WATER QUALITY MONITORING STRATEGY

FOR

THE OHIO RIVER

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Ohio River Valley Water Sanitation Commission

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FOREWORD

Since 1973, the Ohio River Valley Water Sanitation Commission in cooperation with state and federal agencies in the Valley, has prepared and implemented a monitoring strategy for the Ohio River. The Commission has revised its monitoring strategy over the years in a continuing effort to satisfy the needs of the member states for water quality information and support the objectives of the ORSANCO Compact and the Federal Clean Water Act. The last revision to the strategy took place in 1982 under the direction of the Commission's Monitoring Strategy Subcommittee. At that time monitoring activities focused on "real time" data collection of certain conventional parameters (electronic monitors), inorganic constituents (monthly manual sampling) and the newly established early warning system for organics (ODS). New initiatives in toxics control and biological monitoring were just emerging.

In November 1988, the Monitoring Strategy Subcommittee began the process of updating ORSANCO's monitoring strategy. This document, entitled Water Quality Monitoring Strategy for the Ohio River, describes the current design and management of monitoring activities for the Ohio River and its major tributaries. It addresses the fundamental goals and objectives of monitoring, the environmental information needs of the Ohio River Basin in the 1990s and the collection and use of water quality data in pollution control programs.

Over the next several years, the Commission's monitoring programs for physical, chemical and biological constituents and spill detection will continue with particular emphasis on toxic substances and aquatic life impacts. The current programs and those under development will provide a continuing record to assess compliance with water quality standards, identify problem areas and trends, and measure progress in supporting the designated uses of the Ohio River.

WATER QUALITY MONITORING STRATEGY

I. INTRODUCTION

The Commission

In 1948, the Ohio River Valley Sanitation Compact was signed by eight states-Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, and West Virginia-with the approval of the U.S. Congress. In doing so, these states pledged to work together for the control and prevention of pollution in the waters they share. The Compact authorized the governing body it created, the Ohio River Valley Water Sanitation Commission (ORSANCO), to coordinate efforts to improve the quality of surface waters within the Compact District and promulgate rules and regulations as necessary for the abatement and prevention of water pollution in the District.

The Commission consists of three representatives from each state, appointed by their respective governors, and three representatives of the federal government appointed by the President. The Commissioners establish the policies and programs of the Commission and employ a small technical staff to administer and carry out these programs. Funding for the operation of the Commission and its programs comes from the eight states in proportion to their land area and population within the Compact district, and from the federal government in the form of a grant administered by the U.S. Environmental Protection Agency under Section 106 of the Federal Clean Water Act.

The Compact pledges the states to place and maintain the waters of the Ohio River Valley Water Sanitation District in a satisfactory sanitary condition, available for safe use as public and industrial water supplies (after reasonable treatment), suitable for

recreational activities, capable of maintaining fish and other aquatic life, and acceptable for other legitimate uses. Activities to achieve those objectives are set forth each year in a Program Plan which describes the tasks to be conducted during the coming year. The Commission's program is designed to achieve the Compact's objectives in a cooperative manner with those state and federal agencies having concurrent responsibility for water pollution control.

Commission Policies

In the 1970's the Commission adopted certain policies for guidance of its members and staff in meeting the provisions of the Compact. These policies were reviewed and updated in 1984 and again in 1987. The policies expand upon the directives of the Compact and define the Commission's role and relationship to the states and other entities (such as industries and local utilities) involved with the protection of water quality. They emphasize regional coordination in water quality management and specifically address river uses, wastewater treatment, compliance and enforcement, toxic substances, monitoring and dissemination of data. In regard to the latter, a separate policy for release of Commission data to the news media was adopted in 1978. A copy of the Statement of Policies and the policy on release of data are contained in Appendix 1.

Water Quality Monitoring

Water quality monitoring programs of the Commission incorporate those activities which provide chemical, physical, biological and other environmental data required to implement the provisions of the Compact and the Clean Water Act. Water quality monitoring is essential to fulfill water quality objectives that protect the designated uses of rivers, lakes and streams. Information gathered through monitoring activities, both at fixed stations and through

monitoring data are used in compliance evaluations and in support of enforcement actions.

The states provide Quarterly Non-Compliance Reports (QNCRs) and Discharge Monitoring Reports (DMRs) to the Commission for review and identification of major discharges not meeting NPDES permits limitations. Effluent data are closely tracked for those facilities with flows over ten million gallons per day and those with a history of compliance problems. This information, combined with ambient in-stream data, is also used to interpret water quality trends and identify toxic substance impacts.

II. MONITORING GOALS AND OBJECTIVES

The Commission's Monitoring Strategy establishes plans and procedures for achieving two basic monitoring goals:

1) **Support the implementation of the Compact and the Clean Water Act.**
2) **Provide effective coordination and integration of monitoring efforts in the Ohio River Basin.**

Specific objectives in conducting and managing water monitoring activities are:

- Show current conditions and demonstrate improvements (or degradation) in water quality over time.
- Identify sources of point and nonpoint pollution and determine their effect on water quality and aquatic life.
- Evaluate compliance with Commission stream criteria and treatment standards.
- Determine the extent to which the designated uses of the Ohio River are met.
- Support development of water quality-based controls and assess their effectiveness.
- Support water quality management decisions.

The Commission's water quality monitoring strategy addresses environmental information needs, the collection and management of data and the use of the monitoring results in pollution control programs.

III. AGENCY MONITORING NEEDS

The states and the federal government have established agencies to enforce their respective environmental protection laws and carry out associated programs. The U.S. EPA is responsible for administering certain federal environmental laws, including the Clean Water Act. Administration of many programs authorized under the Act have been delegated to the states, with U.S. EPA retaining an oversight role. The states carry out the delegated federal programs in conjunction with their own programs established by state law. The Commission supplements and/or coordinates programs of the state and federal agencies as they affect the Ohio River basin. A compilation of the applicable sections of federal and state statutes that require water quality monitoring is contained in Appendix 2.

Under the provisions of the Clean Water Act, all states need water quality information to characterize their water resources, identify impaired or threatened waters, assess trends, develop water quality-based controls and report to U.S. EPA and the public on the condition of waters within their state. Specific areas of concern for the Ohio basin states are the identification and control of toxic substances and nonpoint source pollution; increased biological monitoring and surveillance to characterize stream conditions; and the effectiveness of pollution control actions in achieving the desired results. In addition, water quality information is needed to implement the following directives of the Compact:

1) Place and maintain the interstate waters of the Ohio River Basin in a satisfactory condition for water supply, recreation, support of fish and aquatic life, and other legitimate uses (Article I).

2) Determine whether pollution originating in a signatory state injuriously affects the various uses of the interstate waters (Article VI).

3) Determine whether tributary water quality is at least equal to that of the Ohio River mainstem above the confluence (Article VI).

4) Evaluate pollution of waters particularly with regard to the construction of treatment plants for the disposal of sewage, industrial and other wastes (Article VI and VIII).

5) Survey and study the pollution problems of the Compact District and prepare reports for the prevention and reduction of stream pollution within the District (Article VIII).

6) Investigate incidents of non-compliance with Pollution Control Standards adopted by the Commission (Article IX).

The Commission has adopted various monitoring strategies over the years in a continuing effort to satisfy the environmental information needs of the member states and to support the Compact objectives. Periodic discussion with state and federal agency staffs are held to review those needs and assess the adequacy of the information generated by the Commission's programs. The Commission needs to continue providing direction and coordination in planning and implementing monitoring activities to insure a consistent approach in Ohio River programs. This includes participation in field activities, compiling of data generated by other agencies and organizations, evaluation of data and dissemination of information to regulatory agencies and the general public.

IV. ENVIRONMENTAL PROGRAM NEEDS

A major study of surface water monitoring activities was completed by U.S. EPA's Office of Water in 1987. This study identified several future challenges for water monitoring programs nationwide and described the information needs required to meet these challenges. The focus of water monitoring has shifted from chemical-specific, technology-based control of pollutants to an ecosystem approach in water quality analysis and water quality-based controls. Traditional methods of monitoring chemicals in the water column cannot provide all the answers to the causes of impaired uses or the degree of use impairment.

The emerging challenges directly impacting the Commission's monitoring program are:

1) Control of toxic water pollutants.
2) Characterizing pollutants from nonpoint sources.
3) Use of biological monitoring and surveillance to characterize water quality and aquatic resources.
4) Demonstrating the effectiveness and results of pollution control actions.

Application of these concepts to a large river system like the Ohio River presents additional challenges in designing and implementing the Commission's water monitoring program.

