UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Kanawha Valley Overview Report Revisions

DATE: APR 30 1986

FROM: John Ruggero, Chief
Environmental Programs Section (3ES12)

TO: Greene A. Jones, Director
Environmental Services Division (3ES00)

With the help of Rich, Deena, and Jim, the KVO Report revisions are finally complete with one exception -- the FIFRA portion, which has not yet been reviewed by the WV Dept. of Agriculture or approved by Larry Miller. Any changes to the FIFRA portion will not substantially affect the document, so I am providing a copy for your review now.

Attachment

cc: James Newsom (3ES10) w/attc.

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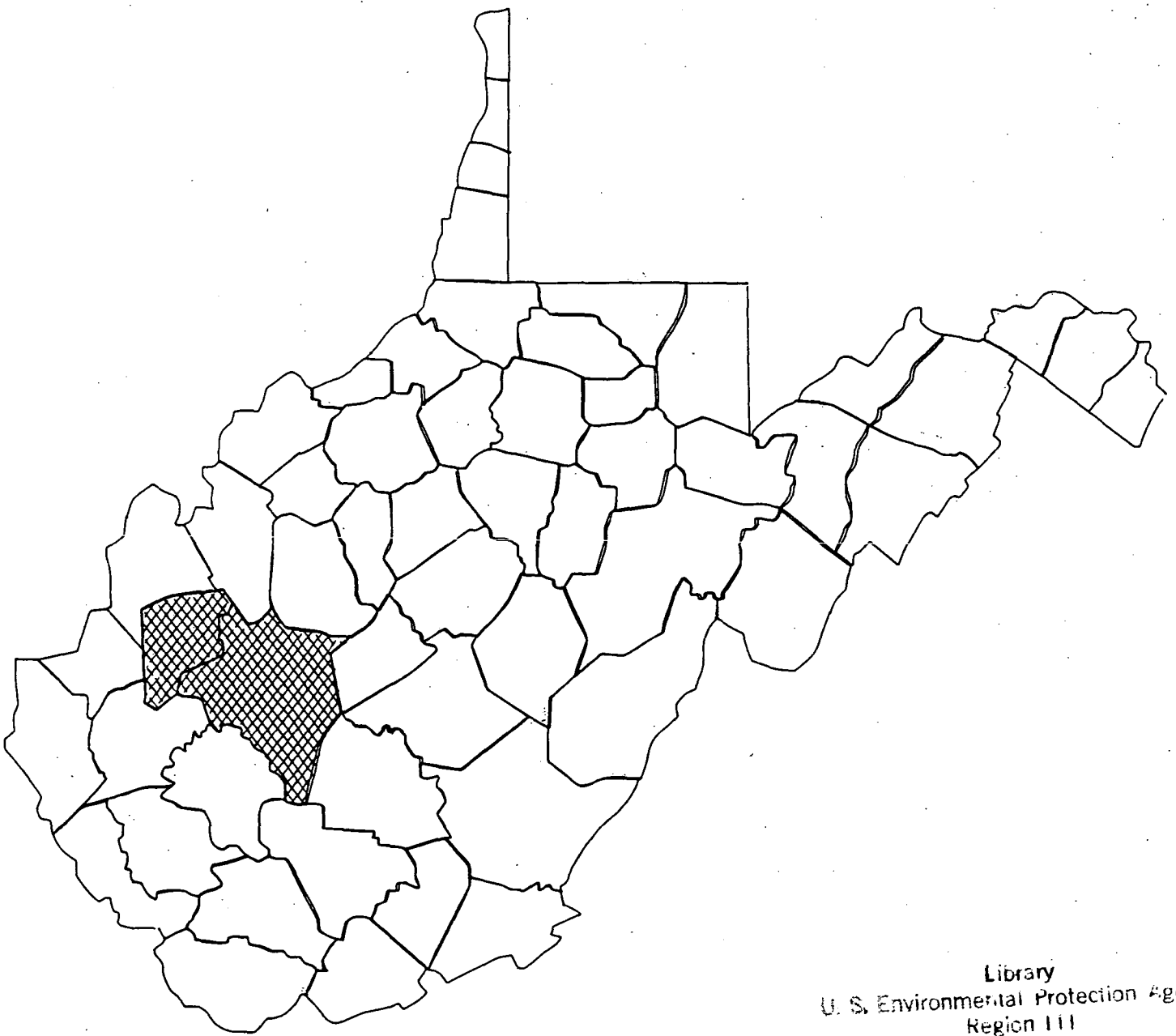
ENVIRONMENTAL OVERVIEW
KANAWHA VALLEY, WEST VIRGINIA



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U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 CHESTNUT BUILDING
PHILADELPHIA, PENNSYLVANIA 19107
APRIL 1986

SHADED COUNTIES
PUTNAM COUNTY
KANAWHA COUNTY

Acknowledgments

The Region appreciates the efforts of all those who helped write this document. Elizabeth Rhoads (Environmental Services Division) and Robert Kramer (Hazardous Waste Management Division) coordinated report preparation. Daniel D. Sweeney (Water Management Division), Joseph W. Kunz (Air Management Division), Dennis Carney (Hazardous Waste Management Division), Dr. Roy L. Smith (Environmental Services Division), and Elizabeth Rhoads wrote individual sections of the report. John Ruggero (Environmental Services Division), Elizabeth Rhoads and Richard Fetzer edited the final report. W. Deena Bradley typed the numerous drafts and final document.

The Region also extends its appreciation to the State of West Virginia for reviewing the draft of this report and for implementing many of the environmental protection programs discussed in this report.

Kanawha Valley, West Virginia
Environmental Overview

Table of Contents

Executive Summary

This report assesses the regulatory and environmental issues that are pertinent to the Kanawha Valley in West Virginia. Three major topics were considered in each EPA program. The conclusions in each topic are summarized below.

1. Status of Permit Issuance and Compliance

   - Permit issuance and compliance enforcement are being managed effectively by EPA and the State for all media.

   - Industry non-compliance with RCRA and NPDES permits are the primary focus of EPA and State enforcement actions.

   - All but one major water discharge permit will contain BAT effluent limit by the end of 1986. An important feature of many of these permits is a bioassay requirement to detect toxic pollutants in effluents.

2. Salient Issues

   - Effluent guidelines for the organic chemical industry have not been promulgated. Therefore, it has been difficult to issue comprehensive and consistent NPDES permits.

   - Fish tissue contamination by dioxin has resulted in the issuance of a fish consumption advisory by the Governor of West Virginia for the lower 45 miles of the Kanawha River.

   - Chronic and acute releases of toxic airborne pollutants require more comprehensive regulation.

   - 140 potential hazardous waste dumpsites have been identified by aerial photography. Resource limitations have prevented EPA from immediately verifying the existance of these sites.

   - As in many areas of the nation, the extent and severity of groundwater contamination in the Kanawha Valley is not well known. EPA's authority to require corrective action and to prevent releases to groundwater was acquired only in 1984 and guidance is not yet complete.

3. Current and Future Actions

° Because of the lack of effluent guidelines for the organic chemical industry, the State has been issuing NPDES permits with BAT limits based on best professional judgement.

° Additional fish and sediment samples are being analyzed in order to characterize the extent and severity of dioxin contamination in the Kanawha River and to identify the source of contamination.

° Several initiatives to prevent releases of toxic airborne pollutants are being implemented. EPA is implementing its National Strategy for Toxic Air Pollutants. The State is implementing a comprehensive emissions inventory program and a Community Right to Know Act. EPA and the State are performing a multi-media study to model ambient concentrations of airborne pollutants based on current emissions, to estimate risk to human health, and to identify possible source controls.

° Potential hazardous waste dumpsite are being investigated in accordance with a plan which establishes a schedule to investigate the highest prioirty sites first. All sites will be investigated by the end of 1987.

° Facilities receiving permits under the Resource Conservation and Recovery Act will be required to correct known groundwater problems by 1988. The extent of groundwater contamination at potential hazardous waste dumpsites is being evaluated under Superfund.

1.0 SUMMARY AND RECOMMENDATIONS

1.0 Summary and Recommendations

This report discusses environmental issues and programs pertaining to the industrial region of the Kanawha Valley in West Virginia. This report describes the status of environmental regulatory programs and responds to questions raised in an August, 1984 publication of the EPA National Enforcement Investigation Center (NEIC). The information presented here (1) explains the status of permit issuance and of compliance with existing permits, (2) identifies remaining environmental issues and constraints to their solution, (3) outlines plans for corrective actions, and (4) updates information presented in the NEIC report. The report includes the following findings and recommendations.

1. Water discharges - The Kanawha River receives treated industrial wastewater discharges from 19 major facilities, all of which have National Pollutant Discharge Elimination System (NPDES) permits. Fifteen of these permits are based on Best Available Technology Economically Achievable (BAT). Five permits are scheduled for reissuance with BAT limits by West Virginia in 1986. Three of these replace permits that currently contain non-BAT limits. The last remaining non-BAT permit will expire in 1987. Where necessary, the permits include bioassay and best management practices (BMP) conditions. However, EPA has not promulgated BAT guidelines for the organic chemical industry, so issuing complete and consistent permits for chemical companies is difficult. Two of the facilities violated permit limits significantly during the last quarter of 1985. In both cases, enforcement actions are being taken. Timely enforcement actions and permit reissuance, consistent with State/EPA Agreements, will be high priorities.

EPA and West Virginia will ensure that toxic substances discharges are controlled by reviewing permits when ambient toxicity is observed, by giving enforcement actions a high priority, and by assisting the State with applying the EPA toxic pollutant control policy to include water quality-based effluent limits in new permits. Reissued BAT permits are providing more comprehensive coverage of toxicants than in the past and include more effective limitations. This is a result of the increased amount of background data on toxic pollutants available in the permit application submitted by each facility, the forthcoming effluent guidelines for the organic chemical industry, and implementation of a toxicant control strategy.

In order to detect and reduce the number of leaks and spills, many reissued permits require implementation of best management practices (BMP) to better prevent such leaks and to detect them more quickly. In addition to actions under NPDES, EPA will continue to respond to these incidents as described below under Spills and Releases.

2. Ambient Water Quality - Statistical analyses of fish and benthic populations did not show significant temporal trends, however, data were sparse. The industrial area affected benthos significantly. Although ambient concentrations of arsenic, cadmium, copper, cyanide, lead, silver, and zinc decreased significantly since 1970, silver and arsenic

have continued to exceed EPA's water quality criteria frequently. Water quality criteria were also exceeded frequently in the Kanawha River above the industrial area, suggesting major inputs from nonpoint sources. High concentrations of dioxin in fish tissue were cause for the State to issue a fish consumption advisory for the Kanawha below its confluence with the Coal River.

Although the Kanawha is well-monitored compared to similar waterways, monitoring priorities were recently reviewed and modified. Investigations are underway to determine ambient levels of benzene, toluene, methanol, and vinyl chloride, and to find sources of dioxin, silver, arsenic, and selenium. The incidence of fish liver tumors is also being studied by West Virginia DNR under grants from EPA.

EPA expects to receive Federal Energy Regulatory Commission license applications for hydropower projects for review in 1986. EPA will review the cumulative impacts of these proposed projects to ensure that dissolved oxygen concentrations and other environmental factors in the River will not be affected adversely.

3. Air emissions - Of 19 major facilities in the Kanawha Valley, one is in violation of visible emissions standards. Federal regulations under §112 of the Clean Air Act presently include process and ambient standards for only six pollutants. EPA Headquarters has issued a Notice of Intent to list 10 toxic air pollutants under §112, which would increase EPA's authority to regulate emissions. West Virginia is implementing a comprehensive emissions inventory program and Community Right to Know Act.

Although present EPA regulations do not comprehensively address either chronic or acute releases of toxic air pollutants, West Virginia and EPA are jointly developing and implementing regulatory mechanisms to control and reduce such emissions to levels which protect human health. One such measure is West Virginia's recently announced voluntary reduction program. This joint program between West Virginia and industry in the Kanawha Valley, will reduce, in the very near future, current levels of air toxics emissions. One goal of such a program should be to investigate possible control measures that do not require the lengthy procedures required by §112 of the Clean Air Act for the control of hazardous air pollutants.

In addition, EPA announced its National Strategy for Toxic Air Pollutants on June 4, 1985. The Strategy will enhance national regulation, expand State programs, and develop multi-media control methods. EPA's Strategy emphasizes giving technical assistance to State programs. Accordingly, EPA is accelerating its efforts to establish health criteria and carcinogenic risk values for those substances believed to be most toxic. The purpose of criteria development is to enable State and local agencies to assess the risks to individuals and populations affected by specific facilities and to establish control limits necessary to reduce risk.

4. Ambient Air Quality - Air in the Kanawha Valley meets the National Ambient Air Quality Standards (NAAQS) for total suspended particulates (TSP), sulfur dioxide (SO_2), ozone (O_3), carbon monoxide (CO), and oxides of nitrogen (NO_x); TSP, SO_2, and lead concentrations have decreased, CO has remained stable, and NO_2 and O_3 have increased slightly.

Emission rates and ambient concentrations of unregulated airborne toxicants are unknown. To obtain data to assess this issue, EPA and the State are collaborating on a multi-media study with emphasis on airborne pollutants which will (1) model ambient concentrations based on current emissions, (2) estimate relative risks among various chemicals and sources, and (3) identify possible source controls.

5. RCRA - Three facilities have received final RCRA permits, one applicant was denied a permit, and 7 more have been requested to submit detailed Part B applications. All permits are expected to be issued by January 1988, and EPA intends to review noncompliance cases and consider enforcement. Four facilities were out of compliance with ground water monitoring regulations in 1985.

EPA's authority to require corrective action for releases to groundwater was acquired only in 1984, and guidance is not complete. All facilities receiving a RCRA permit will be required to take corrective actions at all solid waste management units where necessary by 1988. Assessing the extent of groundwater contamination is a concern nationally. WV and many other states have applied for grants under the Clean Water Act to increase their ability to study and solve groundwater problems. The extent of groundwater contamination at individual sites will also be evaluated under the CERCLA investigations discussed below.

6. CERCLA - EPA conducted a detailed search for hazardous waste dumpsites in response to the NEIC report. The search found 140 potential dumpsites, which have been categorized as follows: 34 (highest priority), 83 (medium), and 23 (low). This report presents a schedule for investigating these sites, which EPA and the State are implementing.

7. FIFRA - All 11 pesticide production sites were in compliance. EPA intends to continue inspections at the current level.

8. TSCA - Five facilities are listed as handling PCBs. Two have been inspected, one of which was out of compliance. That facility is under a consent decree to comply with TSCA regulations.

9. Spills and Releases - Enforcement actions have been taken for all enforceable violations. However, only 52% of reported spills and releases have been documented as exceeding a reportable quantity, and 89% of those which do exceed a reportable quantity are not enforceable violations. The reason is that most releases are of CERCLA hazardous substances to the atmosphere. These substances are usually not considered hazardous under the Clean Air Act, so EPA's only authority is under applicable emergency procedures. Because these procedures may be used only if specific criteria are met, enforcement is usually impossible. Regional Orders governing internal procedures for spill response enforcement have been revised to improve the thoroughness of follow-up actions. Fast emergency response to spill incidents has been achieved through West Virginia's spill alert program.

2.0 INTRODUCTION

2.0 Introduction

2.1 Background

In August 1984, the Environmental Protection Agency's (EPA) National Enforcement Investigation Center (NEIC) published a report titled, "Overview of Environmental Pollution in the Kanawha Valley." The report presented data on air and water pollution from the major industrial facilities in the Valley and on hazardous waste sites in the Valley. Environmental improvements and potential environmental issues were identified. Because the report raised many questions, EPA Region III decided to write a follow-up report. The purposes of this report are:

1. To describe the status of permit issuance and compliance with EPA's regulations for major industries;

2. To identify the remaining environmental issues and the constraints on studying and/or resolving them;

3. To outline action plans to study and resolve environmental issues; and

4. To update the status of the environmental issues raised by the NEIC report.

2.2 Geographic Area

The area covered by this study was identical to the study area used by NEIC for their study. Specifically the study encompassed the narrow developed valley of a 60-mile reach of the Kanawha River extending from Winfield Dam to Alloy (Figure 1). This area includes major industrial facilities at Alloy, Belle, South Charleston, Institute, and Nitro. A list of the major industrial facilities can be found in Table 1.

Figure 1. Location Map - Kanawha Valley Study Area

Taken From: NEIC Report, EPA 1984

Table 1

LIST OF MAJOR* INDUSTRIAL SOURCES OF TOXIC SUBSTANCES

	Facility Name	City
1.	Allied Chemical	Nitro
2.	Appalachian Power-Amos Plant	St. Albans
3.	Appalachian Power-Kanawha R. Plant	Glasgow
4.	Avtex Fibers[a]	Nitro
5.	Chemical Leaman Tank Lines	Institute
6.	Coastal Tank Lines	Nitro
7.	Diamond Shamrock	Belle
8.	DuPont	Belle
9.	Elkem Metals	Alloy
10.	FMC	Nitro
11.	FMC	S. Charleston
12.	Fike Chemicals/CST	Nitro
13.	Hatfield-Henson	Dunbar
14.	Kincaid Enterprises (Chemical Formulators)	Nitro
15.	Mason & Dixon Tank Lines	St. Albans
16.	Monsanto	Nitro
17.	S. Charleston Sewage Treatment Co.	S. Charleston
18.	Union Carbide[b]	Institute
19.	Union Carbide-Technical Center[c]	S. Charleston
20.	Union Carbide	S. Charleston

a. Plant closed.
b. Includes Goff Mountain Landfill and private trucking operations.
c. Includes Ward Hollow and Holz Pond waste disposal area.

* Classification based on a rating system used by the National Enforcement Investigation Center, August 1984.

3.0 PROGRAM SUMMARY

3.0 Program Summary

3.1 Introduction

The Environmental Protection Agency regulates environmental pollutants through the Clean Water Act, Clean Air Act, Resource Conservation and Recovery Act, Toxic Substances Control Act, and Federal Insecticide, Fungicide and Rodenticide Act, and the Comprehensive Environmental Response, Compensation and Liability Act. This chapter summarizes the various regulations and programs under these Acts as they apply to the Kanawha Valley. In many program areas, responsibility for permit issuance and enforcement has been transferred to the State of West Virginia. A description of the delegation status of each of these programs is also provided.

3.2 Program Description

Clean Water Act

The Federal Water Pollution Control Act Amendments of 1972, specifically §402, created the National Pollutant Discharge Elimination System (NPDES). Under this section, Congress authorized EPA or its delegated State agency to issue permits for discharges of pollutants to waters of the United States. This Act and the subsequent 1977 amendments, known as the Clean Water Act (CWA), require municipalities and industries to meet effluent limitations based on accepted treatment technology and to comply with water quality standards of the receiving stream. Discharging without an NPDES permit or in violation of permit conditions constitutes a violation of the CWA, subject to enforcement by EPA and its delegated State agency.

Routine ambient water monitoring is also required by the CWA. In the Kanawha River, the State monitors chemical, physical, and biological parameters in order to assess the status of water quality.

Clean Air Act

The Clean Air Act of 1970 (PL 91-604) gave air quality management a national focus. The Act under §109 required the EPA Administrator to establish National Ambient Air Quality Standards (NAAQS) which would be set at levels to protect human health (primary standard) and welfare (secondary standard). NAAQS have been set for six criteria pollutants: total suspended particulate matter (TSP), sulfur oxides, ozone, carbon monoxide, nitrogen oxides, and lead.

Under §110, the Act requires preparation of State Implementation Plans (SIP's) under which the States, subject to approval by the EPA Administrator, set emission standards for existing sources in order to achieve primary and secondary national air quality standards.

The Act under §111 and §112 also requires the Administrator to establish national emission standards for significant new pollution sources and for all sources emitting hazardous substances. §111 requires EPA to promulgate New Source Performance Standards (NSPS) for new and modified industrial plants. These standards have been issued for many industrial categories, including industrial and electric utility boilers, smelters, petroleum refining and storage, and synthetic organic chemical manufacturing.

Besides setting National Ambient Air Quality Standards for the criteria air pollutants, §112 requires EPA to control any other air pollutants which "may reasonably be anticipated to result in an increase in mortality or increase in serious irreversible, or incapacitating reversible, illness." The Act requires EPA to list each air pollutant suspected of being hazardous to human health, and then, within one year of listing, either set emission standards for point sources emitting the hazardous pollutant or determine that it is not hazardous to human health. Currently six substances have been listed as hazardous air pollutants under §112: asbestos, benzene, beryllium, mercury, radionuclides, and vinyl chloride.

In 1976 EPA began to develop a national methodology for screening potentially hazardous air pollutants. After evaluating exposure and health data, EPA developed an informal list of 37 hazardous air pollutants which, based on the data available at that time, seemed likely candidates for more extensive analysis and future emissions control. Since only a fraction of the total number of chemicals emitted by industrial facilities have been tested for possible health effects, it is likely that some hazardous substances have been omitted from the list. Because most of the 37 potentially hazardous substances are either particulate or volatile organic compounds (i.e., ozone precursors), they are controlled indirectly to varying degrees by controls of TSP and VOC's.

The indirect control of potentially hazardous substances through mandated control of TSP and VOC's is neither comprehensive nor uniform. Areas that achieved the ozone (O_3) standard by 1982, such as the Kanawha Valley, are not required to adopt additional control measures for various major VOC source categories as was required for those areas that did not attain the O_3 standard. Therefore, VOC sources in the Kanawha valley are not subject to an O_3 SIP requirement for an ozone non-attainment area.

In November 1983 EPA committed to review approximately 25 individual chemicals, primarily from the list of 37 hazardous air pollutants, and to decide by December 31, 1985 whether to list them as substances EPA intends to regulate under the Clean Air Act. Through that process 10 substances have been identified in a Federal Register notice of intent to list as explained in Chapter 5.

A correlative function of the Act (§309) gives the Administrator the responsibility to review and comment upon the environmental impact of any Federally-funded project or activity. Thereafter, if those actions are found unsatisfactory, remedies can be sought through mitigation, modification, or referral to the Council on Environmental Quality. The criteria by which projects and activities are evaluated are found in the other environmental statutes and regulations. The authority of this section is the basis for EPA's review of hydropower project environmental impact statements prepared pursuant to the National Environmental Policy Act. The potential effects of these projects are discussed in Section 4.3 below.

Resource Conservation and Recovery Act

Under Subtitle C of the Resource Conservation and Recovery Act (RCRA), permits are to be issued to facilities which treat, store or dispose of hazardous wastes. These permits are issued to ensure that hazardous wastes are handled in accordance with technical standards promulgated by EPA. Specific units or processes which are subject to a permit include: above ground containers or underground tanks used to store or treat hazardous waste, surface impoundments, waste piles, land treatment, landfills, and incinerators.

The RCRA permit application consists of two parts, Part A and Part B. The Part A application requires a minimum level of information concerning the facility while the Part B requires a detailed narrative description of the facility, its processes and wastes handled. For new facilities, both the Part A and Part B must be submitted to EPA or an authorized State agency at least 180 days before construction of the facility.

For existing facilities, a notification that a facility will treat, store or dispose of hazardous waste must be filed within 90 days after the specific waste is listed as a hazardous waste. Furthermore, within 6 months after the listing, an existing treatment, storage, or disposal (TSD) facility handling the waste must file a Part A application. These submittals enable the TSD facility to operate under the provisions of interim status. Under interim status, a facility is treated as if it had a RCRA permit. Existing facilities can operate under interim status until such time as it is withdrawn for failure to comply with specific requirements or when a final action is taken on a permit application.

Toxic Substances Control Act

In accordance with the Toxic Substances Control Act (TSCA), industrial and non-industrial facilities which have stored, used or disposed of polychlorinated biphenyls (PCB's), are monitored for compliance with EPA's requirements. Compliance monitoring is accomplished through facility inspections. The inspections are scheduled

where a specific cause exists. A cause is determined based on complaints received, a computer based random selection process, or targeted by EPA-Headquarters. In the absence of an inspection, a decision cannot be made on the compliance status of a facility.

Federal Insecticide, Fungicide and Rodenticide Act

In accordance with the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), facilities which produce and/or hold pesticides for distribution are monitored for compliance with EPA's requirements. Inspections are used to monitor compliance. By statute, the inspections are limited to those areas where pesticides are stored in finished product form. Inspections do not review intermediate manufacturing activities.

Spills/Releases

Releases and spills of hazardous substances in excess of defined reportable quantities are required to be reported in accordance with §103(a) of CERCLA and §311 of the CWA. Furthermore, §311 specifies enforcement actions which EPA can take should the spill exceed a reportable quantity and reach a navigable waterway. Although CERCLA requires that releases be reported, §103(a) does not provide specific enforcement authority to pursue penalties merely because a release occurred.

3.3 Delegation Status

Clean Water Act

The NPDES permitting authority was delegated in May 1982 to the West Virginia Department of Natural Resources. Under this authority, the State has primacy for permit issuance and compliance. The State receives and reviews all applications, establishes effluent limitations, and issues all permits. They are responsible for reviewing discharge monitoring reports, providing inspections and initiating enforcement action where appropriate. EPA's primary role is one of overview to ensure compliance with NPDES regulations. EPA reviews and approves permits issued or reissued to all major dischargers and to certain categories of minor dischargers, such as coal mining operations, which are considered to be primary industries. The Agency also provides quarterly reviews of discharge monitoring reports and State compliance activities for all major permits. The State and EPA communicate frequently about permit issuance and compliance activities and related developments in NPDES regulations and program policies.

Clean Air Act

Federally enforceable West Virginia Air Pollution Control Commission (APCC) regulations, required by §110 of the CAA, set stationary source emission standards for TSP, sulfur oxides, and ozone.

As allowed under the CAA, the NSPS and National Emission Standards for Hazardous Air Pollutants (NESHAPS) programs were delegated to the State of West Virginia on July 24, 1984. This delegation is consummated in the APCC regulations XVI and XV for NSPS and NESHAPS, respectively. The NSPS regulation is applicable to the new Union Carbide - South Charleston methyl chloride unit while the NESHAPS regulation is applicable to its vinyl chloride emissions. There are no other known sources in the Kanawha Valley which are subject to regulations XVI and XV.

Delegation of the Prevention of Significant Deterioration (PSD) program to the State has been proposed. It is expected to be Federally approved in the near future.

Resource Conservation and Recovery Act

In accordance with the Resource Conservation and Recovery Act (RCRA), active hazardous waste management facilities are monitored for compliance with existing permit conditions or interim status requirements. West Virginia has obtained final authorization for their RCRA program in phases. The State performs inspections and takes enforcement actions against facilities which are currently operating under the provisions of interim status. EPA monitors the State's performance and initiates enforcement actions where necessary.

West Virginia is responsible for "calling in" (requesting facilities to submit) and reviewing Part B permit applications. West Virginia is also authorized to issue storage, treatment and incineration permits and permits for land disposal. However, as a result of the Hazardous and Solid Waste Amendments (HSWA) of 1984, it will be necessary for West Virginia to undergo new authorization efforts to ensure that the additional requirements in the HSWA are incorporated into the State program.

Toxic Substances Control Act

The PCB compliance program is managed by EPA and there is no delegation to the State of West Virginia.

Federal Insecticide, Fungicide, and Rodenticide Act

The FIFRA compliance/enforcement activity in West Virginia is fully delegated to the West Virginia Department of Agriculture (WVDOA) and EPA performs oversight of State performance.

