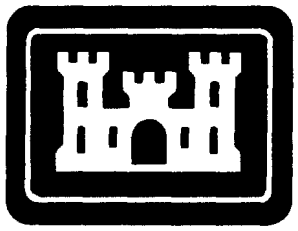


FINAL

CETHA-IR-CR-90172(A)

US Army Corps of Engineers

Toxic and Hazardous Materials Agency

Preliminary Assessment Report Addendum for Radford Army Ammunition Plant, VA

Contract Number DAAA15-90-D-0009
Delivery Order 10

March 1992

Prepared for:

U.S. ARMY TOXIC AND
HAZARDOUS MATERIALS AGENCY
Aberdeen Proving Ground
Maryland 21010-5401

C479N

Prepared by:

Roy F. Weston, Inc.
West Chester
Pennsylvania 19380

THAMA Form 45, 1 Jul 90

FINAL

USATHAMA DELIVERY ORDER 10

PRELIMINARY ASSESSMENT REPORT

ADDENDUM

for

RADFORD ARMY AMMUNITION PLANT, VA

Contract Number DAAA15-90-D-0009

John F. Nist
Senior Project Scientist

Yakir J. Hasit, PhD, P.E.
Project Manager

Frank J. Finger, II, P.E.
Deputy Program Manager

March 1992

Prepared By:

ROY F. WESTON, INC.
1 Weston Way
West Chester, Pennsylvania 19380

W.O. 2281-11-10-0004

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	3/31/92	Final

4. TITLE AND SUBTITLE

Preliminary Assessment Report Addendum for Radford Army Ammunition Plant

5. FUNDING NUMBERS

DAAA15-90-D-0009
Deliver Order 10

6. AUTHOR(S)

Mr. Scott E. Houston
Mr. John F. Nist

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Roy F. Weston, Inc.
1 Weston Way
West Chester, PA 19380

8. PERFORMING ORGANIZATION REPORT NUMBER

2281-11-10-0004

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Headquarters
Radford Army Ammunition Plant
Radford, VA 24141

USATHAMA
ATTN: CETHA-IR-CR
Aberdeen Proving Ground
Maryland 21010-5401

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

CETHA-IR-CR-90172(A)

11. SUPPLEMENTARY NOTES

None

12a. DISTRIBUTION/AVAILABILITY STATEMENT

U.S. Government Agency only. All other requests should be directed to the installation commander.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The U.S. Army Toxic and Hazardous Materials Agency (USATHAMA) previously contracted WESTON to address EPA Region III Preliminary Assessment Deficiency notifications for Radford Army Ammunition Plant. All deficiencies were addressed in accordance with the latest EPA guidance and the information was provided to USATHAMA and Radford Army Ammunition Plant for forwarding to EPA Region III.

EPA then revised its guidance by finalizing the revised version of the Hazard Ranking System (HRS) in February, 1991. This revision required that more detailed information be provided by Radford Army Ammunition Plant for ranking and to determine if Radford Army Ammunition Plant is eligible for placement on the National Priority List (NPL).

This report addresses additional Preliminary Assessment deficiencies for Radford Army Ammunition Plant and provides the information necessary for revised HRS scoring.

This report covers: 1) Overview/Site History; 2) Waste/Source Information; 3) Groundwater Pathway Information; 4) Surface Water Pathway Information; 5) Air Pathway Information; and 6) Soil-Exposure Pathway Information.

14. SUBJECT TERMS

Radford Army Ammunition Plant, CERCLA, Hazardous Substances, Hazardous Waste

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	Unlimited

INTRODUCTION

This Preliminary Assessment Report Addendum has been prepared to provide additional information for assisting US EPA in scoring the facility using the rHRS system to determine whether further action is required under CERCLA.

This Addendum contains the followings sections:

1. Overview/Site History
2. Waste/Source Information
3. Groundwater Pathway Information
4. Surface Water Pathway Information
5. Air Pathway Information
6. Soil-Exposure Pathway Information
7. References

HRS SCORING DEFICIENCY RESPONSES

EPA ID# VA1210020730
Federal Facility ID# VA1210020730
Facility Name Radford Army Ammunition Plant
City Radford State VA Zip 24141

1. OVERVIEW/SITE HISTORY

1A. Reports submitted to EPA are referenced and copies of each reference are provided.

References used in this Preliminary Assessment (PA) update are attached to these responses. Any available responses from the previous PA have also been attached in response to this deficiency.

1B. Describe facility operations (manufacturing, storage, waste disposal practices, etc.) including the following:

Construction of the current RAAP production facility began in 1940, as the United States needs for ammunition production facilities increased due to its participation in World War II. RAAP has been a Government Owned, Contractor Operated (GOCO) facility since it's inception. Waste created during the manufacturing of ammunition has been disposed of onsite, as there are a number of Landfills, Burning Grounds, and disposal areas on RAAP. Refer to the section of Dames & Moore Verification Investigation Work Plan for additional information concerning RAAP's general responsibilities and major activities, etc. [1]

1B2. A topographic map with a 4-mile radius drawn around each source.

USGS 7.5 minute quadrangles with a 4-mile radius drawn around the center of the facility have been provided. [2]

1B3. A facility and source location map and sketch.

Source locations are included in a RCRA Facility Investigation Work Plan For Radford Army Ammunition Plant, which was prepared by Dames and Moore. [3]

1D. Describe any releases of hazardous substances, pollutants, or contaminants to groundwater, surface water, soil, or air and provide sampling results with detection limits, laboratory methods, and quality assurance procedures.

Groundwater sampling from monitoring wells associated with a number of the sources has been conducted by RAAP personnel quarterly for a number of years. This sampling effort is discussed in deficiency response 3L. Several releases of hazardous substances are believed to have occurred from unlined lagoons, landfills, waste oil storage tanks and other various sources. Details of these sources and any releases are contained in Reference 3, 4, and 5. The sampling results are too lengthy to be included with this report. A soil sampling study was conducted by the U.S. Army Environmental Hygiene Agency (AEHA) in April of 1987. Groundwater sampling results associated with many of the sources are included in the 1987, A. T. Kearney Report.

Dames & Moore Consultants are currently installing 39 additional monitoring wells. Sampling of these wells has not yet been conducted. Surface Water, sediment, soil, and soil gas sampling is also being conducted by Dames & Moore under their current investigations at RAAP. These sampling results should be available at a future date. [4][5]

1E. Give the following population within each radius indicated below. Each radius should begin at the center of each source if the source is small or at the outer edge if the source is large. Count population in overlapping areas only once.

Population data for this deficiency is provided using the geographical center of RAAP (39°19'17"N, 80°54'17"W) as the origin and giving population rings in the required increments. [6]

1E1.	**0-1/4 mile**	0
1E2.	**1/4-1/2 mile**	0
1E3.	**1/2-1 mile**	0
1E4.	**1-2 miles**	2,455
1E5.	**2-3 miles**	1,268
1E6.	**3-4 miles**	7,355

1G. Describe facility and source security and access (e.g., fences, patrols, gates, etc.).

An eight foot chain link fence surrounds RAAP. There are three main entrances guarded 24 hours a day. A security clearance is required for all visitors entering the facility. [7]

2. WASTE/SOURCE INFORMATION (see Section 2 of the HRS Final Rule - December 1990 Federal Register).

2B. Describe as specifically as possible the amount (volume, weight, etc.) of each waste type produced and the form in which it was discharged or disposed (e.g., solid, liquid) at the facility.

There have been significant amounts of wastes associated with the production of propellants, explosives, and other materials produced at RAAP. The 1987 A.T. Kearney report provides information on quantities, volumes, and disposal methods for material at each of the sources. [4]

2F. Determine the depth at which wastes were deposited in each source.

Depths of landfills and other disposal areas at RAAP were not formally recorded. Most of the units were simply excavated without design procedures. The 1987 A. T. Kearney Report

includes some estimations of depth of disposal at some of the sources. Sampling currently being conducted by Dames & Moore Consultants could provide additional information on depths of disposal. [4]

2I. Describe the size, volume, capacity, and area of each source.

Due to the current inactivity at some of the sources, some of these parameters are uncertain (sites are overgrown, etc.). The 1987 A.T. Kearney report describes the size, volume, and capacity, at many of the sources. [4]

3. GROUNDWATER PATHWAY INFORMATION (see Section 3 of the HRS Final Rule - December 1990 Federal Register).

3A. Determine if the groundwater within a 4-mile radius of each source is used for any of the following purposes and locate the wells on a map. Each radius should begin at the center of each source if the source is small or at the outer edge if it is large. Provide the depth of each well. (Applies to all sources)

3A1. Private or public drinking water source.

Prices Fork, a small town located northwest of RAAP has two municipal wells serving a total of approximately 2,500 people. These wells are 180 and 350 feet deep. There are three additional water supply systems within 4 miles of RAAP. The Pulaski County supply to the west, City of Radford to the south, and Blacksburg & Christiansburg to the east all utilize surface water from the New River. These 4 supply systems are outlined on the map (dot - dash). Locations of the Prices Fork wells are also provided. The area northeast of RAAP is supplied by private wells. [8]

3A2. Irrigation of commercial food or commercial forage crops (include acres).

It is not believed that groundwater is used for irrigation of commercial food or commercial forage crops within 4 miles of RAAP. An off-post well inventory will be conducted under a RCRA Facility Investigation which will confirm or deny this belief. [3][7]

3A3. Commercial livestock watering.

There are cattle farms scattered throughout the 4 mile radius around RAAP. Many of these farms, especially to the northwest where public water is not available are using groundwater. [7]

3A4. Commercial aquaculture.

Groundwater within a 4-mile radius of RAAP is not used for commercial aquaculture.[7]

3A5. Water for major or designated recreational area, excluding drinking-water use.

Groundwater within 4-miles of RAAP is not used for recreational purposes. [7]

3A6. Standby wells used for drinking water at least once a year.

RAAP has two standby wells on post, however, the frequency of use is uncertain. [7]

3B. Outline the public water distribution system within a 4-mile radius of each source on a topographic map.

The public water distribution system has been outlined on the maps provided in Reference 2. [2]

3C. Identify the nearest drinking water well within a 4-mile radius of each source.

Private wells supply water to homes located just across the New River (the northern boundary of RAAP). The closest house is approximately 2000 feet from this boundary. [8]

3D. Determine the population (including workers, students, and residents) drawing from each drinking water well within the following radii. Each radius should start at the center of each source if the source is small,or at the outer edge if it is large. Count population in overlapping areas only once.

The following populations were determined by manually counting the houses on the appropriate USGS topographical maps and multiplying that count by 2.8 persons per household as determined by the 1980 census data. [9]

3D1. 0 - 1/4 mile

0 people

3D2. 1/4 - 1/2 mile

168 people

3D3. 1/2 - 1 mile

280 people

Facility Name Radford Army Ammunition Plant

3D4. 1 - 2 mile

448 people

3D5. 2 - 3 mile

504 people

3D6. 3 - 4 mile

644 people

3E. Describe known or probable groundwater flow direction from each source

Groundwater flow from each of the sources most probably flows from high elevations towards low elevations, which would be towards the New River. Groundwater flow for sites which undergo quarterly groundwater monitoring are provided in Reference 10. [10]

3L. Provide results from groundwater sampling of aquifers underlying the sources and from domestic wells (drinking water) within 2 miles of each source.

RAAP has a quarterly groundwater monitoring program. Analytical results of this program are too extensive to be included in this report. The general condition of the groundwater is described in Reference 10. [10]

Groundwater sampling results are also provided from areas within a 2 mile radius of three different points on RAAP: 37°12'08"N, 80°31'50"W (north section), 37°10'25"N, 80°32'42"W (south section), and 37°11'38"N, 80°33'56"W (west section). [11]

3M. Provide results from background groundwater sampling of aquifers underlying the sources.

Although there has not been any background groundwater sampling conducted on the facility, there are plans to construct wells that will be used to analyze groundwater entering different parts of the site. This project, to be completed by Dames & Moore Consultants has not yet been implemented. [7]

3N. Determine if any areas within a 4-mile radius of each source are located in a Wellhead Protection Area according to Section 1428 of the Safe Water Drinking Act.

There are no Wellhead Protection Areas within 4 miles of RAAP. [12]

Facility Name Radford Army Ammunition Plant

4. SURFACE-WATER PATHWAY INFORMATION (see Section 4 of the HRS Final Rule - December 1990 Federal Register).

4A. Describe surface-water bodies 0 to 15 miles downstream of each source and provide a map of surface-water bodies receiving drainage from each source.

There are a number of small creeks which drain into the New River within 15 miles downstream of RAAP. There are not any water bodies within 15 miles downstream other than the New River which receive surface drainage from RAAP. [2]

4B. Discuss the probable surface runoff pattern from each source to surface waters, including the distance to the nearest surface-water body; provide a map.

The New River is the main surface drainage feature at RAAP. Within the confines of the plant, the river forms a meander loop, referred to as the Horseshoe Area. The only other major natural drainage area onpost, Stroubles Creek, is the largest tributary of the New River and originates in the southeast sector of RAAP. RAAP also has a series of ditches which direct all surface runoff into either Stroubles Creek or the New River. Surface drainage patterns are shown on the maps provided, and outlined in Reference 13. [2][13]

4C. Describe the point(s) at each source where hazardous substances begin to migrate and their probable point(s) of entry into a surface-water body (including ponds,lakes, streams, etc.).

Any hazardous substance released anywhere on RAAP would migrate via storm sewer or surface runoff into the New River or Stroubles Creek (which discharges into the New River within the facility boundary). [2]

4D. Identify if surface water drawn from intakes within 15 miles downstream of the probable point of entry is used for any of the following purposes:

4D1. irrigation (5-acre minimum) of commercial food or commercial forage crops

Water is used on small farms for this purpose on this stretch of surface water. [20]

4D2. watering of commercial livestock

Water is used on small farms for this purpose on this stretch of surface water. [20]

4D3. ingredient in commercial food preparation

Water is not used for this purpose on this stretch of surface water. [20]

4D4. major or designated water recreation area, excluding drinking water

Water is used for this purpose on this stretch of surface water. [16]

4E. Identify the following targets associated with surface-water bodies 0 to 15 miles downstream of the probable point of entry.

4E1. Population (residents, workers, and students) served by intakes of drinking water.

RAAP has 2 surface water intakes on the New River which it uses primarily for production, but the water is treated to drinking water standards. One is located 2 miles upstream of Stroubles Creek, and the other is 6 miles downstream of RAAP on the New River. The population being served by these intakes for drinking water is estimated to be 1,000 people. [3][14][15][20]

4E4. Any portion of the surface water designated by a state for drinking-water use under Section 305(a) of the Clean Water Act; or any portion of surface water usable for drinking water.

The reach of the New River that passes through RAAP and Stroubles Creek have been classified as water generally satisfactory for: municipal water supply; secondary contact recreation; and fish and aquatic life. [13]

4F. Determine the miles of wetlands (wetland frontage) along surface-water bodies 0 to 15 miles downstream from the probable point of entry (see 40 CFR section 230.3).

There is no wetlands frontage within 15 miles downstream of RAAP. [2]

4G. Provide results from sampling of wetlands and/or sensitive environments 0 to 15 miles downstream of each source.

There are not any sensitive environments or wetlands within 15 miles downstream of RAAP. [2]

4H. Discuss any qualitative, quantitative, or circumstantial evidence of contamination of surface waters from sources.

There has not been any qualitative, quantitative, or circumstantial evidence of contamination of surface waters from sources. [3][4][7][13][16]

4I. Provide results from sediment and surface-water sampling for points 0 to 15 miles downstream of each source.

Results from sampling conducted at the RAAP water treatment plant are included. This sampling was conducted on treated water as well as raw water taken in by each of the two

intakes in the New River adjacent to the facility. Additional surface water sampling results extracted from the STORET database include samples taken adjacent to RAAP at some of the NPDES outfalls, and downstream. Sediment sample results were not present in the STORET database. [13][16][17]

4J. Provide results from background sediment and surface water sampling.

Results of background surface water and sediment sampling were extracted from the STORET database. Sediment samples on the printout provided are underlined and have an asterisks adjacent. The remaining results are surface water analyses. [13][16]

4K. Provide results from sampling of surface-water intakes 0 to 15 miles downstream of each source.

Other than the two intakes on RAAP, there are no surface water intakes within 15 miles downstream of the facility. Refer to 4I for sampling results of these two intakes. [13][14][15]

4L. Estimate the size of the upgradient drainage area for each source.

The upgradient drainage area at RAAP is approximately 20,000 acres. [2]

4M. Determine the 2-year, 24-hour rainfall for the site.

The two-year, 24-hour rainfall at RAAP is 3.0 inches. [18]

4P. Determine if sources are located in a 1-year, 10-year, 100-year, or 500-year flood plain.

Many of the sources at RAAP lie adjacent to the New River. Therefore, a 500-year, 100-year, and possibly a 10-year flood would flood some of these sources, particularly the ones bordering the river. It is unlikely that a 1-year flood would reach any of the sources. [19]

4Q. Discuss fisheries (recreational or commercial) in surface water bodies 0 to 15 miles downstream of each source:

No commercial fisheries exist within 15 miles downstream of RAAP. Several tributaries of the New River are stocked with trout by the State in February, May, June, and in the fall for recreational fishing. [20] The New River is also used for recreational fishing. [21]

4Q1. Describe annual production (in pounds) of human food chain organisms (e.g., trout, shellfish, snapping turtles, crabs) per acre of streams and rivers 0 to 15 miles downstream of each source.

There is no production data for this portion of the New River. [21]

Facility Name Radford Army Ammunition Plant

4Q2. Describe annual production (in pounds) of human food chain organisms (e.g., trout, shellfish, snapping turtles, crabs) per acre of ponds, lakes, bays, or oceans 0 to 15 miles downstream of each source.

There are not any downstream ponds, lakes, bays, or oceans within 15 miles downstream of RAAP that would receive contaminants from the facility. Refer to deficiency response item 4A.

4R. Identify closed fisheries 0 to 15 miles downstream of each source.

There are no closed fisheries on the New River 0-15 miles downstream from RAAP. [21]

4S. Provide results from sampling of human food chain organism tissues in streams and rivers 0 to 15 miles downstream of each source and in ponds, lakes, and bays that receive drainage from the sources.

The STORET database does not contain results of tissue sample analysis for this section of the New River. [7][16]

5. AIR PATHWAY INFORMATION (see Section 6 of the HRS Final Rule - December 1990 Federal Register).

5C. Determine if any of the following resources are located within a 1/2-mile radius of each source.

5C1. Commercial agriculture

No. [7]

5C2. Commercial silviculture

No. [7]

5C3. Major or designated recreation area

The New River, which runs through the site is used for boating and fishing. [21]

5D. Determine if sensitive environments are within a 4-mile radius of each source.

The Jefferson National Forest is within 4 miles of RAAP to the north. [2]

5E. Determine the total area of wetlands within a 4-mile radius of each source.

There are no wetlands within 4 miles of RAAP. [2]

Facility Name Radford Army Ammunition Plant

6. SOIL-EXPOSURE PATHWAY INFORMATION (see Section 5 of the HRS Final Rule - December 1990 Federal Register).

6A. Describe any areas of contamination that are within 2 feet of the ground surface; provide the areal extent of contamination.

The AEHA's 1987 study of the open burning ground revealed contamination from explosive compounds within the uppermost foot of soil. There are not any other areas where soil contamination within 2 feet of ground surface has been confirmed. Dames & Moore consultants are currently conducting a soil sampling program. Results should be available at a future date. [5]

6B. Provide locations and depths of soil samples and results.

Soil sampling results from the AEHA's 1987 study of the open burning ground are provided. Dames & Moore consultants are currently conducting a soil sampling program. Results should be available at a future date. The 1987 A.T. Kearney report contains results from lagoon and ash disposal areas. [4][5]

6C. Provide results of background soil sampling.

There are not any background soil sampling results available. It is unlikely that any exist. Dames & Moore Consultants may obtain some background soil samples during their present soil investigation taking place. [7]

6D. Describe the measures taken to limit access to areas with soil contamination within 2 feet of the surface (e.g., fences, security guards).

All hazardous waste landfills and disposal areas are posted with warning signs. In addition, an eight foot chain link fence surrounds RAAP, three main entrances are guarded 24 hours a day, and the required security clearance limits access on the facility to workers only. [7]

6E. Determine if any of the following are located near or within an area of soil contamination (within 2 feet of the surface); provide the number of individuals for 6E1 and 6E2:

6E1. Within 200 feet of any residences, schools, or day care centers and within the property boundary.

No. [7]

Facility Name Radford Army Ammunition Plant

6E2. Within 200 feet of the work place area and within a work place property boundary.

There is suspected soil contamination within 200 feet of work areas at more than one location on RAAP. Dames & Moore is currently conducting a large soil sampling program that will define these areas. [7]

6E3. Within boundaries of commercial agriculture, silviculture, livestock production, or grazing area.

No. [7]

6E4. Within boundaries of a terrestrial-sensitive environment (see Table 5-5, December 1990 Federal Register).

No. [7]

6F. Determine the number of individuals who live, work, or attend school within the following distances of soil contamination (within 2 feet of the surface).

The following values are based upon the maximum number of people that would be on RAAP at any given time (4,000). The origin of the radius is at the center of the facility. [7]

6F1. 0 - 1/4 mile radius

1,750 people

6F2. 1/4 - 1/2 mile radius

1,750 people

6F3. 1/2 - 1 mile radius

500 people

LIST OF REFERENCES

1. Verification Investigation Work Plan for Radford Army Ammunition Plant, Volume 1: Part A. Prepared by: Dames and Moore Consultants. 1990.

2. USGS 7.5 minute quadrangle topographic maps (Straffordsville, VA; Radford North, VA; Blacksburg, VA; Eggleston, VA; and Pearisburg, VA).

3. RCRA Facility Investigation Work Plan For Radford Army Ammunition Plant. Prepared by Dames and Moore Consultants. 1990.

4. RCRA Facility Assessment of Radford Army Ammunition Plant. Prepared by A.T. Kearney, Inc. 1987.

5. Hazardous Waste Study No. 37-26-0785-88 Soil Sampling Study at the Radford Army Ammunition Plant Open Burning Ground. Prepared by the United States Environmental Hygiene Agency, 1987.

6. Graphical Exposure Modeling System (GEMS), managed by U.S. EPA/Office of Toxic Substances, 1980. Census database "80 Population".

* 7. Interview with Radford Army Ammunition Plant personnel: Shelly Barker, Harvey Stull, and Bob Richardson.

8. Phone Conversations with: Don Tudorian (Montgomery County Water Department), Mr. Montgomery (Radford Water Department), Gerry Higgins (Blacksburg Water Department), and Ron Cook (Pulaski Water Department), December, 1991.

* 9. Wellfax database from the National Water Well Association, based on 1980 census data, Dec. 1991.

10. Ground Water Annual Report Information, Radford Army Ammunition Plant, VA, 13 Aug. 1990.

11. U.S. Environmental Protection Agency (EPA) Storage and Retrieval (STORET) water quality data (Groundwater), December, 1991.

12. Phone conversation with Mr. Terry Wagner, Virginia State Water Control Board, 16 December 1991.

13. Installation Assessment of Radford Army Ammunition Plant, Report No. 103, U.S. Army Toxic and Hazardous Materials Agency, 1979.

14. U.S. Environmental Protection Agency (EPA) Storage and Retrieval (STORET) water quality data (Intakes), December, 1991.

15. Letter from Mr. Paul Herman, Virginia State Water Control Board, 27 January 1992.

16. U.S. Environmental Protection Agency (EPA) Storage and Retrieval (STORET) water quality data (Surface Water), December, 1991.

17. Surface Water Sampling Results. Conducted by Radford Army Ammunition Plant Personnel, July 1991.

18. Two-year, 24-hour rainfall chart from Technical Paper No. 40, Rainfall Frequency Atlas of the United States, U.S. Department of Commerce, January, 1963.

19. Special Flood Hazard Information Report, New River, Montgomery and Pulaski County, Virginia. Prepared by Department of the Army, July 1977.

* 20. Preliminary Assessment Responses for Radford Army Ammunition Plant, Radford, Virginia. Prepared by Advanced Sciences, Inc., 1990.

21. Phone conversation with Mr. Ron Southwick, District 5, Virginia Department of Game and Inland Fisheries, 30 March 1992.

* References not included

REFERENCE 1

1B

Task Order No. 16
Verification Investigation Work Plan
for Radford Army Ammunition Plant, Virginia
Volume 1: Part A
(Draft Final)

Prepared for:
Commander, U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland 21010-5401

DAMES & MOORE

7101 Wisconsin Avenue, Suite 700, Bethesda, Maryland 20814

August 29, 1990

2.0 DESCRIPTION OF CURRENT CONDITIONS

2.1 FACILITY BACKGROUND

2.1.1 Location and History

RAAP is a Government-owned, contractor-operated (GOCO) military industrial installation supplying solvent and solventless propellant grains and TNT explosives. The present contractor-operator is Hercules Incorporated (formerly Hercules Powder Company).

RAAP is located in the mountains of southwest Virginia (Figure 2-1) in Pulaski and Montgomery Counties. The installation consists of two noncontiguous areas--the Radford Unit (or Main Section) and the New River Ammunition Storage Area Unit. The Main Section is located approximately 5 miles northeast of the city of Radford, Virginia, approximately 10 miles west of Blacksburg and 47 miles southwest of Roanoke. The New River Unit is located about 6 miles west of the Main Section, near the town of Dublin (Figure 2-2). The Main Section of RAAP (Figure 2-3) is the focus of this report; all uses of the terms "RAAP" or "the installation" in this report refer to the Main Section only.

Montgomery County, with an area of 394 square miles and an estimated 1988 population of 67,000, is bordered by mountains to the east, north, and south and by the New River on the west. The primary roads in the county are US Route 11, Interstate 81, and US Route 460. The county seat is Christiansburg.

Pulaski County, to the west of Montgomery County, is 328 square miles in size and had an estimated 1988 population of 34,000. The county is bounded by mountains to the north, west, and south and by the New River on the east. The primary roads are US Route 11 and Interstate 81, which run east-west through the center of the county. Pulaski County is generally mountainous except in the central portion, where the hills are gently rolling. The town of Pulaski is the county seat.

RAAP lies in one of a series of narrow valleys typical of the eastern range of the Appalachian Mountains. Oriented in a northeast-southwest direction, the valley is approximately 25 miles long, with a width of 8 miles at the southwest end,

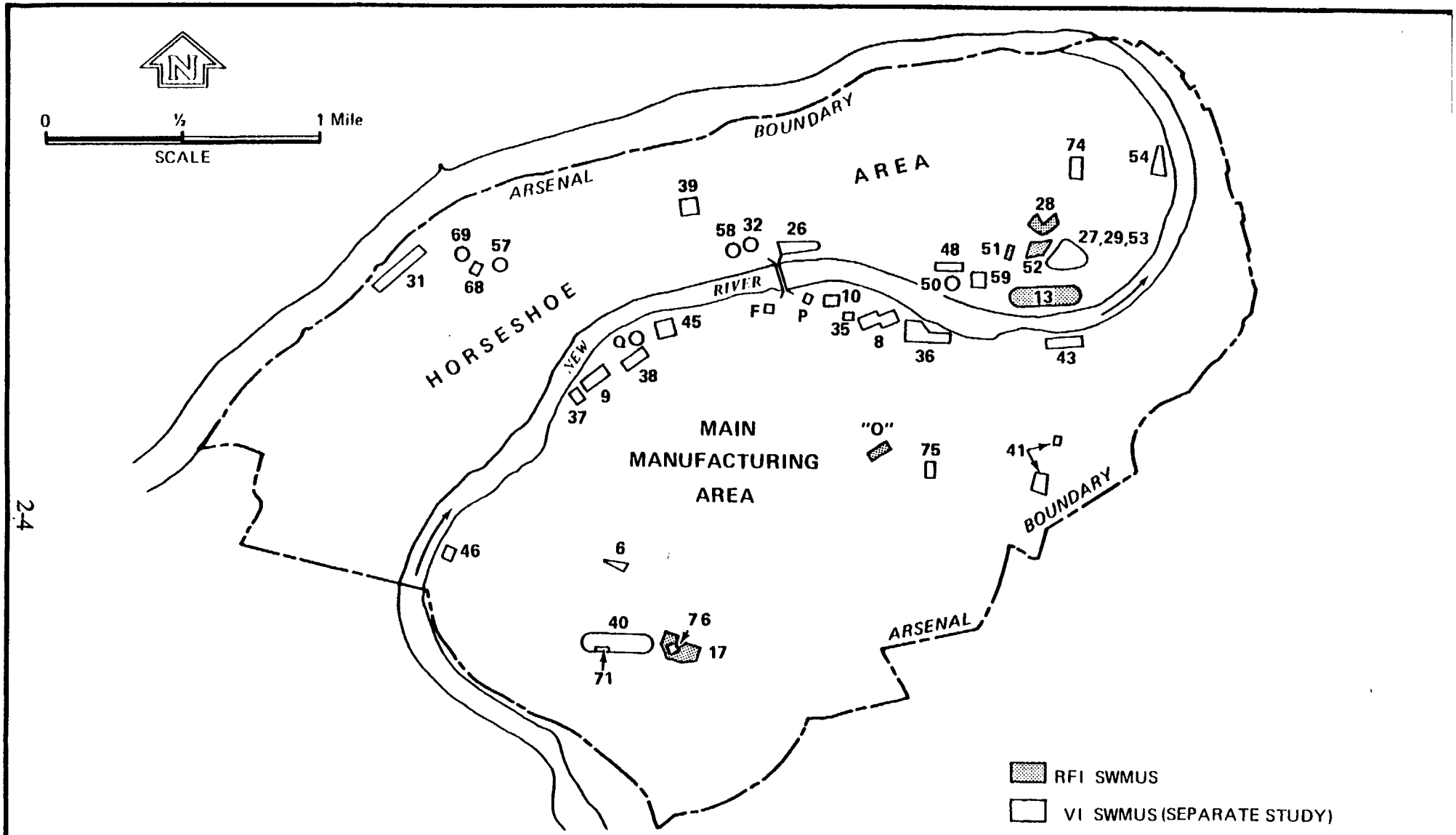


FIGURE 2-3
LAYOUT AND SWMU LOCATION MAP
RADFORD ARMY AMMUNITION PLANT, VIRGINIA

BASE MAP SOURCE: USATHAMA, 1976

narrowing to 2 miles at its northeast end. The plant lies along the New River in the relatively narrow northeast corner of the valley.

The New River divides the Main Section of RAAP into two areas. Within the New River meander is the "Horseshoe Area." Located in the Horseshoe Area are the Nitroglycerin (NG) No. 2 Area, the Cast Propellant Area, and the Continuous Solvent Propellant Area. Many of the former landfills at RAAP are located in this area, as are the Hazardous Waste Landfill, the currently active Sanitary Landfill, and the Waste Propellant Burning Ground. South of the New River is the "Main Manufacturing Area," which includes the Finishing Area; the Trinitrotoluene (TNT) Area; the NG, Nitrocellulose (NC), and Acid Areas; the Automated Propellant Area; and the Administration Area.

RAAP is assigned the following general responsibilities (USATHAMA, 1976):

- Manufacture of explosives and propellants.
- Handling and storage of strategic and critical materials as directed for other government agencies.
- Operation and maintenance, as directed, of active facilities in support of current operations. Maintenance and/or lay-away, in accordance with Ammunition Procurement and Supply Agency instructions, of standby facilities, including any machinery and packaged lines received from industry, in such conditions as will permit rehabilitation and resumption of production within the time limitations prescribed.
- Receipt, surveillance, maintenance, renovation, demilitarization, salvage, storage, and issue of assigned Field Service Stock and industrial stock as required or directed.
- Procurement, receipt, storage, and issue of necessary supplies, equipment, components, and essential materials.
- Mobilization planning, including review and revision of plant as required.

- Custodial maintenance and administrative functions of subinstallations.
- Support services for tenants.

This mission is accomplished through the efforts of the operating contractor, Hercules Inc. The Administrative Contracting Officer (ACO) and his staff provide technical assistance and administer the contracts with the civilian operating contractors. RAAP provides logistics support for tenant activities such as the U.S. Army Research, Development and Acquisition Information Systems Agency, which is charged with performing data processing activities during peacetime and mobilization.

Construction of the current RAAP production facility began in 1940 with the impending participation of the United States in World War II, and the determination by Congress of a need for increased ammunition production facilities. Initially, RAAP consisted of two distinct areas--a smokeless-powder plant [Radford Ordnance Works (ROW)] and a bag-manufacturing-and-loading plant for artillery, cannon, and mortar projectiles [New River Ordnance Works (NROW)]. These two production facilities continued to be operated separately from 1940 to 1945. Late in 1945, ROW was designated Radford Arsenal, and NROW was a subpost. By January 1950, NROW was made an integral part of Radford Arsenal and no longer considered a subpost. The arsenal was renamed Radford Ordnance Plant in 1961 and was finally redesignated RAAP in August 1963 (USATHAMA, 1984).

Since its inception as a GOCO facility in 1940, RAAP has been operated by Hercules. Expansion of both ROW and NROW continued throughout World War II. Late in 1945, the Radford Unit was placed on standby status. The following year, the nitric acid area of the plant was reactivated to produce ammonium nitrate fertilizer, an activity that continued until 1949 under contract with Hercules Powder Company (now Hercules Inc.). In September 1945, the New River Unit was declared surplus; but in April 1946, the magazine areas were changed from surplus status to standby. Between December 1946 and January 1948, large parcels of the New River plant manufacturing area were sold (USATHAMA, 1984).

Powder production was begun on a limited scale in 1949. The Radford Unit underwent rehabilitation and expansion throughout the 1950s in support of the Korean Conflict. At the same time as the new construction, surplus buildings--including the entire pentolite and TNT manufacturing areas--were demolished.

Between 1952 and 1958, Goodyear Aircraft Corp., of Akron, Ohio, contracted to manufacture component parts used in missile production at RAAP. The close coordination required between Goodyear and Hercules led to Goodyear moving its assembly and coating operations to RAAP. In 1958, Hercules took over the Goodyear operations at this plant (USATHAMA, 1984).

Activities at RAAP decreased significantly in the mid-1950s. The remaining manufacturing areas at the New River Unit were sold by 1962-1963, reducing the area to its current size of 2,839 acres.

Activities again increased during the Vietnam Conflict, peaking in 1968, though no significant changes were required in production facilities or techniques. Following the decline in the United States' involvement in Vietnam and a subsequent production decline at RAAP, the post underwent a modernization program.

The continuous TNT plant was put into production in mid-1968 and remained in operation until destroyed by an explosion in May 1974. This plant had five main operational areas--the nitration lines, the finishing buildings, the red water concentration facility, the acid neutralization facility, and the spent acid recovery plant. C-line in the TNT area ran from 1983 to 1986, when the TNT plant was placed on standby. Later, in December 1988, a facility cleanup was conducted and the plant was prepared for long-term standby status.

A chronological listing of major RAAP facilities and activities is presented in Table 2-1.

2.1.2 Industrial Operations

The principal end products produced at RAAP since 1941 are TNT, single and multibase propellant, and cast and solventless propellant. Intermediate products produced are oleum (concentrated sulfuric acid), nitric acid, NG, and NC.

TABLE 2-1

Chronological List of Major Activities at RAAP

Date	Activity
August 1940	Contract signed with Hercules Powder Company for construction and operation of smokeless powder plant
September 1940	Construction of Radford Plant
April 1941	Production started at Radford Plant
1941	Separate New River bag loading plant constructed
1941/45	Construction of various facilities continued
1945	Consolidation of Radford and New River plants
1945	Production stopped--plant in standby
1946/49	Ammonium nitrate produced in Acid Area
1949	Limited resumption of powder production
1950	Plant reactivated for Korean Conflict
1950/51	Large areas of plant rehabilitated
1951	Multibase propellant and cast rocket grain facilities constructed
1967/68	Continuous TNT lines constructed
1970/72	New acid plants constructed
1971/	Preproduction project work on Continuous Automated Multibase Line (CAMBL) started
1972/	Continuous Automated Single-Base Line (CASBL) construction started
1972/	Continuous nitrocellulose nitration construction started
1973/	Military Construction, Army (MCA) pollution abatement facilities construction started
May 1974	TNT plant explosion
1976/	Continuous Automated Single-Base Line M6/M1 conversion started
1978	Construction started on biological wastewater treatment plant
1980	C-line Nitrocellulose Manufacturing Area closed
1983	TNT plant reopened
1986	TNT plant placed on standby
1987	C-line Nitrocellulose Manufacturing Area reopened
December 1988	TNT plant cleanup, preparation for long-term standby

SOURCE: Modified from USATHAMA, 1976.

The production mission of RAAP is accomplished at the primary and secondary manufacturing areas. The production activities of these areas are described below.

The primary manufacturing processes are the production of single-base and multibase solvent propellants, cast and solventless propellants, and TNT. Separate process areas are provided for the production of solvent-type propellant, referred to as rolled powder. The process steps are essentially the same in the production of solvent-type single-, double-, and triple-base propellants. Major differences are in the specific chemicals and explosives ingredients added, as outlined below:

Propellant	Chemicals
Single base and double base	Barium nitrate, potassium nitrate, ethyl centralite, graphite, carbon black, potassium sulfate, lead carbonate, dibutylphthalate, diphenylamine
Triple base	Ethyl centralite, potassium sulfate cryolite
Special high energy propellants	HMX

The production of solventless propellants involves similar process steps, but without the addition of solvents in the mixing step. After the addition of NG, the propellant is air dried and temporarily stored before it is processed through a blender. From the blender, the "powder" is transported to the preroll building and then to the final roll process. The sheets produced from the rolling operations are cut and made into "carpet rolls" or otherwise shaped as desired. These products then proceed for final processing and preparation for shipment.

The separate processes used in the production of the various propellants are discussed below.

- Single-base solvent propellant--In this batch process, nitrocellulose is dehydrated and mixed with appropriate chemicals and solvents for the desired blend. The mixture then undergoes a series of operations

where it is shaped into a cylindrical block, extruded into strands, and cut to desired size. The solvents ethyl alcohol and ethyl ether are recovered, and the grains are water and air dried. The last major operation includes glazing, blending, and packaging.

- Multibase solvent propellant--The manufacture of the multibase solvent propellant is similar to the single base except for the addition of nitroglycerin, nitroguanidine, and other chemicals for the formulation desired. The ethyl alcohol and acetone solvents are recovered, and the mix is forced-air dried.

- Cast propellant--The manufacturing of cast propellants for rocket grains requires the mixing of nitroglycerin with triacetin, diethyl phthalate, ethyl centralite and 2-NDPA (depending on formulation), and a casting solvent, followed by the addition of the base grain. The rocket grain is then cast, cured, machined, assembled, and packaged.

- Solventless propellant (rolled powder)--The solventless propellant is prepared by a batch process in which nitrocellulose, nitroglycerin, and other chemicals are slurried in water, wrung to a wet cake, and dried to a paste. After the paste is blended, the mixture is rolled into sheets. The propellant is then wound into a carpet roll for extrusion into small rocket grains. The propellant is also rolled and finished for mortar increments.

The TNT plant, before its destruction in May 1974, consisted of three manufacturing lines, each with a rated capacity of 50 tons/day using the modern Canadian Industries, Limited (CIL), continuous nitration and purification process and an advanced drying, solidifying, and packaging operation. When the TNT plant reopened in 1983, the B and C lines were restored, and improved safety equipment, process equipment, and a TNT wastewater treatment facility were added. In addition, the overall volume of TNT production was reduced. In direct support of TNT manufacture and located in the TNT plant area were operations for fume recovery, red water concentration and destruction, waste neutralization, and spent acid recovery.

In the nitration process, a toluene feed stock was reacted with a mixture of nitric acid and oleum (strong sulfuric acid) to yield a crude trinitrotoluene by using eight nitrators and eight separators connected in series for the three nitrating steps (mono, di, and tri).

The crude TNT then flowed to adjacent, series-connected tanks located in the same building. The steps in the purification process involved an acid wash and two sellite (sodium sulfite) wash operations. A yellow water produced in the acid wash step was normally fed back into the No. 2 (di-) nitrator in the nitration process. The unwanted isomers removed in sellite washing produced a red water waste.

After purification, the molten TNT was mixed with water and the slurry was pumped to the finishing building. The water was then separated from the TNT and recycled to the purification process. The TNT was passed through a hold tank, then dried and flaked for packaging into cardboard cartons to a net weight of 50 pounds.

Nitrogen oxide fumes generated during nitration were exhausted and scrubbed in the fume recovery towers for recovery of the oxides as nitric acid for reuse in the process.

The red water generated in the sellite TNT purification process has been disposed of by various means, including incineration in rotary kilns or sale to the paper industry. Incineration ash has been landfilled in various RAAP locations.

Acid waste was processed through three tanks wherein the pH level was adjusted by the addition of soda ash (sodium carbonate). The treated effluent was then diluted with TNT Area cooling water and released to Stroubles Creek.

The spent acid from the nitration process was separated by distillation into nitric acid, which was reused, and into sulfuric acid, which was concentrated at another part of the plant and sold.

The secondary manufacturing operations at RAAP are the production of oleum, sulfuric and nitric acids, nitroglycerin, and nitrocellulose, as described below:

- Oleum 40 percent is manufactured by absorbing sulfur trioxide (SO_3) in 100 percent sulfuric acid. A new plant, constructed in 1970, uses a sulfur acid regeneration (SAR) process.
- The ammonia oxidation process (AOP) is used to make weak 60 percent nitric acid. A new plant was constructed in 1970.
- The sulfuric acid concentration (SAC) process produces 93 percent sulfuric acid, and concentrates the sulfuric acid residue from the nitric acid concentration (NAC) and TNT processes. This process was replaced by the SAR process in 1970.
- The NAC process is used to concentrate the weak nitric acid produced in the AOP plant and to recover the spent acids from NC and NG manufacture. This was replaced by a new facility constructed in 1970.

These are major ingredients for the manufacture of the primary products.

NG was manufactured at RAAP by both the batch and continuous (Biazzi) processes. The batch process employs three steps--nitration of glycerin to produce NG, separation, and neutralization of the NG charge. The continuous process is a fully automated controlled method in which the NG is produced by reactions similar to the batch process. In 1984, the batch process became inoperative and was replaced by a continuous process. Since 1984, only the continuous process has been operating.

The manufacture of NC starts with the preparation and air drying of cotton linters and wood pulp fibers and the preparation of the mixed acid (nitric/sulfuric acid). The remaining major steps consist of nitration and purification. A dry charge of cotton linters or wood pulp fibers, depending on the type and grade of NC desired, is agitated with the mixed acid in a dipping pot. After nitration, the spent acid is separated from the NC. The raw NC from the nitration operation is stabilized by a stabilization acid boil and two neutral boils in the boiling tub house. It is then transferred to the beater house, where it is cut to suitable size and partially

neutralized. Next, in the poacher house, a series of NC boils are performed; first, a soda boil neutralizes any remaining acid, then neutral boils and washes are performed to remove the soda. The NC is then screened, filtered, and washed. In the blender house, NC of various analyses is mixed to produce the mixture or blend desired. The mixture is then wrung through centrifugal wringers in the final wringer house to obtain a product containing a small and uniform amount of moisture. The NC is then shipped to the green powder lines for processing into single-base solvent propellant and to the NG premix area for processing into multibase solvent and solventless propellant.

2.1.3 Climate

The climate of the area encompassing Montgomery and Pulaski Counties is classified as "moderate continental" and is characterized by moderately mild winters and warm summers. The climate is determined, for the most part, by the prevailing westerly wind, with a southerly component in the warm season and a northerly component during the cold season. The year-round average surface-air velocity is 8 miles per hour (mph).

The mean annual precipitation in the two-county area is about 39 inches. Tables 2-2 and 2-3 list the average monthly precipitation and temperature for several stations in and around each county. Snowfall in the same area averages 17 inches annually.

Both counties lie in one of the areas of highest occurrence of dense fog in the United States. Dense fog can be expected to occur between 20 and 45 days per year.

2.1.4 General Topography

RAAP lies within the Valley and Ridge Province of the Appalachian Physiographic Division. The Valley and Ridge Province is characterized by a series of long, narrow, flat-topped mountain ridges separated by valleys of varying widths. Either of these landforms may predominate; the mountains may be widely spaced and isolated or so closely spaced that the lowlands are disconnected or absent. A distinctive feature of the installation area is the absence of mountain ridges.

REFERENCE 2

REFERENCE 3

1B3

TASK ORDER NO. 16
RCRA FACILITY INVESTIGATION WORK PLAN
FOR RADFORD ARMY AMMUNITION PLANT, VIRGINIA
(Draft Final)

Prepared for:

Commander, U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland 21010-5401

DAMES & MOORE
7101 Wisconsin Avenue, Suite 700, Bethesda, Maryland 20814

August 29, 1990

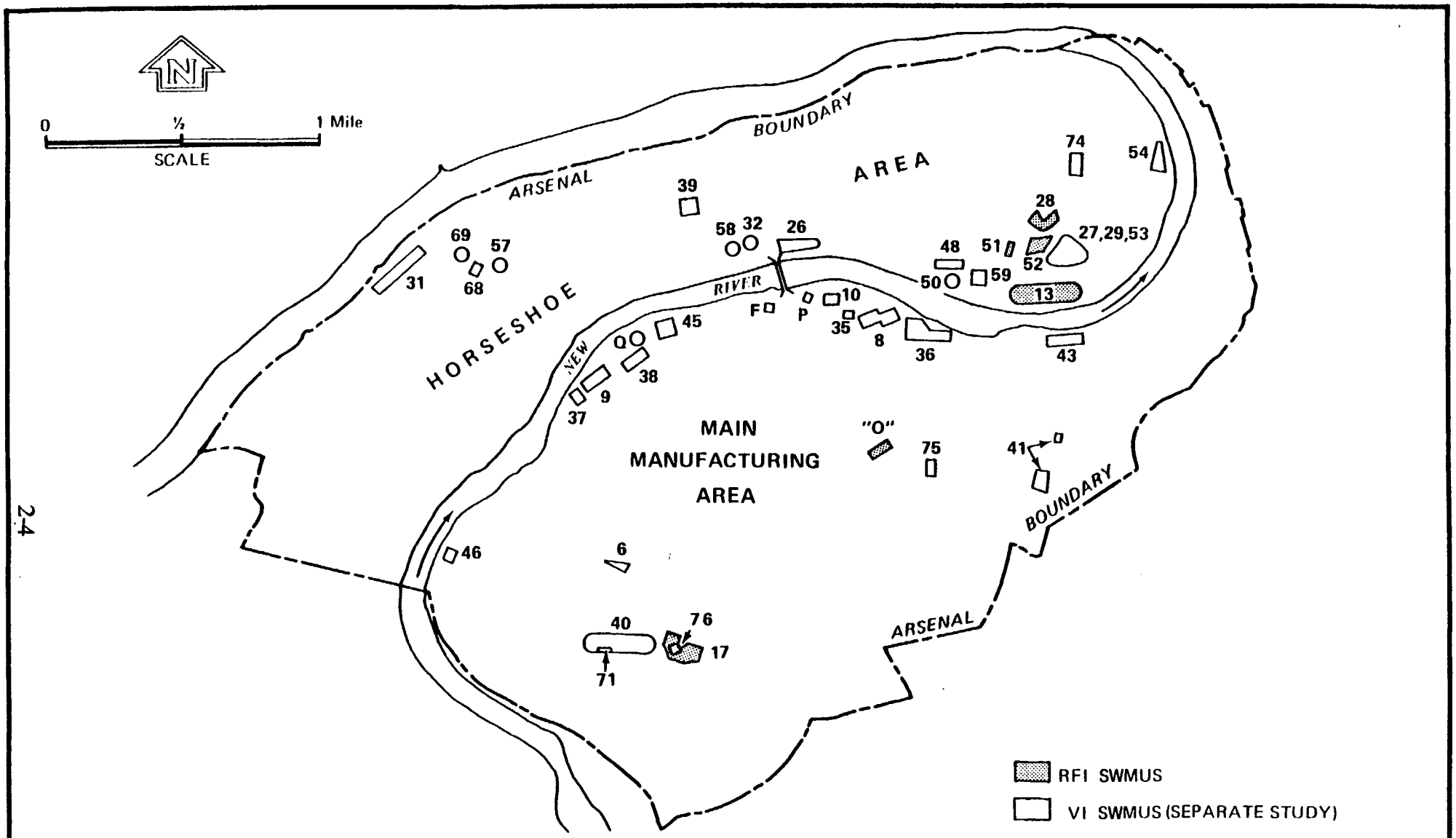


FIGURE 2-3
LAYOUT AND SWMU LOCATION MAP
RADFORD ARMY AMMUNITION PLANT, VIRGINIA

BASE MAP SOURCE: USATHAMA, 1976

Dames & Moore

CONTENTS

PART A: SAMPLING AND ANALYSIS PLAN

CONTENTS (cont'd)

CONTENTS (cont'd)

CONTENTS (cont'd)

CONTENTS (cont'd)

Task Order No. 16
Verification Investigation Work Plan
for Radford Army Ammunition Plant, Virginia
Volume 1: Part A
(Draft Final)

Prepared for:
Commander, U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland 21010-5401

DAMES & MOORE

7101 Wisconsin Avenue, Suite 700, Bethesda, Maryland 20814

August 29, 1990

CONTENTS

Volume 1:

PART A--SAMPLING AND ANALYSIS PLAN

CONTENTS (cont'd)

CONTENTS (cont'd)

CONTENTS (cont'd)

REFERENCE 4

ATTACHMENT 3

RCRA FACILITY ASSESSMENT

of

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA

Prepared for:

U.S. Environmental Protection Agency
Region III
841 Chestnut Street
Philadelphia, Pennsylvania 19107

Prepared by:

A. T. Kearney, Inc.
699 Prince Street
Alexandria, VA 22313

EPA Contract No. 68-01-7038
Work Assignment No. R03-08-07

June 8, 1987

REFERENCE 5

UNITED STATES ARMY ENVIRONMENTAL HYGIENE AGENCY

ABERDEEN PROVING GROUND, MD 21010-5422

HAZARDOUS WASTE STUDY NO. 37-26-0785-88
SOIL SAMPLING STUDY AT THE RADFORD ARMY
AMMUNITION PLANT OPEN BURNING GROUND
RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA
6-10 APRIL 1987

REFERENCE 6

USEPA Graphical Exposure Modeling System (GEMS) Geographic Data Lookup and Display
Site Level Retrieval of Data
Radford Army Ammunition Plant, VA

COVERAGE

LATITUDE	LONGITUDE	RADIUS(KM)	STATE	COUNTY	STATE NAME	COUNTY NAME
37.1917	80.5417	6.44	51	71	Virginia	Giles Co
37.1917	80.5417	6.44	51	121	Virginia	Montgomery Co
37.1917	80.5417	6.44	51	155	Virginia	Pulaski Co

CENTER POINT AT STATE : 51 Virginia
COUNTY : 121 Montgomery Co

REGION OF THE COUNTRY

Zipcode found: 24142 at a distance of 5.5 Km

STATE	CITY NAME	COMMUNITY	FIPSCODE	LATITUDE	LONGITUDE
VA		RADFORD	51750	37.1550	80.5833

CENSUS DATA

SITE NAME ID#: SITE # 1
Radford Army Ammunition Plant
LATITUDE 37:11:30 LONGITUDE 80:32:30 1990 POPULATION

KM	0.00-.402	.402-.805	.805-1.61	1.61-3.22	3.22-4.83	4.83-6.44	SECTOR TOTALS
S 1	0	0	0	0	0	0	0
S 2	0	0	0	0	0	0	0
S 3	0	0	0	0	0	0	0
S 4	0	0	0	2455	0	0	2455
S 5	0	0	0	0	0	0	0
S 6	0	0	0	0	0	0	0
S 7	0	0	0	0	0	0	0
S 8	0	0	0	0	0	0	0
S 9	0	0	0	0	1268	4412	5680
S10	0	0	0	0	0	2923	2923
S11	0	0	0	0	0	0	0
S12	0	0	0	0	0	0	0
S13	0	0	0	0	0	0	0
S14	0	0	0	0	0	0	0
S15	0	0	0	0	0	0	0
S16	0	0	0	0	0	0	0
RING TOTALS	0	0	0	2455	1268	7335	11058

STAR STATION

WBAN NUMBER	STATION NAME	LATITUDE	LONGITUDE	PERIOD OF RECORD	DISTANCE (km)
13868	PULASKI/NEW RIVER VA	37.1333	80.6833	1950-1954 ^F	14.1
13741	ROANOKE VA	37.3167	79.9667	1977-1981 ^F	52.7

03872	BECKLEY/RALEIGH WV	37.7833	81.1167	1968-1972 ^F	83.0
93807	WINSTON SALEM/S REYNOLD NC	36.1333	80.2333	1960-1964 ^F	120.8
13728	DANVILLE VA	36.5667	79.3333	1950-1954 ^F	127.9
13723	GREENSBORO/GSO-HI NC	36.0833	79.9500	1982-1986 ^F	134.0
13866	BECKLEY/RALEIGH CO MEMORIAL A	38.3667	81.6000	1985-1989 ^F	160.2

U.S. SOILS

STATE : VIRGINIA

LATITUDE : 37:11:30 LONGITUDE : 80:32:30
THE STATION IS INSIDE H.U. 5050001

GROUND WATER ZONE	: 8			
RUNOFF SOIL TYPE	: 1			
EROSION	: 1.9800E-03			CM/MONTH
DEPTH TO GROUND WATER BETWEEN	: 9.1440E+02	AND	4.5720E+03	
FIELD CAPACITY FOR TOP SOIL	: 6.0000E-02			
EFFECTIVE POROSITY BETWEEN	: 1.0000E-02	AND	1.0000E-01	
SEEPAGE TO GROUNDWATER BETWEEN	: 4.6330E+02	AND	9.2660E+02	CM/MONTH
DISTANCE TO DRINKING WELL	: 2.5000E+04			CM

U.S. CITY

STATE	PLACE NAME	FIPSCODE	LATITUDE	LONGITUDE
VA	MC COY	51121	37.2200	80.5983
VA	BELSPRING	51155	37.1950	80.6133

REFERENCE 8

WESTON

SGH
Originator

PHONE CONVERSATION RECORD

Conversation with:
Name Don Tudorian
Company
Address
Phone

Date 12 / 11 / 91
Time 1:40 AM/PM

☐ Originator Placed Call
☐ Originator Received Call
W.O. NO.