Toxics Control

The Commission's 1983 Toxic Substances Control Strategy (Appendix 3) outlines a plan of action that is designed to assist the Compact states in identifying toxic conditions in surface waters of the Ohio River basin and develop corrective actions where appropriate. The program emphasizes a consistent yet flexible approach with the cooperation and participation of the public and private sectors.

One of the primary objectives of the strategy is to develop and maintain effective toxics monitoring programs. Toward this end, the toxics strategy recommends that ambient monitoring include analysis of: wastewater effluents, surface waters and indigenous aquatic communities, fish tissue, drinking water, and sediments. Such a monitoring effort carried out on a routine, fixed station basis will provide a broad scope of toxics data on which to establish baseline conditions. Intensive field surveys will assure that specific problem areas are identified accurately and that effective control measures are designed and implemented. Close coordination with state and federal agencies is necessary given the long-term nature of these efforts and their potential high costs.

Nonpoint Sources

Nonpoint source pollution is caused by events that cannot be traced to a discrete discharge point such as water runoff from urban areas, construction sites, and agricultural and silvicultural operations. Groundwater infiltration and acid mine drainage are also classed as nonpoint sources, but the impact from these sources would be greatest under low flow conditions. To properly characterize the effects of runoff related sources on water quality, monitoring is needed at both low flow and high flow periods. Low flow sampling provides baseline data on the waterbody as well as data on diffuse sources such as groundwater infiltration and acid mine drainage. As rainfall events occur, sampling frequency needs to be increased to accurately measure contributions due to runoff. This generally requires a fixed station system with periods of high frequency (possibly long duration) sampling. Positive correlation of parameter concentration with flow indicates a runoff related contribution to the pollutant load. Thus to be cost effective, nonpoint source monitoring should be targeted for only those parameters showing correlation with flow. Stream data combined with related data on land use, hydrology, and demography

are used to identify use impairment due to nonpoint sources and help develop management programs.

Biological Surveys

The Clean Water Act as amended in 1987, seeks to restore and maintain the biological integrity of the nation's waters. Throughout the Act many references are made to the importance of the protection and propagation of fish, shellfish, and wildlife, and the effects of pollutants on the diversity, productivity and stability of indigenous aquatic communities in surface waters. The Act also mandates that the Environmental Protection Agency and the states conduct comprehensive biological monitoring programs in order to measure the dispersion and persistence of toxic pollutants in the water and aquatic organisms and determine the long-term trends of aquatic life in surface waters. The collection of biological data by federal, state and private agencies is either clearly stated or implied in many sections of the Clean Water Act, specifically Sections 101, 102, 104, 302, 303, 304, 305, 502. The definition of biological monitoring in the law is very broad and includes the study of pollution effects on all aquatic life, such as plankton, periphyton, aquatic plants, macroinvertebrates and fish.

There is widespread recognition among state and federal agencies of the importance of biological data in characterizing water quality conditions and in showing attainment of designated aquatic life uses. Traditional chemical/physical data are not always sufficient to identify impaired uses due to toxic or conventional pollutants from point and nonpoint sources. Biological data can show additive impacts of multiple pollution sources, bioaccumulation of toxic substances, impacts of "non-toxic" pollutants from nonpoint sources (siltation, nutrients), and changes in habitat. Biological monitoring is an effective

screening tool for pollution problems and can help verify the results of pollution control measures.

Since 1968 biological monitoring has been conducted periodically at selected locations on the Ohio River. Initially the surveys included macroinvertebrates, but after 1978 the program focused exclusively on fish population monitoring at lockchambers. Other aquatic life monitoring has not been maintained in any consistent or organized way. The Compact States have recognized the need for a more integrated biological program that supports assessment of water quality and aquatic life use attainment. An integrated program would incorporate new, cost-effective sampling methods for aquatic communities; systematic and standardized methods for evaluating biological data; and development/application of biocriteria. Such a program would need to complement and enhance the Commission's existing chemical monitoring program and toxics surveys. In addition, the historic biological data that currently exists for the Ohio River needs to be collected and evaluated to better define the baseline conditions and provide future direction to biological monitoring activities and criteria development.

Trends Assessment

Detection of trends in water quality is an important component of surface water monitoring. The purpose of trend analysis is to determine whether pollution control efforts have resulted in improvements in water quality. It can also reveal environmental problems requiring further study or action and quantify natural variability.

The time scale for detection of trends or changes in water quality is usually several years or decades. It is necessary that the data be collected at a given location on a regular schedule using consistent sampling and measurement techniques. To achieve this

requires documentation of procedures, training of personnel and a vigorous quality assurance program in all phases of the data collection process. Information on time of day, water temperature and stream flow at the time of sample collection is also desirable since these data can account for some of the observed variation in parameter concentration.

Proven statistical techniques are now available for analyzing a large data base to identify changing water quality characteristics at a given location and to estimate the rate of change. The techniques are not intended for determining a change at a prespecified time, but rather for detecting monotonic trend or change, gradual or sudden, during some interval of time. Seasonal variation in constituent level and year to year variations in stream flow are two significant factors which must be taken into account. Incomplete data records or the presence of values below detection levels do not present computational problems in applying most trend analysis techniques.

A basin-wide monitoring program for conventional and toxic parameters has existed for over ten years on the Ohio River. Much of the data is amenable to trends evaluation and serves as the basis for water quality assessments under Section 305(b) of the Clean Water Act. Future trend assessments for the Ohio River basin need to address the following areas: nutrient and sediment impacts from nonpoint sources; biological impacts of toxics; water quality impacts due to hydrologic modifications (hydropower development and reservoir projects) and land use changes.

Spill Response

Due to the multiple uses of the Ohio River for industrial purposes, wastewater discharge, water supply and recreation, an effective surveillance and notification program concerning spills is of paramount importance. Any spill to the Ohio River or its

tributaries has potential interstate impacts, thus the Commission provides coordination and support to state and federal agencies in responding to these situations.

The spill notification procedures established for the Ohio River are designed to insure the early notice of a release of hazardous substances into the interstate waters. Detection or discovery of a spill may be through routine investigations, boat patrols, aerial surveys or river monitoring at fixed stations. In many instances, spills or chemical releases are reported by the responsible party or private citizens.

Monitoring for accidental discharges and spills presents unique challenges. Most releases are unpredictable, can occur at any time and potentially involve a wide variety of chemical substances. Information on river conditions (flow, velocity, temp), the amount and duration of the spill, and the chemical/physical properties of the substance is needed to determine the contaminant concentration and dissipation rate in the river. The type of monitoring effort, whether in-stream or at fixed locations, will be influenced by these factors and thus no one approach can address all spill situations on the Ohio River.

V. COMMISSION MONITORING PROGRAMS

The Commission has been charged by the member states with the major responsibility for collecting ambient water quality data on the Ohio River and the lower reaches of its major tributaries. The current monitoring systems are operated with the participation of state and federal agencies and certain water utilities and concerned industries. They are designed to advance the directives of the Compact and meet the informational needs of the member states in managing water quality programs. Since the 1960s an extensive database of water quality information on the Ohio River has been developed through the Commission's ambient instream monitoring programs. This data is used to characterize water resources, identify water quality problems and trends, develop pollution controls and evaluate their effectiveness.

The Commission's current water quality monitoring program consists of ambient monitoring at fixed stations and intensive field surveys. Fixed stations are locations where river water samples are collected repeatedly over time and include: manual sampling network, fecal coliform/dissolved oxygen sampling, Organics Detection System, the Water Users Network and lockchamber studies. Intensive surveys involve more detailed studies of water conditions, sediments or aquatic life and include toxics field investigations, and fish tissue contaminant analysis. Each of these program elements are described briefly below with specific information on station location, parameters and sampling frequency given in Appendix 4.

SUMMARY OF ORSANCO MONITORING PROGRAMS

MONITORING ACTIVITY	PURPOSE	PARAMETER COVERAGE	DATA REPORTING	DATA USES
Manual Sampling	Characterize water quality conditions	Nutrients Metals Cyanide Phenolics Conventional pollutants	Quality Monitor STORET	Trends assessment 305(b) report Determine compliance with standards
Water Users Network	Show current river conditions	Certain inorganics, Bacteria	Quality Monitor	Screening for unusual river conditions
Organics Detection System	Provide ambient data on certain organic chemicals. Spill detection	Volatile organics	Quality Monitor STORET	Evaluate occurrence and persistence of organics in river. Identify spills for protection of water supplies.
Fish Population Surveys	Collect data on health and relative diversity of fish communities	Not Applicable	BIOS	Qualitative assessment of fish diversity and distribution.
Fish Tissue Contaminant Analysis	Assess suitability of fish for human consumption	PCBs, pesticides, metals	STORET Reports to states and public	Preparation of fish consumption advisories.
River Segment Field Investigations	Identify sources of toxic substances in the river	Toxic metals and organics	Reports to State and Federal agencies	Evaluate impacts due to toxics and develop control measures. 305(b) assessments

Manual Sampling Network

The Manual Sampling Network consists of monthly collection and analysis of river water samples at 36 locations on the Ohio River and lower reaches of the major tributaries. Sampling locations are selected to provide coverage upstream and downstream of major population and industrial centers; at public water supply intakes and high recreational use areas; and near the confluence of major tributaries and interstate boundaries. The monitored constituents and the frequency of sampling are designed to provide information on current water quality conditions and long term trends at each site as well as throughout the river. The data generated by the program is routinely evaluated for stream criteria exceedance and combined with other monitoring data for biennial 305(b) assessments of the Ohio River.