Spills/Releases

The spill response program is not delegated to any state in Region III, however all of the States, including West Virginia, have their own spill response capability.

4.0 ENVIRONMENTAL AND REGULATORY PROGRAMS STATUS

4.0 Environmental and Regulatory Programs Status

This chapter describes the status of the environmental control programs within the Kanawha Valley. Specifically, it addresses the following:

1) Status of permitting for the major facilities under EPA permit programs;
2) Status of the major facilities' compliance with EPA regulations;
3) Ambient water quality;
4) Ambient air quality;
5) Review of Regional procedures for responding to industrial spills and releases;
6) Status of hazardous waste site investigations.

4.1 EPA Permit Programs

Water Permits

NPDES permits were issued for five-year maximum periods to Kanawha Valley chemical plants and other industries requiring Best Practicable Control Technology Currently Available (BPT) effluent limits by July 1, 1977. BPT primarily limits BOD (organic waste), suspended solids, pH, metals, and certain other known pollutants for specific industrial categories. By July 1, 1984, industries were required to meet Best Available Technology Economically Achievable (BAT) limits for toxic pollutants. Because of the complexity of the organic chemical industry and different viewpoints of EPA and industry representatives, effluent guidelines are not expected to be issued by EPA before mid-1986. Consequently, BPT and BAT permit limits are based on best professional judgment (BPJ). Permits reissued after BAT effluent guidelines are promulgated must contain guideline limits.

Under its delegation agreement with EPA the State has been issuing BAT permits based on BPJ with five year duration periods since 1984. Currently, 15 of the 19 facilities listed in Table 1 have BAT limits. By the end of 1986, 18 facilities are expected to have BAT limits in effect. The remaining non-BAT permit (CST/Fike) will expire in 1987. The permit issuance status for each facility is summarized in Table 2 and more fully described in Appendix A, Table A-1.

The BPJ permit limits for chemical industries are based on a number of factors including: proposed effluent guideline limits for conventional and toxic pollutants, EPA treatability studies describing removal efficiencies for different toxic pollutants, statistical analysis of current treatment levels, and a review of data reported in permit applications for 129 toxic pollutants. The proposed discharges are also evaluated to ensure that they do not violate water quality standards. Efforts are made to be as consistent as possible considering the absence of effluent guidelines and the diversity of plant characteristics.

In most cases, few toxic pollutants are specifically limited, because they were not found in significant amounts in the processes or discharges. To control toxic discharges, BAT permits for chemical

plants include requirements for best management practices (BMP) plans, periodic bioassays, and toxic pollutant testing. BMP plans are intended to help prevent releases of toxic and other pollutants through leaks, spills and incidental plant runoff. When bioassays indicate toxicity, the State normally requests information from the permittee on possible pollutant sources and steps taken for toxicity reduction. Most permits reissued in 1986 will require the permittee to provide the State with this information upon discovering toxic bioassay results.

In 1984, EPA issued a policy for development of water quality based permit limits for toxic pollutants. To support implementation, EPA guidance was released in September 1985. The guidance describes more effective and uniform screening and permitting of toxicants through bioassays and evaluation of water quality criteria. West Virginia will be developing and implementing a toxicants control strategy in 1986 based on EPA policy and the guidance document.

RCRA Permits

In August 1984, EPA issued a National Permit Strategy for RCRA which establishes some guidelines for scheduling the issuance of RCRA permits. Working with DNR and considering the priorities established in the National Permit Strategy, EPA has developed a schedule for the issuance of RCRA permits for the major facilities. The schedule targets all major RCRA permits in the Kanawha Valley to be issued by January 1988. This schedule reflects the large number of facilities that require permits and the time required for a sound permit review which are problems influencing the National Permit Strategy. The specific permit status for each of the major facilities is outlined in Table A-2 in the Appendix. Four of the 11 facilities considered as major facilities under RCRA have been issued a final RCRA permit or have been denied a permit. Permits were issued to FMC in Nitro and to two Union Carbide plants in S. Charleston. A permit was denied to CST, Inc. in Nitro. Until final permits are issued, existing facilities will operate under interim status provisions as explained in Section 3.2.

Multimedia Summary of EPA Permit Programs

Table 2 on the following page summarizes the status of permitting under the two covered programs, RCRA and NPDES. Facilities which are listed as "Not Applicable" under the column with the RCRA status heading are not considered major facilities under the RCRA program criteria. All facilities have 6 months to submit their Part B application after EPA or the State requests or "calls in" the application.

The NPDES columns identify expiration dates and control types for existing permits and target dates and control types for proposed permits.

4.2 Compliance with EPA Regulations

Statements made in this report about the compliance of particular facilities with certain laws or regulations are based only on the

TABLE 2

MULTI-MEDIA PERMIT SUMMARY

FACILITY/LOCATION	RCRA STATUS	NPDES EXISTING PERMIT EXP. DATE	NPDES EXISTING PERMIT TYPE	NPDES REISSUANCE TARGET DATE	NPDES REISSUANCE TYPE
Allied Chemical/Nitro	Not applicable	1/3/89	BAT	---	---
Appalachian Power/St. Albans	Not applicable	8/16/90	BAT	---	---
Appalachian Power/Glasgow	Not applicable	11/8/89	BAT	---	---
Chemical Leaman/Institute	Not applicable	1/21/86	BAT	5/86	BAT
Coastal/Nitro	Not applicable	11/18/90	BAT	---	---
CST Inc.,/Fike Chemicals/Nitro	CST, Inc. Permit Denied; 3/86, Fike Part B received	3/5/87	BCT*	---	---
Diamond Shamrock/Belle	Not applicable	1/26/91	BAT	---	---
E.I. DuPont/Belle	Part B called in	9/23/86	BAT	---	---
Elkem Metals/Alloy	Not applicable	3/8/87	BAT	---	---
Fike Chemical/Nitro	Part B received	3/5/87	BAT	---	---
FMC/S. Charleston	Part B called in	6/30/81 (extended)	BPT	8/86	BAT
FMC, Nitro	Permit issued	1/31/81 (extended)	BPT	5/86	BAT
Hatfield & Henson/Dunbar	Not applicable	11/13/90	BAT	---	---
Kinkaid/Nitro	Not applicable	9/16/86	BAT	9/86	BAT
Mason & Dixon/St. Albans	Not applicable	3/12/91	BAT	---	---
Monsanto/Nitro	Part B received	3/10/91	BAT	---	---
S. Charleston STP, S. Charles.	Not applicable	1/4/80 (extended)	BPT	5/86	BAT
Union Carbide/Institute	Part B received	10/30/86	BAT	---	---
Union Carbide/S. Charleston	Permit issued	6/13/89	BAT	---	---
Union Carbide Tech R & D Laboratory/S. Charleston	Part B received	12/17/90	BAT	---	---

*Best Conventional Treatment; no toxicants limited

writers' information and understanding. Such statements should not be relied on as definitive findings of the Agency as to either compliance or non-compliance.

Water

NPDES permit compliance data are derived primarily from self-monitoring reports submitted by all permitted dischargers to the State. Monitoring reports for major dischargers are also sent to EPA Region III. Quarterly non-compliance reports are prepared and submitted to EPA Region III by the State. These reports identify all violations by major dischargers and subsequent enforcement actions taken. All major dischargers are inspected and sampled at least yearly with follow-up inspections where violations are discovered.

The most recent compliance status for the major Kanawha Valley industrial discharges is shown on Table 3. As indicated, two dischargers violated effluent limitations significantly during the last quarter of 1985, and eight dischargers had minor violations. For the purposes of this report, violations are considered significant if they are about twice the permit limit or occur on a frequent basis. Enforcement actions are being taken for the two dischargers having significant violations: EPA with State support is preparing Federal Court action against CST/Fike for chronic effluent violations, primarily involving oil and grease, phenols and BOD limits. The State has imposed a compliance schedule for S. Charleston Treatment Company for providing adequate disinfection facilities to eliminate large and frequent violations of effluent limits for fecal coliform bacteria concentrations.

A comprehensive summary of compliance status for the past three years is shown in Appendix B. This includes parameters violated, causes, corrections, and enforcement actions for each industry. In most cases where violations were noted, the permittee was contacted by the regulatory agency regarding the causes and planned or completed corrections. Regulatory agencies did not generally issue administrative orders or take other enforcement actions for noncontinuous violations which did not threaten the environment or human health.

Each year, EPA and the State sign a formal agreement which outlines procedures and actions to be followed in enforcing environmental laws. The current State/EPA enforcement agreement requires the State to take enforcement action within 180 days when a major discharger has been in significant non-compliance for two consecutive quarters. This significant non-compliance appears in the quarterly report submitted to EPA Region III by the State. If the State does not take enforcement action, it is incumbent upon EPA Region III to do so. Where human health is threatened, EPA may take immediate enforcement action.

Air

Of the nineteen major facilities located in the Kanawha Valley, only one facility is clearly in violation of any applicable Federal or State regulations. Elkem Metals in Alloy is currently in violation

of standards governing visible emissions from the facility's boilers. The WV APCC is actively pursuing correction of the violations with the company.

All the remaining facilities are in compliance with both particulate and sulfur emissions. Some questions arise as to the compliance status of these facilities with regard to VOC emissions. Insufficient data exist upon which a judgement of either compliance or non-compliance for these facilites can be made.

RCRA

EPA and DNR have performed a compliance review of the 11 facilities in the Kanawha Valley classified as major facilities under RCRA. The review indicated that at this time, 6 of the 11 RCRA permitted facilities are not in compliance with interim status or permit requirements. Appropriate enforcement actions to improve compliance are currently being taken or considered by DNR and EPA. Table B-3 in the Appendix lists the major RCRA facilities in the Valley and their current compliance status, and reasons for any non-compliance.

TSCA

Of the 19 major facilities in the Kanawha Valley listed in Table 1, only 5 are listed in EPA's master list of facilites which may use PCB's. This master list and a neutral selection process are used to schedule PCB inspections. Union Carbide - Institute was inspected in December, 1984. No additional PCB inspections in the Kanawha Valley were scheduled in FY 85. The only other facility which was inspected by EPA is the Union Carbide - S. Charleston facility in 1982. As a result of the inspections, the Institute plant was found to be in compliance and the S. Charleston plant was found to be out of compliance. In April 1984 a consent order was issued to Union Carbide - S. Charleston bringing the facility into compliance.

FIFRA

A review of the compliance data gathered by routine State inspections for the 11 pesticide production sites in the Kanawha Valley was performed by EPA during a mid-year review in April 1985. Seven facilities are listed among those in Table 3 which are of multi-media significance. The review found that all of the facilities were in compliance with FIFRA requirements. Table B-4 lists the specific facilities along with specific compliance activities.

Multimedia Compliance Summary

Table 3 on the following page summarizes the compliance status in each program area for the major facilities. Additional information on the compliance status can be found in the previous sections and Appendix B.

Statements made in the following Table about the compliance of particular facilities with certain laws or regulations are based on the writers' information and understanding. Such statements should not be relied on as definitive findings of the Agency as to either compliance or non-compliance.

TABLE 3

MULTI-MEDIA COMPLIANCE PROGRAM SUMMARY

FACILITY	AIR (TSP & SO_2 Only)		WATER 4th Qtr 1985		RCRA		TSCA		FIFRA	
	IN COMP.	OUT OF COMP.	IN COMP.	OUT OF COMP.	IN COMP.	OUT OF COMP.	IN COMP.	OUT OF COMP.	IN COMP.	OUT OF COMP.
Allied Chemical, Nitro	X		X		N/A		N/A		N/A	
Appalachian Power, St. Albans	X		X		N/A		N/A		N/A	
Appalachian Power, Glasgow	X		X		N/A		N/A		N/A	
Coastal Tank Lines, Nitro	N/A			X	N/A		N/A		N/A	
Chemical Leaman, Institute	N/A		X		N/A		N/A		N/A	
CST/Fike Chemical, Nitro (2 RCRA Permits)	N/A			X major		X,X	N/A		X	
Diamond Shamrock, Belle	N/A		X		N/A		N/A		N/A	
DuPont, Belle	X			X	X		N/A		X	
Elkem Metals, Alloy		X		X	N/A		N/A		N/A	
FMC, Nitro	X			X	X		N/A		N/A	
FMC, S. Charleston	X			X		X	N/A		X	
Hatfield-Henson, Dunbar	N/A			X	N/A		N/A		N/A	
Kinkaid, Nitro	N/A		X		N/A		N/A		X	
Mason & Dixon, St. Albans	N/A		X		N/A		N/A		N/A	
Monsanto, Nitro	X		X		X		N/A		X	
S. Charleston, Sewage Treatment Plant	N/A			X major	N/A		N/A		N/A	
Union Carbide, Institute (2 RCRA Pemits)	X			X	X	X	X		X	
Union Carbide, S. Charleston (2 RCRA Permits)	X			X	X	X	X		X	
Union Carbide, Tech. Ctr., S. Charleston	X		N/A			X	N/A		N/A	

4.3 Ambient Water Quality

This assessment of ambient water quality is based on analyses of the quality and quantity of biota, sediment toxicity, aquatic toxicity, and ambient pollutant concentrations in the Kanawha River. Trends in water quality were examined to determine if pollution controls have improved water quality and to search for variations in water quality related to flow, river mile, or seasonal changes. The effectiveness of water quality monitoring in the Kanawha was evaluated to answer two questions: (1) Has the Kanawha been as well-monitored as other water bodies with high inputs of similar discharges, and (2) Are all potentially important pollutants presently being measured? Appendix C contains tables which present and summarize water quality data.

Based on statistical analyses, populations of macroinvertebrates and fish in the Kanawha have not changed significantly since the mid 1970's. However, all statistically nonsignificant correlations between abundance and year were positive, which suggests that significant improvements in macroinvertebrate and fish populations may emerge as more data become available.

There is a concern however that future hydropower and other power generation activities (i.e. fossil fuel) on the Kanawha and its tributaries may reduce dissolved oxygen (DO) concentrations which, in turn, may adversely affect these populations. Under authority of §309 of the Clean Air Act, EPA has been evaluating the potential water quality impacts of hydropower facilities, several of which are proposed on the Kanawha River. In January 1985, EPA completed the first phase of a special study which reviewed the impacts of hydropower development on the Upper Ohio and Lower Monongahela and Allegheny Rivers. EPA found that dissolved oxygen concentrations may decrease if hydropower facilities are operated in series in a basin. Cumulative impacts of non-point sources and organic loadings may also be related to hydropower development. These findings are relevant to the Kanawha River where similar facilities are being proposed. EPA's review of all Federal Energy Regulatory Commission license applications will require applicant certification of nondegradation, routine monitoring and reaeration devices for each hydropower facility proposed.

Sediments sampled in the Kanawha midstream were coarse and are unlikely to be a repository for toxic pollutants. Moderate toxicity of sediments and ambient water to aquatic life was observed between St. Albans and Charleston, but sediments in the remainder of the Kanawha appeared to have no toxicity. The observed toxicity of sediments is probably the result of point discharges, which also showed toxicity.

Ambient river water at six of eleven locations sampled between St. Albans and South Charleston was chronically toxic to fathead minnows and water fleas. The source of this toxicity appeared to be point source discharges, which also were toxic. Observed toxicity above South Charleston may have resulted from point source discharges with a combination of high volume (which this analysis did not consider) and only moderate toxicity.

Pollutant concentrations in the Kanawha appear to have improved significantly during the last 10-15 years. Arsenic, cadmium, copper, cyanide, lead, silver, and zinc all declined significantly between 1970 and 1984 (Figures C-8 to 14). Although some of these differences may have arisen from refinements in analytical techniques, these trends indicate that water quality in the Kanawha, at least from a chemical perspective, has improved. Exceedances of water quality criteria, in particular silver and arsenic, have continued to occur, however.

Concentrations of five toxic pollutants, silver, cadmium, copper, cyanide, and zinc, have exceeded EPA water quality criteria* designed to prevent acute toxicity to aquatic life (EPA, 1980) since 1970 (Table C-14). Frequency of criteria exceedances has decreased for all since 1980. Of these, silver was most frequently above criteria levels. Concentrations of four carcinogens (chloroform, carbon tetrachloride, dichloroethene, and arsenic) occasionally exceeded water quality criteria associated with an incremental lifetime cancer risk of 10^{-5} for average rates of consumption of fish and drinking water (Table C-15). Of the four carcinogens, only arsenic concentrations in water exceeded the 10^{-5} criterion for fish consumption only. Fish tissue has not been analyzed for arsenic in the Kanawha, however the State intends to begin tissue arsenic analyses in FY86.

Several carcinogenic substances including chlordane and PCB's have been detected in some fish samples collected from the River at Winfield between 1978 and 1984. The numbers and types of samples collected did not permit an evaluation of potential adverse health effects. However, a fish consumption advisory was issued by the Governor of West Virginia on March 3, 1986 for a stretch of the River because of the presence of dioxin in fish samples collected in 1985. This advisory extends from the confluence with the Coal River to the mouth of the Kanawha River, approximately 45 miles.

Hardness varied inversely with flow (Figure C-1), a predictable effect of dilution at high flows. The only toxic pollutants which varied significantly with flow were zinc (Figure C-2) and phenol (Figure C-3). The increase in zinc concentration at high flow may be due to significant nonpoint zinc sources; conversely, the decrease in phenol at high flow may indicate that point sources of phenolic compounds are most important. Because concentrations of other toxic pollutants did not show significant trends with flow, their loadings to the Kanawha must increase as flow increases. This suggests that upstream water quality may be impacted by both nonpoint and point sources of these pollutants.

Lead decreased with travel downstream (Figure C-6), suggesting that upstream sources were significant, but concentrations were reduced by the effects of sedimentation and dilution. Selenium concentrations increased

*Note that these conclusions are based on criteria published in 1980. However, EPA revised its aquatic life protection criteria for several inorganic pollutants after this analysis was completed (50 Federal Register 30784, July 29, 1985).

sharply between St. Albans and Winfield (Figure C-7), perhaps due to a significant point or tributary source. The absence of other correlations with river mile suggests that metals and cyanide may enter the industrial region of the Kanawha from upstream and tributaries in significant amounts. Total pollutant loading increased with travel downstream, however, suggesting that point sources were nevertheless significant contributors.

Only phenol varied seasonally (Figure C-4), with higher concentrations from July to December. This result indicates that phenol concentrations are influenced more by low summer flows (Figure C-5) than by biodegradation (which is also greatest in summer). The absence of significant correlations between month and concentrations of other organic pollutants suggests that these compounds are relatively unaffected by seasonal changes in rates of biodegradation, photolysis, and volatilization.

Water quality in the Kanawha is better-monitored than in other similar areas. A list of toxic pollutants potentially present in the Kanawha (Table C-16) was compared with actual parameter coverage. Of the 46 toxic pollutants on the list, 27 are routinely monitored. Among unmonitored pollutants, the most important are probably benzene, toluene, methanol, and vinyl chloride. Monitoring could be improved by analyzing for additional toxic pollutants believed to be present but not currently monitored.

4.4 Ambient Air Quality

The Kanawha Valley in West Virginia is designated as meeting the primary National Ambient Air Quality Standards (NAAQS) for all criteria pollutants, which includes total suspended particulates (TSP), SO_2, O_3, CO, and NO_2, and Pb. The area is designated as not meeting the secondary NAAQS for TSP, even though the current monitoring data are showing attainment. A redesignation of the area has been submitted by the State of West Virginia and EPA will approve the redesignation in the Federal Register in the near future.

The West Virginia Air Pollution Control Commission (WVAPCC) operates the following monitoring network in the Kanawha Valley: Nine TSP monitors, five SO_2 monitors, four Pb monitors, one CO monitor, one O_3 monitor, and one NO_2 monitor. Over the past five years the TSP levels at these monitors have decreased 15-20%, SO_2 decreased 30-70%, CO levels remained approximately the same, and NO_2 increased about 10%. An increased number of exceedances of the ozone standard have been recorded in the Valley.

The Kanawha Valley has not experienced a major shift in production levels over the past five years. There have been no major shutdowns, major modifications, or new sources built for the past several years. Due to the high concentration of chemical processes in the Kanawha Valley there has been some fluctuation in production levels, but nothing of major significance which would impact the air quality of the Valley.

The reason for improved air quality in the Valley over the past several years has more than likely been WVAPCC's aggressive program to bring facilities into compliance with the applicable regulations governing emissions of criteria pollutants and state odor regulations. Also, the decreased levels of lead are probably attributable to the phasing out of leaded gasoline in automobiles.

4.5 Spills/Releases

Spill histories were evaluated for a selected number of industries in the Region. The industries were chosen based on the professional judgment of personnel knowledgeable in the area of spill reporting by industry in the Region. The evaluation resulted in a review of 12 companies, 6 of which were located in the Kanawha Valley. The six companies in the Kanawha Valley are: Diamond Shamrock, duPont (Belle), FMC (S. Charleston), Monsanto, Union Carbide (Institute), and Union Carbide (S. Charleston).

The review indicated that in all cases where an enforceable violation under §311 was documented, an enforcement action was taken. The review also highlights however, that the release of a reportable quantity was documented in only 52% of the spill/release reports received. Finally, the review noted that a very high percentage (89%) of releases which exceeded a reportable quantity were not enforceable violations. Some of these spills were not enforceable because it could not be documented that the substance reached a navigable waterway. A majority of those releases however were air releases of CERCLA-designated hazardous substances which require reporting but are not listed as hazardous air pollutants under the Clean Air Act. In the absence of Agency rulemaking which regulates a specific substance regarded as an "air toxicant", the Agency's best authority to deal with such releases comes from the emergency provisions of the various statutes. The criteria for taking action under such provisions must be met before such action can be taken.

The Region has recently reviewed procedures used in handling spill and release reports received, focusing on internal coordination and enforcement follow-up actions. The review, while finding that proper and timely actions are taken when spill reports are received, did identify some areas where more formal procedures could enhance the Region's internal coordination and follow-up action. Formal Regional procedures in the form of Regional Orders have been revised to improve internal coordination.

4.6 CERCLA

As a follow-up to the findings of the NEIC Report, EPA initiated an effort to evaluate existing source information and identify all potential hazardous waste dump sites within the Kanawha Valley. A potential hazardous waste site is any identified site where hazardous substances may have been released or where the potential exists for a release which could result in a danger to human health or the environment.

A potential site must be technically evaluated to determine the actual seriousness. Very few sites have actual impacts significant enough to warrant a ranking on the National Priority List (NPL) of hazardous waste sites, and it is estimated that only approximately 4-5% of the potential hazardous waste sites discovered will result in placement on the NPL. EPA currently limits its remedial cleanup efforts (funding and enforcement) to sites on the NPL.

For the Kanawha Valley area, EPA's existing inventory as listed in the Emergency and Remedial Response Information System (ERRIS) contains 56 potential hazardous waste sites. The NEIC Report however suggested that 92 potential sites exist. Although EPA has already performed 44 preliminary assessments (PA) and 23 site investigations (SI) at the 56 sites in ERRIS, a number of those PA's and SI's were performed prior to 1983. Since the earlier reviews may not conform with current guidance, it was decided that all potential sites including those already listed in ERRIS would be evaluated against the same criteria and new PA/SI's prioritized for those sites.

An evaluation was performed for the Region by the Field Investigation Team (NUS Corporation). The evaluation consisted of a review of source information including a report from EPA's Environmental Photographic Interpretation Center (EPIC), EPA and West Virginia DNR files, records of the U.S. Soil Conservation Service, the NEIC Report, and interviews with State and local officials. The investigation process actually uncovered 140 (not 92 as previously suggested) potential hazardous waste dump sites including the 56 sites previously identified in ERRIS.

To guide future follow-up site specific investigations, all 140 sites were categorized. The categorization involved the development of 6 classes of sites. The 6 classes are made up of 3 priority divisions (A, B and C) in each of 2 basic groups: an ERRIS group consisting of those 56 sites already known to EPA, and a non-ERRIS group consisting of those additional 84 potential sites discovered from this evaluation. The priority divisions were developed based on a comparison of available data on each potential site against pertinent environmental parameters such as: population within 1/2 mile of site, proximity to floodplain, ground water use, proximity to public water supply sources, site security, and type and quantity of hazardous waste. Sites in Division "A" are considered the highest priority for site specific follow-up activities, then Division "B" followed by Division "C." The categorization resulted in the following breakdown:

ERRIS Group	Non-ERRIS Group
Division "A" - 16 sites	Division "A" - 18 sites
Division "B" - 36 sites	Division "B" - 47 sites
Division "C" - 4 sites	Division "C" - 19 sites

Table 4 identifies the implementation strategy for future investigations at all these sites. The tables in Appendix D identify specific implementation strategies for each of the two basic groups, ERRIS and non-ERRIS.

STRATEGY FOR IMPLEMENTATION

KANAWHA VALLEY SPECIAL REPORT RECOMMENDATIONS

ERRIS & NON-ERRIS SITES

		GROUP A TO BE COMPLETED 6 MONTHS		GROUP B TO BE COMPLETED 1 YEAR		GROUP C TO BE COMPLETED 2 YEARS		
S.D.	ERRIS	0	84	0	0	0	0	84
	NON-ERRIS	84		0		0		
P.A. (#1)(#2)	ERRIS	5	20	10	35	0	5	60
	NON-ERRIS	15		25		5		
S.I. (#1)(#2)	ERRIS	4	8	6	12	2	7	27
	NON-ERRIS	4		6		5		

(#1)- ALL P.A. AND S.I. NUMBERS ARE ESTIMATES.

(#2)- EPA WILL CONDUCT P.A.s AND S.I.s TO REACH THE PLANNED GOALS.

August 1985

5.0 AIR TOXICANTS

5.0 Air Toxicants

As discussed in Chapter 4, although current ambient air standards are being met in the Kanawha Valley, emissions and ambient levels of unregulated air toxicants are largely unknown. The NEIC report identified the need for an evaluation of air quality in the Kanawha Valley. The Administration has also recognized the need for new air toxicant efforts, and in February 1985 the Hazardous Air Pollutants Amendments Act of 1985 (H. R. 967) was referred to the House Committee on Energy and Commerce. This chapter summarizes Region III's plans for an air toxicant assessment in the Valley and outlines the direction of the air toxicant program identified in EPA's National Air Toxics Strategy.

A 1984 Kanawha Valley emissions inventory is now under preparation by the West Virginia Air Pollution Control Commission. Based on this inventory, EPA and WV have initiated a study which focuses on air toxicants. The study is a multi-media screening analysis and will attempt to identify chronic human health and environmental risks resulting from routine chemical exposures in the Valley.

In the study, the screening analysis will model ambient concentrations of pollutants using the 1984 updated emissions data and on-site meterological data, and then estimate relative exposure risks. Risk assessment air analyses will be performed in 4 distinct Valley zones: Belle, Institute, S. Charleston and Nitro. EPA has also sponsored a limited 45-day fixed-station ambient monitoring program to gather data near various facilities in Belle and Institute. Using the preliminary risk estimates, EPA and WV will compare pollutants, exposure routes and sources, and identify locations for additional ambient air monitors. Also, as part of the first phase of the study, potential exposures from hazardous waste sites, drinking water, and surface water pathways will be assessed. If significant exposure routes are identified, possible source controls will be examined during a later phase of the study. A status report which describes the results of the screening work and plans for any necessary additional work is tentatively scheduled for completion in August 1986.