Subject

Notes:

Called @ 1:40 · Not in

Don called back @ 3:00 pm
(2) wells (1) located E-W between 45 & 46
N-S behind Price Fork School

(2) E-W between 45 & 46
N-S 17

N on 654 to 655
E on 655 to 718 NOT W on 655
W on 665 to 657
N on 657 to 718

W of 718 is private (on 655)

☐ **File**
☐ **Tickle File** / /
☐ **Follow-Up By:**
☐ **Copy/Route To:**

Follow-Up-Action:

Originator's Initials

WESTON SM MANAGERS DESIGNERS/CONSULTANTS

SHEET ___ of ___

CLIENT/SUBJECT RAAP Water Info 5/17/90 W.O. NO. ___

TASK DESCRIPTION ___ TASK NO. ___

PREPARED BY ___ DEPT ___ DATE ___ | APPROVED BY

MATH CHECK BY ___ DEPT ___ DATE ___ |

METHOD REV. BY ___ DEPT ___ DATE ___ | DEPT ___ DATE ___

RAAP 2 sw intakes adjacent to facility (see map) drinking + production water
2 standby wells on facility (see map)
(A) 200 feet deep 200,000 gal/day
(B) 170 feet deep (cased to 50') 7,200 gpd

Dop ≈ 4200

Pulaski County - SW intake (Claytor Lake) >>> 3 miles
no municipal GW drawn within 3 miles

Ron Cook (703) 980-~~5550~~ 7710

Blacksburg
Christian
VPI

SW intakes ≈ 1 mile upstream
no municipal GW drawn within 3 miles

(703) 639-257~~6~~5

Population ≈ 40,000

Montgomery County

Don Tudor (703) 382-6930

GW score = 12

no SW intakes
2 municipal wells @ 2.2
pop. ≈ 2,500
179 residents
1 school
1 commercial

180'
350'

CLOSEST SW — NEW RIVER (ADJACENT)

Potential For Private Wells distance to: unk

WESTON

SCA
Originator

PHONE CONVERSATION RECORD

Conversation with:
Name Mr Montgomery
Company
Address (703) 731 3662

Phone

Date 12 / 11 / 91
Time AM/PM

☐ Originator Placed Call
☐ Originator Received Call
W.O. NO.

Subject

Notes: intakes
1.4 miles below interstate 81 bridge
SERVES RADFORD
SOUTH SIDE OF NEW RIVER ONLY

☐ **File**
☐ **Tickle File** / /
☐ **Follow-Up By:**
☐ **Copy/Route To:**

Follow-Up-Action:

Originator's Initials

WESTON

SEA
Originator

PHONE CONVERSATION RECORD

Conversation with:
Name GERRY HIGGINS
Company
Address BLACKSBURG, VPI

Phone (703) 639-2575

Date 12/11/91
Time AM/PM

☐ Originator Placed Call
☐ Originator Received Call
W.O. NO.

Subject

Notes:
RAW WATER @ RT 114 bridge to filtration plant. WATER IS SENT VIA 20" line east to Christiansburg & Blacksburg. no clean line west. Private wells west of plant and South on Co 63 from 114.

☐ **File**
☐ **Tickle File** / /
☐ **Follow-Up By:**
☐ **Copy/Route To:**

Follow-Up-Action:

Originator's Initials

RFW 110-4-83

WESTON

SEA

Originator

PHONE CONVERSATION RECORD

Conversation with:

Name Ron Coak

Company Pulaski County Water

Address

Phone

Date 12 / 11 / 91

Time 135 AM/PM

☐ Originator Placed Call

☐ Originator Received Call

W.O. NO.

Subject

Notes:

Pulaski County serves S of Rt 114 and W of 623 & 600

towns include FAIRLAWN New River Parrot Belspring

☐ **File**

☐ **Tickle File** / /

☐ **Follow-Up By:**

☐ **Copy/Route To:**

Follow-Up-Action:

Originator's Initials

RFW 110-4-83

REFERENCE 10

DEPARTMENT OF THE ARMY
U. S. ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND 21010-5422

REPLY TO ATTENTION OF

13 AUG 1990

HSHB-ME-SG (40)

MEMORANDUM FOR Commander, U.S. Army Armament, Munitions and Chemical Command, ATTN: AMCSC-ISE, Rock Island, IL 61299-6000

SUBJECT: Ground Water Annual Report Information, Radford Army Ammunition Plant, VA

1. Reference letter, Office of the Chief of Engineers, DAEN-ZCE, 23 June 1986, subject: Modification of the U.S. Army Ground-Water Monitoring Program.

2. Enclosed is an evaluation of ground-water contamination at Radford Army Ammunition Plant hazardous waste management units for use in meeting regulatory annual reporting requirements.

3. Implement the following recommendations related to ground-water monitoring:

a. Continue preparing field blanks in addition to laboratory blanks for all organic analyses, due to the frequent detection of contaminants in the sample blanks.

b. Obtain elevation data for the recently-installed monitoring wells MW5 through MW9. Provide the elevation data and location maps for new wells to this Agency.

4. Questions regarding the enclosed report may be referred to Ms. Pat Rippey, Ms. Beth Martin, or Mr. Gary Nemeth, this Agency, DSN/AUTOVON 584-2024 or commerical (301) 672-2024.

FOR THE COMMANDER:

Encl

PAUL R. THIES
LTC, MS
Chief, Waste Disposal Engineering Division

GROUND-WATER ANNUAL REPORT INFORMATION
CALENDAR YEAR 1989
RADFORD ARMY AMMUNITION PLANT
SITES 4, 5, 7, and 16

1. References.

a. Feasibility Study For Hazardous Waste Management Sites 4, 5, 7, and 16, Radford Army Ammunition Plant, U.S. Army Engineer Waterways Experiment Station, August 1988.

b. Letter, HQDA, DASG-PSP-E, 17 February 1983, subject: Environmental Criteria for Explosives in Drinking Water.

2. General. An evaluation of the hydrogeologic conditions underlying Radford Army Ammunition Plant (RAAP) is contained in reference 1b, the feasibility study performed for the four hazardous waste sites. The hydrologic units underlying RAAP consist of unconsolidated alluvial deposits over units of limestone and dolomite.

3. Ground-Water Flow Direction and Velocity. The ground-water flow direction at each site is described below. There was no change in the assumed flow direction based on the 1989 water level data. Darcian approximations of the aquifer characteristics were made, based on the assumption that the numerous fractures in the carbonate bedrock cause it to resemble (in terms of hydraulic properties) a granular porous media. It should be noted, however, that the flow-rate estimation may be low for the bedrock aquifers, where fractures and solution channels may significantly increase velocities on a random, localized basis. The estimations may be closer to true velocities for the alluvial deposits overlying the bedrock. The velocity of ground-water flow was calculated for each site, using hydraulic conductivity values from slug test data (reference 1b), ground-water gradient from measured water levels during the past year, and an assumed effective porosity of 0.35. Ground-water gradient, given as a percent, is a comparison of water elevation differences over the distance between wells. For each site, concurrent water level data from at least three sets of well pairs along the inferred flow line were used to determine average gradient across the site.

a. Site 4. Shallow ground water at this site flows to the northeast towards Stroubles Creek. Figure 1 illustrates the ground-water elevation contours for this site. The calculated ground-water flow rate (see Enclosure 1 for calculations) for Site 4 is 48.5 feet per year (ft/yr). Enclosure 2 contains the 1989 water level information provided by RAAP.

b. Site 5. The ground-water flow at Site 5 is to the north-northeast towards Stroubles Creek and New River. Figure 2 shows the ground-water elevation contours for the site. The calculated

Encl

flow rate (Enclosure 1) is 95 ft/yr. Enclosure 3 contains the water level information for the Site 5 wells for 1989.

c. Site 7.

(1) Ground water beneath Site 7 generally flows west towards the New River; however, the flow system at this site is complicated by several factors. The water table lies close to the bedrock/alluvial sediments interface, resulting in variable hydraulic properties governing the flow of ground water. Karst features are also believed to influence ground-water movement. The 1989 data show seasonal variances, with water level elevations increasing with time. The average gradient for this site was determined for the flow component to the northwest, using many combinations of well pairs/water level measurements because of the complexity of the flow system. The average gradient (0.4%) was notably lower than past estimates (reference 1b).

(2) Figure 3 shows the location of wells and the ground-water contours for Site 7. Note that the figure is based on July 1989 water level information, since it formed the most discernible pattern in terms of ground-water flow direction and gradient. The calculated flow rate (Enclosure 1) is 2 ft/yr. This estimate is almost certainly low, and is attributed in part to the limited slug test data on the Site 7 wells, variable hydraulic properties within the alluvial sediments and bedrock, and the apparent flattening of the water table in the past year. Enclosure 4 contains the water level information for the Site 7 wells.

d. Site 16. Ground water at Site 16 flows to the east, with a highly variable flow gradient. This is due to the presence of a sinkhole in the northeast corner of the disposal area which alters the ground-water flow to a significant degree. Figure 4 shows the location of wells at Site 16 and the ground-water elevation contours. The estimated flow rate of ground water across the site is 1 to 630 ft/yr (see Enclosure 1). The range is attributed to the varying of hydraulic conductivities and flow gradients across the site. The flow rate is much lower to the west (on the upgradient side). Enclosure 5 contains the water level information for 1989 for Site 16.

4. Evaluation of Chemical Data From 1989 Sampling and Analysis of Monitoring Wells.

a. Site 4. Sulfates continue to be detected in high concentrations in several downgradient wells at Site 4. In addition to samples from wells WC9B and W4B, which are

immediately downgradient of the pond, samples from WC41 and WC42 showed increasing concentrations of sulfates. The two latter wells are located farther downgradient and were installed to provide information on a suspected ground-water plume. Nitrate levels, which have been elevated in past sampling rounds, were consistently low in this year's samples. The presence of hazardous constituents (heavy metals and organic compounds) is not indicated by the 1989 sample results. Appendix IX parameters were run on two well samples, including well sample WC9B, and the results did not indicate ground-water contamination by these constituents.

b. Site 5. The 1989 results for Site 5 indicate that ground water has been affected by explosive compounds, volatile organic compounds (VOCs), and sulfates. The high levels of nitrates reported in recent sampling rounds were not detected during the 1989 sampling events. Concentrations of heavy metals also diminished during this year. Elevated levels of explosive compounds were detected most frequently in the samples from wells immediately downgradient or upgradient of the Site 5 impoundment, suggesting another source of explosive compounds, possibly the sewer line which leaked at one time. The VOCs detected included trichloroethylene (TCE), found at fairly low but increasing levels in five well samples. Other VOCs, such as methylene chloride and chloroform, were found in sample blanks and should not be considered ground-water contaminants.

c. Site 7. Samples collected from this site continue to show evidence of ground-water contamination by sulfates and explosives, but do not confirm previous results showing elevated levels of metals and nitrates. The explosive compounds RDX and TNT were present in concentrations exceeding the respective US Army recommended criteria for drinking water (reference 1c). In general, the concentrations of explosives appear to be increasing at this site.

d. Site 16. Explosives compounds continue to be detected in the well samples from Site 16, but the data are inconsistent. In general, explosives compounds were detected with the most frequency and at the highest concentrations during the third sampling period, and were detected in the upgradient as well as downgradient well samples. Despite the anomalies, these compounds should be considered ground-water contaminants at this site. Elevated levels of mercury noted in past sampling rounds (including the first round of 1989) were not confirmed in recent sampling periods. In general, heavy metals do not appear to be contaminants of the ground water at Site 16. Most of the organic compounds detected in the well samples were also found to be present in the blanks at similar concentrations. Exceptions

included the compound 1,1,1-trichloroethane, which was detected at very low concentrations, as has been seen previously. Several other VOCs were detected on a limited basis at low concentrations. Appendix IX parameters were run on three well samples, and the results did not indicate ground-water contamination by these constituents.

Gary Kenneth
for PATRICIA O. RIPPEY
Environmental Scientist
Waste Disposal Engineering
Division

5 Encls

APPROVED:

Paul A. Thiis
JOHN W. BAUER, P.G.
Program Manager
Ground Water and Solid Waste Management

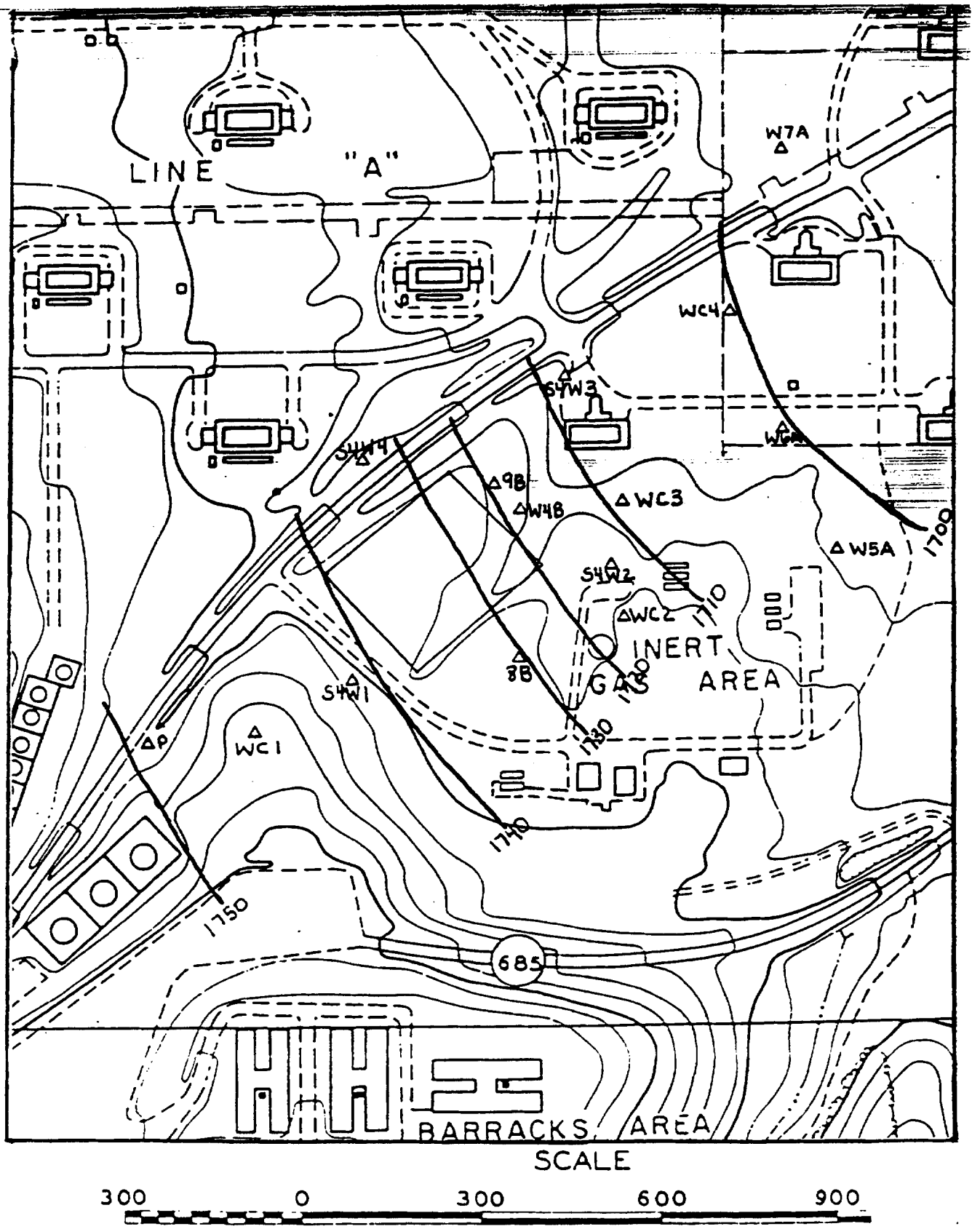


Figure 1. Site 4 Water Level Elevation Map

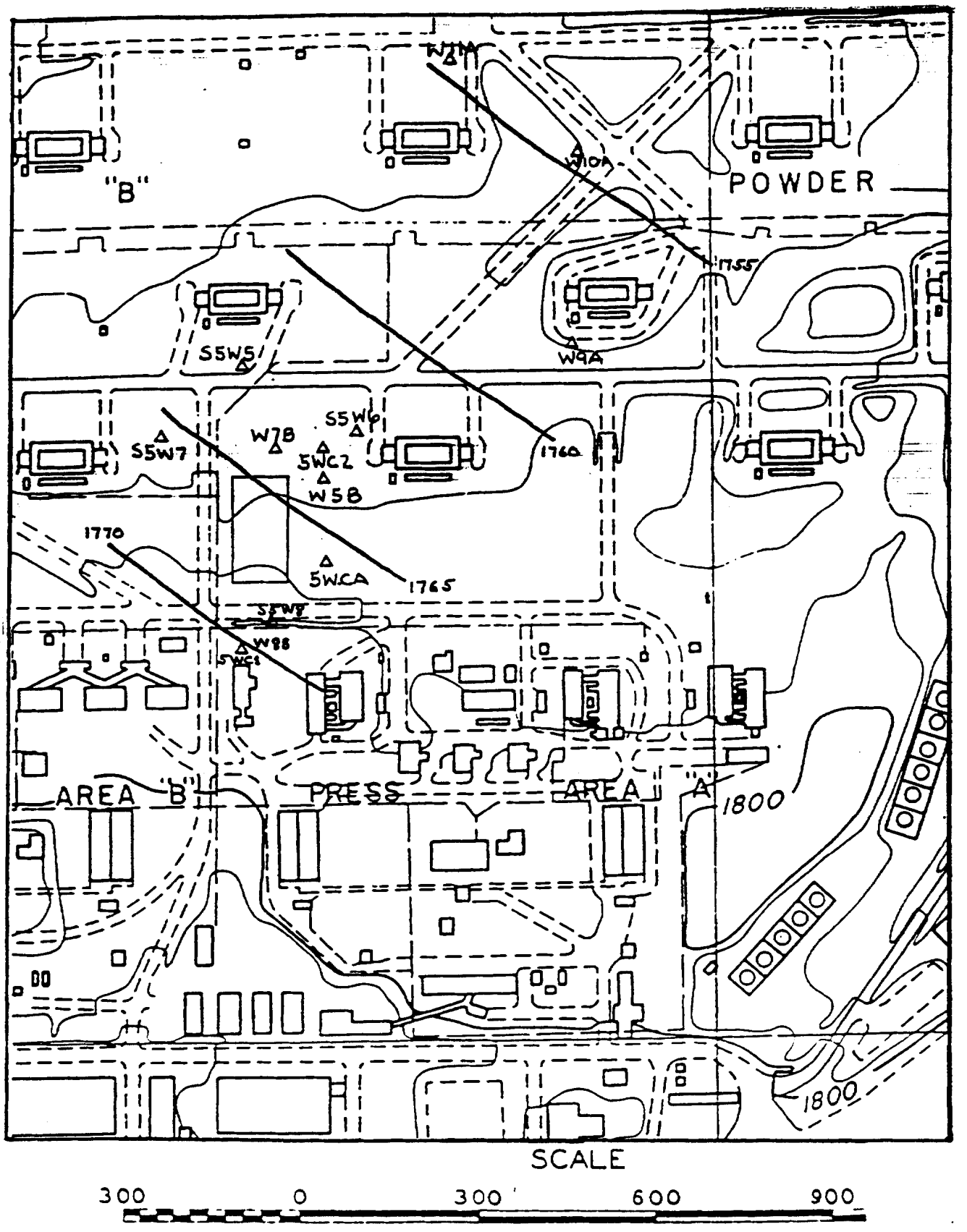


Figure 2. Site 5 Water Level Elevation Map

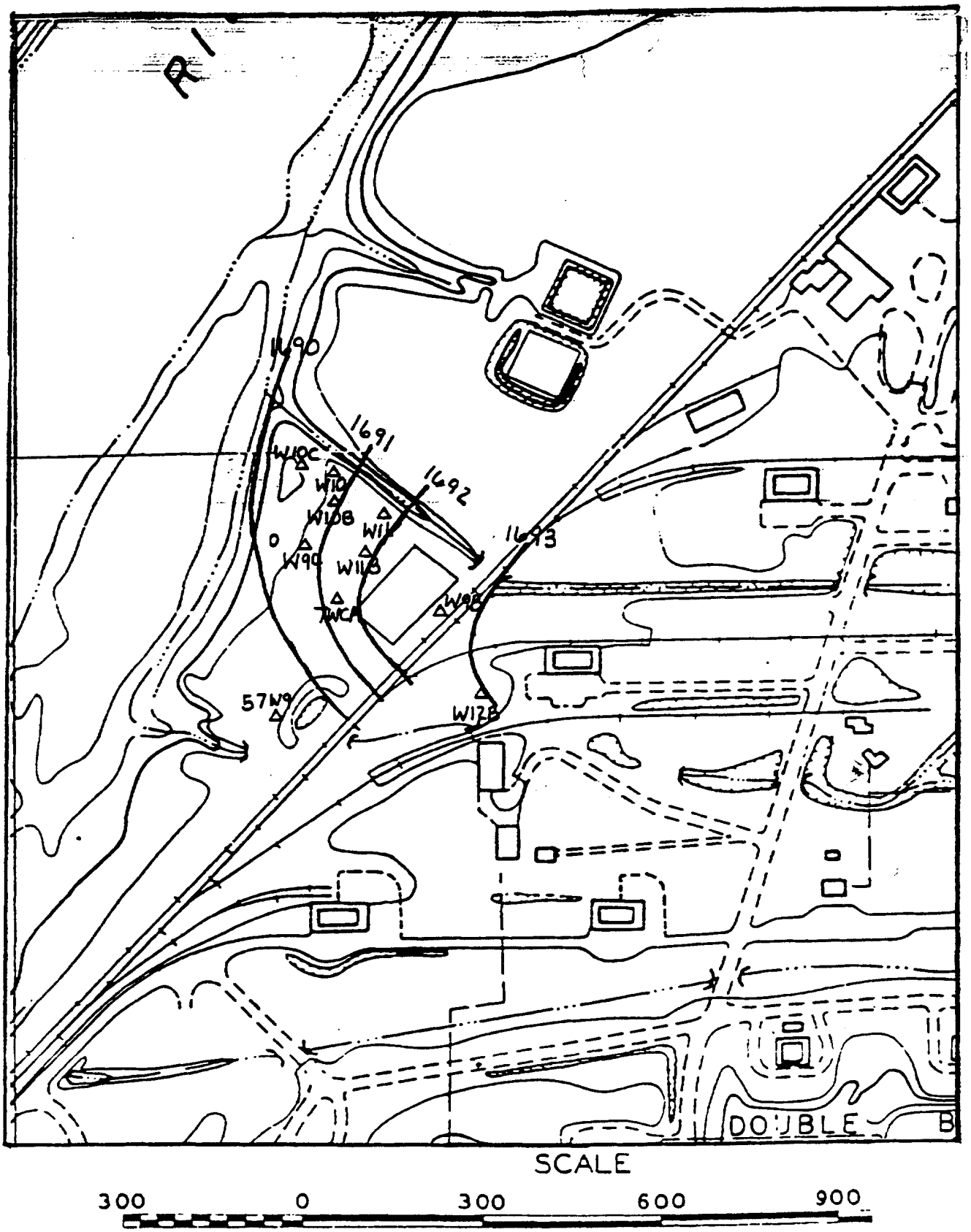


Figure 3. Site 7 Water Level Elevation Map

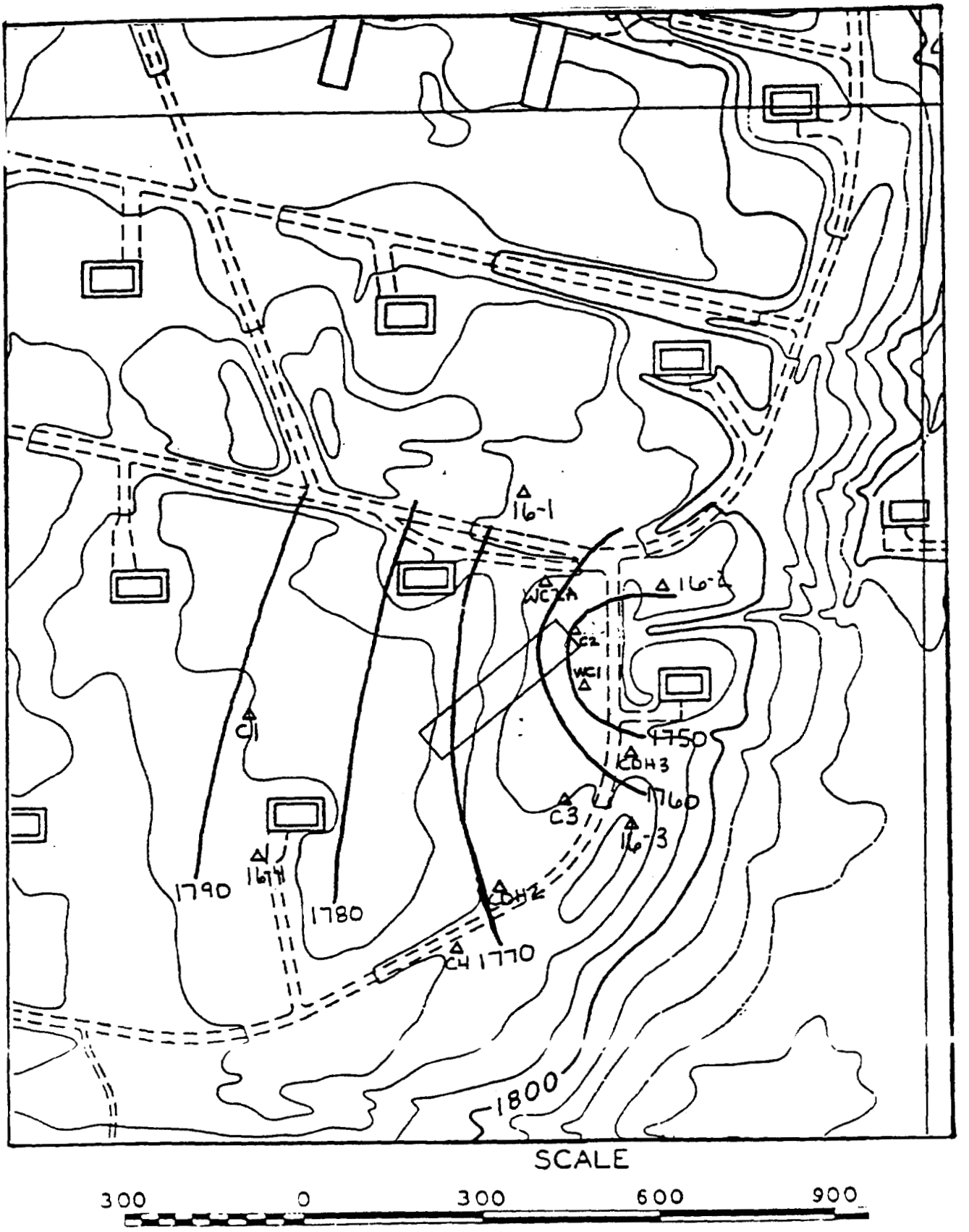


Figure 4. Site 16 Water Level Elevation Map

REFERENCE 11

31 GW RADFORD AAP (W)

37° 11' 38" N
80° 33' 56" W

end
READY
qed
IKJ56700A ENTER DATA SET NAME -
gwrad3
DATASET NOT LINE NUMBERED-NONUM ASSUMED
QED
list
RETRIEVAL PROGRAM
0 PGM=INVENT
THIS IS AN INVENTORY RETRIEVAL SHOWING SUMMARY STATISTICS FOR ALL PARAMETERS
0 NO BEGINNING DATE WAS REQUESTED -- STORET ASSUMED THE BEGINNING DATE WAS THAT OF THE OLDEST DATA VALUE FOUND
NO ENDING DATE WAS REQUESTED -- STORET ASSUMED THE ENDING DATE WAS THAT OF THE MOST RECENT DATA VALUE FOUND
-STATION SELECTION WAS BY:

- ***** ERROR MSG: NO STATION SELECTOR KEYWORDS WERE SPECIFIED - THEREFORE NO STATIONS WERE RETRIEVED *****
-
-
- ***** END OF SUMMARY SECTION *****

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 1
RADFORD AAP (W)
177-00176
37 10 50.0 080 35 19.0 4
PULASKI
51155 VIRGINIA PULASKI
05-OHIO 050700
/TYPA/AMBNT/WELL 07-NEW
21VASWCB 881210 05050001
0000 FEET DEPTH

PARAMETER	MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001 TOT DPTH OF HOLE FT	WATER		1	310.0000			310.0	310.0	88/10/06	88/10/06
72002 TOP DPTH WB ZONE FT	WATER		1	209.0000			209.0	209.0	88/10/06	88/10/06
72003 BOT DPTH WB ZONE FT	WATER		1	210.0000			210.0	210.0	88/10/06	88/10/06
72020 ELEV FEET AB MSL	WATER		1	1860.000			1860.00	1860.00	88/10/06	88/10/06
72060 CASING BOT 1ST FR MP FT	WATER		1	63.00000			63.00	63.00	88/10/06	88/10/06
72068 GROUT BOT 1ST FR MP FT	WATER		1	20.00000			20.00	20.00	88/10/06	88/10/06
72090 CASING DIA 1ST CAS (IN)	WATER		1	6.000000			6.00	6.00	88/10/06	88/10/06
72095 DEPTH TO BEDROCK FEET	WATER		1	15.00000			15.00	15.00	88/10/06	88/10/06
72100 HOLE DIA 1ST ZONE INCHES	WATER		1	9.000000			9.00	9.00	88/10/06	88/10/06
72101 HOLE DIA 2ND ZONE INCHES	WATER		1	6.000000			6.00	6.00	88/10/06	88/10/06
74041 WQF SAMPLE UPDATED	WATER		1	881220.0			881219	881219	88/10/06	88/10/06
82511 WELL YIELD GPM	WATER		1	5.000000			5.00	5.00	88/10/06	88/10/06
84054 LITH- OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	88/10/06	88/10/06
84069 FORMAT'N CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	88/10/06	88/10/06

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 2
RADFORD AAP (W)
160-00258
37 11 49.0 080 34 12.0 4
WHITETHORN
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
/TYPA/AMBNT/WELL 9-NEW
21VASWCB 830611 05050001
0000 FEET DEPTH

PARAMETER	MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001 TOT DPTH OF HOLE FT	WATER		1	90.00000			90.0	90.0	10/01/01	10/01/01
72019 DEPTH-FT BL LAND SURFACE	WATER		1	20.00000			20.00	20.00	10/01/01	10/01/01
72020 ELEV FEET AB MSL	WATER		1	1720.000			1720.00	1720.00	10/01/01	10/01/01
72035 PUMP HR S TOTAL DAILY	WATER		1	8.000000			8	8	10/01/01	10/01/01
72090 CASING DIA 1ST CAS (IN)	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
82511 WELL YIELD GPM	WATER		1	10.00000			10.00	10.00	10/01/01	10/01/01
84054 LITH- OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069 FORMAT'N CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 3
RADFORD AAP (W)
160-00257
37 12 03.0 080 33 46.0 4
WHITETHORN
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
/TYPA/AMBNT/WELL 9-NEW
21VASWCB 830611 05050001
0000 FEET DEPTH

PARAMETER	MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001 TOT DPTH OF HOLE FT	WATER		1	119.0000			119.0	119.0	10/01/01	10/01/01
72020 ELEV FEET AB MSL	WATER		1	1750.000			1750.00	1750.00	10/01/01	10/01/01
82511 WELL YIELD GPM	WATER		1	12.00000			12.00	12.00	10/01/01	10/01/01
84054 LITH- OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069 FORMAT'N CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 4

RADFORD AAP (W)

/TYPA/AMBNT/WELL

160-00256
37 12 39.0 080 33 23.0 4
LONGSHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
9-NEW
21VASWCB 830611 05050001
0000 FEET DEPTH

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH	OF HOLE	FT	WATER		1	205.0000			205.0	205.0	10/01/01	10/01/01
72019	DEPTH-FT	BL LAND	SURFACE	WATER		1	30.00000			30.00	30.00	10/01/01	10/01/01
72020	ELEV	FEET AB	MSL	WATER		1	1760.000			1760.00	1760.00	10/01/01	10/01/01
72090	CASING	DIA 1ST	CAS (IN)	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
74041	WQF	SAMPLE	UPDATED	WATER		1	901020.0			901018	901018	10/01/01	10/01/01
82511	WELL	YIELD	GPM	WATER		1	20.00000			20.00	20.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 5
RADFORD AAP (W)

/TYPA/AMBNT/WELL

160-00196
37 12 40.0 080 33 25.0 4
LONGSHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
9-NEW
21VASWCB 830611 05050001
0000 FEET DEPTH

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72020	ELEV	FEET AB	MSL	WATER		1	1700.000			1700.00	1700.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 6
RADFORD AAP (W)

/TYPA/AMBNT/WELL

160-00474
37 12 41.0 080 32 47.0 4
LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
9-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH	OF HOLE	FT	WATER		1	80.00000			80.0	80.0	85/11/23	85/11/23
72020	ELEV	FEET AB	MSL	WATER		1	1700.000			1700.00	1700.00	85/11/23	85/11/23
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 7
RADFORD AAP (W)

/TYPA/AMBNT/WELL

160-00472
37 12 42.0 080 33 22.0 4
LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
07-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH	OF HOLE	FT	WATER		1	92.00000			92.0	92.0	85/11/23	85/11/23
72020	ELEV	FEET AB	MSL	WATER		1	1820.000			1820.00	1820.00	85/11/23	85/11/23
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 8
RADFORD AAP (W)

/TYPA/AMBNT/WELL

160-00473
37 12 45.0 080 32 55.0 4
LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
07-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

PARAMETER	MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE

72001	TOT DPTH	OF HOLE	FT	WATER			1	48.00000				48.0	48.0	85/11/23	85/11/23
72020	ELEV	FEET AB	MSL	WATER			1	1700.000				1700.00	1700.00	85/11/23	85/11/23
84054	LITH-	OLOGY	CODE	WATER		TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069	FORMAT'N	CODE	ALPHA	WATER		TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 9

RADFORD AAP (W)

160-00255
37 12 52.0 080 34 13.0 4
MCCOY
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
9-NEW
21VASWCB 830611 05050001
0000 FEET DEPTH

/TYPA/AMBNT/WELL

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH OF HOLE	FT	WATER		1	223.0000			223.0	223.0	10/01/01	10/01/01
72002	TOP DPTH WB ZONE	FT	WATER		1	130.0000			130.0	130.0	10/01/01	10/01/01
72003	BOT DPTH WB ZONE	FT	WATER		1	132.0000			132.0	132.0	10/01/01	10/01/01
72019	DEPTH-FT BL LAND	SURFACE	WATER		1	50.00000			50.00	50.00	10/01/01	10/01/01
72020	ELEV FEET AB	MSL	WATER		1	1889.000			1889.00	1889.00	10/01/01	10/01/01
72035	PUMP HR S TOTAL	DAILY	WATER		1	1.000000			1	1	10/01/01	10/01/01
72075	TOP DPTH 2ND WB	ZONE(FT)	WATER		1	200.0000			200.00	200.00	10/01/01	10/01/01
72076	BOT DPTH 2ND WB	ZONE(FT)	WATER		1	201.0000			201.00	201.00	10/01/01	10/01/01
72090	CASING DIA 1ST	CAS (IN)	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
82511	WELL YIELD	GPM	WATER		1	30.00000			30.00	30.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 10

GROSS

0 9 TOTAL STATIONS PROCESSED

RADFORD AAP (W)

SUMMARY

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	5	5	36	5	0	5	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	3	3	12	3	0	3	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	1	1	14	1	0	1	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
TOTAL	9	9	62	9	0	9	0	0

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 11

GROSS

0 9 TOTAL STATIONS PROCESSED

RADFORD AAP (W)

0 PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH OF HOLE	FT	WATER		8	145.8800	8149.600	90.27500	310.0	48.0	10/01/01	88/10/06
72002	TOP DPTH WB ZONE	FT	WATER		2	169.5000	3120.500	55.86200	209.0	130.0	10/01/01	88/10/06
72003	BOT DPTH WB ZONE	FT	WATER		2	171.0000	3042.000	55.15400	210.0	132.0	10/01/01	88/10/06
72019	DEPTH-FT BL LAND	SURFACE	WATER		3	33.33300	233.3300	15.27500	50.00	20.00	10/01/01	10/01/01
72020	ELEV FEET AB	MSL	WATER		9	1766.600	5296.000	72.77400	1889.00	1700.00	10/01/01	88/10/06
72035	PUMP HR S TOTAL	DAILY	WATER		2	4.500000	24.50000	4.949800	8	1	10/01/01	10/01/01
72060	CASING BOT 1ST	FR MP FT	WATER		1	63.00000			63.00	63.00	88/10/06	88/10/06
72068	GROUT BOT 1ST	FR MP FT	WATER		1	20.00000			20.00	20.00	88/10/06	88/10/06
72075	TOP DPTH 2ND WB	ZONE(FT)	WATER		1	200.0000			200.00	200.00	10/01/01	10/01/01
72076	BOT DPTH 2ND WB	ZONE(FT)	WATER		1	201.0000			201.00	201.00	10/01/01	10/01/01
72090	CASING DIA 1ST	CAS (IN)	WATER		4	6.000000	.0000000	.0000000	6.00	6.00	10/01/01	88/10/06
72095	DEPTH TO BEDROCK	FEET	WATER		1	15.00000			15.00	15.00	88/10/06	88/10/06
72100	HOLE DIA 1ST ZONE	INCHES	WATER		1	9.000000			9.00	9.00	88/10/06	88/10/06
72101	HOLE DIA 2ND ZONE	INCHES	WATER		1	6.000000			6.00	6.00	88/10/06	88/10/06
74041	WQF SAMPLE	UPDATED	WATER		2	891120.0	1960E+05	14003.00	901018	881219	10/01/01	88/10/06

```
  82511 WELL    - YIELD      GPM    WATER                      5 15.40000 95.80000 9.787800    30.00     5.00  10/01/01 88/10/06
  84054 LITH-     OLOGY      CODE   WATER           TXT        9    TEXT      TEXT      TEXT      TEXT     TEXT   10/01/01 88/10/06
  84069 FORMAT'N    CODE     ALPHA  WATER           TXT        9    TEXT      TEXT      TEXT      TEXT     TEXT   10/01/01 88/10/06
 THAT'S ALL FOLKS
1STORET   RETRIEVAL DATE 91/12/02
 P
 R1111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111111C11
 H N           :
 DSCXT
 J         Y
 001001RADFORD AAP (W)
 1000000999999000000999999                              ********      77777777  F
 L5,3713222,08036068,3713222,08031451,3709537,08031451,3709537,08036068,,
0EXTRACT/MASKING OPTION PERFORMED
 CLR000000
 SEL000009
-
-
0               ************************************************************
                ************************************************************
                **                                                        **
                **                                                        **
                **        9 STATIONS MET STATION SELECTION CRITERIA       **
                **          (PRIOR TO STATION RESTRICTIONS)               **
                **                                                        **
                **                                                        **
                ************************************************************
                ************************************************************
 STORET RETRIEVAL DATE  91/12/02   -  ECHO OF ORIGINAL REQUEST
 PGM=INVENT,
 #-----------------------------------------------------------------
 #                     REQUEST NAME: GWRAD3
 #                       CREATED BY: HED
 #                             DATE: 91/12/02
 #                             TIME: 21:12
 #
 #----------------------<  STATION SELECTION  >-------------------------
 #    OPTION 4 - WITHIN AN AREA DEFINED BY LAT/LONG POLYGONS OR CIRCLES
 # DEFINE CIRCULAR AREA(S) BY SPECIFYING THE CENTER AND RADIUS
 RADIUS=      3220,L=3711380,L=08033560,
 #
 #----------------------<  STATION RESTRICTION  >---------------------
 # RESTRICT TO SPECIFIC ARCHIVED DATA CLASSES
 ARCLASS=ALL,
 # RESTRICT TO SPECIFIC STATION TYPES/PARAMETER ATTRIBUTES
 ONLYATTR=WELL OR SPRING,
 #
 #-----------------------<  SPECIAL OPTIONS  >-------------------------
 # GROSS WITH INDIVIDUAL STATION DATA
 #       EXCLUDING STATIONS WITH NO SAMPLE DATA
 # SET INVENTORY BREAK POINTS
 INVBRK=M,
 # SUPPRESS DATA TRANSFORMATIONS
 # PRINT THE STATION HEADER AT THE TOP RIGHT CORNER OF EACH PAGE
 HEAD=RADFORD AAP (W),
 ./HED JOB (RFWESTORP,MHED),'PHOENIX-INVENT',TIME=(1,30),PRTY=1,
 ./            MSGLEVEL=(0,0),NOTIFY=HED
 **ROUTE  PRINT HOLD
 **JOBPARM  LINES=999
12/04/91: S2K R11.6 AVAILABLE FOR TESTING           - SEE NEWS ALERT10 OPER

END OF DATA
```

GW DATA **31** GW 37° 12' 08" N 80° 31' 50" W Radford AAP (N)

```
gwrad2
DATASET NOT LINE NUMBERED-NONUM ASSUMED
QED
list
 RETRIEVAL PROGRAM
0   PGM=INVENT
      THIS IS AN INVENTORY RETRIEVAL SHOWING SUMMARY STATISTICS FOR ALL PARAMETERS
0   NO BEGINNING DATE WAS REQUESTED -- STORET ASSUMED THE BEGINNING DATE WAS THAT OF THE OLDEST DATA VALUE FOUND
    NO ENDING DATE WAS REQUESTED -- STORET ASSUMED THE ENDING DATE WAS THAT OF THE MOST RECENT DATA VALUE FOUND
-STATION SELECTION WAS BY:

-              ***** ERROR MSG:  NO STATION SELECTOR KEYWORDS WERE SPECIFIED - THEREFORE NO STATIONS WERE RETRIEVED *****
-
-
                                        ***** END OF SUMMARY SECTION *****
```

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 1

RADFORD AAP (N)

```
160-00386
37 11 52.0 080 30 27.0 4
E OF RAAP
51121   VIRGINIA          MONTGOMERY
05-OHIO                   050700
07-NEW
21VASWCB  860104              05050001
0000 FEET DEPTH
```

/TYPA/AMBNT/WELL

PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00094	CNDUCTVY FIELD MICROMHO	WATER		1	477.0000			477	477	84/10/15	84/10/15
00340	COD HI LEVEL MG/L	WATER		1	1.000000			1	1	84/10/15	84/10/15
00400	PH SU	WATER		1	7.200000			7.20	7.20	84/10/15	84/10/15
00403	PH LAB SU	WATER		1	7.500000			7.5	7.5	84/10/15	84/10/15
00410	T ALK CACO3 MG/L	WATER		1	206.0000			206	206	84/10/15	84/10/15
00500	RESIDUE TOTAL MG/L	WATER		1	286.0000			286	286	84/10/15	84/10/15
00505	RESIDUE TOT VOL MG/L	WATER		1	88.00000			88	88	84/10/15	84/10/15
00510	RESIDUE TOT FIX MG/L	WATER		1	206.0000			206	206	84/10/15	84/10/15
00515	RESIDUE DISS-105 C MG/L	WATER		1	276.0000			276	276	84/10/15	84/10/15
00610	NH3+NH4- N TOTAL MG/L	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00615	NO2-N TOTAL MG/L	WATER		1	.0100000			.010	.010	84/10/15	84/10/15
00620	NO3-N TOTAL MG/L	WATER		1	.1500000			.150	.150	84/10/15	84/10/15
00625	TOT KJEL N MG/L	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00665	PHOS-TOT MG/L P	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00671	PHOS-DIS ORTHO MG/L P	WATER		1	.0200000			.020	.020	84/10/15	84/10/15
00680	T ORG C C MG/L	WATER		1	4.000000			4.0	4.0	84/10/15	84/10/15
00900	TOT HARD CACO3 MG/L	WATER		1	234.0000			234	234	84/10/15	84/10/15
00940	CHLORIDE TOTAL MG/L	WATER		1	31.00000			31	31	84/10/15	84/10/15
00951	FLUORIDE F,TOTAL MG/L	WATER		1	.0900000			.09	.09	84/10/15	84/10/15
01042	COPPER CU,TOT UG/L	WATER		1	10.00000			10	10	84/10/15	84/10/15
01045	IRON FE,TOT UG/L	WATER		1	80.00000			80	80	84/10/15	84/10/15
01055	MANGNESE MN UG/L	WATER		1	60.00000			60.0	60.0	84/10/15	84/10/15
01067	NICKEL NI,TOTAL UG/L	WATER		1	10.00000			10	10	84/10/15	84/10/15
01092	ZINC ZN,TOT UG/L	WATER		1	60.00000			60	60	84/10/15	84/10/15
31507	TOT COLI MPN COMP /100ML	WATER		1	2.200000			2	2	84/10/15	84/10/15
31615	FEC COLI MPNECMED /100ML	WATER		1	2.200000			2	2	84/10/15	84/10/15
72020	ELEV FEET AB MSL	WATER		1	1840.000			1840.00	1840.00	85/11/23	85/11/23
74041	WQF SAMPLE UPDATED	WATER		1	890110.0			890111	890111	84/10/15	84/10/15
82032	CALCIUM TOTAL C A UG/L	WATER		1	50000.00			50000	50000	84/10/15	84/10/15
82033	MG TOTAL MG UG/L	WATER		1	25000.00			25000	25000	84/10/15	84/10/15
82034	K TOTAL K UG/L	WATER		1	1600.000			1600	1600	84/10/15	84/10/15
82035	SODIUM TOTAL NA UG/L	WATER		1	38000.00			38000	38000	84/10/15	84/10/15
84054	LITH- OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069	FORMAT'N CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 2

RADFORD AAP (N)

```
160-00077
37 12 31.1 080 31 56.1 1
WHITETHORN
51121   VIRGINIA          MONTGOMERY
OHIO RIVER                050700
KANAWHA RIVER
21VASWCB  830611              05050001
0000 FEET DEPTH
```

/TYPA/AMBNT/WELL

PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH OF HOLE FT	WATER		1	250.0000			250.0	250.0	10/01/01	10/01/01
72002	TOP DPTH WB ZONE FT	WATER		1	200.0000			200.0	200.0	10/01/01	10/01/01
72003	BOT DPTH WB ZONE FT	WATER		1	201.0000			201.0	201.0	10/01/01	10/01/01
72019	DEPTH-FT BL LAND SURFACE	WATER		1	100.0000			100.00	100.00	10/01/01	10/01/01
72020	ELEV FEET AB MSL	WATER		1	1910.000			1910.00	1910.00	10/01/01	10/01/01
72035	PUMP HR S TOTAL DAILY	WATER		1	2.000000			2	2	10/01/01	10/01/01
72058	CASING TOP 1ST FR MP FT	WATER		1	.0000000			.00	.00	10/01/01	10/01/01
72060	CASING BOT 1ST FR MP FT	WATER		1	177.0000			177.00	177.00	10/01/01	10/01/01
72075	TOP DPTH 2ND WB ZONE(FT)	WATER		1	240.0000			240.00	240.00	10/01/01	10/01/01
72076	BOT DPTH 2ND WB ZONE(FT)	WATER		1	245.0000			245.00	245.00	10/01/01	10/01/01
72090	CASING DIA 1ST CAS (IN)	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
72095	DEPTH TO BEDROCK FEET	WATER		1	22.00000			22.00	22.00	10/01/01	10/01/01

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72100	HOLE DIA	1ST ZONE	INCHES	WATER		1	7.000000			7.00	7.00	10/01/01	10/01/01
72101	HOLE DIA	2ND ZONE	INCHES	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
82511	WELL	YIELD	GPM	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 3
RADFORD AAP (N)

/TYPA/AMBNT/WELL

160-00470
37 12 33.0 080 30 22.0 4
E OF LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
07-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH	OF HOLE	FT	WATER		1	130.0000			130.0	130.0	85/11/23	85/11/23
72020	ELEV	FEET AB	MSL	WATER		1	2000.000			2000.00	2000.00	85/11/23	85/11/23
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 4
RADFORD AAP (N)

/TYPA/AMBNT/WELL

160-00471
37 12 37.0 080 31 12.0 4
E OF LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
07-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72020	ELEV	FEET AB	MSL	WATER		1	1960.000			1960.00	1960.00	85/11/23	85/11/23
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 5
RADFORD AAP (N)

/TYPA/AMBNT/WELL

160-00256
37 12 39.0 080 33 23.0 4
LONGSHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
9-NEW
21VASWCB 830611 05050001
0000 FEET DEPTH

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH	OF HOLE	FT	WATER		1	205.0000			205.0	205.0	10/01/01	10/01/01
72019	DEPTH-FT	BL LAND	SURFACE	WATER		1	30.00000			30.00	30.00	10/01/01	10/01/01
72020	ELEV	FEET AB	MSL	WATER		1	1760.000			1760.00	1760.00	10/01/01	10/01/01
72090	CASING	DIA 1ST	CAS (IN)	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
74041	WQF	SAMPLE	UPDATED	WATER		1	901020.0			901018	901018	10/01/01	10/01/01
82511	WELL	YIELD	GPM	WATER		1	20.00000			20.00	20.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 6
RADFORD AAP (N)

/TYPA/AMBNT/WELL

160-00196
37 12 40.0 080 33 25.0 4
LONGSHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
9-NEW
21VASWCB 830611 05050001
0000 FEET DEPTH

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72020	ELEV	FEET AB	MSL	WATER		1	1700.000			1700.00	1700.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 7
RADFORD AAP (N)

/TYPA/AMBNT/WELL

160-00474
37 12 41.0 080 32 47.0 4
LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
9-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001 TOT DPTH	OF HOLE	FT	WATER		1	80.00000			80.0	80.0	85/11/23	85/11/23
72020 ELEV	FEET AB	MSL	WATER		1	1700.000			1700.00	1700.00	85/11/23	85/11/23
84054 LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069 FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 8
RADFORD AAP (N)

160-00472
37 12 42.0 080 33 22.0 4
LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
07-NEW
/TYPA/AMBNT/WELL 21VASWCB 860104 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001 TOT DPTH	OF HOLE	FT	WATER		1	92.00000			92.0	92.0	85/11/23	85/11/23
72020 ELEV	FEET AB	MSL	WATER		1	1820.000			1820.00	1820.00	85/11/23	85/11/23
84054 LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069 FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 9
RADFORD AAP (N)

160-00473
37 12 45.0 080 32 55.0 4
LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
07-NEW
/TYPA/AMBNT/WELL 21VASWCB 860104 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001 TOT DPTH	OF HOLE	FT	WATER		1	48.00000			48.0	48.0	85/11/23	85/11/23
72020 ELEV	FEET AB	MSL	WATER		1	1700.000			1700.00	1700.00	85/11/23	85/11/23
84054 LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069 FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 10
RADFORD AAP (N)

160-00513
37 13 45.0 080 31 52.0 4
E OF LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
07-NEW
/TYPA/AMBNT/WELL 21VASWCB 860104 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00008 LAB	IDENT.	NUMBER	WATER		1	21266.00			21266	21266	85/08/29	85/08/29
00094 CNDUCTVY	FIELD	MICROMHO	WATER		1	355.0000			355	355	85/08/29	85/08/29
00116 INTNSVE	SURVEY	IDENT	WATER		1	865100.0			865101	865101	85/08/29	85/08/29
00400 PH		SU	WATER		1	7.320000			7.32	7.32	85/08/29	85/08/29
00403 PH	LAB	SU	WATER		1	7.800000			7.8	7.8	85/08/29	85/08/29
00410 T ALK	CACO3	MG/L	WATER		1	180.0000			180	180	85/08/29	85/08/29
00515 RESIDUE	DISS-105 C	MG/L	WATER		1	250.0000			250	250	85/08/29	85/08/29
00610 NH3+NH4-	N TOTAL	MG/L	WATER		1	.1000000			.100	.100	85/08/29	85/08/29
00615 NO2-N	TOTAL	MG/L	WATER		1	.0100000			.010	.010	85/08/29	85/08/29
00620 NO3-N	TOTAL	MG/L	WATER		1	.5000000			.500	.500	85/08/29	85/08/29
00625 TOT KJEL	N	MG/L	WATER		1	.1000000			.100	.100	85/08/29	85/08/29
00665 PHOS-TOT		MG/L P	WATER		1	.1000000			.100	.100	85/08/29	85/08/29
00671 PHOS-DIS	ORTHO	MG/L P	WATER		1	.0100000			.010	.010	85/08/29	85/08/29
00680 T ORG C	C	MG/L	WATER		1	3.000000			3.0	3.0	85/08/29	85/08/29
00900 TOT HARD	CACO3	MG/L	WATER		1	202.0000			202	202	85/08/29	85/08/29
00940 CHLORIDE	TOTAL	MG/L	WATER		1	10.00000			10	10	85/08/29	85/08/29
00945 SULFATE	SO4-TOT	MG/L	WATER		1	22.50000			23	23	85/08/29	85/08/29
00951 FLUORIDE	F,TOTAL	MG/L	WATER		1	.1300000			.13	.13	85/08/29	85/08/29
01002 ARSENIC	AS,TOT	UG/L	WATER		1	1.000000			1	1	85/08/29	85/08/29
01027 CADMIUM	CD,TOT	UG/L	WATER		1	1.000000			1	1	85/08/29	85/08/29
01034 CHROMIUM	CR,TOT	UG/L	WATER		1	1.000000			1	1	85/08/29	85/08/29
01042 COPPER	CU,TOT	UG/L	WATER		1	10.00000			10	10	85/08/29	85/08/29
01045 IRON	FE,TOT	UG/L	WATER		1	40.00000			40	40	85/08/29	85/08/29
01051 LEAD	PB,TOT	UG/L	WATER		1	4.000000			4	4	85/08/29	85/08/29
01055 MANGNESE	MN	UG/L	WATER		1	10.00000			10.0	10.0	85/08/29	85/08/29
01067 NICKEL	NI,TOTAL	UG/L	WATER		1	10.00000			10	10	85/08/29	85/08/29
01092 ZINC	ZN,TOT	UG/L	WATER		1	60.00000			60	60	85/08/29	85/08/29
31507 TOT COLI	MPN COMP	/100ML	WATER		1	2.200000			2	2	85/08/29	85/08/29
31615 FEC COLI	MPNECMED	/100ML	WATER		1	2.200000			2	2	85/08/29	85/08/29