Fecal Coliform Sampling

Fecal coliform bacteria are used as a measure of the suitability of the Ohio River for contact recreation. Currently, thirteen locations are designated for fecal coliform sampling based on historic monitoring data, the extent of recreational activity on the river and the potential impacts of point source discharges. Measurements are taken on a daily or weekly basis by seven water utilities and are supplemented by sampling an additional six locations during the recreational season of May through October. The data are used to evaluate the recreational quality of the Ohio River and assess compliance of wastewater discharges with the Commission's Pollution Control Standards.

Dissolved Oxygen Monitoring

Dissolved oxygen (DO) measurements are obtained from eight navigational pools on the Ohio River which are considered most likely to experience DO problems during periods of low river flow and high temperatures. These pools were selected based either on historic data or the presence of large discharges with high oxygen

demands. DO measurements are recorded by electronic monitors which are interrogated by computer once per week from April through October. Dissolved oxygen is used as a general indicator of water quality conditions in the river. The primary concern during low flow/high temperature periods is the impact of wastewater discharges and natural processes on levels of DO and the subsequent effect on aquatic life. The Corps of Engineers also uses the DO data in reservoir control operations and compliance monitoring of hydropower operations.

Water Users Network

Municipal and industrial facilities that use the Ohio River and its tributaries as a source of water supply perform water quality analyses on the river as part of their routine operations. Twelve such facilities collect chemical data on daily, weekly or monthly intervals and submit it to the Commission. The high frequency of collection for certain conventional parameters provides information on the day-to-day variability of river conditions.

Organics Detection System

The Organics Detection System (ODS) consists of 13 stations operated in cooperation with eleven water utilities and two industries along the Ohio, Allegheny, Monongahela, and Kanawha Rivers. Volatile organic compounds are analyzed daily at the parts-per-billion level in grab samples of river water taken from the plant's intake line. The primary objective of the system is to provide timely detection of organics released through spills and accidental discharges so that affected water utilities can be notified and proper treatment measures provided. Since the ODS also provides quantitative data on ambient levels of volatile organic compounds in the river, the data are used to determine the occurrence and persistence of toxics in the river and identify potential sources of toxics. Cancer risk criteria have been established for 11 of the volatile organics measured by the ODS.

Concentrations found in the river above the detection level are compared to these criteria in water quality assessments.

As a spill detection system, the ODS serves an essential role in protecting public drinking water supplies which use the Ohio and three major tributaries as source water. When significant concentrations are measured, the appropriate state/federal agencies and water utilities are notified so that adjustments in treatment or operation can be made to protect drinking water quality. Spill information is communicated through the Commission's electronic bulletin board, FAX network and phone message system to state agencies and downstream water users.

Biological Monitoring - Fish Population Surveys

Lockchamber fish surveys are conducted each year on the Ohio, Allegheny, Monongahela and Kanawha Rivers in cooperation with the states, U.S. EPA, U.S. Fish and Wildlife and the U.S. Army Corps of Engineers. Fish are collected by application of rotenone to the lockchamber, then segregated by species and size, counted and weighed. Fish population surveys provide information on the health and relative composition of fish communities in the larger rivers of the Ohio Valley. Shifts in species diversity and the re-establishment of pollution sensitive species in the river have been documented by these studies. Although much of the data collected over the years is too sporadic for statistical trends assessment, qualitative determinations of relative abundance, and species richness can be done using the U.S. EPA BIOS database system.

Biological Monitoring - Fish Tissue Contaminant Analysis

Analysis of fish tissue for organic and metal contaminants has been included in the Commission's fish surveys since 1975. Both whole fish and fillets have been analyzed in past studies, but the current emphasis is on fillets due to the public's concern about the edibility of the fish in the river. Sampling locations are

selected each year based on past findings of fish contamination or suspected new sites of contamination. Fish are collected during the lockchamber surveys and at other river locations by state agency personnel using hoop-netting or electrofishing techniques.

Fish tissue contaminant data are used to evaluate the occurrence of toxic substances in the Ohio River and to assess the suitability of Ohio River fish for human consumption. Analysis of fish tissue provides a means to monitor the presence of chemical substances whose concentrations in the water column are usually below laboratory detection levels but which bioaccumulate to detectable levels in fish. Concentrations of pesticides, PCBs and metals in fish fillets are currently compared to U.S. FDA guidelines and used by the states to prepare fish consumption advisories.

Toxic Substances Control

The Commission's Toxics Control Program is being implemented in several phases that include determination of problem areas in the Ohio River, identification of sources of toxic substances and development of control programs in cooperation with state and federal agencies to eliminate or reduce the presence of these substances. The first phase of the program was completed with the publication of the report The Presence of Toxic Substances in the Ohio River, September 1987. Based on comparison of stream data to all established criteria for protection of human health and aquatic life, the report indicated that some type of toxics problem exists in every segment of the Ohio River. Further in-depth study of each segment was warranted in order to identify the sources, both point and nonpoint, of the toxic substances and thereby develop control measures.

Specific program elements under Toxic Substances Control include: river segment investigation of sources, water quality effects of pretreatment programs and contaminated groundwater, inventory of

chemicals stored and transported along the river, removal of instream toxics by water treatment facilities and development of models to predict total maximum loads to the river. The river segment investigations receive the largest allocation of Commission resources relative to all other efforts in toxic control.

River segment investigations begin with an assessment of all available data from wastewater, solid waste, groundwater, hazardous materials and water supply programs within the state agencies. Data from other Commission monitoring programs: Manual Sampling, ODS, and fish contaminant analysis are utilized as well. Constituents of concern are identified, mass loadings calculated, and trend analysis and stream modeling performed to evaluate impacts on river water quality. Based on the results of this preliminary data review and analysis, an intensive field survey is designed to further define toxic substance impacts and locate their source in the study area. These surveys include water column transects at selected tributary and Ohio River locations, sediment sampling, end-of-pipe effluent analysis and fish contaminant analysis. Sampling locations, parameter coverage and frequency are selected based on known or suspected pollution problems in the survey area determined from existing data. The field studies are conducted cooperatively with appropriate state and federal agencies. Results are analyzed and reports prepared by river segment to better relate instream levels of toxics to specific sources and develop control programs for toxics.

Data Reporting and Management

Water quality data gathered through Commission monitoring programs are processed and analyzed by computerized data handling procedures. New data is added quarterly to the in-house computer files, verified against source documents and then transmitted to the U.S. EPA STORET and BIOS databases. Basic statistical and trend analyses are done in-house with more rigorous analysis done through SAS and STORET software. The Commission's computers also

serve as terminals to EPA's National Computer Center which provides access to water quality data generated by other agencies.

The Commission maintains several in-house database systems for processing water quality information. PCFOCUS is used for entry of Manual Sampling, ODS and Water User data and generation of reports for the Quality Monitor. LOTUS 123 is used to tabulate fish tissue contaminant data and provide graphical presentations of data. It also serves as the software for the Ohio River Time-Of-Arrival Spill Model. dBASE III is used to manage the Waterbody System, NPDES permit information, DMR data from state files, toxic substances data from intensive field surveys, and fish population data. The Commission also accesses the following NCC databases: STORET, PCS (KY, OH, PA only), Waterbody System, REACH File and IRIS. Analysis software used in water quality assessments include SAS/SASGRAPH, GEO-EAS, and QUAL2E.

The Quality Monitor is the major vehicle by which data from the Commission's monitoring programs are distributed to interested parties. The publication consists of data summaries from the Manual Sampling Network, Water Users Network, and the Organics Detection System together with brief commentaries on the data. The Quality Monitor is designed primarily for a technical audience and is distributed to state and federal pollution control agencies, industries, water utilities, universities, and consultants throughout the Ohio Valley.

The Commission's monitoring data, in combination with information collected by state and federal agencies, provide the foundation for all water quality assessments on the Ohio River. Specifically, the monitoring results are used to support ongoing studies of point and nonpoint source impacts, tributary contributions and long term trends in water quality. Under the Toxic Substances Control Program, monitoring data are used in the investigation of sources

of toxic substances, in characterizing groundwater quality and assessing the suitability of Ohio River as a drinking water supply. The results of these evaluations are made available to state and federal environmental agencies through periodic technical reports. When appropriate, a condensed summary document is prepared for the general public highlighting significant findings of the study.