EPA's other efforts in the area of air toxicants are described in the National Strategy for Toxic Air Pollutants, released June 4, 1985. The Strategy includes a redirected Federal regulatory program and enhanced Federal support to State air programs for routine and sudden accidental releases. Information on this policy was excerpted from a statement by Lee M. Thomas, EPA Administrator, before the House Subcommittee on Health and the Environment on June 11, 1985.

Necessary actions which are planned in the National Strategy for routine releases include enhancing national regulation, expanding State programs, and developing multi-media control methods. As discussed in Chapter 3, emissions of six toxic air pollutants are covered under

§112 of the CAA. Twenty to twenty-five additional chemicals have been considered for regulation under §112. Ten of those were included in a Federal Register notice of intent to list these pollutants pursuant to §112. Entire emissions streams from various source categories which contain a mixture of toxic chemicals are candidates for regulation. Consistent with the Strategy, the aforementioned study which is underway in the Kanawha Valley is the first step in the anticipated development by the State of a regulatory program covering routine releases of air toxicants. EPA is also providing programmatic assistance to West Virginia in establishing appropriate responses to sudden accidental releases through the mechanism of the Chemical Emergency Preparedness Program. In addition, EPA is currently developing a proposed National Accident Prevention Program in which WV participation will be encouraged.

Implementation of a pre-treatment program for sewage treatment plants is also expected to reduce evaporative losses of toxic chemicals. Other Federal regulatory mechanisms proposed are the use of §111 (NSPS) to control area sources, and the use of RCRA and TSCA to control toxic emissions from hazardous waste facilities. EPA will also strengthen State capabilities to ensure that each State has an air toxics program in place by the end of FY 86 to facilitate enforcement. In addition to State regulatory aid, the Federal program calls for enhancing the technical capabilities at the State level. Because a number of pollutants and source types are of local concern, a Federal air standard may not be warranted. To reduce exposures in these situations, EPA will be assisting State agencies technically and financially. One separate State initiative is West Virginia's Voluntary Reduction Program. This is a joint program between the State and industry in the Valley and is expected to reduce, in the very near future, current levels of air toxic emissions.

As discussed in Chapter 3, sudden accidental spills or releases may be enforced under the CWA if a spill reaches a navigable waterway or under the CAA if the substance released is one of the six hazardous substances covered under §112. CERCLA also requires that these releases be reported to EPA. As with routine releases, EPA will enhance States' capabilities to respond to accidental releases by increasing State training, providing technical support, and coordinating national policy and planning for emergencies. At the local level, the West Virginia Department of Health has recently adopted a community Right-to-Know program. Regulatory programs to deal with accidental releases will also be enhanced and expanded. TSCA and CERCLA recordkeeping and reporting procedures will be revised and enhanced to attain a higher level of comprehensive reporting. Additional civil enforcement authorities under CERCLA have been requested by the Administration. Another action being planned by EPA for accidental spills and releases involves developing an Acute Hazards list. The list will identify those substances most likely to cause health effects from a short-term high level exposure. This list will be used to develop follow-up actions, target emergency response efforts, and aid in developing Right-to-Know programs.

6.0 CONCLUSIONS

6.0 Conclusions

Statements made in this chapter regarding the compliance of particular facilities with certain laws or regulations are based only on the writers' information and understanding. Such statements should not be relied on as definitive findings of the Agency as to either compliance or non-compliance.

Water

NPDES permits with BAT effluent limitations have been issued to 15 of the 19 major facilities in the Valley. Revised permits with BAT effluent limits have been drafted for three of the remaining four. The non-BAT permit will expire in 1987. Relatively few toxic pollutants are specifically limited in permits. Therefore, bioassays have been used to detect effluent toxicity. When bioassays have indicated significant toxicity, EPA and the State have usually obtained additional information on causes and corrective actions. Periodic spills and leaks of toxicants and process upsets may be affecting water quality. Toxicity to aquatic life has also been observed in ambient water and sediments in the industrial section of the Kanawha River.

Two of the 19 major industries in the Kanawha Valley violated effluent limitations significantly during the last quarter of 1985. In each case, the problem has been corrected or the State has initiated regulatory action.

Ambient Water Quality and Water Monitoring

Silver and arsenic concentrations often exceeded water quality criteria, a significant point source of selenium may exist, and nonpoint sources may contribute important pollutant loads. Dioxin concentrations in fish tissue have exceeded the levels of concern for consumers. Although ambient water monitoring in the Kanawha has been effective, West Virginia and ORSANCO should review monitoring priorities in the Kanawha River.

Air

Elkem Metals is the only major facility listed in this report that is not in compliance with air regulations. The facility boilers violated visible emissions standards. The West Virginia Air Pollution Control Commission is actively pursuing correction of these violations by the company.

Ambient Air Quality and Air Monitoring

The air quality in the Kanawha Valley, in general, has improved significantly over the past several years. The monitoring network operated by the WVAPCC presently shows all the National Ambient Air Quality Standards (NAAQS) being met. Two potential problems may be the CO and O_3 levels in the Valley. Because there is only one monitor for each of these pollutants, the data collected may not be representative of the CO and O_3 levels in the entire Valley.

RCRA

For the major facilities in the Kanawha Valley, RCRA permits have either been issued or the Part B permit applications have been called in by DNR or EPA. Permits are being issued in accordance with the priorities established in the RCRA National Permit Strategy. All permits are currently targeted for issuance by January 1988.

Four facilities are currently not in compliance with RCRA's interim status requirements. The most recurring problems are with violations of ground water monitoring requirements.

TSCA

All facilities are in compliance, however, only a limited number of inspections have been done.

FIFRA

All major pesticide producers in the Kanawha Valley are in compliance with FIFRA. Furthermore, regular inspections to ensure continued compliance are being conducted by the West Virginia Department of Agriculture with EPA oversight.

CERCLA

Detailed site discovery resulted in the identification of 140 potential hazardous waste sites. Of those, 84 were not included in EPA's previous inventory of potential sites. The implementation schedule developed to investigate these sites is being followed.

Spills/Releases

Enforcement actions were taken on spills/releases where enforceable violations were documented. To enhance the Region's efforts, formal procedures were revised in 1985. The revised procedures address follow-up actions and internal coordination on spill/release reports.

A substantial percentage of the releases reported as exceeding a reportable quantity are air releases of substances not listed as hazardous under the CAA.

APPENDIX A

PERMITS

TABLE A-1

PERMIT ISSUANCE STATUS

Facility/NPDES No. Location/Waste Contributing Activity	Existing Permits Issued	Expires	Reissuance Target Date	Bases for Permit Limitations
Allied Chemical/WV0002542 Nitro, WV/Inorganic Chemicals	01-04-84	01-03-89		BPJ for BAT (Facility recently closed except for storage area)
Appalachian Power/WV0001074 St. Albans, WV Power Plant	08-16-85	08-16-90		1982 power plant gdlns for BAT.
Appalachian Power/WV0001066 Glasgow, WV/Power Plant	11-08-84	11-08-89		1982 power plant gdlns for BAT
Chemical Leaman/WV0002372 Institute, WV/Chemical Transporter	01-21-81	01-21-86	05-86	BPJ for BAT
Coastal/WV0050130 Nitro, WV/Chemical Transporter	11-18-85	11-18-90		BPJ for BAT
CST (Fike)/WV0001651 Nitro, WV/Organic Chemicals	03-05-82	03-05-87		BPJ for BCT (Conventional pollutants) (Toxicity limited by bioassay)
Diamond Shamrock/WV0002313 Belle, WV/Inorganic Chemicals	01-26-86	01-26-91		BPJ for BAT
E.I. DuPont/WV0002399 Belle, WV/Inorganic & Organic Chemicals	09-23-81	09-23-86		BPJ for BAT
Elkem Metals/WV0000167 Alloy, WV/Ferroalloys	03-08-82	03-08-87		BPJ for BAT

TABLE A-1 (Continued)

PERMIT ISSUANCE STATUS

Facility/NPDES No. Location/Waste Contributing Activity	Existing Permits Issued	Expires	Reissuance Target Date	Bases for Permit Limitations
FMC/WV0000400 Nitro, WV/Organic Chemicals	01-31-80	01-31-81 (extended)	05-86	Existing-BPJ for BPT Proposed-BPJ for BAT
FMC/WV0000442 S. Charleston, WV/Inorganic & Organic Chemicals	02-21-81	06-30-81 (extended)	08-86	Existing-BPJ for BPT Proposed-1982 inorg. gdln for BAT - BPJ for BAT (organic)
Hatfield & Henson/WV0002381 Dunbar, WV/Cooling Water	11-13-85	11-13-90		BPJ for BAT
Kinkaid/WV0000108 Nitro,WV/Inorganic & Organic Chemicals	09-16-81	09-16-86	09-86	BPJ for BAT-Exist and Proposed
Mason & Dixon/WV0001708 St. Albans/Chemical Transporter	03-12-86	03-12-91		BPJ for BAT
Monsanto/WV0000868 Nitro, WV/Organic Chemicals	03-10-86	03-10-91		BPJ for BPT
S. Charleston Sewage Tr. Co./WV0023116 S. Charleston, WV/Primarily Chemical Waste Tr.	12-04-74	01-04-80 (extended)	05-86	Existing-BPJ for BPT Proposed-BPJ for BAT
Union Carbide/WV0000086 Institute, WV/Organic Chem & Pesticides	10-30-81	10-30-86		BPJ for BAT
Union Carbide Tech Center WV0000124 S. Charleston/R & D Laboratory	12-17-85	12-17-90		BPJ for BAT
Union Carbide/WV0000078 S. Charleston, WV/Chem. Plant Cooling Water	06-14-84	06-13-89		BPJ for BAT

NOTE - Extended NPDES permits due to (1) timely reapplication or (2) existing valid State permit.

Table A-2

RCRA Permit Status

Name/Address of Facility	Permit Application Submission Date	Permit Issuance Target Date	Comments
1) duPont Belle, WVA	6/85	1/90	Per RCRA Nat'l Strategy
2) CST, Inc. Nitro, WVA	12/84	Permit Denied 3/86	-----
3) Fike Chemicals Nitro, WVA	12/84	9/86	-----
4) FMC S. Charleston, WVA	6/85	12/87	Per RCRA Nat'l Strategy
5) FMC Nitro, WVA	----	9/84	Permit does not cover entire facility
6) Monsanto Nitro, WVA	----	9/86	-----
7) Union Carbide Agricultural Products Institute, WVA	10/84	10/87	Per RCRA Nat'l Strategy
8) Union Carbide (Plant 514) S. Charleston, WVA	----	4/83	-----
9) Union Carbide - PTO Institute, WVA	6/85	12/87	Per RCRA Nat'l Strategy
10) Union Carbide - Holz S. Charleston, WVA	6/85	1/88	Per RCRA Nat'l Strategy
11) Union Carbide - Tech Ctr S. Charleston, WVA	----	6/85	-----

APPENDIX B - COMPLIANCE

Statements made in these tables about the compliance of particular facilities with certain laws or regulations are based only on the writers' information and understanding. Such statements should not be relied on as definitive findings of the Agency as to either compliance or noncompliance.

COMPLIANCE REVIEW

Facility: Allied Chemical
Location: Nitro, WV

NPDES Permit No.: WV0002542
Activity: Inorganic Chemicals
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	No Violations Reported (NVR)		
Apr - Jun 82	NVR		
Jul - Sep 82	NVR		
Oct - Dec 82	NVR		
Jan - Mar 83	NVR		
Apr - Jun 83	NVR		
Jul - Sep 83	NVR		
Oct - Dec 83	NVR		
Jan - Mar 84	NVR		
Apr - Jun 84	NVR		Facility closed except for storage area; runoff monitored
Jul - Sep 84	NVR		
Oct - Dec 84	NVR		
Jan - Mar 85	NVR		
Apr - Jun 85	NVR		
Jul - Sep 85	NVR		
Oct - Dec 85	NVR		

COMPLIANCE REVIEW

Facility: Appalachian Power-Amos Plant
Location: St. Albans

NPDES Permit No.: WV0001074
Activity: Power Plant
NPDES Enforcement Lead: EPA

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	No Violations Reported (NVR)		
Apr - Jun 82	NVR		
Jul - Sep 82	NVR		
Oct - Dec 82	NVR		
Jan - Mar 83	NVR		
Apr - Jun 83	NVR		
Jul - Sep 83	NVR		
Oct - Dec 83	NVR		
Jan - Mar 84	NVR		
Apr - Jun 84	NVR		
Jul - Sep 84	NVR		
Oct - Dec 84	NVR		
Jan - Mar 85	NVR		
Apr - Jun 85	NVR		
Jul - Sep 85	NVR		
Oct - Dec 85	NVR		

COMPLIANCE REVIEW

Facility: Appalachian Power-Kanawha River Plant
Location: Glasgow, WV

NPDES Permit No.: WV0001066
Activity: Power Plant
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	No Violations Reported (NVR)		
Apr - Jun 82	NVR		
Jul - Sep 82	NVR		
Oct - Dec 82	NVR		
Jan - Mar 83	NVR		
Apr - Jun 83	NVR		
Jul - Sep 83	NVR		
Oct - Dec 83	NVR		
Jan - Mar 84	NVR		
Apr - Jun 84	NVR		
Jul - Sep 84	NVR		
Oct - Dec 84	NVR		
Jan - Mar 85	NVR		
Apr - Jun 85	NVR		
Jul - Sep 85	NVR		
Oct - Dec 85	NVR		

COMPLIANCE REVIEW

Facility: Chemical Leaman Tank Lines
Location: Institute, WV

NPDES Permit No.: WV0002372
Activity: Chemicals Transporter
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Dec 82	No Violations Reported (NVR)		
Jan - Mar 83	Moderate TKN, oil & grease violation	Raw water contained unusually high amount of imine & amine products upsetting plant	Returned to compliance
Apr - Dec 83	No Violations Reported (NVR)		
Jan - Mar 84	Minor oil & grease viol.	Cold weather effects on treatment	Returned to compliance
Apr - Jun 84	NVR		
Jul - Sep 84	Moderate oil & grease violation in September	Unusually high oil & grease raw waste loading	
Oct - Dec 84	Oil & grease violations	No sheen detected; company suspects testing error gave false readings for violation	Company requested future splitting of samples with State to check testing procedures
Jan - Mar 85	(Apparent violations) Oil & grease Minor TKN, phenols	Testing error confirmed	O & G samples sent to new lab, returned to compliance.
Apr - Dec 85	No Violations Reported (NVR)		

COMPLIANCE REVIEW

Facility: Coastal Tank Lines
Location: Nitro, WV

NPDES Permit No.: WV0050130
Activity: Chemical Transporter
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Sep 82	Monitoring reports not received		
Oct - Dec 82	Minor COD, oil & grease, ammonia violations	No causes given	Enforcement action deferred
Jan - Jun 83	Minor COD, oil & grease, ammonia violations	Biomass upset; company re-established sludge mass and reviewed waste loading procedures	Enforcement action deferred
Jul - Dec 83	Minor COD, oil & grease, ammonia violations	Company hired trained operator to improve treatment; company plans to haul out troublesome waste	State issued Notice to Comply
Jan - Mar 84	COD, oil & grease, ammonia, phenol, BOD, pH violations		State issued warning letter
Apr - Jun 84	Oil & grease viol, Apr 84	Company attempted to correct problem by segregating wastes	State issued Notice to Comply
Jul - Sep 84	Phenol, ammonia violations, Aug 84	Inspection indicated inadequate O & M	
Oct - Dec 84	Oil & grease, COD violations		
Jan - Mar 85	Oil & grease, COD, phenols violations	Toxic bioassay results; plant overload.	Order issued requiring compliance
Apr - Jun 85	Oil & grease violation, Apr		Minor violation; returned to compliance
Jul - Sep 85	No violations reported		Oil and Grease returned to compliance
Oct - Dec 85	COD, ammonia, Oil and grease	Toxic bioassay results	State study initiated to reduce toxicity

COMPLIANCE REVIEW

Facility: CST/Fike Chemical
Location: Nitro, WV

NPDES Permit No.: WV0001651
Activity: Chemical Transporter
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Apr - Jun 82	Large phenols violation in June	Suspected storm flushing of accumulated phenolic substances out of sewer line	EPA issued warning letter; returned to compliance
Jul - Mar 83	No Violations Reported (NVR)		
Apr - Jun 83	Large phenols violations	pH upset killed off treatment microbes; plant reseeded	Returned to compliance
Jul - Sep 83	Minor pH violations		
Oct - Dec 83	No Violations Reported (NVR)		
Jan - Jun 84	Oil & grease, phenols, pH, COD, BOD, TSS violations	High hydraulic loading caused biomass washout and severe plant upset Biomass not recovered; aeration tank reseeded. Grease problems caused by washout of accumulated deposits in sewer line	State issued Notice to Comply
Jul - Sep 84	Oil & grease, phenols, pH, COD, BOD, TSS violations	Company submitted plan for activated carbon treatment, diatomaceous earth filter and process improvements.	State issued Order for compliance
Oct - Dec 84	TSS, oil & grease, phenols, BOD, COD violations		State granted time extension until Mar 85 for full complaince
Jan - Mar 85	Oil & grease, phenols, BOD, COD violations		Filter & act carbon upgraded; effluent improvement expected
Apr - Jun 85	Oil & grease, phenols, BOD, COD violations	Start-up problems with carbon regeneration system	Effluent improved during summer; under close review by State
Jul - Sep 85	Phenols, O & G sulphate viol.	By-passing activated carbon system	
Oct - Dec 85	COD, BOD, O & G violations	By-passing activated carbon system	EPA preparing Federal Court Action

COMPLIANCE REVIEW

Facility: Diamond Shamrock
Location: Belle, WV

NPDES Permit No.: WV0002313
Activity: Inorganic Chemicals
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	No Violations Reported (NVR)		
Apr - Jun 82	NVR		
Jul - Sep 82	NVR		
Oct - Dec 82	NVR		
Jan - Mar 83	NVR		
Apr - Jun 83	NVR		
Jul - Sep 83	NVR		
Oct - Dec 83	pH violation, 004, Dec. 1983	Sulfuric acid leak through cracked drain valve in dike, repaired	Returned to compliance
Jan - Mar 84	NVR		
Apr - Jun 84	NVR		
Jul - Sep 84	NVR		
Oct - Dec 84	NVR		
Jan - Mar 85	NVR		
Apr - Jun 85	NVR		
Jul - Sep 85	NVR		
Oct - Dec 85	NVR		

COMPLIANCE REVIEW

Facility: DuPont
Location: Belle, WV

NPDES Permit No.: WV0002399
Activity: Organic & Inorganic Chemicals
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Jun 83	No Violations Reported (NVR)		
Jul - Sep 83	TOC, BOD, pH, f. coliform violations	TOC viol. from pump seal failure; repaired. BOD viol from aeration blower failure; repaired.	Returned to compliance
Oct - Dec 83	TSS violation, outfall 062, Oct TOC violation, outfall 043, Nov TOC violation, outfall 013, Dec	High nitrogen loading affected settling Valving error; corrected Organic material on ground entered drain; remaining material cleaned up	Returned to compliance
Jan - Mar 84	Minor pH viol, outlet 017, Mar	Heat exchanger leak; repaired	Returned to compliance
Apr - Jun 84	Moderate TSS violation, outfall 062, May Minor BOD violation, outfall 062, June	Sludge bulking in clarifier; treatment modified to stabilize system High loading while one unit down; temporary problem	Returned to compliance
Jul - Sep 84	NVR		
Oct - Dec 84	TOC violation	Possible contamination of cooling water; temporary problem	Returned to compliance
Jan - Mar 85	BOD vio, outfall 062, Feb	Organic & hydraulic overload; returned to compliance	Closer monitoring of waste loading
Apr - Jun 85	BOD vio, outfall 062, Jun TSS vio, outfall 062, May	Forming caused TSS carry-over Sludge coagulation caused BOD excess	Non-continuous; returned to compliance
Jul - Sep 85	NVR		BOD, TSS returned to compliance
Oct - Dec 85	TOC vio, outfall 043, Oct	Line plugged; cleaned and returned to compliance	Short term violation

COMPLIANCE REVIEW

Facility: Elkem Metals
Location: Alloy, WV

NPDES Permit No.: WV0000161
Activity: Ferroalloys
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Apr - Jun 82	TSS violation in June	Process changeover and heavy rains	Returned to compliance
Jul - Sep 82	TSS violations, outfalls 003, 004 in Sept. Raw sewage spill in Sept.	Sewer line break; repaired	Returned to compliance
Oct - Dec 82	Monitoring frequency violation	Company monitoring monthly; permit requires weekly monitoring	Company advised to comply with permit monitoring requirements
Jan - Mar 83	No Violations Reported (NVR)		
Apr - Jun 83	TSS violations, outfalls 004, 007 Fecal coliform violations in April	Runoff from heavy rain Temporary malfunction of chlorination system; repaired	Violations under State review
Jul - Dec 83	NVR		
Jan - Mar 84	No monitoring for outfall 005, Feb. TSS viol, outfall 004, 005, Jan.	Plant labor strike Contaminated surface runoff	State issued Notice to Comply
Apr - Jun 84	Minor manganese violation, outfall 007, April	Runoff from heavy rain	
Jul - Sep 84	TSS viol, outfalls 002, 003, 004, 005, July F. coli viol, outfall 102, Aug. TSS viol, outfall 003, Aug.	Unknown reasons Chlorination system malfunction, repaired	Violations under State review
	TSS viol, outfalls 102, 005, Sept.	Startup problems at steam plant	
Oct - Dec 84	TSS viol, outfalls 102, 005, Oct. TSS viol, outfalls 004, 005, 008, Nov.	Startup problems Heavy rainfall runoff	Returned to compliance

C O N T I N U E D

Facility: Elkem Metals
Location: Alloy, WV

NPDES Permit No.: WV0000161
Activity: Ferroalloys
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 85	No Violations Reported (NVR)		
Apr - Jun 85	TSS Viol, outfall 004, Apr.	Unknown reasons	Minor; returned to compliance
Jul - Sep 85	pH, outfall 008, July, Aug.	Unknown reasons	Minor; returned to compliance
Oct - Dec 85	pH, outfall 006, Nov. TSS, outfalls 002, 003, 004 Dec.	Runoff problems caused by heavy rains	Minor violations; returned to compliance

COMPLIANCE REVIEW

Facility: FMC
Location: Nitro, WV

NPDES Permit No.: WV0000400
Activity: Organic Chemicals
NPDES Enforcement Lead: EPA

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Sep 82	No Violations Reported (NVR)		
Oct - Dec 82	BOD violation in Dec. 82	Packing Failure in stripping column, packing replaced	Returned to compliance
Jan - Mar 83	NVR		
Apr - Jun 83	pH violation	Spillage from accidental acidic drum breakage	Returned to compliance
Jul - Sep 83	Minor arsenic violation	Problems with reaction/distallation system; system was cleaned and no subsequent violation occurred	Returned to compliance
Oct - Dec 83	Minor ph Violations Moderate BOD violations	Packing failure; replaced. Heat exchange leak; repaired. Activated carbon system failed; replaced	Returned to compliance
Jan - Mar 84	Large BOD violations Moderate BOD violations	Organic overload; seeded to increase biomass. Activated carbon system failed; replaced. Moderate toxicity indicated by biomonitoring inspection	Returned to compliance
Apr - Jun 84	No Violations Reported (NVR)		
Jul - Sep 84	pH violation, July pH violation, August pH violation, Sept. Arsenic violations (3) Sept.	Leak in diked process area; repaired Collection trench leak; repaired Temporary process line leak; repaired Entire plant initially shut down to investigate; scrubber tank identified as source; it was taken out of service and analyzed for problems	Returned to compliance
Jan - Mar 85	pH violation, Jan	Acidic overflow due to instrument malfunction; Backup instrument installed	Short term violation; Returned to compliance
Apr - Jun 85	Minor arsenic violation	Condenser plugging caused inefficient separation in distillation system	Condenser unplugged; Returned to compliance
Jul - Dec 85	No Violations Reported (NVR)		

COMPLIANCE REVIEW

Facility: FMC
Location: South Charleston, WV

NPDES Permit No.: WV0000442
Activity: Inorganic & Organic Chemicals
NPDES Enforcement Lead: EPA

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Jun 82	No Violations Reported (NVR)		
Jul - Sep 82	Ammonia violation in Sept.		Returned to compliance
Oct - Dec 82	pH violation, outfall 004	Valve stuck, repaired, alarm fixed, pH controller replaced.	EPA issued order to correct problem and prevent recurrence
Jan - Mar 83	Moderate TKN violations	Unknown problem at ammonia production unit	Enforcement action deferred
Apr - Jun 83	Moderate TKN violations	Ammonia gas scrubber and valve; situation corrected and back up treatment system installed	Returned to compliance
Jul - Sep 83	Minor chlorine violations	Treatment unit plugged; problem corrected and neutralization increased	Returned to compliance
Oct - Dec 83	ph violations	pH control improvements completed	EPA issued order to comply with pH limits; returned to compliance
Jan - Sep 84	NVR		
Oct - Dec 84	Minor pH violation, outfall 018, Oct.	Hose rupture; replaced	Returned to compliance
	TSS & TKN violations, outfall 029, Oct.	Flyash pond overflowed; equalization pond operation improved	Returned to compliance
Jan - Mar 85	Minor pH violation, outfall 018	Frozen water line in pH controller	Returned to compliance
Apr - Dec 85	Minor pH violation	Unknown	Returned to compliance

COMPLIANCE REVIEW

Facility: Hatfield - Henson
Location: Dunbar, WV

NPDES Permit No.: WV0002381
Activity: Power plant cooling pond
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Sep 82	No Violations Reported (NVR)		
Oct - Dec 82	TSS, copper, barium, arsenic violations	Boiler blowdown is source of metals	Metals limits based on stream standards for very small receiving stream
Jan - Mar 83	TSS, copper, nickel, TSS violations, Jan Barium violation, Feb Copper violation, Mar		State Notice to Comply issued
Apr - Jun 83	Barium violation		
Jul - Sep 83	Barium, arsenic violations		Company indicated plans to request stream standards variance for metals
Oct - Dec 83	Barium violation, Oct, Nov Arsenic violation, Oct Copper, nickel violations, Nov No metal analysis, Dec		
Jan - Mar 84	Copper violation, Jan & Feb Arsenic violation, Jan & Mar Barium violation, Mar		State issued Notice to Comply
Apr - Jun 84	Barium, arsenic, copper violations		
Jul - Sep 84	Barium, arsenic, nickel, zinc violations		State issued Order to initiate compliance action
Oct - Dec 84	Barium, copper, arsenic violations		Company requested variance from stream standards

COMPLIANCE REVIEW

Facility: Hatfield - Henson
Location: Dunbar, WV

NPDES Permit No.: WV0002381
Activity: Power plant cooling pond
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 85	Barium, copper, arsenic violations	Discharge must equal stream standards; Board considering variances.	State Order to comply with stream standards
Apr - Jun 85	Barium, copper, arsenic violations	Discharge will be required to meet new, less stringent stream standards	Permit to be issued with less stringent limits.
Jul - Sep 85	Barium, copper, nickel violations	Discharge will be required to meet new, less stringent stream standards	Permit to be issued with less stringent limits.
Oct - Dec 85	No Violations Reported (NVR)		Reissued permit contains less stringent limits.

