/21/79	CUMBERLAND POND	SUNFISH	100				1979
	9/21/79	MACS POND	SUNFISH	500				1979
			SUNFISH	150				1979
HT	7/31/79	SPRUCE RUN RESERVOIR		1050				1979
HT	8/24/79	SPRUCE RUN RESERVOIR	TIGER MUSKIES	1500				
			TIGER MUSKIES	2845				1979
				4345				1979
				[redacted]				
	9/26/80	CLARKS POND	BLUEGILLS	100				
	9/16/80	MILTON LAKE		100				1980
	9/16/80	PEDDIE LAKE	CHANNEL CATFISH	500				
			CHANNEL CATFISH	500				1980
								1980

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Date		Species	#_F	F/lb	lb_F	XL	YEAR
6/16/83	BUDD LAKE	NORTHERN PIKE	484				1983
6/16/83	SPRUCE RUN RESERVOIR	NORTHERN PIKE	485				1983
			969				
			11534				
7/3/85	ALLENTOWN LAKE	BLUEGILLS	250				1985
7/19/85	COOPER MILL PARK POND	BLUEGILLS	100			6.10	1985
7/19/85	SOUTH BRUNSWICK PARK POND	BLUEGILLS	100			6.10	1985
8/16/85	PLEASANT VALLEY PARK POND	BLUEGILLS	150			6.50	1985
8/30/85	DONALSON PARK POND	BLUEGILLS	300			6.00	1985
9/20/85	LOWER ECHO PARK POND	BLUEGILLS	250			6.20	1985
9/27/85	CUMBERLAND POND	BLUEGILLS	200				1985
			1350				
7/25/85	LAKE ASSUNPINK	CHANNEL CATFISH	500	1.7	294	12.40	1985
7/30/85	MARY ELMER LAKE	CHANNEL CATFISH	500	1.7	294	12.40	1985
7/30/85	WOODSTOWN LAKE	CHANNEL CATFISH	500	1.7	294	12.40	1985
8/9/85	MILTON LAKE	CHANNEL CATFISH	500	1.7	294	12.40	1985
9/6/85	HARRISONVILLE LAKE	CHANNEL CATFISH	200	2.1	95	11.60	1985
9/20/85	OXFORD FURNACE LAKE	CHANNEL CATFISH	170	2.3	74	11.30	1985
			2370				
10/8/85	UNION LAKE	HYBRID BASS	1281	7.14	179.4	6.67	1985
10/9/85	ASSUNPINK LAKE	HYBRID BASS	292	8.1	36	6.48	1985
10/9/85	CRANBERRY LAKE	HYBRID BASS	256	11	23.2	6.45	1985
			1829				
9/6/85	ALLENTOWN LAKE	LARGEMOUTH BASS	180	1.9	9.5	10.50	1985
9/6/85	BOYDS POND	LARGEMOUTH BASS	50	5.5	9	7.40	1985
9/6/85	HARRISONVILLE LAKE	LARGEMOUTH BASS	150	2.7	56	9.40	1985
10/19/85	DELAWARE RARITAN CANAL	LARGEMOUTH BASS	200				1985
10/19/85	DELAWARE RARITAN CANAL	LARGEMOUTH BASS	400				1985
10/27/85	DELAWARE RARITAN CANAL	LARGEMOUTH BASS	186				1985
			1166				
7/24/85	NAVASINK RIVER	STRIPED BASS	4008	249	16.1	2.30	1985
8/21/85	NAVASINK RIVER	STRIPED BASS	7979	100.2	79.6	3.20	1985
9/25/85	NAVASINK RIVER	STRIPED BASS	7926	44.1	179.8	4.10	1985
10/17/85	NAVASINK RIVER	STRIPED BASS	6934	16.2	429	5.20	1985
			26847				
			33562				
6/13/86	BOYDS POND	BLUEGILLS	100			5.80	1986
6/13/86	ZABRISKIE POND	BLUEGILLS	250			5.80	1986
6/20/86	BELLE MOUNTAIN PARK POND	BLUEGILLS	250			4.80	1986
6/20/86	OTTO C PEHLE PARK POND	BLUEGILLS	200			4.80	1986
7/3/86	JEFFERSON PARK POND	BLUEGILLS	200			5.10	1986
7/11/86	COOPER MILL PARK POND	BLUEGILLS	200			5.60	1986
7/11/86	HARDCASTLE POND	BLUEGILLS	150			5.60	1986
7/11/86	SPRING LAKE	BLUEGILLS	200			5.60	1986
7/18/86	MONMOUTH JUNCTION POND	BLUEGILLS	150			5.40	1986
7/18/86	SOUTH BRUNSWICK PARK POND	BLUEGILLS	150			5.40	1986

Date	Name	Species	# F	F/lb	lb F	XL	YEAR
8/8/86	JOHNSON PARK POND	BLUEGILLS	200			5.30	1986
8/22/86	JAMESTOWN TRAINING POND	BLUEGILLS	200			5.90	1986
9/12/86	LOWER ECHO PARK POND	BLUEGILLS	250			6.10	1986
9/19/86	CUMBERLAND POND	BLUEGILLS	300			6.10	1986
			2800				
9/19/86	CUMBERLAND POND	BROWN BULLHEAD	1000	4	250		1986
			1000				
6/27/86	JJ BRADDOCK PARK POND	CHANNEL CATFISH	500	1.8	278	12.30	1986
7/2/86	WEST HUDSON PARK POND	CHANNEL CATFISH	500	2.2	227	11.50	1986
9/19/86	CUMBERLAND POND	CHANNEL CATFISH	4				1986
9/26/86	ROSEDALE LAKE	CHANNEL CATFISH	197	21	9.4	5.40	1986
			1201				
9/10/86	LAKE ASSUNPINK	HYBRID BASS	1394	22.1	63.1	4.50	1986
			1394				
3/6/86	ROUND VALLEY RESERVOIR	LAKE TROUT	5128	4	1282	9.37	1986
			5128				
5/15/86	PETTY POND	LARGEMOUTH BASS	810	26.1	31	4.40	1986
5/30/86	HARRISONVILLE LAKE	LARGEMOUTH BASS	1525	20.1	76	4.80	1986
5/30/86	NEWMARKET POND	LARGEMOUTH BASS	1270	20.1	63	4.80	1986
7/2/86	PEQUEST QUARRY POND	LARGEMOUTH BASS	50	12.6	4	5.60	1986
9/10/86	ETRA LAKE	LARGEMOUTH BASS	1000	12.6	7.9	5.60	1986
9/16/86	SAFFRIN POND	LARGEMOUTH BASS	700	12.6	55	5.60	1986
9/17/86	DELAWARE RARITAN CANAL	LARGEMOUTH BASS	1000	12	83	5.70	1986
10/3/86	DELAWARE RARITAN CANAL	LARGEMOUTH BASS	5715	12.6	453	5.60	1986
			12070				
6/25/86	BUDD LAKE	NORTHERN PIKE	1162	98	11.9	3.70	1986
7/16/86	BUDD LAKE	NORTHERN PIKE	173	14.6	11.8	7.00	1986
			1335				
8/20/86	NAVESINK RIVER	STRIPED BASS	3460	71.3	48.5	3.30	1986
9/11/86	NAVESINK RIVER	STRIPED BASS	4306	27	159.5	4.30	1986
9/30/86	NAVESINK RIVER	STRIPED BASS	5877	19.6	299.7	5.00	1986
			13643				
6/5/87	BARBOURS POND	BLUEGILLS	150			5.70	1987
6/5/87	JOHNSON PARK POND	BLUEGILLS	150			5.70	1987
6/5/87	KENNEDY PARK POND	BLUEGILLS	150			5.70	1987
6/12/87	AT&T POND	BLUEGILLS	200			5.70	1987
6/12/87	DEER PATH PARK POND	BLUEGILLS	150			5.70	1987
6/12/87	ZABRISKIE POND	BLUEGILLS	150			5.70	1987
6/19/87	BELLE MOUNTAIN PARK POND	BLUEGILLS	250			5.70	1987
6/19/87	BOYDS POND	BLUEGILLS	125			5.70	1987
6/19/87	SPRING LAKE	BLUEGILLS	200			5.70	1987
7/2/87	JEFFERSON PARK POND	BLUEGILLS	300	7.8	38	5.60	1987
7/2/87	NORTH COMMUNITY PARK POND	BLUEGILLS	100	7.8	13	5.60	1987
7/10/87	COOPER MILL PARK POND	BLUEGILLS	200	6.7	30	5.90	1987
7/17/87	SOUTH BRUNSWICK PARK POND	BLUEGILLS	125	6.1	20	6.10	1987
7/24/87	JOHNSON PARK POND	BLUEGILLS	150	5.5	27	6.30	1987