Every two years the Commission prepares an assessment of water quality conditions in the Ohio River as required under Section 305b of the Federal Clean Water Act. This assessment compares the results of physical/chemical/biological analyses of the river to adopted stream criteria and evaluates the extent to which the river's designated uses are supported and the goals of the Compact and Clean Water Act achieved. The Ohio River 305(b) report is used by the states along the main stem in their individual 305(b) reports to EPA and serves to document progress in water pollution control on the Ohio River.

Quality Assurance

It is the policy and practice of the Commission to provide sufficient quality assurance within its monitoring programs to insure that valid and reliable environmental data is generated and used in water quality assessments. For all programs, data are reviewed upon receipt to assure their quality and validity. Questionable results are verified with the laboratory generating the data prior to computer entry and reporting.

Quality Assurance (QA) Project Plans are prepared for all on-going monitoring activities and intensive field surveys. These plans define the specific objectives, sampling design, field procedures and controls required to insure the reliability of the monitoring and measurement data. Routine or repetitive tasks are documented in Standard Operating Procedures (SOPs) which are referenced in the QA Plans. Both the QA Plans and SOPs are combined in a Quality

Assurance Manual which is reviewed annually to incorporate improvements or changes in the Commission's monitoring program. Each year the Commission's quality assurance program is reviewed and approved by U.S. EPA as required under the 106 grant regulations.

During 1989 QA Work Plans for the Manual Sampling Network, Dissolved Oxygen System, Fecal Coliform Monitoring, Organics Detection System and Fish Surveys and Tissue Analysis were substantially updated. Future revisions in these programs will be incorporated each fiscal year as changes or improvements are implemented.

Field investigations under the Toxic Substances Program were documented in work plans for Wheeling to Parkersburg (1977), Pittsburgh to Wheeling (1988) and Cincinnati to Louisville (1989) river segments. As new field investigations are initiated, quality assurance work plans will be prepared for inclusion in the Quality Assurance Manual.

VI. COORDINATION WITH STATE/FEDERAL PROGRAMS

The Commission supplements and/or coordinates programs of the state and federal agencies as they affect the Ohio River basin. Certain state functions, such as water quality monitoring and 305(b) assessments of the Ohio River are delegated to the Commission in order to minimize duplication of effort, achieve consistency and realize cost savings. Commission activities in water pollution control are set forth each year in a Program Plan which describes the tasks to be done and the resources needed to implement them. The Program Plan is developed jointly by the member state and federal agencies to advance the objectives of the Compact and respond to the regulatory requirements of the states.

The Commission coordinates its activities with state/federal agency personnel and with users of the Ohio River through a network of committees. The Technical Committee and its subcommittees provide technical guidance and expertise in addressing water quality problems. The Technical Committee consists of representatives of the state environmental agencies, U.S. EPA, U.S. Geological Survey and the Army Corps of Engineers. Active subcommittees of the Technical Committee include Biological Water Quality, Monitoring Strategy, NPDES Coordinating, Stream Criteria, and Toxic Substances Control. These subcommittees provide essential input to the Commission's technical program and allow for valuable information exchanges among the members. In addition, the Commission receives input from several advisory committees representing the chemical and power industries, water treatment facilities, municipal wastewater treatment facilities, and private citizens interested in Ohio River water quality.

State/federal interaction with the Commission also includes participation in field sampling activities, joint response to interstate spill incidents, laboratory services and sharing of environmental data. Manpower and equipment resources are combined

to carry out intensive field surveys such as the fish population studies, toxics investigations and spills monitoring. State laboratories are used whenever possible for routine analysis of water samples as well as special studies requiring chemical analysis.

The Commission continues to expand linkages with other computerized databases such as STORET, the Permit and Compliance System (PCS), Waterbody System, Reach File and the Integrated Risk Information System (IRIS) to better utilize existing agency data in water quality assessments.

The Commission, as an organization for regional cooperation, is a focal point for coordinating and implementing water pollution control programs in the Ohio Valley. As a regulatory agency, it stands ready to support state actions and work closely with U.S. EPA to achieve compliance with requirements. As a forum and mechanism for achieving cooperation, the Commission provides the Ohio Valley with a unified voice on water quality issues of concern to all member states. The Commission provides a basin-wide perspective in interstate and inter-regional water pollution control for the Ohio River basin.

VII. FIVE YEAR MONITORING PLAN

The Commission's water quality monitoring program for biological, physical/chemical parameters, toxics substances and spill detection will continue as a major activity in pollution control and abatement for the Ohio River basin. This activity provides an on-going record of water quality information needed to identify problem areas, determine trends in water quality, assess compliance with Pollution Control Standards and measure progress in supporting the designated uses of the Ohio River. Periodic review of and adjustments to the program are made as needed to be responsive to current policy and environmental concerns of the Commission and its member states.

The five year program for monitoring activities will focus on the following areas:

1) **Toxic Substances Control**

The Commission's Toxics Control strategy adopted in 1983 is considered appropriate and timely for addressing problems due to toxic substances in the Ohio River basin. Implementation of the program began in 1986 with emphasis on the assessment of ambient data and identification of sources of toxics. This approach has shown numerous instances where concentrations of toxic substances exceed stream criteria but has not identified any actual effects on aquatic life or human health.

The identification and evaluation of toxic substances in the Ohio River will continue as the major activity in the Toxics Control Program. This will provide current information on threatened or impaired waters as required under Sections 304(1) and 303(d) of the Water Quality Act of 1987 and reported to the Compact States and EPA under the 305(b) assessment process. Intensive field surveys are planned over the next several years to complete the evaluation of the entire Ohio River on a segment-by-segment basis. As the

river segment investigations proceed, improvements will be made in sampling design and methodology to better identify toxic problems and sources. Corrective action as well as follow-up monitoring for identified problem areas will be developed jointly with the states and US EPA.

The impact of low level toxics substances in the Ohio River on human health and aquatic life is not known or well understood. Commission program elements which specifically address human health concerns, such as fish contaminant analysis and study of in-stream contaminants affecting drinking water supplies, are underway. Risk assessment and analysis methods will be used in evaluating water quality data for potential human health effects and in developing appropriate toxics criteria for the Ohio River. Aquatic life impacts due to toxic substances will be addressed under the Commission's revised biological monitoring program.

2) **Biological Monitoring**

Current Ohio River water quality assessments are almost exclusively based on physical/chemical water quality data. The lack of biological data on the river has limited efforts to determine support of aquatic life uses (a key provision of the Compact and the Federal Clean Water Act) and fully assess the impacts of major spills or accidental discharges to the Ohio River.

To better characterize the aquatic resources of the Ohio River, a comprehensive biological monitoring program will be developed and integrated with the existing chemical monitoring program. The program's work plan will address specific aquatic communities for study, sampling methodologies and locations, sample analysis, data evaluation methods and the associated resource/budget requirements. The experience and knowledge gained by state and federal agencies in utilizing biological testing methods will provide the framework

for designing the Ohio River program and interpreting pollution impacts on aquatic life.

A biological monitoring strategy paper will be prepared and appended to this document. The detailed quality assurance work plan for the program will become a part of the Quality Assurance Manual. The implementation of the biological program will be a multi-year effort with a specific schedule of activities delineated in the Commission's Program Plan each year.

Fish contaminant analysis is an important monitoring activity in assessing human health impacts due to toxic substances. Since 1975 the Commission has conducted chemical analyses on Ohio River fish to monitor levels of contaminants in their tissues. These studies show persistent levels of PCBs and chlordane in certain species at many locations throughout the river.

In recognition of these findings, the Commission initiated the development of protocols for evaluating fish contaminant data and for issuance of Ohio River fish consumption advisories, if warranted. These protocols will address sampling and analytical procedures, significance of contaminant level and associated risk assessment, advisory language and distribution, and the geographic range of the advisory. The Commission will continue to facilitate agreement among the participating state/federal agencies and promote scientifically valid guidelines regarding fish consumption for the entire river.

An expanded fish tissue analysis program will be necessary to define the extent and magnitude of the contamination problem and provide data for fish consumption advisories. The scope of the program will focus on potential or suspected river contamination sites and target those fish species most frequently consumed from the Ohio River. Implementation of the program will require

additional budgetary sources as well as a collaborative effort by the main stem states.