COMPLIA REVIEW

Facility: Kinkaid (Chemical Formulators) NPDES Permit No.: WV0000108
Location: Nitro, WV Activity: Organic and Inorganic Chemicals
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	No Violations Reported (NVR)		
Apr - Jun 82	NVR		
Jul - Sep 82	NVR		
Oct - Dec 82	NVR		
Jan - Mar 83	NVR		
Apr - Jun 83	NVR		
Jul - Sep 83	NVR	Toxic bioassay results due to high TDS.*	TDS is not limited in effluent; WQS not violated
Oct - Dec 83	NVR		
Jan - Mar 84	NVR		
Apr - Jun 84	NVR		
Jul - Sep 84	NVR		
Oct - Dec 84	NVR		
Jan - Mar 85	NVR	Toxic bioassay results*	High chlorides suspected
Apr - Jun 85	NVR		
Jul - Sep 85	NVR	Toxic bioassay results*	
Oct - Dec 85	NVR		

*The permit requires that toxic bioassay results be followed up with evaluation of sources; they are not specific permit violations.

COMPLIANCE REVIEW

Facility: Mason & Dixon Tank Lines
Location: St. Albans, WV

NPDES Permit No.: WV0001708
Activity: Chemicals Transporter
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Sep 82	No Violations Reported (NVR)		
Oct - Dec 82	BOD, TSS, TKN, Color violations		Enforcement Action deferred
Jan - Mar 83	Color, TKN violation	Company hired consultant to recommend remedy by Oct. 83	State issued Notice to Comply
Apr - Sep 83	Color, TKN violation		
Oct - Dec 83	Color, TKN violation	Company ceased using ammonia nutrient; TKN violations stopped	
Jan - Mar 84	Color, BOD, F Coli, TKN viol.		
Apr - Jun 84	Color, F. Coli, TKN violations		State issued Notice to Comply with F.Coli, TKN limits
Jul - Sep 84	Color violation		State plans to modify color limit to achievable level
Oct - Dec 84	No Violations Reported (NVR)		
Jan - Mar 85	No Violations Reported (NVR)		Permit modified to remove color limit. Bioassay indicates non-toxicity
Apr - Jun 85	F. Coli, viol., May		Non-continuous; returned to compliance
Jul - Dec 85	No Violations Reported (NVR)		

COMPLIANCE REVIEW

Facility: Monsanto
Location: Nitro, WV

NPDES Permit No.: WV0000868
Activity: Organic Chemicals
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	No Violations Reported (NVR)		
Apr - Jun 82	NVR		
Jul - Sep 82	NVR		
Oct - Dec 82	NVR		
Jan - Mar 83	NVR		
Apr - Jun 83	NVR		
Jul - Sep 83	NVR		
Oct - Dec 83	NVR		
Jan - Mar 84	Minor TSS violation	Upset due to organic overload	Returned to compliance
Apr - Jun 84	NVR		
Jul - Sep 84	NVR		
Oct - Dec 84	NVR		
Jan - Mar 85	NVR		
Apr - Jun 85	NVR		
Jul - Sep 85	NVR		
Oct - Dec 85	NVR		

COMPLIANCE REVIEW

Facility: Union Carbide
Location: Institute, WV

NPDES Permit No.: WV0000086
Activity: Pesticides & Organic Chemicals
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	TOC violations 004, Jan, Feb	Cold weather treatment upset	pH returned to compliance
	TOC violations 004, Mar	Suspected small leak in acetone unit; not confirmed	
	TOC violations 006, Mar	Suspected small leak in Napthol unit	TCC returned to compliance
	pH violations 005, Feb	Neutralization problems; investigation started, problems ceased	
Apr - Jun 82	TOC violation, 004, Apr		
Jul - Sep 83	No violations reported (NVR)		
Oct - Dec 83	TSS violation, outlet 001, Oct		
	TOC viol, outlet 003, Nov & Dec	Process line rupture; repaired	Short term violation of returned to compliance
	Ammonia viol, outlet 002, Nov & Dec	Leak; repaired	
	TKN, TOC, pH viol, outlet 002, Dec	Brief occurrence	
Jan - Mar 84	TKN, ammonia, pH viol; 002 Jan	Condenser leak; repaired	TKN, pH returned to compliance
	TSS viol, 008, Mar		
Apr - Jun 84	TSS viol, outlet 008, Apr 84	Start up problems for ash treatment pond	TSS returned to compliance
	TOC, pH viol, outlet 005 Apr 84		
	TOC viol, outlet 003, Apr 84		
	TSS viol, outlet 002, Apr 84		
Jul - Sep 84	F. coli viol, outfall 001, Aug	Brief occurrence	Returned to compliance
	pH viol, outfall 005, Sep	Undetermined cause	

C O N T I N U E D

Facility: Union Carbide
Location: Institute, WV

NPDES Permit No.: WV0000086
Activity: Pesticides & Organic Chemicals
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Oct - Dec 84	Minor TOC violation, Nov Isophorone violation, 001, Nov Large toluene violations, outfall 005, Dec	Brief 001 occurrence; unknown cause Toluene condenser leaked into cooling water; shut down and reparied upon detection	EPA issued § 308 letter requiring complete report of Dec & Jan toluene incidents.
Jan - Mar 85	Large toluene violations, 005, Jan	Leak in toluene cooling unit and process sewer line; repaired.	Company response received, and under review.
Apr - Jun 85	Isophorone violation	Power failure caused process upset and overload	Isophorone - Process upset safeguards provided. Toluene - modified permit will require increased monitoring.
Jul - Sep 85	Isophorone violation TOC Violations BOD, TSS Violations, outfall 001, July	Overflow of production unit still; modifications made; problem ceased TOC - storage tank leak; repaired BOD, TSS - 47 undetermined cause	
Oct - Dec 85	pH violations, outfall 005, Oct	Leak in caustic line; repaired.	Isophorone, BOD, TSS, TOC returned to compliance

Facility: South Charleston Treatment Company NPDES Permit No.: WV0023116
Location: South Charleston, WV Activity: Treats 90% Industrial, 10% Municipal Wastes
NPDES Enforcement Lead: EPA

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	Large fecal coliform violations Minor TSS violation BOD, COD violation	Chlorination unit inadequate for treating municipal waste contribution. Motor failure & rising solids; repaired Cold weather upset	Industrial wastes are primarily from Union Carbide's organic chemical plant. EPA Order was issued on Feb 82 for upgrading chlorination unit. Permittee had applied for construction grant funds to provide adequate chlorination or to pump municipal portion to proposed regional sewage treatment plant.
Apr - Jun 82	Large F. coli violations Minor BOD, COD ammonia viol.	Inadequate chlorination unit	
Jul - Sep 82	Large F. coli violations Minor BOD, TSS chlorides viol.	Inadequate chlorination unit	
Oct - Dec 82	Large F. coli violations Minor chlorides violations	Inadequate chlorination unit	
Jan - Mar 83	Large F. coli violations Large BOD, COD ammonia viol. Mod. TSS, phenols, TKN viol.	Inadequate chlorination unit Biological unit upset due to large sludge buildup; operation improved after sludge removal, aeration increase & nutrient addition.	Enforcement Action deferred
Apr - Jun 83	Large F. coli violations Large BOD, chloride, ammonia viol.	Inadequate chlorination unit High municipal loading suspected; company investigating	Enforcement Action deferred
Jul - Sep 83	High F. coli violations High BOD, COD, phenol, chlorides violation	Inadequate chlorination unit Residual sludge problems; clarifier cleaned and O & M consultant hired	Enforcement Action deferred

C O N T I N U E D

Facility: South Charleston Treatment Company NPDES Permit No.: WV0023116
Location: South Charleston, WV Activity: Treats 90% Industrial, 10% Municipal Wastes
NPDES Enforcement Lead: EPA

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Oct - Dec 83	High F. coli violations High BOD, phenols, mod. chlorides viol.	Inadequate chlorination unit	Enforcement Action deferred
Jan - Mar 84	High F. coli violations High BOD, phenols violations	Inadequate chlorination unit Tr. plant upset; unknown causes	Enforcement Action deferred
Apr - Jun 84	High F. coli violations Minor BOD, chlorides violations	Inadequate chlorination unit	Enforcement Action deferred
Jul - Sep 84	High F. coli violations Minor BOD, chlorides violation	Inadequate chlorination unit. Compliance correction plan submitted by company.	State issued Notice to Comply; BOD returned to compliance
Oct - Dec 84	High F. coli violations	Inadequate chlorination unit.	Grant funds for chlorination unit upgrading considered unlikely; State compliance schedule requires upgrading by 1987
Jan - Mar 85	High F. coli violations Minor chloride violations	Inadequate chlorination unit	Same as above
Apr - Jun 85	High F. coli violations BOD violations	Inadequate chlorination unit Treatment problems	Same as above
Jul - Sep 85	High F. coli violations Minor ammonia violations	Inadequate chlorination unit	Same as above
Oct - Dec 85	High F. coli violations Minor ammonia, phenols, violations	Inadequate chlorination unit	Same as above

COMPLIANCE REVIEW

Facility: Union Carbide - Technical Center
Location: S. Charleston, WV

NPDES Permit No.: WV0000124
Activity: R & D Laboratory
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Mar 82	No Violations Reported (NVR)		
Apr - Jun 82	NVR		
Jul - Sep 82	NVR		
Oct - Dec 82	NVR		
Jan - Mar 83	NVR		
Apr - Jun 83	NVR		
Jul - Sep 83	NVR		
Oct - Dec 83	NVR		
Jan - Mar 84	NVR		
Apr - Jun 84	NVR		
Jul - Sep 84	NVR		
Oct - Dec 84	COD, TSS violations	Rainfall runoff problems; limits were based on dry weather conditions.	Notice to Comply issued for State permit; State considering response blaming wet weather conditions.
Jan - Mar 85	COD violations		
Apr - Jun 85	COD, O & G violations	Runoff problems	Short term violations.
Jul - Dec 85	NVR		

COMPLIANCE REVIEW

Facility: Union Carbide
Location: South Charleston, WV

NPDES Permit No.: WV0000078
Activity: Cooling water discharge from chemical plant
NPDES Enforcement Lead: WVDNR

Period	Compliance Status	Non-Compliance Causes & Corrections	Regulatory Actions & General Comments
Jan - Dec 82	No Violations Reported (NVR)		
Jan - Dec 83	No Violations Reported (NVR)		
Jan - Jun 84	No Violations Reported (NVR)		
Jul - Sep 84	pH violation, outfall 032, Aug	Intermittent blowdown prob.	Returned to compliance
Oct - Dec 84	Minor pH violation		
Jan - Mar 85	TOC viol, outfall 014, Jan TOC viol, outfalls 015, 016 036, 076, Feb Methyl acetate, acetone discharges Mar	-Process line rupture; repaired -Process waste overflows to cooling discharges; corrected -Line rupture; repaired	EPA Section 308 information request sent for Mar violations; returned to compliance
Apr - Jun 85	TOC concentration violation	Non-containment in unit area	Dike walls built around unit area. Satisfactory 308 response received
Jul - Sep 85	TOC viol, outfalls 016,	TOC - unknown cause; possible low background flow resulting in higher TOC concentrations	TOC limited by concentration, no evidence of increased loading
Oct - Dec 85	TOC viol, outfalls 016, 017 pH violation, outfall 009	TOC - same as above pH - caustic line leak; repaired	

TABLE B-2

AIR PROGRAM COMPLIANCE
STATUS
BY REGULATED POLLUTANT

Name/Location of Facility	Compliance Status by Pollutant			Compliance Activity	Lead Agency
	TP	SO_2	VOC		
Allied Chemical - Nitro	I C	I C	a	none needed	WV
Appl. Power Co. - John E. Amos	I C	I C	a	none needed	WV
App. Power Co. - Kanawha River	I C	I C	a	none needed	WV
Chemical Leaman - Institute	c	b	c	Inspect	WV
Coastal Tank Lines - Nitro	c	b	c	Inspect	WV
Diamond Shamrock - Belle	b	b	b		WV
DuPont - Belle	I C	I C	a	none needed	WV
Elkem Metals - Alloy	I V	I C	a		WV
Fike Chemical - Nitro	b	b	b		WV
FMC - Nitro	b	b	b		WV
FMC - S. Charleston	I C	I C	a	none needed	WV
Hatfield & Hanson - Dunbar	b	b	b	none needed	WV
Monsanto - Nitro	I C	I C	a	114 letter 6/15/85 NOV 7/05/85 In Compliance	WV

(continued)

Table B-2
(Continued)

AIR PROGRAM COMPLIANCE
STATUS
BY REGULATED POLLUTANT

Name/Location of Facility	Compliance Status by Pollutant			Projected Compliance Status	Lead Agency
	TP	SO_2	VOC		
Kinkaid Enterprises - Nitro	c	b	c	Inspect	WV
Mason & Dixon - Halbaus	c	b	c	Inspect	WV
S. Charleston Sewage Treatment - S. Charleston	b	b	b	Inspect	WV
Union Carbide - Institute	I C	I C	a	none needed	WV
Union Carbide - S. Charleston	I C	I C	a	none needed	WV
Union Carbide - Tech Center	I C	I C	a	none needed	WV

DEFINITIONS

I C -- In compliance with applicable Federal and State Regulations for the pollutant specified.

I V -- In violation with applicable Federal and State Regulations for the pollutant specified.

a -- Sources may be subject to regulations governing VOC emissions from petroleum refineries bulk gasoline terminals or stored petroleum liquids.

b -- Discussions with the State indicate sources do not have any processes in operation which are subject to Federally approved regulations. Status of these facilities would therefore be judged as in compliance.

c -- Discussions with the State indicate sources do not have any processes which would emit particulate (TSP) or sulfur (SO_2) pollutants. Based purely on facility name it is possible, sources may be subject to regulations governing VOC emission from gasoline bulk storage tanks. Information contained in available files, however, is not sufficient to make a determination.

APPENDIX C - AMBIENT WATER MONITORING

Table B-3

RCRA Compliance Status

Name/Location Inspection Date	Compliance Status*	Compliance Activities	Lead Agency
1) duPont Belle, WVA WVD005012851	In Compliance	Inspected 7/25/85	DNR
2) CST, Inc. Nitro, WVA WVD030143960	Out of Compliance	Inspected 12/12/85 Enforcement Pending	EPA/DNR
3) Fike Chemicals Nitro, WVA WVD047989207	Out of Compliance	Inspected 1/7/86 2/6/86 Enforcement Pending	EPA
4) FMC South Charleston, WVA WVD005005079	Out of Compliance	Inspected 2/27-28/86 Enforcement Pending (Administrative Order for late notification 2/12/86)	EPA
5) FMC Nitro, WVA WVD005005087	In Compliance	Inspected 3/15/85	DNR
6) Monsanto Nitro, WVA WVD039990965	In Compliance (as of 3/10/86)		DNR
7) Union Carbide Agricultural Products Institute, WVA WVD005005509	In Compliance (as of 3/10/86)		DNR
8) Union Carbide (Plant 514) S. Charleston, WVA WVD005005483	Out of Compliance	Inspected 9/25/85	DNR
9) Union Carbide (PTO) Institute, WVA WVD000739722	Not reported Out of Compliance	Inspected 2/4/86 9/19/85	DNR
10) Union Carbide (Holz) S. Charleston, WVA WVD980554885	Not reported In Compliance	Inspected 2/4/86 9/25/85 Enforcement Pending	EPA/DNR
11) Union Carbide (Tech Ctr) S. Charleston, WVA WVD060682291	Out of Compliance	Inspected 9/12/85	DNR

*Note: Compliance Status is current and does not reflect situations where a facility may have been out of compliance and then returned. For those facilities out of compliance, DNR and EPA are monitoring the situations to determine if appropriate enforcement measures should be taken.

Table B-4

FIFRA Compliance Status

Name/Address of Facility	Compliance Status*	Compliance Activities	Lead Agency
1) Albans Labs, Inc.	In Compliance	Inspection to be conducted in next 6 months	WVDOA
2) duPont Belle, WVA	In Compliance	Inspected 8/84	WVDOA
3) Fike Chemicals Nitro, WVA	In Compliance	Inspected 6/84	WVDOA
4) FMC S. Charleston, WVA	In Compliance	Inspected 10/84	WVDOA
5) Kincaid Enterprises Nitro, WVA	In Compliance	Inspected 10/84	WVDOA
6) Monsanto Nitro, WVA	In Compliance	Inspected 10/84	WVDOA
7) Union Carbide Institute, WVA	In Compliance	Inspection to be conducted in next 6 months	WVDOA
8) Union Carbide S. Charleston, WVA	In Compliance	Inspection to be conducted in next 6 months	WVDOA
9) WV Dept. of Agriculture Charleston, WVA	In Compliance	Inspection to be conducted in next 6 months	WVDOA
10) PB & S Chemicals St. Albans, WVA	In Compliance	Inspected 10/84	WVDOA
11) Southern Labs Charleston, WV	In Compliance	Inspected 3/85	WVDOA

Ambient Water Monitoring

Methods

The part of the Kanawha selected for study includes the industrial complex extending from Eleanor, WV to the head of navigation at Alloy, WV (river mile 31 to 90; the confluence of the Kanawha and Ohio Rivers is river mile 0). The same section of the river was considered by the NEIC Report. This section of the river receives discharges from chemical, trucking, primary metals, and municipal facilities, and is believed to be significantly impacted by numerous landfills. A list was compiled of toxic pollutants potentially present in toxic concentrations in ambient water, using information in EPA (1984 and 1981), Dalton et al. (1983), and SCS Engineers (1979). In order to restrict the size of the study, but keep a high probability of identifying toxic problems, analyses of water quality data were restricted to the pollutants on this list.

Information in EPA's STORET national water quality database was used to obtain locations of stations on the Kanawha, and means and sample sizes for parametric data taken at those stations. STORET was also accessed for comparable information on two other water bodies with high concentrations of chemical and primary metals dischargers: Buffalo Bayou (Houston, TX) and the Delaware River (south of Philadelphia, PA).

Other data from the Kanawha were obtained from the West Virginia Department of Natural Resources (DNR) and the Army Corps of Engineers (COE), Huntington WV District and the Wheeling Office of EPA Region III. These data included macroinvertebrate and fish abundance, particle sizes of dredged material, pollutant concentrations in elutriate from dredged material, toxicity of elutriate, effluent, and ambient water samples, and concentrations of pollutants in fish tissue.

STORET was again accessed for all available parametric data from Kanawha River stations for potentially significant toxic pollutants. Data were analyzed using SAS (Statistical Analysis System, SAS Institute, Cary, NC) by the following process: (1) Descriptive statistics for each parameter were obtained. (2) Each chemical parameter was tested for significant correlations with the independent variables flow, month, river mile, temperature, and year. (3) Where significant correlations were observed, analyses of variance were used to test for significant differences among means. (4) Trends were plotted where data were sufficient. (5) Chemical data were compared with current EPA water quality criteria (EPA, 1980) for protection of aquatic life and for an incremental lifetime cancer risk of 10^{-5} for drinking water and fish consumption.

Results

1. Biomonitoring. Analyses of macroinvertebrate and fish data from the Kanawha (Tables C-1 and C-2) were mostly inconclusive. The only significant trend observed was a decline in the number of fish species sampled at river mile 83 between 1975 and 1984 ($r=-0.72$, $p=0.04$), although this appears to have resulted from an abnormal sample. No other significant trends in abundance of fish or macroinvertebrates were found, and the upstream and downstream stations were not significantly different ($p>0.05$, ANOVA).

A recent study (COE, in preparation) suggests that macroinvertebrate population diversity, number of taxa, and community diversity decline downstream of the industrial area. This study, although still in draft form, contains more complete macroinvertebrate data than those in Table C-1. This suggests that point source discharges to the Kanawha significantly degrade the macroinvertebrate community.

2. Sediments. Particle size of dredged sediments in the Kanawha (Table C-3) was very large, with a median sieve size of > 0.25 inches at 4 of 6 stations. Concentrations of toxic pollutants in sediment elutriate (Table C-4) were mostly similar to concentrations in ambient water (Table C-8, discussed later), although zinc and cyanide were somewhat more concentrated in elutriate. No measurements were available of organic compounds in sediment elutriates.

3. Aquatic toxicity. Elutriates from four sediment samples (Table C-5) were not toxic to fathead minnows (Pimephales promelas). Toxicity to larval midges (Tanytarsus dissimilis) was greatest at river miles 47 and 57; toxicity to water fleas (Daphnia magna) was greatest at river mile 47. Ambient water in most of the 50-mile industrial section of the Kanawha appears to be free of chronic toxicity, but significant effects to water fleas (Ceriodaphnia sp.) and fathead minnows (Table C-6) were observed between river miles 47 and 61. Toxicity of discharges to the Kanawha (indicated by low LC50s in Table C-7) was greatest between river miles 44 and 52.

4. Ambient water data. Descriptive statistics for parametric data from STORET are in Table C-8. Results of correlation analyses of inorganics, fish tissue, and organics are in Tables C-9, 10, and 11, respectively. Significant correlations with flow, month, year, and river mile were further subjected to testing by ANOVA (Table C-12), and well-supported trends in the data were plotted. Hardness varied inversely with in flow (Figure C-1), a predictable effect of dilution at high flows. The only toxic pollutants which varied significantly with flow were zinc (Figure C-2) and phenol (Figure C-3). Correlation analysis using month and concentrations of toxic pollutants was used to search for seasonal events. Only phenol varied seasonally (Figure C-4), with higher concentrations from July to December.

Most of the organic compounds (except phenolic compounds) were monitored only at St. Albans, WV, so correlations between river mile and concentrations of organics could not be calculated. Concentrations of two metals, lead and selenium, changed significantly with river mile. Lead decreased with travel downstream (Figure C-6). Selenium concentrations increased sharply between river miles 46 and 32 (Figure C-7).

Concentrations of many toxic pollutants changed significantly with year. Among inorganics, arsenic, cadmium, copper, cyanide, lead, silver, and zinc all declined significantly between 1970 and 1984 (Figures C-8 to 14). The organic pollutants phenolic compounds, chloroform, carbon tetrachloride, and trichloroethene have also declined significantly (Figures C-15 to 18) since monitoring began in the late 1970s. Two pollutants in fish tissue showed significant trends: chromium decreased since 1978 (Figure C-19) and copper increased (Figure C-20). Additional data (Table C-12a), which were not analyzed statistically, suggest that contamination of fish tissue by priority pollutants increases with travel downstream.

5. Effectiveness of monitoring. A comparison (Table C-13) of ambient water monitoring in the Kanawha River, the Delaware River, and Buffalo Bayou (the Houston Ship Channel) shows that approximately the same number of stations were sampled in each area during the last two years. The Kanawha is second in number of water parameters analyzed per station, but first in number of fish tissue parameters analyzed per station. Total analyses per station, a measure of sampling frequency combined with parameter coverage, is far greater in the Kanawha than in the other areas.

6. Comparison of ambient data with criteria. Concentrations of five toxic pollutants (silver, cadmium, copper, cyanide, and zinc) have exceeded EPA water quality criteria designed to prevent acute toxicity to aquatic life (EPA, 1980) since 1970 (Table C-14). Frequency of criteria exceedances has decreased for all since 1980. Of these, silver was most frequently above criteria levels.* Concentrations of four carcinogens (chloroform, carbon tetrachloride, dichloroethene, and arsenic) sometimes exceeded water quality criteria associated with an incremental lifetime cancer risk of 10^{-5} (EPA, 1980)(Table C-15).

7. Other potential threats to water quality. A list of toxic pollutants potentially present in the Kanawha (Table C-16) was compared with actual parameter monitoring coverage. Of the 46 toxic pollutants on the list, 27 are routinely monitored. Also monitored are numerous parameters not on the list (and not addressed by this study), which may nevertheless be present in toxic amounts.

*Note that these conclusions are based on criteria published in 1980. However, EPA revised its aquatic life protection criteria for several inorganic pollutants after this analysis was completed (50 Fed. Reg. 30784, July 29, 1985). Therefore, this analysis will be revised in the near future.

References

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U.S. EPA 1984. Overview of environmental pollution in the Kanawha Valley. U.S. EPA Office of Enforcement and Compliance Monitoring, National Enforcement Investigations Center, Denver, CO. 163 pp.

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U.S. EPA. 1980. Water quality criteria documents; availability. Federal Register 45(231): 79318-79379.

Table 1. Kanawha River, West Virginia. Macroinvertebrates captured with artificial substrate samplers and identified to genus. Data provided courtesy of Dr. Eli McCoy, West Virginia Department of Natural Resources.

Station	River Mile	Year	n	Mean individuals/ sample	Mean taxa/ sample
London Locks	83	1975	1	75	9
		1976	3	26	8
		1977	2	71	12
		1979	2	9	5
		1980	3	23	13
		1981	3	129	20
		1982	3	37	9
		1983	3	106	19
Winfield Lock	31	1975	2	28	10
		1976	3	94	9
		1977	2	157	13
		1979	2	32	6
		1980	3	31	6
		1981	3	108	15
		1982	2	100	14

Table 2. Kanawha River, West Virginia. Fish captured in navigation locks. Data provided courtesy of Dr. Eli McCoy, West Virginia Department of Natural Resources.

Station	River Mile	Year	Individuals sampled	Species sampled
London Lock	83	1976	833	27
		1977	238	25
		1978	2615	26
		1979	201	18
		1980	643	19
		1982	203	17
		1983	1060	24
		1984	116	13
Winfield Lock	31	1979	253	13
		1980	424	16
		1981	2532	21
		1982	3708	17
		1983	1043	17

Table 3. Kanawha River, West Virginia. Particle sizes of dredged material, 1981. Data courtesy of Col. Robert B. Wilson, U. S. Army Corps of Engineers, Huntington, WV District.

Station Name	River Mile	50th percentile sieve size (inches)
Eleanor	30	0.014 - 0.020
Winfield Lock	31	1.0 - 1.5
DuPont City	67	1.5 - 2.0
Marmet	68	0.020 - 0.025
London	82	1.5 - 2.0
London Lock	83	0.25 - 0.38

Table 4. Kanawha River, West Virginia. Analyses (in ug/l) of elutriate of material dredged at the confluence of the Kanawha and Ohio Rivers, April 1981. Data courtesy of Col. Robert B. Wilson, U. S. Army Corps of Engineers, Huntington, WV District.

Parameter	Receiving water concentration	Elutriate concentration
Arsenic	< 1	< 1
Cadmium	2.0	< 1
Chromium	< 1	< 1
Copper	< 5	< 5
Cyanide	< 50	< 50
Lead	< 2	< 2
Mercury	< 1	< 1
Nickel	< 5	6
Phenols	< 2	< 2
Selenium	2	2
Silver	< 0.1	< 0.1
Zinc	57	75

Table 5. Kanawha River, West Virginia. Mortality (in %) in undiluted elutriate from dredged sediments, April 1981. Data courtesy of Col. Robert B. Wilson, U. S. Army Corps of Engineers, Huntington, WV District.

River Mile	fathead minnows *Pimephales promelas*	larval midges *Tanytarsus dissimilis*	water fleas *Daphnia magna*
88	0	25	20
57	0	45	0
47	0	45	95
31	0	30	5

Table 6. Kanawha River, West Virginia. Toxicity of ambient water, August, 1984. Column 1 = Ceriodaphnia mean number of young per female, 2 = Ceriodaphnia mean survival, 3 = Pimephales larval weights, 4 = Pimephales larval mean survival. *** = significantly lower than other stations, $p<.05$, modified Tukey's HSD procedure; - = no significant effect. Preliminary data, courtesy of Dr. Donald Mount, EPA Duluth Environmental Research Laboratory.