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Date	Name	Species	#_F	F/lb	lb_F	XL	YEAR
7/31/87	BERLIN PARK POND	BLUEGILLS	100	5	20	6.50	1987
9/4/87	DONALSON PARK POND	BLUEGILLS	200	8.6	23	5.40	1987
9/11/87	LOWER ECHO PARK POND	BLUEGILLS	250	4	62	7.00	1987
9/18/87	CUMBERLAND POND	BLUEGILLS	250	3.8	66	7.10	1987
9/25/87	WARINANCO PARK POND	BLUEGILLS	300	3.8	79	7.10	1987
			3500				
8/26/87	BRANCH BROOK PARK POND	CHANNEL CATFISH	1000	12	83	6.70	1987
8/26/87	VERONA PARK POND	CHANNEL CATFISH	550	12	46	6.70	1987
9/4/87	POMPTON LAKE	CHANNEL CATFISH	1650	33	50	4.70	1987
9/4/87	WHITES POND	CHANNEL CATFISH	500	33	15	4.70	1987
9/18/87	SUNSET LAKE	CHANNEL CATFISH	1300	22.7	57.5	5.00	1987
9/28/87	COLONIAL LAKE	CHANNEL CATFISH	500	12.6	40.1	6.10	1987
9/28/87	MERCER LAKE	CHANNEL CATFISH	1500	13.4	112.2	6.00	1987
9/28/87	PEDDIE LAKE	CHANNEL CATFISH	600	14	43	5.90	1987
9/28/87	ROSEDALE LAKE	CHANNEL CATFISH	950	13.9	68.5	5.90	1987
9/28/87	SPRING LAKE	CHANNEL CATFISH	600	14.3	42.5	5.80	1987
10/8/87	AMWELL LAKE	CHANNEL CATFISH	500	10.4	48.5	6.50	1987
10/8/87	HARRISONVILLE LAKE	CHANNEL CATFISH	950	11.1	85.5	6.30	1987
10/8/87	TAKANASSE LAKE	CHANNEL CATFISH	500	10.5	47.5	6.50	1987
10/9/87	BARBOURS POND	CHANNEL CATFISH	550	12.2	45.1	6.20	1987
10/9/87	COLUMBIA LAKE	CHANNEL CATFISH	1175	12.6	93.2	6.10	1987
10/9/87	FURNACE LAKE	CHANNEL CATFISH	1165	13.7	85	5.90	1987
10/9/87	SPEEDWELL LAKE	CHANNEL CATFISH	600	12.8	47	6.10	1987
10/9/87	SURPRISE LAKE	CHANNEL CATFISH	785	15.4	51	5.70	1987
			15375				
3/27/87	RARITAN RIVER	CHINOOK SALMON	59705	110	541	3.20	1987
			59705				
7/31/87	LAKE ASSUNPINK	HYBRID BASS	192	25	7.7	4.20	1987
			192				
3/11/87	ROUND VALLEY RESERVOIR	LAKE TROUT	6351	2.9	2224	10.00	1987
			6351				
9/18/87	BOSTWICK LAKE	LARGEMOUTH BASS	320	4.1	78	8.10	1987
9/23/87	SPRUCE RUN RESERVOIR	LARGEMOUTH BASS	4844	12.9	375.5	5.40	1987
9/25/87	BOGUES POND	LARGEMOUTH BASS	270	12.9	20.9	5.40	1987
9/28/87	MONMOUTH FIRE POND	LARGEMOUTH BASS	50	12.9	3.9	5.40	1987
9/30/87	SPRUCE RUN RESERVOIR	LARGEMOUTH BASS	2915	12.9	226	5.40	1987
9/30/87	SPRUCE RUN RESERVOIR	LARGEMOUTH BASS	2251	11.2	201	5.50	1987
10/7/87	MONKSVILLE RESERVOIR	LARGEMOUTH BASS	12745	35	364	3.70	1987
10/16/87	MONKSVILLE RESERVOIR	LARGEMOUTH BASS	7300	42	174	3.40	1987
			30695				
5/18/87	SPRUCE RUN	NORTHERN PIKE	6518	84	78	4.00	1987
5/27/87	BUDD LAKE	NORTHERN PIKE	3736	67	55.9	4.20	1987
5/29/87	SPRUCE RUN	NORTHERN PIKE	6503	63	104	4.30	1987
6/3/87	MAURICE RIVER	NORTHERN PIKE	5807	61	94.8	4.40	1987
6/11/87	CARNAGIE LAKE	NORTHERN PIKE	1159	38	30.5	5.10	1987
6/17/87	CARNAGIE LAKE	NORTHERN PIKE	2210	43	51.4	4.90	1987
6/25/87	FARRINGTON LAKE	NORTHERN PIKE	3304	28	118	5.40	1987