3) **Ambient Monitoring for Trends, Nonpoint Source and Tributary Assessments**

The Commission's Manual Sampling Network is a primary data source for water quality assessments of the Ohio River and its major tributaries. Recent analysis of Ohio River ambient data collected over a ten year period indicate that:

- o significant improvements in water quality have been achieved for most chemical parameters.
- o nonpoint sources have a significant impact on Ohio River water quality.
- o point and nonpoint sources of toxics and conventional parameters located on the tributaries impact Ohio River water quality.

The effectiveness of the current Manual Sampling program in supporting future information needs in these areas will be evaluated so that limited resources can be directed to the most significant water quality problems.

4) **Spill Detection and Response**

Spills and accidental discharges will continue to be a potential problem due to the number of facilities manufacturing, treating, storing and transporting various chemicals along the Ohio River. Recent experiences with several major spills on the Ohio River indicates the need for better coordination of activities among the various responding agencies. Working with state and local emergency response coordinators, the Commission plans to address the following areas: mobilization of test equipment and laboratory support, standardization of analytical techniques, methods for predicting spill movement/concentration and communication networks.

Improvements in on-river monitoring capability using fluorometry and portable gas chromatography will be pursued along with establishing strategic sampling points above major water supply intakes.

Through the Organics Detection System (ODS) the Commission maintains the capability to detect and track releases of organic chemicals to the river. Future ODS improvements in instrumentation and station coverage will further assure an effective spill response system for the protection of all Ohio River water users.


OHIO BASIN
LAKE ERIE
N. Y.
PENNA.
MD.
VIRGINIA
W. VA.
OHIO
INDIANA
ILLINOIS
KENTUCKY
TENNESSEE
MO.
MISS.
ALA.
GEORGIA
S. CAR.
N. CAR.
CHICAGO
SOUTH BEND
TOLEDO
CLEVELAND
AKRON
ERIE
Jamestown
Oil City
YOUNGSTOWN
CANTON
PITTSBURGH
Johnstown
Altoona
Harrisburg
FORT WAYNE
Peoria
Kokomo
Muncie
Danville
Springfield
INDIANAPOLIS
Mattoon
Terre Haute
Vincennes
ST. LOUIS
Harrisburg
Cairo
Paducah
Clarksville
Paris
NASHVILLE
Columbia
MEMPHIS
Florence
Huntsville
Decatur
CHATTANOOGA
Gadsden
DAYTON
COLUMBUS
CINCINNATI
Portsmouth
Ashland
Huntington
Charleston
Parkersburg
Clarksburg
Grafton
Wheeling
Cumberland
BALTIMORE
WASHINGTON
RICHMOND
Roanoke
Radford
Bristol
Kingsport
Johnson City
KNOXVILLE
Asheville
Greensboro
Raleigh
Charlotte
Spartanburg
Greenville
Columbia
LOUISVILLE
Frankfort
Lexington
EVANSVILLE
Harlan
Miami
Little Miami
Muskingum
Hocking River
Scioto
Kentucky
Licking River
Salt River
Green River
Cumberland
Tennessee
Duck River
Hiwassee River
Little Tennessee River
Broad River
French Broad
Ralston
Olinch
Big Sandy R.
Guyandot R.
Kanawha R.
New R.
Monongahela
Youghiogheny River
Allegheny River
Pearl River
Embarrass River
Little Wabash River
Wabash
W. Fork White R.
E. Fork White R.
OHIO RIVER BASIN
Drainage Area - 203,900 Square Miles
1940 Population - 18,815,800
OHIO RIVER POLLUTION SURVEY
U S PUBLIC HEALTH SERVICE
25 0 25 50 75
SCALE OF MILES

OHIO RIVER VALLEY WATER SANITATION COMMISSION

STATEMENT OF POLICIES

Revised May 10, 1984

WHEREAS: The eight states signatory to the Ohio River Valley Water Sanitation Compact (Compact), having taken the initiative more than three decades ago to devise an organization for regional coordination, have clearly and continuously demonstrated its usefulness in advancing mutual goals and associated activities for the abatement and prevention of water pollution; and

WHEREAS: The success of this experience has revealed further opportunities to enhance the usefulness of The Ohio River Valley Water Sanitation Commission (Commission) as an interstate compact agency and as a creative influence in promoting the concept and practice of regional water quality management; and

WHEREAS: There has been a continuous review of the posture and activities of the Commission; and

WHEREAS: In view of changing conditions and circumstances, the Commission recognizes the need for a restatement of its policies;

NOW, THEREFORE, BE IT RESOLVED: That the Commissioners of the Ohio River Valley Water Sanitation Commission subscribe to and set forth the following policies for guidance in meeting the provisions of the Compact:

1. The mission of the Commission is to take whatever action that may be within its authority and to coordinate and supplement efforts of the signatory states to place and maintain the interstate waters of the Ohio River Basin in a condition satisfactory for a source of public and industrial water supplies, suitable for recreational and agricultural usage, favorable for maintaining fish and other aquatic life, free from unsightly or malodorous nuisances due to floating solids, debris or sludge deposits, and acceptable for other beneficial uses.

2. In the pursuit of its mission, the Commission will be guided by the principle that the discharge of municipal and industrial wastewaters or from any source, including agricultural, dredging, mining, construction, recreational and transportation activities within any of the signatory states, shall not impair any of the previously defined uses of the interstate waters of the Ohio River Basin which are intended to be protected by the Compact. Toward this end, the Commission will publish stream criteria; develop, promulgate and enforce, in accordance with the provisions of the Compact, appropriate standards for the treatment of municipal and industrial wastewater and other discharges; and otherwise promote the proper planning, design, and construction, as well as the effective management and operation of pollution control facilities. Secondary treatment of wastewater and an equivalent degree of treatment of other damaging discharges are imperative if the true objectives of the Compact with respect to improved water quality are to be achieved and maintained. The minimum requirements for this level of treatment shall be consistent with the Commission's pollution control standards.

3. The Commission will take appropriate action to control the discharge of toxic substances and to prevent the creation of any new sources of water pollution within the Ohio River Basin. Water pollution is defined as an alteration of the physical, chemical or biological characteristics of water to a degree as to render it harmful or detrimental to human, animal, plant or aquatic life, or as a condition which otherwise would impair any legitimate, beneficial use of the water.

4. Realization of the objectives of the interstate Compact will be accomplished primarily by applying the resources of the Commission so as to supplement the efforts of the regulatory agencies of the signatory states. The Commission will, however, when necessary, in accordance with the provisions of the Compact, initiate legal action to insure compliance with its objectives.

5. The Commission will rely upon the signatory states to provide data on the location, amounts and characteristics of wastewater discharges, together with information on the status of compliance by municipalities

and industries with standards and requirements established by the Commission. In connection with any regulatory actions, the Commission will supplement this information with its own investigations where necessary.

6. To insure maximum return from investments by public and private entities for the installation of pollution control facilities, the Commission places a high priority on the effective performance of these facilities. Accordingly, the Commission urges each signatory state to implement a facility inspection and performance evaluation program and a water quality surveillance program for receiving waters.

7. The Commission will continue to support improvement and expansion of its monitoring and data evaluation capabilities, which it regards as a major activity in meeting its responsibilities of regional coordination. The Commission will continue to make available to state and federal agencies and to individuals and organizations assessments of water quality conditions based on data acquired through its monitoring system. Within its capability and in the interests of compatibility, the Commission staff will provide advice and guidance to the signatory states and federal agencies on monitoring and surveillance techniques and strategies.

8. Recognizing with appreciation the contributions historically made by a variety of advisory committees, the Commission will continue to seek input to its activities by such groups.

9. The Commission asserts that water quality considerations are critical in planning for any beneficial use of water and in operating any water quality control facility in the Ohio River Basin. Accordingly, the Commission will communicate and participate, as appropriate, with any agency or responsible organization involved in water quality management.

10. From time to time and as resources permit, the Commission may perform specific services or undertake research and demonstration studies that the signatory states, federal agencies, or advisory committees may recommend as being important and relevant to achieving the Commission's regional goals.

11. The Commission will continue its practice of disseminating information to the public.

APPENDIX 1

POLICY FOR RELEASE OF COMMISSION DATA TO THE MEDIA

It shall be the Commission's policy to release promptly to the public all data collected through whatever means is most appropriate. As a part of its interstate role, the Commission shall also release comprehensive information about water quality in the Ohio River derived from multiple sources, both state and federal, in situations of sufficient public interest (i.e., spills, accidental discharges, etc.). Monitoring data is normally released in the monthly publication of the Quality Monitor. Project data is published in project reports which are available to the public on request. Alerts are sent to state agencies and, through them, to the public when unusual and/or potentially serious quality conditions exist, via the Commission's "Ohio River Quality Update." A news release is issued when data is of sufficient public importance that these do not provide the appropriate widespread availability to the public.