River Mile	1	2	3	4
90.1	***	-	-	-
88.7	-	-	-	-
86.4R	-	-	-	-
86.4L	-	-	-	-
82.8	-	-	-	-
78.0	-	-	-	-
73.6	-	-	-	-
71.0	-	-	-	-
69.6	-	-	-	-
67.7	-	-	-	-
65.4	-	-	-	-
63.2	-	-	-	-
61.0	-	-	***	-
58.5	-	-	-	-
57.5R	***	-	-	-
56.2	-	-	-	-
54.7R	-	-	-	-
54.7L	***	-	-	-
54.3R	-	-	***	-
54.3L	-	-	***	-
53.5	-	-	-	-
53.3 (Davis Ck.)	***	-	***	-
52.5	-	-	-	-
50.0	-	-	-	-
47.3	-	-	***	-
44.2	-	-	-	-
42.5	-	-	-	-
41.0R	-	-	-	-
41.0L	-	-	-	-
38.1	***	-	-	-
32.2	-	-	-	-

Table 7a. Kanawha River, West Virginia. LC50s of industrial discharges in % effluent (NT = no toxicity). Tests are 24-hr static tests with fathead minnows unless otherwise noted. Data provided courtesy of Dr. Eli McCoy, West Virginia Department of Natural Resources.

Facility, Location, River Mile	Outfall	Year: 1981	1982	1983	1984
Allied Chemical, Nitro, 44	002			NT	
	003			83	
Chemical Leaman, Institute, 49	001	19.7[1,2]	5.2	64.7	47.0
Coastal Tank Lines, Nitro, 44	001	35.5[1]	42		23.5
Diamond Shamrock, Belle, 69	001	32.0[1]			
DuPont, Belle, 69	062				60.8[3]
	017				NT[3]
	046				NT[3]
Elkem Metals, Alloy, 90	003			NT	
Fike Chemical, Nitro, 44	001	5.6[1]	77.8	27.0	21.8
FMC, Nitro, 44	001		47.6		59.0
FMC, S. Charleston, 52	018		57.0[1]	12.2[3]	17.5[3]
	022		NT[1]	NT[3]	54.9[3]
	029		NT[1]	38.4[3]	7.0[3]
	025		12.3[1]	30.0[3]	NT[3]
	023		NT[1]		NT[3]
Kincaid Enterprises, Nitro, 44	001			14.0	
Markay Chemicals, Amandaville, 45	001	<5.6[1]			
Mason-Dixon Truck, St Albans, 47	001				42.0[2]
Monsanto, Nitro, 44	001				44.0
South Charleston STP, 52	001			75.0[3]	
Union Carbide, Charleston, 57	003	80.0[1,2]	NT[1]		NT[2]
	009		56.0		
	008		NT		
Union Carbide, Institute, 49	002		NT[3]		
	003		NT[3]		
	005		NT[3]		
Union Carbide, S. Charleston, 52	023		NT		
	025		NT		
	032		NT		
	035		NT		
	074		NT		
Monsanto Polymer, Nitro, 44	001				33.6[3]

1 test with Daphnia pulex.
2 48-hr static test.
3 96-hr static test.

Table 7b. Kanawha River, West Virginia. LC50s of industrial and municipal discharges in % effluent (NT = No Toxicity). Tests are 48-hr static test (D = Daphnia, F = fathead minnow). Data courtesy of H. Ronald Preston, Wheeling Office, EPA Region III.

Facility, Location River Mile	Outfall	Year: 1981	1982	1983	1984	1985
Charleston STP, 55	001	D-NT F-NT				
Chemical Leaman, Institute, 44	001	D-35 F-50	D-7 F-9	D-25 F-50		D-19.1 F-20.0
Coastal Tank Lines, Nitro, 44	001			D-<25 F-35	D-17.3 F-10.0	D-11.1 F-2.6
DuPoint, Belle, 69	062					D-46.2 F-19.2
Fike Chemical, Nitro, 44	001	D-4 F-32.5			D-12.3 F-27 F<6.25	D-<3 F-10.4
FMC	001 001	D-85[1] F-35[1] D-90[1] F-35[1]				
Hatfield Henson	001 001	D-NT[1] F-NT[1] D-NT[1] F-NT[1]				
Kincaid Enterprises, Nitro, 44	001 001				D-0.52 F-<0.25	D-3.9 F-10.7
Mason Dixon Truck, St. Albans, 47	001	D-<25 F-29				D-35.4 F-10.7

[1]24 Hr. Static

Table 8. Kanawha River, West Virginia. Descriptive statistics for selected toxic pollutants and other parameters measured from 1970 to 1984. Data were obtained from STORET.

Variable	N	Mean	Std Dev	Minimum	Maximum
Independent variables:					
Flow (cfs)	560	16967.14	19852.86	---	211999.5
Month	782	6.41	3.42	1.0	12.0
River mile	782	43.57	18.18	31.0	83.0
Temp (F)	483	14.92	9.37	0	81.5
Year	782	1978.13	3.48	1970.0	1984.0
Inorganics: (water analyses in ug/l; tissue analyses in mg/kg)					
Ag	191	1.96	1.61	0	18.0
Tissue Ag	20	0.31	0.10	0.1	0.5
As	232	3.46	3.56	0	32.0
Cd	445	2.97	6.06	0	90.0
Tissue Cd	24	0.17	0.10	0.0	0.4
CN (mg/l)	298	0.02	0.11	0.0	1.0
Tissue Cr	24	0.80	0.65	0.0	2.6
Cu	303	18.72	46.59	0	500.0
Tissue Cu	25	0.83	0.36	0.0	1.6
Hardness	546	63.42	23.86	6.2	441.0
Tissue Hg	25	0.12	0.08	0.0	0.4
Ni	174	18.40	53.43	0	510.0
Tissue Ni	16	0.72	0.48	0.4	1.9
Pb	458	29.00	37.36	3.0	380.0
Tissue Pb	24	2.63	0.97	1.3	5.4
Se	182	1.95	1.87	0	10.0
Zn	315	38.71	60.58	2.2	720.0
Tissue Zn	17	18.92	2.95	13.0	25.0
Organics: (water analyses in ug/l; tissue analyses in mg/kg)					
Bromoform	692	0.137	0.199177	0.100	2.700
Bis (2-ethylhexyl) phthlate	18	5.000	0	5.000	5.000
Chloroform	692	1.871	8.633832	0.100	218.800
Carbon tetrachloride	692	0.945	1.394837	0.100	14.700
Tissue DDE	19	0.03	0.11	0	0.5
1,2-dichlorobenzene	18	5.000	0	5.000	5.000
1,3-dichlorobenzene	18	11.222	2.263666	5.000	12.000
1,4-dichlorobenzene	696	0.136	0.414207	0.100	5.000
1,1-dichloroethylene	692	0.374	1.278239	0.100	23.200
Isophorone	18	<5.000	0	<5.000	<5.000
Methylene chloride	692	0.427	2.934615	0.100	73.500
Naphthalene	20	4.600	1.231174	1.000	5.000
Tetrachloroethylene	692	0.256	0.538379	0.100	6.500
Trichloroethylene	692	0.257	0.520622	0.100	5.300

Table 9. Kanawha River, West Virginia. Results of correlation analyses for selected inorganic ambient water quality data taken between 1970 and 1984. Correlation coefficients, probability of type I error, number of samples (lines 1-3, respectively). * = $p<0.05$. Data were obtained from STORET.

	Flow	Month	River Mile	Temp	Year
Silver	-0.10493	-0.05575	0.31907	-0.03489	-0.26980
	0.1924	0.4437	0.0001*	0.7064	0.0002*
	156	191	191	119	191
Aresnic	-0.02843	-0.06602	0.01672	0.06115	-0.18381
	0.6894	0.3167	0.8000	0.4381	0.0050*
	200	232	232	163	232
Cadmium	0.00314	0.00352	0.05558	0.03991	-0.14077
	0.9533	0.9409	0.2420	0.4754	0.0029*
	350	445	445	322	445
Cyanide	0.02357	0.19566	0.07899	-0.00817	-0.25880
	0.7482	0.0007	0.1739	0.9011	0.0001*
	188	298	298	234	298
Copper	0.02615	0.04300	-0.01674	0.02378	-0.24487
	0.6926	0.4559	0.7717	0.7175	0.0001*
	231	303	303	234	303
Hardness	-0.18778	0.06628	-0.11761	0.20347	-0.03615
	0.0001*	0.1219	0.0059*	0.0001*	0.3992
	427	546	546	405	546
Lead	0.00188	0.03717	0.13401	-0.00010	-0.34351
	0.9717	0.4274	0.0041*	0.9985	0.0001*
	358	458	458	326	458
Nickel	0.12443	-0.08338	-0.02660	-0.09647	0.09406
	0.1536	0.2740	0.7275	0.2925	0.2170
	133	174	174	121	174
Selenium	0.05963	-0.05852	-0.19646	-0.06054	-0.01790
	0.4582	0.4326	0.0079*	0.5131	0.8104
	157	182	182	119	182
Zn	0.13384	0.02265	-0.05641	0.01277	-0.28339
	0.0363*	0.6888	0.3183	0.8558	0.0001*
	245	315	315	205	315

Table 10. Kanawha River, West Virginia. Results of correlation analyses for selected fish tissue data taken between 1970 and 1984. Correlation coefficients, probability of type I error, number of samples (lines 1-3, respectively). * = $p<0.05$. Data were obtained from STORET.

	Month	Year
Tissue Ag	-0.48389	0.26993
	0.0306*	0.2498
	20	20
Tissue Cd	-0.36502	0.03910
	0.0795	0.8561
	24	24
Tissue Cr	-0.32547	-0.86761
	0.1207	0.0001*
	24	24
Tissue Cu	-0.16760	0.44563
	0.4233	0.0256*
	25	25
Tissue DDE	-0.41770	-0.04398
	0.0752	0.8581
	19	19
Tissue Hg	-0.01505	-0.13603
	0.9431	0.5168
	25	25
Tissue Ni	-0.81142	-0.40475
	0.0001*	0.1199
	16	16
Tissue Pb	-0.20593	0.33722
	0.3344	0.1071
	24	24
Tissue Zn	0.46756	-0.19680
	0.0584	0.4490
	17	17

Table 11. Kanawha River, West Virginia. Results of correlation analyses for selected organic ambient water quality data taken between 1970 and 1984. Correlation coefficients, probability of type I error, number of samples (lines 1-3, respectively). * = $p<0.05$. Data were obtained from STORET.

Pollutant	Month	Year
Bromoform	0.05455	0.03910
	0.1517	0.3044
	692	692
Bis (2-ethylhexyl) phthalate	0.00000	0.00000
	1.0000	1.0000
	18	18
Chloroform	0.05935	-0.07477
	0.1188	0.0493*
	692	692
Carbon tetrachloride	0.06624	-0.35924
	0.0816	0.0001*
	692	692
1,2-dichlorobenzene	0.00000	0.00000
	1.0000	1.0000
	18	18
1,3-dichlorobenzene	0.41905	-0.72411
	0.0835	0.0007*
	18	18
1,4-dichlorobenzene	-0.05485	0.10086
	0.1483	0.0077*
	696	696
1,1-dichloroethylene	0.00037	0.05127
	0.9922	0.1779
	692	692
Isophorone	0.00000	0.00000
	1.0000	1.0000
	18	18
Methylene chloride	-0.03619	-0.03433
	0.3418	0.3672
	692	692
Naphthalene	0.03407	-0.37341
	0.8866	0.1049
	20	20

Table 11 continued. Kanawha River, West Virginia. Results of correlation analyses for selected organic ambient water quality data taken between 1970 and 1984. Correlation coefficients, probability of type I error, number of samples (lines 1-3, respectively). Data were obtained from STORET.

Pollutant	Month	Year
Tetrachloroethylene	0.00816	0.03133
	0.8303	0.4106
	692	692
Trichloroethylene	0.05687	-0.10450
	0.1350	0.0059
	692	692

Table 12. Kanawha River, West Virginia. Results of single classification analyses of variance. p = probability of type I error. * = $p<0.05$, ** = $p<0.01$, *** = $p<0.001$, ns = no significant differences. Blanks were not tested. Data were obtained from STORET.

	Independent Variables:			
Dependent Variables:	Month	Year	River Mile	Ln Flow
inorganics				
arsenic		***		
cadmium		**		
copper		***		
tissue Cr		***		
tissue Cu		**		
cyanide	***	***		
hardness			*	***
lead		***	*	
silver		**	***	
selenium			*	
zinc		***		ns
organics				
carbon tetrachloride		***		
chloroform		*		
1,3 dichlorobenzene	ns	ns		
tissue O,P' DDD	ns			
tissue P,P' DDT	*	ns		
tissue P,P' DDE	ns			
tissue PCB 1254		ns		
phenols	ns	***		ns
trichloroethylene		***		

Table 12a. Kanawha River, West Virginia. Concentration of some priority pollutants in fish tissue at 3 locations. I = London Lock, river mile 83, 1980; II = downstream of St. Albans STP, river mile 45, 1980; III = Winfield Lock, river mile 31, 1979. Analyses performed in EPA, Region III by Toxicant Analysis Center Bay St. Louis, MI.

PRIORITY POLLUTANT	I	II	III
PCB-1254	210	5140	3350
bis(2-ethylhexyl)phthalate	ND	25	ND
di-n-butyl phthalate	ND	35	ND
diethyl phthalate	ND	70	ND
chlordane	60	1230	1430
trichlorofluoroethane	10	18	393
1,4-dichlorobenzene	ND	100	ND
butyl benzyl phthalate	ND	240	ND
1,1,2,2-tetrachloroethane	ND	130	ND
dieldrin	ND	130	ND
naphthalene	ND	ND	280
carbon tetrachloride	ND	14	ND
chloroform	ND	9	ND
toluene	20	19	ND
4,4'-DDT	ND	40	ND
4,4'-DDE	ND	80	ND
4.4'-DDD	ND	80	ND
heptachlor epoxide	ND	20	30

Table 13. STORET records of analyses for toxic pollutants in ambient water and fish tissue since January 1, 1982 in the Kanawha River, Delaware River, and Buffalo Bayou (Houston Ship Channel).

Area	Stations	Water parameters per station	Tissue parameters per station	Total analyses performed	Analyses performed per station
Kanawha	9	22	22	7916	880
Delaware	9	9	0	743	83
Houston Ship Channel	7	30	3	711	102

Table 14. Kanawha River, West Virginia. Analyses exceeding 1980 EPA water quality criteria for protection of freshwater aquatic life since 1970. Expressed as number of analyses and percent of total analyses.

Pollutant	1970-present No.	%	1980-present No.	%
Silver	116	60.7	32	45.0
Cadmium	179	40.2	32	15.5
Copper	76	25.1	14	9.9
Cyanide	6	2.0	2	2.1
Zinc	6	1.9	0	0

Table 15. Kanawha River, West Virginia. Analyses exceeding 10-5 incremental cancer risk over the lifetime for water and fish consumption, and for fish consumption only since 1979. Expressed as numbers of analyses and percent of total analyses.

Pollutant	Fish and water No.	%	Fish only No.	%
Chloroform	145	20.9	1	0.001
Carbon tetrachloride	25	3.6	0	0
1,1-dichloroethylene	121	17.5	1	0.001
Arsenic[1]	230	99.1	230	99.1

1 Exceedances since 1970.

Table 16. Kanawha River, West Virginia. Toxic pollutants potentially present in toxic concentrations. List compiled from EPA (1984) and SCS Engineers (1981). W, T = water, tissue; * = routinely monitored.

	W	T		W	T
Cyanides	*		Acrylonitrile		
Arsenic	*		Benzene		
Barium	*		Bis (2-ethylhexyl) phthalate	*	
Beryllium			Bromoform	*	
Cadmium	*	*	Carbaryl		
Chromium	*	*	Carbon tetrachloride	*	
Copper	*	*	Chloroform	*	
Lead	*	*	DDD		*
Mercury		*	DDE		*
Nickel	*	*	DDT		*
Selenium	*		Dichlorobenzene	*	
Silver	*	*	Dimethyl butyl ether		
Zinc	*	*	Ethylbenzene		
1,1-dichloroethene	*		Isophorone	*	
2-methyl-2-pentenol			Methacrylate		
4-methyl-2-pentanone			Methanol		
PCB-1016			Methylene chloride	*	
PCB-1221			Naphthalene	*	
PCB-1232			Phenolics	*	
PCB-1242			Tetrachloroethene	*	
PCB-1248			Toluene		
PCB-1254		*	Trichloroethene	*	
PCB-1260		*	Vinyl chloride		

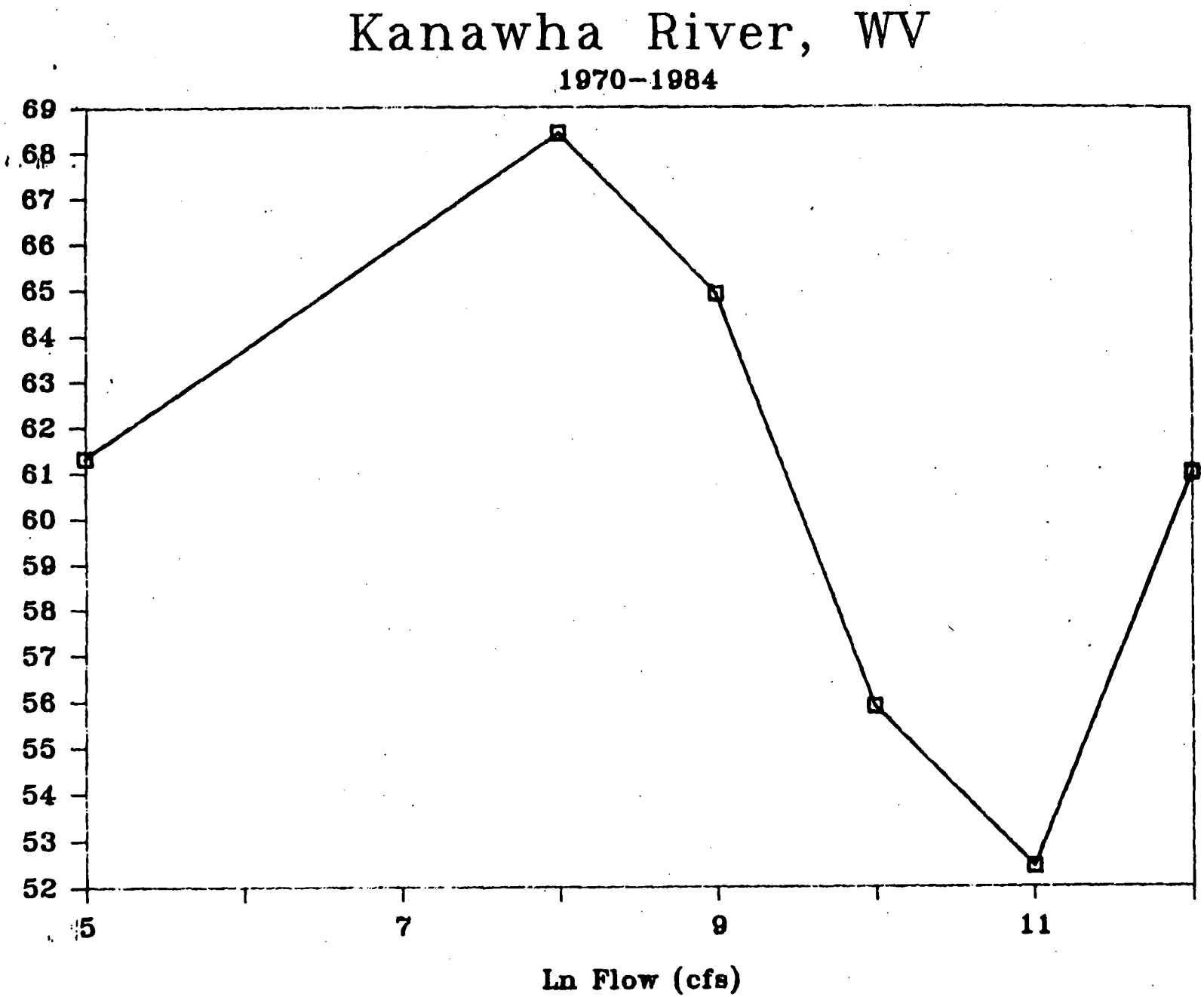

Figure 1. Kanawha River, WV. Changes in mean hardness with the natural log of flow.

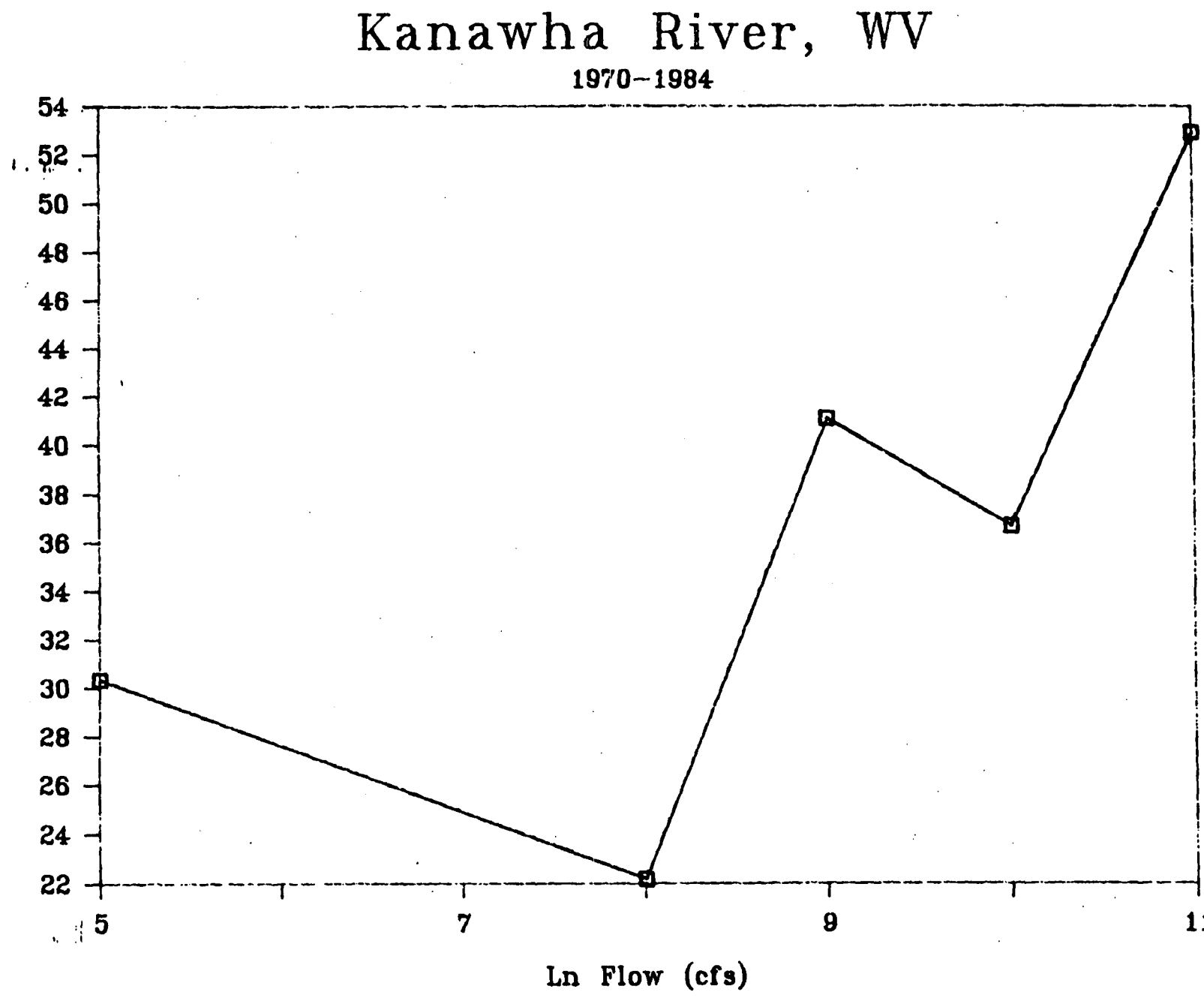

Figure 2. Kanawha River, WV. Changes in mean zinc concentration with the natural log of flow.

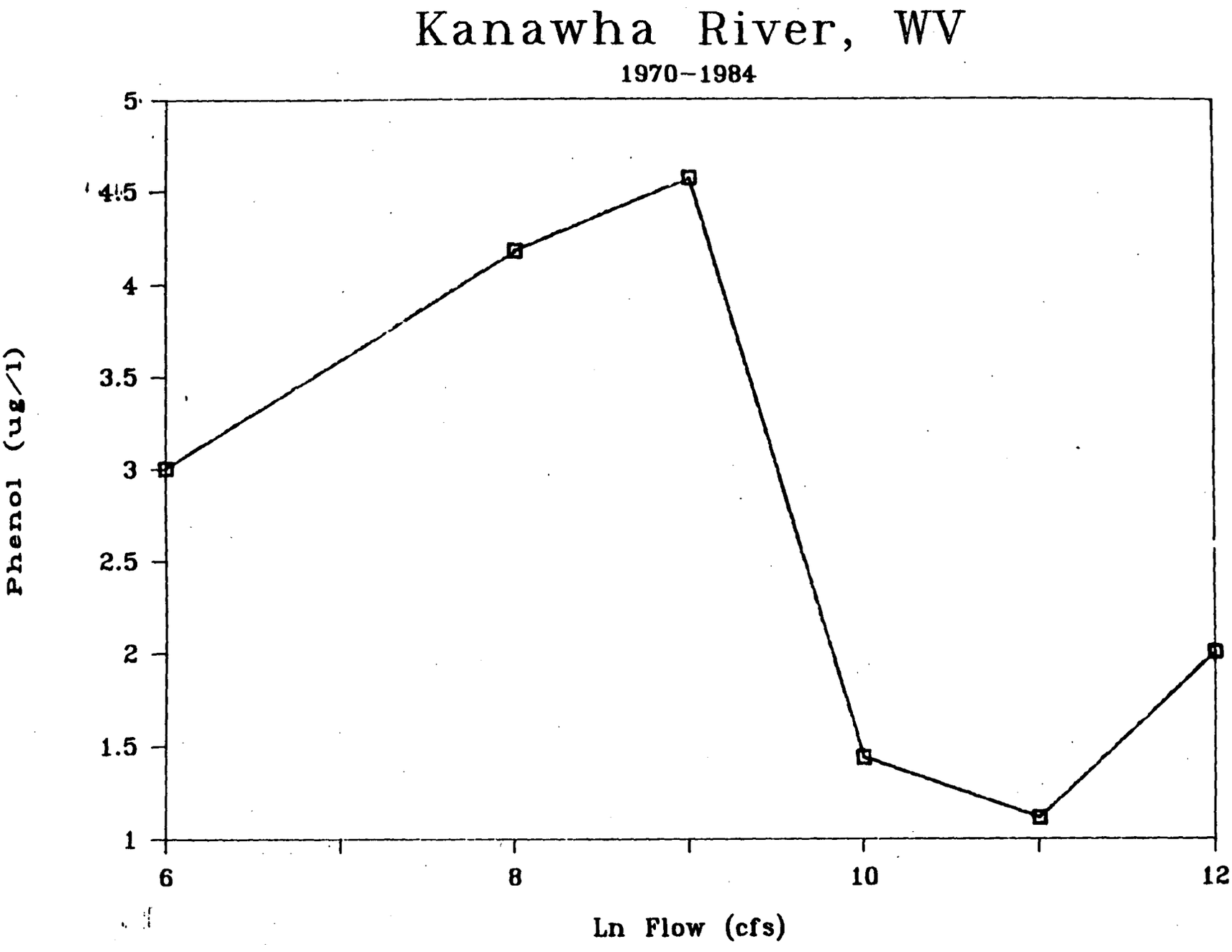

Figure 3. Kanawha River, WV. Changes in mean phenol concentration with the natural log of flow.