72001	TOT DPTH	OF HOLE	FT	WATER		1	200.0000			200.0	200.0	85/11/24	85/11/24
72020	ELEV	FEET AB	MSL	WATER		1	1757.000			1757.00	1757.00	85/11/24	85/11/24
72060	CASING	BOT 1ST	FR MP FT	WATER		1	21.00000			21.00	21.00	85/11/24	85/11/24
72068	GROUT	BOT 1ST	FR MP FT	WATER		1	20.00000			20.00	20.00	85/11/24	85/11/24
72090	CASING	DIA 1ST	CAS (IN)	WATER		1	6.000000			6.00	6.00	85/11/24	85/11/24
72095	DEPTH TO	BEDROCK	FEET	WATER		1	20.00000			20.00	20.00	85/11/24	85/11/24
72100	HOLE DIA	1ST ZONE	INCHES	WATER		1	10.00000			10.00	10.00	85/11/24	85/11/24
72101	HOLE DIA	2ND ZONE	INCHES	WATER		1	6.000000			6.00	6.00	85/11/24	85/11/24
74041	WQF	SAMPLE	UPDATED	WATER		2	881010.0	8011E+05	28304.00	901018	861003	85/08/29	85/11/24
82032	CALCIUM	TOTAL C A	UG/L	WATER		1	39000.00			39000	39000	85/08/29	85/08/29

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 11
RADFORD AAP (N)

/TYPA/AMBNT/WELL

160-00513
37 13 45.0 080 31 52.0 4
E OF LONG SHOP
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
07-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
82033	MG	TOTAL MG	UG/L	WATER		1	24000.00			24000	24000	85/08/29	85/08/29
82034	K	TOTAL K	UG/L	WATER		1	1700.000			1700	1700	85/08/29	85/08/29
82035	SODIUM	TOTAL NA	UG/L	WATER		1	13000.00			13000	13000	85/08/29	85/08/29
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/24	85/11/24
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/24	85/11/24

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 12
GROSS

0 10 TOTAL STATIONS PROCESSED
RADFORD AAP (N)

SUMMARY

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	3	3	28	3	0	3	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	1	0	31	1	0	0	0	0
1985	6	7	67	8	0	6	1	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
TOTAL	10	10	126	12	0	9	1	0

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 13
GROSS

0 10 TOTAL STATIONS PROCESSED
RADFORD AAP (N)

0	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00008	LAB	IDENT.	NUMBER	WATER		1	21266.00			21266	21266	85/08/29	85/08/29
00094	CNDUCTVY	FIELD	MICROMHO	WATER		2	416.0000	7442.000	86.26700	477	355	84/10/15	85/08/29
00116	INTNSVE	SURVEY	IDENT	WATER		1	865100.0			865101	865101	85/08/29	85/08/29
00340	COD	HI LEVEL	MG/L	WATER		1	1.000000			1	1	84/10/15	84/10/15
00400	PH		SU	WATER		2	7.260000	.0072022	.0848660	7.32	7.20	84/10/15	85/08/29
00403	PH	LAB	SU	WATER		2	7.650000	.0449980	.2121300	7.8	7.5	84/10/15	85/08/29
00410	T ALK	CACO3	MG/L	WATER		2	193.0000	338.0000	18.38500	206	180	84/10/15	85/08/29
00500	RESIDUE	TOTAL	MG/L	WATER		1	286.0000			286	286	84/10/15	84/10/15
00505	RESIDUE	TOT VOL	MG/L	WATER		1	88.00000			88	88	84/10/15	84/10/15
00510	RESIDUE	TOT FIX	MG/L	WATER		1	206.0000			206	206	84/10/15	84/10/15
00515	RESIDUE	DISS-105 C	MG/L	WATER		2	263.0000	338.0000	18.38500	276	250	84/10/15	85/08/29
00610	NH3+NH4-	N TOTAL	MG/L	WATER		2	.1000000	.0000000	.0000000	.100	.100	84/10/15	85/08/29
00615	NO2-N	TOTAL	MG/L	WATER		2	.0100000	.0000000	.0000000	.010	.010	84/10/15	85/08/29
00620	NO3-N	TOTAL	MG/L	WATER		2	.3250000	.0612500	.2474900	.500	.150	84/10/15	85/08/29
00625	TOT KJEL	N	MG/L	WATER		2	.1000000	.0000000	.0000000	.100	.100	84/10/15	85/08/29
00665	PHOS-TOT		MG/L P	WATER		2	.1000000	.0000000	.0000000	.100	.100	84/10/15	85/08/29

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00671 PHOS-DIS	ORTHO	MG/L P		WATER		2	.0150000	.0000500	.0070711	.020	.010	84/10/15	85/08/29
00680 T ORG C	C	MG/L		WATER		2	3.500000	.5000000	.7071100	4.0	3.0	84/10/15	85/08/29
00900 TOT HARD	CACO3	MG/L		WATER		2	218.0000	512.0000	22.62800	234	202	84/10/15	85/08/29
00940 CHLORIDE	TOTAL	MG/L		WATER		2	20.50000	220.5000	14.84900	31	10	84/10/15	85/08/29
00945 SULFATE	SO4-TOT	MG/L		WATER		1	22.50000			23	23	85/08/29	85/08/29
00951 FLUORIDE	F,TOTAL	MG/L		WATER		2	.1100000	.0008000	.0282850	.13	.09	84/10/15	85/08/29
01002 ARSENIC	AS,TOT	UG/L		WATER		1	1.000000			1	1	85/08/29	85/08/29
01027 CADMIUM	CD,TOT	UG/L		WATER		1	1.000000			1	1	85/08/29	85/08/29
01034 CHROMIUM	CR,TOT	UG/L		WATER		1	1.000000			1	1	85/08/29	85/08/29
01042 COPPER	CU,TOT	UG/L		WATER		2	10.00000	.0000000	.0000000	10	10	84/10/15	85/08/29
01045 IRON	FE,TOT	UG/L		WATER		2	60.00000	800.0000	28.28400	80	40	84/10/15	85/08/29
01051 LEAD	PB,TOT	UG/L		WATER		1	4.000000			4	4	85/08/29	85/08/29
01055 MANGNESE	MN	UG/L		WATER		2	35.00000	1250.000	35.35500	60.0	10.0	84/10/15	85/08/29
01067 NICKEL	NI,TOTAL	UG/L		WATER		2	10.00000	.0000000	.0000000	10	10	84/10/15	85/08/29
01092 ZINC	ZN,TOT	UG/L		WATER		2	60.00000	.0000000	.0000000	60	60	84/10/15	85/08/29
31507 TOT COLI	MPN COMP	/100ML		WATER		2	2.200000	.0000000	.0000000	2	2	84/10/15	85/08/29
31615 FEC COLI	MPNECMED	/100ML		WATER		2	2.200000	.0000000	.0000000	2	2	84/10/15	85/08/29
72001 TOT DPTH	OF HOLE	FT		WATER		7	143.5700	5717.300	75.61300	250.0	48.0	10/01/01	85/11/24
72002 TOP DPTH	WB ZONE	FT		WATER		1	200.0000			200.0	200.0	10/01/01	10/01/01
72003 BOT DPTH	WB ZONE	FT		WATER		1	201.0000			201.0	201.0	10/01/01	10/01/01
72019 DEPTH-FT	BL LAND	SURFACE		WATER		2	65.00000	2450.000	49.49800	100.00	30.00	10/01/01	10/01/01
72020 ELEV	FEET AB	MSL		WATER		10	1814.700	12333.00	111.0500	2000.00	1700.00	10/01/01	85/11/24
72035 PUMP HR	S TOTAL	DAILY		WATER		1	2.000000			2	2	10/01/01	10/01/01
72058 CASING	TOP 1ST	FR MP FT		WATER		1	.0000000			.00	.00	10/01/01	10/01/01
72060 CASING	BOT 1ST	FR MP FT		WATER		2	99.00000	12168.00	110.3100	177.00	21.00	10/01/01	85/11/24
72068 GROUT	BOT 1ST	FR MP FT		WATER		1	20.00000			20.00	20.00	85/11/24	85/11/24

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 14

GROSS

0 10 TOTAL STATIONS PROCESSED

RADFORD AAP (N)

0 PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72075 TOP DPTH	2ND WB	ZONE(FT)		WATER		1	240.0000			240.00	240.00	10/01/01	10/01/01
72076 BOT DPTH	2ND WB	ZONE(FT)		WATER		1	245.0000			245.00	245.00	10/01/01	10/01/01
72090 CASING	DIA 1ST	CAS (IN)		WATER		3	6.000000	.0000000	.0000000	6.00	6.00	10/01/01	85/11/24
72095 DEPTH TO	BEDROCK	FEET		WATER		2	21.00000	2.000000	1.414200	22.00	20.00	10/01/01	85/11/24
72100 HOLE DIA	1ST ZONE	INCHES		WATER		2	8.500000	4.500000	2.121300	10.00	7.00	10/01/01	85/11/24
72101 HOLE DIA	2ND ZONE	INCHES		WATER		2	6.000000	.0000000	.0000000	6.00	6.00	10/01/01	85/11/24
74041 WQF	SAMPLE	UPDATED		WATER		4	888290.0	3572E+05	18900.00	901018	861003	10/01/01	85/11/24
82032 CALCIUM	TOTAL C A	UG/L		WATER		2	44500.00	60500000	7778.200	50000	39000	84/10/15	85/08/29
82033 MG	TOTAL MG	UG/L		WATER		2	24500.00	499970.0	707.0900	25000	24000	84/10/15	85/08/29
82034 K	TOTAL K	UG/L		WATER		2	1650.000	5000.000	70.71100	1700	1600	84/10/15	85/08/29
82035 SODIUM	TOTAL NA	UG/L		WATER		2	25500.00	3125E+05	17678.00	38000	13000	84/10/15	85/08/29
82511 WELL	YIELD	GPM		WATER		2	13.00000	98.00000	9.899500	20.00	6.00	10/01/01	10/01/01
84054 LITH-	OLOGY	CODE		WATER	TXT	10	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	85/11/24
84069 FORMAT'N	CODE	ALPHA		WATER	TXT	10	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	85/11/24

```
THAT'S ALL FOLKS
1STORET   RETRIEVAL DATE 91/12/02
P
R11111111111111111111111111111111111111111111111111111111111111111111C11
H N          :
DSCXT
J          Y
001001RADFORD AAP (N)
1000000999999000000999999                        *********     77777777  F
L5,3713522,08034008,3713522,08029391,3710237,08029391,3710237,08034008,,
0EXTRACT/MASKING OPTION PERFORMED
CLR000000
SEL000010
-
-
0               ****************************************************************
                ****************************************************************
                **                                                            **
                **                                                            **
                **        10 STATIONS MET STATION SELECTION CRITERIA          **
                **           (PRIOR TO STATION RESTRICTIONS)                  **
                **                                                            **
                **                                                            **
                ****************************************************************
                ****************************************************************
STORET RETRIEVAL DATE  91/12/02   -  ECHO OF ORIGINAL REQUEST
PGM=INVENT,
#----------------------------------------------------------------------
#                        REQUEST NAME: GWRAD2
#                          CREATED BY: HED
#                                DATE: 91/12/02
#                                TIME: 21:12
#
#-----------------------< STATION SELECTION  >------------------------
#    OPTION 4 - WITHIN AN AREA DEFINED BY LAT/LONG POLYGONS OR CIRCLES
# DEFINE CIRCULAR AREA(S) BY SPECIFYING THE CENTER AND RADIUS
RADIUS=      3220,L=3712080,L=08031500,
#
```

```
#----------------------<  STATION RESTRICTION  >---------------------
# RESTRICT TO SPECIFIC ARCHIVED DATA CLASSES
ARCLASS=ALL,
# RESTRICT TO SPECIFIC STATION TYPES/PARAMETER ATTRIBUTES
ONLYATTR=WELL OR SPRING,
#
#-----------------------<  SPECIAL OPTIONS  >-------------------------
# GROSS WITH INDIVIDUAL STATION DATA
#       EXCLUDING STATIONS WITH NO SAMPLE DATA
# SET INVENTORY BREAK POINTS
INVBRK=M,
# SUPPRESS DATA TRANSFORMATIONS
# PRINT THE STATION HEADER AT THE TOP RIGHT CORNER OF EACH PAGE
HEAD=RADFORD AAP (N),
./HED JOB (RFWESTORP,MHED),'PHOENIX-INVENT',TIME=(1,30),PRTY=1,
./              MSGLEVEL=(0,0),NOTIFY=HED
**ROUTE  PRINT HOLD
**JOBPARM  LINES=999

END OF DATA
```

C-W DATA [31] GW 37° 10' 25" N 80° 32' 42" W RADFORD AAP(S)

```
qed
IKJ56700A ENTER DATA SET NAME -
gwrad4
DATASET NOT LINE NUMBERED-NONUM ASSUMED
QED
list
 RETRIEVAL PROGRAM
0   PGM=INVENT
        THIS IS AN INVENTORY RETRIEVAL SHOWING SUMMARY STATISTICS FOR ALL PARAMETERS
0   NO BEGINNING DATE WAS REQUESTED -- STORET ASSUMED THE BEGINNING DATE WAS THAT OF THE OLDEST DATA VALUE FOUND
    NO ENDING DATE WAS REQUESTED -- STORET ASSUMED THE ENDING DATE WAS THAT OF THE MOST RECENT DATA VALUE FOUND
-STATION SELECTION WAS BY:

-              ***** ERROR MSG:  NO STATION SELECTOR KEYWORDS WERE SPECIFIED - THEREFORE NO STATIONS WERE RETRIEVED *****
-
-                                    ***** END OF SUMMARY SECTION *****
1STORET RETRIEVAL DATE 91/12/02                PGM=INVENT                                                    PAGE:     1
 RADFORD AAP (S)                                                    177-00088
                                                                    37 08 51.0 080 32 54.5 1
                                                                    JAMES WHITED
                                                                    51155   VIRGINIA          PULASKI
                                                                    OHIO RIVER                050700
 /TYPA/AMBNT/WELL                                                   KANAWHA RIVER
                                                                    21VASWCB  830611           HQ 05050001
                                                                    0000 FEET DEPTH
```

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH	OF HOLE FT	WATER		1	480.0000			480.0	480.0	10/01/01	10/01/01
72003	BOT DPTH	WB ZONE FT	WATER		1	300.0000			300.0	300.0	10/01/01	10/01/01
72020	ELEV	FEET AB MSL	WATER		1	1960.000			1960.00	1960.00	10/01/01	10/01/01
72038	PUMPING	LVL BELW M.P. FT	WATER		1	285.0000			285.00	285.00	10/01/01	10/01/01
72058	CASING	TOP 1ST FR MP FT	WATER		1	.0000000			.00	.00	10/01/01	10/01/01
72060	CASING	BOT 1ST FR MP FT	WATER		1	64.00000			64.00	64.00	10/01/01	10/01/01
72068	GROUT	BOT 1ST FR MP FT	WATER		1	64.00000			64.00	64.00	10/01/01	10/01/01
72085	SCREEN	DIA 1ST SCR (IN)	WATER		1	.0000000			.00	.00	10/01/01	10/01/01
72095	DEPTH TO	BEDROCK FEET	WATER		1	50.00000			50.00	50.00	10/01/01	10/01/01
82511	WELL	YIELD GPM	WATER		1	20.00000			20.00	20.00	10/01/01	10/01/01
84054	LITH-	OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

```
1STORET RETRIEVAL DATE 91/12/02                PGM=INVENT                                                    PAGE:     2
 RADFORD AAP (S)                                                    177-00103
                                                                    37 09 19.9 080 33 42.2 1
                                                                    ED DOBBINS
                                                                    51155   VIRGINIA          PULASKI
                                                                    OHIO RIVER                050700
 /TYPA/AMBNT/WELL                                                   KANAWHA RIVER
                                                                    21VASWCB  830611           HQ 05050001
                                                                    0000 FEET DEPTH
```

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00008	LAB	IDENT. NUMBER	WATER		1	12034.00			12034	12034	80/06/18	80/06/18
00094	CNDUCTVY	FIELD MICROMHO	WATER		1	158.0000			158	158	80/06/18	80/06/18
00340	COD	HI LEVEL MG/L	WATER		1	7.000000			7	7	80/06/18	80/06/18
00403	PH	LAB SU	WATER		1	7.500000			7.5	7.5	80/06/18	80/06/18
00410	T ALK	CACO3 MG/L	WATER		1	44.00000			44	44	80/06/18	80/06/18
00500	RESIDUE	TOTAL MG/L	WATER		1	94.00000			94	94	80/06/18	80/06/18
00505	RESIDUE	TOT VOL MG/L	WATER		1	11.00000			11	11	80/06/18	80/06/18
00510	RESIDUE	TOT FIX MG/L	WATER		1	83.00000			83	83	80/06/18	80/06/18
00530	RESIDUE	TOT NFLT MG/L	WATER		1	5.000000			5	5	80/06/18	80/06/18
00535	RESIDUE	VOL NFLT MG/L	WATER		1	5.000000			5	5	80/06/18	80/06/18
00540	RESIDUE	FIX NFLT MG/L	WATER		1	5.000000			5	5	80/06/18	80/06/18
00556	OIL-GRSE	FREON-GR MG/L	WATER		1	5.000000			5.00	5.00	80/06/18	80/06/18
00610	NH3+NH4-	N TOTAL MG/L	WATER		1	.1000000			.100	.100	80/06/18	80/06/18
00615	NO2-N	TOTAL MG/L	WATER		1	.0100000			.010	.010	80/06/18	80/06/18
00620	NO3-N	TOTAL MG/L	WATER		1	.2100000			.210	.210	80/06/18	80/06/18
00625	TOT KJEL	N MG/L	WATER		1	.1000000			.100	.100	80/06/18	80/06/18
00665	PHOS-TOT	MG/L P	WATER		1	.1000000			.100	.100	80/06/18	80/06/18
00671	PHOS-DIS	ORTHO MG/L P	WATER		1	.0100000			.010	.010	80/06/18	80/06/18
00680	T ORG C	C MG/L	WATER		1	6.000000			6.0	6.0	80/06/18	80/06/18
00900	TOT HARD	CACO3 MG/L	WATER		1	60.00000			60	60	80/06/18	80/06/18
00940	CHLORIDE	TOTAL MG/L	WATER		1	6.000000			6	6	80/06/18	80/06/18
00945	SULFATE	SO4-TOT MG/L	WATER		1	15.00000			15	15	80/06/18	80/06/18
00951	FLUORIDE	F,TOTAL MG/L	WATER		1	.7000000			.70	.70	80/06/18	80/06/18
01027	CADMIUM	CD,TOT UG/L	WATER		1	10.00000			10	10	80/06/18	80/06/18
01034	CHROMIUM	CR,TOT UG/L	WATER		1	10.00000			10	10	80/06/18	80/06/18
01042	COPPER	CU,TOT UG/L	WATER		1	50.00000			50	50	80/06/18	80/06/18
01045	IRON	FE,TOT UG/L	WATER		1	40.00000			40	40	80/06/18	80/06/18
01051	LEAD	PB,TOT UG/L	WATER		1	6.000000			6	6	80/06/18	80/06/18
01055	MANGNESE	MN UG/L	WATER		1	10.00000			10.0	10.0	80/06/18	80/06/18
01067	NICKEL	NI,TOTAL UG/L	WATER		1	10.00000			10	10	80/06/18	80/06/18
01092	ZINC	ZN,TOT UG/L	WATER		1	10.00000			10	10	80/06/18	80/06/18
71900	MERCURY	HG,TOTAL UG/L	WATER		1	.3000000			.3	.3	80/06/18	80/06/18

72001	TOT DPTH	OF HOLE	FT	WATER		1	238.0000		238.0	238.0	10/01/01 10/01/01
72020	ELEV	FEET AB	MSL	WATER		1	1836.000		1836.00	1836.00	10/01/01 10/01/01
72060	CASING	BOT 1ST	FR MP FT	WATER		1	100.0000		100.00	100.00	10/01/01 10/01/01
82032	CALCIUM	TOTAL C A	UG/L	WATER		1	17000.00		17000	17000	80/06/18 80/06/18
82033	MG	TOTAL MG	UG/L	WATER		1	3000.000		3000	3000	80/06/18 80/06/18
82034	K	TOTAL K	UG/L	WATER		1	1600.000		1600	1600	80/06/18 80/06/18
82035	SODIUM	TOTAL NA	UG/L	WATER		1	4000.000		4000	4000	80/06/18 80/06/18

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 3
RADFORD AAP (S)

/TYPA/AMBNT/WELL

177-00103
37 09 19.9 080 33 42.2 1
ED DOBBINS
51155 VIRGINIA PULASKI
OHIO RIVER 050700
KANAWHA RIVER
21VASWCB 830611 HQ 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
82511	WELL	YIELD GPM	WATER		1	24.00000			24.00	24.00	10/01/01	10/01/01
84054	LITH-	OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 4
RADFORD AAP (S)

/TYPA/AMBNT/WELL

177-00105
37 09 21.9 080 33 37.3 1
ANNA KENLEY
51155 VIRGINIA PULASKI
OHIO RIVER 050700
KANAWHA RIVER
21VASWCB 830611 HQ 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72019	DEPTH-FT	BL LAND SURFACE	WATER		1	90.00000			90.00	90.00	10/01/01	10/01/01
72020	ELEV	FEET AB MSL	WATER		1	1836.000			1836.00	1836.00	10/01/01	10/01/01
72060	CASING	BOT 1ST FR MP FT	WATER		1	66.00000			66.00	66.00	10/01/01	10/01/01
72095	DEPTH TO	BEDROCK FEET	WATER		1	60.00000			60.00	60.00	10/01/01	10/01/01
82511	WELL	YIELD GPM	WATER		1	40.00000			40.00	40.00	10/01/01	10/01/01
84054	LITH-	OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 5
RADFORD AAP (S)

/TYPA/AMBNT/WELL

177-00033
37 09 29.2 080 33 19.0 1
C W POFF & SON
51155 VIRGINIA PULASKI
OHIO RIVER 050700
KANAWHA RIVER
21VASWCB 830611 HQ 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72020	ELEV	FEET AB MSL	WATER		1	1780.000			1780.00	1780.00	10/01/01	10/01/01
72037	PUMPING	RATE GPM	WATER		1	8.000000			8.00	8.00	10/01/01	10/01/01
82511	WELL	YIELD GPM	WATER		1	8.000000			8.00	8.00	10/01/01	10/01/01
84054	LITH-	OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 6
RADFORD AAP (S)

/TYPA/AMBNT/WELL

177-00026
37 09 36.2 080 33 14.2 1
RIVER BEND SUBDIV
51155 VIRGINIA PULASKI
OHIO RIVER 050700
KANAWHA RIVER
21VASWCB 830611 HQ 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72002	TOP DPTH	WB ZONE FT	WATER		1	248.0000			248.0	248.0	10/01/01	10/01/01
72003	BOT DPTH	WB ZONE FT	WATER		1	238.0000			238.0	238.0	10/01/01	10/01/01
72020	ELEV	FEET AB MSL	WATER		1	1740.000			1740.00	1740.00	10/01/01	10/01/01
72035	PUMP HR	S TOTAL DAILY	WATER		1	24.00000			24	24	10/01/01	10/01/01
72037	PUMPING	RATE GPM	WATER		1	40.00000			40.00	40.00	10/01/01	10/01/01
72060	CASING	BOT 1ST FR MP FT	WATER		1	60.00000			60.00	60.00	10/01/01	10/01/01
72090	CASING	DIA 1ST CAS (IN)	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
72095	DEPTH TO	BEDROCK FEET	WATER		1	50.00000			50.00	50.00	10/01/01	10/01/01
72100	HOLE DIA	1ST ZONE INCHES	WATER		1	8.000000			8.00	8.00	10/01/01	10/01/01
72101	HOLE DIA	2ND ZONE INCHES	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01

82511	WELL	YIELD	GPM	WATER			1	40.00000			40.00	40.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER		TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER		TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

RADFORD AAP (S)

177-00077
37 09 37.2 080 33 14.3 1
JERRY DEHART
51155 VIRGINIA PULASKI
OHIO RIVER 050700
/TYPA/AMBNT/WELL KANAWHA RIVER
21VASWCB 830611 HQ 05050001
0000 FEET DEPTH

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72001	TOT DPTH	OF HOLE	FT	WATER		1	100.0000			100.0	100.0	10/01/01	10/01/01
72020	ELEV	FEET AB	MSL	WATER		1	1720.000			1720.00	1720.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

RADFORD AAP (S)

160-00384
37 09 41.0 080 32 14.0 4
CENTERVILLE
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
/TYPA/AMBNT/WELL 07-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00094	CNDUCTVY	FIELD	MICROMHO	WATER		1	428.0000			428	428	84/10/15	84/10/15
00340	COD	HI LEVEL	MG/L	WATER		1	1.000000			1	1	84/10/15	84/10/15
00400	PH		SU	WATER		1	7.700000			7.70	7.70	84/10/15	84/10/15
00403	PH	LAB	SU	WATER		1	7.200000			7.2	7.2	84/10/15	84/10/15
00410	T ALK	CACO3	MG/L	WATER		1	249.0000			249	249	84/10/15	84/10/15
00500	RESIDUE	TOTAL	MG/L	WATER		1	264.0000			264	264	84/10/15	84/10/15
00505	RESIDUE	TOT VOL	MG/L	WATER		1	58.00000			58	58	84/10/15	84/10/15
00510	RESIDUE	TOT FIX	MG/L	WATER		1	206.0000			206	206	84/10/15	84/10/15
00515	RESIDUE	DISS-105 C	MG/L	WATER		1	259.0000			259	259	84/10/15	84/10/15
00610	NH3+NH4-	N TOTAL	MG/L	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00615	NO2-N	TOTAL	MG/L	WATER		1	.0100000			.010	.010	84/10/15	84/10/15
00620	NO3-N	TOTAL	MG/L	WATER		1	1.000000			1.000	1.000	84/10/15	84/10/15
00625	TOT KJEL	N	MG/L	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00665	PHOS-TOT		MG/L P	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00671	PHOS-DIS	ORTHO	MG/L P	WATER		1	.0100000			.010	.010	84/10/15	84/10/15
00680	T ORG C	C	MG/L	WATER		1	3.000000			3.0	3.0	84/10/15	84/10/15
00900	TOT HARD	CACO3	MG/L	WATER		1	292.0000			292	292	84/10/15	84/10/15
00940	CHLORIDE	TOTAL	MG/L	WATER		1	3.000000			3	3	84/10/15	84/10/15
00945	SULFATE	SO4-TOT	MG/L	WATER		1	4.110000			4	4	84/10/15	84/10/15
00951	FLUORIDE	F,TOTAL	MG/L	WATER		1	.1100000			.11	.11	84/10/15	84/10/15
01042	COPPER	CU,TOT	UG/L	WATER		1	10.00000			10	10	84/10/15	84/10/15
01045	IRON	FE,TOT	UG/L	WATER		1	40.00000			40	40	84/10/15	84/10/15
01055	MANGNESE	MN	UG/L	WATER		1	40.00000			40.0	40.0	84/10/15	84/10/15
01067	NICKEL	NI,TOTAL	UG/L	WATER		1	10.00000			10	10	84/10/15	84/10/15
01092	ZINC	ZN,TOT	UG/L	WATER		1	1600.000			1600	1600	84/10/15	84/10/15
31507	TOT COLI	MPN COMP	/100ML	WATER		1	2.200000			2	2	84/10/15	84/10/15
31615	FEC COLI	MPNECMED	/100ML	WATER		1	2.200000			2	2	84/10/15	84/10/15
72001	TOT DPTH	OF HOLE	FT	WATER		1	150.0000			150.0	150.0	85/11/23	85/11/23
72020	ELEV	FEET AB	MSL	WATER		1	2020.000			2020.00	2020.00	85/11/23	85/11/23
74041	WQF	SAMPLE	UPDATED	WATER		1	890110.0			890111	890111	84/10/15	84/10/15
82032	CALCIUM	TOTAL C A	UG/L	WATER		1	54000.00			54000	54000	84/10/15	84/10/15
82033	MG	TOTAL MG	UG/L	WATER		1	30000.00			30000	30000	84/10/15	84/10/15
82034	K	TOTAL K	UG/L	WATER		1	800.0000			800	800	84/10/15	84/10/15
82035	SODIUM	TOTAL NA	UG/L	WATER		1	37000.00			37000	37000	84/10/15	84/10/15
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

RADFORD AAP (S)

160-00385
37 09 47.0 080 32 16.0 4
CENTERVILLE
51121 VIRGINIA MONTGOMERY
05-OHIO 050700
/TYPA/AMBNT/WELL 07-NEW
21VASWCB 860104 05050001
0000 FEET DEPTH

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00094	CNDUCTVY	FIELD	MICROMHO	WATER		1	626.0000			626	626	84/10/15	84/10/15
00340	COD	HI LEVEL	MG/L	WATER		1	1.000000			1	1	84/10/15	84/10/15
00400	PH		SU	WATER		1	7.300000			7.30	7.30	84/10/15	84/10/15

00403	PH	LAB	SU	WATER		1	7.400000			7.4	7.4	84/10/15	84/10/15
00410	T ALK	CACO3	MG/L	WATER		1	331.0000			331	331	84/10/15	84/10/15
00500	RESIDUE	TOTAL	MG/L	WATER		1	356.0000			356	356	84/10/15	84/10/15
00505	RESIDUE	TOT VOL	MG/L	WATER		1	72.00000			72	72	84/10/15	84/10/15
00510	RESIDUE	TOT FIX	MG/L	WATER		1	284.0000			284	284	84/10/15	84/10/15
00515	RESIDUE	DISS-105 C	MG/L	WATER		1	351.0000			351	351	84/10/15	84/10/15
00610	NH3+NH4-	N TOTAL	MG/L	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00615	NO2-N	TOTAL	MG/L	WATER		1	.0100000			.010	.010	84/10/15	84/10/15
00620	NO3-N	TOTAL	MG/L	WATER		1	.0600000			.060	.060	84/10/15	84/10/15
00625	TOT KJEL	N	MG/L	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00665	PHOS-TOT		MG/L P	WATER		1	.1000000			.100	.100	84/10/15	84/10/15
00671	PHOS-DIS	ORTHO	MG/L P	WATER		1	.0100000			.010	.010	84/10/15	84/10/15
00680	T ORG C	C	MG/L	WATER		1	4.000000			4.0	4.0	84/10/15	84/10/15
00900	TOT HARD	CACO3	MG/L	WATER		1	216.0000			216	216	84/10/15	84/10/15
00940	CHLORIDE	TOTAL	MG/L	WATER		1	1.000000			1	1	84/10/15	84/10/15
00945	SULFATE	SO4-TOT	MG/L	WATER		1	14.14000			14	14	84/10/15	84/10/15
00951	FLUORIDE	F,TOTAL	MG/L	WATER		1	.3600000			.36	.36	84/10/15	84/10/15
01042	COPPER	CU,TOT	UG/L	WATER		1	10.00000			10	10	84/10/15	84/10/15
01045	IRON	FE,TOT	UG/L	WATER		1	200.0000			200	200	84/10/15	84/10/15
01055	MANGNESE	MN	UG/L	WATER		1	50.00000			50.0	50.0	84/10/15	84/10/15
01067	NICKEL	NI,TOTAL	UG/L	WATER		1	20.00000			20	20	84/10/15	84/10/15
01092	ZINC	ZN,TOT	UG/L	WATER		1	960.0000			960	960	84/10/15	84/10/15
31507	TOT COLI	MPN COMP	/100ML	WATER		1	2.200000			2	2	84/10/15	84/10/15
31615	FEC COLI	MPNECMED	/100ML	WATER		1	2.200000			2	2	84/10/15	84/10/15
72020	ELEV	FEET AB	MSL	WATER		1	1980.000			1980.00	1980.00	85/11/23	85/11/23
74041	WQF	SAMPLE	UPDATED	WATER		1	890110.0			890111	890111	84/10/15	84/10/15
82032	CALCIUM	TOTAL C A	UG/L	WATER		1	59000.00			59000	59000	84/10/15	84/10/15
82033	MG	TOTAL MG	UG/L	WATER		1	40000.00			40000	40000	84/10/15	84/10/15
82034	K	TOTAL K	UG/L	WATER		1	2000.000			2000	2000	84/10/15	84/10/15
82035	SODIUM	TOTAL NA	UG/L	WATER		1	46000.00			46000	46000	84/10/15	84/10/15
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	85/11/23	85/11/23

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 10
RADFORD AAP (S)

160-00131
37 09 59.7 080 32 27.9 1
CENTERVILLE
51121 VIRGINIA MONTGOMERY
OHIO RIVER 050700
KANAWHA RIVER
21VASWCB 830611 05050001
0000 FEET DEPTH

/TYPA/AMBNT/WELL

72001	TOT DPTH	OF HOLE	FT	WATER		1	200.0000			200.0	200.0	10/01/01	10/01/01
72002	TOP DPTH	WB ZONE	FT	WATER		1	190.0000			190.0	190.0	10/01/01	10/01/01
72003	BOT DPTH	WB ZONE	FT	WATER		1	195.0000			195.0	195.0	10/01/01	10/01/01
72019	DEPTH-FT	BL LAND	SURFACE	WATER		1	100.0000			100.00	100.00	10/01/01	10/01/01
72020	ELEV	FEET AB	MSL	WATER		1	1900.000			1900.00	1900.00	10/01/01	10/01/01
72035	PUMP HR	S TOTAL	DAILY	WATER		1	1.000000			1	1	10/01/01	10/01/01
72058	CASING	TOP 1ST	FR MP FT	WATER		1	.0000000			.00	.00	10/01/01	10/01/01
72060	CASING	BOT 1ST	FR MP FT	WATER		1	155.0000			155.00	155.00	10/01/01	10/01/01
72090	CASING	DIA 1ST	CAS (IN)	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
72095	DEPTH TO	BEDROCK	FEET	WATER		1	23.00000			23.00	23.00	10/01/01	10/01/01
72100	HOLE DIA	1ST ZONE	INCHES	WATER		1	9.000000			9.00	9.00	10/01/01	10/01/01
72101	HOLE DIA	2ND ZONE	INCHES	WATER		1	6.000000			6.00	6.00	10/01/01	10/01/01
74041	WQF	SAMPLE	UPDATED	WATER		1	901010.0			901011	901011	10/01/01	10/01/01
82511	WELL	YIELD	GPM	WATER		1	15.00000			15.00	15.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 11
RADFORD AAP (S)

160-00067
37 10 15.0 080 31 55.0 4
CENTERVILLE
51121 VIRGINIA MONTGOMERY
05-OHIO 050900
9-NEW
21VASWCB 830611 05050001
0000 FEET DEPTH

/TYPA/AMBNT/WELL

72020	ELEV	FEET AB	MSL	WATER		1	2025.000			2025.00	2025.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 12
RADFORD AAP (S)

160-00069
37 10 17.1 080 31 55.0 1
CENTERVILLE
51121 VIRGINIA MONTGOMERY
OHIO RIVER 050700
KANAWHA RIVER
21VASWCB 830611 05050001
0000 FEET DEPTH

/TYPA/AMBNT/WELL

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72020	ELEV	FEET AB MSL	WATER		1	2040.000			2040.00	2040.00	10/01/01	10/01/01
84054	LITH-	OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 13

RADFORD AAP (S)

160-00068
37 10 17.2 080 31 48.8 1
CENTERVILLE
51121 VIRGINIA MONTGOMERY
OHIO RIVER 050700
/TYPA/AMBNT/WELL KANAWHA RIVER
21VASWCB 830611 05050001
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72020	ELEV	FEET AB MSL	WATER		1	2020.000			2020.00	2020.00	10/01/01	10/01/01
84054	LITH-	OLOGY CODE	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01
84069	FORMAT'N	CODE ALPHA	WATER	TXT	1	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	10/01/01

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 14

GROSS

0 12 TOTAL STATIONS PROCESSED
RADFORD AAP (S)

SUMMARY

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	10	9	72	10	0	9	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	1	36	1	0	0	0	1
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	2	0	64	2	0	0	0	0
1985	0	2	7	2	0	0	2	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
TOTAL	12	12	179	15	0	9	2	1

1STORET RETRIEVAL DATE 91/12/02 PGM=INVENT PAGE: 15

GROSS

0 12 TOTAL STATIONS PROCESSED
RADFORD AAP (S)

0 PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00008	LAB	IDENT. NUMBER	WATER		1	12034.00			12034	12034	80/06/18	80/06/18
00094	CNDUCTVY	FIELD MICROMHO	WATER		3	404.0000	55188.00	234.9200	626	158	80/06/18	84/10/15
00340	COD	HI LEVEL MG/L	WATER		3	3.000000	12.00000	3.464100	7	1	80/06/18	84/10/15
00400	PH	SU	WATER		2	7.500000	.0800020	.2828500	7.70	7.30	84/10/15	84/10/15
00403	PH	LAB SU	WATER		3	7.366700	.0234530	.1531400	7.5	7.2	80/06/18	84/10/15
00410	T ALK	CACO3 MG/L	WATER		3	208.0000	21853.00	147.8300	331	44	80/06/18	84/10/15
00500	RESIDUE	TOTAL MG/L	WATER		3	238.0000	17668.00	132.9200	356	94	80/06/18	84/10/15
00505	RESIDUE	TOT VOL MG/L	WATER		3	47.00000	1021.000	31.95300	72	11	80/06/18	84/10/15
00510	RESIDUE	TOT FIX MG/L	WATER		3	191.0000	10269.00	101.3400	284	83	80/06/18	84/10/15
00515	RESIDUE	DISS-105 C MG/L	WATER		2	305.0000	4232.000	65.05400	351	259	84/10/15	84/10/15
00530	RESIDUE	TOT NFLT MG/L	WATER		1	5.000000			5	5	80/06/18	80/06/18
00535	RESIDUE	VOL NFLT MG/L	WATER		1	5.000000			5	5	80/06/18	80/06/18
00540	RESIDUE	FIX NFLT MG/L	WATER		1	5.000000			5	5	80/06/18	80/06/18
00556	OIL-GRSE	FREON-GR MG/L	WATER		1	5.000000			5.00	5.00	80/06/18	80/06/18
00610	NH3+NH4-	N TOTAL MG/L	WATER		3	.1000000	.0000000	.0000000	.100	.100	80/06/18	84/10/15
00615	NO2-N	TOTAL MG/L	WATER		3	.0100000	.0000000	.0000000	.010	.010	80/06/18	84/10/15
00620	NO3-N	TOTAL MG/L	WATER		3	.4233300	.2550300	.5050100	1.000	.060	80/06/18	84/10/15
00625	TOT KJEL	N MG/L	WATER		3	.1000000	.0000000	.0000000	.100	.100	80/06/18	84/10/15
00665	PHOS-TOT	MG/L P	WATER		3	.1000000	.0000000	.0000000	.100	.100	80/06/18	84/10/15
00671	PHOS-DIS	ORTHO MG/L P	WATER		3	.0100000	.0000000	.0000000	.010	.010	80/06/18	84/10/15

00680	T ORG C -	C	MG/L	WATER		3	4.333300	2.333400	1.527500	6.0	3.0	80/06/18	84/10/15
00900	TOT HARD	CACO3	MG/L	WATER		3	189.3300	13989.00	118.2800	292	60	80/06/18	84/10/15
00940	CHLORIDE	TOTAL	MG/L	WATER		3	3.333300	6.333400	2.516600	6	1	80/06/18	84/10/15
00945	SULFATE	SO4-TOT	MG/L	WATER		3	11.08300	36.65600	6.054400	15	4	80/06/18	84/10/15
00951	FLUORIDE	F,TOTAL	MG/L	WATER		3	.3900000	.0877010	.2961400	.70	.11	80/06/18	84/10/15
01027	CADMIUM	CD,TOT	UG/L	WATER		1	10.00000			10	10	80/06/18	80/06/18
01034	CHROMIUM	CR,TOT	UG/L	WATER		1	10.00000			10	10	80/06/18	80/06/18
01042	COPPER	CU,TOT	UG/L	WATER		3	23.33300	533.3300	23.09400	50	10	80/06/18	84/10/15
01045	IRON	FE,TOT	UG/L	WATER		3	93.33300	8533.400	92.37600	200	40	80/06/18	84/10/15
01051	LEAD	PB,TOT	UG/L	WATER		1	6.000000			6	6	80/06/18	80/06/18
01055	MANGNESE	MN	UG/L	WATER		3	33.33300	433.3300	20.81700	50.0	10.0	80/06/18	84/10/15
01067	NICKEL	NI,TOTAL	UG/L	WATER		3	13.33300	33.33400	5.773500	20	10	80/06/18	84/10/15
01092	ZINC	ZN,TOT	UG/L	WATER		3	856.6700	640030.0	800.0200	1600	10	80/06/18	84/10/15
31507	TOT COLI	MPN COMP	/100ML	WATER		2	2.200000	.0000000	.0000000	2	2	84/10/15	84/10/15
31615	FEC COLI	MPNECMED	/100ML	WATER		2	2.200000	.0000000	.0000000	2	2	84/10/15	84/10/15
71900	MERCURY	HG,TOTAL	UG/L	WATER		1	.3000000			.3	.3	80/06/18	80/06/18
72001	TOT DPTH	OF HOLE	FT	WATER		5	233.6000	21675.00	147.2200	480.0	100.0	10/01/01	85/11/23
72002	TOP DPTH	WB ZONE	FT	WATER		2	219.0000	1682.000	41.01200	248.0	190.0	10/01/01	10/01/01
72003	BOT DPTH	WB ZONE	FT	WATER		3	244.3300	2786.400	52.78600	300.0	195.0	10/01/01	10/01/01
72019	DEPTH-FT	BL LAND	SURFACE	WATER		2	95.00000	50.00000	7.071100	100.00	90.00	10/01/01	10/01/01
72020	ELEV	FEET AB	MSL	WATER		12	1904.800	14032.00	118.4600	2040.00	1720.00	10/01/01	85/11/23
72035	PUMP HR	S TOTAL	DAILY	WATER		2	12.50000	264.5000	16.26400	24	1	10/01/01	10/01/01

GROSS

0 12 TOTAL STATIONS PROCESSED

RADFORD AAP (S)

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
72037	PUMPING	RATE	GPM	WATER		2	24.00000	512.0000	22.62800	40.00	8.00	10/01/01	10/01/01
72038	PUMPING	LVL BELW	M.P. FT	WATER		1	285.0000			285.00	285.00	10/01/01	10/01/01
72058	CASING	TOP 1ST	FR MP FT	WATER		2	.0000000	.0000000	.0000000	.00	.00	10/01/01	10/01/01
72060	CASING	BOT 1ST	FR MP FT	WATER		5	89.00000	1618.000	40.22400	155.00	60.00	10/01/01	10/01/01
72068	GROUT	BOT 1ST	FR MP FT	WATER		1	64.00000			64.00	64.00	10/01/01	10/01/01
72085	SCREEN	DIA 1ST	SCR (IN)	WATER		1	.0000000			.00	.00	10/01/01	10/01/01
72090	CASING	DIA 1ST	CAS (IN)	WATER		2	6.000000	.0000000	.0000000	6.00	6.00	10/01/01	10/01/01
72095	DEPTH TO	BEDROCK	FEET	WATER		4	45.75000	252.2500	15.88200	60.00	23.00	10/01/01	10/01/01
72100	HOLE DIA	1ST ZONE	INCHES	WATER		2	8.500000	.5000000	.7071100	9.00	8.00	10/01/01	10/01/01
72101	HOLE DIA	2ND ZONE	INCHES	WATER		2	6.000000	.0000000	.0000000	6.00	6.00	10/01/01	10/01/01
74041	WQF	SAMPLE	UPDATED	WATER		3	893750.0	39846000	6312.400	901011	890111	10/01/01	84/10/15
82032	CALCIUM	TOTAL C A	UG/L	WATER		3	43333.00	5263E+05	22942.00	59000	17000	80/06/18	84/10/15
82033	MG	TOTAL MG	UG/L	WATER		3	24333.00	3663E+05	19140.00	40000	3000	80/06/18	84/10/15
82034	K	TOTAL K	UG/L	WATER		3	1466.700	373340.0	611.0100	2000	800	80/06/18	84/10/15
82035	SODIUM	TOTAL NA	UG/L	WATER		3	29000.00	4890E+05	22113.00	46000	4000	80/06/18	84/10/15
82511	WELL	YIELD	GPM	WATER		6	24.50000	172.7000	13.14200	40.00	8.00	10/01/01	10/01/01
84054	LITH-	OLOGY	CODE	WATER	TXT	12	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	85/11/23
84069	FORMAT'N	CODE	ALPHA	WATER	TXT	12	TEXT	TEXT	TEXT	TEXT	TEXT	10/01/01	85/11/23

THAT'S ALL FOLKS

```
1STORET   RETRIEVAL DATE 91/12/02
 P
 R11111111111111111111111111111111111111111111111111111111111111111111111C11
 H N           :
 DSCXT
 J        Y
 001001RADFORD AAP (S)
 1000000999999000000999999                      *********     77777777  F
 L5,3712092,08034528,3712092,08030311,3708407,08030311,3708407,08034528,,
0EXTRACT/MASKING OPTION PERFORMED
 CLR000000
 SEL000012
-
-
0              **********************************************************
               **********************************************************
               **                                                      **
               **                                                      **
               **       12 STATIONS MET STATION SELECTION CRITERIA     **
               **          (PRIOR TO STATION RESTRICTIONS)             **
               **                                                      **
               **                                                      **
               **********************************************************
               **********************************************************
 STORET RETRIEVAL DATE  91/12/02   -  ECHO OF ORIGINAL REQUEST
 PGM=INVENT,
 #-----------------------------------------------------------------------
 #                    REQUEST NAME: GWRAD4
 #                      CREATED BY: HED
 #                            DATE: 91/12/02
 #                            TIME: 21:12
 #
 #----------------------< STATION SELECTION  >------------------------
 #    OPTION 4 - WITHIN AN AREA DEFINED BY LAT/LONG POLYGONS OR CIRCLES
 # DEFINE CIRCULAR AREA(S) BY SPECIFYING THE CENTER AND RADIUS
 RADIUS=      3220,L=3710250,L=08032420,
 #
```

```
#----------------------<  STATION RESTRICTION  >----------------------
# RESTRICT TO SPECIFIC ARCHIVED DATA CLASSES
ARCLASS=ALL,
# RESTRICT TO SPECIFIC STATION TYPES/PARAMETER ATTRIBUTES
ONLYATTR=WELL OR SPRING,
#
#-------------------------<  SPECIAL OPTIONS  >-------------------------
# GROSS WITH INDIVIDUAL STATION DATA
#       EXCLUDING STATIONS WITH NO SAMPLE DATA
# SET INVENTORY BREAK POINTS
INVBRK=M,
# SUPPRESS DATA TRANSFORMATIONS
# PRINT THE STATION HEADER AT THE TOP RIGHT CORNER OF EACH PAGE
HEAD=RADFORD AAP (S),
./HED JOB (RFWESTORP,MHED),'PHOENIX-INVENT',TIME=(1,30),PRTY=1,
./             MSGLEVEL=(0,0),NOTIFY=HED
**ROUTE  PRINT HOLD
**JOBPARM  LINES=999

END OF DATA
```

REFERENCE 12

WESTON

J. Nist
Originator

PHONE CONVERSATION RECORD

Conversation with:

Name Mr. Terry Wagner

Company Virginia State Water Control Board

Address _____

Phone (804) 527-5203

Subject Wellhead Protection Areas

Date 12/16/91

Time 12:45 AM (PM)

☐ Originator Placed Call

☑ Originator Received Call

W.O. NO. 2281-11-10

Notes:

The following resulted from our phone conversation:

There are no wellhead protection areas recognized by the US EPA in the State of Virginia.

☑ File _____

☐ Tickle File ____/____/____

☐ Follow-Up By: _____

☐ Copy/Route To: _____

Follow-Up-Action: _____

Originator's Initials JN

REFERENCE 13

In addition, an Army Reserve Center is satellited on this installation. The daily staff has two full time civilian employees; however, during training periods, the staff is increased.

d. History

Radford AAP consists of three areas: the main plant and Horseshoe areas where manufacturing takes place, and the New River area which consists of storage magazines. Construction of facilities for the manufacture of smokeless powder began in 1940. Construction of additional facilities, including the New River area, continued from 1940 to the end of World War II. At the end of World War II, manufacturing operations at both the main plant area and Horseshoe area were discontinued. In 1946, the nitric acid facility was reactivated to produce ammonium nitrate liquor (83 percent solution); this operation continued until 1949. In 1949, production of smokeless powders began again on a very limited scale.

During the Korean conflict, the plant was rehabilitated and new cast propellant facilities were constructed. Following the Korean conflict, Radford AAP remained in partial production. Full reactivation to the present status was accomplished in 1966.

The continuous TNT plant was put into production in mid-1968 and remained in operation until destroyed by an explosion in May 1974. This plant had five main operational areas: the nitration lines, the finishing buildings, the red water concentration facility, the acid neutralization facility, and the spent acid recovery plant. Production has not been resumed since the explosion in May 1974.

A chronological listing of major facilities and activities of Radford AAP is presented in table I-1.

5. Environmental Setting

a. Water Quality

(1) Surface Water

The New River is the major drainageway within the Radford AAP and forms a meander loop within the confines of the plant. Locally the area within this loop is referred to as the Horseshoe Area. The river varies from 200 to 1000 feet in width, but averages about 410 feet. Generally, the depth is about 4 to 6 feet; however, pools may obtain depths to 10 feet between rock outcrops in the river bed. The flow through the plant is regulated by a control structure some 7 miles south of the Radford AAP.

Stroubles Creek is the largest tributary of New River and originates in the southeast sector of Radford AAP. This creek is fed by several branches that originate on and off post. The larger surface drainageways within the installation and their direction of flow are shown in figure I-5. Man-made surface drainageways occur, but the scale of presentation prevents their delineation. Regardless of location, the direction of surface drainage flow is to the New River.

Subsurface drainage is present in Radford AAP through the sinks or solution cavities formed by percolating waters within the underlying limestone. These cavities vary in size and shape and may be interconnected forming underground drainageways. Sufficient data are not available to determine size, direction, and outlets of the solution cavities within Radford AAP.

Several communities and industries discharge wastes into New River before it reaches Radford AAP. Stroubles Creek comprises primarily storm water runoff and effluent from the Blacksburg, Virginia Municipal Wastewater Treatment Plant. Stroubles Creek then empties into the New River on the Radford AAP installation and contributes significant loadings of domestic and industrial wastes.

The New River storage area is located 9 miles southwest of the main plant area and is nearly saturated with bunkers and igloos. The area is composed of rolling hills with a good grass covering some timbered areas. Two main valleys drain the bunker areas and empty into the New River system.

The effects of municipal and industrial waste discharges on stream quality are most readily apparent in Peak Creek below Blacksburg, and in Stony Creek below Kimballton. In these areas, impacts occur as a result of natural and man-made pollution.

Both industrial and domestic wastes are being discharged into the New River from the city of Radford, upstream from Radford AAP. The city of Radford provides only primary sewage treatment before discharge into the New River of 2.5 million gallons per day (mgd), and yet the river is considered to be clean.

Twenty-eight industrial wastewater outfalls were designated by Radford AAP on an application for a discharge permit filed pursuant to the 1899 Refuse Act. In addition to these, there are a large number of surface streams not identified as industrial outfalls which convey surface drainage from various industrial or service facilities. For internal use and reference, Radford AAP has identified a total of 40 outfalls to either the New River or Stroubles Creek from the main production and Horseshoe

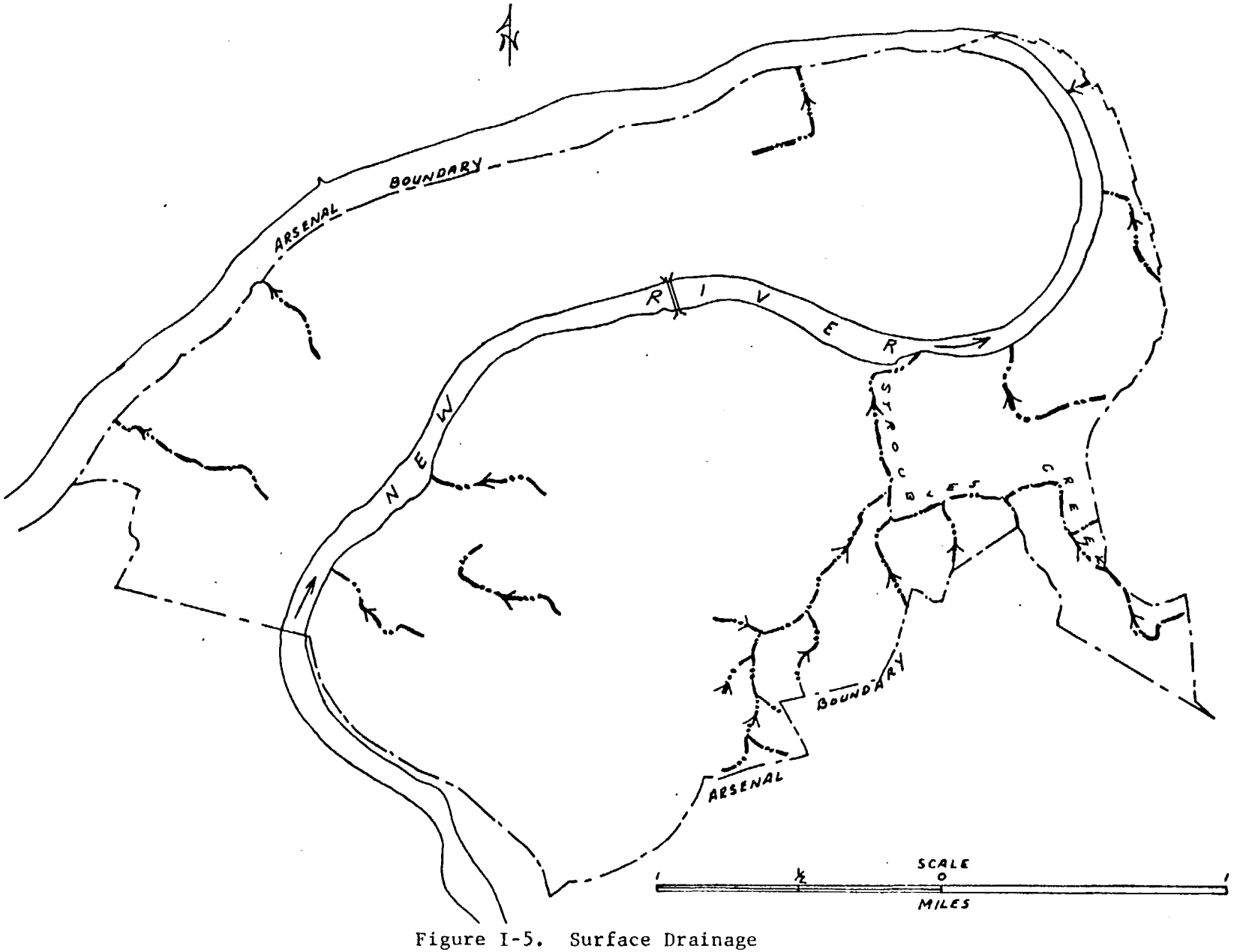


Figure I-5. Surface Drainage

areas. The age and condition of the facilities at Radford AAP, as well as the dispersion and topography of the production areas, have resulted in many instances of combined drainage for surface runoff, cooling waters, and industrial discharges.