Procedures for releasing information to the news media will be as follows:

1. In situations of an immediate or critical nature which necessitate immediate release of information to the media, affected states, utilities, federal agencies or other water users will be notified of the contents of the release by telephone prior to its circulation to the media, including news and wire services. A situation of an immediate or critical nature includes spills of radioactive materials, toxic substances, known carcinogens, and untreated sewage, whether deemed to have a major water quality impact or not.

2. Any news release issued is to be prepared by the Information Specialist with the assistance of the appropriate technical staff and approved by the Executive Director.

3. News releases shall be issued to those media in the appropriate geographical areas.

4. Copies of news releases issued shall be mailed simultaneously to members of the Commission, the Technical Advisory Committee, the Public Interest Advisory Committee, and chairmen of other advisory committees.

5. When the data to be released results from a cooperative sampling or study program, those agencies or utilities cooperating in the effort will be sent a draft of the proposed release five days prior to its mailing to the media. Comments derived there from will be carefully

evaluated, but the Commission is not constrained to adopt any changes recommended by individual project participants. The release will be distributed to the media after the five-day review period.

6. News releases issued by the Commission will not attempt interpretation of limits and standards adopted by other agencies which do not deal directly with water quality (i.e., U.S. FDA tolerance limits), nor will they contain detailed statements as to health effects, which is not the area of Commission expertise. When information is available regarding the rationale for such standards or limits, it will also be included in the release. Where possible, expert contacts in appropriate agencies will be sought to which media representatives may be referred.

September, 1978

APPENDIX 2

STATUTORY REQUIREMENTS OF PARTICIPATING AGENCIES

The following is a compilation of applicable sections of federal, interstate and state statutes that require water quality monitoring by the participating agencies.

FEDERAL	Description
Clean Water Act of 1977 Amended 1987 PL 100-4	
Sec. 102(a)	The Administrator shall prepare or develop comprehensive programs for preventing, reducing, or eliminating the pollution of the navigable waters and ground waters and improving the sanitary condition of surface and underground waters. Joint investigations are authorized.
Sec. 104(A) (1)	Promote the coordination and acceleration of, research, investigations, experiments, training, demonstrations, surveys, and studies relating to the causes, effects, extent, prevention, reduction, and elimination of pollution.
Sec. 104(a)(5)	The Administrator shall establish, equip, and maintain a water quality surveillance system for the purpose of monitoring the quality of the navigable waters and ground waters and the continuous zone and the oceans, and shall report on such quality in the report under subsection (a) of Section 516.
Sec. 105(d)(3)	The Administrator shall develop, refine, and achieve practical application of improved methods and procedures to identify and measure the effects of pollutants on the chemical, physical, and biological integrity of water, including those pollutants created by new technological developments.
Sec. 305(b)	Each State, thereafter, shall biennially on even numbered years

	submit to the Administrator a Water Quality Inventory.
Sec. 305(b)(1)(E)	Each State to submit to the Administrator a description of the nature and extent of non-point sources, recommend control programs including an estimate of costs.
Sec. 115	Administrator to identify the location of in-place pollutants with emphasis on toxic pollutants in harbors and navigable waterways.
Sec. 208(a) (2), (3)	The State(s) shall identify each area which as a result of urban-industrial concentrations or other factors, has substantial water quality control problems.
Sec. 303(d)(1)(A)	State to identify those waters for which effluent limitations required by Sec. 301(b)(1)(A) and Sec. 301(b)(1)(B) are not stringent enough to meet water quality standards.
Sec. 303(d)(1)(B)	State to identify those waters for which controls on thermal discharges under Sec. 301 are not stringent enough to assure protection and propagation of shellfish, fish, and wildlife.
Sec. 516(a)	Reports to Congress -- Contains among other things a summary of the results of the survey required under Sec. 210.

Circular A-67
1964
OMB

Description

1. This Circular prescribes guidelines for the coordination of Federal activities in acquiring water data from streams, lakes, reservoirs, estuaries, and ground waters.

   Included in such activities are the collection of quantitative and qualitative data, their processing, publication, and storage. The responsibility for the coordination of Federal water data acquisition activities has been assigned to the Department of Interior, Geological Survey, Office of Water Data Coordination.

2. The Department of Interior is responsible for the design and operation of a national network for acquiring water data on the quantity and quality of surface and ground water, including the sediment load of streams. Department and agencies whose operating requirements cannot be met efficiently through the national network, including appropriate adjustments therein, will arrange for specialized data acquisition. Determination as to the need for specialized data is entirely the responsibility of the user agencies.

3. In operating the national network, the Department of Interior will utilize the services of other agencies in acquiring national network water data when such cooperative arrangements are more effective or economical than having the Department acquire such data. Conversely, agencies needing water data to meet their special operating requirements should first determine the availability of the services of the Department of the Interior. Each agency will coordinate its activities with those of a similar nature being

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conducted under State and local auspices.

4. The Department of Interior maintains a central catalog of information on national network and specialized water data and on Federal activities being planned or conducted to acquire such data.

5. The Department of Interior prepares, and keeps current, a Federal plan for the efficient utilization of network and related specialized water data acquisition activities.

U.S. Geological Survey
P.L. 100-446 as amended annually
20 Stat. 394
43 U.S.C. 31
25 Stat. 526
28 Stat. 398

Authority for carrying out its mission derives from legislation of 1879 (20 Stat. 394; 43 U.S.C. 31), which created the Geological Survey; legislation of 1888 (25 Stat. 526) and 1894 (28 Stat. 398) which provided for gauging the streams and determining the water supply of the Nation; and Congressional appropriations which have been made annually since 1894. The most recent annual act is PL 100-446 (for fiscal year 1989) which authorizes the Survey "to perform surveys, investigations, and research covering...water resources of the United States, its Territories and possessions, and other areas as authorized by law."

OHIO RIVER VALLEY
WATER SANITATION COMPACT

	Description
Art. I	Pledges signatory states to pollution control and outlines uses to be protected for public and industry: water supply, recreational usage, maintaining fish and other aquatic life, freedom from unsightly or malodorous nuisances due to floating solids or sludge deposits.
Art. VI	Recognizes variation of size, flow, location, character, self purification and usage of water within the district. The guiding principle is that wastewaters from one state shall not injuriously affect the various uses of interstate waters. Wastewaters must be treated to protect health or preserve the waters for other legitimate purposes. Tributary streams within a state shall be maintained in such condition that quality is a least equal to the interstate stream immediately above the confluence. Rules, regulations and standards may be promulgated.
Art. VIII	Commission shall conduct a survey, study the pollution problems and prepare reports for prevention or reduction of stream pollution. Commission shall confer with agencies of the federal government, and regional planning bodies as well as consult with various states, communities, corporations, personnel or other entities with regard to waste disposal.

STATES

ILLINOIS
Environmental Protection Act
July 1, 1970

	Description
Sec. 4b	The Agency shall have the duty to collect and disseminate such

information, acquire such technical data and conduct such experiments as may be required to carry out the duties of this Act including ascertainment of the quantity and nature of discharges from any contaminant source and data on those sources, and to operate and arrange for the operation of devices for the monitoring of environmental quality.

Sec. 4c

The Agency shall have authority to conduct a program of continuing surveillance and/or regular or periodic inspection of actual or potential contaminants or noise sources, or public water supplies, and of refuse disposal sites.

Sec. 13

The Board, pursuant to procedures prescribed in (in part) Title 7 of this Act may adopt regulations to promote purposes of this type (water pollution). Without limiting the generalities of this authority, such regulations may, among other things, prescribe: Part 9 - Requirements and Standards for equipment and procedures for monitoring contaminant discharges and their sources, the collection of samples and the collection, reporting, and retention of data resulting from such monitoring.

INDIANA
Stream Pollution
Control Law

(1C 13-L-3) Sec.3

The Technical Secretary of the Stream Pollution Control Board "shall...make or arrange for such investigations and surveys and obtain, assemble or prepare such reports and data as the Board may direct or authorize".

	information, acquire such technical data and conduct such experiments as may be required to carry out the duties of this Act including ascertainment of the quantity and nature of discharges from any contaminant source and data on those sources, and to operate and arrange for the operation of devices for the monitoring of environmental quality.
Sec. 4c	The Agency shall have authority to conduct a program of continuing surveillance and/or regular or periodic inspection of actual or potential contaminants or noise sources, or public water supplies, and of refuse disposal sites.
Sec. 13	The Board, pursuant to procedures prescribed in (in part) Title 7 of this Act may adopt regulations to promote purposes of this type (water pollution). Without limiting the generalities of this authority, such regulations may, among other things, prescribe: Part 9 - Requirements and Standards for equipment and procedures for monitoring contaminant discharges and their sources, the collection of samples and the collection, reporting, and retention of data resulting from such monitoring.
INDIANA Stream Pollution Control Law	
(1C 13-L-3) Sec.3	The Technical Secretary of the Stream Pollution Control Board "shall...make or arrange for such investigations and surveys and obtain, assemble or prepare such reports and data as the Board may direct or authorize".