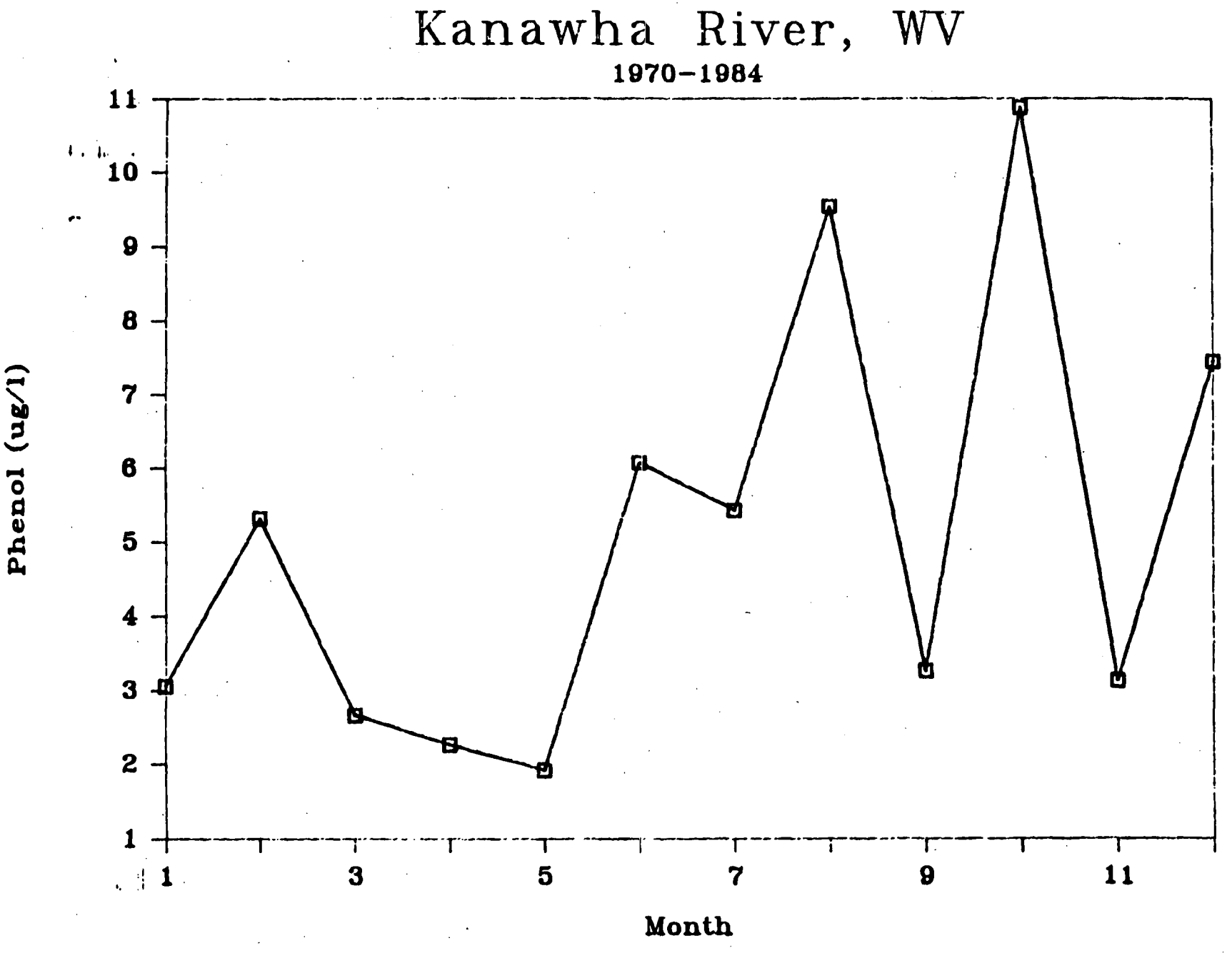

Figure 4. Kanawha River, WV. Seasonal changes in mean phenol concentration.

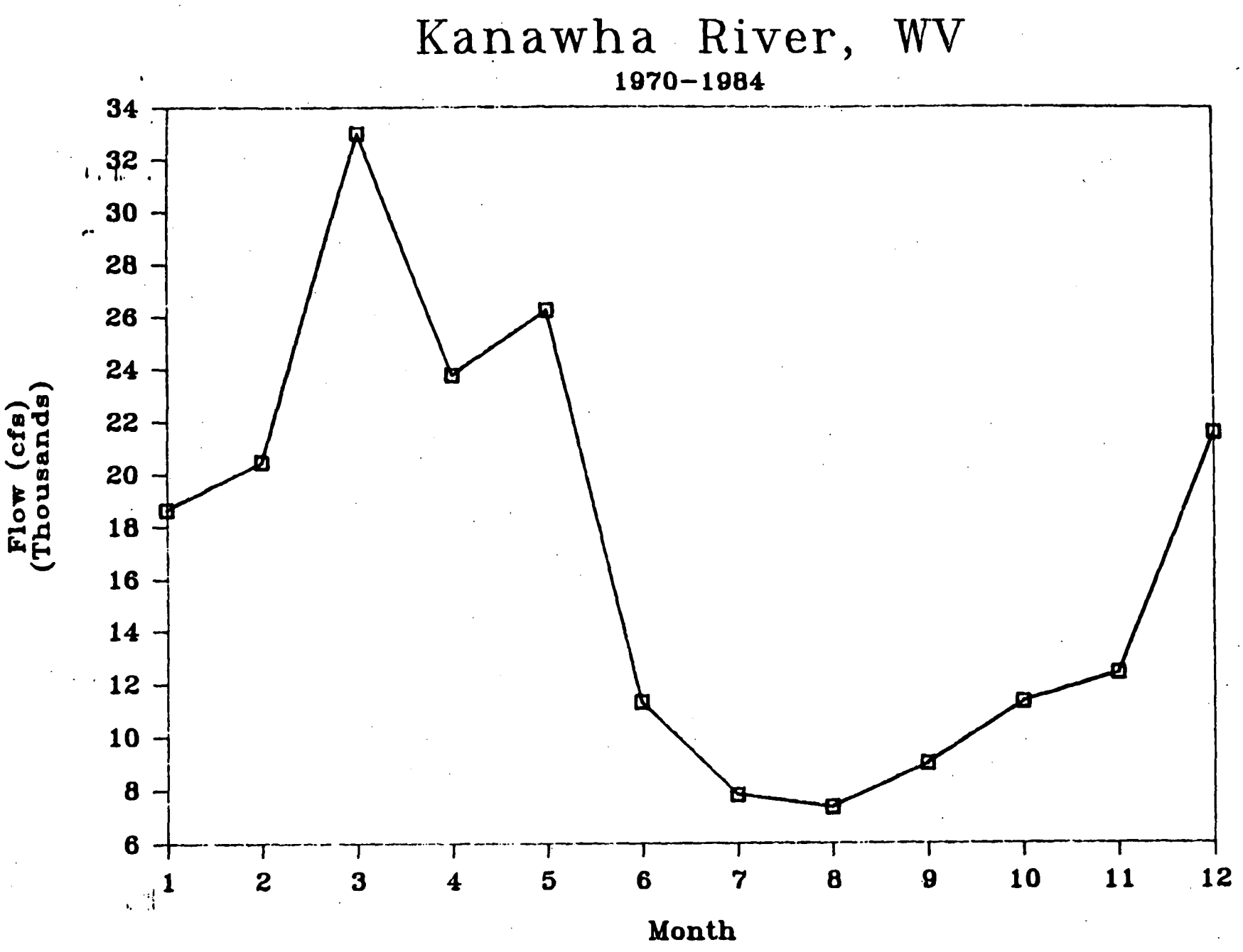

Figure 5. Kanawha River, WV. Seasonal changes in mean flow.

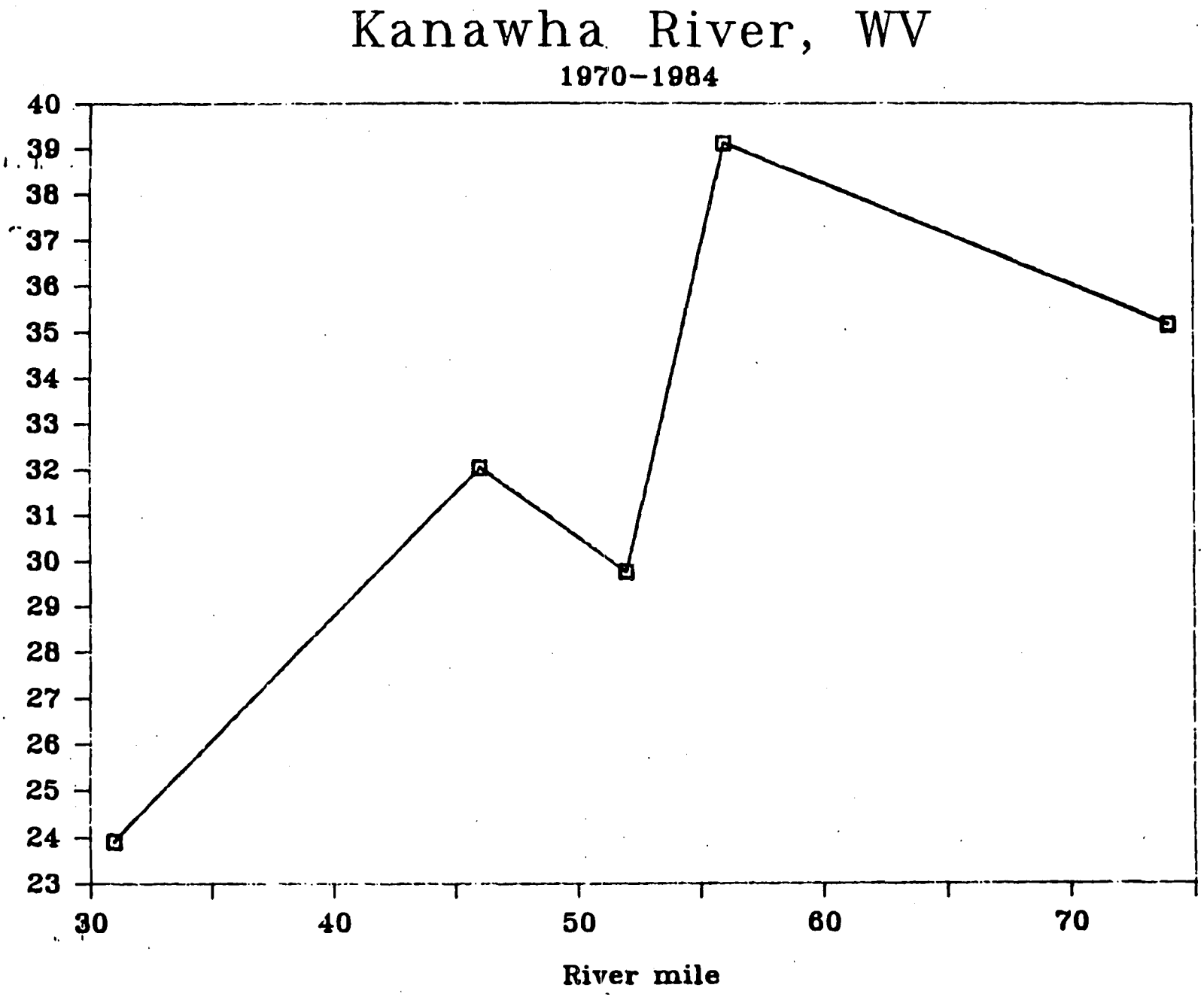

Figure 6. Kanawha River, WV. Changes in lead concentration with river mile.

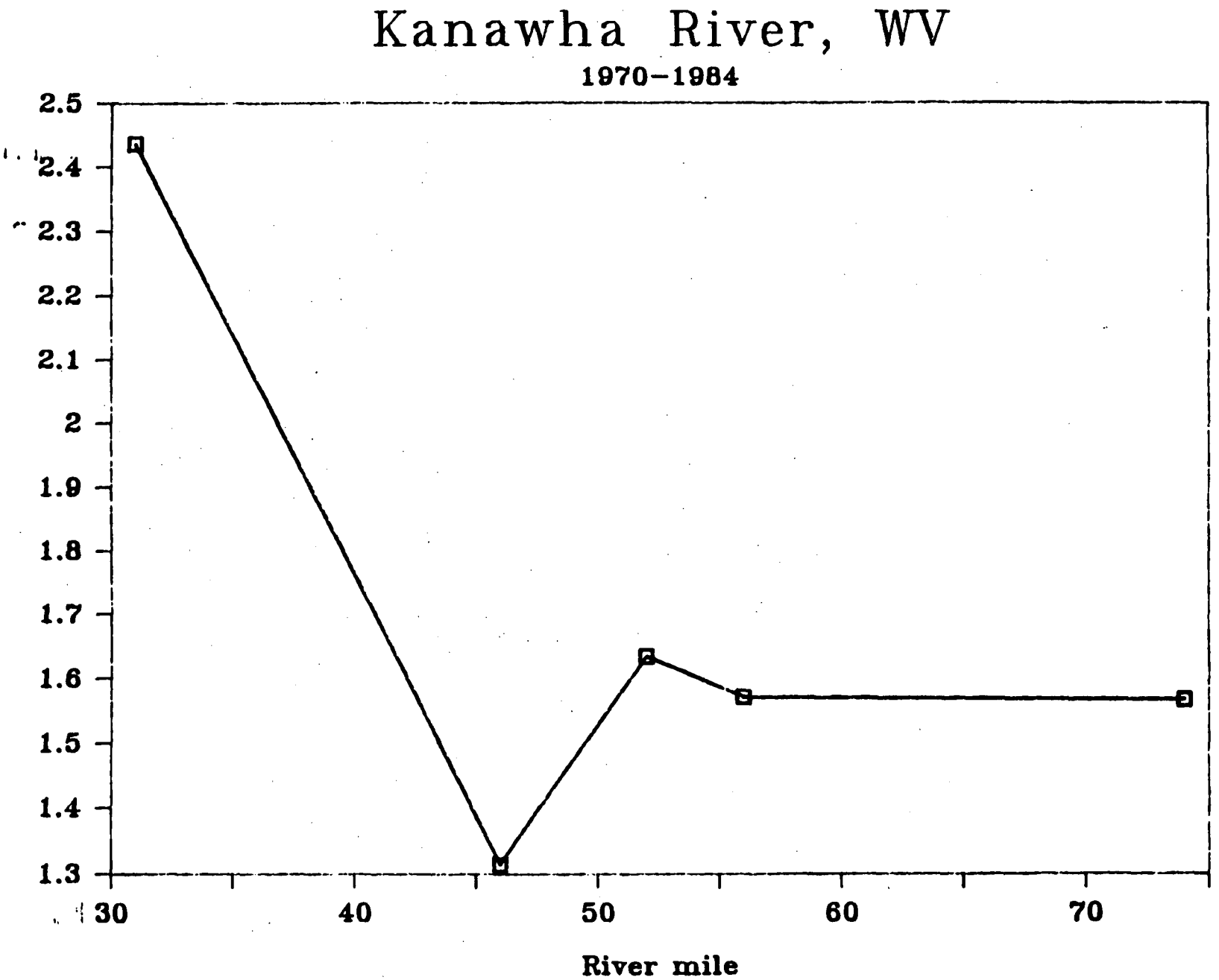

Figure 7. Kanawha River, WV. Changes in selenium concentration with river mile.

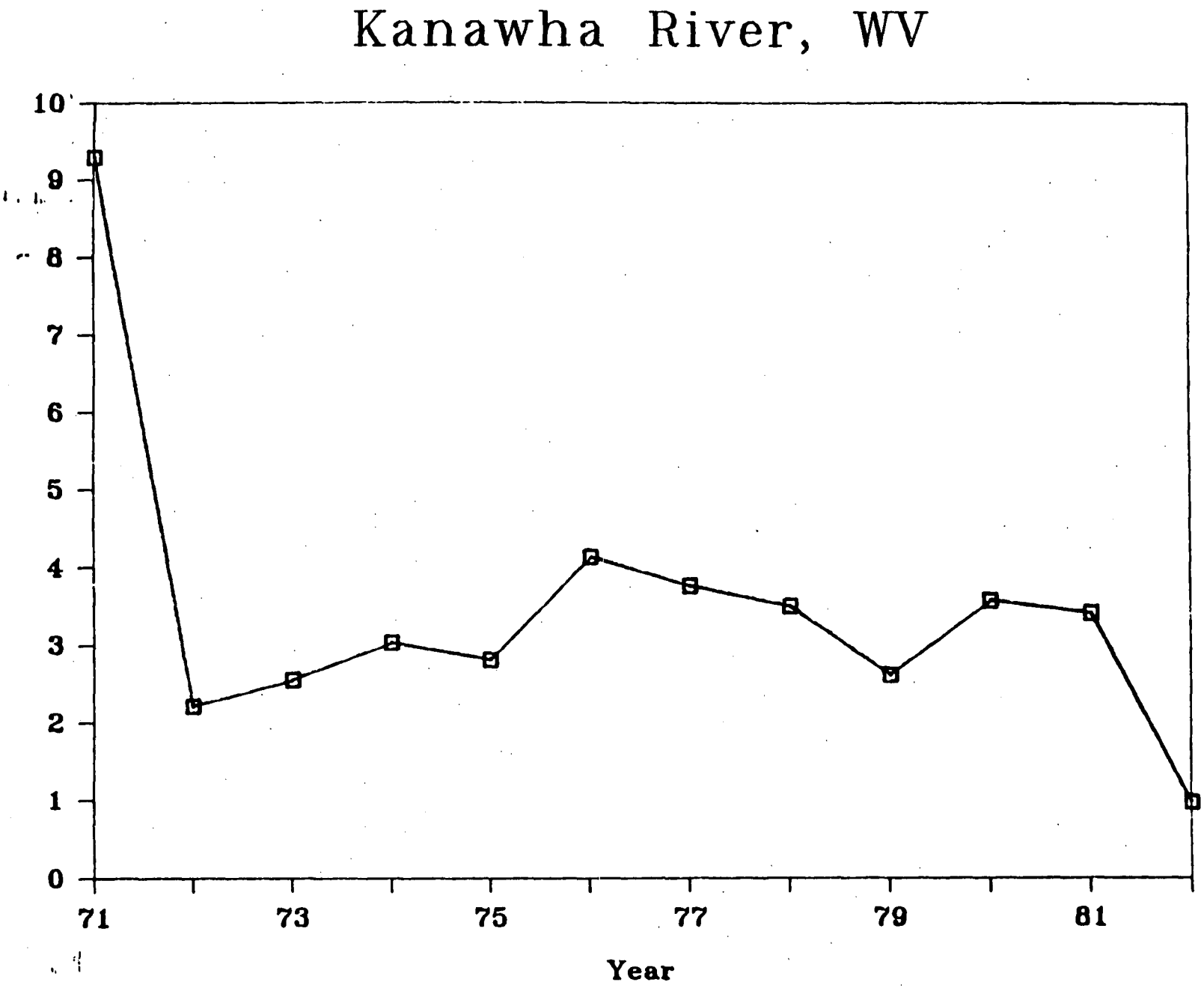

Figure 8. Kanawha River, WV. Changes in arsenic concentration with year.

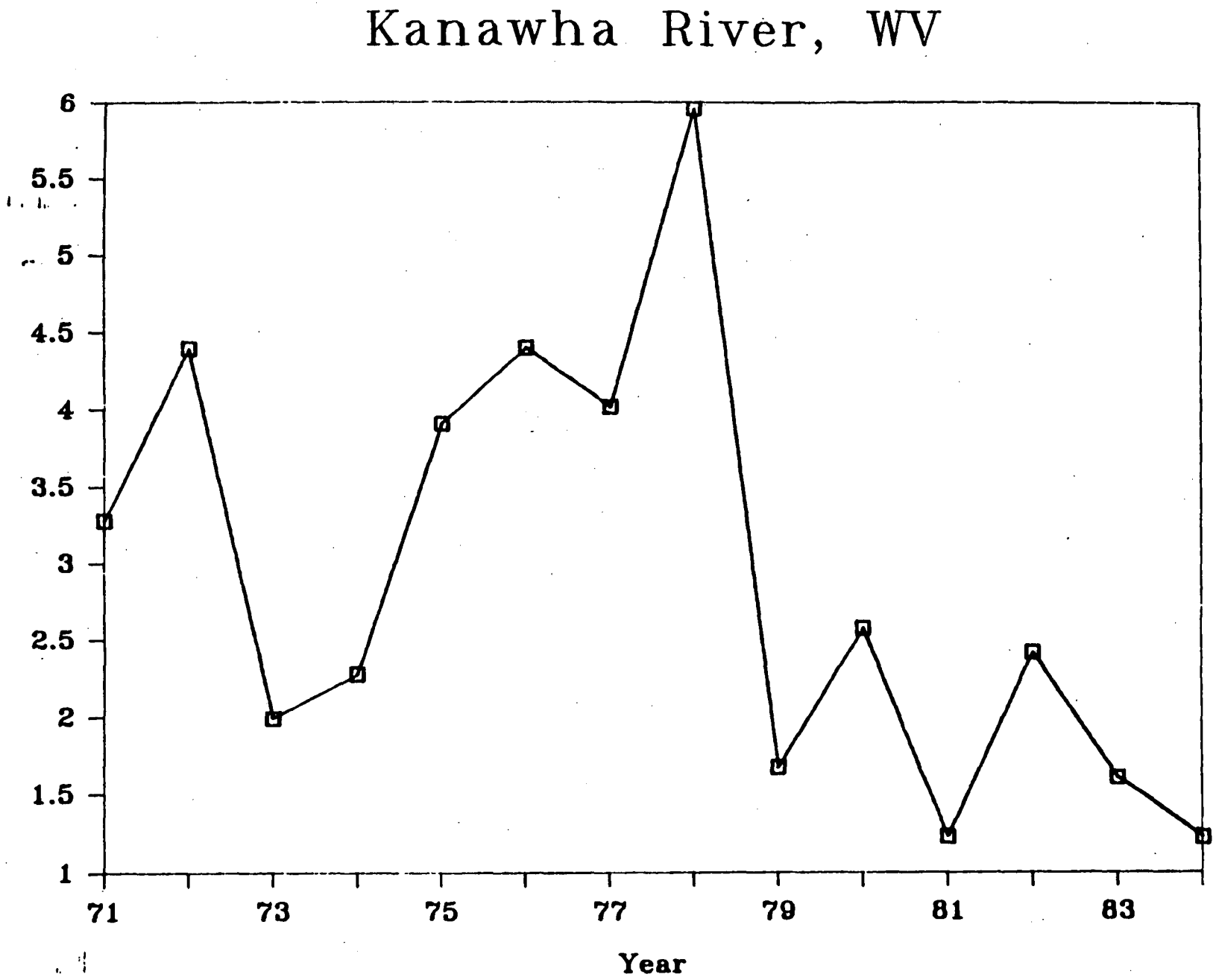

Figure 9. Kanawha River, WV. Changes in cadmium concentration with year.

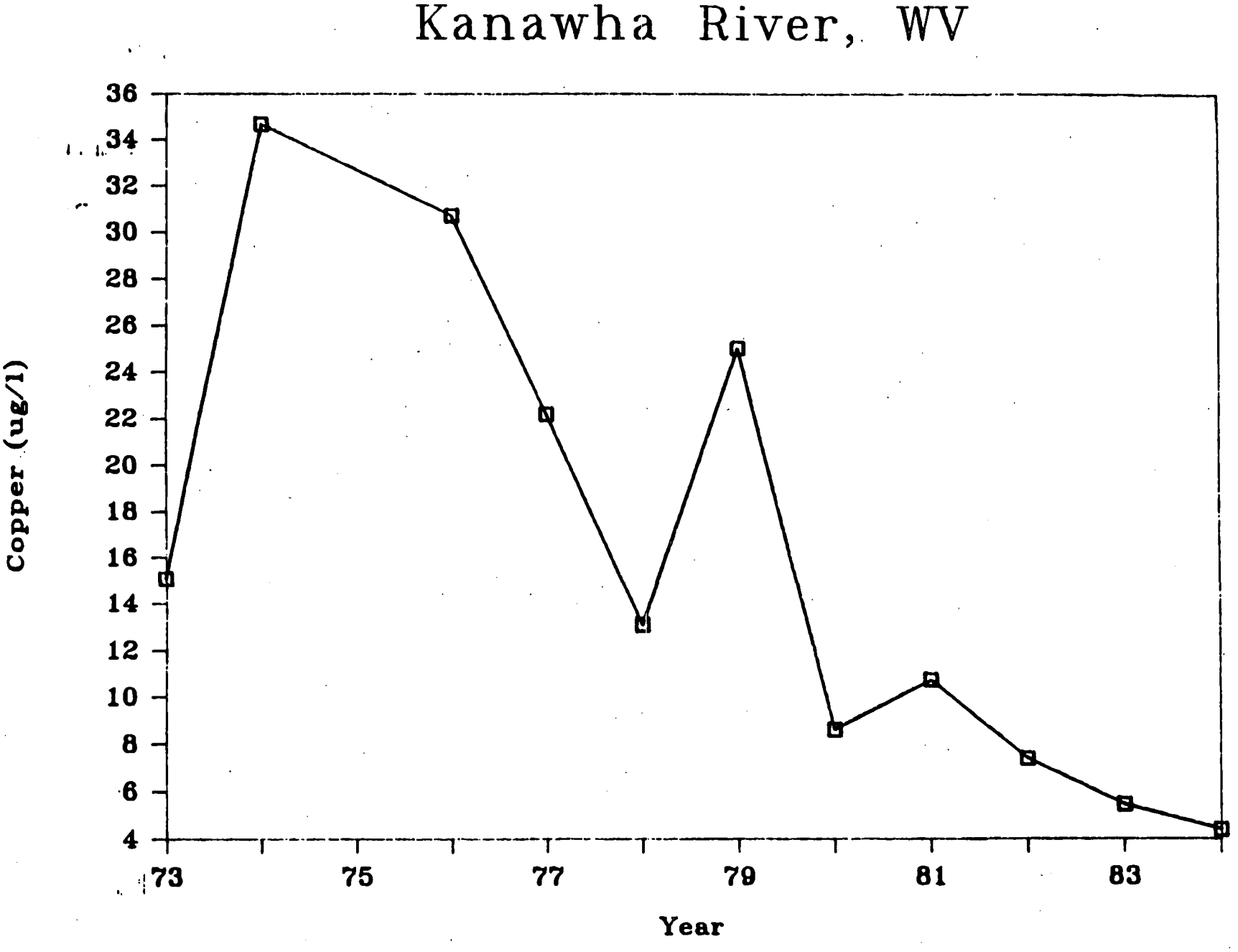

Figure 10. Kanawha River, WV. Changes in copper concentration with year.