Date	Place	Species	[redacted]	[redacted]	[redacted]	XL	YEAR
7/29/87	PASSAIC RIVER	TIGER MUSKIES	965	24	40.2	6.90	1987
			965				
			146020				
5/13/88	WEST HUDSON PARK POND	BLUEGILLS	250	6.7	37	5.90	1988
5/20/88	GLOUCESTER CITY PARK POND	BLUEGILLS	150	5.5	27	6.30	1988
5/20/88	LOWER EDGE LAKE POND	BLUEGILLS	250	5.5	45	6.30	1988
6/3/88	CARTERET PARK POND	BLUEGILLS	250	6.1	41	6.10	1988
6/3/88	DEER PATH PARK POND	BLUEGILLS	150	6.1	25	6.10	1988
6/3/88	KENNEDY PARK POND	BLUEGILLS	150	6.1	25	6.10	1988
6/3/88	SPRING LAKE	BLUEGILLS	250	6.1	41	6.10	1988
6/10/88	AT&T POND	BLUEGILLS	200	7.4	27	5.70	1988
6/10/88	BARBOURS POND	BLUEGILLS	150	7.4	20	5.70	1988
6/10/88	COLONIAL LAKE	BLUEGILLS	250	7.4	34	5.70	1988
6/10/88	ZABRISKIE POND	BLUEGILLS	150	7.4	20	5.70	1988
6/17/88	BOYDS POND	BLUEGILLS	125	7.4	17	5.70	1988
6/17/88	GOFFLE BROOK PARK POND	BLUEGILLS	200	7.4	27	5.70	1988
6/17/88	SPOOKY BROOK POND	BLUEGILLS	150	7.4	20	5.70	1988
6/24/88	BRICK LAKE	BLUEGILLS	200	7	29	5.80	1988
7/1/88	JEFFERSON PARK POND	BLUEGILLS	250	6.4	39	6.00	1988
7/1/88	NORTH COMMUNITY PARK POND	BLUEGILLS	100	6.4	16	6.00	1988
7/8/88	COOPER MILL PARK POND	BLUEGILLS	250	8.8	29	5.40	1988
7/8/88	SMITHVILLE LAKE	BLUEGILLS	150	8.8	17	5.40	1988
7/15/88	SOUTH BRUNSWICK PARK POND	BLUEGILLS	125	11.4	11	4.90	1988
8/18/88	JOHNSON PARK POND	BLUEGILLS	100	5.3	19	6.40	1988
9/9/88	WARINANCO PARK POND	BLUEGILLS	225	5.3	43	6.40	1988
9/16/88	CUMBERLAND POND	BLUEGILLS	100	5.3	19	6.40	1988
9/30/88	WARINANCO PARK POND	BLUEGILLS	225	5.3	43	6.40	1988
			4400				
8/18/88	COMO LAKE	CHANNEL CATFISH	959	21.8	44	5.90	1988
8/18/88	HOLMDEL PARK POND	CHANNEL CATFISH	305	21.8	14	5.90	1988
8/18/88	ROOSEVELT PARK POND	CHANNEL CATFISH	610	21.8	28	5.90	1988
8/19/88	CARNEGIE LAKE	CHANNEL CATFISH	1550	21.8	72	5.90	1988
8/19/88	WHITEHEAD POND	CHANNEL CATFISH	650	21.8	30	5.90	1988
9/30/88	BRANCH BROOK PARK POND	CHANNEL CATFISH	880	13.5	65	6.00	1988
10/7/88	POMPTON LAKE	CHANNEL CATFISH	1130	11	102.7	6.00	1988
11/1/88	POMPTON LAKE	CHANNEL CATFISH	370	17.2	21.5	6.00	1988
11/1/88	VERONA PARK POND	CHANNEL CATFISH	660	17.2	38	6.00	1988
11/1/88	WHITES POND	CHANNEL CATFISH	600	17.2	35	6.00	1988
11/10/88	SUNSET LAKE	CHANNEL CATFISH	1400	13.9	101	6.40	1988
11/10/88	SWEDESBORO LAKE	CHANNEL CATFISH	1000	14.1	71	6.20	1988
11/10/88	WOOLMANS PARK LAKE	CHANNEL CATFISH	500	14.1	35.5	6.20	1988
11/18/88	COLLIERS MILL POND	CHANNEL CATFISH	740	14.1	52.6	6.10	1988
[illegible]/10/88	TOPENEMUS LAKE	CHANNEL CATFISH	820	14.1	58.2	6.10	1988
[illegible]/88	TURNMILL POND	CHANNEL CATFISH	1415	13.2	107.2	6.10	1988
	DIAMOND MILL POND	CHANNEL CATFISH	539	13.4	40.1	6.20	1988
	LAKE ASSUNPINK	CHANNEL CATFISH	1528	14	108.9	5.90	1988
	MOUNT HOPE POND	CHANNEL CATFISH	758	13.9	54.5	6.20	1988

Date	Name	Species	#_F	F/lb	lb_F	XL	YEAR
6/21/89	MONKSVILLE RESERVOIR	WALLEYE	19592	496	39.5	2.00	1989
11/14/89	MONKSVILLE RESERVOIR	WALLEYE	1937	74.5	26	3.90	1989
			1256423				
			[redacted]				
5/11/90	KENNEDY PARK POND	BLUEGILLS	125	7.2	17.4	5.70	1990
5/18/90	LOWER ECHO PARK POND	BLUEGILLS	150	7.2	20.8	5.70	1990
5/25/90	MARTINS POND	BLUEGILLS	150	5.6	26.8	6.20	1990
6/1/90	DEANE PORTER POND	BLUEGILLS	100	5.6	17.8	6.20	1990
6/1/90	SPRUCE RUN CREEK	BLUEGILLS	150	5.6	26.8	6.20	1990
6/1/90	ZABRISKIE POND	BLUEGILLS	150	5.6	26.8	6.20	1990
6/7/90	MANASQUAN RESERVOIR	BLUEGILLS	11200	140	80	2.00	1990
6/8/90	GOFFLE BROOK PARK POND	BLUEGILLS	150	8.5	17.6	5.40	1990
6/8/90	METTLERS POND	BLUEGILLS	125	8.5	14.7	5.40	1990
6/8/90	SPRING LAKE PARK POND	BLUEGILLS	150	8.5	17.6	5.40	1990
6/15/90	BERLIN PARK POND	BLUEGILLS	100	8.5	11.8	5.40	1990
6/22/90	BRICK LAKE	BLUEGILLS	150	8.5	17.6	5.40	1990
6/29/90	WHITE OAK POND	BLUEGILLS	100	8.5	11.8	5.40	1990
7/6/90	JEFFERSON PARK POND	BLUEGILLS	150	8	18.7	5.50	1990
7/13/90	SOUTH BRUNSWICK PARK POND	BLUEGILLS	125	6.8	18.3	5.80	1990
9/21/90	CUMBERLAND POND	BLUEGILLS	200	8.5	23.6	5.40	1990
9/21/90	WARINANCO PARK POND	BLUEGILLS	200	8.5	23.6	5.40	1990
			13475				
9/28/90	AMWELL LAKE	CHANNEL CATFISH	1240	113	11	3.24	1990
9/28/90	BARBOURS POND	CHANNEL CATFISH	1280	108	11.8	3.41	1990
9/28/90	COLONIAL LAKE	CHANNEL CATFISH	1200	113	10.6	3.24	1990
9/28/90	MERCER LAKE	CHANNEL CATFISH	3160	113	28	3.24	1990
9/28/90	PEDDIE LAKE	CHANNEL CATFISH	1360	113	12	3.24	1990
9/28/90	WEEQUAHIC PARK POND	CHANNEL CATFISH	2625	105	25	3.41	1990
10/5/90	COLONIAL LAKE	CHANNEL CATFISH	600	16.5	36.4	5.92	1990
10/5/90	MERCER LAKE	CHANNEL CATFISH	1710	17.1	99.8	5.88	1990
10/5/90	PEDDIE LAKE	CHANNEL CATFISH	680	16.5	41.3	5.92	1990
10/12/90	CARNAGIE LAKE	CHANNEL CATFISH	1590	19.9	80	5.79	1990
10/12/90	HARRISONVILLE LAKE	CHANNEL CATFISH	955	19.5	49	5.96	1990
10/12/90	SWEDESBORO LAKE	CHANNEL CATFISH	1000	19.5	51.3	5.96	1990
10/12/90	WHITEHEAD POND	CHANNEL CATFISH	656	19.9	33	5.79	1990
10/12/90	WOOLMANS LAKE	CHANNEL CATFISH	500	19.5	25.6	5.96	1990
10/15/90	BIRCH GROVE PARK POND	CHANNEL CATFISH	640	15.8	40.5	6.00	1990
10/15/90	COMO LAKE	CHANNEL CATFISH	905	14.9	60.8	6.14	1990
10/15/90	CRESTWOOD VILLAGE POND	CHANNEL CATFISH	250	14.9	17	6.14	1990
10/15/90	SPRING LAKE	CHANNEL CATFISH	680	15.8	43	6.00	1990
10/23/90	BARBOURS POND	CHANNEL CATFISH	640	17.25	37.2	5.88	1990
10/23/90	DIAMOND MILL POND	CHANNEL CATFISH	400	16.3	24.5	6.07	1990
10/23/90	HOOKS CREEK LAKE	CHANNEL CATFISH	600	16.2	37	6.12	1990
10/23/90	PASSAIC RIVER	CHANNEL CATFISH	2000	17.2	116.3	5.88	1990
10/23/90	WEEQUAHIC PARK POND	CHANNEL CATFISH	1300	16.2	80.3	6.12	1990
11/7/90	LAKE HOPATCONG	CHANNEL CATFISH	4000	12.6	317	6.62	1990
11/7/90	MOUNT HOPE POND	CHANNEL CATFISH	720	13.4	54	6.37	1990