Environmental
Management Act

(IC 13-7) 22
Sec. 1(c) and (s)
as amended

It shall be the duty of the (Environmental Management) Board to conduct a program of continuing surveillance...of actual or threatened sources of environmental pollution by contamination...

Chapter 5, Sec. 1(b)

...the Board shall have the power to: (b) Have a designated agent enter, upon any private or public property to inspect for and investigate possible violations of this article or regulations promulgated by the Board.

KENTUCKY
Environmental
Protection
Kentucky Revised Statutes

Sec. 224.033(4)

Develop and conduct a comprehensive program for the management of water, land and air resources to assure their protection and balance utilization consistent with the environmental policy of the Commonwealth.

Sec. 224.033(7)

Secure necessary scientific, technical, administrative, and operational services, including laboratory facilities, by contract or otherwise.

Sec. 224.033(16)

Monitor the environment to afford more effective and efficient control practices, to identify changes and conditions in ecological systems and to warn of emergency conditions.

Sec. 244.033(22)

Require, by regulation, that any person engaged in any operation regulated pursuant to this chapter install, maintain, and use at such locations and intervals as the department may prescribe any equipment, device or test and the methodologies and procedures for the use of such equipment, device or test to monitor the nature and amount of any substance emitted or discharged

into the ambient air or waters or land of the Commonwealth and to provide any information concerning such monitoring to the department in accordance with the provisions of subsection (23) of this section;

Sec. 244.033(23)

Require by regulation that any person engaged in any operation regulated pursuant to this chapter file with the department reports containing information as to location, size height, rate of emissions or discharge, and emitted into the waters or onto the land of the Commonwealth, and such other information as the department may require.

PENNSYLVANIA
The Clean Streams Law
of 1937 Act 394, 1987
Amended in 1980

Description

Sec. 4(5)

The achievement of the objective herein set forth requires a comprehensive program of watershed management and control.

Sec. 5(b)(2)(4)

Establish policies for effective water quality management in the Commonwealth of Pennsylvania and coordinate and be responsible for the development and implementation of comprehensive public water supply, water management and other water quality plans.

Report from time to time to the legislature and to the Governor on the Commonwealth's public water supply and water quality control program.

Sec. 304

The department shall have power to make a complete survey of the waters of the Commonwealth in order to ascertain the extent of pollution in each of said waters, and the remedies to be employed to purify said waters. It shall have power to adopt, prescribe, and enforce such rules and

regulations, not inconsistent with this act, as may be deemed necessary for the protection of the purity of the waters of the Commonwealth, or parts thereof, and to purify those now polluted, and to assure the proper and practical operation and maintenance of treatment works approved by it. A violation of which rules and regulations, after notice, shall also constitute a nuisance under this act.

WEST VIRGINIA
Water Pollution Control
Act as amended 1985

Chapter 20
Article 5A-3

Description

To encourage, participate in, or conduct studies, or cause to be conducted studies, scientific or other investigations, research, experiments and demonstrations relating to water pollution, and the causes, control and reduction thereof, and to collect data with respect thereto, all as may be deemed advisable and necessary to carry out the purposes of this article;

To collect and disseminate information relating to water pollution and the control and reduction thereof;

To sample ground and surface water with sufficient frequency to ascertain the standards of purity or quality from time to time of the waters of the State.

OHIO
Chapter 6111 Ohio
Revised Code Water
Pollution Control

6111.03(E)

Description

The director of environmental protection may:

Encourage, participate in, or conduct studies, investigation, research, and demonstrations relating to water pollution, and the causes, prevention, control, and abatement thereof, as is advisable and

regulations, not inconsistent with this act, as may be deemed necessary for the protection of the purity of the waters of the Commonwealth, or parts thereof, and to purify those now polluted, and to assure the proper and practical operation and maintenance of treatment works approved by it. A violation of which rules and regulations, after notice, shall also constitute a nuisance under this act.

WEST VIRGINIA
Water Pollution Control
Act as amended 1985

Chapter 20
Article 5A-3

Description

To encourage, participate in, or conduct studies, or cause to be conducted studies, scientific or other investigations, research, experiments and demonstrations relating to water pollution, and the causes, control and reduction thereof, and to collect data with respect thereto, all as may be deemed advisable and necessary to carry out the purposes of this article;

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OHIO
Chapter 6111 Ohio
Revised Code Water
Pollution Control

6111.03(E)

Description

The director of environmental protection may:

Encourage, participate in, or conduct studies, investigation, research, and demonstrations relating to water pollution, and the causes, prevention, control, and abatement thereof, as is advisable and

	necessary for the discharge of its duties under sections 6111.01 to 6111.08 of the Revised Code;
6111.41(A)	The environmental protection agency shall:
6111.42	Collect, study, and interpret all available information, statistics, and data pertaining to the study, use, conservation, and replenishment of the underground and surface waters in the state.

VIRGINIA State Water Control Law	Description
Section 62.1-44.13	Inspections and investigations, etc.- The Board State Water Control Law shall make such inspections, conduct such investigations and do such other things as are necessary to carry out the provisions of this chapter within the limits of appropriation, funds, or personnel which are, or become, available from any source for this purpose.
Section 62.1-44.15	Powers and duties - It shall be the duty of the Board; it shall have authority to study and investigate all problems concerned with the quality of State waters and to make reports and recommendations thereon.

VIRGINIA State Water Control Law	Description
Amended 1972	(4) To conduct or have conducted scientific experiments, investigations, studies, and research to discover methods for maintaining water quality consistent with the purposes of this chapter. To this end the Board may cooperate with any public or private agency in the conduct of such experiments, investigations and research and may receive in behalf of the Commonwealth any monies which any such agency may contribute as its share of the cost under any such cooperative agreement. Such monies shall be used only for the purposes for which they are contributed and any balance remaining

after the conclusion of the experiments, investigations, studies, and research, shall be returned to the contributors.

(6) To make investigations and inspections, to insure compliance with any certificates, standards, policies, rules, regulations, rulings and special orders which it may adopt, issue or establish and to furnish advice, recommendations, or instructions for the purpose of obtaining such compliance.

(11) To investigate any large-scale killing of fish.

NEW YORK

Conservation Law

S 17-0303,5

Description

It shall be the duty and responsibility of the Department to:

h. Establish a Water Quality Surveillance Network with sufficient stations and sampling schedule to meet the needs of the State, including ground water and surface water, both fresh and salt, and publish the results of such Water Quality Surveillance Network periodically.

TOXIC SUBSTANCES CONTROL STRATEGY FOR THE OHIO RIVER VALLEY COMPACT DISTRICT

Ohio River Valley Water Sanitation Commission
49 E. Fourth Street
Cincinnati, Ohio 45202

May 12, 1983

TOXIC SUBSTANCES CONTROL STRATEGY FOR THE OHIO RIVER VALLEY COMPACT DISTRICT*

Introduction and Perspective

The Ohio River Valley, because of its water, energy and transport resources, is and will continue to be an attractive location for many industries. As such, the existing and potential presence of toxic substances in its surface waters is of primary concern to the Ohio River Valley Water Sanitation Commission (ORSANCO).

The Commission's desire to develop a control strategy for toxic substances in the Ohio Basin is reflective of its unique position as a regional water quality agency with inherent participation of state and federal agencies, industry, local utilities, environmental, conservation and related public interests.

The following strategy has been developed so that the states may advance their efforts to identify needs and exercise control programs for toxic substances in a consistent and concerted way. The need for flexibility to account for individual state program differences and information exchange has been considered in the strategy design.

The goal of the strategy is as follows:

> To protect and enhance the water quality of the Ohio River Basin so that the designated uses of its waters, including protection of public health and aquatic life, and as a source of supply for potable uses after reasonable treatment will not be adversely impacted by toxic substances.

For the purpose of this strategy, the following definitions are considered:

> **Toxic Substance** - A substance which, when acting individually or in combination with other substances, might reasonably be expected to cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformations in fish, other aquatic life, wildlife, or humans.
>
> **Toxic Condition** - A condition of water, created or aided by the presence of toxic substances, whereby exposure and/or ingestion by fish, other aquatic life, wildlife, or humans

* Adopted May 12, 1983

may reasonably be expected to cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions, including malfunctions in reproduction, or physical deformations.