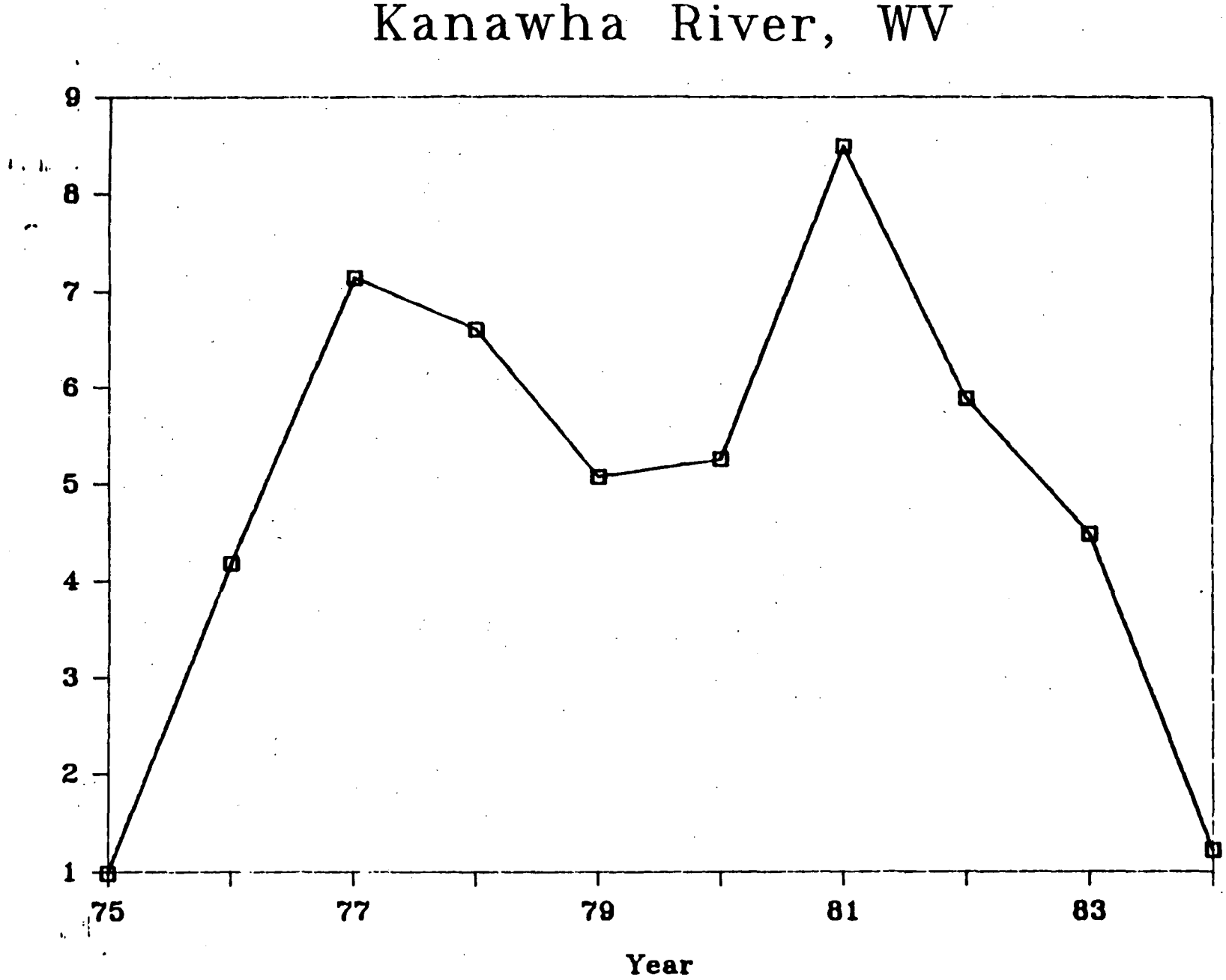

Figure 11. Kanawha River, WV. Changes in cyanide concentration with year.

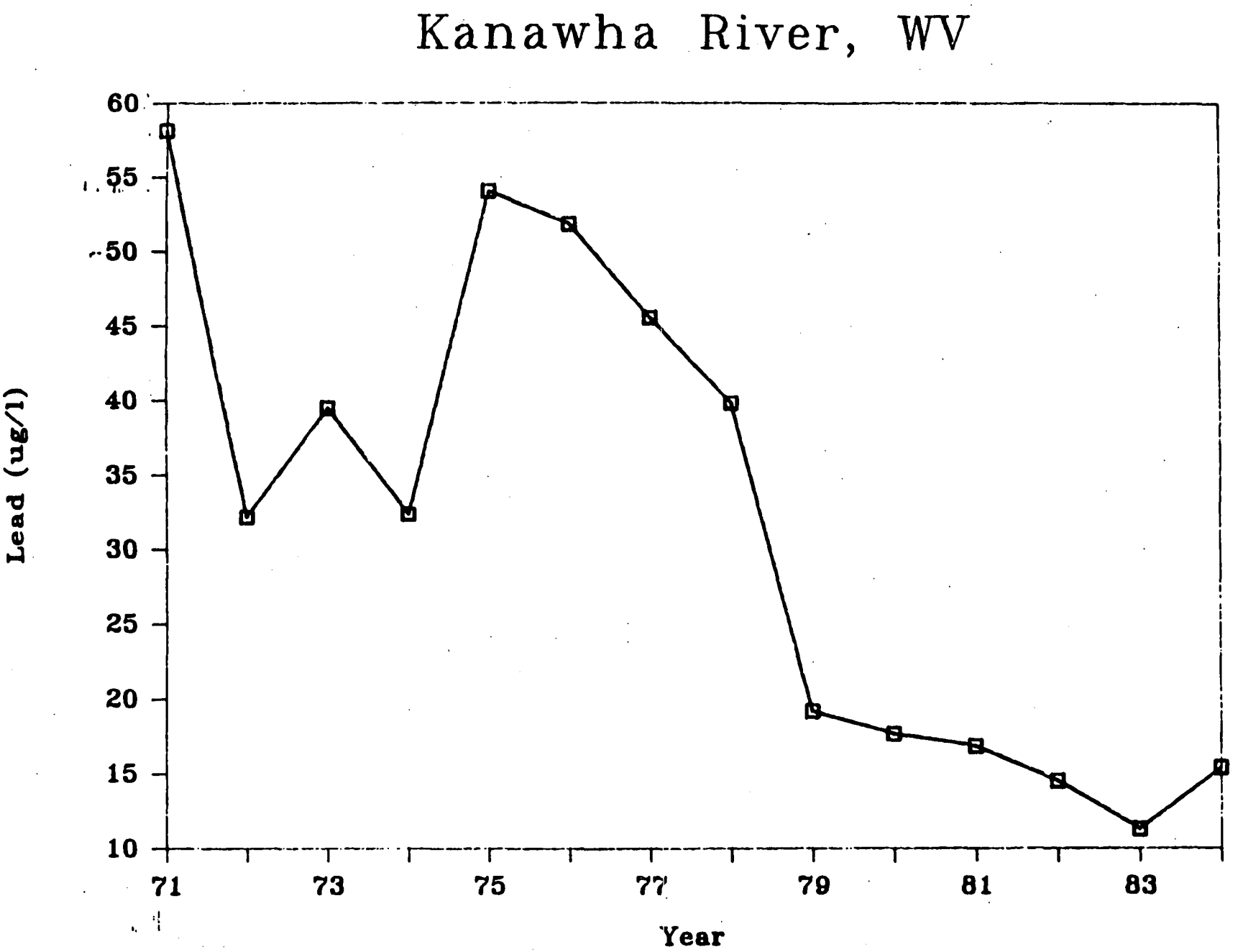

Figure 12. Kanawha River, WV. Changes in lead concentration with year.

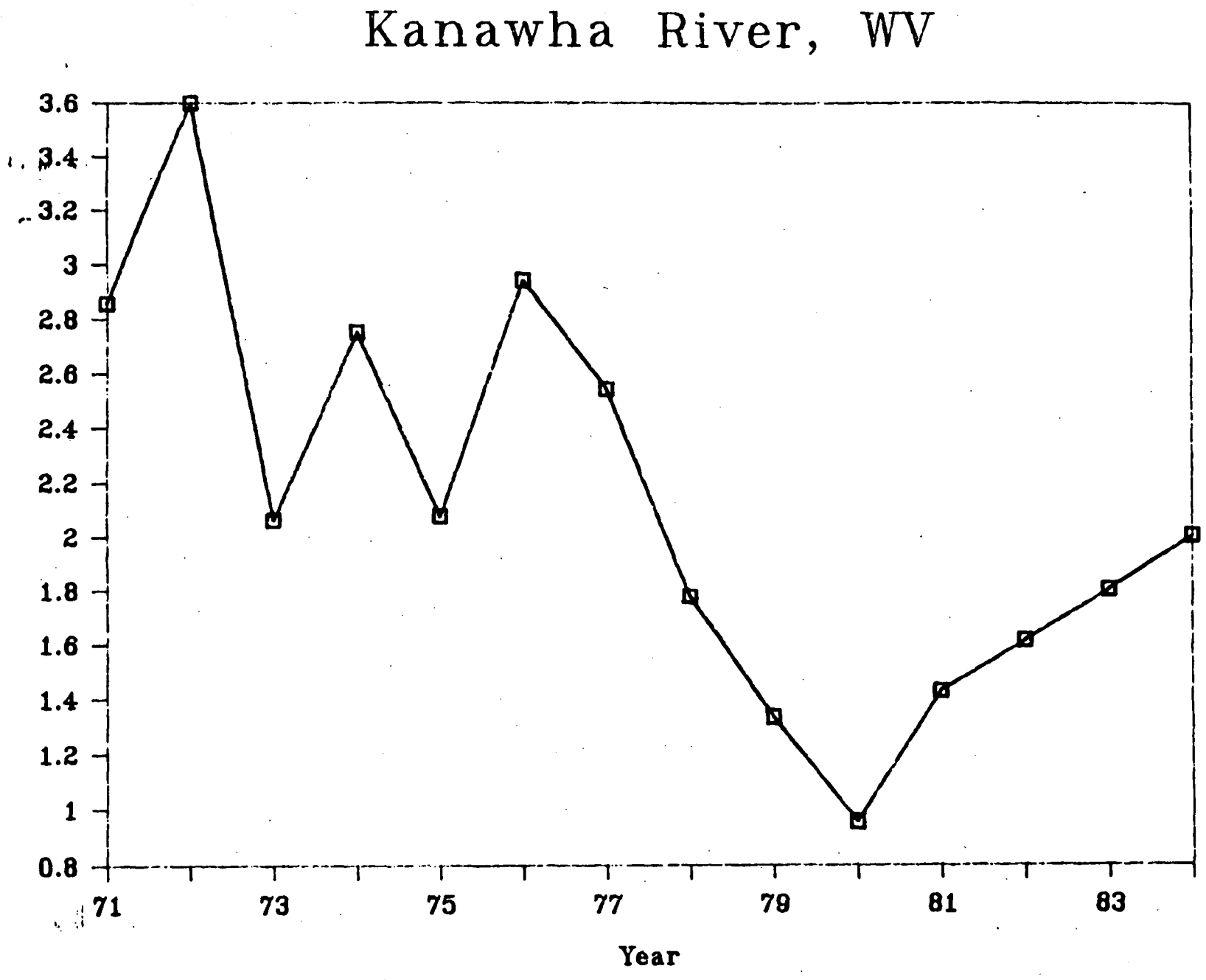

Figure 13. Kanawha River, WV. Changes in silver concentration with year.

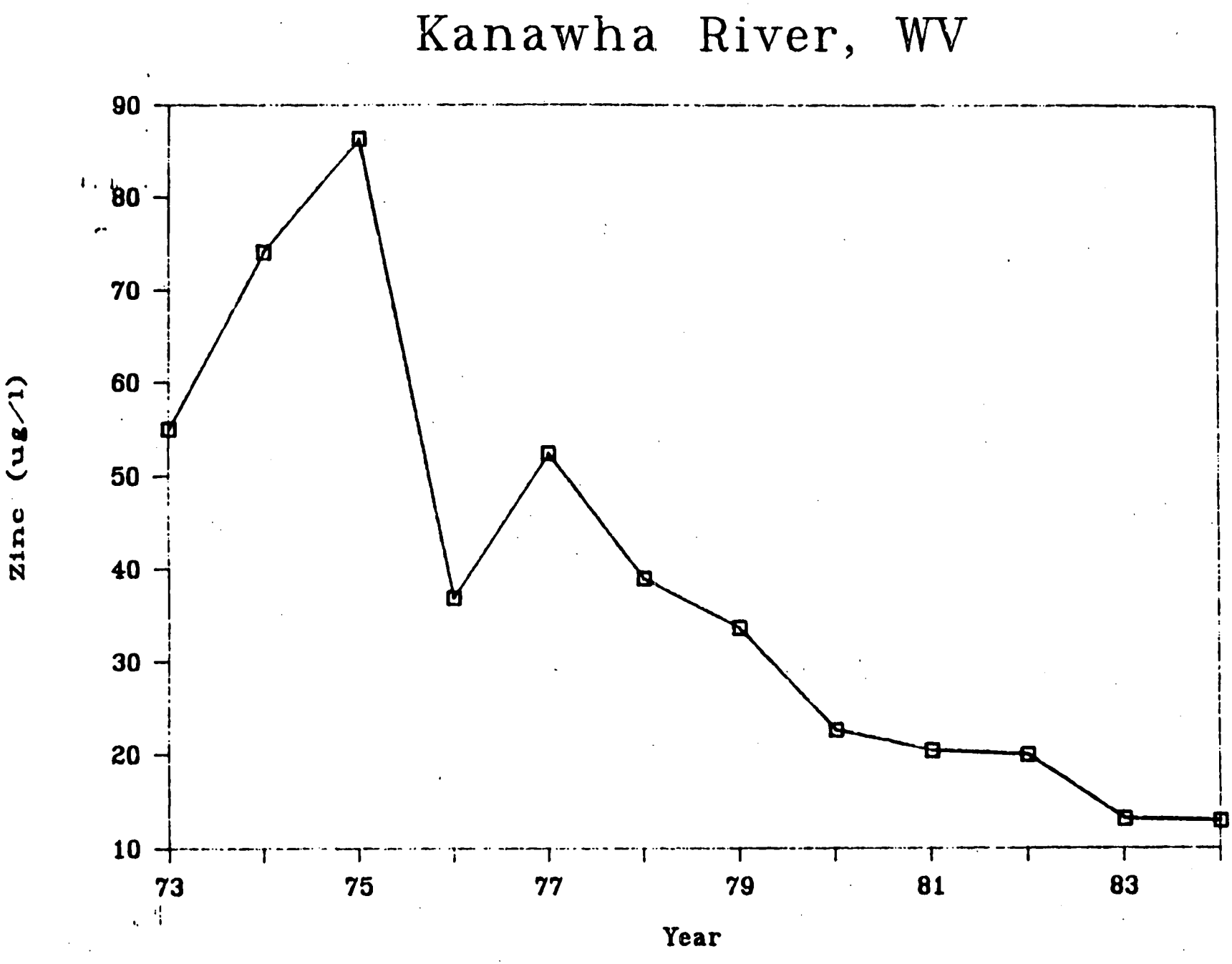

Figure 14. Kanawha River, WV. Changes in zinc concentration with year.

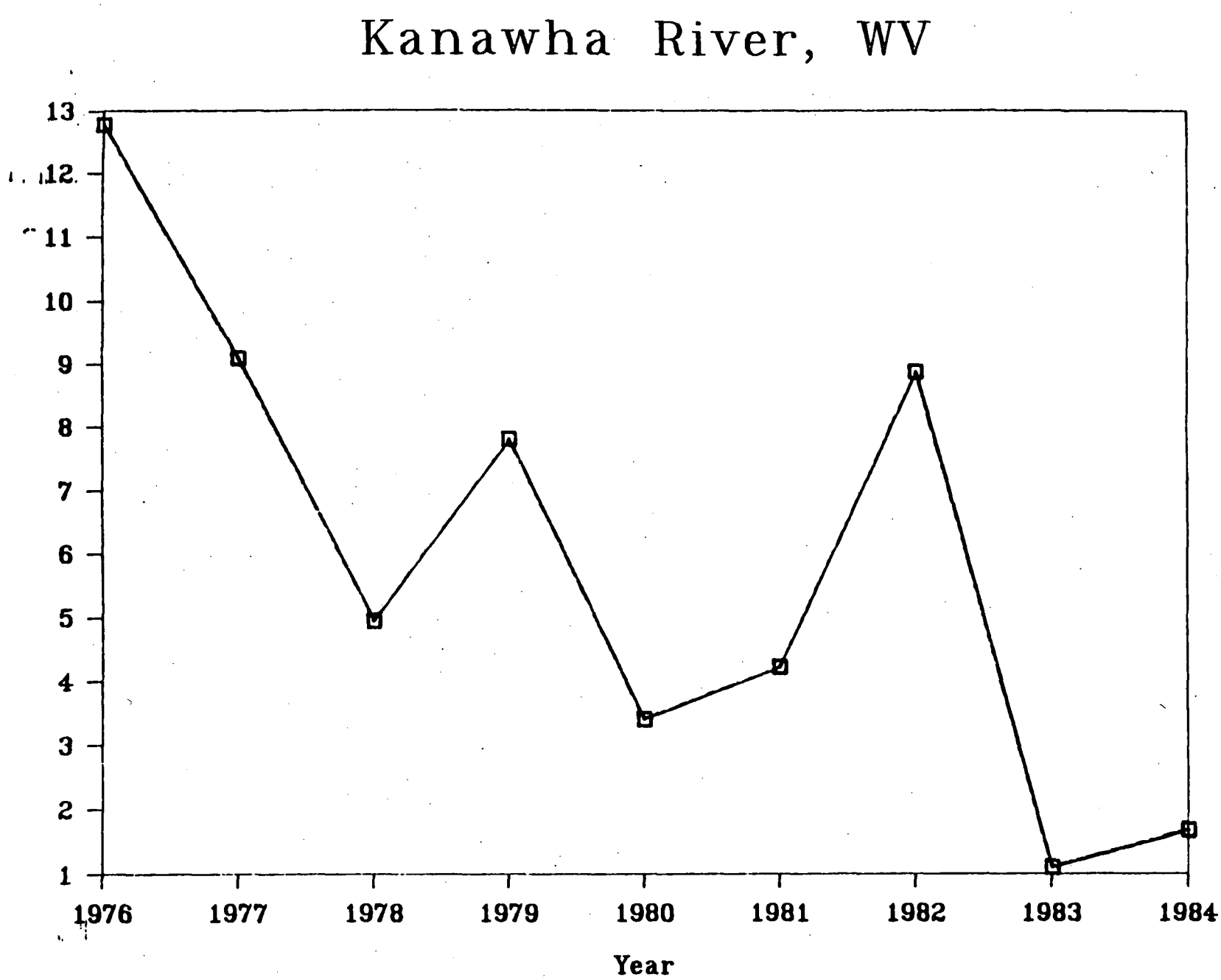

Figure 15. Kanawha River, WV. Changes in phenol concentration with year.

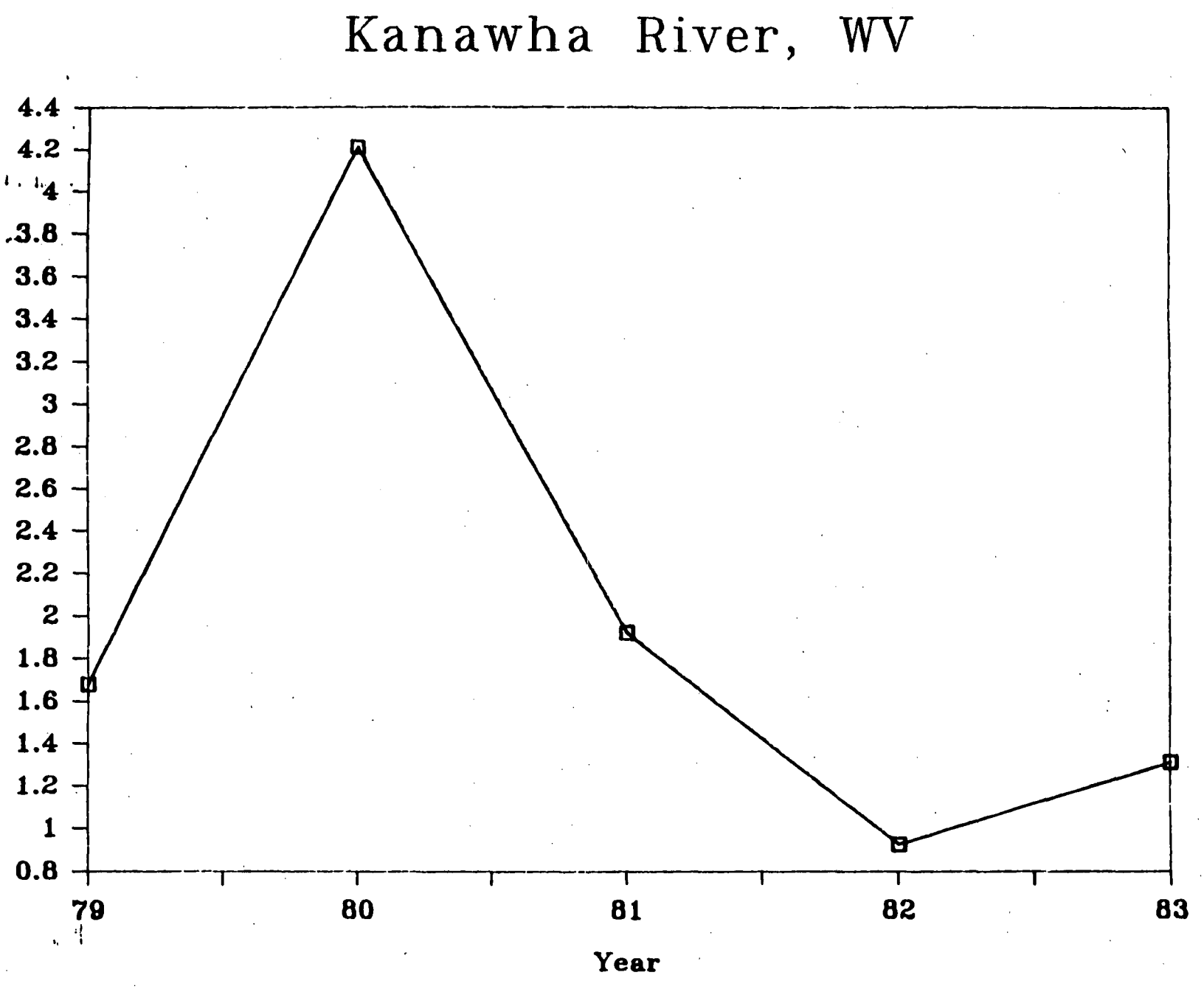

Figure 16. Kanawha River, WV. Changes in chloroform concentration with year.

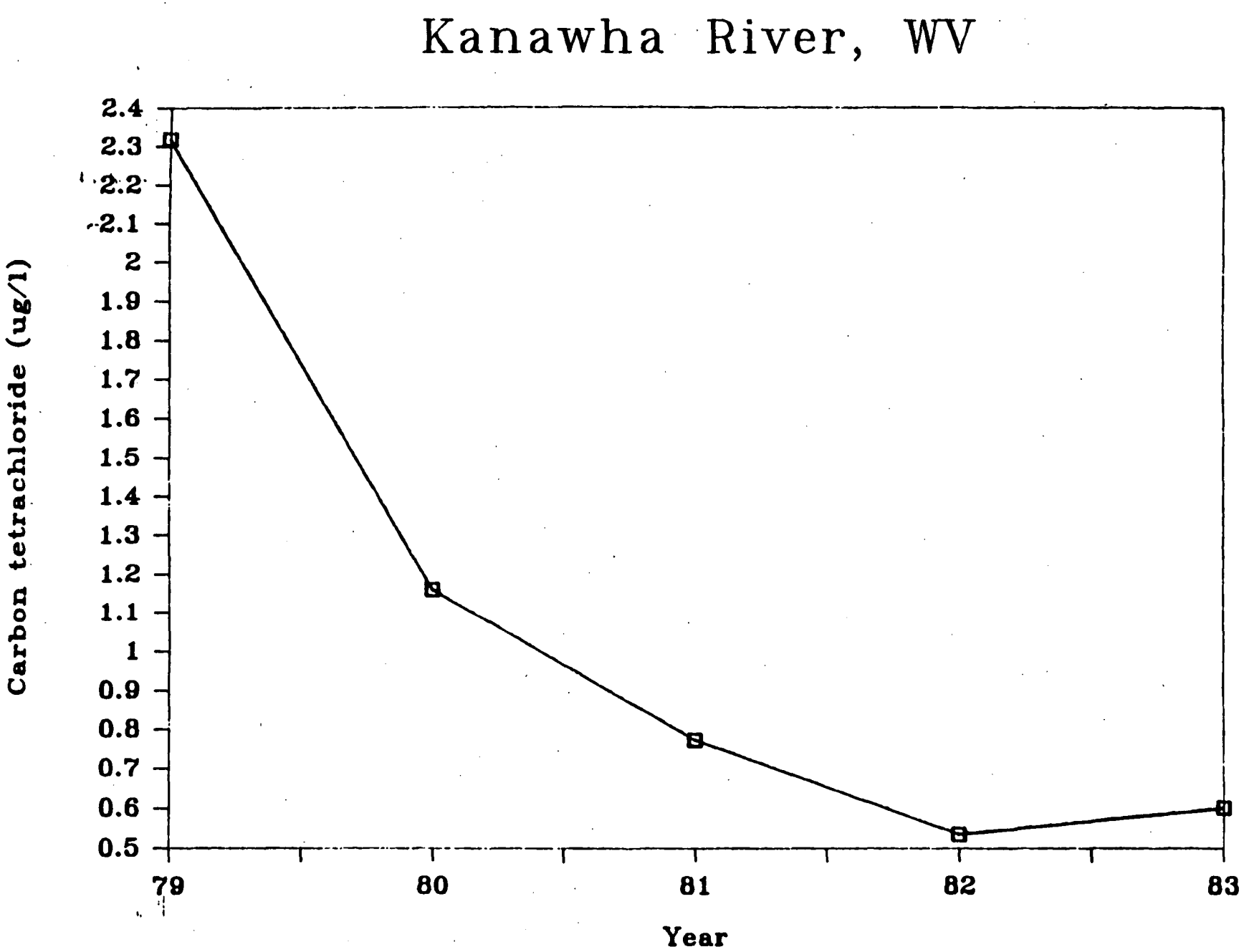

Figure 17. Kanawha River, WV. Changes in carbon tetrachloride concentration with year.