Fortunately, the New River itself has experienced few major problems from the discharge of either treated or untreated effluents. The ability of the New River to recover from organic loading is generally high as a result of the river's natural reaeration characteristics, high base flow, and the present quality and quantity of waste discharges.

With few exceptions, the quality of surface water obtained from various sources within Pulaski and Montgomery counties can generally be described as good.

The upper reaches of the Little River and its tributaries have water of excellent quality. These streams have less than 50 parts per million (ppm) of dissolved solids due to the underlying metamorphic rocks, which contribute very little to natural pollution. In the balance of the region, dissolved solids increase the 50- to 199-ppm range as water drains from areas underlain by shale, sandstone, and limestone formations. Where carbonate rocks occur, the bicarbonate content of the water is particularly high, resulting in 100 to 199 ppm of calcium carbonate ($CaCO_3$) found in the waters of Walker Creek, Sinking Creek, Wolf Creek, and the New River below Radford AAP.

The State of Virginia has classified Stroubles Creek as well as the stretch of New River passing through the confines of Radford AAP as water generally satisfactory for beneficial uses which include public or municipal water supply, secondary contact recreation, and propagation of fish and aquatic life.

All water used at Radford AAP is taken from the New River. The river flow varies due to water managment at Claytor Dam. Typical flows range about 3800 mgd and water supply has always been adequate. Separate water systems are provided for the main plant and the Horseshoe plant areas. These systems are described later in report. North of Radford AAP, the New River serves as a source of drinking water for the towns of Blacksburg and Christiansburg.

Water quality analysis of the New River has been conducted both where the river enters the Radford AAP installation and where it exits the installation. The analysis indicates that the quality of the water when it leaves the installation is essentially the same as when it enters the installation. Table I-2 is a chart of New River water quality.

Table I-2. Analyses of the New River Entering and Leaving Radford Army Ammunition Plant

PARAMETER	CONCENTRATION* ENTERING	LEAVING
Alkalinity (as $CaCO_3$)	45	45
BOD	2	2
COD	10	10
Total Solids	66	66
Total Dissolved Solids	61	61
Total Suspended Solids	5	5
Total Volatile Solids	29	29
Ammonia	0	0
Kjeldahl Nitrogen	0.4	0.4
Nitrate (as Nitrogen)	0.4	0.7
Phosphorus Total	< 0.3	< 0.3
Color (Color Units)	16	15
Nitrite	< 0.01	< 0.01
Sulfate	4	10
Sulfide	< 0.1	< 0.1
Bromide	0.59	0.59
Aluminum	< 0.10	< 0.10
Cadmium	< 0.005	< 0.005
Chloride	5.2	5.7
Copper	< 0.010	< 0.010
Iron	0.35	0.33
Lead	< 0.010	< 0.010
Magnesium	5	4
Mercury	< 0.002	< 0.002
Beryllium	0	0
Boron	0	0

*All results are in milligrams per liter (mg/l) except as noted.

COMMONWEALTH of VIRGINIA

STATE WATER CONTROL BOARD

4900 COX ROAD

Richard N. Burton
Executive Director

Post Office Box 11143
Richmond, Virginia 23230-1143
(804) 527-5000
TDD (804) 367-6763

HQ TELEFAX #: 804-527-5311

TELECOPY TRANSMITTAL

DATE: JANUARY 27, 1992 TIME: 4:00 AM / PM

FROM: NAME: PAUL HERMAN

OFFICE: WATER RESOURCES MANAGEMENT

TO: NAME: JOHN F NIST

OFFICE: WESTON

TELECOPIER NO: 215-430-7597

NUMBER OF PAGES (INCLUDING TRANSMITTAL SHEET) 3

REMARKS:

SENDER USE ONLY:

RETURN TRANSMITTAL TO SENDER: YES_____ NO_____

TRANSMITTED BY _____
(INITIAL)

REFERENCE 14

4D1 – 4D4
4E1

r=05050001008

DRINKING WATER INTAKES WITHIN 15 MILES

```
UP/DOWN(U/D)? d
TERMINATION EXPRESSION OPTIONS
------------------------------
N=XXX   FOR STOP AT XXX MILES
L=+XX    FOR STOP AFTER XX LEVEL CHANGES
R=, P=, ETC. FOR STOP AT DESIGNATED LOCATION

TERM EXP(CONNECTORS WILL BE "OR")? m=40
TERM EXP?
REACHES ONLY(Y/N)? n
REPORT ON DRINKS(Y/N)? y
DATE 911130    TIME 132143
       14 REACHES
       11 PIPES
        1 PLANTS-INTAKES-SOURCES
DETAIL(Y/N)? y

00000.00 05050001008  0.00 LM:   0.00 HM:   0.00 TYPE R  LEV 3  LENGTH   4.30 NAME NEW R
                              0 DISCHARGES
    0.00 DRINK VA1121643 RADFORD AMUNITION PL POP    9000 Y     -1 TGD TYPE P112   NEW RIVER            SOURCE S
    0.00 GAGE WEG05050001008      ?                    STCO    -1 DA     -1 ?   MF(CFS)   3884 LF(CFS)    948

00000.00 05050001007  0.00 LM:   0.00 HM:   3.50 TYPE R  LEV 3  LENGTH   3.50 NAME NEW R
                              0 DISCHARGES
    3.50 GAGE WEG05050001007      ?                    STCO    -1 DA     -1 ?   MF(CFS)   3896 LF(CFS)    937

00003.50 05050001003  0.00 LM:   0.00 HM:   2.20 TYPE R  LEV 3  LENGTH   2.20 NAME NEW R
                              0 DISCHARGES
    5.70 GAGE WEG05050001003      ?                    STCO    -1 DA     -1 ?   MF(CFS)   3911 LF(CFS)    931

00005.70 05050001001  0.00 LM:   0.00 HM:   2.30 TYPE R  LEV 3  LENGTH   2.30 NAME NEW R
                              0 DISCHARGES
    8.00 GAGE WEG05050001001      ?                    STCO    -1 DA     -1 ?   MF(CFS)   3916 LF(CFS)    924

00008.00 05050002047  0.00 LM:   0.00 HM:   1.00 TYPE R  LEV 3  LENGTH   1.00 NAME NEW R
                              0 DISCHARGES
    9.00 GAGE WEG05050002047      ?                    STCO    -1 DA     -1 ?   MF(CFS)   3917 LF(CFS)    921

00009.00 05050002046  0.00 LM:   0.00 HM:   7.10 TYPE R  LEV 3  LENGTH   7.10 NAME NEW R
                              0 DISCHARGES
   11.13 GAGE USGS03171500        NEW R AT EGGLESTON V STCO 51071 DA 294100 ON  MF(CFS)   3924 LF(CFS)    872
   16.10 GAGE WEG05050002046      ?                    STCO    -1 DA     -1 ?   MF(CFS)   3942 LF(CFS)    919

00016.10 05050002045  0.00 LM:   0.00 HM:   0.20 TYPE R  LEV 3  LENGTH   0.20 NAME NEW R
                              0 DISCHARGES
   16.30 GAGE WEG05050002045      ?                    STCO    -1 DA     -1 ?   MF(CFS)   3978 LF(CFS)    935

00016.30 05050002044  0.00 LM:   0.00 HM:   2.00 TYPE R  LEV 3  LENGTH   2.00 NAME NEW R
                              0 DISCHARGES
   18.30 GAGE WEG05050002044      ?                    STCO    -1 DA     -1 ?   MF(CFS)   4027 LF(CFS)    955

00018.30 05050002036  0.00 LM:   0.00 HM:   4.30 TYPE R  LEV 3  LENGTH   4.30 NAME NEW R
                              0 DISCHARGES
   22.60 GAGE WEG05050002036      ?                    STCO    -1 DA     -1 ?   MF(CFS)   4404 LF(CFS)   1007

00022.60 05050002035  0.00 LM:   0.00 HM:   8.40 TYPE R  LEV 3  LENGTH   8.40 NAME NEW R
                              4 DISCHARGES
   26.00 PIPE  1 NPDES# VA0063100 PEARISBURG SEWAGE TREATMENON    FLOW(TGD)     271.00 -P SIC  4952   -1   -1
   28.49 PIPE  1 NPDES# VA0000299 CELANESE CORP, NARROWS    ON    FLOW(TGD)   62000.00 -B SIC  2821   -1   -1
   28.49 PIPE  2 NPDES# VA0000299 CELANESE CORP, NARROWS    ON    FLOW(TGD)    2800.00 -P SIC  2821   -1   -1
   28.49 PIPE  3 NPDES# VA0000299 CELANESE CORP, NARROWS    ON    FLOW(TGD)    3500.00 -P SIC  2821   -1   -1
   31.00 GAGE WEG05050002035      ?                    STCO    -1 DA     -1 ?   MF(CFS)   4543 LF(CFS)   1065

00031.00 05050002033  0.00 LM:   0.00 HM:   0.40 TYPE R  LEV 3  LENGTH   0.40 NAME NEW R
                              1 DISCHARGE
   31.40 GAGE WEG05050002033      ?                    STCO    -1 DA     -1 ?   MF(CFS)   4571 LF(CFS)   1077
   31.40 PIPE  1 NPDES# VA0021113 NARROWS,TOWN OF,SEWAGE TREON    FLOW(TGD)    1060.00 -P SIC  4952   -1   -1

00031.40 05050002031  0.00 LM:   0.00 HM:   3.70 TYPE R  LEV 3  LENGTH   3.70 NAME NEW R
                              1 DISCHARGE
CONTINUE(RETURN/N)?

DATE 911130    TIME 132203  R=05050001008 D M=40
   34.81 PIPE  1 NPDES# VA0021041 RICH CREEK,TOWN OF        ON    FLOW(TGD)      70.00 -P SIC  4952   -1   -1
   35.10 GAGE WEG05050002031      ?                    STCO    -1 DA     -1 ?   MF(CFS)   4899 LF(CFS)   1109

00035.10 05050002030  0.00 LM:   0.00 HM:   2.60 TYPE R  LEV 3  LENGTH   2.60 NAME NEW R
                              5 DISCHARGES
   36.94 PIPE  1 NPDES# VA0060895 NEW RIVER MFG CO INC      ON    FLOW(TGD)      25.00 -P SIC  3532   -1   -1
   37.40 PIPE  1 NPDES# VA0000370 APPALACHIAN PWR  GLEN LYN ON    FLOW(TGD)    1300.00 -B SIC  4911   -1   -1
   37.50 GAGE USGS03176500         NEW RIVER AT GLEN LY STCO 51071 DA 376800 ON  MF(CFS)   5010 LF(CFS)   1111
   37.60 PIPE  2 NPDES# VA0000370 APPALACHIAN PWR  GLEN LYN ON    FLOW(TGD)   44300.00 -B SIC  4911   -1   -1
   37.60 PIPE  3 NPDES# VA0000370 APPALACHIAN PWR  GLEN LYN ON    FLOW(TGD)  124000.00 -B SIC  4911   -1   -1
   37.70 GAGE WEG05050002030      ?                    STCO    -1 DA     -1 ?   MF(CFS)   5011 LF(CFS)   1155
   37.70 PIPE  6 NPDES# VA0000370 APPALACHIAN PWR  GLEN LYN ON    FLOW(TGD)    2800.00 -P SIC  4911   -1   -1

00037.70 05050002026  0.00 LM:   8.90 HM:  11.20 TYPE R  LEV 3  LENGTH  11.20 NAME NEW R
```

RAAP

FLOW

16.3 MILES downstream

REFERENCE 15

January 27, 1992

Mr. John F. Nist
WESTON

Dear Mr. Nist:

Listed below are the withdrawals lying on or adjacent to the surface water bodies you identified on the maps you sent via FAX on January 24, 1992. These withdrawals may or may not meet the requirements of question 4D. I have provided information regarding goods produced by the withdrawers where it is not obvious.

Do not assume the list below is the universe of surface water withdrawals on the water bodies you specified. The regulation that requests the withdrawal data be reported, VR 680-15-01 Water Withdrawal Reporting, requires withdrawers using in excess of 300,000 gallons/month (10,000 gallons/day) to report their withdrawal to the VWCB annually. Further, prior to 1991, agricultural irrigators reported their water use voluntarily to the VWCB. A 1990 amendment to VR 680-15-01 requires all agricultural irrigators using in excess of 1.0 million gallons/month for irrigation to report their total monthly withdrawals annually to the VWCB.

What this all amounts to is the surface water bodies you've identified may have withdrawals which meet the specifics of question 4D but are exempt from reporting their withdrawal under the Regulation, ie, their withdrawal is less than 300,000 gallons/month (10,000 gpd) or 1.0 million gallons/month for irrigators. Or, there may be withdrawers who are not conforming with the Regulation. This is especially true for irrigators who just recently fell under the Regulation.

James River downstream of Williamsburg
1. Virginia Power-Surry Nuclear Power Plant
   latitude: 371018 longitude: 0764223

Cedar Run, Great Run, Turkey Run at Warrenton Training Center
1. Town of Warrenton WTP
   latitude: 384427 longitude: 0774724

Kettle Run, Broad Run near Vint Hill Farms Station
1. City of Manassas WTP
   latitude: 384550 longitude: 0773725
2. Dutchland Farm, Prince William County-soybeans
   latitude, longitude: not available

Mont Creek, Marcossic Creek, Beverly Run, Goldenvale Creek near Fort A.P. Hill
No surface water withdrawals reported in the area

Potomac River downstream of Washington D.C.

1. Virginia Power-Possum Point Power Station
   latitude: 383216 longitude: 0771650
2. Potomac Electric and Power Co.-Alexandria Power Plant
   latitude: 384828 longitude: 0770200
3. U.S. Government-Dalecarlia WTP
   latitude: 385615 longitude: 0770650

Nottoway River near Fort Pickett

1. C.F. Baskerville Farm, Dinwiddie County-tobacco
   latitude, longitude: not available
2. U.S. Goverment-Fort Pickett WTP
   latitude: 365922 longitude: 0775750
3. Georgia-Pacific Corp.-Allen Road Plant, sawmill gypsum product.
   latitude: 365022 longitude: 0772825
4. Commonwealth of Virginia-Garland Grady Forest Center forest nursery
   latitude: 365130 longitude: 0771105

New River downstream of Radford

upstream of RAAP
~~1. Blacksburg-Christiansburg Water Authority WTP~~
   latitude: 370945 longitude: 0803305
downstream of RAAP
~~2. Radford WTP~~
   latitude: 370638 longitude: 0803532
3. U.S. Government-Radford Ammunitions WTP 1, industrial inorganic chemicals, explosives, nitrogenous fertilizer. latitude: 371057 longitude: 0803335
4. U.S. Government-Radford Ammunitions WTP 2, industrial inorganic chemicals, explosives, nitrogenous fertilizer. latitude: 371137 longitude: 0803409
5. Appalachian Power Co.-Glen Lyn Power Plant
   latitude: 372218 longitude: 0805147
6. Hoechst Celanese-Celco Plant, synthetic resins, cellulosic manmade fibers
   latitude: 372034 longitude: 0804558

If you have any questions or require additional information please give me a call at (804) 527-5123.

Sincerely,

Paul E. Herman
Environmental Engineer Senior

ph/wp
enclosure

REFERENCE 16

4I - RAAP Radford - SW

SURFACE WATER / SEDIMENT SAMPLING

5050001001 05050001099
-STATIONS SELECTED WERE RESTRICTED TO:

STATION TYPE(S) AND/OR SPECIFIC PARAMETER COVERAGE
AGENCIES WHOSE DATA HAS NOT BEEN 'RETIRED'
-CONTACTS FOR AGENCY CODES RETRIEVED:

AGENCY	PRIMARY CONTACT NAME	ORGANIZATION	PHONE NUMBER(S)
11140100	KANETSKY, CHARLES	USEPA REGION 3	(215)59-8176 (FTS)597-9839
21VASWCB	POLLOCK, VERA	VIRGINIA WATER CONTROL BD	(804)527-5224

-DATA RESTRICTIONS:

NOTE
NO DEPTH INDICATOR RESTRICTIONS WERE SPECIFIED - COMPUTATIONS WILL BE PERFORMED WITHOUT REGARD TO DEPTH INDICATORS

NOTE
NO GRAB/COMPOSITE RESTRICTIONS WERE UTILIZED, SO BOTH GRAB AND COMPOSITE SAMPLE TYPES MAY HAVE BEEN INCLUDED - COMPUTATIONS WILL BE PERFORMED WITHOUT REGARD TO SAMPLE TYPE

NOTE
NO COMPOSITE SAMPLE RESTRICTIONS WERE SPECIFIED - COMPUTATIONS WILL INCLUDE STATISTICAL FEATURES OF THE COMPOSITING PROCESS, PRODUCING VALID RESULTS ONLY WHEN SOPHISTICATED COMPOSITES ARE NOT ENCOUNTERED. SPECIFY COMPOSITE HANDLING KEYWORDS "ANC" AND/OR "DSROC" IF NEEDED

OTHE DATA WAS AGGREGATED BY: REACHES

***** END OF SUMMARY SECTION *****

COORDINATES OF SAMPLE LOCATION

1STORET RETRIEVAL DATE 91/12/12 PGM=INVENT PAGE: 1
RADFORD AAP

510037
37 11 05.0 080 34 53.0 1
NEW RIVER AT COWAN
51077 VIRGINIA GRAYSON
OHIO RIVER 050790
KANAWHA RIVER
11140100 05050001007 0002.320 ON
0000 FEET DEPTH

/TYPA/AMBNT/STREAM

NEW RIVER
IMMED. DOWNSTREAM of RAAP
(SW SAMPLING WITHIN 15 MI DOWNSTREAM)

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER TEMP	CENT	WATER		6	24.00000	2.800000	1.673300	26.0	22.0	64/07/07	64/07/11
00011	WATER TEMP	FAHN	WATER		6	75.20000	9.085200	3.014200	78.8	71.6	64/07/07	64/07/11
00060	STREAM FLOW	CFS	WATER		6	967.5000	126060.0	355.0500	1625	700	64/07/07	64/07/11
00070	TURB	JKSN	JTU	WATER	6	25.00000	.0000000	.0000000	25.0	25.0	64/07/07	64/07/11
00095	CNDUCTVY AT 25C	MICROMHO	WATER		6	150.5000	87.50000	9.354200	160	135	64/07/07	64/07/11
00300	DO	MG/L	WATER		6	9.266700	5.406800	2.325300	11.8	6.6	64/07/07	64/07/11
00301	DO SATUR	PERCENT	WATER		6	109.4900	908.6000	30.14300	143.9	75.0	64/07/07	64/07/11
00310	BOD 5 DAY	MG/L	WATER		6	.6166700	.0976670	.3125200	1.1	.3	64/07/07	64/07/11
00400	PH	SU	WATER		6	8.883300	.6817400	.8256800	9.70	7.80	64/07/07	64/07/11
00410	T ALK CACO3	MG/L	WATER		6	48.00000	6.000000	2.449500	51	44	64/07/07	64/07/11
00435	T ACDITY CACO3	MG/L	WATER		6	.0000000	.0000000	.0000000	0	0	64/07/07	64/07/11
00500	RESIDUE TOTAL	MG/L	WATER		1	14.10000			14	14	64/07/11	64/07/11
00530	RESIDUE TOT NFLT	MG/L	WATER		3	64.00000	5668.000	75.28600	150	10	64/07/10	64/07/11
00707	INVALID PAR	NUMBER	WATER		6	25.00000	.0000000	.0000000	25.00000	25.00000	64/07/07	64/07/11
00940	CHLORIDE TOTAL	MG/L	WATER		6	.0000000	.0000000	.0000000	0	0	64/07/07	64/07/11
01045	IRON FE,TOT	UG/L	WATER		6	83.33300	5666.700	75.27700	200	0	64/07/07	64/07/11
03000	INVALID PAR	NUMBER	WATER		6	84.00000	2295.600	47.91300	149.0000	39.00000	64/07/07	64/07/11
16730	INVALID PAR	NUMBER	WATER		5	88.00000	4070.000	63.79700	180.0000	30.00000	64/07/07	64/07/10
31501	TOT COLI MFIMENDO	/100ML	WATER		6	358.3300	499500.0	706.7500	1800	40	64/07/07	64/07/11
31616	FEC COLI MFM-FCBR	/100ML	WATER		6	21.66700	343.0700	18.52200	46	2	64/07/07	64/07/11
31673	FECSTREP MFKFAGAR	/100ML	WATER		5	88.00000	4070.000	63.79700	180	30	64/07/07	64/07/10
31679	FECSTREP MF M-ENT	/100ML	WATER		5	88.00000	4070.000	63.79700	180	30	64/07/07	64/07/10
70300	RESIDUE DISS-180 C	MG/L	WATER		6	84.00000	2295.600	47.91300	149	39	64/07/07	64/07/11
82028	RATIO FEC COL	FEC STRP	WATER		5	.3011100	.0150070	.1225000	.5	.2	64/07/07	64/07/10

05050001007 REACHES 1 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	1	1	132	6	0	1	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
TOTAL	1	1	132	6	0	1	0	0

1STORET RETRIEVAL DATE 91/12/12 PGM=INVENT PAGE: 3

05050001007 REACHES 1 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

REACH SUMMARY

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	WATER		6	24.00000	2.800000	1.673300	26.0	22.0	64/07/07	64/07/11
00011	WATER	TEMP	FAHN	WATER		6	75.20000	9.085200	3.014200	78.8	71.6	64/07/07	64/07/11
00060	STREAM	FLOW	CFS	WATER		6	967.5000	126060.0	355.0500	1625	700	64/07/07	64/07/11
00070	TURB	JKSN	JTU	WATER		6	25.00000	.0000000	.0000000	25.0	25.0	64/07/07	64/07/11
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		6	150.5000	87.50000	9.354200	160	135	64/07/07	64/07/11
00300	DO		MG/L	WATER		6	9.266700	5.406800	2.325300	11.8	6.6	64/07/07	64/07/11
00301	DO	SATUR	PERCENT	WATER		6	109.4900	908.6000	30.14300	143.9	75.0	64/07/07	64/07/11
00310	BOD	5 DAY	MG/L	WATER		6	.6166700	.0976670	.3125200	1.1	.3	64/07/07	64/07/11
00400	PH		SU	WATER		6	8.883300	.6817400	.8256800	9.70	7.80	64/07/07	64/07/11
00410	T ALK	CACO3	MG/L	WATER		6	48.00000	6.000000	2.449500	51	44	64/07/07	64/07/11
00435	T ACDITY	CACO3	MG/L	WATER		6	.0000000	.0000000	.0000000	0	0	64/07/07	64/07/11
00500	RESIDUE	TOTAL	MG/L	WATER		1	14.10000			14	14	64/07/11	64/07/11
00530	RESIDUE	TOT NFLT	MG/L	WATER		3	64.00000	5668.000	75.28600	150	10	64/07/10	64/07/11
00707	INVALID	PAR	NUMBER	WATER		6	25.00000	.0000000	.0000000	25.00000	25.00000	64/07/07	64/07/11
00940	CHLORIDE	TOTAL	MG/L	WATER		6	.0000000	.0000000	.0000000	0	0	64/07/07	64/07/11
01045	IRON	FE,TOT	UG/L	WATER		6	83.33300	5666.700	75.27700	200	0	64/07/07	64/07/11
03000	INVALID	PAR	NUMBER	WATER		6	84.00000	2295.600	47.91300	149.0000	39.00000	64/07/07	64/07/11
16730	INVALID	PAR	NUMBER	WATER		5	88.00000	4070.000	63.79700	180.0000	30.00000	64/07/07	64/07/10
31501	TOT COLI	MFIMENDO	/100ML	WATER		6	358.3300	499500.0	706.7500	1800	40	64/07/07	64/07/11
31616	FEC COLI	MFM-FCBR	/100ML	WATER		6	21.66700	343.0700	18.52200	46	2	64/07/07	64/07/11
31673	FECSTREP	MFKFAGAR	/100ML	WATER		5	88.00000	4070.000	63.79700	180	30	64/07/07	64/07/10
31679	FECSTREP	MF M-ENT	/100ML	WATER		5	88.00000	4070.000	63.79700	180	30	64/07/07	64/07/10
70300	RESIDUE	DISS-180 C	MG/L	WATER		6	84.00000	2295.600	47.91300	149	39	64/07/07	64/07/11
82028	RATIO	FEC COL	FEC STRP	WATER		5	.3011100	.0150070	.1225000	.5	.2	64/07/07	64/07/10

1STORET RETRIEVAL DATE 91/12/12 PGM=INVENT PAGE: 4

RADFORD AAP

VA0000248016

37 11 20.0 080 31 40.0 1

RADFORD ARSENAL OUTFALL 016
51077 VIRGINIA GRAYSON
OHIO RIVER 050790
KANAWHA RIVER
11140100 HQ 05050001008 0004.020 OFF
0000 FEET DEPTH

/TYPA/AMBNT/STREAM

NEW RIVER
ADJACENT TO RAAP

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	WATER		3	12.33300	1.333500	1.154800	13.0	11.0	72/02/16	72/02/18
00011	WATER	TEMP	FAHN	WATER		3	54.20000	4.320300	2.078500	55.4	51.8	72/02/16	72/02/18
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		3	309.2000	105660.0	325.0500	650	3	72/02/16	72/02/18
00335	COD	LOWLEVEL	MG/L	WATER		3	57.66700	472.3400	21.73300	74.0	33.0	72/02/16	72/02/18
00400	PH		SU	WATER		3	7.100000	.0301360	.1736000	7.30	7.00	72/02/16	72/02/18
00500	RESIDUE	TOTAL	MG/L	WATER		3	178.0000	9111.000	95.45200	288	117	72/02/16	72/02/18
00530	RESIDUE	TOT NFLT	MG/L	WATER		3	4.333300	2.333400	1.527500	6	3	72/02/16	72/02/18
00625	TOT KJEL	N	MG/L	WATER		3	.1600000	.0000999	.0099993	.170	.150	72/02/16	72/02/18
00680	T ORG C	C	MG/L	WATER		3	15.36700	24.41300	4.941000	19.9	10.1	72/02/16	72/02/18
70300	RESIDUE	DISS-180 C	MG/L	WATER		3	173.6700	8832.400	93.98100	282	114	72/02/16	72/02/18

1STORET RETRIEVAL DATE 91/12/12 PGM=INVENT PAGE: 5
05050001008 REACHES 2 STATIONS PROCESSED IN THIS AGGREGATE
RADFORD AAP

0

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	0	0	0	0	1	0	0	0
1972	1	1	30	3	0	1	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
TOTAL	1	1	30	3	1	1	0	0

1STORET RETRIEVAL DATE 91/12/12 PGM=INVENT PAGE: 6
05050001008 REACHES 2 STATIONS PROCESSED IN THIS AGGREGATE
RADFORD AAP

REACH
SUMMARY

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	WATER		3	12.33300	1.333500	1.154800	13.0	11.0	72/02/16	72/02/18
00011	WATER	TEMP	FAHN	WATER		3	54.20000	4.320300	2.078500	55.4	51.8	72/02/16	72/02/18
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		3	309.2000	105660.0	325.0500	650	3	72/02/16	72/02/18
00335	COD	LOWLEVEL	MG/L	WATER		3	57.66700	472.3400	21.73300	74.0	33.0	72/02/16	72/02/18

00400	PH		SU	WATER		3	7.100000	.0301360	.1736000	7.30	7.00	72/02/16 72/02/18
00500	RESIDUE	TOTAL	MG/L	WATER		3	178.0000	9111.000	95.45200	288	117	72/02/16 72/02/18
00530	RESIDUE	TOT NFLT	MG/L	WATER		3	4.333300	2.333400	1.527500	6	3	72/02/16 72/02/18
00625	TOT KJEL	N	MG/L	WATER		3	.1600000	.0000999	.0099993	.170	.150	72/02/16 72/02/18
00680	T ORG C	C	MG/L	WATER		3	15.36700	24.41300	4.941000	19.9	10.1	72/02/16 72/02/18
70300	RESIDUE	DISS-180 C	MG/L	WATER		3	173.6700	8832.400	93.98100	282	114	72/02/16 72/02/18

RADFORD AAP

VA0000248002
37 11 00.0 080 33 30.0 1
RADFORD ARSENAL 002 OUTFALL
51121 VIRGINIA MONTGOMERY
OHIO RIVER 050790
KANAWHA RIVER
11140100 05050001009 0000.800 ON
0000 FEET DEPTH

NEW RIVER ADJACENT TO RAAP

/TYPA/AMBNT/STREAM

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER TEMP	CENT	WATER		3	13.73300	.8634000	.9292000	14.5	12.7	72/02/16	72/02/18
00011	WATER TEMP	FAHN	WATER		3	56.72000	2.796900	1.672400	58.1	54.9	72/02/16	72/02/18
00080	COLOR PT-CO	UNITS	WATER		3	36.66700	33.33500	5.773600	40	30	72/02/16	72/02/18
00095	CNDUCTVY AT 25C	MICROMHO	WATER		3	560.0000	33700.00	183.5800	690	350	72/02/16	72/02/18
00335	COD LOWLEVEL	MG/L	WATER		3	54.66700	2.335900	1.528400	56.0	53.0	72/02/16	72/02/18
00400	PH	SU	WATER		3	7.066700	4.013300	2.003300	8.60	4.80	72/02/16	72/02/18
00410	T ALK CACO3	MG/L	WATER		3	113.3300	7169.400	84.67200	170	16	72/02/16	72/02/18
00435	T ACDITY CACO3	MG/L	WATER		3	15.33300	12.33400	3.511900	19	12	72/02/16	72/02/18
00500	RESIDUE TOTAL	MG/L	WATER		3	235.0000	9243.000	96.14100	346	178	72/02/16	72/02/18
00530	RESIDUE TOT NFLT	MG/L	WATER		3	3.666700	14.33300	3.785900	8	1	72/02/16	72/02/18
00625	TOT KJEL N	MG/L	WATER		3	.3166700	.0114330	.1069300	.410	.200	72/02/16	72/02/18
00680	T ORG C C	MG/L	WATER		3	26.26700	2.974000	1.724500	27.8	24.4	72/02/16	72/02/18
39516	PCBS WHL SMPL	UG/L	WATER		1	.1000000			.100	.100	72/02/16	72/02/16
70300	RESIDUE DISS-180 C	MG/L	WATER		3	231.3300	9710.400	98.54100	345	170	72/02/16	72/02/18
71900	MERCURY HG,TOTAL	UG/L	WATER		2	1.050000	.2450000	.4949800	1.4	.7	72/02/16	72/02/18

RADFORD AAP

VA0000248005
37 11 20.0 080 33 20.0 1
RADFORD ARSENAL OUTFALL 005
51077 VIRGINIA GRAYSON
OHIO RIVER 050790
KANAWHA RIVER
11140100 05050001009 0000.800 ON
0000 FEET DEPTH

NEW RIVER ADJACENT TO RAAP

/TYPA/AMBNT/STREAM

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER TEMP	CENT	WATER		3	19.83300	7.583700	2.753900	23.0	18.0	72/02/16	72/02/18
00011	WATER TEMP	FAHN	WATER		3	67.70000	24.57000	4.956900	73.4	64.4	72/02/16	72/02/18
00080	COLOR PT-CO	UNITS	WATER		3	50.00000	.0000000	.0000000	50	50	72/02/16	72/02/18
00095	CNDUCTVY AT 25C	MICROMHO	WATER		3	273.3300	1233.400	35.12000	310	240	72/02/16	72/02/18
00335	COD LOWLEVEL	MG/L	WATER		2	225.0000	4050.000	63.64000	270.0	180.0	72/02/16	72/02/17
00400	PH	SU	WATER		3	7.966700	.0434270	.2083900	8.20	7.80	72/02/16	72/02/18
00410	T ALK CACO3	MG/L	WATER		3	52.00000	1.000000	1.000000	53	51	72/02/16	72/02/18
00435	T ACDITY CACO3	MG/L	WATER		3	5.333300	6.333400	2.516600	8	3	72/02/16	72/02/18
00500	RESIDUE TOTAL	MG/L	WATER		3	231.0000	21261.00	145.8100	395	116	72/02/16	72/02/18
00530	RESIDUE TOT NFLT	MG/L	WATER		3	13.00000	93.00000	9.643700	24	6	72/02/16	72/02/18
00620	NO3-N TOTAL	MG/L	WATER		2	6.050000	.4050100	.6364100	6.500	5.600	72/02/16	72/02/17
00625	TOT KJEL N	MG/L	WATER		2	1.350000	.0049992	.0707050	1.400	1.300	72/02/16	72/02/17
00680	T ORG C C	MG/L	WATER		3	54.13300	20.30300	4.505900	58.5	49.5	72/02/16	72/02/18
00945	SULFATE SO4-TOT	MG/L	WATER		3	11.66700	8.333500	2.886800	15	10	72/02/16	72/02/18
01049	LEAD PB,DISS	UG/L	WATER		3	.0000000	.0000000	.0000000	0	0	72/02/16	72/02/18
01051	LEAD PB,TOT	UG/L	WATER		3	.0000000	.0000000	.0000000	0	0	72/02/16	72/02/18
39516	PCBS WHL SMPL	UG/L	WATER		1	.2000000			.200	.200	72/02/16	72/02/16
70300	RESIDUE DISS-180 C	MG/L	WATER		3	218.0000	21744.00	147.4600	386	110	72/02/16	72/02/18

RADFORD AAP

VA0000248006
37 11 40.0 080 32 20.0 1
★ RADFORD ARSENAL OUTFALL 006
51077 VIRGINIA GRAYSON
OHIO RIVER 050790
KANAWHA RIVER
11140100 05050001009 0000.800 ON
0000 FEET DEPTH

NEW RIVER
ADJACENT TO RAAP

/TYPA/AMBNT/STREAM

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	WATER		3	10.03300	3.303500	1.817600	11.5	8.0	72/02/16	72/02/18
00011	WATER	TEMP	FAHN	WATER		3	50.06000	10.70100	3.271300	52.7	46.4	72/02/16	72/02/18
00080	COLOR	PT-CO	UNITS	WATER		3	5.000000	.0000000	.0000000	5	5	72/02/16	72/02/18
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		3	206.6700	2433.400	49.32900	240	150	72/02/16	72/02/18
00335	COD	LOWLEVEL	MG/L	WATER		3	109.0000	17103.00	130.7800	260.0	32.0	72/02/16	72/02/18
00400	PH		SU	WATER		3	8.533300	.1435200	.3788400	8.80	8.10	72/02/16	72/02/18
00410	T ALK	CACO3	MG/L	WATER		3	45.00000	1.000000	1.000000	46	44	72/02/16	72/02/18
00435	T ACDITY	CACO3	MG/L	WATER		3	6.000000	37.00000	6.082800	13	2	72/02/16	72/02/18
00500	RESIDUE	TOTAL	MG/L	WATER		3	128.3300	446.3500	21.12700	142	104	72/02/16	72/02/18
00530	RESIDUE	TOT NFLT	MG/L	WATER		3	33.66700	342.3400	18.50200	52	15	72/02/16	72/02/18
00550	OIL-GRSE	TOT-SXLT	MG/L	WATER		2	2.000000	6.480000	2.545600	3.8	.2	72/02/17	72/02/18
00610	NH3+NH4-	N TOTAL	MG/L	WATER		3	.6933300	.2764300	.5257700	1.300	.370	72/02/16	72/02/18
00612	UN-IONZD	NH3-N	MG/L	WATER		3	.0640830	.0058634	.0765730	.151	.008	72/02/16	72/02/18
00619	UN-IONZD	NH3-NH3	MG/L	WATER		3	.0779180	.0086684	.0931040	.184	.010	72/02/16	72/02/18
00625	TOT KJEL	N	MG/L	WATER		2	.8550000	.3960500	.6293300	1.300	.410	72/02/16	72/02/18
00680	T ORG C	C	MG/L	WATER		3	4.500000	12.63000	3.553900	8.6	2.3	72/02/16	72/02/18
01049	LEAD	PB,DISS	UG/L	WATER		3	.0000000	.0000000	.0000000	0	0	72/02/16	72/02/18
01051	LEAD	PB,TOT	UG/L	WATER		2	.0000000	.0000000	.0000000	0	0	72/02/16	72/02/18
39516	PCBS	WHL SMPL	UG/L	WATER		1	.2000000			.200	.200	72/02/16	72/02/16
70300	RESIDUE	DISS-180 C	MG/L	WATER		3	94.66700	80.34800	8.963700	105	89	72/02/16	72/02/18
71900	MERCURY	HG,TOTAL	UG/L	WATER		1	1.800000			1.8	1.8	72/02/16	72/02/16

RADFORD AAP

VA0000248007
37 11 20.0 080 32 20.0 1
★ RADFORD ARSENAL OUTFALL 007
51077 VIRGINIA GRAYSON
OHIO RIVER 050790
KANAWHA RIVER
11140100 05050001009 0000.800 ON
0000 FEET DEPTH

NEW RIVER
ADJACENT TO RAAP

/TYPA/AMBNT/STREAM

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	WATER		3	15.00000	1.000000	1.000000	16.0	14.0	72/02/16	72/02/18
00011	WATER	TEMP	FAHN	WATER		3	59.00000	3.238300	1.799500	60.8	57.2	72/02/16	72/02/18
00080	COLOR	PT-CO	UNITS	WATER		3	8.333300	8.333400	2.886800	10	5	72/02/16	72/02/18
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		3	2013.300	759040.0	871.2300	3000	1350	72/02/16	72/02/18
00335	COD	LOWLEVEL	MG/L	WATER		3	33.66700	608.3400	24.66500	62.0	17.0	72/02/16	72/02/18
00400	PH		SU	WATER		3	6.866700	1.823500	1.350400	8.20	5.50	72/02/16	72/02/18
00410	T ALK	CACO3	MG/L	WATER		3	16.66700	112.3300	10.59900	28	7	72/02/16	72/02/18
00435	T ACDITY	CACO3	MG/L	WATER		3	10.00000	75.00000	8.660300	20	5	72/02/16	72/02/18
00500	RESIDUE	TOTAL	MG/L	WATER		3	1671.700	757040.0	870.0800	2669	1068	72/02/16	72/02/18
00530	RESIDUE	TOT NFLT	MG/L	WATER		3	22.00000	151.0000	12.28800	36	13	72/02/16	72/02/18
00610	NH3+NH4-	N TOTAL	MG/L	WATER		3	.1533300	.0345330	.1858300	.360	.000	72/02/16	72/02/18
00612	UN-IONZD	NH3-N	MG/L	WATER		3	.0000873	1618E-11	.0001272	.0002	.000	72/02/16	72/02/18
00619	UN-IONZD	NH3-NH3	MG/L	WATER		3	.0001062	2393E-11	.0001546	.0003	.000	72/02/16	72/02/18
00620	NO3-N	TOTAL	MG/L	WATER		3	96.00000	2404.000	49.03100	144.000	46.000	72/02/16	72/02/18
00625	TOT KJEL	N	MG/L	WATER		3	.1533300	.0345330	.1858300	.360	.000	72/02/16	72/02/18
00680	T ORG C	C	MG/L	WATER		3	16.73300	124.2000	11.14500	29.6	10.1	72/02/16	72/02/18
00945	SULFATE	SO4-TOT	MG/L	WATER		2	775.0000	211250.0	459.6200	1100	450	72/02/16	72/02/18
01049	LEAD	PB,DISS	UG/L	WATER		3	33.33300	933.3300	30.55100	60	0	72/02/16	72/02/18
01051	LEAD	PB,TOT	UG/L	WATER		3	33.33300	933.3300	30.55100	60	0	72/02/16	72/02/18
70300	RESIDUE	DISS-180 C	MG/L	WATER		3	1649.700	736660.0	858.2900	2633	1051	72/02/16	72/02/18

71900 MERCURY · HG,TOTAL UG/L WATER 2 2.900000 .0000000 .0000000 2.9 2.9 72/02/16 72/02/18

RADFORD AAP

510038

37 09 44.0 080 33 12.0 1

★ NEW RIVER BELOW RADFORD

51077 VIRGINIA GRAYSON

OHIO RIVER 050790

KANAWHA RIVER

11140100 05050001009 0004.270 ON

0000 FEET DEPTH

NEW RIVER IMMED UPSTREAM OF RAAP (BACKGROUND)

/TYPA/AMBNT/STREAM

PARAMETER				MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	WATER		24	18.01300	89.11800	9.440200	27.0	1.5	64/07/07	75/07/22
00011	WATER	TEMP	FAHN	WATER		24	64.42200	288.7300	16.99200	80.6	34.7	64/07/07	75/07/22
00060	STREAM	FLOW	CFS	WATER		17	3448.300	18769000	4332.300	12700	570	62/08/22	64/09/03
00070	TURB	JKSN	JTU	WATER		16	28.75000	188.3300	13.72400	80.0	25.0	64/07/07	64/09/03
00080	COLOR	PT-CO	UNITS	WATER		7	5.000000	8.333300	2.886800	10	0	64/08/22	72/02/18
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		22	147.3600	988.9100	31.44700	210	100	64/07/07	72/02/18
00300	DO		MG/L	WATER		21	7.966700	3.500400	1.870900	10.7	4.5	64/07/07	75/07/22
00301	DO	SATUR	PERCENT	WATER		21	80.23500	237.9300	15.42500	111.8	51.7	64/07/07	75/07/22
00310	BOD	5 DAY	MG/L	WATER		16	.9875000	.1478300	.3844900	1.5	.0	64/07/07	75/07/22
00335	COD	LOWLEVEL	MG/L	WATER		9	9.722200	92.45200	9.615200	25.0	2.0	64/08/22	75/07/22
00400	PH		SU	WATER		24	7.875000	.4828200	.6948500	9.50	6.90	64/07/07	75/07/22
00410	T ALK	CACO3	MG/L	WATER		22	42.54600	6.547300	2.558800	47	38	64/07/07	72/02/18
00435	T ACDITY	CACO3	MG/L	WATER		22	.5454600	1.021700	1.010800	3	0	64/07/07	72/02/18
00500	RESIDUE	TOTAL	MG/L	WATER		6	117.6700	2277.900	47.72700	196	72	72/02/16	72/02/18
00530	RESIDUE	TOT NFLT	MG/L	WATER		11	21.36400	672.2600	25.92800	87	1	64/07/07	72/02/18
00550	OIL-GRSE	TOT-SXLT	MG/L	WATER		6	8.100000	17.30800	4.160300	16.2	5.0	72/02/16	72/02/18
00610	NH3+NH4-	N TOTAL	MG/L	WATER		5	.1200000	.0017000	.0412310	.190	.090	72/02/16	72/02/18
00612	UN-IONZD	NH3-N	MG/L	WATER		5	.0002163	1708E-11	.0001307	.0004	.00007	72/02/16	72/02/18
00619	UN-IONZD	NH3-NH3	MG/L	WATER		5	.0002630	2525E-11	.0001589	.0005	.00008	72/02/16	72/02/18
00625	TOT KJEL	N	MG/L	WATER		6	.3233300	.0109070	.1044400	.480	.170	72/02/16	72/02/18
00650	T PO4	PO4	MG/L	WATER		1	.3200000			.32	.32	64/08/22	64/08/22
00655	POLY PO4	PO4	MG/L	WATER		2	.3000000	.0000000	.0000000	.30	.30	62/08/22	64/08/22
00660	ORTHOPO4	PO4	MG/L	WATER		2	.0200000	.0000000	.0000000	.02	.02	62/08/22	64/08/22
00680	T ORG C	C	MG/L	WATER		5	3.220000	.3220300	.5674700	4.1	2.6	72/02/16	72/02/18
00707	INVALID	PAR	NUMBER	WATER		16	28.75000	188.3300	13.72400	80.00000	25.00000	64/07/07	64/09/03
00900	TOT HARD	CACO3	MG/L	WATER		4	40.00000	8.000000	2.828400	44	38	64/08/31	64/09/03
00915	CALCIUM	CA,DISS	MG/L	WATER		4	8.500000	1.666700	1.291000	10.0	7.0	64/08/31	64/09/03
00925	MGNSIUM	MG,DISS	MG/L	WATER		4	4.500000	1.000000	1.000000	5.0	3.0	64/08/31	64/09/03
00940	CHLORIDE	TOTAL	MG/L	WATER		16	2.750000	34.06700	5.836700	19	0	64/07/07	75/07/22
00945	SULFATE	SO4-TOT	MG/L	WATER		7	9.714300	.2381600	.4880200	10	9	62/08/22	72/02/18
01045	IRON	FE,TOT	UG/L	WATER		15	246.6700	126950.0	356.3000	1300	0	64/07/07	64/09/03
01049	LEAD	PB,DISS	UG/L	WATER		6	1.666700	16.66700	4.082500	10	0	72/02/16	72/02/18
01051	LEAD	PB,TOT	UG/L	WATER		3	3.333300	33.33300	5.773500	10	0	72/02/16	72/02/18
01055	MANGNESE	MN	UG/L	WATER		4	4500.000	1000000	1000.000	5000.0	3000.0	64/08/31	64/09/03
01056	MANGNESE	MN,DISS	UG/L	WATER		1	.0000000			.0	.0	64/08/22	64/08/22
03000	INVALID	PAR	NUMBER	WATER		6	53.16700	1488.600	38.58200	109.0000	26.00000	64/07/07	64/07/11
16730	INVALID	PAR	NUMBER	WATER		16	1492.900	24441000	4943.800	20000.00	20.00000	64/07/07	64/09/03
31501	TOT COLI	MFIMENDO	/100ML	WATER		16	1230.600	1250800	1118.400	3400	200	64/07/07	75/07/22
31616	FEC COLI	MFM-FCBR	/100ML	WATER		14	128.7200	23985.00	154.8700	580	16	64/07/07	64/09/03

RADFORD AAP

510038

37 09 44.0 080 33 12.0 1

★ NEW RIVER BELOW RADFORD

51077 VIRGINIA GRAYSON

OHIO RIVER 050790

KANAWHA RIVER

11140100 05050001009 0004.270 ON

0000 FEET DEPTH

NEW RIVER IMMED UPSTREAM OF RAAP (BACKGROUND)

/TYPA/AMBNT/STREAM

PARAMETER	MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE

31673	FECSTREP	MFKFAGAR	/100ML	WATER		16	1492.900	24441000	4943.800	20000	20	64/07/07	64/09/03
31679	FECSTREP	MF M-ENT	/100ML	WATER		14	261.1400	97440.00	312.1500	1200	20	64/07/07	64/09/03
46570	CAL HARD	CA MG	MG/L	WATER		4	39.75600	6.785200	2.604800	43	37	64/08/31	64/09/03
70300	RESIDUE	DISS-180 C	MG/L	WATER		12	82.16700	2678.200	51.75100	194	26	64/07/07	72/02/18
71900	MERCURY	HG,TOTAL	UG/L	WATER		1	.8000000			.8	.8	72/02/16	72/02/16
82028	RATIO	FEC COL	FEC STRP	WATER		14	.7323500	.4832900	.6951900	2	.09	64/07/07	64/09/03

05050001009 REACHES 7 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

0

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	1	0	349	17	2	0	0	0
1972	4	4	333	18	0	4	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	1	18	2	0	0	0	1
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0
1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
TOTAL	5	5	700	37	2	4	0	1

05050001009 REACHES 7 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

REACH SUMMARY

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010	WATER	TEMP	CENT	WATER		36	16.89200	66.08800	8.129500	27.0	1.5	64/07/07	75/07/22
00011	WATER	TEMP	FAHN	WATER		36	62.40500	214.1200	14.63300	80.6	34.7	64/07/07	75/07/22
00060	STREAM	FLOW	CFS	WATER		17	3448.300	18769000	4332.300	12700	570	62/08/22	64/09/03
00070	TURB	JKSN	JTU	WATER		16	28.75000	188.3300	13.72400	80.0	25.0	64/07/07	64/09/03
00080	COLOR	PT-CO	UNITS	WATER		19	17.63200	345.4700	18.58700	50	0	64/08/22	72/02/18
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		34	364.7700	333970.0	577.9100	3000	100	64/07/07	72/02/18
00300	DO		MG/L	WATER		21	7.966700	3.500400	1.870900	10.7	4.5	64/07/07	75/07/22
00301	DO	SATUR	PERCENT	WATER		21	80.23500	237.9300	15.42500	111.8	51.7	64/07/07	75/07/22
00310	BOD	5 DAY	MG/L	WATER		16	.9875000	.1478300	.3844900	1.5	.0	64/07/07	75/07/22
00335	COD	LOWLEVEL	MG/L	WATER		20	56.47500	6659.900	81.60800	270.0	2.0	64/08/22	75/07/22
00400	PH		SU	WATER		36	7.786100	.8344600	.9134900	9.50	4.80	64/07/07	75/07/22
00410	T ALK	CACO3	MG/L	WATER		34	47.55900	944.8000	30.73800	170	7	64/07/07	72/02/18
00435	T ACDITY	CACO3	MG/L	WATER		34	3.588200	31.82500	5.641400	20	0	64/07/07	72/02/18
00500	RESIDUE	TOTAL	MG/L	WATER		18	416.8900	429450.0	655.3300	2669	72	72/02/16	72/02/18
00530	RESIDUE	TOT NFLT	MG/L	WATER		23	19.65200	430.0600	20.73800	87	1	64/07/07	72/02/18
00550	OIL-GRSE	TOT-SXLT	MG/L	WATER		8	6.575000	21.26200	4.611100	16.2	.2	72/02/16	72/02/18
00610	NH3+NH4-	N TOTAL	MG/L	WATER		11	.2854600	.1317100	.3629200	1.300	.000	72/02/16	72/02/18
00612	UN-IONZD	NH3-N	MG/L	WATER		11	.0176000	.0020640	.0454310	.151	.000	72/02/16	72/02/18
00619	UN-IONZD	NH3-NH3	MG/L	WATER		11	.0213990	.0030514	.0552390	.184	.000	72/02/16	72/02/18

00620	NO3-N	TOTAL	MG/L	WATER	5	60.02000	3629.400	60.24500	144.000	5.600	72/02/16	72/02/18
00625	TOT KJEL	N	MG/L	WATER	16	.4850000	.1926400	.4389100	1.400	.000	72/02/16	72/02/18
00650	T PO4	PO4	MG/L	WATER	1	.3200000			.32	.32	64/08/22	64/08/22
00655	POLY PO4	PO4	MG/L	WATER	2	.3000000	.0000000	.0000000	.30	.30	62/08/22	64/08/22
00660	ORTHOPO4	PO4	MG/L	WATER	2	.0200000	.0000000	.0000000	.02	.02	62/08/22	64/08/22
00680	T ORG C	C	MG/L	WATER	17	18.88200	379.6200	19.48400	58.5	2.3	72/02/16	72/02/18
00707	INVALID	PAR	NUMBER	WATER	16	28.75000	188.3300	13.72400	80.00000	25.00000	64/07/07	64/09/03
00900	TOT HARD	CACO3	MG/L	WATER	4	40.00000	8.000000	2.828400	44	38	64/08/31	64/09/03
00915	CALCIUM	CA,DISS	MG/L	WATER	4	8.500000	1.666700	1.291000	10.0	7.0	64/08/31	64/09/03
00925	MGNSIUM	MG,DISS	MG/L	WATER	4	4.500000	1.000000	1.000000	5.0	3.0	64/08/31	64/09/03
00940	CHLORIDE	TOTAL	MG/L	WATER	16	2.750000	34.06700	5.836700	19	0	64/07/07	75/07/22
00945	SULFATE	SO4-TOT	MG/L	WATER	12	137.7500	107810.0	328.3400	1100	9	62/08/22	72/02/18
01045	IRON	FE,TOT	UG/L	WATER	15	246.6700	126950.0	356.3000	1300	0	64/07/07	64/09/03
01049	LEAD	PB,DISS	UG/L	WATER	15	7.333300	320.9500	17.91500	60	0	72/02/16	72/02/18
01051	LEAD	PB,TOT	UG/L	WATER	11	10.00000	420.0000	20.49400	60	0	72/02/16	72/02/18
01055	MANGNESE	MN	UG/L	WATER	4	4500.000	1000000	1000.000	5000.0	3000.0	64/08/31	64/09/03
01056	MANGNESE	MN,DISS	UG/L	WATER	1	.0000000			.0	.0	64/08/22	64/08/22
03000	INVALID	PAR	NUMBER	WATER	6	53.16700	1488.600	38.58200	109.0000	26.00000	64/07/07	64/07/11
16730	INVALID	PAR	NUMBER	WATER	16	1492.900	24441000	4943.800	20000.00	20.00000	64/07/07	64/09/03
31501	TOT COLI	MFIMENDO	/100ML	WATER	16	1230.600	1250800	1118.400	3400	200	64/07/07	75/07/22
31616	FEC COLI	MFM-FCBR	/100ML	WATER	14	128.7200	23985.00	154.8700	580	16	64/07/07	64/09/03
31673	FECSTREP	MFKFAGAR	/100ML	WATER	16	1492.900	24441000	4943.800	20000	20	64/07/07	64/09/03
31679	FECSTREP	MF M-ENT	/100ML	WATER	14	261.1400	97440.00	312.1500	1200	20	64/07/07	64/09/03

05050001009 REACHES 7 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39516	PCBS	WHL SMPL	UG/L	WATER	3	.1666700	.0033334	.0577350	.200	.100	72/02/16	72/02/16
46570	CAL HARD	CA MG	MG/L	WATER	4	39.75600	6.785200	2.604800	43	37	64/08/31	64/09/03
70300	RESIDUE	DISS-180 C	MG/L	WATER	24	315.2900	337190.0	580.6800	2633	26	64/07/07	72/02/18
71900	MERCURY	HG,TOTAL	UG/L	WATER	6	1.750000	.9550000	.9772400	2.9	.7	72/02/16	72/02/18
82028	RATIO	FEC COL	FEC STRP	WATER	14	.7323500	.4832900	.6951900	2	.09	64/07/07	64/09/03