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Date	Name	Species	# F	F/lb	lb F	XL	YEAR
4/22/91	MANASQUAN RESERVOIR	BLACK CRAPPIE	11679	51	229	3.60	1991
4/22/91	MERRILL CREEK RESERVOIR	BLACK CRAPPIE	3570	51	70	3.60	1991
9/24/91	CLARKS POND	BLACK CRAPPIE	1500	51	29.4	3.60	1991
			16749				
5/3/91	KENNEDY PARK POND	BLUEGILLS	150	9.5	15.8	5.20	1991
5/3/91	VERNON FIREMANS POND	BLUEGILLS	150	9.5	15.8	5.20	1991
5/17/91	DAILYS POND	BLUEGILLS	150	9.5	15.8	5.20	1991
5/17/91	ECHO PARK POND	BLUEGILLS	150	9.5	15.8	5.20	1991
5/17/91	WEST HUDSON PARK POND	BLUEGILLS	150	9.5	15.8	5.20	1991
5/31/91	ANN VAN MIDDLESWORTH PARK POND	BLUEGILLS	150	9.5	15.8	5.20	1991
5/31/91	JOHNSON PARK POND	BLUEGILLS	150	9.5	15.8	5.20	1991
5/31/91	ZABRISKIE POND	BLUEGILLS	150	9.5	15.8	5.20	1991
6/7/91	AT&T POND	BLUEGILLS	150	8.5	17.6	5.40	1991
6/7/91	BERLIN PARK POND	BLUEGILLS	150	8.5	17.6	5.40	1991
6/7/91	COLONIAL LAKE	BLUEGILLS	150	8.5	17.6	5.40	1991
6/7/91	DEANE PORTER POND	BLUEGILLS	150	8.5	17.6	5.40	1991
6/7/91	GOFFLE BROOK PARK POND	BLUEGILLS	150	8.5	17.6	5.40	1991
6/7/91	MARTINS LAKE	BLUEGILLS	150	8.5	17.6	5.40	1991
6/7/91	SPRING LAKE	BLUEGILLS	150	8.5	17.6	5.40	1991
6/7/91	VETERANS MEMORIAL PARK POND	BLUEGILLS	150	8.5	17.6	5.40	1991
6/14/91	BOYDS POND	BLUEGILLS	200	8.5	17.6	5.40	1991
6/21/91	CARTERET PARK POND	BLUEGILLS	200	8.5	17.6	5.40	1991
6/21/91	SPRING LAKE	BLUEGILLS	200	8.5	17.6	5.40	1991
6/21/91	TWINNEY PARK POND	BLUEGILLS	200	8.5	17.6	5.40	1991
			3200				
9/13/91	DUCK POND	CHANNEL CATFISH	250	130	1.92	2.78	1991
9/13/91	SWEDES LAKE	CHANNEL CATFISH	25	0.15	166	25.00	1991
9/13/91	UNION LAKE	CHANNEL CATFISH	40	0.15	266	25.00	1991
9/19/91	VERONA PARK LAKE	CHANNEL CATFISH	15	0.15	100	25.00	1991
9/19/91	WOODCLIFFE LAKE	CHANNEL CATFISH	15	0.15	100	25.00	1991
9/24/91	ALLENTOWN POND	CHANNEL CATFISH	25	0.15	166	25.00	1991
9/24/91	CLARKS POND	CHANNEL CATFISH	500	65	7.7	3.53	1991
9/24/91	CONINES MILL POND	CHANNEL CATFISH	25	0.15	166	25.00	1991
9/24/91	ROSEDALE LAKE	CHANNEL CATFISH	25	0.15	166	25.00	1991
9/30/91	LAKE HOPATCONG	CHANNEL CATFISH	40	0.15	266	25.00	1991
10/4/91	BRANCH BROOK PARK POND	CHANNEL CATFISH	800	20.3	39.5	5.75	1991
10/4/91	GREEN TURTLE POND	CHANNEL CATFISH	1050	20.3	52	5.77	1991
10/4/91	OLDHAM POND	CHANNEL CATFISH	660	20.3	32.5	5.77	1991
10/4/91	SWARTSWOOD LAKE	CHANNEL CATFISH	1865	20.3	92	5.75	1991
10/4/91	VERONA PARK LAKE	CHANNEL CATFISH	660	20.3	32.5	5.75	1991
10/4/91	WHITES POND	CHANNEL CATFISH	600	20.3	30	5.77	1991
10/11/91	EAST BRUNSWICK PARK POND	CHANNEL CATFISH	910	24.3	37.5	5.50	1991
10/11/91	FARRINGTON LAKE	CHANNEL CATFISH	1590	25.1	63.4	5.62	1991
10/11/91	HOOKS CREEK PARK LAKE	CHANNEL CATFISH	600	24.3	24.5	5.50	1991
10/11/91	ROOSEVELT PARK POND	CHANNEL CATFISH	600	25.1	23.9	5.62	1991
10/11/91	SILAS CONDIT PARK POND	CHANNEL CATFISH	600	24.3	24.5	5.50	1991
10/11/91	WEST HUDSON PARK LAKE	CHANNEL CATFISH	400	24.3	16.5	5.50	1991
10/11/91	WESTONS MILL POND	CHANNEL CATFISH	1360	25.1	54.2	5.62	1991