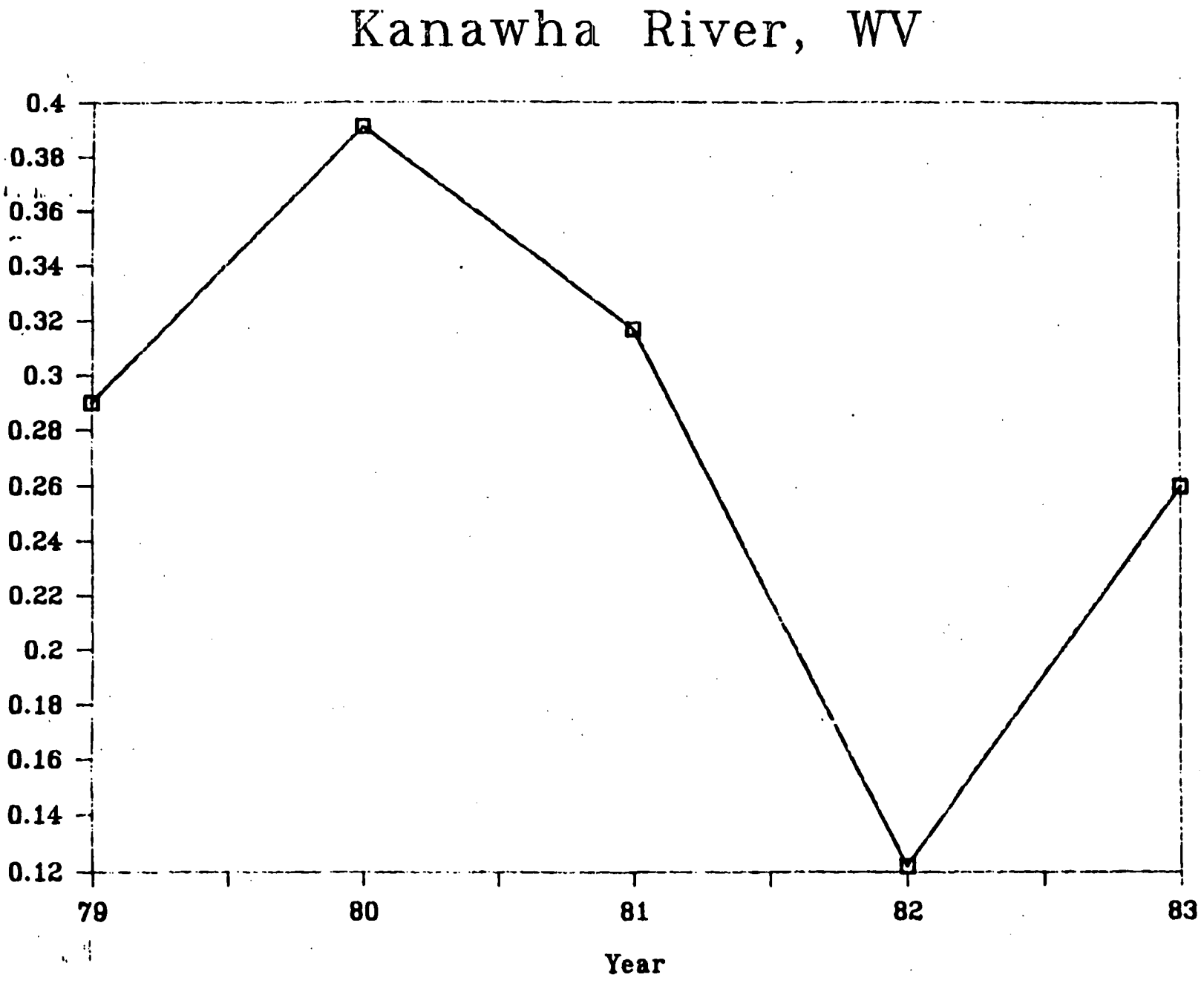

Figure 18. Kanawha River, WV. Changes in trichloroethylene concentration with year.

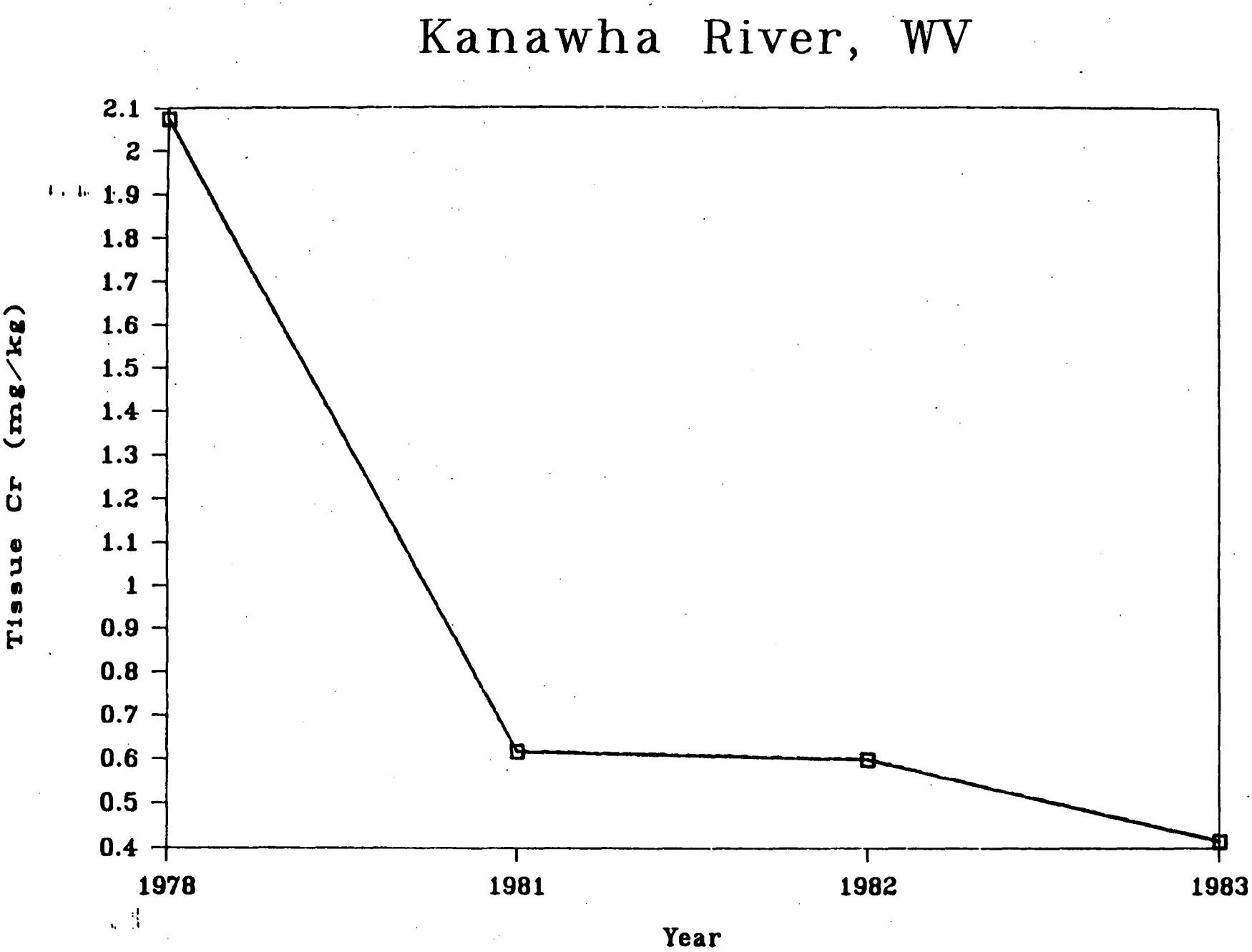

Figure 19. Kanawha River, WV. Changes in tissue chromium concentration with year.

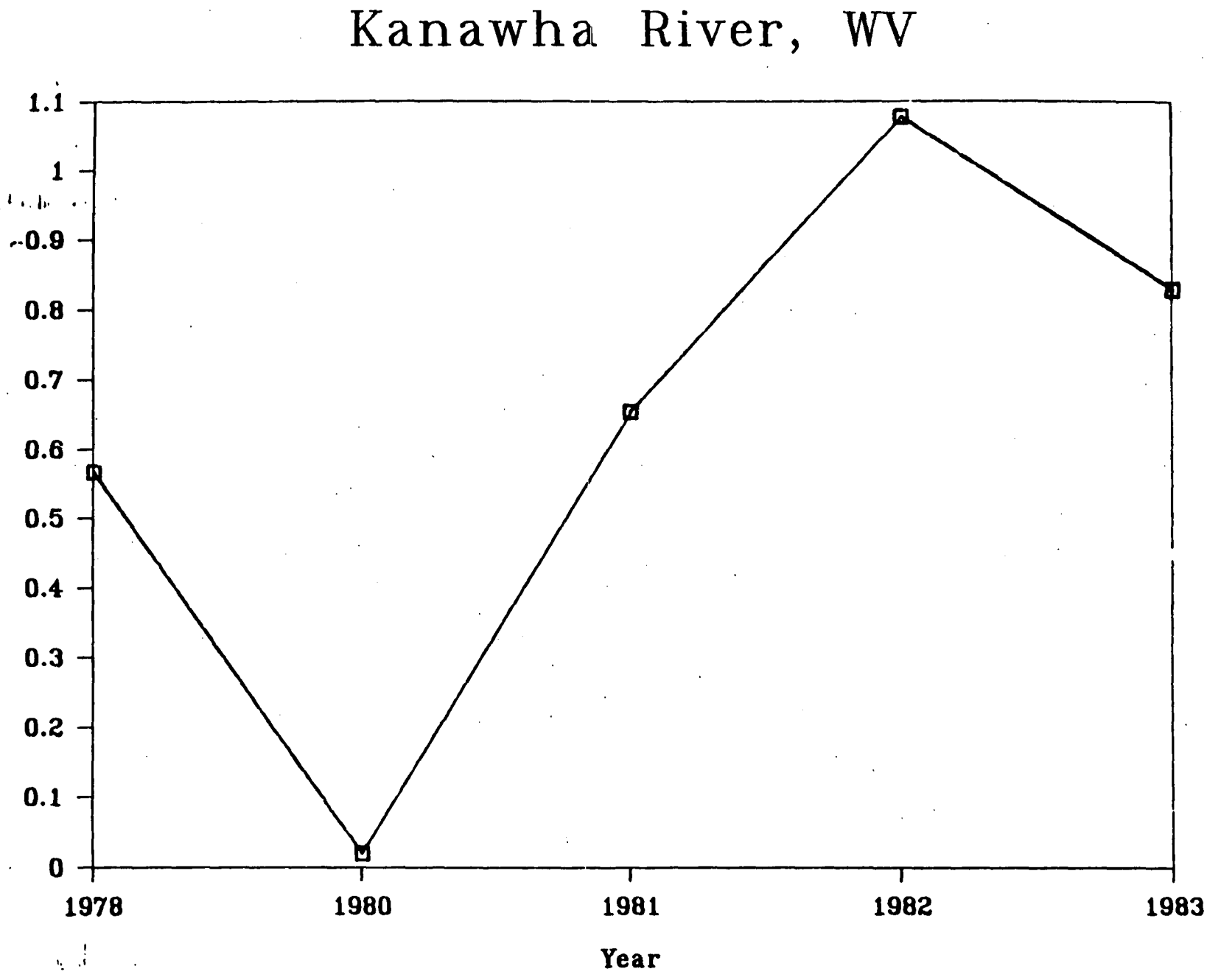

Figure 20. Kanawha River, WV. Changes in tissue copper concentration with year.

APPENDIX D - CERCLA

STRATEGY FOR IMPLEMENTATION

KANAWHA VALLEY SPECIAL REPORT RECOMMENDATIONS

ERRIS SITES

		GROUP A TO BE COMPLETED 6 MONTHS		GROUP B TO BE COMPLETED 1 YEAR		GROUP C TO BE COMPLETED 2 YEARS		
S.D.	DNR	0	0	0	0	0	0	0
	EPA	0		0		0		
P.A. (#1) (#2)	DNR	5	5	5	10	0	0	15
	EPA	0		5		0		
S.I. (#1) (#2)	DNR	1	4	2	6	2	2	12
	EPA	3		4		0		

(#1)- ALL P.A. AND S.I. NUMBERS ARE ESTIMATES.

(#2)- EPA WILL CONDUCT P.A.s AND S.I.s TO REACH THE PLANNED GOALS.

August 1985

STRATEGY FOR IMPLEMENTATION

KANAWHA VALLEY SPECIAL REPORT RECOMMENDATIONS

NON-ERRIS SITES

		GROUP A TO BE COMPLETED 6 MONTHS		GROUP B TO BE COMPLETED 1 YEAR		GROUP C TO BE COMPLETED 2 YEARS		
S.D.	DNR	0	84	0	0	0	0	84
	EPA	84		0		0		
P.A. (#1)(#2)	DNR	15	15	25	25	5	5	45
	EPA	0		0		0		
S.I. (#1)(#2)	DNR	2	4	2	6	2	5	5
	EPA	2		4		3		

(#1)- ALL P.A. AND S.I. NUMBERS ARE ESTIMATES.

(#2)- EPA WILL CONDUCT P.A.s AND S.I.s TO REACH THE PLANNED GOAL.

August 1985

APPENDIX E

ENVIRONMENTAL ISSUES

Environmental Issues

The report by the National Enforcement Investigation Center (August 1984) identifies a number of areas in the various EPA programs where additional investigations, permit actions, program reviews, or enforcement actions are needed in the Kanawha Valley. Additional issues have also been identified by EPA Region III as a result of the preparation of the overview in Chapter 4. Past, current, and future responses by regulatory agencies to these issues and needed actions are discussed briefly below.

Water

The NEIC report indicates that the State's policy is to wait for guideline promulgation prior to reissuing best available technology permits to several organic chemical plants. NEIC urges that comprehensive permits be reissued to Monsanto, both FMC plants, and Union Carbide at S. Charleston. West Virginia has reissued the Union Carbide and Monsanto permits based on best professional judgment (BPJ). The FMC permits will be issued in 1986. See Section 4.1 for details of NPDES permit reissuance.

The report observes that Chemical Leaman, Coastal Tank Lines, and Mason & Dixon Tank Lines have high potentials for toxic discharges but no toxicant permit limits and urges modification of the permit to include such limits. There are no effluent guideline regulations for toxic pollutants for these industries. These facilities' permits have bioassay conditions for toxicity screening and requirements to investigate toxic results. The Coastal Tank Line and Mason and Dixon permits were reissued in 1985. The Chemical Leaman permit will be reissued in 1986. Application data on 129 toxic pollutants and other monitoring information have been reviewed by the State and EPA to determine which specific toxic pollutants should be limited.

NEIC identified the need to better assess permit limits for meeting water quality standards and potential toxicity to aquatic life. Water quality standards and other water quality-based criteria will be more fully utilized in considering toxicant limitations for reissued permits. EPA guidance issued September 1985 on toxicant screening for water quality-based permits will aid in this effort.

The NEIC report notes that there are inconsistencies in permit conditions for the major chemical plants. The absence of effluent guidelines and plant differences are the major factors for any inconsistency. Implementation of a toxicant control strategy by the State will facilitate a more uniform and comprehensive approach in screening and limiting toxicants.

The report observes that many effluent bioassays demonstrate toxicity and that the causes are not defined. Greater emphasis is being placed on responding to reports of toxic bioassays. As explained in Section 4.1, new permits require dischargers to provide information on probable causes of toxicity and steps taken to reduce it. This is generally true throughout the Region.

The NEIC report indicates that there are frequent spills and leaks from chemical plants. Although these discharges are usually short term and corrected soon after detection, in some cases, violations of NPDES permit limits result. These violations are usually resolved by informal contacts with the permittee. Depending upon the severity of the violation, regulatory action may include a written inquiry into the circumstances regarding the incident issuance of an administrative order may be taken. Many reissued permits require implementation of best management practices (BMP) to better prevent such leaks and to detect them more quickly. In addition to actions under NPDES, EPA will continue to respond to the incidents under Section 311 of the Clean Water Act as described below under Spills and Releases.

Water Monitoring and Water Quality

The NEIC report indicates that the presence of low concentrations of toxic pollutants in the Kanawha River reduces the quantity and quality of the fishery in the lower river. This review (described in Chapter 5) found that numbers of individual fish and fish species sampled in navigation locks were not statistically different upstream and downstream of Charleston. This suggests that discharges to the industrial section of the river may have less impact on the fishery than the NEIC report implied. However, a more recent report by the Army Corps of Engineers indicates that benthos diversity is lower below the industrial area. This suggests that industrial dischargers did have an adverse impact on biota. Contamination of fish tissue by some priority pollutants was greater at locations downstream of the industrial area.

Ambient water quality measurements indicate that many inorganic pollutants were also present upstream of the industrial area. No statistically significant improvement in numbers of fish species and individuals was observed between 1978 and 1984. However, most non-significant trends in fish populations were positive, suggesting that as more data become available, statistically significant improvements may emerge.

The NEIC report states that chronic toxicity potentially affects aquatic life in the Kanawha River in the vicinity of the industrial discharges. Bioassays recently performed by West Virginia and EPA Region III confirmed that some effluents to the industrial section of the river were indeed toxic. Bioassays performed by the EPA Duluth Environmental Research Laboratory also showed that ambient river

water near these discharges had chronic toxicity to water fleas and fathead minnows. Some of this ambient chronic toxicity occurred upstream of the tested discharges, suggesting that there may be other additional sources of toxic pollutants.

The NEIC report points out the need for expanding the toxic pollutant monitoring program, in particular by monitoring organic pollutants at more than one location on the Kanawha. The present organic pollutant monitoring station located at St. Albans is operated by ORSANCO as a daily early warning of organic substances spills to water users on the Ohio River. Although it would be desirable to have more upstream data, the Kanawha is already well-monitored relative to similar water bodies in other parts of the U.S. West Virginia DNR has recently begun two intensive surveys on the Kanawha River. One survey will analyze ambient river water at several stations within the industrial area for benzene, toluene, methanol, and vinyl chloride. These compounds are not presently monitored at St. Albans. The second survey will study the incidence and types of liver tumors and external lesions occurring in sensitive fish species sampled at four stations in the industrial area and at a control station. Occurrence of these tumors and lesions is believed to be a sensitive indicator of chronic sublethal stress.

The NEIC report mentions potential problems with chronic toxicity to aquatic life and/or bioaccumulation of toxic pollutants in fish. Violations of water quality criteria for cyanide, manganese, lead, cadmium, phenolic compounds, and iron were specifically discussed. The present study compared ambient concentrations of toxic pollutants with two sets of 1980 EPA criteria: those for protection of aquatic life from chronic toxicity, and those associated with an incremental lifetime cancer risk of 10^{-5} for aquatic life consumption. This study confirmed the NEIC's conclusion that cyanide and phenolic compounds sometimes exceed the aquatic life criteria, but also found that arsenic concentrations almost always exceed the level associated with 10^{-5} incremental lifetime cancer risk from aquatic life consumption. Concentrations of all of these compounds except arsenic may be improving. The State of West Virginia intends to begin analyses of arsenic in fish tissue by 1986 to determine whether fish tissue contains concentrations of arsenic that are consistent with the concentrations observed in ambient water.

Air

The NEIC report states that an emissions inventory and exposure assessment are needed in order to list chemicals of concern in priority order. NEIC screened and ranked chemicals based solely upon health effects data independent of emission levels and exposure projections. APPC has initiated a comprehensive emissions inventory program. In addition, West Virginia recently passed the Community Right to Know Act which will require companies to list chemicals stored on-site.

The NEIC report implies that there should be federal regulatory limits for various volatile organic compounds (VOC's) in order to reduce potential health impacts from substances in the ambient air. Many toxic substances are indirectly limited by the emission controls imposed for VOC's as part of the process to reduce ambient ozone levels. This effort, however does not address health considerations beyond those caused by ozone. It is also true that emissions of relatively few additional substances may eventually be regulated under §112 of the CAA, or limited indirectly by provisions of other statutes. Nevertheless, ambient air standards for toxic chemicals are not expected to be developed by the federal government in the near future. EPA is accelerating its efforts to establish health criteria and carcinogenic risk values for those substances believed to be most toxic. The purpose of criteria development is to enable State and local agencies to assess the risks to individuals and populations affected by specific facilities and to establish control limits necessary to reduce risks. Region III's multi-media study planned for the Kanawha Valley will also evaluate exposure routes and potential control measures for air toxicants.

The NEIC report states that there is a need for an assessment of the current status of air quality in the Kanawha Valley. EPA Region III, EPA Headquarters, and WV are conducting a multi-media study with a focus on air toxicants. The study will be implemented in three phases with goals of developing a risk assessment for the Kanawha Valley, identifying possible control strategies, and implementing controls. To assess air quality, EPA and the State will perform preliminary dispersion modeling, verify emissions inventories, identify monitoring locations, and calculate risk estimates. A status report will be prepared that summarizes the screening work and its results and is scheduled for release in August 1986.

An important issue involves the frequent occurrence of leaks and air releases at the different plants. For example, the air releases of methyl chloride at Union Carbide's South Charleston plant are noteworthy. These releases indicate that there may have been deficiencies related to the process, equipment, or operation and maintenance procedures. EPA has inspected the facility for deficiencies and documented its findings in an inspection report. The actions taken to date by the APCC consist primarily of inspections and engineering review of the process and process equipment in an effort to determine if there are repetitive large releases. After the review, the APCC attempts to obtain an agreement from the company to correct the problem. This process has been only partially successful because there are no EPA ambient or process standards for methyl chloride. In the absence of Agency rulemaking which particularly regulates a specific substance regarded as an "air toxicant", EPA's best authority to deal with such releases comes from the emergency provisions of the various statutes.

The criteria for taking action under such provisions must also be met before an action can be taken. At present, West Virginia is compiling an air emissions inventory with the assistance of EPA and will use this to decide how and what pollutants to regulate. In addition, EPA is redirecting its program and increasing support to State programs as described in the National Strategy for Toxic Air Pollutants, June 4, 1985, which is summarized briefly in Chapter 5 of this report.

RCRA

The NEIC Report suggests that EPA should request RCRA Part B applications from those industries in the Valley which NEIC ranked as major sources of toxic substances. In particular, these facilities include DuPont, FMC - Nitro, CST Fike, Union Carbide-Institute, Monsanto, and Union Carbide - S. Charleston. The Part B contains detailed information needed to identify the more comprehensive environmental controls associated with final permit determinations. As indicated in Table A-2, the Part B applications have been requested or "called in" and permitting activities for all of these major facilities are progressing.

Although ground water monitoring indicates that contamination has occurred at some sites, EPA has not always taken immediate enforcement action to require cleanups at interim status facilities. Prior to 1984, the law did not give EPA the authority under RCRA to require corrective action for prior releases. The recent amendments in 1984 broaden EPA's authority and provide options for cleanup besides those available under CERCLA. EPA guidance for implementing corrective actions is being completed. All facilities receiving a RCRA permit will be required to take corrective actions at all solid waste management units where necessary by 1988. Assessing the extent of groundwater contamination is a concern nationally. WV and many other states have applied for grants under the Clean Water Act to increase their ability to study and solve groundwater problems. The extent of groundwater contamination at individual sites will also be evaluated under the CERCLA investigations discussed below.

A review of the permit status of individual facilities indicates that certain facilities are not targeted for RCRA permit issuance until 1987 or 1988. This schedule is in accordance with the RCRA National Permit Strategy. The National Strategy recognizes that a large number of facilities require permits and the time needed to do sound permit reviews is contingent upon the available resources at EPA and the States. This recognition results in a need to issue permits in a priority order. Therefore, land disposal permits are highest, followed by treatment, followed by storage. These prioritites are consistent with the concept that greater environmental benefits will be gained by permitting land disposal facilities first. However, all existing facilities must comply with Interim Status provisions as explained in Section 3.2.

TSCA

There are no specific compliance issues related to PCB's raised in the NEIC Report. The Report correctly indicates that there are no known point source discharges of PCB's in the Kanawha Valley, and also notes the trend of decreasing PCB levels in fish samples during the period 1969-1981. PCB levels in fish tissue in 1982 ranged from 0.16-1.3 ppm. Possible sources of contamination may be from sediments, historical spills, or illegal discharges and disposal fo PCB's. Additional fish tissue sampling is being performed by WV DNR to better characterize contaminant levels.

A specific question which arises regarding PCB's is why EPA does not perform more inspections to identify situations where spills could potentially occur. The answer is that as many inspections are conducted as available resources will allow. The use of the neutral (random) selection process enables EPA to select inspection targets equitably from the universe of facilities handling PCB's. The summary of completed inspections is provided in Section 4.2.

FIFRA

There are no specific compliance issues raised in the NEIC Report related to pesticides as they are regulated under FIFRA. When conducting pesticide inspections, however, EPA does not evaluate the manufacturing process for potential mishandling of chemicals or dangerous practices. Under existing law, EPA's inspections are limited to the finished product, its quality, and its labeling.

Spills and Releases

While the NEIC report notes that numerous chemical substances were being emitted to the atmosphere, it also recognized that these emissions were typically not a hazardous air pollutant as designated by EPA regulations and therefore not enforceable under the CAA. Further actions on air toxicants by EPA and the State of West Virginia are discussed in Chapter 5. WV has developed and implemented a spill alert program to respond to accidental spills and releases.

The NEIC Report notes that periodic spills and releases emit pollutants into the environment. It is not possible for EPA and other governmental agencies to control or manage all the various industries and activities which generate spills to the point where they will never occur. EPA will ensure that there will be proper notification of releases, and that appropriate responses and follow-up enforcement actions will be taken. These activities are presently on-going at EPA. Regional Orders delineating internal procedures for spill response enforcement have been revised to improve the thoroughness of follow-up actions.

CERCLA

The NEIC report notes that EPA was actively investigating those sites currently listed in ERRIS. It also suggests that further evaluations were needed to discover additional sites or investigate the potential sites mapped by EPIC. The effort described in Chapter 4 is a major step towards achieving the additional activities viewed as necessary. This effort has resulted in a detailed identification of 84 new potential hazardous waste sites. A framework for scheduling in priority order the site-specific PA/SI's needed to determine long-term remedial activities has also been achieved. The actual PA/SI's will now be accomplished in an orderly fashion with existing resources. A proposed schedule for entering the 84 newly identified sites into ERRIS and completing the PA/SI's is included in Appendix D. The implementation schedule also includes a tentative breakout of the work between EPA and DNR.

EPA will not be performing all the preliminary assessments/site investigations (PA/SI) immediately. While the completion of PA/SI's in the Kanawha Valley could be expedited, it would involve shifting resources from PA/SI's in other geographic areas of the Region where the priorities for site-specific activities may be higher than at some sites in the Kanawha Valley. However, all of these sites that are considered high priority will be done expeditiously.

The NEIC report suggested that several hazardous waste sites "appear to have a significant potential for long-term release of toxic substances to the environment." CERCLA PA/SI's discussed above will determine whether sites are releasing toxicants over a long-term period. To attempt to identify potential environmental impacts of such releases, water monitoring data were evaluated to determine if these sites currently affect water quality. In an attempt to distinguish between existing impacts of point and non-point sources, ambient concentrations were correlated with flow and river mile. Concentrations of arsenic, cadmium, copper, cyanide, lead, silver, and selenium did not correlate with flow or river mile, suggesting that both point and non-point sources contribute to ambient levels. Hazardous waste sites may be among the non-point sources which contribute to these levels. These possible sources will be investigated during PA/SI's. Similar analyses using concentrations of organic pollutants were not possible because most organics were measured at only one river location, and flow data were not taken simultaneously.