05050001010 REACHES 1 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

0

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	0	0	0	0	1	0	0	0
1972	0	0	0	0	0	0	0	0
1973	0	0	0	0	0	0	0	0
1974	0	0	0	0	0	0	0	0
1975	0	0	0	0	0	0	0	0
1976	0	0	0	0	0	0	0	0
1977	0	0	0	0	0	0	0	0
1978	0	0	0	0	0	0	0	0
1979	0	0	0	0	0	0	0	0
1980	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	0	0	0
1986	0	0	0	0	0	0	0	0
1987	0	0	0	0	0	0	0	0
1988	0	0	0	0	0	0	0	0
1989	0	0	0	0	0	0	0	0

1990	0	0	0	0	0	0	0	0
1991	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	1	0	0	0

ADJACENT TO RAAP

/TYPA/AMBNT/STREAM

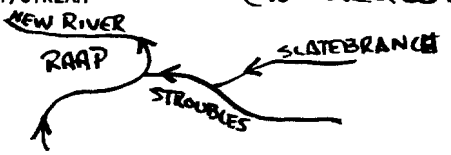
VA0000248012
37 11 00.0 080 31 40.0 1
★ RADFORD ARSENAL OUTFALL 012
51077 VIRGINIA GRAYSON
OHIO RIVER 050790
KANAWHA RIVER
11140100 HQ 05050001099 0000.840 OFF
0000 FEET DEPTH

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00010 WATER	TEMP	CENT	WATER		3	11.50000	1.000000	1.000000	12.5	10.5	72/02/16	72/02/18
00011 WATER	TEMP	FAHN	WATER		3	52.70000	3.238300	1.799500	54.5	50.9	72/02/16	72/02/18
00080 COLOR	PT-CO	UNITS	WATER		3	43.33300	433.3400	20.81700	60	20	72/02/16	72/02/18
00095 CNDUCTVY	AT 25C	MICROMHO	WATER		3	756.6700	75034.00	273.9200	1000	460	72/02/16	72/02/18
00335 COD	LOWLEVEL	MG/L	WATER		3	12.30000	20.77000	4.557400	17.0	7.9	72/02/16	72/02/18
00400 PH		SU	WATER		3	7.600000	.0701450	.2648500	7.90	7.40	72/02/16	72/02/18
00410 T ALK	CACO3	MG/L	WATER		3	109.0000	1009.000	31.76500	136	74	72/02/16	72/02/18
00435 T ACDITY	CACO3	MG/L	WATER		3	3.333300	.3333400	.5773600	4	3	72/02/16	72/02/18
00500 RESIDUE	TOTAL	MG/L	WATER		3	446.0000	31024.00	176.1400	618	266	72/02/16	72/02/18
00530 RESIDUE	TOT NFLT	MG/L	WATER		3	5.000000	3.000000	1.732100	7	4	72/02/16	72/02/18
00550 OIL-GRSE	TOT-SXLT	MG/L	WATER		3	13.40000	228.2800	15.10900	30.8	3.6	72/02/16	72/02/18
00610 NH3+NH4-	N TOTAL	MG/L	WATER		3	.7200000	.0487010	.2206800	.950	.510	72/02/16	72/02/18
00612 UN-IONZD	NH3-N	MG/L	WATER		3	.0078790	.0000593	.0077020	.017	.003	72/02/16	72/02/18
00619 UN-IONZD	NH3-NH3	MG/L	WATER		3	.0095800	.0000877	.0093648	.020	.003	72/02/16	72/02/18
00620 NO3-N	TOTAL	MG/L	WATER		3	21.96000	729.6900	27.01300	53.000	3.780	72/02/16	72/02/18
00625 TOT KJEL	N	MG/L	WATER		2	.8250000	.0312510	.1767800	.950	.700	72/02/16	72/02/17
00680 T ORG C	C	MG/L	WATER		3	7.000000	.0301440	.1736200	7.1	6.8	72/02/16	72/02/18
00945 SULFATE	SO4-TOT	MG/L	WATER		3	178.3300	4658.400	68.25200	240	105	72/02/16	72/02/18
70300 RESIDUE	DISS-180 C	MG/L	WATER		3	441.0000	31003.00	176.0800	614	262	72/02/16	72/02/18
71900 MERCURY	HG,TOTAL	UG/L	WATER		2	.8500000	.0050011	.0707180	.9	.8	72/02/16	72/02/18

9-SLT000.50 VA9-02AX0048 VA9-2X0048
37 10 45.0 080 29 53.0 1
★ SLATEBRANCH
51121 VIRGINIA MONTGOMERY
05-OHIO RIVER + KANAWHA 050792
9-NEW
21VASWCB HQ 05050001099 0002.790 OFF
0000 FEET DEPTH

SLATEBRANCH CREEK UPSTREAM OF STROUBLES CREEK UPSTREAM OF RAAP (BACKGROUND)

/TYPA/AMBNT/STREAM



PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00002 HSAMPLOC	% FROM	RT BANK	WATER		35	50.00000	.0000000	.0000000	50.0	50.0	74/12/10	78/05/04
00005 VSAMPLOC	DEPTH	% OF TOT	WATER		36	50.00000	.0000000	.0000000	50	50	74/12/10	78/05/04
00010 WATER	TEMP	CENT	WATER		44	11.50300	49.86800	7.061700	25.0	.0000009	74/12/10	79/06/25
00011 WATER	TEMP	FAHN	WATER		44	52.70500	161.5700	12.71100	77.0	32.0	74/12/10	79/06/25
00041 WEATHER	WMO CODE	4501	WATER		46	2.043500	.8869600	.9417900	3	1	74/12/10	79/06/25
00300 DO		MG/L	WATER		46	9.654900	4.347400	2.085100	14.0	6.4	74/12/10	79/06/25
00301 DO	SATUR	PERCENT	WATER		44	86.11700	204.5400	14.30200	110.0	49.3	74/12/10	79/06/25
00400 PH		SU	WATER		46	8.434400	.4757900	.6897700	9.30	7.00	74/12/10	79/06/25
00610 NH3+NH4-	N TOTAL	MG/L	WATER		46	.2629700	.5172000	.7191700	4.699	.100	75/01/30	79/06/25
00612 UN-IONZD	NH3-N	MG/L	WATER		42	.0231200	.0046903	.0684860	.452	.0001	75/01/30	79/06/25
00615 NO2-N	TOTAL	MG/L	WATER		46	.0295570	.0062940	.0793350	.450	.010	75/01/30	79/06/25
00619 UN-IONZD	NH3-NH3	MG/L	WATER		42	.0281110	.0069341	.0832710	.549	.0002	75/01/30	79/06/25
00620 NO3-N	TOTAL	MG/L	WATER		18	.5648700	.2233600	.4726100	2.059	.010	75/01/30	76/11/29
00625 TOT KJEL	N	MG/L	WATER		46	.8670800	4.379000	2.092600	11.390	.100	75/01/30	79/06/25
00630 NO2&NO3	N-TOTAL	MG/L	WATER		28	.7009600	.2610900	.5109700	3.01	.13	76/10/27	79/06/25
01002 ARSENIC	AS,TOT	UG/L	WATER		4	3.250000	10.25000	3.201600	8	1	76/06/16	79/06/25
01027 CADMIUM	CD,TOT	UG/L	WATER		5	9.999400	.0001831	.0135320	10	10	75/06/25	79/06/25

01034	CHROMIUM	CR,TOT	UG/L	WATER		7	9.999300	.0001627	.0127580	10	10	74/12/10	79/06/25
01042	COPPER	CU,TOT	UG/L	WATER		7	9.999300	.0001627	.0127580	10	10	74/12/10	79/06/25
01045	IRON	FE,TOT	UG/L	WATER		2	150.0000	5000.000	70.71100	200	100	79/01/10	79/06/25
01051	LEAD	PB,TOT	UG/L	WATER		7	21.42400	201.1800	14.18400	38	3	74/12/10	79/06/25
01055	MANGNESE	MN	UG/L	WATER		2	155.0000	22050.00	148.4900	260.0	50.0	79/01/10	79/06/25
01065	NICKEL	NI,DISS	UG/L	WATER		7	72.85200	2156.800	46.44100	100	.0010	74/12/10	79/06/25
01092	ZINC	ZN,TOT	UG/L	WATER		7	27.13700	190.3800	13.79800	50	10	74/12/10	79/06/25
31616	FEC COLI	MFM-FCBR	/100ML	WATER		45	397.7800	1057500	1028.400	6000	100	75/01/30	79/06/25
70505	T PO4	P-COL	MG/L	WATER		46	.4521100	2.070300	1.438900	8.50	.10	75/01/30	79/06/25
70507	PHOS-T	ORTHO	MG/L P	WATER		46	.1530400	.4512000	.6717200	4.500	.010	75/01/30	79/06/25
71900	MERCURY	HG,TOTAL	UG/L	WATER		7	.4435000	.0096100	.0980310	.5	.3	74/12/10	79/06/25

RADFORD AAP

9-STE002.41 VA9-02AX0049 VA9-2X0049

37 11 02.0 080 30 04.0 1

★ STROUBLESCREEK

51155 VIRGINIA PULASKI

05-OHIO RIVER + KANAWHA 050791

9-NEW

21VASWCB HQ 05050001099 0002.790 OFF

0000 FEET DEPTH

STROUBLES CREEK
UPSTREAM OF RAAP

/TYPA/AMBNT/STREAM

(BACKGROUND)

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00002	HSAMPLOC	% FROM RT BANK	WATER		93	50.00000	.0000000	.0000000	50.0	50.0	70/04/01	81/11/16
00005	VSAMPLOC	DEPTH % OF TOT	WATER		90	49.44500	27.78000	5.270700	50	0	70/04/01	78/05/04
00010	WATER	TEMP CENT	WATER		212	12.34300	53.14400	7.290000	30.0	.0	70/04/01	91/02/11
00011	WATER	TEMP FAHN	WATER		212	54.21500	172.3200	13.12700	86.0	32.0	70/04/01	91/02/11
00041	WEATHER	WMO CODE 4501	WATER		248	2.036300	.8934200	.9452100	4	1	70/04/01	91/02/11
00070	TURB	JKSN JTU	WATER		4	4.625000	16.22900	4.028600	10.0	.5	71/04/05	87/10/27
00094	CNDUCTVY	FIELD MICROMHO	WATER		110	341.0800	8547.400	92.45200	576	5	79/07/20	91/02/11
00095	CNDUCTVY	AT 25C MICROMHO	WATER		2	427.8500	17993.00	134.1400	523	333	89/04/10	89/08/08
00300	DO	MG/L	WATER		212	9.724000	5.807600	2.409900	15.6	.8	70/04/01	91/02/11
00301	DO	SATUR PERCENT	WATER		211	88.66000	323.9000	17.99700	140.0	6.7	70/04/01	91/02/11
00310	BOD	5 DAY MG/L	WATER		107	1.854100	4.092100	2.022900	14.0	1.0	70/04/01	88/06/16
00340	COD	HI LEVEL MG/L	WATER		102	10.41200	103.2000	10.15900	76	1	79/07/20	88/06/16
00400	PH	SU	WATER		213	8.369300	.3924300	.6264400	10.00	6.10	70/04/01	91/02/11
00403	PH	LAB SU	WATER		18	8.010800	.0729690	.2701300	8.4	7.3	70/04/01	88/06/16
00410	T ALK	CACO3 MG/L	WATER		16	156.1900	2469.500	49.69400	210	80	70/04/01	88/06/16
00500	RESIDUE	TOTAL MG/L	WATER		10	320.2000	3484.200	59.02700	419	200	70/04/01	88/02/16
00505	RESIDUE	TOT VOL MG/L	WATER		10	80.20000	2145.500	46.32000	164	0	70/04/01	88/02/16
00510	RESIDUE	TOT FIX MG/L	WATER		10	238.0000	2905.100	53.89900	339	154	70/04/01	88/02/16
00530	RESIDUE	TOT NFLT MG/L	WATER		107	22.16800	3409.100	58.38800	400	2	70/04/01	88/06/16
00535	RESIDUE	VOL NFLT MG/L	WATER		107	11.49500	3333.900	57.74000	600	0	70/04/01	88/06/16
00540	RESIDUE	FIX NFLT MG/L	WATER		107	22.01900	7301.400	85.44800	800	0	70/04/01	88/06/16
00610	NH3+NH4-	N TOTAL MG/L	WATER		197	.5319800	1.579400	1.256700	9.000	.010	70/04/01	88/06/16
00612	UN-IONZD	NH3-N MG/L	WATER		194	.0238420	.0031788	.0563810	.569	.00001	70/04/01	88/06/16
00615	NO2-N	TOTAL MG/L	WATER		199	.0764610	.0240430	.1550600	1.049	.010	70/04/01	88/06/16
00619	UN-IONZD	NH3-NH3 MG/L	WATER		194	.0289900	.0046992	.0685510	.692	.00001	70/04/01	88/06/16
00620	NO3-N	TOTAL MG/L	WATER		169	1.765200	2.864100	1.692400	11.250	.140	70/04/01	88/06/16
00625	TOT KJEL	N MG/L	WATER		195	1.032500	4.087600	2.021800	11.590	.100	70/04/01	88/06/16
00630	NO2&NO3	N-TOTAL MG/L	WATER		29	1.961700	1.655200	1.286600	7.00	.30	76/10/27	79/06/25
00665	PHOS-TOT	MG/L P	WATER		98	.1173500	.0053659	.0732530	.600	.100	79/07/20	88/06/16
00671	PHOS-DIS	ORTHO MG/L P	WATER		100	.0375000	.0041018	.0640450	.550	.010	79/07/20	88/06/16
00680	T ORG C	C MG/L	WATER		97	5.892000	19.96100	4.467800	24.0	1.0	79/07/20	88/06/16
00900	TOT HARD	CACO3 MG/L	WATER		35	214.0300	1573.000	39.66100	260	118	86/05/29	91/02/11
00940	CHLORIDE	TOTAL MG/L	WATER		1	15.70000			16	16	87/06/10	87/06/10
00945	SULFATE	SO4-TOT MG/L	WATER		1	25.60000			26	26	87/06/10	87/06/10
00951	FLUORIDE	F,TOTAL MG/L	WATER		1	.2400000			.24	.24	87/06/10	87/06/10
01002	ARSENIC	AS,TOT UG/L	WATER		21	3.190200	6.060900	2.461900	10	1.0	71/03/03	90/10/16
01003	ARSENIC	SEDMG/KG DRY WGT	WATER		6	9.641700	2.864500	1.692500	12.10	8.00	80/01/29	90/07/26
01012	BERYLIUM	BE,TOT UG/L	WATER		1	1.000000			1.00	1.00	84/05/22	84/05/22
01027	CADMIUM	CD,TOT UG/L	WATER		25	6.579600	18.47000	4.297600	10	1.0	70/11/02	90/10/16

BACKGROUND SEDIMENT

RADFORD AAP

9-STE002.41 VA9-02AX0049 VA9-2X0049

37 11 02.0 080 30 04.0 1

★ STROUBLESCREEK

STROUBLES CREEK
UPSTREAM OF RAAP

51155 VIRGINIA PULASKI
05-OHIO RIVER + KANAWHA 050791
/TYPA/AMBNT/STREAM 9-NEW
21VASWCB HQ 05050001099 0002.790 OFF
0000 FEET DEPTH

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
01028	CD MUD	DRY WGT MG/KG-CD	WATER		5	.4960000	.2127300	.4612300	1.00	.11	80/07/22	90/07/26
01029	CHROMIUM	SEDMG/KG DRY WGT	WATER		6	19.05800	11.43500	3.381500	22.00	14.00	80/01/29	90/07/26
01034	CHROMIUM	CR,TOT UG/L	WATER		34	16.88100	406.4300	20.16000	100	1	70/04/01	90/10/16
01042	COPPER	CU,TOT UG/L	WATER		34	13.97000	133.0000	11.53300	50	10	70/04/01	90/10/16
01043	COPPER	SEDMG/KG DRY WGT	WATER		6	17.18500	20.56600	4.535000	25.00	11.50	80/01/29	90/07/26
01045	IRON	FE,TOT UG/L	WATER		8	166.2300	15505.00	124.5200	400	50	70/11/02	90/10/16
01051	LEAD	PB,TOT UG/L	WATER		31	10.35300	40.86400	6.392500	27	2	70/11/02	90/10/16
01052	LEAD	SEDMG/KG DRY WGT	WATER		5	31.22000	172.6200	13.13900	45.00	14.80	80/07/22	90/07/26
01053	MN MUD	DRY WGT MG/KG-MN	WATER		1	600.0000			600.00	600.00	89/04/10	89/04/10
01055	MANGNESE	MN UG/L	WATER		8	66.24800	2198.300	46.88600	160.0	10.0	70/04/01	90/10/16
01059	THALLIUM	TL,TOTAL UG/L	WATER		1	1.000000			1	1	84/05/22	84/05/22
01065	NICKEL	NI,DISS UG/L	WATER		12	84.99200	1227.000	35.02900	100	10	73/01/30	79/06/25
01067	NICKEL	NI,TOTAL UG/L	WATER		11	22.72700	321.8200	17.93900	50	10	81/04/29	90/10/16
01068	NICKEL	SEDMG/KG DRY WGT	WATER		6	18.20700	18.91000	4.348500	25.00	12.50	80/01/29	90/07/26
01092	ZINC	ZN,TOT UG/L	WATER		34	21.76200	202.8300	14.24200	50	10	70/04/01	90/10/16
01093	ZINC	SEDMG/KG DRY WGT	WATER		6	85.39700	291.3200	17.06800	104.00	62.18	80/01/29	90/07/26
01147	SELENIUM	SE,TOT UG/L	WATER		4	3.000000	5.333300	2.309400	5	1	82/04/05	88/10/12
01148	SELENIUM	SEDMG/KG DRY WGT	WATER		1	7.000000			7.00	7.00	89/04/10	89/04/10
01170	FE MUD	DRY WGT MG/KG-FE	WATER		1	30000.00			30000.00	30000.00	89/04/10	89/04/10
01351	STREAM	FLOW SEVERITY	WATER		116	3.250000	.4673900	.6836600	5	2	79/07/20	88/06/16
31505	TOT COLI	MPN CONF /100ML	WATER		7	4575.700	20703000	4550.000	11000	930	70/04/27	70/11/02
31616	FEC COLI	MFM-FCBR /100ML	WATER		200	553.8900	1560700	1249.300	7500	0	70/11/30	91/02/11
34259	DELTABHC	TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34351	ENDSULSF	TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34356	B-ENDO	SULFAN TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34361	A-ENDO	SULFAN TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34366	ENDRINAL	DEHYDE TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34671	PCB	1016 TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
38442	DICAMBA	(BANVEL) DISSUG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
38451	DICLPROP	SUSPUG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
38745	2,4-DB	TOTWUG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
39032	PCP	TOT UG/L	WATER		4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39062	CHLORDAN	C ISOMER WWS-UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39065	CHLORDAN	T ISOMER WWS-UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39068	NONACHLR	C ISOMER WWS-UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39071	NONACHLR	T ISOMER WWS-UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39300	P,P'DDT	TOT UG/L	WATER		4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39305	O,P' DDT	WHL SMPL UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39310	P,P'DDD	TOT UG/L	WATER		4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29

RADFORD AAP

STROUBLES CREEK
UPSTREAM FROM RAAP
(BACKGROUND)

9-STE002.41 VA9-02AX0049 VA9-2X0049
37 11 02.0 080 30 04.0 1
STROUBLESCREEK
51155 VIRGINIA PULASKI
/TYPA/AMBNT/STREAM 05-OHIO RIVER + KANAWHA 050791
9-NEW
21VASWCB HQ 05050001099 0002.790 OFF
0000 FEET DEPTH

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39315	O,P' DDD	WHL SMPL UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39320	P,P'DDE	TOT UG/L	WATER		4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39327	O P DDE	WHL SMP L UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39330	ALDRIN	TOT UG/L	WATER		5	.0400000	.0030000	.0547720	.100	.000	80/01/29	84/10/29
39333	ALDRIN	SEDUG/KG DRY WGT	WATER		2	.0000000	.0000000	.0000000	.00	.00	81/05/27	83/01/31

39337	ALPHABHC		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39338	BETA BHC		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39340	GAMMABHC	LINDANE	TOT.UG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39350	CHLRDANE	TECH&MET	TOT UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39380	DIELDRIN		TOTUG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39390	ENDRIN		TOT UG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39400	TOXAPHEN		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39410	HEPTCHLR		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39420	HPCHLREP		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39480	MTHXYCLR	WHL SMPL	UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39488	PCB-1221		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39492	PCB-1232		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39496	PCB-1242		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39500	PCB-1248		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39508	PCB-1260		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39516	PCBS	WHL SMPL	UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39630	ATRAZINE	WHL SMPL	UG/L	WATER	2	.2750000	.1012600	.3182100	.500	.050	71/07/14	83/09/22
39631	ATRAZINE	MUD	UG/KG	WATER	2	.0000000	.0000000	.0000000	.00	.00	81/05/27	83/01/31
39700	HCB		TOT UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39730	2,4-D	WHL SMPL	UG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
39740	2,4,5-T	WHL SMPL	UG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
39760	SILVEX	WHL SMPL	UG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
70505	T PO4	P-COL	MG/L	WATER	98	1.114400	2.282200	1.510700	6.10	.010	70/04/01	79/06/25
70507	PHOS-T	ORTHO	MG/L P	WATER	98	.9764200	2.070400	1.438900	5.799	.010	70/04/01	79/06/25
71900	MERCURY	HG,TOTAL	UG/L	WATER	34	.4236200	.0097462	.0987230	.5	.3	70/09/15	90/10/16
* 71921	MERCURY	SEDMG/KG	DRY WGT	WATER	6	.1966700	.0173870	.1318600	.4	.05	80/01/29	90/07/26
74041	WQF	SAMPLE	UPDATED	WATER	71	879410.0	1565E+05	12510.00	910425	860722	84/10/29	91/02/11
77825	ALACHLOR	TOTAL	UG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29

TROUBLES CREEK UPSTREAM FROM RAAP (BACKGROUND)

/TYPA/AMBNT/STREAM

9-STE003.74 VA9-02AX0050 VA9-2X0050
37 11 22.0 080 29 24.0 1
* STROUBLES CREEK
51121 VIRGINIA MONTGOMERY
05-OHIO RIVER + KANAWHA 050792
9-NEW
21VASWCB HQ 05050001099 0003.560 OFF
0000 FEET DEPTH

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00002	HSAMPLOC	% FROM	RT BANK	WATER	59	50.00000	.0000000	.0000000	50.0	50.0	73/01/30	78/05/04
00005	VSAMPLOC	DEPTH	% OF TOT	WATER	60	50.83300	41.66700	6.455000	100	50	73/01/30	78/05/04
00010	WATER	TEMP	CENT	WATER	70	12.06500	50.10300	7.078400	24.4	.0000009	73/01/30	79/06/25
00011	WATER	TEMP	FAHN	WATER	70	53.71700	162.3200	12.74000	76.0	32.0	73/01/30	79/06/25
00041	WEATHER	WMO CODE	4501	WATER	70	2.000000	.8985500	.9479200	3	1	73/01/30	79/06/25
00300	DO		MG/L	WATER	71	8.876600	4.341900	2.083700	14.0	4.2	73/01/30	79/06/25
00301	DO	SATUR	PERCENT	WATER	70	80.51800	211.2000	14.53300	109.5	48.3	73/01/30	79/06/25
00400	PH		SU	WATER	71	8.281200	.4197000	.6478400	9.70	6.80	73/01/30	79/06/25
00610	NH3+NH4-	N TOTAL	MG/L	WATER	69	1.502600	3.964000	1.991000	8.500	.100	73/01/30	79/06/25
00612	UN-IONZD	NH3-N	MG/L	WATER	68	.0520200	.0061598	.0784850	.367	.0001	73/01/30	79/06/25
00615	NO2-N	TOTAL	MG/L	WATER	68	.2040800	.0555240	.2356400	.850	.010	73/01/30	79/06/25
00619	UN-IONZD	NH3-NH3	MG/L	WATER	68	.0632500	.0091066	.0954290	.446	.0002	73/01/30	79/06/25
00620	NO3-N	TOTAL	MG/L	WATER	40	2.520700	2.080900	1.442600	7.000	.140	73/01/30	76/11/29
00625	TOT KJEL	N	MG/L	WATER	67	2.382800	9.142400	3.023600	12.590	.100	73/01/30	79/06/25
00630	NO2&NO3	N-TOTAL	MG/L	WATER	29	1.959500	.7400800	.8602800	3.70	.37	76/10/27	79/06/25
01002	ARSENIC	AS,TOT	UG/L	WATER	5	1.800000	.7000100	.8366600	3	1	75/12/02	79/06/25
01003	ARSENIC	SEDMG/KG	DRY WGT	WATER	1	6.699000			6.70	6.70	76/04/14	76/04/14
01027	CADMIUM	CD,TOT	UG/L	WATER	8	9.999300	.0001046	.0102290	10	10	73/08/13	79/06/25
01028	CD MUD	DRY WGT	MG/KG-CD	WATER	1	.3299000			.33	.33	76/04/14	76/04/14
01029	CHROMIUM	SEDMG/KG	DRY WGT	WATER	1	33.29000			33.29	33.29	76/04/14	76/04/14
01034	CHROMIUM	CR,TOT	UG/L	WATER	14	9.999100	.0001502	.0122570	10	10	73/01/30	79/06/25
01042	COPPER	CU,TOT	UG/L	WATER	14	9.999100	.0001502	.0122570	10	10	73/01/30	79/06/25
01043	COPPER	SEDMG/KG	DRY WGT	WATER	1	48.00000			48.00	48.00	76/04/14	76/04/14
01045	IRON	FE,TOT	UG/L	WATER	2	225.0000	1250.000	35.35500	250	200	79/01/10	79/06/25
01051	LEAD	PB,TOT	UG/L	WATER	13	10.69000	73.67200	8.583300	32	2	73/01/30	79/06/25
01052	LEAD	SEDMG/KG	DRY WGT	WATER	1	23.29000			23.29	23.29	76/04/14	76/04/14

01055	MANGNESE	MN	UG/L	WATER	2	205.0000	18050.00	134.3500	300.0	110.0	79/01/10	79/06/25
01065	NICKEL	NI,DISS	UG/L	WATER	13	93.06900	622.9300	24.95900	100	10	73/01/30	79/06/25
01068	NICKEL	SEDMG/KG	DRY WGT	WATER	1	16.69000			16.69	16.69	76/04/14	76/04/14
01092	ZINC	ZN,TOT	UG/L	WATER	14	27.13700	298.8000	17.28600	70	10	73/01/30	79/06/25
01093	ZINC	SEDMG/KG	DRY WGT	WATER	1	183.0000			183.00	183.00	76/04/14	76/04/14
31505	TOT COLI	MPN CONF	/100ML	WATER	1	9300.000			9300	9300	75/02/07	75/02/07
31616	FEC COLI	MFM-FCBR	/100ML	WATER	67	626.8700	2081100	1442.600	6000	100	73/01/30	79/06/25
70505	T PO4	P-COL	MG/L	WATER	69	1.482300	2.557700	1.599300	6.00	.10	73/01/30	79/06/25
70507	PHOS-T	ORTHO	MG/L P	WATER	69	1.359400	2.521300	1.587900	5.699	.010	73/01/30	79/06/25
71900	MERCURY	HG,TOTAL	UG/L	WATER	14	.4717700	.0052962	.0727750	.5	.3	73/01/30	79/06/25
71921	MERCURY	SEDMG/KG	DRY WGT	WATER	1	.7199000			.7	.7	76/04/14	76/04/14

1STORET RETRIEVAL DATE 91/12/12 PGM=INVENT PAGE: 23

RADFORD AAP

9-STE008.56 VA9-02-X0051 VA9-2X0051

37 12 59.0 080 26 07.0 1

STROUBLES CREEK

51121 VIRGINIA MONTGOMERY

05-OHIO RIVER + KANAWHA 050792

9-NEW

21VASWCB HQ 05050001099 0007.840 OFF

0000 FEET DEPTH

STROUBLES CREEK
UPSTREAM FROM RAAP
(BACKGROUND

/TYPA/AMBNT/STREAM

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00002	HSAMPLOC	% FROM RT BANK	WATER		53	50.00000	.0000000	.0000000	50.0	50.0	73/01/30	78/05/30
00005	VSAMPLOC	DEPTH % OF TOT	WATER		53	50.00000	.0000000	.0000000	50	50	73/01/30	78/05/30
00010	WATER	TEMP CENT	WATER		62	13.91500	54.64300	7.392100	25.6	.0000009	73/01/30	79/06/28
00011	WATER	TEMP FAHN	WATER		62	57.04800	177.0300	13.30500	78.0	32.0	73/01/30	79/06/28
00041	WEATHER	WMO CODE 4501	WATER		61	2.065600	.9289600	.9638300	3	1	73/01/30	79/06/28
00300	DO	MG/L	WATER		62	9.219700	5.789300	2.406100	16.4	4.8	73/01/30	79/06/28
00301	DO	SATUR PERCENT	WATER		62	88.22400	563.9900	23.74800	145.8	38.4	73/01/30	79/06/28
00400	PH	SU	WATER		62	8.410800	.2908600	.5393100	9.50	6.80	73/01/30	79/06/28
00610	NH3+NH4-	N TOTAL MG/L	WATER		61	.1144100	.0032430	.0569470	.400	.030	73/01/30	79/06/28
00612	UN-IONZD	NH3-N MG/L	WATER		61	.0127540	.0002093	.0144670	.068	.00006	73/01/30	79/06/28
00615	NO2-N	TOTAL MG/L	WATER		61	.0175370	.0001321	.0114950	.070	.010	73/01/30	79/06/28
00619	UN-IONZD	NH3-NH3 MG/L	WATER		61	.0155080	.0003094	.0175910	.083	.00007	73/01/30	79/06/28
00620	NO3-N	TOTAL MG/L	WATER		38	1.840500	1.010300	1.005200	4.399	.550	73/01/30	78/01/11
00625	TOT KJEL	N MG/L	WATER		59	.3338300	.0271080	.1646400	.800	.100	73/01/30	79/06/28
00630	NO2&NO3	N-TOTAL MG/L	WATER		23	1.756200	.9032600	.9504000	3.30	.12	76/10/07	79/06/28
01002	ARSENIC	AS,TOT UG/L	WATER		5	1.400000	.3000200	.5477400	2	1.0	73/08/13	79/06/28
01027	CADMIUM	CD,TOT UG/L	WATER		7	8.713800	11.57100	3.401500	10	1.0	73/08/13	79/06/28
01034	CHROMIUM	CR,TOT UG/L	WATER		11	16.36100	205.3500	14.33000	50	10	73/01/30	79/06/28
01042	COPPER	CU,TOT UG/L	WATER		11	9.999300	.0000976	.0098821	10	10	73/01/30	79/06/28
01045	IRON	FE,TOT UG/L	WATER		2	125.0000	1250.000	35.35500	150	100	79/01/17	79/06/28
01051	LEAD	PB,TOT UG/L	WATER		10	14.39700	142.4700	11.93600	45	4	73/01/30	79/06/28
01055	MANGNESE	MN UG/L	WATER		2	90.00000	5000.000	70.71100	140.0	40.0	79/01/17	79/06/28
01065	NICKEL	NI,DISS UG/L	WATER		11	91.81100	736.2300	27.13400	100	10	73/01/30	79/06/28
01092	ZINC	ZN,TOT UG/L	WATER		11	18.17800	56.31600	7.504400	30	10	73/01/30	79/06/28
31505	TOT COLI	MPN CONF /100ML	WATER		2	265.0000	2450.000	49.49800	300	230	77/05/11	77/08/08
31616	FEC COLI	MFM-FCBR /100ML	WATER		60	1087.800	3013600	1736.000	6000	70	73/01/30	79/06/28
70505	T PO4	P-COL MG/L	WATER		61	.1049100	.0008078	.0284230	.30	.10	73/01/30	79/06/28
70507	PHOS-T	ORTHO MG/L P	WATER		61	.0519600	.0021387	.0462460	.180	.010	73/01/30	79/06/28
71900	MERCURY	HG,TOTAL UG/L	WATER		11	.4456500	.0087516	.0935500	.5	.3	73/01/30	79/06/28

1STORET RETRIEVAL DATE 91/12/12 PGM=INVENT PAGE: 24

05050001099 REACHES 6 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

0

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	1	0	377	18	1	0	0	0
1972	1	1	286	15	0	1	0	0
1973	2	0	694	37	0	0	0	0

1974	1	0	532	30	0	0	0	0
1975	0	0	822	47	0	0	0	0
1976	0	0	675	38	0	0	0	0
1977	0	0	653	39	0	0	0	0
1978	0	0	655	41	0	0	0	0
1979	0	3	518	27	0	0	0	3
1980	0	0	235	9	0	0	0	0
1981	0	0	291	13	0	0	0	0
1982	0	0	301	12	0	0	0	0
1983	0	0	298	13	0	0	0	0
1984	0	0	315	14	0	0	0	0
1985	0	0	261	13	0	0	0	0
1986	0	0	304	14	0	0	0	0
1987	0	0	351	24	0	0	0	0
1988	0	0	230	18	0	0	0	0
1989	0	0	63	8	0	0	0	0
1990	0	0	57	5	0	0	0	0
1991	0	1	10	1	0	0	0	1
TOTAL	5	5	7928	436	1	1	0	4

05050001099 REACHES 6 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

REACH SUMMARY

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00002	HSAMPLOC	% FROM	RT BANK	WATER		240	50.00000	.0000000	.0000000	50.0	50.0	70/04/01	81/11/16
00005	VSAMPLOC	DEPTH	% OF TOT	WATER		239	50.00000	21.00800	4.583500	100	0	70/04/01	78/05/30
00010	WATER	TEMP	CENT	WATER		391	12.44100	52.14900	7.221400	30.0	.0	70/04/01	91/02/11
00011	WATER	TEMP	FAHN	WATER		391	54.39400	169.0300	13.00100	86.0	32.0	70/04/01	91/02/11
00041	WEATHER	WMO CODE	4501	WATER		425	2.035300	.8926200	.9447900	4	1	70/04/01	91/02/11
00070	TURB	JKSN	JTU	WATER		4	4.625000	16.22900	4.028600	10.0	.5	71/04/05	87/10/27
00080	COLOR	PT-CO	UNITS	WATER		3	43.33300	433.3400	20.81700	60	20	72/02/16	72/02/18
00094	CNDUCTVY	FIELD	MICROMHO	WATER		110	341.0800	8547.400	92.45200	576	5	79/07/20	91/02/11
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		5	625.1400	74451.00	272.8600	1000	333	72/02/16	89/08/08
00300	DO		MG/L	WATER		391	9.482100	5.441500	2.332700	16.4	.8	70/04/01	91/02/11
00301	DO	SATUR	PERCENT	WATER		387	86.82800	335.3000	18.31100	145.8	6.7	70/04/01	91/02/11
00310	BOD	5 DAY	MG/L	WATER		107	1.854100	4.092100	2.022900	14.0	1.0	70/04/01	88/06/16
00335	COD	LOWLEVEL	MG/L	WATER		3	12.30000	20.77000	4.557400	17.0	7.9	72/02/16	72/02/18
00340	COD	HI LEVEL	MG/L	WATER		102	10.41200	103.2000	10.15900	76	1	79/07/20	88/06/16
00400	PH		SU	WATER		395	8.361700	.3920500	.6261400	10.00	6.10	70/04/01	91/02/11
00403	PH	LAB	SU	WATER		18	8.010800	.0729690	.2701300	8.4	7.3	70/04/01	88/06/16
00410	T ALK	CACO3	MG/L	WATER		19	148.7400	2482.600	49.82500	210	74	70/04/01	88/06/16
00435	T ACDITY	CACO3	MG/L	WATER		3	3.333300	.3333400	.5773600	4	3	72/02/16	72/02/18
00500	RESIDUE	TOTAL	MG/L	WATER		13	349.2300	10827.00	104.0600	618	200	70/04/01	88/02/16
00505	RESIDUE	TOT VOL	MG/L	WATER		10	80.20000	2145.500	46.32000	164	0	70/04/01	88/02/16
00510	RESIDUE	TOT FIX	MG/L	WATER		10	238.0000	2905.100	53.89900	339	154	70/04/01	88/02/16
00530	RESIDUE	TOT NFLT	MG/L	WATER		110	21.70000	3323.200	57.64700	400	2	70/04/01	88/06/16
00535	RESIDUE	VOL NFLT	MG/L	WATER		107	11.49500	3333.900	57.74000	600	0	70/04/01	88/06/16
00540	RESIDUE	FIX NFLT	MG/L	WATER		107	22.01900	7301.400	85.44800	800	0	70/04/01	88/06/16
00550	OIL-GRSE	TOT-SXLT	MG/L	WATER		3	13.40000	228.2800	15.10900	30.8	3.6	72/02/16	72/02/18
00610	NH3+NH4-	N TOTAL	MG/L	WATER		376	.6109400	1.811700	1.346000	9.000	.010	70/04/01	88/06/16
00612	UN-IONZD	NH3-N	MG/L	WATER		368	.0269980	.0035145	.0592830	.569	.00001	70/04/01	88/06/16
00615	NO2-N	TOTAL	MG/L	WATER		374	.0842840	.0272630	.1651200	1.049	.010	70/04/01	88/06/16
00619	UN-IONZD	NH3-NH3	MG/L	WATER		368	.0328270	.0051956	.0720800	.692	.00001	70/04/01	88/06/16
00620	NO3-N	TOTAL	MG/L	WATER		268	2.034000	12.41900	3.524100	53.000	.010	70/04/01	88/06/16
00625	TOT KJEL	N	MG/L	WATER		369	1.144200	4.735800	2.176200	12.590	.100	70/04/01	88/06/16
00630	NO2&NO3	N-TOTAL	MG/L	WATER		109	1.593900	1.154800	1.074600	7.00	.12	76/10/07	79/06/28
00665	PHOS-TOT		MG/L P	WATER		98	.1173500	.0053659	.0732530	.600	.100	79/07/20	88/06/16
00671	PHOS-DIS	ORTHO	MG/L P	WATER		100	.0375000	.0041018	.0640450	.550	.010	79/07/20	88/06/16
00680	T ORG C	C	MG/L	WATER		100	5.925200	19.39300	4.403700	24.0	1.0	72/02/16	88/06/16
00900	TOT HARD	CACO3	MG/L	WATER		35	214.0300	1573.000	39.66100	260	118	86/05/29	91/02/11
00940	CHLORIDE	TOTAL	MG/L	WATER		1	15.70000			16	16	87/06/10	87/06/10
00945	SULFATE	SO4-TOT	MG/L	WATER		4	140.1500	8937.400	94.53800	240	26	72/02/16	87/06/10
00951	FLUORIDE	F,TOTAL	MG/L	WATER		1	.2400000			.24	.24	87/06/10	87/06/10

01002	ARSENIC	AS,TOT	UG/L	WATER		35	2.742700	5.137100	2.266500	10	1.0	71/03/03 90/10/16
01003	ARSENIC	SEDMG/KG	DRY WGT	WATER		7	9.221300	3.624200	1.903700	12.10	6.70	76/04/14 90/07/26
01012	BERYLIUM	BE,TOT	UG/L	WATER		1	1.000000			1.00	1.00	84/05/22 84/05/22

05050001099 REACHES 6 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
01027	CADMIUM	CD,TOT UG/L	WATER		45	7.899500	14.05000	3.748400	10	1.0	70/11/02	90/10/16
01028	CD MUD	DRY WGT MG/KG-CD	WATER		6	.4683200	.1747800	.4180700	1.00	.11	76/04/14	90/07/26
01029	CHROMIUM	SEDMG/KG DRY WGT	WATER		7	21.09200	38.46300	6.201900	33.29	14.00	76/04/14	90/07/26
01034	CHROMIUM	CR,TOT UG/L	WATER		66	14.60500	248.0200	15.74900	100	1	70/04/01	90/10/16
01042	COPPER	CU,TOT UG/L	WATER		66	12.04500	71.52200	8.457100	50	10	70/04/01	90/10/16
01043	COPPER	SEDMG/KG DRY WGT	WATER		7	21.58700	152.7900	12.36100	48.00	11.50	76/04/14	90/07/26
01045	IRON	FE,TOT UG/L	WATER		14	166.4200	9759.100	98.78800	400	50	70/11/02	90/10/16
01051	LEAD	PB,TOT UG/L	WATER		61	12.35800	89.61700	9.466600	45	2	70/11/02	90/10/16
01052	LEAD	SEDMG/KG DRY WGT	WATER		6	29.89800	148.5800	12.18900	45.00	14.80	76/04/14	90/07/26
01053	MN MUD	DRY WGT MG/KG-MN	WATER		1	600.0000			600.00	600.00	89/04/10	89/04/10
01055	MANGNESE	MN UG/L	WATER		14	102.1400	7526.000	86.75200	300.0	10.0	70/04/01	90/10/16
01059	THALLIUM	TL,TOTAL UG/L	WATER		1	1.000000			1	1	84/05/22	84/05/22
01065	NICKEL	NI,DISS UG/L	WATER		43	87.20200	1034.700	32.16600	100	.0010	73/01/30	79/06/28
01067	NICKEL	NI,TOTAL UG/L	WATER		11	22.72700	321.8200	17.93900	50	10	81/04/29	90/10/16
01068	NICKEL	SEDMG/KG DRY WGT	WATER		7	17.99000	16.08600	4.010800	25.00	12.50	76/04/14	90/07/26
01092	ZINC	ZN,TOT UG/L	WATER		66	22.87500	199.2200	14.11500	70	10	70/04/01	90/10/16
01093	ZINC	SEDMG/KG DRY WGT	WATER		7	99.34000	1603.700	40.04600	183.00	62.18	76/04/14	90/07/26
01147	SELENIUM	SE,TOT UG/L	WATER		4	3.000000	5.333300	2.309400	5	1	82/04/05	88/10/12
01148	SELENIUM	SEDMG/KG DRY WGT	WATER		1	7.000000			7.00	7.00	89/04/10	89/04/10
01170	FE MUD	DRY WGT MG/KG-FE	WATER		1	30000.00			30000.00	30000.00	89/04/10	89/04/10
01351	STREAM	FLOW SEVERITY	WATER		116	3.250000	.4673900	.6836600	5	2	79/07/20	88/06/16
31505	TOT COLI	MPN CONF /100ML	WATER		10	4186.000	20242000	4499.200	11000	230	70/04/27	77/08/08
31616	FEC COLI	MFM-FCBR /100ML	WATER		372	634.2700	1855600	1362.200	7500	0	70/11/30	91/02/11
34259	DELTABHC	TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34351	ENDSULSF	TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34356	B-ENDO	SULFAN TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34361	A-ENDO	SULFAN TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34366	ENDRINAL	DEHYDE TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34671	PCB	1016 TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
38442	DICAMBA	(BANVEL) DISSUG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
38451	DICLPROP	SUSPUG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
38745	2,4-DB	TOTWUG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
39032	PCP	TOT UG/L	WATER		4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39062	CHLORDAN	C ISOMER WWS-UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39065	CHLORDAN	T ISOMER WWS-UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39068	NONACHLR	C ISOMER WWS-UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39071	NONACHLR	T ISOMER WWS-UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39300	P,P'DDT	TOT UG/L	WATER		4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39305	O,P' DDT	WHL SMPL UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39310	P,P'DDD	TOT UG/L	WATER		4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39315	O,P' DDD	WHL SMPL UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39320	P,P'DDE	TOT UG/L	WATER		4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29

05050001099 REACHES 6 STATIONS PROCESSED IN THIS AGGREGATE

RADFORD AAP

PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
39327	O P DDE	WHL SMP L UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39330	ALDRIN	TOT UG/L	WATER		5	.0400000	.0030000	.0547720	.100	.000	80/01/29	84/10/29
39333	ALDRIN	SEDUG/KG DRY WGT	WATER		2	.0000000	.0000000	.0000000	.00	.00	81/05/27	83/01/31

39337	ALPHABHC		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39338	BETA BHC		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39340	GAMMABHC	LINDANE	TOT.UG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39350	CHLRDANE	TECH&MET	TOT UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39380	DIELDRIN		TOTUG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39390	ENDRIN		TOT UG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39400	TOXAPHEN		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39410	HEPTCHLR		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39420	HPCHLREP		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39480	MTHXYCLR	WHL SMPL	UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39488	PCB-1221		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39492	PCB-1232		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39496	PCB-1242		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39500	PCB-1248		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39508	PCB-1260		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39516	PCBS	WHL SMPL	UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39630	ATRAZINE	WHL SMPL	UG/L	WATER	2	.2750000	.1012600	.3182100	.500	.050	71/07/14	83/09/22
39631	ATRAZINE	MUD	UG/KG	WATER	2	.0000000	.0000000	.0000000	.00	.00	81/05/27	83/01/31
39700	HCB		TOT UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39730	2,4-D	WHL SMPL	UG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
39740	2,4,5-T	WHL SMPL	UG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
39760	SILVEX	WHL SMPL	UG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
70300	RESIDUE	DISS-180 C	MG/L	WATER	3	441.0000	31003.00	176.0800	614	262	72/02/16	72/02/18
70505	T PO4	P-COL	MG/L	WATER	274	.8711200	2.065800	1.437300	8.50	.010	70/04/01	79/06/28
70507	PHOS-T	ORTHO	MG/L P	WATER	274	.7288200	1.719200	1.311200	5.799	.010	70/04/01	79/06/28
71900	MERCURY	HG,TOTAL	UG/L	WATER	68	.4516800	.0133030	.1153400	.9	.3	70/09/15	90/10/16
71921	MERCURY	SEDMG/KG	DRY WGT	WATER	7	.2714100	.0536000	.2315200	.7	.05	76/04/14	90/07/26
74041	WQF	SAMPLE	UPDATED	WATER	71	879410.0	1565E+05	12510.00	910425	860722	84/10/29	91/02/11
77825	ALACHLOR	TOTAL	UG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29

0 12 TOTAL STATIONS PROCESSED
RADFORD AAP

COMPLETE SUMMARY

	STA BEG	STA END	# OF OBS	# OF SAMPLE	STA END-PERIOD OF RECD IN YRS =0	<.5	<3	>=3
<1972	3	1	858	41	5	1	0	0
1972	6	6	649	36	0	6	0	0
1973	2	0	694	37	0	0	0	0
1974	1	0	532	30	0	0	0	0
1975	0	1	840	49	0	0	0	1
1976	0	0	675	38	0	0	0	0
1977	0	0	653	39	0	0	0	0
1978	0	0	655	41	0	0	0	0
1979	0	3	518	27	0	0	0	3
1980	0	0	235	9	0	0	0	0
1981	0	0	291	13	0	0	0	0
1982	0	0	301	12	0	0	0	0
1983	0	0	298	13	0	0	0	0
1984	0	0	315	14	0	0	0	0
1985	0	0	261	13	0	0	0	0
1986	0	0	304	14	0	0	0	0
1987	0	0	351	24	0	0	0	0
1988	0	0	230	18	0	0	0	0
1989	0	0	63	8	0	0	0	0
1990	0	0	57	5	0	0	0	0
1991	0	1	10	1	0	0	0	1
TOTAL	12	12	8790	482	5	7	0	5

0 12 TOTAL STATIONS PROCESSED
RADFORD AAP

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00002	HSAMPLOC	% FROM	RT BANK	WATER		240	50.00000	.0000000	.0000000	50.0	50.0	70/04/01	81/11/16
00005	VSAMPLOC	DEPTH	% OF TOT	WATER		239	50.00000	21.00800	4.583500	100	0	70/04/01	78/05/30
00010	WATER	TEMP	CENT	WATER		436	12.96700	55.31500	7.437400	30.0	.0	64/07/07	91/02/11
00011	WATER	TEMP	FAHN	WATER		436	55.34000	179.2800	13.39000	86.0	32.0	64/07/07	91/02/11
00041	WEATHER	WMO CODE	4501	WATER		425	2.035300	.8926200	.9447900	4	1	70/04/01	91/02/11
00060	STREAM	FLOW	CFS	WATER		23	2801.100	14919000	3862.600	12700	570	62/08/22	64/09/03
00070	TURB	JKSN	JTU	WATER		26	24.17300	189.6600	13.77200	80.0	.5	64/07/07	87/10/27
00080	COLOR	PT-CO	UNITS	WATER		22	21.13600	418.8900	20.46700	60	0	64/08/22	72/02/18
00094	CNDUCTVY	FIELD	MICROMHO	WATER		110	341.0800	8547.400	92.45200	576	5	79/07/20	91/02/11
00095	CNDUCTVY	AT 25C	MICROMHO	WATER		48	361.6300	258590.0	508.5200	3000	3	64/07/07	89/08/08
00300	DO		MG/L	WATER		418	9.402800	5.431900	2.330700	16.4	.8	64/07/07	91/02/11
00301	DO	SATUR	PERCENT	WATER		414	86.82200	345.5700	18.59000	145.8	6.7	64/07/07	91/02/11
00310	BOD	5 DAY	MG/L	WATER		129	1.689100	3.548100	1.883600	14.0	.0	64/07/07	88/06/16
00335	COD	LOWLEVEL	MG/L	WATER		26	51.51500	5309.700	72.86800	270.0	2.0	64/08/22	75/07/22
00340	COD	HI LEVEL	MG/L	WATER		102	10.41200	103.2000	10.15900	76	1	79/07/20	88/06/16
00400	PH		SU	WATER		440	8.313100	.4656800	.6824100	10.00	4.80	64/07/07	91/02/11
00403	PH	LAB	SU	WATER		18	8.010800	.0729690	.2701300	8.4	7.3	70/04/01	88/06/16
00410	T ALK	CACO3	MG/L	WATER		59	80.18700	3579.100	59.82600	210	7	64/07/07	88/06/16
00435	T ACDITY	CACO3	MG/L	WATER		43	3.069800	26.59000	5.156600	20	0	64/07/07	72/02/18
00500	RESIDUE	TOTAL	MG/L	WATER		35	359.7800	227280.0	476.7400	2669	14	64/07/11	88/02/16
00505	RESIDUE	TOT VOL	MG/L	WATER		10	80.20000	2145.500	46.32000	164	0	70/04/01	88/02/16
00510	RESIDUE	TOT FIX	MG/L	WATER		10	238.0000	2905.100	53.89900	339	154	70/04/01	88/02/16
00530	RESIDUE	TOT NFLT	MG/L	WATER		139	21.89900	2821.700	53.12000	400	1	64/07/07	88/06/16
00535	RESIDUE	VOL NFLT	MG/L	WATER		107	11.49500	3333.900	57.74000	600	0	70/04/01	88/06/16
00540	RESIDUE	FIX NFLT	MG/L	WATER		107	22.01900	7301.400	85.44800	800	0	70/04/01	88/06/16
00550	OIL-GRSE	TOT-SXLT	MG/L	WATER		11	8.436400	70.70300	8.408500	30.8	.2	72/02/16	72/02/18
00610	NH3+NH4-	N TOTAL	MG/L	WATER		387	.6016900	1.766400	1.329100	9.000	.000	70/04/01	88/06/16
00612	UN-IONZD	NH3-N	MG/L	WATER		379	.0267260	.0034693	.0589010	.569	.000	70/04/01	88/06/16
00615	NO2-N	TOTAL	MG/L	WATER		374	.0842840	.0272630	.1651200	1.049	.010	70/04/01	88/06/16
00619	UN-IONZD	NH3-NH3	MG/L	WATER		379	.0324960	.0051288	.0716160	.692	.000	70/04/01	88/06/16
00620	NO3-N	TOTAL	MG/L	WATER		273	3.096100	126.2400	11.23600	144.000	.010	70/04/01	88/06/16
00625	TOT KJEL	N	MG/L	WATER		388	1.109400	4.535000	2.129600	12.590	.000	70/04/01	88/06/16
00630	NO2&NO3	N-TOTAL	MG/L	WATER		109	1.593900	1.154800	1.074600	7.00	.12	76/10/07	79/06/28
00650	T PO4	PO4	MG/L	WATER		1	.3200000			.32	.32	64/08/22	64/08/22
00655	POLY PO4	PO4	MG/L	WATER		2	.3000000	.0000000	.0000000	.30	.30	62/08/22	64/08/22
00660	ORTHOPO4	PO4	MG/L	WATER		2	.0200000	.0000000	.0000000	.02	.02	62/08/22	64/08/22
00665	PHOS-TOT		MG/L P	WATER		98	.1173500	.0053659	.0732530	.600	.100	79/07/20	88/06/16
00671	PHOS-DIS	ORTHO	MG/L P	WATER		100	.0375000	.0041018	.0640450	.550	.010	79/07/20	88/06/16
00680	T ORG C	C	MG/L	WATER		120	7.996800	89.48900	9.459900	58.5	1.0	72/02/16	88/06/16
00707	INVALID	PAR	NUMBER	WATER		22	27.72700	137.4500	11.72400	80.00000	25.00000	64/07/07	64/09/03
00900	TOT HARD	CACO3	MG/L	WATER		39	196.1800	4269.100	65.33800	260	38	64/08/31	91/02/11
00915	CALCIUM	CA,DISS	MG/L	WATER		4	8.500000	1.666700	1.291000	10.0	7.0	64/08/31	64/09/03