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Date	Name	Species	#_F	F/lb	lb_F	XL	YEAR
8/20/93	GLEN LAKE	LARGEMOUTH BASS	150	90.6	1.7	2.84	1993
10/15/93	MANAHAWKIN IMPOUNDMENT	LARGEMOUTH BASS	500	15.8	38	5.00	1993
10/15/93	MANAHAWKIN IMPOUNDMENT	LARGEMOUTH BASS	350	10.8	32	5.44	1993
10/15/93	MIRROR LAKE	LARGEMOUTH BASS	10830	108	128	2.71	1993
			11830				
9/2/93	FURNACE LAKE	MUSKELLUNGE	300	38	8	5.60	1993
9/2/93	GREENWOOD LAKE	MUSKELLUNGE	3600	38	95	5.60	1993
			3900				
5/19/93	CRANBERRY LAKE	NORTHERN PIKE	240	9	27	8.20	1993
5/26/93	CRANBERRY LAKE	NORTHERN PIKE	362	51	7	4.60	1993
6/15/93	CRANBERRY LAKE	NORTHERN PIKE	324	18.5	17.5	6.00	1993
6/21/93	SPRUCE RUN RESERVOIR	NORTHERN PIKE	2207	21.2	104.1	5.87	1993
6/28/93	SPRUCE RUN RESERVOIR	NORTHERN PIKE	2373	31.2/36.2	6.5/57/4	.97/5.3	1993
7/22/93	POMPTON LAKE	NORTHERN PIKE	1840	13.1	140	6.89	1993
7/22/93	POMPTON LAKE	NORTHERN PIKE	225	20.6	11.2	5.31	1993
7/23/93	CRANBERRY LAKE	NORTHERN PIKE	825	13.1	63	6.89	1993
7/23/93	CRANBERRY LAKE	NORTHERN PIKE	140	20	7	6.31	1993
7/27/93	SPRUCE RUN RESERVOIR	NORTHERN PIKE	544	12.7	42.8	7.30	1993
7/27/93	SPRUCE RUN RESERVOIR	NORTHERN PIKE	140	20	7	6.31	1993
			9220				
7/9/93	CLINTON RESERVOIR	SMALLMOUTH BASS	2000	291	6.9	1.74	1993
7/13/93	CLINTON RESERVOIR	SMALLMOUTH BASS	60	1.2	50	15.00	1993
7/13/93	ECHO LAKE RESERVOIR	SMALLMOUTH BASS	50	1.2	40	15.00	1993
			2110				
4/30/93	BEST WESTERN MOTOR LAKE	SUNFISH	200	7.3	27	5.80	1993
4/30/93	DAHNERTS POND	SUNFISH	200	9.5	21	5.20	1993
4/30/93	GIAMPIETRO PARK POND	SUNFISH	200	7.3	27	5.80	1993
5/7/93	ANN VAN MIDDLESWORTH	SUNFISH	200	7.3	27	5.80	1993
5/7/93	ECHO LAKE PARK POND	SUNFISH	200	7.3	27	5.80	1993
5/7/93	KENNEDY PARK POND	SUNFISH	200	7.3	27	5.80	1993
5/14/93	DEAN PORTER SCHOOL POND	SUNFISH	200	7.3	27	5.80	1993
5/14/93	ECHO PARK LAKE POND	SUNFISH	200	7.3	27	5.80	1993
5/14/93	WEST HUDSON PARK POND	SUNFISH	200	7.3	27	5.80	1993
5/15/93	BARBOURS POND	SUNFISH	200	9.9	20	5.10	1993
5/20/93	DUCK POND	SUNFISH	200	9.9	20	5.10	1993
5/29/93	THOMAS POND	SUNFISH	200	7.5	27	5.40	1993
6/4/93	AT&T POND	SUNFISH	200	7.5	27	5.40	1993
6/4/93	COLONIAL LAKE	SUNFISH	200	7.5	27	5.40	1993
6/4/93	GOFFLE BROOK POND	SUNFISH	200	7.5	27	5.40	1993
6/4/93	JOHNSON PARK POND	SUNFISH	200	7.5	27	5.40	1993
6/4/93	PONDSIDE PARK POND	SUNFISH	200	7.5	27	5.40	1993
6/4/93	SPRING LAKE PARK	SUNFISH	200	7.5	27	5.40	1993
6/4/93	VETERANS MEMORIAL PARK	SUNFISH	200	7.5	27	5.40	1993
6/4/93	ZABRISKIE POND	SUNFISH	200	7.5	27	5.40	1993
6/5/93	METTLERS POND	SUNFISH	200	7.5	27	5.40	1993
6/11/93	BERGEN COUNTY PARK POND	SUNFISH	200	7.5	27	5.40	1993
6/11/93	DONALDSON PARK POND	SUNFISH	200	7.5	27	5.40	1993
6/11/93	INDIAN LAKE	SUNFISH	200	7.5	27	5.40	1993
		SUNFISH	200	7.5	27	5.40	1993

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Date	Place	Species	#_F	F/lb	lb_F	XL	YEAR
6/12/93	LIBERTY PARK POND	SUNFISH	200	7.5	27	5.40	1993
6/12/93	TWINNEY PARK POND	SUNFISH	200	7.5	27	5.40	1993
6/18/93	BOYDS POND	SUNFISH	200	7.5	27	5.40	1993
6/18/93	CARTERET PARK POND	SUNFISH	200	7.5	27	5.40	1993
6/19/93	SPRING LAKE	SUNFISH	200	7.5	27	5.40	1993
6/25/93	CARTERET PARK POND	SUNFISH	200	7.5	27	5.40	1993
6/25/93	NEW EGYPT LAKE	SUNFISH	200	7.5	27	5.40	1993
6/26/93	BRICK LAKE PARK POND	SUNFISH	200	7.5	27	5.40	1993
7/2/93	CONINES MILL POND	SUNFISH	200	7.5	27	5.40	1993
7/8/93	JEFFERSON POND	SUNFISH	200				1993
7/8/93	SOUTHARD PARK POND	SUNFISH	200				1993
7/10/93	WOODLOT PARK POND	SUNFISH	200				1993
7/23/93	MARTINS POND	SUNFISH	200				1993
8/4/93	RAHWAY RIVER PARK POND	SUNFISH	200				1993
8/18/93	GLEN LAKE	SUNFISH	200				1993
8/21/93	STACY PARK POND	SUNFISH	3400	1575	2.2	0.75	1993
10/5/93	MIRROR LAKE	SUNFISH	200				1993
		SUNFISH	2000	154	13	2.00	1993
7/1/93	MERCER LAKE		13200				
7/1/93	RANCOCAS CREEK	TIGER MUSKELLUNGE	700	31	22.6	5.53	1993
7/6/93	SPRUCE RUN RESERVOIR	TIGER MUSKELLUNGE	1200	31	38.7	5.53	1993
7/21/93	LITTLE SWARTSWOOD LAKE	TIGER MUSKELLUNGE	3000	44.3	67.6	5.11	1993
7/21/93	MOUNTAIN LAKE	TIGER MUSKELLUNGE	375	34	11		1993
7/22/93	RANCOCAS CREEK	TIGER MUSKELLUNGE	610	34	18		1993
7/23/93	SUNSET LAKE	TIGER MUSKELLUNGE	1200	32	22		1993
7/27/93	SPRUCE RUN RESERVOIR	TIGER MUSKELLUNGE	440	21.3	20.7	6.46	1993
8/18/93	LITTLE SWARTSWOOD	TIGER MUSKELLUNGE	1000	19.2	52	6.72	1993
8/18/93	MOUNTAIN LAKE	TIGER MUSKELLUNGE	375	13.5	27.8	7.39	1993
8/27/93	MERCER LAKE	TIGER MUSKELLUNGE	610	10.3	59.2	8.09	1993
9/2/93	DELAWARE RARITAN CANAL (10)	TIGER MUSKELLUNGE	700	10.6	66	7.94	1993
9/2/93	RANCOCAS CREEK	TIGER MUSKELLUNGE	300	11.4	27	8.12	1993
9/3/93	FARRINGTON LAKE	TIGER MUSKELLUNGE	1200	11.5	104	8.07	1993
		TIGER MUSKELLUNGE	1330	12.2	109	8.10	1993
7/20/93	MONKSVILLE RESERVOIR		13040				
7/22/93	MONKSVILLE RESERVOIR	WALLEYE	4347	76	57.2	3.85	1993
7/22/93	SWARTSWOOD LAKE	WALLEYE	700	68.3	10.2	3.90	1993
		WALLEYE	2588	68.3	37.9	3.90	1993
			7635				
			182979				

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ATTACHMENT H

State of New Jersey
State Water Policy Commission
Howard T. Critchlow, Engineer in Charge

The Ground-Water Supplies of Middlesex County New Jersey

With Special Reference to the Part of the Coastal Plain Northeast of Jamesburg

By

Henry C. Barksdale

Meredith E. Johnson
Roger C. Baker
Edward J. Schaefer
George D. DeBuchananne

Prepared in cooperation with the United States Department of the Interior, Geological Survey

STRATIGRAPHIC TABLE FOR MIDDLESEX COUNTY, N. J.

Cenozoic sequence
- Quaternary system
  - Recent series
    - Alluvium
    - Eolian deposits
  - Pleistocene series
    - Wisconsin drift
    - Cape May formation
    - Pensauken formation

UNCONFORMITY

Mesozoic sequence.
- Cretaceous system
  - Upper Cretaceous series
    - Mount Laurel and Wenonah sands
    - Marshalltown formation
    - Englishtown sand
    - Woodbury clay
    - Merchantville clay
    - Magothy formation
    - Raritan formation
      - Amboy stoneware clay
      - Old Bridge sand member
      - South Amboy fire-clay
      - Sayreville sand member
      - Woodbridge clay
      - Farrington sand member
      - Raritan fire-clay

UNCONFORMITY

- Triassic system
  - Upper Triassic series (Newark group)
    - Brunswick shale
    - Lockatong formation
    - Stockton formation

UNCONFORMITY

Proterozoic sequence (?)
- Pre-Cambrian (?)
  - Wissahickon formation

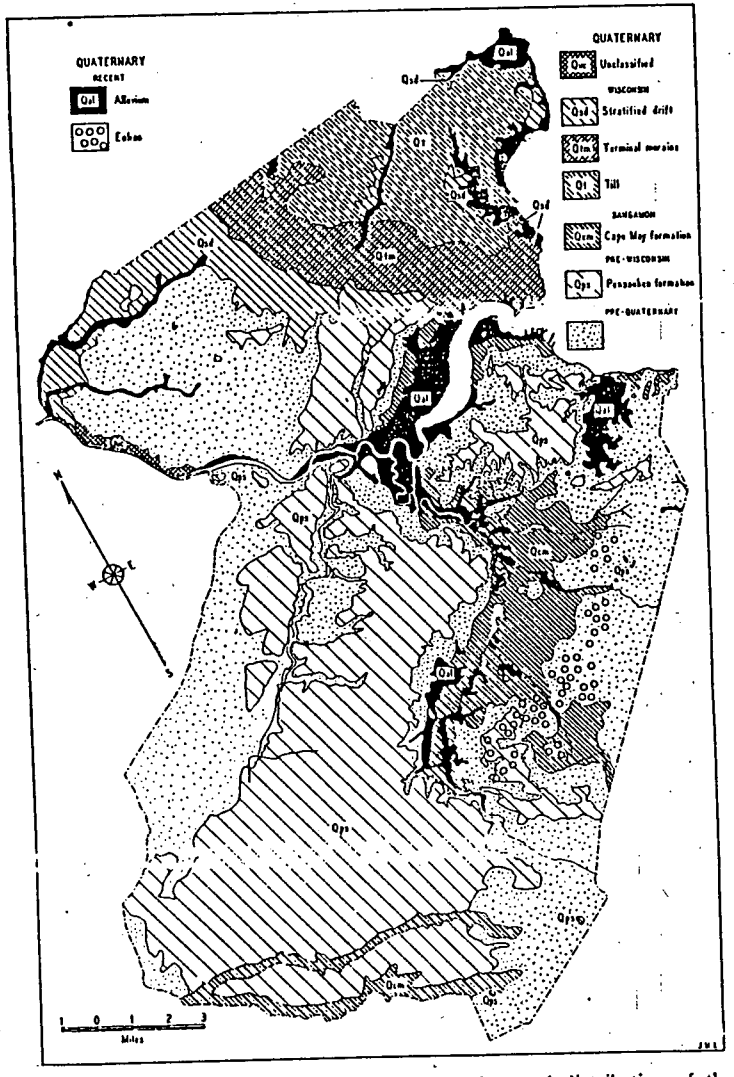

FIGURE 4.—Map of Middlesex County showing the areal distribution of the rocks of the Quaternary system. Small quantities of good water are obtained from the eolian deposits, the stratified drift, the Cape May and Pensauken formations, and the unclassified deposits.

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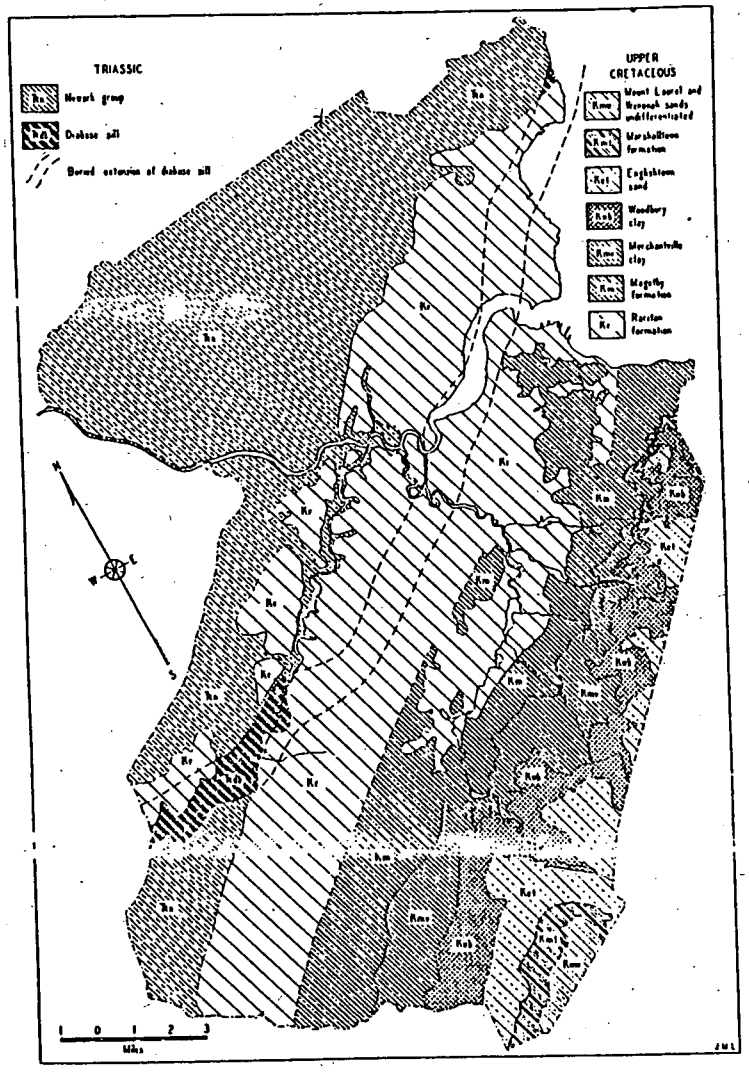

FIGURE 5.—Map of Middlesex County showing the exposures of the rocks of the Triassic and Cretaceous systems. Small quantities of good water are obtained from the Mount Laurel and Wenonah sands, the Englishtown sand and the Magothy formation within the county. Substantial quantities are derived from the Raritan formation and the rocks of the Newark group.