GROSS

0 12 TOTAL STATIONS PROCESSED

RADFORD AAP

	PARAMETER			MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
00925	MGNSIUM	MG,DISS	MG/L	WATER		4	4.500000	1.000000	1.000000	5.0	3.0	64/08/31	64/09/03
00940	CHLORIDE	TOTAL	MG/L	WATER		23	2.595700	32.88800	5.734800	19	0	64/07/07	87/06/10
00945	SULFATE	SO4-TOT	MG/L	WATER		16	138.3500	80848.00	284.3400	1100	9	62/08/22	87/06/10
00951	FLUORIDE	F,TOTAL	MG/L	WATER		1	.2400000			.24	.24	87/06/10	87/06/10
01002	ARSENIC	AS,TOT	UG/L	WATER		35	2.742700	5.137100	2.266500	10	1.0	71/03/03	90/10/16
01003	ARSENIC	SEDMG/KG	DRY WGT	WATER		7	9.221300	3.624200	1.903700	12.10	6.70	76/04/14	90/07/26
01012	BERYLIUM	BE,TOT	UG/L	WATER		1	1.000000			1.00	1.00	84/05/22	84/05/22
01027	CADMIUM	CD,TOT	UG/L	WATER		45	7.899500	14.05000	3.748400	10	1.0	70/11/02	90/10/16
01028	CD MUD	DRY WGT	MG/KG-CD	WATER		6	.4683200	.1747800	.4180700	1.00	.11	76/04/14	90/07/26
01029	CHROMIUM	SEDMG/KG	DRY WGT	WATER		7	21.09200	38.46300	6.201900	33.29	14.00	76/04/14	90/07/26
01034	CHROMIUM	CR,TOT	UG/L	WATER		66	14.60500	248.0200	15.74900	100	1	70/04/01	90/10/16
01042	COPPER	CU,TOT	UG/L	WATER		66	12.04500	71.52200	8.457100	50	10	70/04/01	90/10/16

01043	COPPER	SEDMG/KG	DRY WGT	WATER		7	21.58700	152.7900	12.36100	48.00	11.50	76/04/14	90/07/26
01045	IRON	FE,TOT	UG/L	WATER		35	186.5700	60481.00	245.9300	1300	0	64/07/07	90/10/16
01049	LEAD	PB,DISS	UG/L	WATER		15	7.333300	320.9500	17.91500	60	0	72/02/16	72/02/18
01051	LEAD	PB,TOT	UG/L	WATER		72	11.99800	135.6200	11.64600	60	0	70/11/02	90/10/16
01052	LEAD	SEDMG/KG	DRY WGT	WATER		6	29.89800	148.5800	12.18900	45.00	14.80	76/04/14	90/07/26
01053	MN MUD	DRY WGT	MG/KG-MN	WATER		1	600.0000			600.00	600.00	89/04/10	89/04/10
01055	MANGNESE	MN	UG/L	WATER		18	1079.500	3721800	1929.200	5000.0	10.0	64/08/31	90/10/16
01056	MANGNESE	MN,DISS	UG/L	WATER		1	.0000000			.0	.0	64/08/22	64/08/22
01059	THALLIUM	TL,TOTAL	UG/L	WATER		1	1.000000			1	1	84/05/22	84/05/22
01065	NICKEL	NI,DISS	UG/L	WATER		43	87.20200	1034.700	32.16600	100	.0010	73/01/30	79/06/28
01067	NICKEL	NI,TOTAL	UG/L	WATER		11	22.72700	321.8200	17.93900	50	10	81/04/29	90/10/16
01068	NICKEL	SEDMG/KG	DRY WGT	WATER		7	17.99000	16.08600	4.010800	25.00	12.50	76/04/14	90/07/26
01092	ZINC	ZN,TOT	UG/L	WATER		66	22.87500	199.2200	14.11500	70	10	70/04/01	90/10/16
01093	ZINC	SEDMG/KG	DRY WGT	WATER		7	99.34000	1603.700	40.04600	183.00	62.18	76/04/14	90/07/26
01147	SELENIUM	SE,TOT	UG/L	WATER		4	3.000000	5.333300	2.309400	5	1	82/04/05	88/10/12
01148	SELENIUM	SEDMG/KG	DRY WGT	WATER		1	7.000000			7.00	7.00	89/04/10	89/04/10
01170	FE MUD	DRY WGT	MG/KG-FE	WATER		1	30000.00			30000.00	30000.00	89/04/10	89/04/10
01351	STREAM	FLOW	SEVERITY	WATER		116	3.250000	.4673900	.6836600	5	2	79/07/20	88/06/16
03000	INVALID	PAR	NUMBER	WATER		12	68.58300	1979.400	44.49000	149.0000	26.00000	64/07/07	64/07/11
16730	INVALID	PAR	NUMBER	WATER		21	1158.400	18708000	4325.200	20000.00	20.00000	64/07/07	64/09/03
31501	TOT COLI	MFIMENDO	/100ML	WATER		22	992.7300	1170500	1081.900	3400	40	64/07/07	75/07/22
31505	TOT COLI	MPN CONF	/100ML	WATER		10	4186.000	20242000	4499.200	11000	230	70/04/27	77/08/08
31616	FEC COLI	MFM-FCBR	/100ML	WATER		392	606.8300	1775600	1332.500	7500	0	64/07/07	91/02/11
31673	FECSTREP	MFKFAGAR	/100ML	WATER		21	1158.400	18708000	4325.200	20000	20	64/07/07	64/09/03
31679	FECSTREP	MF M-ENT	/100ML	WATER		19	215.5800	77414.00	278.2300	1200	20	64/07/07	64/09/03
34259	DELTABHC		TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34351	ENDSULSF		TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34356	B-ENDO	SULFAN	TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34361	A-ENDO	SULFAN	TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
34366	ENDRINAL	DEHYDE	TOTWUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29

GROSS

0 12 TOTAL STATIONS PROCESSED
RADFORD AAP

	PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
34671	PCB 1016		TOTWUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
38442	DICAMBA	(BANVEL)	DISSUG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
38451	DICLPROP		SUSPUG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
38745	2,4-DB		TOTWUG/L	WATER	1	.2000000			.200	.200	84/10/29	84/10/29
39032	PCP		TOT UG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39062	CHLORDAN	C ISOMER	WWS-UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39065	CHLORDAN	T ISOMER	WWS-UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39068	NONACHLR	C ISOMER	WWS-UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39071	NONACHLR	T ISOMER	WWS-UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39300	P,P'DDT		TOT UG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39305	O,P' DDT	WHL SMPL	UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39310	P,P'DDD		TOT UG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39315	O,P' DDD	WHL SMPL	UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39320	P,P'DDE		TOT UG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39327	O P DDE	WHL SMP L	UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39330	ALDRIN		TOT UG/L	WATER	5	.0400000	.0030000	.0547720	.100	.000	80/01/29	84/10/29
39333	ALDRIN	SEDUG/KG	DRY WGT	WATER	2	.0000000	.0000000	.0000000	.00	.00	81/05/27	83/01/31
39337	ALPHABHC		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39338	BETA BHC		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39340	GAMMABHC	LINDANE	TOT.UG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39350	CHLRDANE	TECH&MET	TOT UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39380	DIELDRIN		TOTUG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39390	ENDRIN		TOT UG/L	WATER	4	.0250000	.0025000	.0500000	.100	.000	80/01/29	84/10/29
39400	TOXAPHEN		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39410	HEPTCHLR		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39420	HPCHLREP		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29
39480	MTHXYCLR	WHL SMPL	UG/L	WATER	3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39488	PCB-1221		TOTUG/L	WATER	1	.1000000			.100	.100	84/10/29	84/10/29

39492 PCB-1232	TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
39496 PCB-1242	TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
39500 PCB-1248	TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
39508 PCB-1260	TOTUG/L	WATER		1	.1000000			.100	.100	84/10/29	84/10/29
39516 PCBS WHL SMPL	UG/L	WATER		6	.0833330	.0096667	.0983190	.200	.000	72/02/16	82/04/05
39630 ATRAZINE WHL SMPL	UG/L	WATER		2	.2750000	.1012600	.3182100	.500	.050	71/07/14	83/09/22
39631 ATRAZINE MUD	UG/KG	WATER		2	.0000000	.0000000	.0000000	.00	.00	81/05/27	83/01/31
39700 HCB	TOT UG/L	WATER		3	.0000000	.0000000	.0000000	.000	.000	80/01/29	82/04/05
39730 2,4-D WHL SMPL	UG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
39740 2,4,5-T WHL SMPL	UG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
39760 SILVEX WHL SMPL	UG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
46570 CAL HARD CA MG	MG/L	WATER		4	39.75600	6.785200	2.604800	43	37	64/08/31	64/09/03
70300 RESIDUE DISS-180 C	MG/L	WATER		36	275.4200	234790.0	484.5500	2633	26	64/07/07	72/02/18
70505 T PO4 P-COL	MG/L	WATER		274	.8711200	2.065800	1.437300	8.50	.010	70/04/01	79/06/28

GROSS

0 12 TOTAL STATIONS PROCESSED

RADFORD AAP

-

0 PARAMETER		MEDIUM	RMK	NUMBER	MEAN	VARIANCE	STAN DEV	MAXIMUM	MINIMUM	BEG DATE	END DATE
70507 PHOS-T ORTHO	MG/L P	WATER		274	.7288200	1.719200	1.311200	5.799	.010	70/04/01	79/06/28
71900 MERCURY HG,TOTAL	UG/L	WATER		74	.5569500	.2049300	.4527000	2.9	.3	70/09/15	90/10/16
71921 MERCURY SEDMG/KG	DRY WGT	WATER		7	.2714100	.0536000	.2315200	.7	.05	76/04/14	90/07/26
74041 WQF SAMPLE	UPDATED	WATER		71	879410.0	1565E+05	12510.00	910425	860722	84/10/29	91/02/11
77825 ALACHLOR TOTAL	UG/L	WATER		1	.2000000			.200	.200	84/10/29	84/10/29
82028 RATIO FEC COL	FEC STRP	WATER		19	.6188700	.3904400	.6248500	2	.09	64/07/07	64/09/03

THAT'S ALL FOLKS

1STORET RETRIEVAL DATE 91/12/12

```
P
R1
H L          :
DAGGR REACHES
DSCXT
J        Y
001001RADFORD AAP
1000000999999000000999999              ********    77777777  F  9
DUM.ORDER=1;        3711240        8030558        3712243        8030558
   3712243          8034301        3711240        8034301
OEXTRACT/MASKING OPTION PERFORMED  DUM.ORDER=1;   3708421        8031293
   3711586          8031293        3711586        8034204        3708421
   8034204       DUM.ORDER=1;      3710433        8033590        3712048
   8033590          3712048        8036376        3710433        8036376
DUM.ORDER=1;        3711486        8036187        3713418        8036187
   3713418          8037265        3711486        8037265     DUM.ORDER=1;
   3713230          8036296        3715162        8036296        3715162
   8037279          3713230        8037279     DUM.ORDER=1;      3710084
   8024089          3714569        8024089        3714569        8032430
   3710084          8032430
AGGR_COUNT=        17;
CLR000000
SEL000022
-
-
```

```
0        ******************************************************************
         ******************************************************************
         **                                                              **
         **                                                              **
         **        22 STATIONS MET STATION SELECTION CRITERIA            **
         **           (PRIOR TO STATION RESTRICTIONS)                    **
         **                                                              **
         **                                                              **
         ******************************************************************
         ******************************************************************
```

STORET RETRIEVAL DATE 91/12/12 - ECHO OF ORIGINAL REQUEST

```
PGM=INVENT,
#-------------------------------------------------------------------
#                    REQUEST NAME: RADFORD
#                      CREATED BY: HED
#                            DATE: 91/12/12
#                            TIME: 16:38
#
#----------------------<  STATION SELECTION  >-----------------------
#    OPTION 8 - BY EPA REACHES
AREA=05050001008,
AREA=05050001009,
AREA=05050001007,
AREA=05050001003,
AREA=05050001001,
AREA=05050001099,
#
#----------------------<  STATION RESTRICTION  >---------------------
#                  STATION TYPES AND/OR PARAMETER ATTRIBUTES
ONLYATTR=AMBNT AND NOT WELL,
#
#----------------------<  STATION AGGREGATION  >----------------------
AGGR=REACHES,
# GRAB AND COMPOSITE SAMPLES
SAMPTYPE=ALL,
# COMPOSITE SAMPLES
# ALL OF THE ABOVE
#
#-----------------------<  SPECIAL OPTIONS  >-------------------------
# GROSS WITH INDIVIDUAL STATION DATA
#       EXCLUDING STATIONS WITH NO SAMPLE DATA
# SET INVENTORY BREAK POINTS
INVBRK=M,
# SUPPRESS DATA TRANSFORMATIONS
# PRINT THE STATION HEADER AT THE TOP RIGHT CORNER OF EACH PAGE
HEAD=RADFORD AAP,
./HED JOB (RFWESTORP,MHED),'INDIAN-INVENT',TIME=(1,30),PRTY=2,
./             MSGLEVEL=(0,0),NOTIFY=HED
**ROUTE  PRINT HOLD
**JOBPARM  LINES=999

END OF DATA
CA
```

REFERENCE 17

HERCULES INCORPORATED

RADFORD ARMY AMMUNITION PLANT

4h

SURFACE WATER SAMPLING (WTP)

AIR, WATER AND WASTE CONTROL LABORATORY

DRINKING WATER REPORT
July 1991

DATE	SAMPLING LOCATION: CAST AREA	SAMPLING LOCATION: YARN PLANT	pH	Cl_2 P.P.M RESIDUAL	NO_3 P.P.M.	COLIFORM COUNT
7-10-91	4912-46		8.68	0.60	0.58	Absence
7-10-91		220	8.54	1.00	0.74	Absence
7-11-91	9489		8.73	1.10	1.87	Absence
7-11-91		3609	8.49	1.30	0.79	Absence
7-16-91		3037	8.54	1.60	0.64	Absence
7-16-91	4705-05		9.00	0.48	0.90	Absence
7-18-91		7217	8.65	1.15	0.66	Absence
7-18-91	TR 805		8.62	1.70	0.63	Absence
7-22-91	4327-1		8.80	0.43	0.48	Absence
7-22-91		#5 Staff-Village	8.62	0.23	0.62	Absence

APPROVED BY R. E. Winfrey

TITLE Supervisor

DF8003 RUN DATE: 08/01/91 PAGE 1

REPORT OF OPERATION
OF
POTABLE WATER PLANT (MAIN PLANT)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUN. 30, 1991 THRU JUL. 27, 1991

BLDG. 419

	RAW WATER TREATMENT				FILT. WATER TREAT.		FILTER AND WASH DATA			
DATE	WATER TREATED (TGD)	HRS OPER.	LBS CHEM USED ALUM	PPM ALUM	LBS CHEM USED LIME	PPM LIME	FILTERS USED	NO. WASHED	WATER TGD	DATE
30	1420	24	194	16	45	4	4	1	38	30
1	1553	24	201	15	57	4	4	1	38	1
2	1531	24	202	15	47	4	4	1	38	2
3	1546	24	221	17	49	4	4	1	38	3
4	1363	24	192	16	42	4	4	1	38	4
5	1472	24	212	17	44	3	4	1	38	5
6	934	24	133	16	26	3	4	1	38	6
7	1359	24	166	14	36	3	4	1	38	7
8	1472	24	179	14	34	3	4	1	38	8
9	1698	24	231	16	52	4	4	1	38	9
10	1532	24	204	16	47	4	4	1	38	10
11	1527	24	209	16	46	4	4	1	38	11
12	1605	24	235	17	46	3	4	1	38	12
13	1517	24	216	17	41	3	4	1	38	13
14	1497	24	203	16	44	3	4	1	38	14
15	1616	24	217	16	49	4	4	1	38	15
16	1610	24	217	16	49	4	4	1	38	16
17	1597	24	215	16	48	4	4	1	38	17
18	1548	24	211	16	49	4	4	1	38	18
19	1588	24	186	14	48	4	4	1	38	19
20	1412	24	186	15	44	4	4	1	38	20
21	1419	24	207	17	45	4	4	1	38	21
22	1518	24	228	18	49	4	4	1	38	22
23	1728	24	239	16	57	4	4	1	38	23
24	1770	24	88	6	60	4	4	1	38	24
25	1701	24	213	15	60	4	4	1	38	25
26	1790	24	382	25	60	4	4	1	38	26
27	1451	24	194	16	51	4	4	1	38	27
TOTAL	42774	672	5781	444	1325	105	112	28	1064	
AVER.	1528	24	206	16	47	4	4	1	38	

KIND OF CHEMICALS USED

SULPHATE OF ALUMINA _____
LIME _____
CHLORINE 740 lbs
AMMONIA _____
IRON _____
TYPE OF FLUORIDE CHEM. USED _____

SIGNED: C. B. Hucks
TITLE: A/E

Filter Drawn Down PM Results -7-8-91
#1 = 1.818 GPM/ft²
#2 = 1.974 " "
#3 = 1.612 " "
#4 = 1.924 " "

REPORT OF OPERATION
OF
POTABLE WATER PLANT (MAIN PLANT)
(CONT.)

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUN. 30, 1991 THRU JUL. 27, 1991

BLDG. 419

CHEMICAL AND PHYSICAL DATA-PARTS PER MILLION

DATE	TURBIDITY RAW	TURBIDITY APP.	TURBIDITY FIN.	ALKALINITY RAW	ALKALINITY APP.	ALKALINITY FIN.	PH RAW	PH APP.	PH FIN.	FREE CO2 RAW	FREE CO2 APP.	COLOR RAW	COLOR APP.	COLOR FIN.	RES CHLOR. FIN.	DATE
30	1.6	.2	.1	44	45	51	7.7	8.0	8.7	7	1	20	0	0	2.0	30
1	1.7	.3	.1	48	47	52	7.7	8.5	8.7	7	1	20	0	0	1.9	1
2	1.8	.4	.1	47	52	54	7.6	8.2	8.7	8	1	20	0	0	2.0	2
3	1.7	.2	.1	48	49	53	7.5	7.9	8.6	7	1	20	0	0	2.0	3
4	1.5	.2	.1	48	45	53	7.5	7.8	8.8	7	2	20	0	0	2.0	4
5	2.5	.2	.1	49	43	53	7.4	7.8	8.7	5	1	20	0	0	2.0	5
6	2.0	.2	.1	48	43	52	7.6	7.9	8.7	5	1	17	0	0	1.9	6
7	1.9	.2	.1	47	42	52	7.6	7.9	8.7	3	2	10	0	0	2.0	7
8	1.5	.2	.1	49	41	53	7.7	7.7	8.6	5	1	17	0	0	2.0	8
9	1.8	.2	.1	46	41	53	7.6	7.8	8.6	5	1	20	0	0	2.0	9
10	1.6	.2	.1	45	45	54	7.5	8.0	8.7	6	1	20	0	0	2.0	10
11	1.6	.2	.1	49	45	52	7.5	7.9	8.7	7	2	20	0	0	2.0	11
12	1.5	.2	.1	48	45	52	7.6	7.9	8.8	6	2	20	0	0	2.0	12
13	1.6	.2	.1	49	44	51	7.6	7.9	8.8	7	1	20	0	0	2.0	13
14	1.5	.2	.1	51	47	55	7.6	8.0	8.8	6	1	20	0	0	2.0	14
15	1.9	.2	.1	49	43	51	7.5	8.1	8.8	9	1	20	0	0	2.0	15
16	1.5	.2	.1	48	45	54	7.6	8.0	8.7	7	1	20	0	0	1.9	16
17	1.4	.2	.1	47	43	53	7.6	8.1	8.6	6	1	20	0	0	1.9	17
18	1.5	.2	.1	44	43	53	7.5	8.0	8.7	7	1	20	0	0	1.9	18
19	1.4	.3	.1	44	43	53	7.5	8.2	8.8	7	1	20	0	0	2.0	19
20	1.4	.4	.1	49	44	52	7.5	8.5	8.8	7	0	20	0	0	2.0	20
21	1.3	.4	.1	49	44	52	7.6	8.4	8.7	7	0	20	0	0	2.0	21
22	1.4	.2	.1	49	45	51	7.6	8.0	8.6	7	1	20	0	0	2.0	22
23	1.4	.2	.1	48	48	51	7.4	7.9	8.6	8	1	20	0	0	2.0	23
24	1.4	.2	.1	48	48	51	7.6	8.0	8.7	8	1	20	0	0	2.0	24
25	1.5	.2	.1	48	46	50	7.5	8.1	8.8	8	1	20	0	0	2.0	25
26	1.6	.3	.1	41	47	57	7.4	8.3	8.8	0	0	20	0	0	2.0	26
27	2.1	.2	.1	40	48	57	7.4	8.1	8.7	0	1	20	0	0	2.0	27
TOTAL	45.6	6.5	2.8	1320	1261	1475	211.4	224.9	243.9	172	29	544	0	0	55.5	
AVER.	1.6	.2	.1	47	45	53	7.6	8.0	8.7	6	1	19	0	0	2.0	

PER CENT WASH WATER USED ----- 2.4 --
WASH WATER RISE (IN. P.M.) 17.6
AV. NO. MIN. EACH FILTER WASHED 15-20
AV. LOSS OF HEAD FILTERS WASHED 1.0-2.0
COAG. BASINS--DATE LAST CLEANED --------
COPPER SULPHATE APPLIED:
DATE: ----------
WHERE: ----------
AMOUNT: 0

********** REMARKS **********

AVERAGE HRS. FOR EACH FILTER RUN = 100

DFB003 RUN DATE: 07/31/91 PAGE 1

REPORT OF OPERATION
OF
POTABLE WATER PLANT (CAST AREA)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUN. 30, 1991 THRU JUL. 27, 1991

BLDG. 4330

	RAW WATER TREATMENT				FILT. WATER TREAT.		FILTER AND WASH DATA			
DATE	WATER TREATED (TGD)	HRS OPER.	LBS CHEM USED ALUM	PPM ALUM	LBS CHEM USED SODA	PPM SODA	FILTERS USED	NO. WASHED	WATER TGD	DATE
30	979	24	120	15	241	29	2	0	5	30
1	4422	24	135	4	280	7	2	2	93	1
2	1045	24	135	15	273	31	2	0	5	2
3	951	24	145	18	235	29	2	0	5	3
4	877	24	130	17	200	26	2	1	49	4
5	947	24	125	15	183	22	2	1	49	5
6	899	24	140	19	223	30	2	0	5	6
7	880	24	125	16	185	24	2	1	49	7
8	1054	24	130	14	215	23	2	1	49	8
9	1074	24	125	14	235	26	2	0	5	9
10	1067	24	140	15	238	26	2	1	49	10
11	1148	24	130	14	245	25	2	0	5	11
12	1140	24	140	14	220	22	2	1	49	12
13	1076	24	140	16	222	25	2	0	5	13
14	1037	24	140	15	225	25	2	1	49	14
15	1088	24	145	15	240	25	2	1	49	15
16	997	24	145	17	225	27	2	0	5	16
17	1167	24	140	14	250	25	2	1	49	17
18	1164	24	115	11	255	25	2	1	49	18
19	947	24	120	15	208	26	2	0	5	19
20	1014	24	110	12	220	25	2	1	49	20
21	934	24	120	15	230	28	2	1	49	21
22	944	24	140	18	225	28	2	0	5	22
23	1018	24	130	15	225	25	2	1	49	23
24	929	24	145	18	230	28	2	1	49	24
25	949	24	125	15	235	28	2	1	49	25
26	921	24	125	16	205	27	2	0	5	26
27	763	24	105	15	210	31	2	1	49	27
TOTAL	31431	672	3665	417	6378	718	56	18	932	
AVER.	1123	24	131	15	228	26	2	1	33	

KIND OF CHEMICALS USED

SULPHATE OF ALUMINA _____
LIME _____
CHLORINE 1,265
AMMONIA _____
IRON _____
TYPE OF FLUORIDE CHEM. USED _____

SIGNED: C. B. Lucas

TITLE: A/E

Filter Drawn Down PM Results – 7-8-91
#1 = 1.974 GPM/Ft²
#2 = 1.818 " "

DF8003 RUN DATE: 07/31/91

REPORT OF OPERATION
OF
POTABLE WATER PLANT (CAST AREA)
(CONT.)

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUN. 30, 1991 THRU JUL. 27, 1991

BLDG. 4330

CHEMICAL AND PHYSICAL DATA-PARTS PER MILLION

	--- TURBIDITY ---			--- ALKALINITY --			------- PH -------			-- FREE CO2 --		----- COLOR -----			RES CHLOR.	
DATE	RAW	APP.	FIN.	RAW	APP.	FIN.	RAW	APP.	FIN.	RAW	APP.	RAW	APP.	FIN.	FIN.	DATE
30	1.5	.4	.1	44	34	62	8.1	7.0	8.9	3	1	10	0	0	1.9	30
1	1.5	.5	.1	45	35	61	8.1	7.0	8.9	3	9	10	0	0	1.9	1
2	1.5	.5	.1	45	33	61	8.0	7.0	8.8	3	8	10	0	0	1.9	2
3	1.5	.4	.1	43	33	59	7.9	6.9	8.8	3	8	10	0	0	1.9	3
4	1.5	.4	.1	45	33	61	7.9	6.9	8.9	3	8	10	0	0	1.9	4
5	2.3	.5	.1	45	35	59	7.7	6.9	8.8	3	8	10	0	0	1.9	5
6	1.9	.7	.1	45	34	64	7.8	6.9	8.8	3	0	10	0	0	1.9	6
7	1.8	.5	.1	46	34	63	7.9	6.9	8.8	3	8	10	0	0	1.9	7
8	1.4	.5	.1	43	35	61	8.0	7.0	8.8	3	8	10	0	0	1.9	8
9	1.7	.8	.1	46	34	64	7.9	7.0	8.8	3	9	15	0	0	1.9	9
10	1.3	.6	.1	42	33	61	8.0	7.0	8.9	3	8	10	0	0	1.9	10
11	1.3	.6	.1	43	35	63	8.0	7.0	8.8	4	7	10	0	0	1.9	11
12	1.1	.6	.1	46	35	63	7.9	7.0	8.8	3	9	10	0	0	1.9	12
13	1.2	.6	.1	44	35	62	8.0	7.0	8.8	3	9	10	0	0	1.9	13
14	1.5	.5	.1	47	38	63	8.0	7.0	8.8	2	8	10	0	0	1.9	14
15	1.7	.6	.1	46	35	62	8.0	6.9	8.8	3	9	10	0	0	1.9	15
16	1.3	.6	.1	46	33	62	8.0	6.9	8.8	3	9	10	0	0	1.9	16
17	1.1	.6	.1	44	35	63	8.0	7.0	8.8	3	9	10	0	0	1.9	17
18	1.0	.6	.1	44	35	62	8.0	7.0	8.8	3	9	10	0	0	1.9	18
19	1.2	.6	.1	45	36	65	8.0	7.0	8.8	3	9	10	0	0	1.9	19
20	1.1	.7	.1	46	35	62	8.1	7.0	8.8	3	8	10	0	0	1.9	20
21	1.1	.6	.1	45	36	61	8.0	7.0	8.9	3	8	10	0	0	1.9	21
22	1.3	.6	.1	46	35	63	7.9	7.0	8.8	2	8	10	0	0	1.9	22
23	1.7	.5	.1	43	33	60	7.8	6.9	8.9	3	7	10	0	0	1.9	23
24	1.3	.4	.1	43	33	63	7.7	6.9	8.9	3	1	12	0	0	1.9	24
25	1.1	.5	.1	43	32	61	7.9	6.9	8.8	3	1	10	0	0	1.9	25
26	1.6	.6	.1	45	35	62	7.7	6.9	8.8	4	9	12	0	0	1.9	26
27	2.4	.6	.1	44	35	63	7.5	6.8	8.9	4	1	17	0	0	1.9	27
TOTAL	40.9	15.6	2.8	1249	964	1736	221.8	194.7	247.2	85	196	294	0	0	53.2	
AVER.	1.5	.6	.1	45	34	62	7.9	7.0	8.8	3	7	11	0	0	1.9	

PER CENT WASH WATER USED ----- 2.9 --
WASH WATER RISE (IN. P.M.) 22.4
AV. NO. MIN. EACH FILTER WASHED 15-20
AV. LOSS OF HEAD FILTERS WASHED 2.0-4.0
COAG. BASINS--DATE LAST CLEANED --------
COPPER SULPHATE APPLIED:
DATE: ----------
WHERE: ----------
AMOUNT: 0

********** REMARKS **********

AVERAGE HRS. FOR EACH FILTER RUN = 75

FACILITIES ENGINEERING OPERATING LOG
(Sewage · General)

INSTALLATION: Hercules - RAAP - Bldg. 4325
PLANT: Radford - Imhoff Plant
PRIMARY TREATMENT ☐ COMPLETE TREATMENT ☒
MONTH: July - 1991

DATE	DAY OF WEEK	WEATHER: RAINFALL, INCHES (1)	WEATHER: WIND DIRECTION (2)	WEATHER: AIR TEMPERATURE °F. (3)	STREAM FLOW (4)	TEMP. PLANT INFLUENT °F. (5)	pH PLANT INFLUENT (6)	pH PRIMARY EFFLUENT (7)	SEWAGE FLOW, 1,000 GAL. RATE PER DAY: MAXIMUM (8)	RATE PER DAY: MINIMUM (9)	TOTAL TREATED (10)	TOTAL BY-PASSED (11)	TOTAL RECIRCULAT. FROM ___ TO ___ (12)	SETTLING SOLIDS ml/liter: RAW (13)	PRIMARY EFFLUENT (14)	D.O. FINAL EFFLUENT (15)	BOD FINAL EFFLUENT % (16)	RAW SLUDGE PUMPED, GALLONS (17)	DIGESTED SLUDGE DRAWN TO BEDS-GAL. (18)
1											26,000								
2								7.30			27,000					5.90	4.9		
3											25,000								
4											25,000								
5											23,500								
6											19,500								
7											12,000								
8											18,000								
9								7.13			18,000					5.40	3.2		
10											23,000								
11											31,500								
12											32,000								
13											30,500								
14											24,000								
15											17,000								
16								7.21			15,000					5.10	8.9		
17											15,000								
18											17,250								
19											20,000								
20											20,000								
21											19,000								
22											18,000								
23								7.32			17,000					6.30	4.4		
24											22,000								
25											16,000								
26											25,500								
27											30,000								
28											28,000								
29											35 000								
30								7.10			36,000					6.20	5.5		
31											30,000								
TOTAL																			
MAXIMUM								7.32			36,000					6.30	8.90		
MINIMUM								7.10			12.000					5.10	3,20		
AVERAGE								7.21			23.087					5.78	5.38		

DATE	12-8	8-4	4-12	Cl2 Used
1	1.3	1.5	1.0	1.0
2	1.1	1.3	1.1	1.0
3	2.0	2.5	1.6	1.0
4	1.8	1.8	1.8	1.0
5	1.8	1.9	1.2	1.0
6	1.4	1.7	1.8	1.0
7	1.8	1.8	1.8	1.0
8	1.8	1.8	1.6	1.0
9	1.6	1.6	1.0	1.0
10	1.1	1.2	1.2	1.0
11	1.8	No Flow	1.0	1.0
12	0.6	1.6	1.4	0.0
13	1.0	1.8	1.8	1.0
14	2.0	1.8	1.8	1.0
15	1.2	1.5	1.3	1.0
16	2.0	1.9	2.0	1.0
17	1.6	1.5	1.8	1.0
18	1.7	1.9	1.3	1.0
19	1.5	1.5	1.2	1.0
20	1.4	1.4	1.4	1.0
21	1.5	1.6	0.8	1.0
22	1.3	1.5	1.0	1.0
23	1.2	1.0	1.4	1.0
24	1.1	1.5	1.1	1.0
25	1.0	1.4	1.8	1.0
26	2.0	1.1	1.0	1.0
27	1.0	1.0	1.3	1.0
28	2.0	2.0	1.8	1.0
29	1.0	0/1.8	2.0	1.0
30	1.6	2.9	1.3	1.0
31	2.0	1.6	1.0/0.8	1.0
MAXIMUM	2.00	2.50	2.00	1.0
MINIMUM	0.60	0.00	0.80	1.0
AVERAGE	1.49	1.76	1.39	1.0

REMARKS (Include unusual sewage or stream flows, operating troubles, complaints, special analysis, etc.)

MONTHLY SUMMARY

(19) SEWAGE RECEIVED FROM OTHERS
1,000 GALLONS
(20) POPULATION
(21) SCREENINGS AND GRIT REMOVAL
SCREENINGS CU. FT.
GRIT CU. FT.
(22) SLUDGE DRAWN TO BEDS
AVERAGE pH
AVERAGE % SOLIDS
AVG. % VOLATILE SOLIDS
(23) DRIED SLUDGE REMOVED
CU. YDS. REMOVED
AVG. DRYING TIME, DAYS
(24) DIGESTER NO. ___ SURVEY
DEPTH BELOW OVERFLOW LEVEL, FT.
TOP OF SCUM
BOTTOM OF SCUM
TOP OF SLUDGE
DIGESTER NO. ___ SURVEY
TOP OF SCUM
BOTTOM OF SCUM
TOP OF SLUDGE
(25) IMHOFF AND CLARIGESTER SURVEY
TOP OF SLUDGE BELOW SLOT, FEET

DATE	INLET END	OUTLET END

SEE REVERSE SIDE FOR INSTRUCTIONS

PREPARED BY: C. B. Tilley — DATE: 8-1-91

APPROVED BY: R. E. Winfrey — DATE: 8-6-91

POST ENGINEER: C. B. Tilley — DATE: 8-6-91

DA FORM 4947

For use of this form, see AR 420-48; the proponent agency is the Office, Chief of Engineers.

DUP-6067

LABORATORY REPORT OF OPERATION OF THE RADFORD ARMY AMMUNITION PLANT SEWAGE TREATMENT PLANT-424 TO THE VIRGINIA STATE DEPARTMENT OF HEALTH BUREAU OF SANITARY ENGINEERING RICHMOND 19, VA.

Signed R. E. Winfree

Title Supervisor

DATE July 1-31, 1971		DISSOLVED OXYGEN-FINAL EFFLUENT (WEEKLY) mg/lO_2	ALKALINITY RAW-INFLUENT (WEEKLY) mg/$lCaCO_3$	ALKALINITY FINAL EFFLUENT (WEEKLY) mg/$lCaCO_3$	ALKALINITY-SUPERNATANT (TWICE WEEKLY) mg/$lCaCO_3$	VOLATILE SOLIDS-SLUDGE (AS NEEDED) %	VOLATILE ACIDS-SUPERNATANT (TWICE WEEKLY) mg/lCH_3COOH	pH SUPERNATANT (TWICE WEEKLY)	NITRATE-FINAL EFFLUENT (WEEKLY) mg/lNO_3	BOD-RAW SEWAGE (WEEKLY) mg/lO_2	BOD-PRIMARY (WEEKLY) mg/lO_2	BOD-FINAL EFFLUENT (WEEKLY) mg/lO_2	BOD-SUPERNATANT (WEEKLY) mg/lO_2		
1												11.2			
2		4.10	148	88	420		296	6.52	23.3	32.8	6.9	10.3	193		
3												9.3			
4															
5															
6															
7															
8															
9		6.10	125	74	480		193	6.38	99.7	43.7	7.3	8.10	200		
10												10.70			
11					420		124	6.48				6.70	130		
12															
13															
14															
15															
16		6.10	100	94	475		150	6.45	28.1	13.2	6.8	7.99	115		
17												5.80			
18					460		394	6.44				8.30	127		
19															
20															
21															
22															
23		6.30	105	78	470		99	6.67	38	11.2	4.3	8.0	108		
24												6.8			
25					460		64	6.72				5.8	73		
26															
27															
28															
29															
30		5.40	125	101	490		99	6.87	25.5	24	13	9.7	73		
31												*			
Avg.		5.60	120.6	87.0	459.4		177.4	6.57	42.9	25.0	7.60	8.36	127.4		
Max.		6.30	148.0	101.0	480.0		394.0	6.87	99.7	43.7	13.00	11.20	200.0		
Min.		4.10	100.0	74.0	420.0		64.0	6.38	23.3	11.2	4.30	5.80	73.0		

DF8051 RUN DATE 07/30/91

REPORT OF OPERATION
OF TRICKLING FILTER
SEWAGE TREATMENT PLANT (BLDG. 424)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

SIGNED C.B. Hucks

TITLE A/E

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUN. 30, 1991 THRU JUL. 27, 1991

DAY	TEMPERATURE (F) AIR MAX.	AIR MIN.	INFLUENT MAX.	INFLUENT MIN.	SEWAGE FLOW 1000 GALS TOTAL	1000 GALS MAX.	SLUDGE TO DIGESTER 1000 GALS.	DIGESTER TEMP. (F)	SETTLEABLE SOLIDS ML/L RAW	PRIMARY	FINAL	SUPERNATANT LIQUOR	FINAL EFFLUENT TOTAL CHLORINE 6-8 AM	4-12 PM	PH (WEEKDAYS ONLY) RAW	FINAL	SUPERNATANT LIQUOR	LIME ADDED LBS
6/30	95	70	74	65	106	145	0	78					1.2			6.9		0
7/ 1	95	69	75	66	147	186	11	78	4.0	0.0	0.0	4.0	1.7	0.8	7.0	7.0	6.2	0
7/ 2	94	74	74	67	142	182	9	78	7.5	0.0	0.0	4.5	2.0	1.4	7.1	7.0	6.3	0
7/ 3	87	68	74	69	135	174	9	78	6.3	0.0	0.0	4.0	1.8	1.1	7.1	7.1	6.3	0
7/ 4	96	66	70	68	99	138	0	80					1.9			7.0		0
7/ 5	84	68	74	68	87	126	9	80	4.5	0.0	0.0	4.0	2.0	1.6	7.1	7.0	6.2	0
7/ 6	90	62	68	68	76	115	0	80					1.5			7.0		0
7/ 7	94	68	68	67	70	109	0	72					1.2			6.8		0
7/ 8	90	68	74	68	120	160	9	81	6.3	0.0	0.0	7.5	1.3	2.0	7.1	6.9	6.3	0
7/ 9	89	68	72	69	131	170	11	80	7.0	0.0	0.0	5.0	1.8	1.1	7.1	7.1	6.3	0
7/10	87	66	74	68	128	168	9	80	2.8	0.0	0.0	4.0	1.7	1.7	7.4	7.4	7.1	0
7/11	87	67	74	67	128	167	9	79	3.5	0.0	0.0	5.0	2.0	1.6	7.3	7.4	6.4	0
7/12	90	68	73	70	156	196	9	79	4.0	0.0	0.0	5.0	1.8	1.5	7.3	7.4	6.3	0
7/13	88	68	69	68	178	218	0	79					1.4			7.3		0
7/14	85	68	70	69	140	180	0	79					1.5			7.3		0
7/15	88	62	72	70	165	205	18	80	6.0	TR	0.0	5.5	1.8	1.2	7.5	7.5	6.7	0
7/16	86	63	72	70	172	212	9	78	1.4	TR	TR	0.7	2.5	1.6	7.4	7.4	6.5	0
7/17	89	60	74	70	135	175	9	78	7.5	0.0	0.0	5.0	1.7	1.5	7.3	7.4	6.4	0
7/18	86	66	74	70	150	190	11	78	7.5	0.0	0.0	4.0	1.5	1.1	7.4	7.3	6.4	0
7/19	88	68	74	71	133	173	9	78	4.5	0.0	0.0	4.0	1.7	1.5	7.3	7.3	6.4	0
7/20	94	70	72	70	97	136	0	79					1.9			7.3		0
7/21	92	70	72	68	83	123	0	80					2.0			7.1		0
7/22	97	70	76	70	131	171	11	80	7.5	TR	0.0	6.3	2.1	2.4	7.4	7.2	6.5	0
7/23	95	71	75	70	132	172	9	80	7.0	0.0	0.0	4.0	2.0	1.2	7.4	7.3	6.5	0
7/24	94	70	74	70	153	187	9	81	6.5	0.0	0.0	4.0	1.7	1.1	7.3	7.3	6.5	0
7/25	92	68	74	69	167	207	9	81	8.7	0.0	0.0	4.0	1.9	1.5	7.4	7.3	6.5	0
7/26	78	70	77	71	179	218	9	80	6.3	0.0	0.0	4.5	1.9	1.7	7.3	7.2	6.5	0
7/27	79	67	73	69	131	170	0	80						1.9		7.2		0
TOTAL					3671		188											0
AVG.	90	68	73	69	131	170	7	79	5.7			4.5	1.8	1.5	7.3	7.2	6.4	0
MAX	97	74	77	71	179	218	18	81	8.7			7.5	2.5	2.4	7.5	7.5	7.1	0
MIN	78	60	68	67	70	109	0	72	1.4			0.7	1.2	1.1	7.1	6.8	6.2	0

Note: No septage pumped during this period. CBH

Chlorine used = 367 lbs.

REPORT OF OPERATION
OF
POTABLE WATER PLANT (CAST AREA)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

BLDG. 4330

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUL. 28, 1991 THRU AUG. 31, 1991

DATE	WATER TREATED (TGD)	HRS OPER.	RAW WATER TREATMENT: LBS CHEM USED ALUM	RAW WATER TREATMENT: PPM ALUM	FILT. WATER TREAT.: LBS CHEM USED SODA	FILT. WATER TREAT.: PPM SODA	FILTER AND WASH DATA: FILTERS USED	FILTER AND WASH DATA: NO. WASHED	FILTER AND WASH DATA: WATER TGD	DATE
28	845	24	130	17	218	29	2	1	49	28
29	838	24	150	21	223	32	2	0	5	29
30	827	24	150	22	240	35	2	0	5	30
31	1004	24	125	14	240	27	2	1	49	31
1	686	24	135	17	225	29	2	1	49	1
2	900	24	140	19	218	29	2	0	5	2
3	771	24	130	19	190	28	2	1	49	3
4	819	24	140	19	193	27	2	1	49	4
5	848	24	125	18	180	25	2	0	5	5
6	892	24	160	20	200	25	2	1	49	6
7	915	24	130	16	213	26	2	1	49	7
8	1075	24	140	16	245	27	2	0	5	8
9	1039	24	130	14	220	24	2	1	49	9
10	1088	24	150	16	280	30	2	1	49	10
11	1047	24	150	17	255	29	2	0	5	11
12	1005	24	135	15	240	27	2	1	49	12
13	1029	24	130	15	230	27	2	0	5	13
14	1087	24	120	12	260	26	2	2	93	14
15	1157	24	250	26	110	11	2	0	5	15
16	1098	24	130	14	245	26	2	1	49	16
17	1025	24	120	13	223	25	2	1	49	17
18	1055	24	120	14	250	28	2	0	5	18
19	992	24	135	16	235	27	2	1	49	19
20	1077	24	135	14	225	24	2	1	49	20
21	1051	24	135	15	225	26	2	0	5	21
22	1131	24	115	12	226	23	2	1	49	22
23	1101	24	125	13	218	23	2	1	49	23
24	1020	24	120	14	223	26	2	0	5	24
25	1076	24	140	15	225	24	2	1	49	25
26	1160	24	115	11	255	25	2	1	49	26
27	1147	24	135	13	290	28	2	2	93	27
28	1121	24	145	15	290	30	2	1	49	28
29	1112	24	145	15	275	28	2	1	49	29
30	1054	24	140	15	250	27	2	1	49	30
31	1052	24	140	15	218	24	2	1	49	31
TOTAL	35342	840	4815	557	8053	927	70	26	1319	
AVER.	1010	24	138	16	230	26	2	1	38	

KIND OF CHEMICALS USED

SULPHATE OF ALUMINA _____
LIME _____

ED: Capt. Landry

CHLORINE 1480 LBS
AMMONIA
IRON
TYPE OF FLUORIDE CHEM. USED

TITLE: Water/Wast supv

REPORT OF OPERATION
OF
POTABLE WATER PLANT (CAST AREA)
(CONT.)

BLDG. 4330

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUL. 28, 1991 THRU AUG. 31, 1991

CHEMICAL AND PHYSICAL DATA-PARTS PER MILLION

DATE	--- TURBIDITY --- RAW	APP.	FIN.	--- ALKALINITY -- RAW	APP.	FIN.	------- PH ------- RAW	APP.	FIN.	-- FREE CO2 -- RAW	APP.	----- COLOR ----- RAW	APP.	FIN.	RES CHLOR. FIN.	DATE
28	2.7	.6	.1	43	33	63	7.5	6.8	8.8	3	0	15	0	0	1.9	28
29	2.9	.7	.1	42	31	63	7.5	6.8	8.8	4	1	18	0	0	1.9	29
30	3.3	.8	.1	42	32	61	7.5	6.8	8.8	4	1	15	0	0	1.9	30
31	2.6	.7	.1	43	32	61	7.8	6.8	8.8	3	0	13	0	0	1.9	31
1	2.0	.6	.1	45	32	62	7.8	6.9	8.8	2	0	13	0	0	1.9	1
2	1.5	.5	.1	46	36	64	7.9	6.9	8.8	2	0	13	0	0	1.9	2
3	1.5	.4	.1	47	34	64	7.9	6.9	8.9	2	0	10	0	0	1.9	3
4	1.3	.4	.1	43	33	63	8.1	6.9	8.8	4	9	10	0	0	1.9	4
5	1.6	.4	.1	48	37	64	8.1	6.9	8.7	4	1	10	0	0	1.9	5
6	1.5	.5	.1	48	37	62	8.1	7.0	8.8	2	9	13	0	0	1.9	6
7	1.7	.6	.1	47	39	65	7.9	7.0	8.8	3	0	10	0	0	1.9	7
8	2.2	.6	.1	45	36	63	7.6	6.9	8.8	3	1	15	0	0	1.9	8
9	1.7	.6	.1	47	35	63	7.9	6.9	8.8	2	0	10	0	0	1.9	9
10	1.5	.6	.1	46	34	65	8.0	7.0	8.9	2	0	15	0	0	1.9	10
11	1.0	.5	.1	47	37	63	8.2	7.0	8.8	3	0	12	0	0	2.0	11
12	1.0	.4	.1	44	37	65	8.0	7.0	8.8	3	9	10	0	0	1.9	12
13	1.4	.5	.1	46	37	65	7.7	6.9	8.7	4	1	10	0	0	1.9	13
14	1.2	.5	.1	44	33	66	7.6	6.9	8.8	3	9	10	0	0	1.9	14
15	1.7	.6	.1	42	33	68	7.8	7.0	8.8	3	0	10	0	0	1.9	15
16	1.6	.6	.1	44	37	63	7.8	6.9	8.8	3	1	12	0	0	1.9	16
17	1.1	.6	.1	46	37	61	8.0	6.9	8.8	3	1	10	0	0	2.0	17
18	1.1	.6	.1	44	33	61	8.0	7.0	8.8	2	0	10	0	0	1.9	18
19	1.1	.5	.1	44	35	64	8.2	6.9	8.8	2	9	10	0	0	1.9	19
20	1.0	.5	.1	48	33	63	8.3	7.0	8.9	2	8	10	0	0	1.9	20
21	1.0	.5	.1	47	35	62	8.2	7.0	8.9	2	8	10	0	0	2.0	21
22	1.2	.6	.1	46	35	60	8.2	7.0	8.8	2	9	8	0	0	2.0	22
23	1.0	.6	.1	49	35	61	8.2	7.0	8.8	2	9	8	0	0	2.0	23
24	.9	.5	.1	45	36	63	8.2	7.0	8.8	1	9	8	0	0	2.0	24
25	.8	.5	.1	45	36	65	8.2	7.0	8.7	3	9	5	0	0	2.0	25
26	.6	.5	.1	46	38	65	8.2	7.1	8.8	1	0	5	0	0	2.0	26
27	.9	.7	.1	46	40	67	8.1	7.1	8.8	3	1	5	0	0	2.0	27
28	.9	.6	.1	47	40	67	8.0	7.0	8.9	3	9	5	0	0	1.9	28
29	1.0	.6	.1	48	38	65	8.0	7.0	8.8	4	9	5	0	0	1.9	29
30	1.3	.5	.1	47	36	62	8.0	7.0	8.8	3	0	8	0	0	1.9	30
31	1.0	.5	.1	47	35	61	8.2	7.0	8.8	3	9	5	0	0	1.9	31
TOTAL	51.0	19.4	3.5	1594	1237	2220	278.7	243.2	308.2	95	132	356	0	0	67.4	
AVER.	1.5	.6	.1	46	35	63	8.0	6.9	8.8	3	4	10	0	0	1.9	

PER CENT WASH WATER USED ----- 3.7 --
WASH WATER RISE (IN. P.M.) 22.4
AV. NO. MIN. EACH FILTER WASHED 15-20
AV. LOSS OF HEAD FILTERS WASHED 2.0-4.0
COAG. BASINS--DATE LAST CLEANED ---

********** REMARKS **********

AVERAGE HRS. FOR EACH FILTER RUN = 75

COPPER SULPHATE APPLIED:
DATE: _____
WHERE: _____
AMOUNT: _____ D

REPORT OF OPERATION
OF
POTABLE WATER PLANT (MAIN PLANT)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUL. 28, 1991 THRU AUG. 31, 1991

BLDG. 419

	RAW WATER TREATMENT				FILT. WATER TREAT.		FILTER AND WASH DATA			
DATE	WATER TREATED (TGD)	HRS OPER.	LBS CHEM USED ALUM	PPM ALUM	LBS CHEM USED LIME	PPM LIME	FILTERS USED	NO. WASHED	WATER TGD	DATE
28	1433	24	190	15	49	4	4	1	38	28
29	1524	24	177	14	46	4	4	1	38	29
30	1542	24	219	17	51	4	4	1	38	30
31	1531	24	198	15	47	4	4	0	5	31
1	1561	24	186	14	46	3	4	1	38	1
2	1511	24	196	15	45	3	4	1	38	2
3	1401	24	188	16	41	3	4	1	38	3
4	1396	24	183	15	37	3	4	1	38	4
5	1480	24	227	18	44	3	4	1	38	5
6	1530	24	254	19	56	4	4	1	38	6
7	1578	24	317	24	72	5	4	1	38	7
8	1650	24	299	21	75	5	4	1	38	8
9	1596	24	311	23	71	5	4	1	38	9
10	1434	24	280	23	66	5	4	1	38	10
11	1344	24	420	36	84	7	4	1	38	11
12	1468	24	405	32	83	7	4	1	38	12
13	1569	24	322	24	69	5	4	1	38	13
14	1541	24	341	26	85	6	4	1	38	14
15	1547	24	383	29	82	6	4	1	38	15
16	1565	24	336	25	61	5	4	1	38	16
17	1473	24	348	28	66	5	4	1	38	17
18	1658	24	618	44	122	9	4	1	38	18
19	1635	24	447	32	83	6	4	1	38	19
20	1622	24	297	21	55	4	4	1	38	20
21	1729	24	318	22	58	4	4	1	38	21
22	1518	24	246	19	49	4	4	1	38	22
23	1578	24	263	20	51	4	4	1	38	23
24	1543	24	326	25	64	5	4	1	38	24
25	1544	24	342	26	59	4	4	1	38	25
26	1647	24	355	25	68	5	4	1	38	26
27	1584	24	343	25	60	4	4	1	38	27
28	1666	24	376	26	61	4	4	1	38	28
29	1543	24	467	35	62	5	4	1	38	29
30	1406	24	387	32	59	5	4	1	38	30
31	1330	24	391	34	76	7	4	1	38	31
TOTAL	53675	840	10956	835	2203	166	140	34	1297	
AVER.	1534	24	313	24	63	5	4	1	37	

KIND OF CHEMICALS USED

SULPHATE OF ALUMINA _____
LIME _____

SIGNED: Cyril Loveday

CHLORINE ---- 1220 lbs.
AMMONIA ----
IRON ----
TYPE OF FLUORIDE CHEM. USED ----

TITLE: Water/Waste SUPV.

REPORT OF OPERATION
OF
POTABLE WATER PLANT (MAIN PLANT)
(CONT.)

BLDG. 419

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUL. 28, 1991 THRU AUG. 31, 1991

CHEMICAL AND PHYSICAL DATA-PARTS PER MILLION

DATE	--- TURBIDITY --- RAW	APP.	FIN.	--- ALKALINITY -- RAW	APP.	FIN.	------- PH ------- RAW	APP.	FIN.	-- FREE CO2 -- RAW	APP.	----- COLOR ----- RAW	APP.	FIN.	RES CHLOR. FIN.	DATE
28	2.3	.2	.1	40	47	53	7.3	8.1	8.7	0	1	20	0	0	2.0	28
29	3.3	.2	.1	46	44	54	7.3	8.1	8.7	9	1	20	0	0	2.0	29
30	3.1	.2	.1	46	45	50	7.4	8.2	8.7	1	1	20	0	0	2.0	30
31	2.6	.2	.1	42	47	53	7.5	8.1	8.7	9	1	20	0	0	2.0	31
1	1.8	.2	.1	45	45	52	7.5	7.9	8.6	0	1	20	0	0	2.0	1
2	1.5	.2	.1	42	47	53	7.6	7.9	8.7	6	1	20	0	0	1.9	2
3	1.6	.2	.1	42	50	54	7.6	7.9	8.6	5	1	20	0	0	2.0	3
4	1.8	.2	.1	42	45	51	7.6	7.9	8.6	5	2	20	0	0	2.0	4
5	1.5	.2	.1	42	45	50	7.7	7.7	8.6	4	1	20	0	0	2.0	5
6	1.9	.2	.1	42	43	53	7.6	7.9	8.7	4	1	20	0	0	2.0	6
7	1.7	.3	.1	42	47	55	7.6	7.9	8.7	3	1	20	0	0	2.0	7
8	2.2	.2	.1	45	47	57	7.5	8.1	8.8	3	1	20	0	0	2.0	8
9	2.7	.2	.1	45	49	58	7.6	8.1	8.8	5	1	30	0	0	2.0	9
10	2.0	.2	.1	47	49	58	7.6	8.1	8.8	5	1	20	0	0	2.0	10
11	1.3	.2	.1	48	49	58	7.9	8.0	8.8	2	1	20	0	0	2.0	11
12	1.5	.4	.1	49	48	55	7.7	8.3	8.8	3	1	20	0	0	2.0	12
13	1.7	.3	.1	48	47	57	7.5	8.1	8.8	4	1	20	0	0	2.0	13
14	1.4	.2	.1	45	43	54	7.5	8.0	8.6	7	1	20	0	0	2.0	14
15	2.3	.2	.1	43	43	55	7.5	8.0	8.7	7	1	20	0	0	2.0	15
16	2.0	.2	.1	43	43	52	7.5	7.8	8.6	9	1	20	0	0	2.0	16
17	1.5	.2	.1	43	43	53	7.6	7.7	8.7	7	2	20	0	0	2.0	17
18	1.3	.2	.1	42	43	55	7.6	7.9	8.7	8	1	20	0	0	2.0	18
19	1.5	.3	.1	42	43	57	7.6	8.0	8.7	9	1	20	0	0	2.0	19
20	1.6	.2	.1	43	44	55	7.7	7.8	8.6	9	1	20	0	0	2.0	20
21	1.5	.2	.1	44	45	54	7.8	8.0	8.6	7	1	20	0	0	2.0	21
22	1.3	.2	.1	44	43	53	7.7	7.8	8.6	6	1	20	0	0	2.0	22
23	1.5	.2	.1	48	43	56	7.7	7.7	8.7	9	2	20	0	0	1.9	23
24	1.3	.2	.1	46	43	55	7.8	7.8	8.7	7	1	20	0	0	1.9	24
25	1.2	.2	.1	42	47	55	7.8	7.7	8.7	7	1	20	0	0	1.9	25
26	1.8	.2	.1	51	44	56	7.8	7.8	8.8	9	2	20	0	0	2.0	26
27	1.2	.2	.1	52	45	55	7.7	7.7	8.7	9	2	20	0	0	2.0	27
28	1.4	.2	.1	52	44	55	7.7	7.8	8.8	1	2	20	0	0	2.0	28
29	1.3	.2	.1	52	48	56	7.7	7.8	8.8	8	2	20	0	0	2.0	29
30	1.5	.2	.1	47	44	53	7.6	7.6	8.6	7	2	18	0	0	2.0	30
31	1.4	.2	.1	47	42	53	7.7	7.7	8.6	7	2	20	0	0	2.0	31
TOTAL	61.5	7.5	3.5	1579	1584	1903	266.5	276.9	304.3	201	44	708	0	0	69.6	
AVER.	1.8	.2	.1	45	45	54	7.6	7.9	8.7	6	1	20	0	0	2.0	

PER CENT WASH WATER USED ----- 2.4 --
WASH WATER RISE (IN. P.M.) 17.6
AV. NO. MIN. EACH FILTER WASHED 15-20
AV. LOSS OF HEAD FILTERS WASHED 1.0-2.0
COAG. BASINS--DATE LAST CLEANED --------

********** REMARKS **********

AVERAGE HRS. FOR EACH FILTER RUN = 100

COPPER SULPHATE APPLIED:
DATE: _____
WHERE: _____
AMOUNT: 0

HERCULES AEROSPACE DIVISION

HERCULES INCORPORATED

RADFORD ARMY AMMUNITION PLANT

AIR, WATER AND WASTE CONTROL LABORATORY

DRINKING WATER REPORT

August 1991

DATE	BUILDING		pH	Cl_2 p.p.m RESIDUAL	NO_3 p.p.m.	COLIFORM COUNT
	CAST AREA	MAIN PLANT				
8-07-91	1992		8.82	0.30	0.53	Absence
-07-91		407	8.68	0.25	0.57	Absence
8-08-91	9463		8.53	1.70	0.38	Absence
-08-91		404	8.70	0.85	0.40	Absence
-14-91	4912-46		8.83	1.02	0.61	Absence
8-14-91		205	8.86	0.89	0.64	Absence
-15-91		450 Well	7.54	0.0	0.0	Absence
8-15-91	4712		8.49	0.99	0.71	Absence
-20-91		# 11 Staff-Village	8.36	0.90	0.58	Absence
-20-91	4339-15		8.70	0.20	0.53	Absence

APPROVED BY R. E. Cawthon

TITLE Supervisor

DF6051 RUN DATE 09/04/91

SIGNED Cpt Barclay

TITLE Water/Waste Supvr.