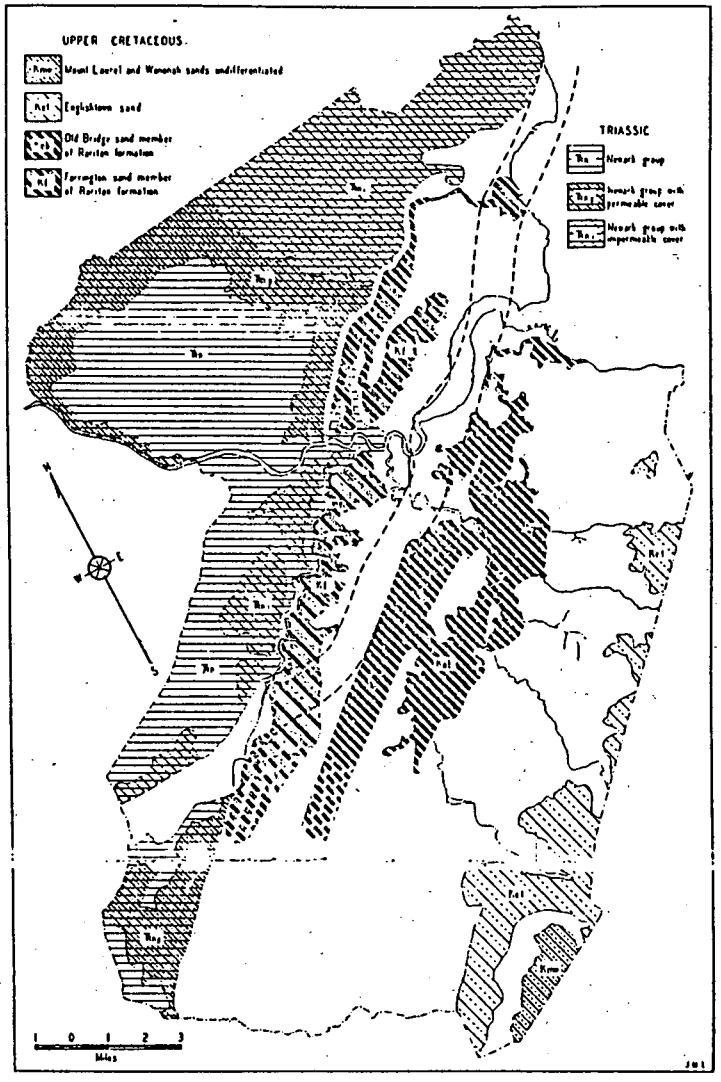

FIGURE 6.—Map of Middlesex County showing the intake areas of the important aquifers. Large quantities of good water are obtained from the Old Bridge and Farrington sand members of the Raritan formation. Small quantities are obtained from the Englishtown sand and the Mount Laurel and Wenonah sands. The rocks of the Newark group yield moderately large supplies where overlain by permeable materials, but elsewhere their yield is small.

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yielding about 30 million gallons daily. The destruction of existing and potential ground-water supplies outside the county might be at least as great.

Another plan for the proposed canal contemplates a sea-level canal. In this case, there would be no locks to even retard the movement of salt water along the canal. The destruction of the ground-water supplies by a sea-level canal would be more rapid and possibly more complete than by the lock canal discussed above.

RARITAN FIRE-CLAY

The Raritan fire-clay, the lowest of the Cretaceous beds, includes the "Raritan potter's clay" of early reports and is an inconstant, variable member which, at its outcrop near Nixon, Bonhampton, Fords, Keasbey and Milltown, has a thickness ranging from zero to 35 feet. The average thickness probably increases to the southeast as wells at East Spotswood, Old Bridge, Runyon, Parlin and South Amboy have encountered from 27 to 86 feet of blue, brown, gray or red clay at this stratigraphic horizon. Typically, the basal part of the clay has a brick-red color identical in shade with the underlying Triassic red shale from which it was derived. It has this same appearance where exposed in a recent roadcut northwest of Patricks Corner; but there the red clay is only a foot thick and is overlain by gray clay. Near the mouth of Mill Brook, southwest of Nixon, the clay is mixed with sand and gravel, but half a mile to the northeast it is a relatively pure light-gray clay with a reddish tinge and is a little over six feet thick. The same clay is exposed in a pit half a mile south of the point where Lawrence Brook empties into the Raritan River. There its base is concealed, but the exposed portion (7 feet thick) is a gray, "fat" clay of good quality.

TRIASSIC SYSTEM

Newark Group

In the investigations upon which this report is based, the study of the water-bearing properties of the rocks of the Newark group has been less detailed than those of the Old Bridge and Farrington sands. However, the rocks of the Newark group form one of the three most important aquifers in Middlesex County. This is true both because of the large amounts of water developed from them and because of their relatively wide extent. In much of that part of the county underlain by the coastal plain formations, two or more aquifers can be tapped at any given point by increasing the depth of drilling. In the area covered

by the Newark group, however, this is not true, because these rocks are very thick and essentially homogeneous, and because they are underlain by no other rocks that are capable of yielding any appreciable quantity of water.

GEOLOGY

As shown on the map on page 20, nearly all of the bed rock in Middlesex County northwest of a line roughly from Plainsboro through Monmouth Junction, Milltown and Woodbridge to Carteret is of Triassic age. The younger Quarternary formations form a relatively thin veneer on portions of the Triassic, particularly in the northern part of the county. South of the line mentioned the Triassic is overlain by Cretaceous deposits, but it has been penetrated by wells at Dunhams Corner, Parlin and South Amboy, and probably by the deep well near the Runyon pumping station.

The Triassic rocks in New Jersey belong to the Newark group which is divided into three formations, all of which are found in Middlesex County. The oldest is the *Stockton formation* which consists of conglomerate and sandstone interbedded with red shale. Next above is the *Lockatong formation* and this consists of hard shale and argillite of various hues. These two formations are found only in a small area between Milltown and Kingston near the southwestern border of the county. To the east they are covered by the younger Cretaceous rocks. The Stockton and Lockatong formations cannot be well seen or studied in the county, and they are not differentiated on the geologic maps.

The *Brunswick formation* is the youngest of the three formations of the Newark group, and within Middlesex County it crops out in a much greater area than the other two Triassic formations combined. It is a dull red shale interbedded with siltstones and occasional layers of sandstone. When dry it is a dense compact rock but it quickly softens and disintegrates when exposed to weathering.

In Middlesex County all the sedimentary rocks of the Newark group dip to the northwest at angles of 5° to 15°. The formations are rather impermeable except along the numerous cracks which everywhere traverse the beds at high angles to the bedding. Some water may also follow along the bedding planes, although such movement must be very restricted judging from actual experience with wells.

Molten rock was intruded into the Newark group in late Triassic time and in this region it solidified beneath the surface of the ground in the form of steeply dipping dikes and relatively flat sills. The largest of these is a diabase sill which is now exposed to the north in

Bergen Hill and the Palisades, to the east on Staten Island, and to the west in Rocky Hill. Between these latter two exposures it is buried beneath a mantle of Cretaceous and Pleistocene sediments, but its position has been determined by the many wells which have encountered it and by geophysical exploration. Since it has an important bearing on the water supply of the region, its location has been shown on the geologic maps. The diabase sill stood as a ridge on the pre-Cretaceous surface and was continuous from Rocky Hill to Bayonne. Between Staten Island and Rocky Hill the surface was downfaulted prior to the deposition of the Cretaceous sediments. The first Cretaceous sediments were deposited on each side of the ridge but not on top of it. With continued deposition sandy material covered the higher slopes and then was deposited across it without a break as shown in figure 3. The Farrington sand is very thin or lacking on top of the buried trap ridge between Perth Amboy and South Amboy, but near the Borough of South River it is continuous across a lower segment of the ridge. Because of these geologic factors water cannot move easily from the intake area of the Farrington sand north of the ridge and near Perth Amboy directly south to the center of pumpage from the sand near Parlin; but near the Borough of South River it probably can and does readily move across the trap ridge to the wells in that area.

The intrusion of this thick diabase sill profoundly affected the adjacent beds of shale, those nearest being altered to a tough, dark, spotted rock as hard as slate but lacking its cleavability. With increasing distance from the contacts the alteration is less and less pronounced, the rock becoming progressively softer and changing in color from dark gray, brown and greenish gray to light gray, purplish red, and finally the typical brick red of the unaltered shale. North of Middlesex County where the sill and adjacent beds are exposed the latter are altered for a thickness of 500 feet or more from the contacts. In this region similar altered beds may be seen in a gully west of Patricks Corner, which is more than half a mile distant from the nearest outcrop of diabase but which is unquestionably underlain by that rock at a depth of a few hundred feet; and near the mouth of Mill Brook, two miles northwest of Sayreville, where the nearest exposure of diabase is a small dike more than a mile distant. Metamorphosed or altered shale has also been encountered by wells drilled in Milltown, Keasbey, Perth Amboy and Woodbridge, and by two boreholes respectively two miles east-southeast of Plainsboro and two miles east-northeast of Dayton.

PHYSICAL PROPERTIES

The facts that the materials composing the rocks of the Newark group are usually fine-grained and relatively impermeable and that the formations are water-bearing by virtue of the cracks and crevices in the rocks, introduce special problems in any attempt to appraise their water-bearing capacity. Laboratory tests of ordinary samples of material collected in the field would be of no particular value, because they must of necessity deal with fragments of the rock and cannot indicate the capacity of the cracks between the undisturbed fragments as found in nature. Pumping tests provide the best means of studying the capacity of the group to yield water but very few have been made.

The permeability and the specific yield of the Newark group depend upon the degree of cracking. Since the degree of cracking decreases with the depth, the permeability and specific yield of the rocks also decrease with the depth. An advantage of pumping tests is that their results represent a composite of the conditions from top to bottom of the water-bearing part of the formation. The results of a pumping test may be directly expressed as a coefficient of transmissibility and a coefficient of storage. The coefficient of transmissibility is a measure of the ability of the formation to transmit water. It is the product of the average coefficient of permeability and the depth of the saturated portion of the aquifer. Under water-table conditions the coefficient of storage as determined in a pumping test is essentially the same as the average specific yield of the material. The cracks in the rocks of the Newark group intersect one another at many different angles with the result that the water in the rocks can generally move in any direction and is essentially under water-table conditions. Thus, without actually determining the effective depth of cracking of the aquifer or its characteristics at any given depth, it is possible by pumping tests to determine coefficients that are accurate indices of its capacity to store and transmit water.

Early in 1943 an opportunity arose to conduct a pumping test on some wells drawing from the rocks of the Newark group at Kenilworth, New Jersey, which is in Union County, about four or five miles north of the Middlesex County line at Rahway. At the site of the test the rocks of the Newark group were covered by a relatively permeable phase of the glacial till to a thickness of perhaps 30 or 40 feet. The results of the pumping test no doubt combine the characteristics of both the rock and the overlying materials to some extent. However, they are probably more representative of conditions in the shale than of those

in the overlying till. The results of the pumping tests at Kenilworth indicate that the coefficient of transmissibility of the rocks at that location is about 25,000 and that the coefficient of storage is about 0.0044.

The results of a single test cannot be considered representative of the whole Newark group. Nevertheless, they furnish a basis for an interesting comparison of the group with the aquifers of the coastal plain formations. The Farrington sand, for example, is about 80 feet thick and has an average coefficient of permeability of at least 1,200. Its coefficient of transmissibility would be the product of its thickness and its coefficient of permeability or at least 96,000. This means that the Farrington sand could transmit four or five times as much water as the rocks of the Newark group under a given head and through a given width of section.

The difference in the capacity of the two aquifers to store water is even more striking. It was estimated that a block of the Farrington sand one square mile in area and one foot thick could store about 67 million gallons of available water. If the sand is 80 feet thick, one square mile of it would store about 5,360 million gallons. If the thickness of the water-bearing part of the Newark group is assumed to be 300 feet and its specific yield 0.0044, one square mile of this aquifer could store only about 275 million gallons. Of course where there are overlying permeable sandy deposits, substantial additional quantities of water stored in these deposits, may be available to wells tapping the rocks. The low storage capacity of the rocks helps to explain the high rate of runoff and low ground-water flows observed on streams draining areas underlain by the Newark group where there is no permeable covering.

QUALITY OF WATER

With the exception of the waters that are contaminated by the intrusion of sea water, the water from the Triassic shales and sandstones of the Newark group is more highly mineralized than any other ground water obtained in Middlesex County. A majority of the wells tapping these rocks yield good water containing less than 200 or 300 parts per million of total solids, but it is not unusual to find several hundred parts per million of dissolved solids. The water is high in calcium and magnesium and the hardness is therefore high. The sulphates are high as compared with the carbonates and bicarbonates and much of the hardness is therefore noncarbonate or "permanent" hardness. In the water from one industrial well used for cooling, the total hardness expressed as calcium carbonate was reported to be 900 parts

per million. Very often the waters from these formations also contain objectionable quantities of iron. The chlorides are usually fairly low.

The quality of the water from the Newark group varies from place to place and from one bed to another. The Stockton formation usually yields very good water. Water from the Brunswick shale, on the other hand, is sometimes more highly mineralized. In general, it may be said that where the beds yield water most freely its quality is likely to be better than in those localities where the crevices in the rock are small and the yield is low. Perhaps the greater circulation of meteoric waters through the more permeable beds has removed some of the objectionable soluble materials that have been retained in the less permeable rocks. The fact that better water is generally encountered near the surface than at greater depths tends to confirm this idea.

DEVELOPMENT AND PUMPAGE

A great many wells have been drilled into the Newark group in Middlesex County. The vast majority of them have produced some water. In fact, one reason for the importance of this group of rocks as an aquifer is that they will generally yield at least a small quantity of water to a well in almost any locality where they are encountered. Numerous small wells have been drilled in these rocks for domestic and farmstead water supplies, and most of them have been satisfactory for this purpose. The yield of these wells ranges from a few gallons per minute to 100 gallons per minute or more.

A considerable number of wells have also been drilled into these rocks for municipal or industrial water supplies. Where conditions are most favorable such wells may yield from 100 to 500 gallons per minute, or even more, but very high yields are exceptional. With one or two exceptions the larger developments tapping this aquifer within Middlesex County yield less than 500,000 gallons daily, but there are several well fields yielding water supplies ranging from 100,000 to 500,000 gallons daily or more, and a considerable number that produce 25,000 to 100,000 gallons daily.

A total of approximately 9.6 million gallons a day was withdrawn from the aquifers of the Newark group in Middlesex County in 1941 for municipal and industrial use. About 8.5 million gallons a day or 89 percent of the total was withdrawn from wells in the municipalities north of the Raritan River. Nearly 6.5 million gallons a day or 68 percent of the total was pumped from wells in the Borough of South Plainfield, practically all from wells owned by the Middlesex Water

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