REPORT OF OPERATION
OF TRICKLING FILTER
SEWAGE TREATMENT PLANT (BLDG. 424)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
JUL. 28, 1991 THRU AUG. 31, 1991

DAY	TEMPERATURE (F) AIR MAX.	AIR MIN.	INFLUENT MAX.	INFLUENT MIN.	SEWAGE FLOW 1000 GALS TOTAL	1000 GALS MAX.	SLUDGE TO DIGESTER 1000 GALS.	DIGESTER TEMP. (F)	SETTLEABLE SOLIDS ML/L RAW	PRIMARY	FINAL	SUPER-NATANT LIQUOR	FINAL EFFLUENT TOTAL CHLORINE 6-8 AM	4-12 PM	PH (WEEKDAYS ONLY) RAW	FINAL	SUPER-NATANT LIQUOR	LIME ADDED LBS
7/28	73	63	72	69	95	134	0						1.8			7.2		0
7/29	68	64	74	70	295	334	11	78	3.0	0.0	0.0	4.0	1.2	1.2	7.4	7.3	6.5	0
7/30	86	62	77	70	141	181	9	78	3.5	0.0	0.0	4.0	2.2	1.5	7.3	7.4	6.5	0
7/31	89	65	77	70	160	200	9	76	3.0	0.0	0.0	3.0	1.7	1.2	7.4	7.4	6.5	0
8/ 1	93	67	74	72	167	207	4	78	7.0	0.0	0.0	2.0	1.6	0.8	7.4	7.4	6.5	0
8/ 2			76	72	159	199	9	78	4.5	0.0	0.0	4.0	1.6	1.4	7.5	7.4	6.5	0
8/ 3			72	72	125	164	0	80					2.2	2.0		7.4		0
8/ 4	90	66	72	71	69	108	0	80					1.2			7.4		0
8/ 5	89	63	75	71	13	170	9	80	3.5	0.0	0.0	2.0	2.3	1.5	7.5	7.3	6.5	0
8/ 6	89	67	75	75	145	185	9	80	7.5	0.0	0.0	3.5	1.5	1.9	7.5	7.4	6.5	0
8/ 7	88	69	76	75	204	239	9	80	7.5	0.0	0.0	3.0	2.2	1.5	7.4	7.4	6.5	0
8/ 8	92	67	74	74	245	280	9	80	7.0	0.0	0.0	3.0	1.7	1.4	7.5	7.5	6.5	0
8/ 9	85	70	74	74	240	275	11	80	4.5	0.0	0.0	3.0	1.6	1.3	7.8	7.8	6.5	0
8/10	81	68	76	76	150	189	0	80					2.0			7.7		0
8/11	88	57	74	74	110	140	0	72					1.8			7.8		0
8/12	76	60	75	74	158	198	13	80	4.5	0.0	0.0	4.0	1.9		7.5	7.5	6.5	0
8/13	71	62	75	75	187	228	9	80	4.0	0.0	0.0	2.0	1.9	1.2	7.2	7.4	6.5	0
8/14	70	69	75	74	182	221	9	78	7.0	0.0	0.0	2.5	1.9	1.4	7.4	7.4	6.6	0
8/15	87	57	75	74	180	215	9	76	3.5	0.0	0.0	3.0	1.9	1.6	7.4	7.4	6.6	0
8/16	88	58	75	74	154	188	9	76	5.8	0.0	0.0	2.5	2.2	1.1	7.4	7.4	6.6	0
8/17	89	60	67	67	142	181	0	78					1.3			7.3		0
8/18	84	62	74	74	132	171	0	78					1.9			7.3		0
8/19	88	66	74	74	174	214	9	78	4.5	0.0	0.0	2.0	1.8	0.9	7.3	7.3	6.5	0
8/20	76	62	75	74	182	217	9	78	4.0	0.0	0.0	2.0		1.1	7.3	7.3	6.5	0
8/21	80	58	75	74	184	219	9	78	7.0	0.0	0.0	2.5	1.8	1.6	7.1	7.4	6.5	0
8/22	88	54	74	74	186	226	9	76	3.5	0.0	0.0	2.0	1.8	1.7	7.2	7.4	6.5	0
8/23	89	57	74	74	186	226	9	76	3.5	0.0	0.0	2.0	1.8	1.6	7.3	7.4	6.5	0
8/24	90	60	74	74	148	187	0	74					1.1			6.6		0
8/25	80	64	73	73	160	200	0	73					1.6			7.1		0
8/26	85	66	94	93	175	215	9	78	4.5	0.0	0.0	2.0	1.8	1.4	7.1	7.1	6.5	0
8/27	82	68			178	217	9	78	4.5	0.0	0.0	2.0	1.9	1.5	7.4	7.3	6.5	0
8/28	88	70			167	206	9	78	2.5	0.0	0.0	2.0	1.8	1.5	7.3	7.3	6.5	0
8/29	94	67			156	196	9	78	5.8	0.0	0.0	2.0	1.9	1.7	7.3	7.4	6.5	0
8/30	96	68			164	203	9	78	5.8	0.0	0.0	2.0	1.9	1.8	7.3	7.4	6.5	0
8/31	90	68			106	146	0	80					1.7			7.3		0
TOTAL					5619		228											0
AVG.	85	64	75	74	161	202	7	78	4.9			2.6	1.8	1.4	7.4	7.4	6.5	0
MAX	96	70	94	93	295	334	13	80	7.5			4.0	2.3	2.0	7.8	7.8	6.6	0
MIN	68	54	67	67	13	108	0	72	2.5			2.0	1.1	0.8	7.1	6.6	6.5	0

Chlorine Used - 565 LBs.

FACILITIES ENGINEERING OPERATING LOG
(Sewage - General)

INSTALLATION Hercules - RAAP - Bldg. 4325

PLANT Radford - Imhoff Plant

PRIMARY TREATMENT ☐ COMPLETE TREATMENT ☐

MONTH August - 1991

DATE	DAY OF WEEK	RAINFALL, INCHES (1)	WIND DIRECTION (2)	AIR TEMPERATURE °F. (3)	STREAM FLOW (4)	TEMP. PLANT INFLUENT °F. (5)	pH PLANT INFLUENT (6)	pH PRIMARY EFFLUENT (7)	SEWAGE FLOW, 1,000 GAL. RATE PER DAY MAXIMUM (8)	RATE PER DAY MINIMUM (9)	TOTAL TREATED (10)	TOTAL BY-PASSED (11)	TOTAL RECIRCULAT. FROM ___ TO ___ (12)	SETTLING SOLIDS ml/liter RAW (13)	PRIMARY EFFLUENT (14)	D.O. FINAL EFFLUENT (15)	BOD FINAL EFFLUENT % (16)	RAW SLUDGE PUMPED, GALLONS (17)	DIGESTED SLUDGE DRAWN TO BEDS-GAL. (18)	REMARKS: Cl2 Used	Cl2 12-8	Cl2 8-4	Cl2 4-12
1											30,000									1.0	1.0	1.9	0.3/3.1 (0.3/3.2)
2											30,000									1.0	1.1/1.2	3.0/3.0	1.9/1.0/1.4
3											9,500									1.0	1.0	1.2	1.4
4											10,000									1.0	1.0	2.0	1.1
5											16,000									1.0	1.0	1.2	1.0
6								7.62			15,500					6.35	4.3			1.0	1.0	1.6	1.4
7											18,000									1.0	1.6	1.7	1.6
8											19,000									1.0	1.7	1.2	1.4
9											23,000									1.0	1.3	0.6/1.1	1.5
10											24,500									1.0	1.0	1.4	1.2
11											16,000									1.0	1.2	1.8	1.8
12											10,000									1.0	2.0	1.8	0.7
13								7.22			10,000					6.40	3.9			1.0	2.0	2.0	1.7
14											10,000									1.0	1.9	1.9	2.0
15											10,000									1.0	2.0	2.0	1.7
16											9,500									1.0	1.7	2.0	2.0
17											8,500									1.0	2.0	1.4	1.4
18											7,500									1.0	1.3	1.0	2.0
19											8,000									1.0	1.5	1.6	1.5
20								7.58			5,000					6.35	3.3			1.0	1.7	1.9	2.0
21											4,500									1.0	1.8	2.0	1.6
22											3,500									1.0	1.5	1.8	1.9
23											7,500									1.0	2.0	1.7	1.2
24											12,000									1.0	1.1	1.4	1.3
25											11,800									1.0	.7	1.0	1.0
26											13,946									1.0	1.0	1.0	.7/2.0
27								7.39			20,460					4.9	3.7			1.0	1.4	1.3/1.0	1.6
28											23,480									1.0	1.6	1.0	1.0
29											12,000									1.0	1.2	1.2	1.0
30											25,000									1.0	1.7	1.0	1.0
31											25,840									1.0	1.3	1.3	1.1
TOTAL																							
MAXIMUM								7.62			30,000					6.40	4.3			1.0	2.0	3.0	3.2
MINIMUM								7.22			3,500					4.90	3.3			1.0	0.7	0.6	0.3
AVERAGE								7.45			14,516					6.00	3.8			1.0	1.42	1.56	1.46

REMARKS (*Include unusual sewage or stream flows, operating troubles, complaints, special analysis, etc.*)

MONTHLY SUMMARY

(19) SEWAGE RECEIVED FROM OTHERS
- 1,000 GALLONS
- (20) POPULATION

(21) SCREENINGS AND GRIT REMOVAL
- SCREENINGS CU. FT.
- GRIT CU. FT.

(22) SLUDGE DRAWN TO BEDS
- AVERAGE pH
- AVERAGE % SOLIDS
- AVG. % VOLATILE SOLIDS

(23) DRIED SLUDGE REMOVED
- CU. YDS. REMOVED
- AVG. DRYING TIME, DAYS

(24) DIGESTER NO. ___ SURVEY — DEPTH BELOW OVERFLOW LEVEL, FT.
- TOP OF SCUM
- BOTTOM OF SCUM
- TOP OF SLUDGE

DIGESTER NO. ___ SURVEY
- TOP OF SCUM
- BOTTOM OF SCUM
- TOP OF SLUDGE

(25) IMHOFF AND CLARIGESTER SURVEY — TOP OF SLUDGE BELOW SLOT, FEET

DATE	INLET END	OUTLET END

SEE REVERSE SIDE FOR INSTRUCTIONS

PREPARED BY [signature] | DATE 9-4-91 | APPROVED BY R.E. [signature] | DATE 9-4-91 | POST ENGINEER [signature] | DATE 9-4-91

DA FORM 4247 REPLACES DA FORM 5-50, 1 JUN 89, WHICH WILL BE USED.

For use of this form, see AR 420-46; the proponent agency is the Office, Chief of Engineers.

DUP-6067

LABORATORY REPORT OF OPERATION
OF THE
RADFORD ARMY AMMUNITION PLANT
SEWAGE TREATMENT PLANT-424
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING
RICHMOND 19, VA.

Signed R. Cawthorn
Title Supervisor

DATE August 1-31, 1991		DISSOLVED OXYGEN-FINAL EFFLUENT (WEEKLY) mg/lO_2	ALKALINITY RAW-INFLUENT (WEEKLY) mg/$lCaCO_3$	ALKALINITY FINAL EFFLUENT (WEEKLY) mg/$lCaCO_3$	ALKALINITY-SUPERNATANT (TWICE WEEKLY) mg/$lCaCO_3$	VOLATILE SOLIDS-SLUDGE (AS NEEDED) %	VOLATILE ACIDS-SUPERNATANT (TWICE WEEKLY) mg/lCH_3COOH	pH SUPERNATANT (TWICE WEEKLY)	NITRATE-FINAL EFFLUENT (WEEKLY) mg/lNO_3	BOD-RAW SEWAGE (WEEKLY) mg/lO_2	BOD-PRIMARY (WEEKLY) mg/lO_2	BOD-FINAL EFFLUENT (WEEKLY) mg/lO_2	BOD-SUPERNATANT (WEEKLY) mg/lO_2		
1					465		69	6.43				8.3	23		
2															
3															
4															
5															
6		6.30	142	97	510		77	6.41	26.2	28	11	80	70		
7												6.5			
8					490		214	6.23				4.2	67		
9															
10															
11															
12															
13		5.40	99	109	540		184	6.53	32.9	22	10	7.3	116		
14												4.4			
15					510		146	6.58				6.6	82		
16															
17															
18															
19															
20		5.70	256	189	500		180	6.53	40.0	23	11.7	7.18	97		
21												4.7			
22					550		64	6.69				4.6	95		
23															
24															
25															
26															
27		5.10	127	97	490		86	6.56	26.7	36	5.7	7.5	-		
28												3.5			
29					450		56	6.42				3.9	83		
30															
31															
Avg.		5.55	156.0	123.0	500.6		119.6	6.48	31.4	27.3	9.6	5.67	79.1		
Max.		6.30	256.0	189.0	550.0		214.0	6.69	40.0	36.0	11.7	8.30	116.0		
Min.		5.10	99.0	97.0	450.0		56.0	6.23	26.2	22.0	5.7	3.50	23.0		

RECORD OF SEPTAGE DISPOSAL

DATE	ORIGIN OF LOAD	pH	VOLUME OF LOAD (GALLONS)	LOCATION OF UNLOADING POINT	NAME
5-6-91	TNT	6.7	1,000	N.W. 1600	P. Saylor

REPORT OF OPERATION
OF
POTABLE WATER PLANT (CAST AREA)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

BLDG. 4330

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 29, 1991 THRU OCT. 26, 1991

	RAW WATER TREATMENT				FILT. WATER TREAT.		FILTER AND WASH DATA			
DATE	WATER TREATED (TGD)	HRS OPER.	LBS CHEM USED ALUM	PPM ALUM	LBS CHEM USED SODA	PPM SODA	FILTERS USED	NO. WASHED	WATER TGD	DATE
29	913	24	145	19	185	24	2	0	5	29
30	1046	24	125	14	190	22	2	0	5	30
1	1150	24	135	13	173	17	2	2	93	1
2	1077	24	140	16	188	21	2	0	5	2
3	1089	24	135	14	205	22	2	1	49	3
4	1071	24	125	13	225	24	2	1	49	4
5	1042	24	130	15	185	21	2	0	5	5
6	978	24	125	14	200	22	2	2	93	6
7	1039	24	135	15	178	20	2	0	5	7
8	1057	24	125	14	155	17	2	1	49	8
9	1240	24	125	12	265	25	2	1	49	9
10	1182	24	120	11	225	21	2	2	93	10
11	1178	24	130	13	220	22	2	0	5	11
12	1082	24	140	15	225	24	2	1	49	12
13	1126	24	140	14	218	22	2	1	49	13
14	1054	24	140	15	260	26	2	1	49	14
15	1050	24	150	16	200	22	2	1	49	15
16	1129	24	135	14	258	26	2	1	49	16
17	1067	24	135	14	225	24	2	1	49	17
18	1057	24	145	16	238	25	2	0	5	18
19	1037	24	140	15	195	21	2	2	93	19
20	964	24	130	16	163	20	2	0	5	20
21	1066	24	135	15	203	22	2	1	49	21
22	1149	24	125	13	218	22	2	1	49	22
23	1152	24	125	12	210	21	2	1	49	23
24	1102	24	115	12	225	23	2	1	49	24
25	1173	24	130	13	210	21	2	1	49	25
26	1098	24	140	15	235	25	2	1	49	26
TOTAL	30368	672	3720	398	5837	622	56	24	1196	
AVER.	1085	24	133	14	208	22	2	1	43	

KIND OF CHEMICALS USED

SULPHATE OF ALUMINA _____
LIME _____
CHLORINE 4120 lbs
AMMONIA _____
IRON _____
TYPE OF FLUORIDE CHEM. USED _____

SIGNED: C B Yeatts

TITLE: A/E

REPORT OF OPERATION
OF
POTABLE WATER PLANT (CAST AREA)
(CONT.)

BLDG. 4330

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 29, 1991 THRU OCT. 26, 1991

CHEMICAL AND PHYSICAL DATA-PARTS PER MILLION

	--- TURBIDITY ---			--- ALKALINITY --			------- PH -------			-- FREE CO2 --		----- COLOR -----			RES CHLOR.	
DATE	RAW	APP.	FIN.	RAW	APP.	FIN.	RAW	APP.	FIN.	RAW	APP.	RAW	APP.	FIN.	FIN.	DATE
29	.9	.4	.1	49	39	63	8.5	7.1	8.8	2	9	8	0	0	2.0	29
30	.9	.4	.1	51	44	65	8.5	7.1	8.7	0	9	6	0	0	1.9	30
1	.9	.6	.1	51	41	65	8.4	7.1	8.7	4	9	5	0	0	1.9	1
2	.8	.6	.1	51	43	67	8.4	7.1	8.7	3	8	5	0	0	1.9	2
3	.8	.6	.1	52	42	67	8.3	7.1	8.8	3	8	5	0	0	2.0	3
4	.8	.6	.1	53	44	67	8.4	7.1	8.8	3	9	5	0	0	1.9	4
5	.9	.6	.1	53	44	67	8.4	7.1	8.8	3	9	5	0	0	1.9	5
6	.9	.6	.1	53	44	67	8.4	7.1	8.8	3	9	5	0	0	1.9	6
7	.8	.6	.1	55	46	68	8.5	7.1	8.8	2	9	7	0	0	2.0	7
8	.8	.7	.1	53	43	67	8.4	7.2	8.8	2	9	5	0	0	2.0	8
9	.8	.8	.1	55	43	68	8.4	7.2	8.7	2	8	5	0	0	2.0	9
10	.9	.9	.1	52	44	65	8.4	7.3	8.8	2	8	7	0	0	2.0	10
11	.9	.8	.1	50	41	63	8.2	7.1	8.8	3	9	7	0	0	1.9	11
12	.9	.7	.1	53	41	63	8.1	7.0	8.8	3	9	5	0	0	1.9	12
13	.9	.7	.1	50	41	65	8.4	7.2	8.8	2	9	5	0	0	1.9	13
14	.9	.7	.1	47	41	64	8.3	7.1	8.8	2	8	5	0	0	1.9	14
15	.9	.6	.1	49	40	62	8.0	7.0	8.8	2	7	5	0	0	1.9	15
16	.8	.7	.1	51	42	67	8.1	7.1	8.8	3	8	5	0	0	1.9	16
17	.8	.7	.1	51	41	66	8.3	7.1	8.8	2	8	5	0	0	1.9	17
18	.8	.7	.1	49	42	67	8.2	7.1	8.8	1	9	5	0	0	1.9	18
19	.7	.6	.1	51	43	65	8.3	7.1	8.8	2	8	5	0	0	1.9	19
20	.8	.7	.1	52	41	67	8.3	7.1	8.8	2	8	5	0	0	1.9	20
21	.7	.7	.1	51	42	68	8.3	7.1	8.8	2	8	5	0	0	1.9	21
22	.8	.6	.1	51	43	66	8.2	7.1	8.8	3	8	5	0	0	1.9	22
23	.7	.6	.1	51	42	67	8.2	7.1	8.9	3	8	5	0	0	1.9	23
24	.7	.6	.1	52	41	67	8.2	7.0	8.8	2	9	0	0	0	1.9	24
25	.7	.6	.1	52	44	69	8.3	7.1	8.8	3	8	8	0	0	1.9	25
26	.7	.6	.1	52	44	69	8.3	7.1	8.8	3	8	8	0	0	1.9	26
TOTAL	22.9	18.0	2.8	1440	1186	1851	232.7	199.0	246.1	65	236	151	0	0	53.8	
AVER.	.8	.6	.1	51	42	66	8.3	7.1	8.8	2	8	5	0	0	1.9	

PER CENT WASH WATER USED ----- 3.9 --
WASH WATER RISE (IN. P.M.) 22.4
AV. NO. MIN. EACH FILTER WASHED 15-20
AV. LOSS OF HEAD FILTERS WASHED 2.0-4.0
COAG. BASINS--DATE LAST CLEANED --------
COPPER SULPHATE APPLIED:
DATE: ----------
WHERE: ----------
AMOUNT: 0

********** REMARKS **********

AVERAGE HRS. FOR EACH FILTER RUN = 75

DF8003 RUN DATE: 10/30/91

REPORT OF OPERATION
OF
POTABLE WATER PLANT (MAIN PLANT)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

BLDG. 419

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 29, 1991 THRU OCT. 26, 1991

DATE	WATER TREATED (TGD)	HRS OPER.	RAW WATER TREATMENT — LBS CHEM USED ALUM	RAW WATER TREATMENT — PPM ALUM	FILT. WATER TREAT. — LBS CHEM USED LIME	FILT. WATER TREAT. — PPM LIME	FILTER AND WASH DATA — FILTERS USED	FILTER AND WASH DATA — NO. WASHED	FILTER AND WASH DATA — WATER TGD	DATE
29	1424	24	258	21	58	5	4	1	38	29
30	1589	24	264	19	67	5	4	1	38	30
1	1681	24	235	16	68	5	4	1	38	1
2	1614	24	222	16	65	5	4	1	38	2
3	1657	24	228	16	69	5	4	1	49	3
4	1668	24	242	17	72	5	4	1	49	4
5	1520	24	242	19	70	5	4	1	38	5
6	1461	24	285	23	77	6	4	1	38	6
7	1559	24	248	19	65	5	4	1	38	7
8	1674	24	206	14	51	4	4	1	38	8
9	1629	24	213	15	60	4	4	1	38	9
10	1543	24	196	15	54	4	4	1	38	10
11	1558	24	202	15	69	4	4	1	38	11
12	1496	24	219	17	53	4	4	1	38	12
13	1464	24	275	22	62	5	4	0	0	13
14	1519	24	311	24	63	5	4	1	38	14
15	1652	24	237	17	64	4	4	1	38	15
16	1675	24	229	16	55	4	4	1	38	16
17	1698	24	233	16	60	4	4	1	38	17
18	1589	24	223	16	56	4	4	1	38	18
19	1466	24	204	16	51	4	4	1	38	19
20	1561	24	274	21	67	5	4	1	38	20
21	1538	24	230	17	61	5	4	1	38	21
22	1588	24	220	16	46	3	4	1	38	22
23	1575	24	212	16	57	4	4	1	38	23
24	1567	24	213	16	44	3	4	1	38	24
25	1604	24	212	15	47	3	4	1	38	25
26	1558	24	251	19	68	5	4	1	38	26
TOTAL	44127	672	6584	489	1676	124	112	27	1053	
AVER.	1576	24	235	17	60	4	4	1	38	

KIND OF CHEMICALS USED

SULPHATE OF ALUMINA _____
LIME _____
CHLORINE 970 lbs.
AMMONIA _____
IRON _____
TYPE OF FLUORIDE CHEM. USED _____

SIGNED: C. B. Hicks

TITLE: A/E

REPORT OF OPERATION
OF
POTABLE WATER PLANT (MAIN PLANT)
(CONT.)

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 29, 1991 THRU OCT. 26, 1991

BLDG. 419

CHEMICAL AND PHYSICAL DATA-PARTS PER MILLION

	--- TURBIDITY ---			--- ALKALINITY --			-------- PH --------			-- FREE CO2 --		------ COLOR -----			RES CHLOR.	
DATE	RAW	APP.	FIN.	RAW	APP.	FIN.	RAW	APP.	FIN.	RAW	APP.	RAW	APP.	FIN.	FIN.	DATE
29	1.1	.1	.1	49	52	59	7.8	7.8	8.7	3	1	10	0	0	2.0	29
30	1.1	.1	.1	50	49	62	7.8	7.9	8.7	3	2	10	0	0	2.0	30
1	1.0	.2	.1	54	50	59	7.8	7.8	8.7	4	1	10	0	0	2.0	1
2	1.2	.2	.1	51	53	65	7.8	8.1	8.8	3	1	8	0	0	2.0	2
3	1.2	.2	.1	53	55	65	7.8	8.1	8.8	6	2	10	0	0	2.0	3
4	1.1	.2	.1	53	55	61	7.8	8.0	8.8	6	1	10	0	0	2.0	4
5	1.2	.2	.1	53	53	63	7.8	8.1	8.7	4	1	10	0	0	2.0	5
6	1.2	.3	.1	54	56	65	7.8	8.4	8.8	5	1	10	0	0	2.0	6
7	1.3	.3	.1	55	56	67	8.0	8.3	8.9	2	1	10	0	0	2.0	7
8	1.4	.2	.1	54	54	62	7.9	8.1	8.7	3	2	10	0	0	2.0	8
9	1.3	.2	.1	57	51	59	7.8	8.2	8.8	3	1	10	0	0	2.0	9
10	1.1	.2	.1	58	51	60	7.8	8.1	8.8	3	1	10	0	0	2.0	10
11	1.1	.2	.1	54	51	62	7.7	8.0	8.8	3	1	10	0	0	2.0	11
12	1.2	.1	.1	51	51	61	7.8	7.9	8.7	4	2	10	0	0	2.0	12
13	1.3	.2	.1	52	52	61	7.8	8.2	8.8	4	1	10	0	0	2.0	13
14	1.2	.2	.1	54	53	62	7.7	8.1	8.8	4	1	10	0	0	2.0	14
15	1.2	.2	.1	55	54	62	7.6	7.9	8.7	5	1	10	0	0	1.9	15
16	1.1	.2	.1	53	54	64	7.6	7.9	8.7	5	1	10	0	0	2.0	16
17	1.1	.2	.1	55	55	61	7.8	8.3	8.8	5	1	11	0	0	2.0	17
18	1.1	.2	.1	56	52	61	7.7	8.2	8.7	3	1	10	0	0	2.0	18
19	1.1	.2	.1	54	49	58	7.8	8.1	8.7	4	1	10	0	0	2.0	19
20	1.4	.2	.1	57	55	61	7.7	8.2	8.8	4	1	10	0	0	2.0	20
21	1.2	.2	.1	56	55	61	7.8	8.1	8.8	4	1	10	0	0	2.0	21
22	1.2	.3	.2	54	57	64	7.7	8.3	8.8	5	1	10	0	0	2.0	22
23	1.2	.2	.1	56	53	59	7.7	8.1	8.7	3	1	10	0	0	2.0	23
24	1.1	.3	.1	58	53	60	7.7	8.1	8.8	3	1	10	0	0	2.0	24
25	1.1	.2	.1	51	54	63	7.7	8.1	8.6	4	1	10	0	0	2.0	25
26	1.2	.2	.1	51	53	60	7.7	7.9	8.7	4	1	10	0	0	2.0	26
TOTAL	33.0	5.7	2.9	1508	1486	1727	217.4	226.3	245.1	107	32	279	0	0	55.9	
AVER.	1.2	.2	.1	54	53	62	7.8	8.1	8.8	4	1	10	0	0	2.0	

PER CENT WASH WATER USED ----- 2.3 --
WASH WATER RISE (IN. P.M.) 17.6
AV. NO. MIN. EACH FILTER WASHED 15-20
AV. LOSS OF HEAD FILTERS WASHED 1.0-2.0
COAG. BASINS--DATE LAST CLEANED _____
COPPER SULPHATE APPLIED:
DATE: _____
WHERE: _____
AMOUNT: 0

********** REMARKS **********

AVERAGE HRS. FOR EACH FILTER RUN = 100

HERCULES AEROSPACE DIVISION

HERCULES INCORPORATED

RADFORD ARMY AMMUNITION PLANT

AIR, WATER AND WASTE CONTROL LABORATORY

DRINKING WATER REPORT

October 1991

DATE	BUILDING		pH	Cl_2 p.p.m RESIDUAL	NO_3 p.p.m.	COLIFORM COUNT
	CAST AREA	MAIN PLANT				
10-02-91		201	8.65	1.35	0.53	Absence
10-02-91	4922		8.58	0.85	0.96	Absence
10-03-91	0489		8.50	1.30	1.98	Absence
10-03-91		1564	8.76	1.25	0.41	Absence
10-07-91	4931		8.73	1.45	0.60	Absence
10-07-91		1886	8.92	0.50	0.43	Absence
10-15-91		407	8.75	1.25	0.49	Absence
10-15-91	4925		8.73	1.15	0.02	Absence
10-22-91	4711		8.54	0.90	0.32	Absence
10-22-91		#6 Staff-Village	8.52	1.10	0.33	Absence

APPROVED BY R. E. Mahaffey

TITLE Supervisor

RECORD OF SEPTAGE DISPOSAL

DATE	ORIGIN OF LOAD	pH	VOLUME OF LOAD (GALLONS)	LOCATION OF UNLOADING POINT	NAME
10-10-91	Bldg. 4925	6.9	2,200	906-1 Pump station	C. J. Loveda

DUP-6067

LABORATORY REPORT OF OPERATION OF THE RADFORD ARMY AMMUNITION PLANT SEWAGE TREATMENT PLANT-424 TO THE VIRGINIA STATE DEPARTMENT OF HEALTH BUREAU OF SANITARY ENGINEERING RICHMOND 19, VA.

Signed R. E. Crumpler

Title Supervisor

DATE Sept. 1-30 1971

	DISSOLVED OXYGEN-FINAL EFFLUENT (WEEKLY) mg/lO_2	ALKALINITY RAW-INFLUENT (WEEKLY) mg/$lCaCO_3$	ALKALINITY FINAL EFFLUENT (WEEKLY) mg/$lCaCO_3$	ALKALINITY-SUPERNATANT (TWICE WEEKLY) mg/$lCaCO_3$	VOLATILE SOLIDS-SLUDGE (AS NEEDED) %	VOLATILE ACIDS-SUPERNATANT (TWICE WEEKLY) mg/lCH_3COOH	PH SUPERNATANT (TWICE WEEKLY)	NITRATE-FINAL EFFLUENT (WEEKLY) mg/lNO_3	BOD-RAW SEWAGE (WEEKLY) mg/lO_2	BOD-PRIMARY (WEEKLY) mg/lO_2	BOD-FINAL EFFLUENT (WEEKLY) mg/lO_2	BOD-SUPERNATANT (WEEKLY) mg/lO_2
1												
2												
3											4.5	
4	5.70	43	25					38	37	8.5	6.0	
5				450		47.1	6.43				5.9	32
6												
7												
8												
9												
10	4.70	124	73	420		11.1	6.50	23	29	8.3	8.86	45
11											6.30	
12				400		34.3	6.10				4.70	59
13												
14												
15												
16												
17	5.30	167	89	430		60.0	6.37	33	39	8.8	6.94	61
18											7.00	
19				410		33.0	6.61				6.50	53
20												
21												
22												
23												
24	6.50	117	97	450		36.9	6.55	57	19	11	7.19	65
25											5.70	
26				400		51.4	6.53				4.30	60
27												
28												
29												
30												
31												
Ave.	5.55	112.8	71.0	422.9		39.1	6.44	37.8	31.0	9.15	6.16	53.6
Max.	6.50	167.0	97.0	450.0		60.0	6.61	57.0	39.0	8.80	8.86	65.0
Min.	4.70	43.0	25.0	400.0		11.1	6.10	23.0	19.0	8.30	4.30	32.0

FACILITIES ENGINEERING OPERATING LOG
(Sewage · General)

INSTALLATION: HERCULES, RAAP, BLDG. 4325
PLANT: Radford - Imhoff Plant
PRIMARY TREATMENT / COMPLETE TREATMENT: 8
MONTH: SEPTEMBER, 1991

DATE	DAY OF WEEK	WEATHER: RAINFALL INCHES	WEATHER: WIND DIRECTION	WEATHER: AIR TEMPERATURE °F.	STREAM FLOW	TEMP. PLANT INFLUENT °F.	pH PLANT INFLUENT	pH PRIMARY EFFLUENT	SEWAGE FLOW, 1,000 GAL. RATE PER DAY: MAXIMUM	SEWAGE FLOW, 1,000 GAL. RATE PER DAY: MINIMUM	SEWAGE FLOW, 1,000 GAL. TOTAL TREATED	TOTAL BY-PASSED	TOTAL RECIRCULAT. FROM ___ TO ___	SETTLING SOLIDS ml/liter: RAW	SETTLING SOLIDS ml/liter: PRIMARY EFFLUENT	BOD: FINAL EFFLUENT	DO: FINAL EFFLUENT % SATURATION	RAW SLUDGE PUMPED, GALLONS	DIGESTED SLUDGE DRAWN TO BEDS, GAL.	Cl2 Used	12-8	8-4	4-12
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)				
1											14,530									1.0	1.5	1.2	1.0
2											14,000									1.0	1.3	1.4	1.5
3											14,060									1.0	1.7	1.6	1.4
4								7.26			28,000					4.33	6.10			1.0	1.6	1.8	1.6
5											25,400									1.0	1.8	1.5	1.4
6											29,758									1.0	1.2	1.4	1.2
7											30,276									1.0	1.0	1.6	1.6
8											30,092									1.0	1.2	1.2	1.2
9											29,510									1.0	1.2	1.2	1.4
10								7.45			30,019					5.87	6.10			1.0	1.2	1.2	1.0
11											31,960									1.0	1.2	1.2	1.0
12											33,164									1.0	1.9	1.9	1.8
13											34,216									1.0	1.8	1.3	1.5
14											33,482									1.0	1.7	1.0	1.7
15											32,253									1.0	1.8	2.0	1.5
16											31,173									1.0	1.5	1.6	1.5
17								7.48			32,311					7.40	6.50			1.0	1.4	1.4	1.2
18											23,796									1.0	1.0	1.1	1.0
19											49,446									1.0	1.1	2.5	1.4
20											42,800									1.0	.7/1.4	2.6	2.0
21											40,218									1.0	1.5	1.4	1.2
22											40,324									1.0	1.7	1.8	1.6
23											27,353									1.0	1.8	1.8	1.6
24								7.36			15,964					4.36	7.70			1.0	1.9	1.8	*
25											13,901									1.0	1.9	1.8	1.9
26											14,528									1.0	1.6	1.8	1.8
27											16,185									1.0	1.9	2.0	1.6
28											17,303									1.0	1.6	1.6	1.0
29											18,340									1.0	1.2	2.0	1.0
30											19,466									1.0	1.5	1.2	1.0
31											—									—	—	—	—
TOTAL																							
MAXIMUM								7.48			49,446					7.40	7.70			1.0	1.90	2.00	2.00
MINIMUM								7.26			13,901					4.33	6.10			1.0	0.70	0.20	1.00
AVERAGE								7.39			27,185					5.79	6.60			1.0	1.48	1.47	1.40

REMARKS (Include unusual sewage or stream flows, operating troubles, complaints, special analysis, etc.)

Cl2 Used

Cl2 · 12-8 · 8-4 · 4-12

MONTHLY SUMMARY

(19) SEWAGE RECEIVED FROM OTHERS
1,000 GALLONS
(20) POPULATION
(21) SCREENINGS AND GRIT REMOVAL
SCREENINGS CU. FT.
GRIT CU. FT.
(22) SLUDGE DRAWN TO BEDS
AVERAGE pH
AVERAGE % SOLIDS
AVG. % VOLATILE SOLIDS
(23) DRIED SLUDGE REMOVED
CU. YDS. REMOVED
AVG. DRYING TIME, DAYS
(24) DIGESTER NO. ___ SURVEY
DEPTH BELOW OVERFLOW LEVEL, FT.
TOP OF SCUM
BOTTOM OF SCUM
TOP OF SLUDGE
DIGESTER NO. ___ SURVEY
TOP OF SCUM
BOTTOM OF SCUM
TOP OF SLUDGE
(25) IMHOFF AND CLARIGESTER SURVEY
TOP OF SLUDGE BELOW SLOT, FEET

DATE	INLET END	OUTLET END

SEE REVERSE SIDE FOR INSTRUCTIONS

PREPARED BY: C. B. Weeks — DATE: 10-1-91

APPROVED BY: R. E. Winfrey — DATE: 10-1-91

POST ENGINEER: C. B. Weeks — DATE: 10-2-91

DA FORM 1 MAY 74 4247 REPLACES DA FORM 5-60, 1 JUN 58, WHICH WILL BE USED.

For use of this form, see AR 420-48; the proponent agency is the Office, Chief of Engineers.

* = No Flow

DF8051 RUN DATE 10/01/91

REPORT OF OPERATION
OF TRICKLING FILTER
SEWAGE TREATMENT PLANT (BLDG. 424)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

SIGNED *C.B. Weeks*

TITLE *A/E*

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 1, 1991 THRU SEP. 28, 1991

DAY	TEMPERATURE (F) AIR MAX.	AIR MIN.	INFLUENT MAX.	INFLUENT MIN.	SEWAGE FLOW 1000 GALS TOTAL	SEWAGE FLOW MAX.	SLUDGE TO DIGESTER 1000 GALS.	SLUDGE DIGESTER TEMP. (F)	SETTLEABLE SOLIDS ML/L RAW	PRIMARY	FINAL	SUPER-NATANT LIQUOR	FINAL EFFLUENT TOTAL CHLORINE 6-8 AM	4-12 PM	PH (WEEKDAYS ONLY) RAW	FINAL	SUPER-NATANT LIQUOR	LIME ADDED LBS
9/ 1	78	68	⊗		111	150	0	80					0.8			7.2		0
9/ 2	76	61			99	138	0						2.0			7.0		0
9/ 3	73	60			97	101	0	80					1.1			6.7		0
9/ 4	84	72			152	192	9	78	7.0	0.0	0.0	2.0	1.5	1.7	7.4	6.9	6.5	0
9/ 5	86	66			169	20	11	78	6.3	0.0	0.0	2.0	2.6	0.9	7.3	7.3	6.5	0
9/ 6	85	66			161	200	9	76	3.5	0.0	0.0	2.0	1.9	2.2	7.4	7.5	6.5	0
9/ 7	86	66			123	158	0	76					2.0			7.4		0
9/ 8	86	69			109	148	0	80					0.8			7.4		0
9/ 9	86	56			143	182	9	76	3.5	0.0	0.0	2.0	1.7	1.5	7.4	7.4	6.5	0
9/10	79	59			181	220	9	76	6.3	0.0	0.0	3.5	2.4	1.2	7.4	7.3	6.5	0
9/11	85	64	78	72	172	212	9	76	4.5	0.0	0.0	2.0	1.8	1.3	7.4	7.4	6.5	0
9/12	85	60	80	75	181	216	9	76	7.0	0.0	0.0	2.0	1.7	1.4	7.4	7.4	6.5	0
9/13	89	66	80	71	166	205	9	76	3.0	0.0	0.0	2.0	1.7	1.5	7.4	7.4	6.5	0
9/14	88	67	75	71	127	167	0	80					1.7			7.3		0
9/15	88	66	74	70	119	154	0	58						1.7		6.9		0
9/16	93	64	79	70	177	217	9	77	7.0	0.0	0.0	3.5	1.1	1.3	7.4	7.2	6.4	0
9/17	92	66	78	72	157	197	9	78	7.0	0.0	0.0	3.0	2.2	1.7	7.4	7.2	6.5	0
9/18	89	67	80	72	168	208	9	78	4.5	0.0	0.0	2.0	1.8	1.3	7.4	7.6	6.5	0
9/19	72	52	78	72	161	200	9	78	4.0	0.0	0.0	2.0	1.9	1.5	7.4	7.5	6.5	0
9/20	66	46	78	71	170	209	9	76	3.0	0.0	0.0	2.0	1.6	2.6	7.8	7.6	6.5	0
9/21	74	52	73	67	147	186	0	75					2.0			7.4		0
9/22	76	42	70	67	138	177	0	70					2.0			7.5		0
9/23	72	52	77	68	167	206	11	74	7.5	0.0	0.0	2.5	1.8	1.1	7.4	7.3	6.5	0
9/24	67	57	75	69	181	221	9	73	3.5	0.0	0.0	2.0	1.9	1.5	7.3	7.4	6.4	0
9/25	65	58	76	69	175	214	9	72	4.0	0.0	0.0	2.0	1.8	1.6	7.3	7.3	6.4	0
9/26	66	46	77	66	183	223	9	70	3.5	0.0	0.0	2.0	1.8	1.5	7.4	7.4	6.5	0
9/27	77	46	75	68	196	236	9	70	3.5	0.0	0.0	2.0	1.6	1.3	7.4	7.4	6.5	0
9/28	74	38	70	67	112	152	0	70					1.9			6.8		0
TOTAL					4242		166											0
AVG.	80	59	76	70	152	182	6	75	4.9			2.3	1.7	1.5	7.4	7.3	6.5	0
MAX	93	72	80	75	196	236	11	80	7.5			3.5	2.6	2.6	7.8	7.6	6.5	0
MIN	65	38	70	66	97	20	0	58	3.0			2.0	0.8	0.9	7.3	6.7	6.4	0

⊗ *Influent temperature Recorder out of service 9-1-91 thru 9-10-91 - for repair CBW*

No septage pumped during this period. CBW

Chlorine used - 272 lbs.

DF8003 RUN DATE: 10/02/91

REPORT OF OPERATION
OF
POTABLE WATER PLANT (CAST AREA)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

BLDG. 4330

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 1, 1991 THRU SEP. 28, 1991

	Raw Water Treatment						Filt. Water Treat.			Filter and Wash Data			
DATE	WATER TREATED (TGD)	HRS OPER.	LBS CHEM USED ALUM	PPM ALUM	LBS CHEM USED SODA	PPM SODA	FILTERS USED	NO. WASHED	WATER TGD	DATE
1	1118	24	130	13	215	22	2	1	49	1
2	970	24	125	15	196	24	2	0	5	2
3	1060	24	115	12	204	22	2	1	49	3
4	1078	24	135	14	218	23	2	1	49	4
5	1027	24	130	14	210	23	2	1	49	5
6	1096	24	150	16	215	23	2	1	49	6
7	1104	24	140	15	240	25	2	1	49	7
8	1064	24	150	17	225	25	2	0	5	8
9	1132	24	140	14	230	23	2	1	49	9
10	1156	24	140	14	225	22	2	1	49	10
11	1135	24	130	13	225	23	2	1	49	11
12	1131	24	165	17	233	24	2	1	49	12
13	1112	24	140	15	230	25	2	0	5	13
14	1070	24	130	14	255	27	2	1	49	14
15	1087	24	120	13	230	24	2	1	49	15
16	1120	24	160	16	240	25	2	1	49	16
17	1198	24	130	12	225	22	2	1	49	17
18	1206	24	145	14	280	28	2	0	5	18
19	1194	24	145	14	290	28	2	1	49	19
20	1096	24	135	14	268	28	2	1	49	20
21	947	24	115	14	200	25	2	0	5	21
22	1000	24	120	14	193	22	2	1	49	22
23	1048	24	130	14	225	24	2	1	49	23
24	1047	24	145	17	220	25	2	0	5	24
25	1117	24	150	15	150	15	2	2	93	25
26	1121	24	150	16	305	32	2	0	5	26
27	1018	24	140	16	205	24	2	0	5	27
28	1009	24	140	15	200	22	2	2	93	28
TOTAL	30461	672	3845	407	6350	675	56	22	1108	
AVER.	1088	24	137	15	227	24	2	1	40	

KIND OF CHEMICALS USED

SULPHATE OF ALUMINA _____
LIME _____
CHLORINE 1,080 lbs.
AMMONIA _____
IRON _____
TYPE OF FLUORIDE CHEM. USED _____

SIGNED: C.B. Hicks

TITLE: A/E

REPORT OF OPERATION
OF
POTABLE WATER PLANT (CAST AREA)
(CONT.)

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 1, 1991 THRU SEP. 28, 1991

BLDG. 4330

CHEMICAL AND PHYSICAL DATA-PARTS PER MILLION

DATE	--- TURBIDITY --- RAW	APP.	FIN.	--- ALKALINITY -- RAW	APP.	FIN.	------- PH ------- RAW	APP.	FIN.	-- FREE CO2 -- RAW	APP.	----- COLOR ----- RAW	APP.	FIN.	RES CHLOR. FIN.	DATE
1	1.0	.5	.1	48	37	63	8.0	7.0	8.7	1	0	8	0	0	1.9	1
2	1.0	.4	.1	45	34	63	8.1	7.0	8.7	3	0	10	0	0	2.0	2
3	.9	.4	.1	46	35	59	8.0	7.1	8.7	2	2	5	0	0	2.0	3
4	1.0	.6	.1	47	40	63	8.2	7.1	8.9	2	1	10	0	0	1.9	4
5	1.0	.5	.1	45	37	61	8.1	7.0	8.8	2	0	10	0	0	1.9	5
6	1.1	.6	.1	48	40	63	8.1	7.0	8.8	3	0	10	0	0	2.0	6
7	1.1	.5	.1	48	38	64	8.1	7.0	8.8	2	9	10	0	0	1.9	7
8	1.0	.4	.1	48	36	63	8.1	7.0	8.8	3	9	10	0	0	2.0	8
9	1.0	.5	.1	46	37	63	8.3	7.1	8.8	3	0	7	0	0	2.0	9
10	.9	.5	.1	47	38	62	8.2	7.0	8.8	2	9	7	0	0	2.0	10
11	1.0	.5	.1	49	39	64	8.2	7.0	8.8	3	8	7	0	0	2.0	11
12	.9	.5	.1	47	36	65	8.3	7.1	8.8	3	8	5	0	0	2.0	12
13	1.0	.5	.1	47	35	61	8.3	7.0	8.7	0	8	5	0	0	1.9	13
14	1.0	.5	.1	49	39	63	*8.2	7.0	8.8	3	8	5	0	0	2.0	14
15	1.3	.5	.1	47	39	63	8.0	7.0	8.8	3	9	7	0	0	2.0	15
16	.8	.4	.1	46	41	63	8.1	7.0	8.8	1	8	5	0	0	2.0	16
17	1.0	.5	.1	48	40	61	8.2	7.1	8.8	2	8	5	0	0	1.9	17
18	1.7	.6	.1	48	37	61	7.7	7.0	8.8	3	9	10	0	0	1.9	18
19	1.6	.5	.1	48	35	62	7.5	6.9	8.8	3	9	10	0	0	1.9	19
20	.9	.4	.1	45	35	63	8.1	7.0	8.9	3	9	5	0	0	2.0	20
21	.8	.4	.1	46	34	63	8.3	7.1	8.9	0	9	7	0	0	2.0	21
22	.8	.5	.1	47	36	65	8.4	7.1	8.8	0	9	7	0	0	2.0	22
23	.7	.4	.1	47	38	66	8.3	7.1	8.8	3	8	5	0	0	1.9	23
24	.8	.4	.1	47	41	65	7.9	7.1	8.7	3	9	5	0	0	1.9	24
25	.8	.4	.1	48	39	66	8.0	7.0	8.8	3	9	5	0	0	1.9	25
26	.9	.5	.1	49	39	62	8.3	7.1	8.8	4	9	8	0	0	1.9	26
27	.9	.5	.1	48	41	63	8.4	7.1	8.7	1	0	8	0	0	2.0	27
28	.9	.5	.1	49	40	63	8.4	7.1	8.8	2	8	8	0	0	2.0	28
TOTAL	27.8	13.4	2.8	1323	1058	1763	227.8	197.1	246.1	63	175	204	0	0	54.8	
AVER.	1.0	.5	.1	47	38	63	8.1	7.0	8.8	2	6	7	0	0	2.0	

PER CENT WASH WATER USED ----- 3.6 --
WASH WATER RISE (IN. P.M.) 22.4
AV. NO. MIN. EACH FILTER WASHED 15-20
AV. LOSS OF HEAD FILTERS WASHED 2.0-4.0
COAG. BASINS--DATE LAST CLEANED --------
COPPER SULPHATE APPLIED:
DATE: ----------
WHERE: ----------
AMOUNT: 0

********** REMARKS **********

AVERAGE HRS. FOR EACH FILTER RUN = 75

DF8003 RUN DATE: 10/02/91

REPORT OF OPERATION
OF
POTABLE WATER PLANT (MAIN PLANT)
TO THE
VIRGINIA STATE DEPARTMENT OF HEALTH
BUREAU OF SANITARY ENGINEERING

BLDG. 419

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 1, 1991 THRU SEP. 28, 1991

DATE	WATER TREATED (TGD)	HRS OPER.	RAW WATER TREATMENT: LBS CHEM USED ALUM	RAW WATER TREATMENT: PPM ALUM	FILT. WATER TREAT.: LBS CHEM USED LIME	FILT. WATER TREAT.: PPM LIME	FILTER AND WASH DATA: FILTERS USED	FILTER AND WASH DATA: NO. WASHED	FILTER AND WASH DATA: WATER TGD	DATE
1	1430	24	324	26	62	5	4	1	38	1
2	1337	24	364	32	65	6	4	1	38	2
3	1352	24	338	29	57	5	4	1	38	3
4	1605	24	230	17	42	3	4	1	38	4
5	1617	24	254	18	48	3	4	1	38	5
6	1481	24	195	15	40	3	4	1	38	6
7	1474	24	235	19	44	4	4	0	5	7
8	1390	24	275	23	50	4	4	1	38	8
9	1518	24	291	22	52	4	4	1	38	9
10	1596	24	239	18	43	3	4	1	38	10
11	1600	24	185	14	54	4	4	1	38	11
12	1750	24	216	14	45	3	4	1	38	12
13	1580	24	212	16	52	4	4	1	38	13
14	1592	24	218	16	54	4	4	1	38	14
15	1494	24	504	39	126	10	4	1	38	15
16	1591	24	270	20	72	5	4	1	38	16
17	1648	24	168	12	78	6	4	1	38	17
18	1678	24	240	17	60	4	4	0	5	18
19	1523	24	230	18	66	5	4	1	38	19
20	1628	24	232	17	66	5	4	1	38	20
21	1634	24	245	18	60	4	4	1	38	21
22	1538	24	293	22	76	6	4	1	38	22
23	1598	24	248	18	68	5	4	1	38	23
24	1638	24	252	18	79	6	4	1	38	24
25	1626	24	233	17	69	5	4	1	38	25
26	1516	24	215	17	48	4	4	1	38	26
27	1592	24	229	17	55	4	4	1	38	27
28	1467	24	228	18	54	4	4	1	38	28
TOTAL	43493	672	7163	547	1689	128	112	26	998	
AVER.	1553	24	256	20	60	5	4	1	36	

KIND OF CHEMICALS USED

SULPHATE OF ALUMINA _____
LIME _____
CHLORINE 370 lbs.
AMMONIA _____
IRON _____
TYPE OF FLUORIDE CHEM. USED _____

SIGNED: C. B. Walker

TITLE: A/E

REPORT OF OPERATION
OF
POTABLE WATER PLANT (MAIN PLANT)
(CONT.)

BLDG. 419

RADFORD ARMY AMMUNITION PLANT
REPORT PERIOD:
SEP. 1, 1991 THRU SEP. 28, 1991

CHEMICAL AND PHYSICAL DATA-PARTS PER MILLION

DATE	--- TURBIDITY --- RAW	APP.	FIN.	--- ALKALINITY -- RAW	APP.	FIN.	------- PH ------- RAW	APP.	FIN.	-- FREE CO2 -- RAW	APP.	----- COLOR ----- RAW	APP.	FIN.	RES CHLOR. FIN.	DATE
1	1.2	.2	.1	46	41	54	7.6	7.7	8.6	8	1	20	0	0	2.0	1
2	1.1	.2	.1	48	40	53	7.6	7.9	8.8	1	1	20	0	0	2.0	2
3	1.0	.2	.1	48	45	55	7.7	7.8	8.6	9	1	20	0	0	2.0	3
4	1.2	.2	.1	46	43	57	7.6	7.7	8.6	8	1	20	0	0	2.0	4
5	1.2	.2	.1	47	43	55	7.6	7.7	8.7	8	1	20	0	0	2.0	5
6	1.2	.2	.1	47	43	57	7.6	7.6	8.7	9	1	20	0	0	2.0	6
7	1.1	.2	.1	44	43	56	7.7	7.6	8.7	9	1	20	0	0	2.0	7
8	1.2	.2	.1	43	45	57	7.7	7.8	8.8	8	1	20	0	0	2.0	8
9	1.4	.2	.1	43	46	57	7.8	7.7	8.7	8	1	20	0	0	2.0	9
10	1.2	.2	.1	43	43	57	7.7	7.8	8.7	7	1	20	0	0	1.9	10
11	1.2	.2	.1	41	43	55	7.6	7.8	8.7	5	1	20	0	0	2.0	11
12	1.2	.2	.1	44	42	53	7.6	7.8	8.7	8	1	17	0	0	1.9	12
13	1.5	.2	.1	48	43	52	7.6	7.8	8.7	8	1	15	0	0	2.0	13
14	1.3	.2	.1	48	43	54	7.5	7.9	8.7	8	2	12	0	0	2.0	14
15	1.5	.2	.1	47	43	55	7.5	8.0	8.8	7	1	10	0	0	2.0	15
16	1.2	.2	.1	44	45	55	7.6	8.1	8.7	7	1	10	0	0	2.0	16
17	1.2	1.1	.1	47	52	55	7.6	8.1	8.7	7	1	10	2	0	2.0	17
18	1.6	.2	.1	46	43	53	7.3	7.7	8.7	8	2	13	0	0	1.9	18
19	1.5	.2	.1	45	42	53	7.3	7.8	8.7	8	2	17	0	0	2.0	19
20	1.0	.2	.1	48	42	54	7.7	7.9	8.7	8	1	14	0	0	2.0	20
21	1.1	.2	.1	52	43	55	7.8	7.9	8.7	5	1	10	0	0	2.0	21
22	1.1	.2	.1	53	46	57	7.9	8.2	8.8	5	1	10	0	0	2.0	22
23	1.1	.2	.1	51	49	60	7.7	8.1	8.8	4	1	10	0	0	2.0	23
24	1.3	.3	.1	50	53	63	7.6	8.3	8.8	5	1	10	0	0	2.0	24
25	1.2	.5	.1	53	55	62	7.6	8.3	8.8	3	1	10	0	0	2.0	25
26	1.1	.3	.1	54	53	66	7.7	8.2	8.8	3	0	10	0	0	2.0	26
27	1.2	.4	.1	51	49	60	7.7	8.2	8.7	4	1	10	0	0	2.0	27
28	1.0	.1	.1	50	52	59	7.8	7.8	8.6	4	1	10	0	0	2.0	28
TOTAL	34.1	7.1	2.8	1327	1270	1579	213.7	221.2	244.0	182	30	418	2	0	55.7	
AVER.	1.2	.3	.1	47	45	56	7.6	7.9	8.7	7	1	15	0	0	2.0	

PER CENT WASH WATER USED ----- 2.2 --
WASH WATER RISE (IN. P.M.) 17.6
AV. NO. MIN. EACH FILTER WASHED 15-20
AV. LOSS OF HEAD FILTERS WASHED 1.0-2.0
COAG. BASINS--DATE LAST CLEANED --------
COPPER SULPHATE APPLIED:
DATE: ----------
WHERE: ----------
AMOUNT: 0

********** REMARKS **********

AVERAGE HRS. FOR EACH FILTER RUN = 100

HERCULES AEROSPACE DIVISION

HERCULES INCORPORATED

RADFORD ARMY AMMUNITION PLANT

AIR, WATER AND WASTE CONTROL LABORATORY

DRINKING WATER REPORT

September 1991

DATE	BUILDING		pH	Cl_2 p.p.m RESIDUAL	NO_3 p.p.m.	COLIFORM COUNT
	CAST AREA	MAIN PLANT				
-09-91		201	8.63	1.50	0.57	Absence
-09-91	4339-29		8.77	1.40	0.52	Absence
9-10-91		4922	8.63	0.62	0.48	Absence
-10-91	4931		8.63	1.20	0.44	Absence
9-17-91		229	8.89	0.42	0.43	Absence
-17-91	4711		8.62	0.90	0.34	Absence
-18-91		3567	8.64	1.50	0.40	Absence
9-18-91	0447		8.64	0.70	0.38	Absence
-24-91		# 1 Staff-Village	8.66	0.43	0.46	Absence
9-24-91	4736		8.64	0.98	0.47	Absence

APPROVED BY R. Conkling

TITLE Supervisor

COMMONWEALTH OF VIRGINIA STATE WATER CONTROL BOARD

PERMITTEE NAME/ADDRESS (INCLUDE FACILITY NAME/LOCATION IF DIFFERENT)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) DISCHARGE MONITORING REPORT (DMR)

INDUSTRIAL MAJOR

06/26/86
STATE WATER CONTROL BOARD (REGIONAL OFFICE)

NAME: RADFORD ARMY AMMUNITION PLANT

ADDRESS: DEPT. OF THE ARMY
RADFORD VA 24141

FACILITY LOCATION: FILE NO. 22-3540.

PERMIT NUMBER: VA0000248

DISCHARGE NUMBER: 026

MONITORING PERIOD: FROM YEAR 91 MO 09 DAY 01 TO YEAR 91 MO 09 DAY 30

WEST CENTRAL REGIONAL OFFICE
P.O. BOX 7017
ROANOKE, VA. 24019
703-982-7432

NOTE: READ PERMIT AND GENERAL INSTRUCTIONS BEFORE COMPLETING THIS FORM.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	QUANTITY OR LOADING UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	QUALITY OR CONCENTRATION UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
001 FLOW	REPORTED	0.149	0.196		**********	**********	**********		0	CONT	MEAS
	PERMIT REQUIREMENT			MGD	**********	**********	**********			CONT	MEAS
002 PH	REPORTED	**********	**********		6.6	**********	7.6		0	1/D	GRAB
	PERMIT REQUIREMENT	**********	**********		6.0000	**********	9.0000	SU		1/D	GRAB
003 BOD5	REPORTED	3.9	4.5		**********	6.2	6.8		0	30/W	8HC
	PERMIT REQUIREMENT	114.0000	170.0000	KG/D	**********	30.0000	45.0000	MG/L		3 D/W	8HC
004 TOTAL SUS. SOLIDS	REPORTED	2.7	3.3		**********	4.4	5.0		0	30/W	8HC
	PERMIT REQUIREMENT	114.0000	170.0000	KG/D	**********	30.0000	45.0000	MG/L		3 D/W	8HC
005 TOTAL CL2	REPORTED	**********	**********		0.5	**********	2.8		16	3/D	GRAB
	PERMIT REQUIREMENT	**********	**********		1.0000	**********	2.0000	MG/L	27	3/D	GRAB
	REPORTED										
	PERMIT REQUIREMENT										
	REPORTED										
	PERMIT REQUIREMENT										
	REPORTED										
	PERMIT REQUIREMENT										

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW (M.G.)	TOTAL BOD5 (K G)

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ATTACHMENTS AND THAT, BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. § 1001 AND 33 U.S.C. § 1319. (Penalties under these statutes may include fines up to $10,000 and/or maximum imprisonment of between 6 months and 5 years.)

OPERATOR IN RESPONSIBLE CHARGE			DATE		
C. B. Weeks	C. B. Weeks	000482	91	10	4
TYPED OR PRINTED NAME	SIGNATURE	CERTIFICATE NO.	YEAR	MO	DAY
PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT		TELEPHONE	DATE		
for Shelley Barker	R. L. Richardson	703 639-8482	91	10	07
TYPED OR PRINTED NAME	SIGNATURE	AREA CODE / NUMBER	YEAR	MO	DAY

SWCB NPDES FORM 5

COMMONWEALTH OF VIRGINIA STATE WATER CONTROL BOARD

PERMITTEE NAME/ADDRESS (INCLUDE FACILITY NAME/LOCATION IF DIFFERENT)

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) DISCHARGE MONITORING REPORT (DMR)

INDUSTRIAL MAJOR 06/26/86

STATE WATER CONTROL BOARD (REGIONAL OFFICE)

NAME RADFORD ARMY AMMUNITION PLANT

ADDRESS DEPT. OF THE ARMY
RADFORD VA 24141

FACILITY LOCATION FILE NO. 22-3540.

VA0000248 PERMIT NUMBER

028 DISCHARGE NUMBER

MONITORING PERIOD FROM YEAR 91 MO 09 DAY 01 TO YEAR 91 MO 09 DAY 30

WEST CENTRAL REGIONAL OFFICE
P.O. BOX 7017
ROANOKE, VA. 24019
703-982-7432

NOTE: READ PERMIT AND GENERAL INSTRUCTIONS BEFORE COMPLETING THIS FORM.

PARAMETER		QUANTITY OR LOADING AVERAGE	QUANTITY OR LOADING MAXIMUM	UNITS	QUALITY OR CONCENTRATION MINIMUM	QUALITY OR CONCENTRATION AVERAGE	QUALITY OR CONCENTRATION MAXIMUM	UNITS	NO. EX	FREQUENCY OF ANALYSIS	SAMPLE TYPE
001 FLOW	REPORTED	0.035	0.141		**********	**********	**********		0	CONT	RFC
	PERMIT REQUIREMENT			MGD	**********	**********	**********			1/D	MEAS
002 PH	REPORTED	**********	**********		6.3	**********	7.3		0	3/D	Grab
	PERMIT REQUIREMENT	**********	**********		6.0000	**********	9.0000	SU		1/D	GRAB
003 BOD5	REPORTED	1.0	2.3		**********	5.5	7.4		0	1/W	Grab
	PERMIT REQUIREMENT	8.5000	12.8000	KG/D	**********	30.0000	45.0000	MG/L		1/M	GRAB
004 TOTAL SUS. SOLIDS	REPORTED	2.1	4.3		**********	11.9	19.1		0	1/W	Grab
	PERMIT REQUIREMENT	8.5000	12.8000	KG/D	**********	30.0000	45.0000	MG/L		1/M	GRAB
005 TOTAL CL2	REPORTED	**********	**********		0.2	**********	2.0		3	3/D	Grab
	PERMIT REQUIREMENT	**********	**********		1.0000	**********	2.0000	MG/L	12	1/D	GRAB
	REPORTED										
	PERMIT REQUIREMENT										
	REPORTED										
	PERMIT REQUIREMENT										
	REPORTED										
	PERMIT REQUIREMENT										

ADDITIONAL PERMIT REQUIREMENTS OR COMMENTS

BYPASSES AND OVERFLOWS	TOTAL OCCURRENCES	TOTAL FLOW (M.G.)	TOTAL BOD5 (K G)

OPERATOR IN RESPONSIBLE CHARGE

TYPED OR PRINTED NAME	SIGNATURE	CERTIFICATE NO.	DATE YEAR	MO	DAY
C. B. Weeks	C. B. Weeks	000482	91	10	4

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED IN THIS DOCUMENT AND ALL ATTACHMENTS AND THAT, BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U S C § 1001 AND 33 U S C § 1319 (Penalties under these statutes may include fines up to $10,000 and/or maximum imprisonment of between 6 months and 5 years.)

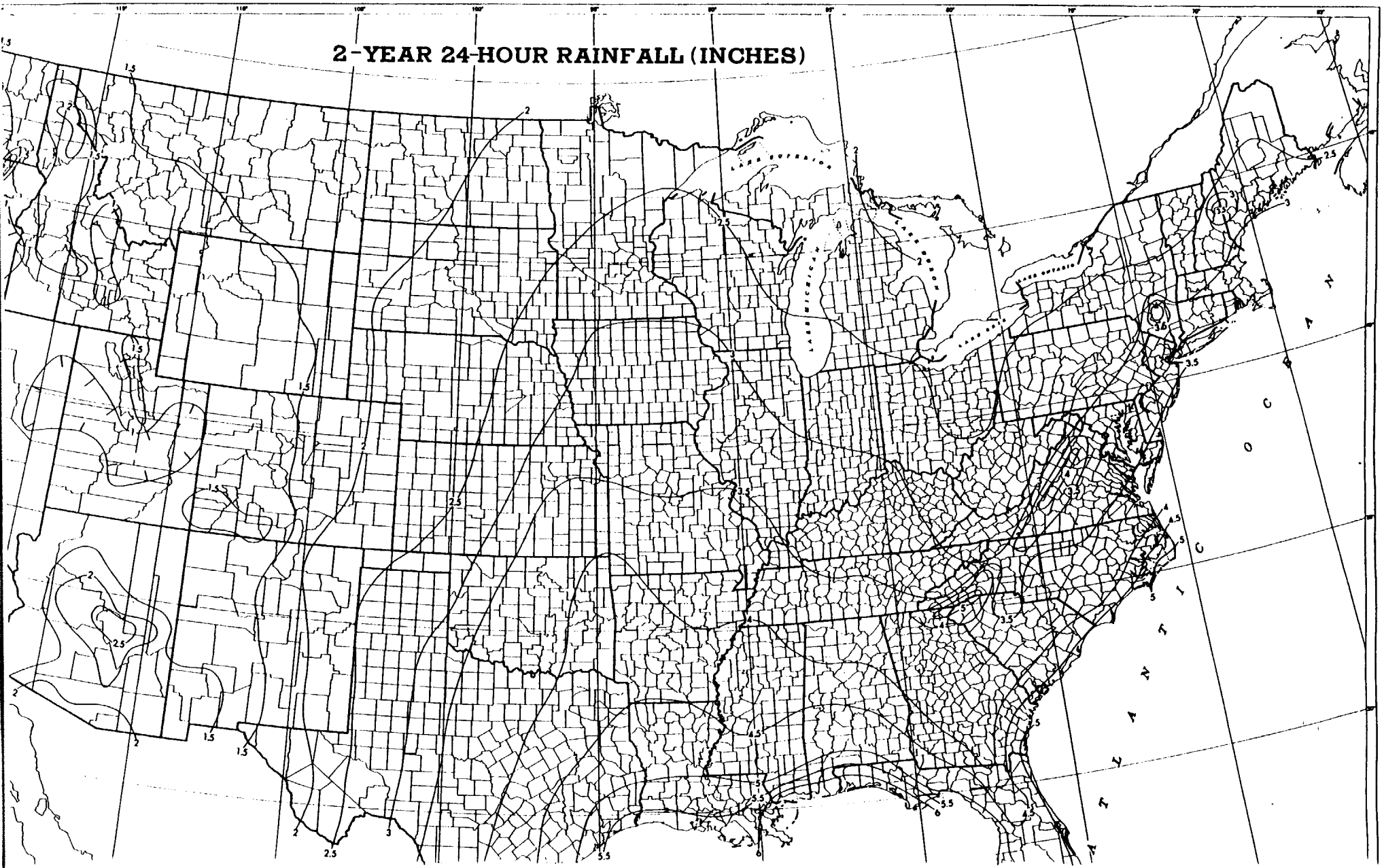
PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT

TYPED OR PRINTED NAME	SIGNATURE	AREA CODE	TELEPHONE NUMBER	DATE YEAR	MO	DAY
for Shelley Barker	R. L. Richardson	703	639-8482	91	10	07

SWCB NPDES FORM 5

REFERENCE 18

2-YEAR 24-HOUR RAINFALL (INCHES)



REFERENCE 19

SPECIAL FLOOD HAZARD INFORMATION REPORT

NEW RIVER

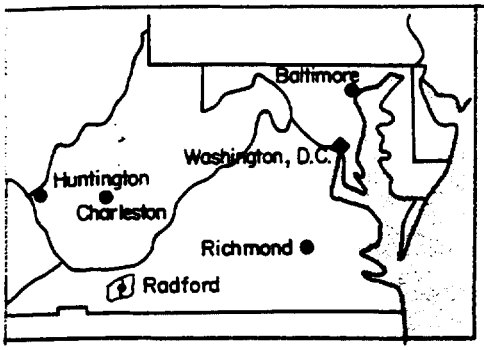
MONTGOMERY COUNTY AND PULASKI COUNTY VIRGINIA

PREPARED FOR
THE STATE WATER CONTROL BOARD
OF THE
COMMONWEALTH OF VIRGINIA

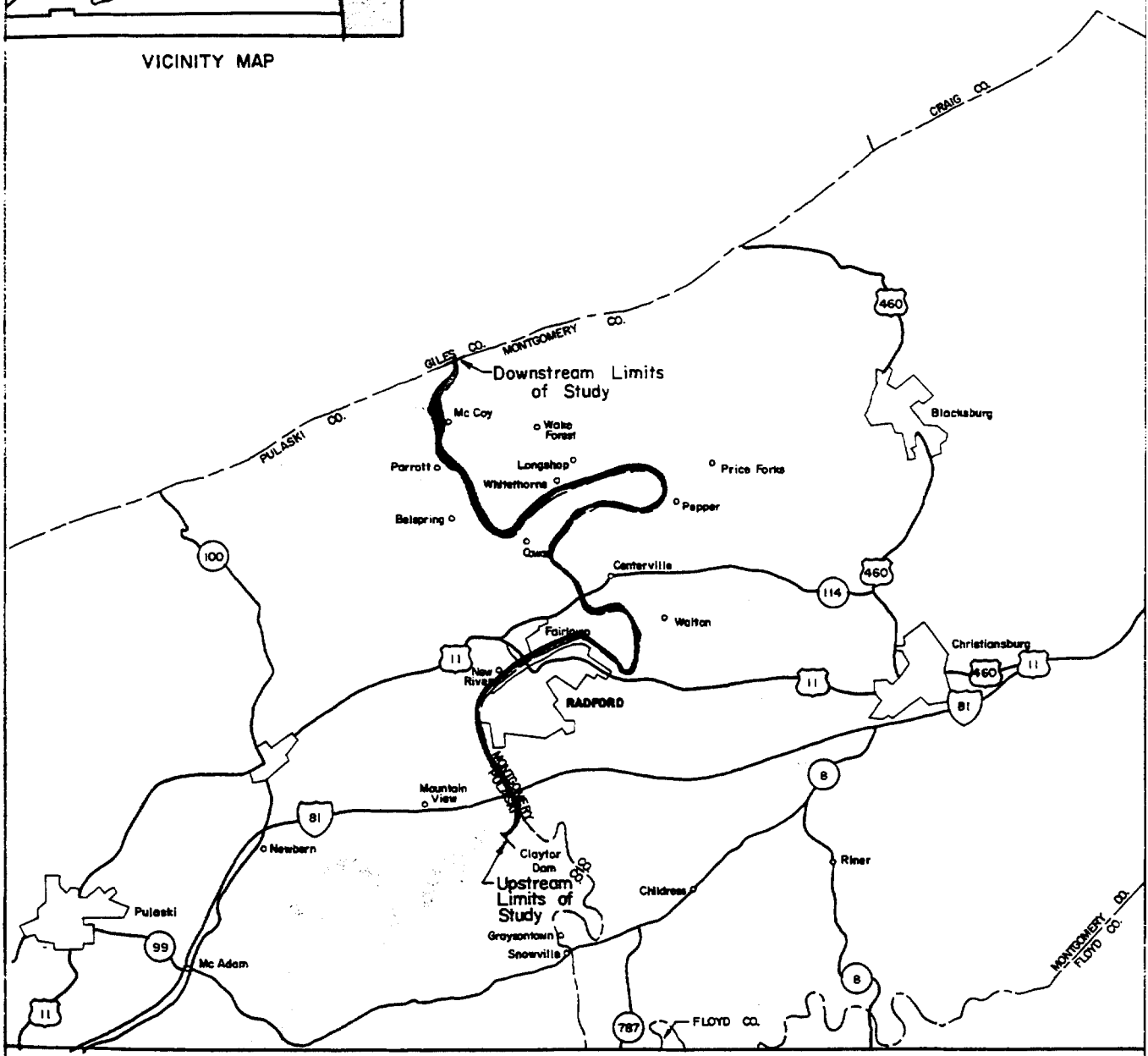
BY

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT, CORPS OF ENGINEERS
HUNTINGTON, WEST VIRGINIA

JULY 1977



VICINITY MAP



LEGEND

STREAM REACHES WITHIN PULASKI, MONTGOMERY COS. COVERED IN THIS REPORT

GAGING STATION

5 0 5

SCALE IN MILES

GENERAL MAP

NEW RIVER

PULASKI, MONTGOMERY COS.

VIRGINIA

Approximately 41 percent of the county's civilian work force are employed in manufacturing. Textile and furniture manufacturing plants, principally in the Pulaski area, are among the largest employers of the county citizenry.

Claytor Lake, an Appalachian Power Company hydro-electric reservoir on New River in the Radford-Dublin area, is the leading recreational attraction, perhaps, of the Upper New River Basin as well as an industrial development potential. As of July 1975, Pulaski County had an estimated population of 32,600 and a total area of 327 square miles.

The Stream and Its Valley

The general map (Plate 1) shows the contributing area network of streams within the study reach, the watershed boundary and other features of the New River drainage basin. Drainage areas for the New River watershed are shown in Table 1.

TABLE 1
DRAINAGE AREAS AND DISCHARGES
NEW RIVER

Location	Mileage Above Mouth	Drainage Area (Square Miles)	Discharge (c.f.s.) 100 Year Flood	Discharge (c.f.s.) 500 Year Flood
Montgomery, Pulaski-Giles County Line	124.35	2,918	198,860	400,000
Radford (USGS Gage)	145.10	2,748	193,000	400,000
Claytor Lake Dam	150.65	2,382	193,000	400,000

Montgomery County is geologically situated in the Valley and Ridge province, with its valley floor interrupted by a number of smaller ridges. Part of the area drains into the New River flowing northward along the county's western boundary and part drains eastward into the Roanoke River. Elevations range upward from about 1,800 feet above sea level; the higher points (Hightop Mountain, Abner's Knob, Pilot Mountain, Paris Mountain, Brush Mountain, Poor Mountain) have altitudes ranging from 2,700 to 3,700 feet.

Pulaski County lies in the Great Valley between the Blue Ridge and Allegheny Mountains. Elevations range from 1,600 to 3,600 feet above

Table 2 lists the crests and discharges of the ten major floods in the basin at the Radford U.S.G.S. gage. All of the stages have been adjusted to the present gage location.

TABLE 2

HIGHEST KNOWN FLOODS AT RADFORD U.S.G.S. GAGE
NEW RIVER MILE 145.10

Date of Crest	Discharge (a) (cfs)	Stage (b) (feet)	Elevation (feet above m.s.l.)
Aug 14, 1940	218,000	35.96	1,748.12
Sep 15, 1878(c)	217,000	34.84(d)(e)	1,747.00
Jul 16, 1916	200,000	33.14(d)	1,745.30
May 22, 1901	147,000	24.24(d)(e)	1,736.40
Jul 13, 1905	79,800	22.45(d)(e)	1,734.61
Jun 13, 1907	70,400	20.85(d)(e)	1,733.01
Jun 21, 1972	80,600	20.21	1,738.37
Dec 29, 1901	111,000	20.04(d)(e)	1,732.30
May 28, 1973	79,300	30.82	1,732.18
Jan 23, 1906	60,200	18.85(d)(e)	1,731.01

(a) As Published
(b) Zero Gage Elevation = 1,712.16 feet above m.s.l., datum of 1929
(c) Estimated
(d) Adjusted to Present Gage Location
(e) Gage Height Records Published for August 1898 to September 1907 are considered unreliable by U.S.G.S.

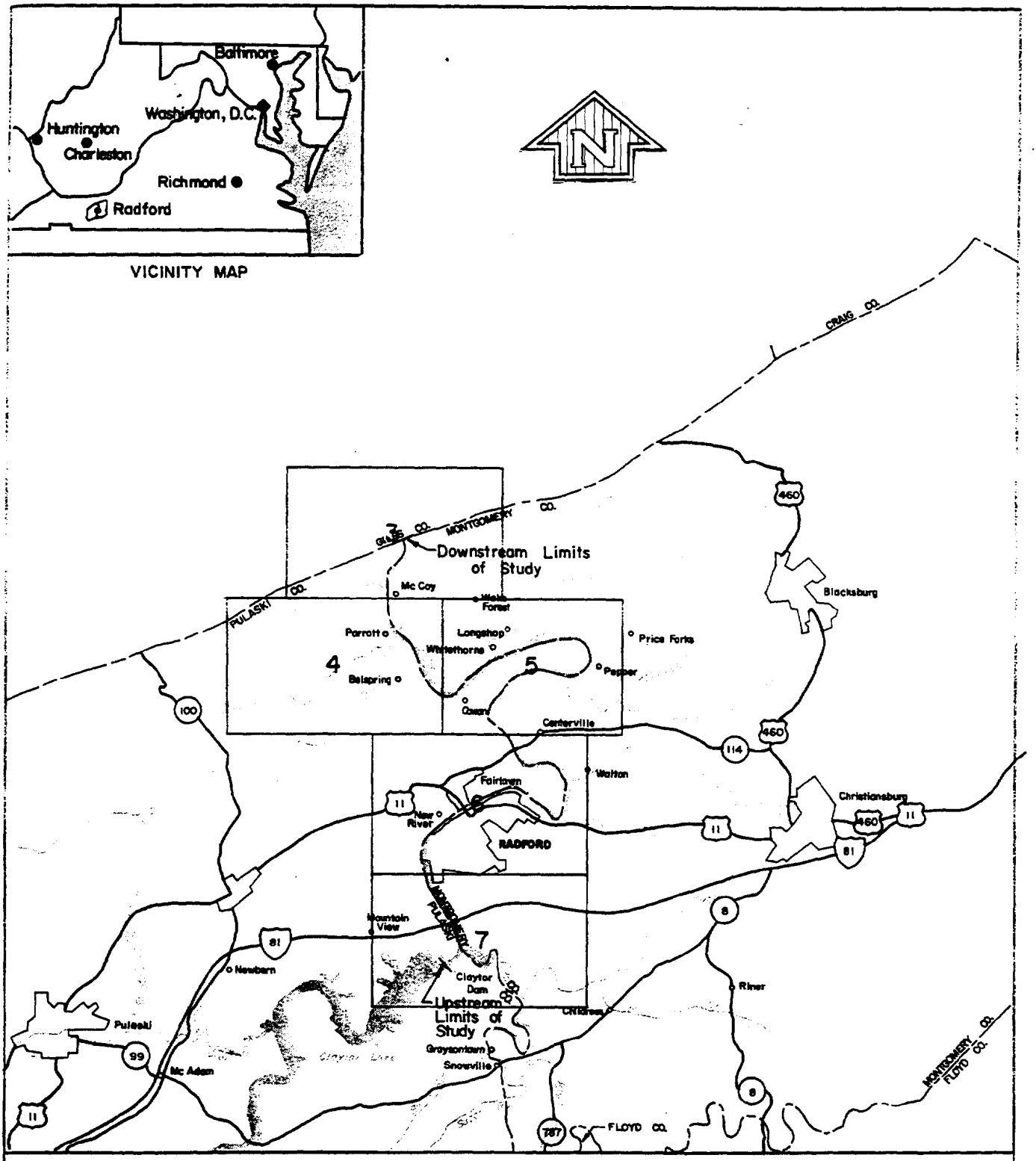
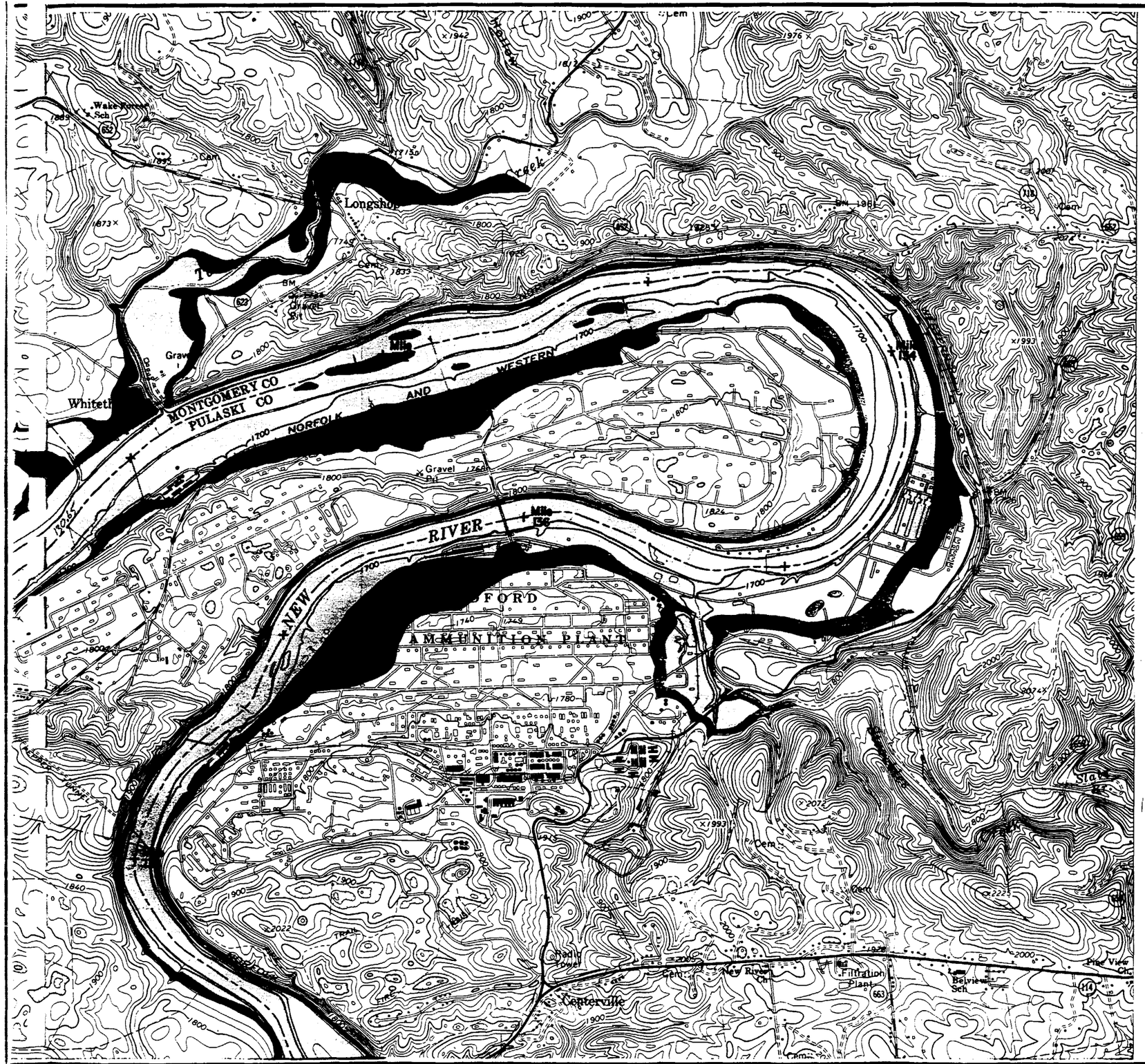

Baltimore
Washington, D.C.
Huntington
Charleston
Richmond
Radford
VICINITY MAP
N
CRAIG CO.
MONTGOMERY CO.
GILES CO.
PULASKI CO.
Downstream Limits of Study
Mc Coy
Wabb Forest
Parrott
Longshop
Whitethorne
Price Forks
Belspring
Pepper
Ozone
Centerville
Blacksburg
Fairlawn
Walton
New River
RADFORD
Christiansburg
Mountain View
Newbern
Claytor Dam
Upstream Limits of Study
Riner
Pulaski
Mc Adam
Graysontown
Snowville
Childress
FLOYD CO.
460
100
114
11
81
8
99
LEGEND
PLATE NUMBER
AREA COVERED
GAGING STATION
5 0 5
SCALE IN MILES
INDEX
TO
FLOODED AREA
MAPS

PLATE 2



LEGEND

500 - YEAR FLOOD OVERFLOW AREA

INTERMEDIATE REGIONAL FLOOD OVERFLOW AREA

— 1700 — GROUND ELEVATION IN FEET, M.S.L.

M+136 STREAM MILES ABOVE MOUTH

2000 0 2000 4000

SCALE IN FEET

NOTES

Base map taken from U.S. Geological Survey topographic maps.

Only backwater flooding from Main Stream is shown on smaller tributaries.

The actual limits of the overflow area on the ground may vary somewhat from that shown on the map because the contour interval and scale of the map do not permit precise plotting of the flooded area boundaries.

Elevations shown are based on Mean Sea Level Datum of 1929.
Contour interval is 20 feet.

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
HUNTINGTON, WEST VIRGINIA

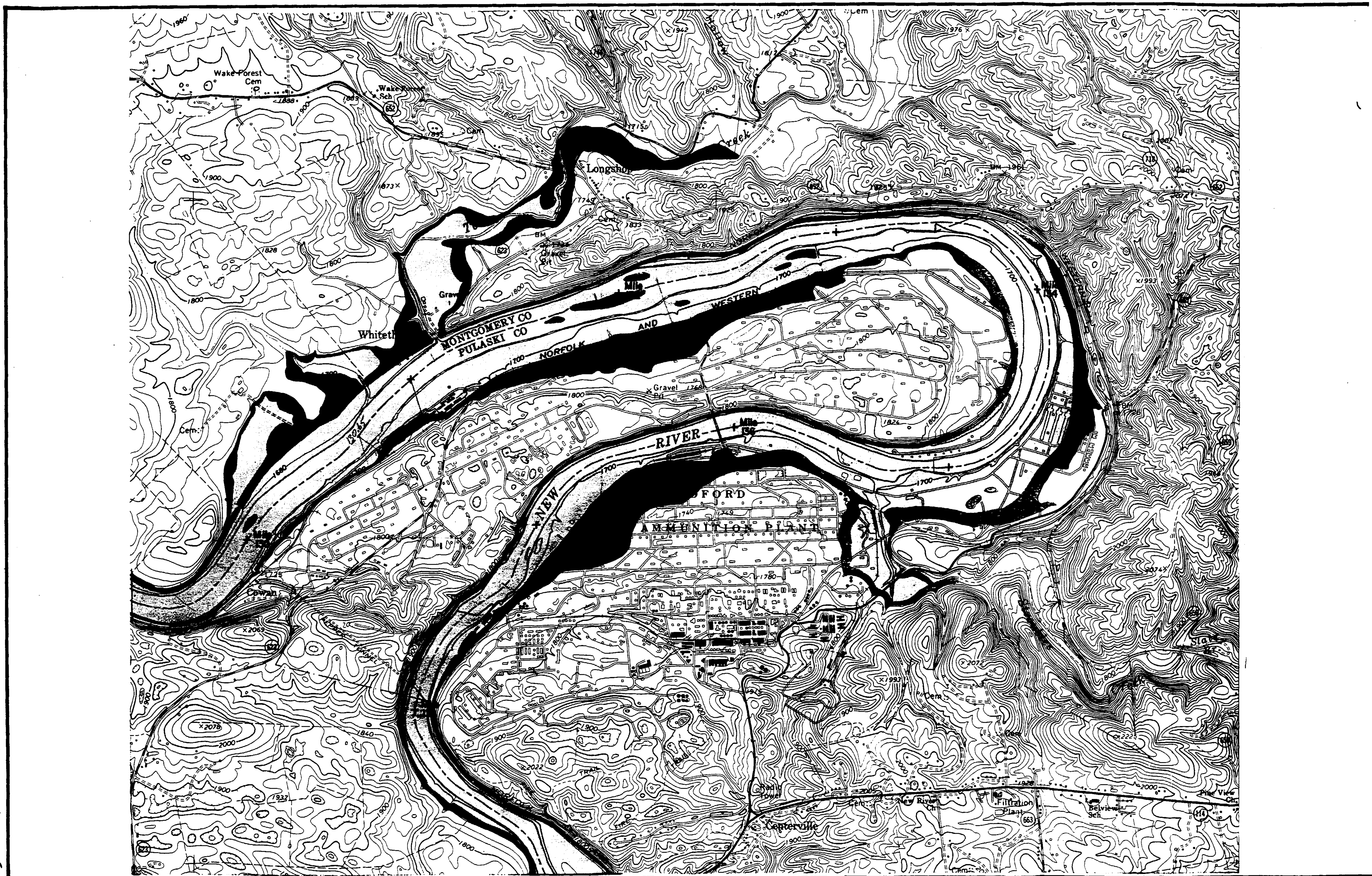
FLOODED AREAS

NEW RIVER

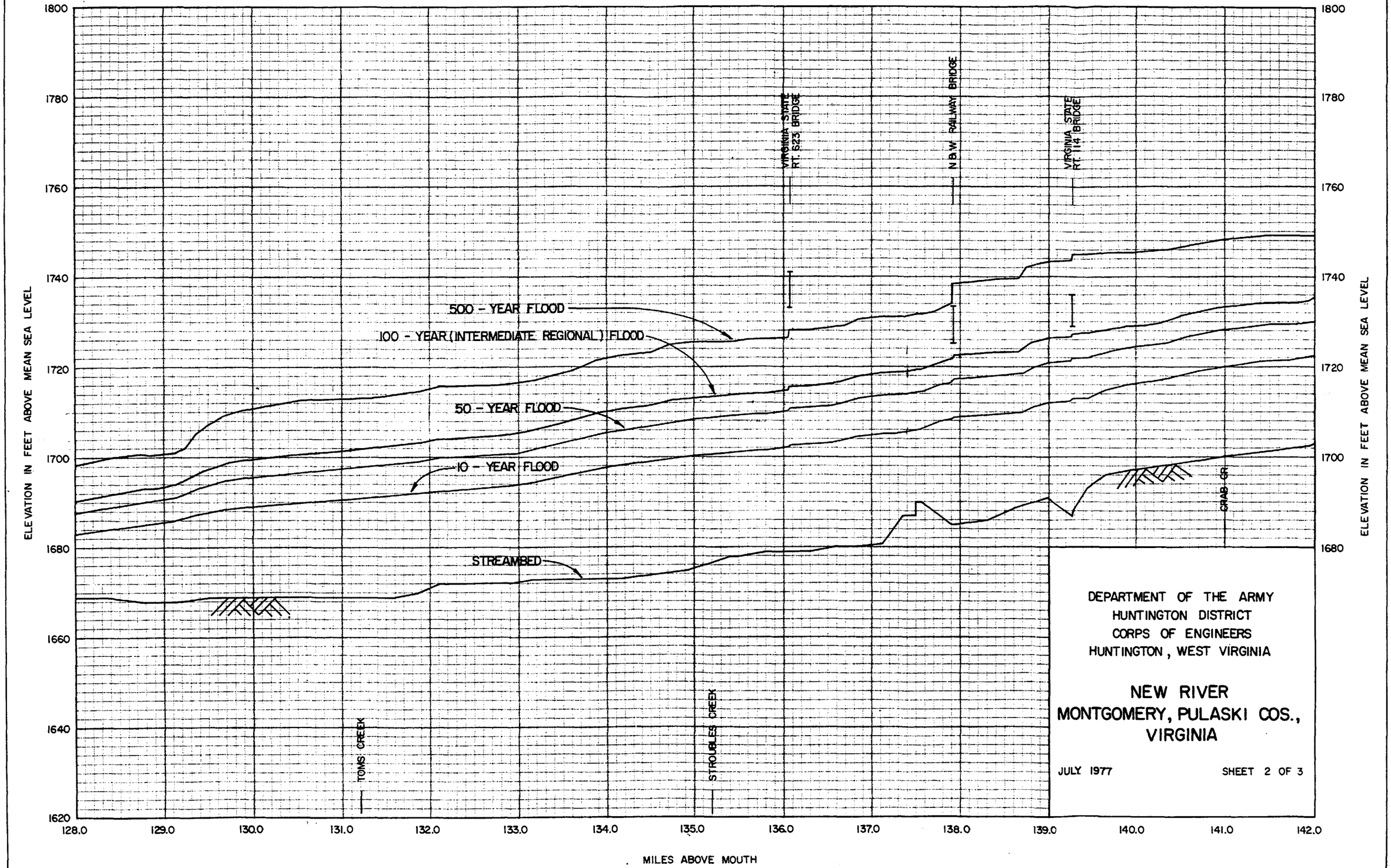
MONTGOMERY CO. & PULASKI CO.

MILE 129.3 TO MILE 139.0

PLATE 5



Wake Forest
Cem
Longshop
MONTGOMERY CO
PULASKI CO
NORFOLK
AND
WESTERN
NEW
RIVER
AMMUNITION PLANT
Cowan
Centerville
New River
Ch
Filtration
Plant
Belview
Sch
Pine View
Ch



DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT
CORPS OF ENGINEERS
HUNTINGTON, WEST VIRGINIA

NEW RIVER
MONTGOMERY, PULASKI COS., VIRGINIA

JULY 1977

SHEET 2 OF 3

PLATE 9

REFERENCE 21

WESTON

Originator

PHONE CONVERSATION RECORD

Conversation with:

Name Mr. Ron Southwick

Company Dept. of Game + Inland Fisheries

Address District V
Blacksburg, VA

Phone (703) 951-7929

Date 3/30/92

Time 4:00 AM/(PM)

☑ Originator Placed Call

☐ Originator Received Call

W.O. NO. 2281-11-10

Subject Annual Production of Fish on New River

Notes: Mr. Southwick does not have any human food chain organism production data for the New River. According to him, ~~the~~ only recreational fisheries exist and no production data has been compiled.

Mr. Southwick also said that there are no closed fisheries 0-15 miles downstream from RAAP on the New River.

☑ **File**

☐ **Tickle File** ___/___/___

☐ **Follow-Up By:**

☐ **Copy/Route To:**

Follow-Up-Action:

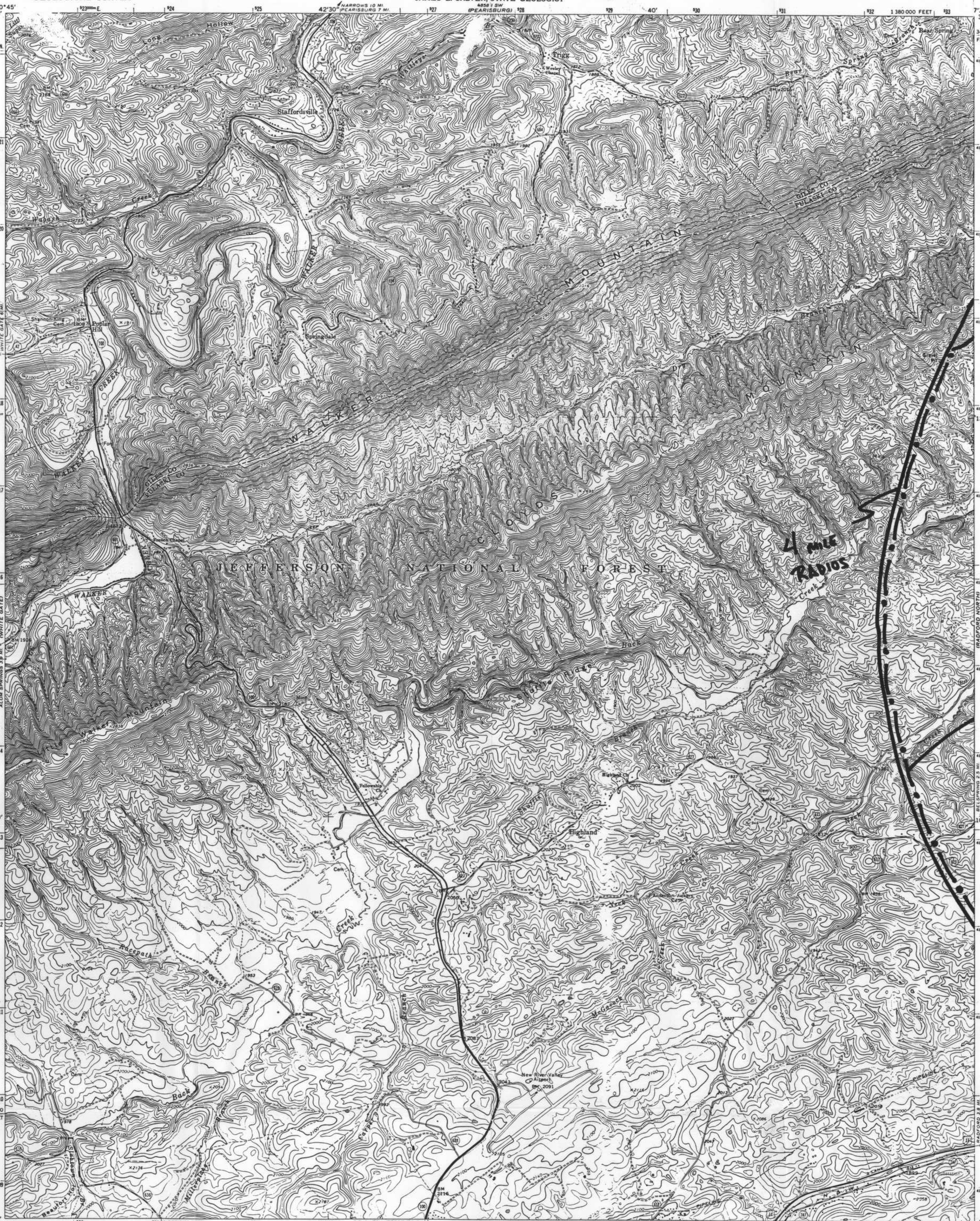
Originator's Initials

RFW 110-4-83

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF VIRGINIA
DIVISION OF MINERAL RESOURCES
JAMES L. CALVER, STATE GEOLOGIST

STAFFORDSVILLE QUADRANGLE
VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1965

Polyconic projection. 1927 North American datum
10,000-foot grid based on Virginia coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

Revisions shown in purple compiled in cooperation with Commonwealth of Virginia agencies from aerial photographs taken 1972 and 1976. This information not field checked. Map edited 1977

UTM GRID AND 1977 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
AND VIRGINIA DIVISION OF MINERAL RESOURCES, CHARLOTTESVILLE, VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

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

STAFFORDSVILLE, VA.

N3707.5—W8037.5/7.5

1965
PHOTOREVISED 1972 AND 1977
AMS 4858 II NW—SERIES V834

M1

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF VIRGINIA
DIVISION OF MINERAL RESOURCES

RADFORD NORTH QUADRANGLE
VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)
NE/4 RADFORD 15' QUADRANGLE

PRIVATE WELLS

SURFACE RUNOFF PATTERNS

RAAP SW INTAKE #2

RAAP SW INTAKE #1

PULASKI COUNTY WATER DEPT

CITY OF RADFORD WATER DEPT

4 NIKE RADAR

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1965

Polyconic projection. 10,000-foot grid ticks based on Virginia coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 9 meters south and 17 meters west as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

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

SCALE 1:24000

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

UTM GRID AND 1984 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

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

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U.S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
AND VIRGINIA DIVISION OF MINERAL RESOURCES, CHARLOTTESVILLE, VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

Revisions shown in purple and woodland compiled in cooperation with Commonwealth of Virginia agencies from aerial photographs taken 1982 and other sources
This information not field checked. Map edited 1984

RADFORD NO. ..., VA.
NE/4 RADFORD 15' QUADRANGLE
37080-B5-TF-024

1965
PHOTOREVISED 1984
DMA 4858 II NE-SERIES V834

M2

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF VIRGINIA
DIVISION OF MINERAL RESOURCES

BLACKSBURG QUADRANGLE
VIRGINIA—MONTGOMERY CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

4958 I SE (EGGLESTON)

4958 IV SE (MC DONALDS MILL)

4958 II NE (RADFORD NORTH)

4958 III NE (IRONTO)

4958 III SW (RINER)

4958 IV SW (NEWPORT)

(RADFORD SOUTH) 4958 II SE

(PILOT) 4958 III SE

MONTGOMERY COUNTY WATER DEPT

WELLS

2 MILE RADIUS

BLACKSBURG, VPI, CHRISTIANSBURG WATER DEPT

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1965

Projection. 10,000-foot grid ticks based on Virginia coordinate system, south zone

1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue

1927 North American Datum

To place on the predicted North American Datum 1983 move the projection lines 9 meters south and 18 meters west as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

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 1983 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Revisions shown in purple and woodland compiled in cooperation with Commonwealth of Virginia agencies from aerial photographs taken 1980 and other sources This information not field checked. Map edited 1983

SCALE 1:24000

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
AND VIRGINIA DIVISION OF MINERAL RESOURCES, CHARLOTTESVILLE, VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

VIRGINIA
QUADRANGLE LOCATION

ROAD CLASSIFICATION

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

BLACKSBURG, VA.

37080-B4-TF-024

1965
PHOTOREVISED 1983
DMA 4958 III NW—SERIES V834

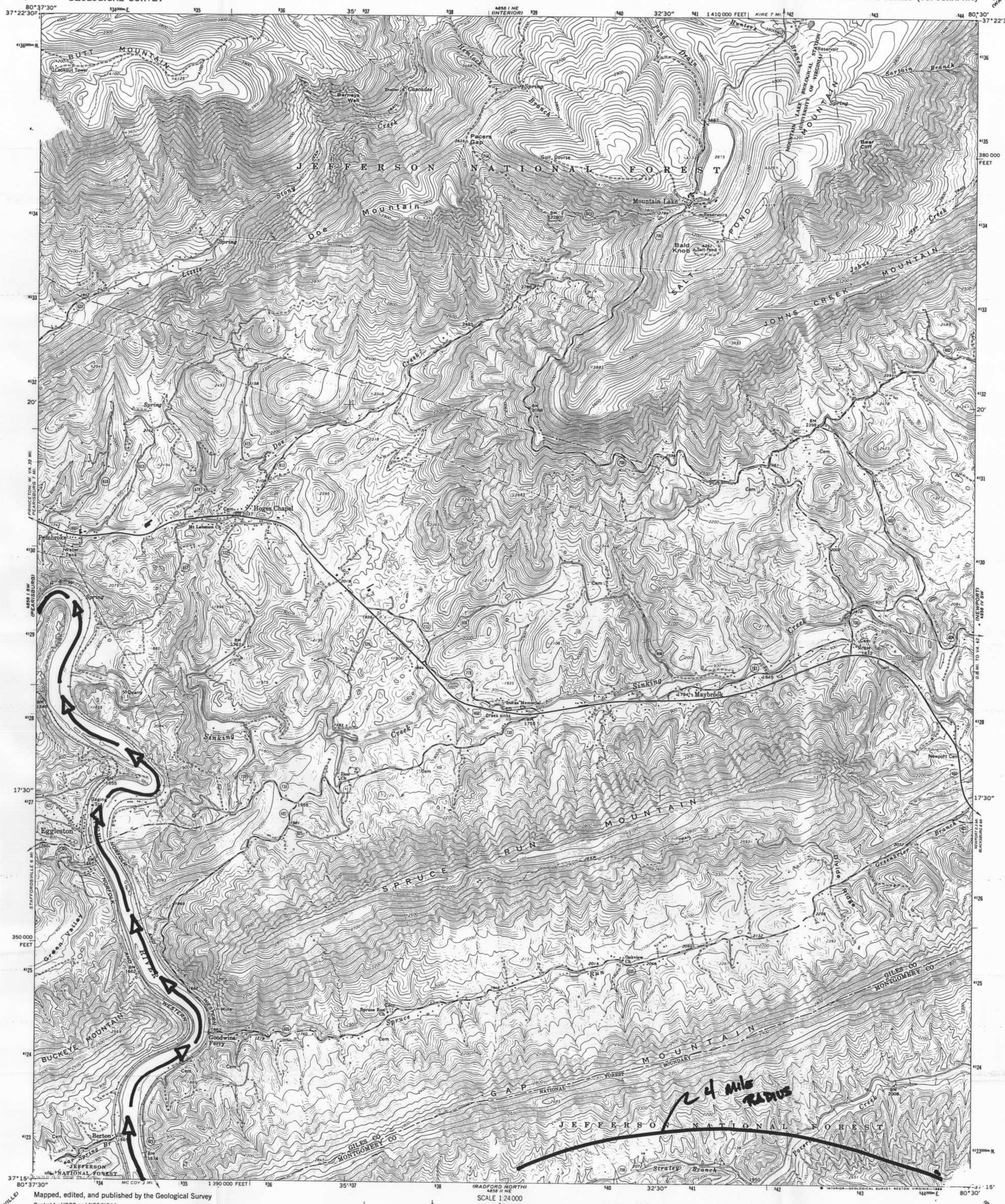
INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1984

M3

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF VIRGINIA
DIVISION OF MINERAL RESOURCES

EGGLESTON QUADRANGLE
VIRGINIA
7.5 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1965

Polyconic projection. 10,000-foot grid ticks based on Virginia coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 9 meters south and 17 meters west as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

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

MN GN
6° 107 MILS 0°16' 5 MILS

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

Revisions shown in purple and woodland compiled in cooperation with Commonwealth of Virginia agencies from aerial photographs taken 1982 and other sources. This information not field checked. Map edited 1985

SCALE 1:24000

1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER

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
AND VIRGINIA DIVISION OF MINERAL RESOURCES, CHARLOTTESVILLE, VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

VIRGINIA
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty	Light-duty
Medium-duty	Unimproved dirt
U. S. Route	State Route

EGGLESTON, VA.
37080-C5-TF-024

1965
PHOTOREVISED 1985
DMA 4858 I SE-SERIES V834

M4

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

COMMONWEALTH OF VIRGINIA
DIVISION OF MINERAL RESOURCES

PEARISBURG QUADRANGLE
VIRGINIA—GILES CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

4858 IV NE (PETERSTOWN)
4858 I NW (LINDSIDE)
4858 I NE (INTERIOR)
4658 IV SE (NARROWS)
4858 I SE (EGGLESTON)
(WHITE GATE) 4858 III NE
(RADFORD NORTH) 4858 I NE

80°45' — 80°37'30" — 37°22'30" — 37°15'

1 380 000 FEET — 380 000 FEET — 350 000 FEET

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1965

Polyconic projection. 10,000-foot grid ticks based on Virginia coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 17, shown in blue
1927 North American Datum
To place on the predicted North American Datum 1983 move the projection lines 9 meters south and 17 meters west as shown by dashed corner ticks

Fine red dashed lines indicate selected fence and field lines where generally visible on aerial photographs. This information is unchecked

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

UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24000

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
AND VIRGINIA DIVISION OF MINERAL RESOURCES, CHARLOTTESVILLE, VIRGINIA 22903
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGLE LOCATION

Revisions shown in purple and woodland compiled in cooperation with Commonwealth of Virginia agencies from aerial photographs taken 1982 and other sources. This information not field checked. Map edited 1985

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

PEARISBURG, VA.
37080-C6-TF-024

1965
PHOTOREVISED 1985
DMA 4858 I SW—SERIES V834

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1987

15 MILES

M5