At the present time, little is scientifically known about the individual or interactive water related toxicity of many chemicals currently in use (estimated in a 1980 U.S. General Accounting Office report at over 55,000). Much of the information that is available is incomplete and/or inconclusive. In consideration of this paucity of data, the Toxic Substances Control Strategy includes both an interim and long-term program. The interim program is based on those actions which can be initiated immediately by utilizing current knowledge and regulatory programs. The long-term program relies on emerging data and appropriate shifts in budget and manpower resources. The interim program will be concomitant with the long-term strategy.

Finally, although the strategy is intended to address toxic conditions and associated substances in surface waters of the basin, the quality of surface waters and ground waters are closely interdependent. The member states of the Compact should, therefore, incorporate ground water concerns into their programs to the extent possible.

The Strategy, in General

The strategy, in general, calls for certain activities by the states in order to identify toxic conditions in surface waters followed by corrective actions were appropriate. Two related initiatives are also proposed to support these activities: (1) implement effective and thorough monitoring programs which will provide a continuing profile of environmental conditions; and (2) establish a central toxics information clearinghouse to disseminate information on toxic substances in support of the strategy task efforts.

The objectives of the strategy are as follows:

TOXICS STRATEGY OBJECTIVES

1. **Identify and evaluate environmental problem areas.**
2. **Develop corrective action programs for identified problem areas.**
3. **Develop and maintain effective toxics monitoring programs.**
4. **Establish and maintain a central clearinghouse for toxics data.**

In-place state, federal, and Commission programs must be utilized to the fullest extent possible to accomplish the above objectives, particularly in the implementation of the interim program.

Interim program activities will focus on analysis of current water quality conditions of the Ohio River mainstem for toxic conditions resulting from selected substances. Long-term efforts will address both existing and potential toxic conditions and associated substances of concern in the Ohio River Basin. A discussion of both interim and long-term program objectives and associated scope of activities is presented below. Overall program summaries are consolidated in Attachment 1.

The Interim Program

1. Identify and evaluate environmental problem areas.

Scope of Activities

- Limit evaluation of waters and point source discharges to the Ohio River mainstem and conditions of major tributaries at their confluence.

- Perform evaluation utilizing existing data (TSCA Data Base, ORSANCO Organics Detection System and biological survey results, NPDES documents and other existing data bases). Perform additional surveys as necessary to fill gaps in the data.

- Evaluate for the presence of US EPA's "Priority Pollutants" and selected additional substances as indicated by review of existing data.

Discussion

Activities proposed for the interim program will focus on the Ohio River mainstem. The Ohio River provides drinking water to a population of approximately three million, and supports a variety of manufacturing, transportation and utility industries. In addition, monitoring programs are in-place and an appreciable data base exists for some toxic substances. The interim program will allow these resources and data to be expeditiously utilized in the evaluation of the quality of the river water and its ecosystems.

There are approximately 450 entities authorized to discharge to the Ohio River under the NPDES program. A small number of these may be a potential point source of toxic substances in the river environment. The interim program includes a review of NPDES permits and facility surveys as appropriate to pinpoint source problems.

The scope of the interim program will be limited to those substances comprising US EPA's "Priority Pollutant" list (65 compound classes with approximately 125 compounds) and any additional substances found after examination of stream, point source and biological data.

2. Develop corrective action programs for identified problem areas.

Scope of Activities

- Establish screening bioassay and/or other screening monitoring requirements as needed for selected point source discharges.
- Include bioassay monitoring requirements, other monitoring requirements and/or numerical limits as part of the NPDES permit where necessary.
- Limit evaluation and implementation of corrective actions to point sources and apply through existing NPDES and RCRA programs.
- Utilize the NPDES-Pretreatment Program to address toxics received by or discharged from publicly owned treatment works.

Discussion

Interim activities of the toxics strategy will be limited to those which can be taken under the NPDES or RCRA programs. Such actions may include establishing numerical and/or monitoring requirements for facility effluents or pretreated wastes discharged to publicly owned treatment works, depending on the severity and understanding of any problems identified. As a first step, screening bioassay and other screening monitoring requirements should be incorporated as necessary into NPDES permits where toxic substances are present or suspected in the discharge. Where necessary, bioassay and/or other monitoring requirements should be made part of the NPDES permit. Incorporating monitoring requirements into NPDES permits will serve as a surveillance/enforcement tool as well as a means of generating data from which further actions can be based. If numerical limits in permits are indicated, the setting thereof should be a coordinated effort of the states.

3. Develop and maintain effective toxics monitoring programs.

Scope of Activities

- Evaluate existing monitoring programs and develop recommendations to improve their effectiveness in addressing toxic substances.

Discussion

Until long-term monitoring programs are operational, a review of existing programs should be undertaken to evaluate their effectiveness in identifying toxic conditions. Based on such a review, existing programs should be adjusted to the extent possible, commensurate with interim and long-term strategy activities.

4. Establish and maintain a central clearinghouse for toxics data.

Scope of Activities

- Evaluate alternative arrangements and develop recommendations for clearinghouse services, including evaluation of information systems currently in use or under development and their use as part of this strategy.

Discussion

Alternative clearinghouse arrangements may range from the establishment of "switchboard" services connecting various information systems and data users to establishing stand-alone data management capabilities. Currently, several agencies are actively developing and utilizing data information systems for toxic substances. The International Joint Commission's Information System for Hazardous Organics in Water (ISHOW), under development for several years, may be a particularly useful resource in implementing the Commission's toxic strategy. Information contained in the ISHOW data base includes the locations of manufacturers and the uses of over 14,000 chemicals and associated know physical, chemical, and toxicological properties. The states of Illinois, Indiana, and Ohio are now participants in ISHOW.

The Long-Term Program

1. Identify and evaluate environmental problem areas.

Scope of Activities

- Evaluate quality of surface waters in the basin for the presence of toxic conditions resulting from toxic substances.
- Review non-point sources and selected point source discharges in the basin to isolate existing and potential releases of toxic substances of concern.
- Set priorities for follow-up actions for problem areas identified based on application of evaluation protocols.

Discussion

The identification and evaluation of environmental problem areas as related to toxic chemicals is the baseline activity of the overall strategy. Accomplishment of this objective will require that coordinated programs be established to assemble available data on toxic substances in surface streams, sediments and biota. NPDES information should be evaluated and surveys performed to determine the presence of toxic substances emanating from manufacturing plants and in discharges to and from publicly and privately owned wastewater treatment works. Information on toxic conditions in surface waters considered with available information on the manufacture, handling and use of toxic substances of concern should provide a starting point for the development of ambient monitoring programs as well as facilitate follow-up actions for identified water quality problems.

Data evaluation must be preceded by the development of protocols to quantify existing or potential degrees of hazard and, therefore, allow priorities to be set for follow-up actions. Application of the protocol would consider prepared listings of substances which are known to be present in the basin, and for which control criteria are needed, evaluation of available information through the strategy clearinghouse, and result in quantification of the existing or potential degree of hazard.

2. Develop corrective action programs for identified problems areas.

Scope of Activities

Develop and implement a systematic corrective actions policy which considers the following:

- Established priorities for problem areas identified.
- Site-specific water quality investigations.
- In-place regulatory programs (NPDES, RCRA, others), and
- Controls for non-point sources.

Discussion

Corrective measures may involve a range of surveillance and enforcement activities, including site-specific water quality and effluent bioassay surveys, review of stream criteria, setting limits and monitoring requirements in NPDES and RCRA permits and the issuing of orders. The long-term strategy requires that these mechanisms be considered in the development of a comprehensive policy to address areas where toxics are of concern.

3. Develop and maintain effective ambient toxics monitoring programs.

Scope of Activities

- Develop ambient monitoring programs for toxic substances of concern, to include analyses of:
    - wastewater effluents
    - surface waters and indigenous aquatic communities,
    - fish tissue,
    - drinking water, and
    - sediments.
- Coordinate program development and implementation, and share results among companion agencies in the Ohio River Basin.

Discussion

The employment of effective ambient monitoring programs to measure the water quality environment for toxic conditions must consider sampling and analyses of the several above mentioned environmental systems. Analyses of effluents, surface waters, fish tissue, drinking water and sediments will assure a broad scope of data on which to base decisions. In addition, information/data about human health effects resulting from toxic chemicals should be considered whenever possible. Because of the potential costs involved, the long-term monitoring program should be coordinated as closely as possible with monitoring efforts already in place, and the individual program designs and associated data should be shared among the potential users.

4. Establish and maintain a central clearinghouse for toxics data.

Scope of Activities

Establish clearinghouse services for toxics data in support of the strategy which would include information on:

- environmental and health effects,
- inventory of substances existing in the basin in significant quantities,
- profile of environmental conditions based on existing and future monitoring systems, and
- analytical methodology and hardware.

Discussion

The purpose of a central clearinghouse for toxics data is to facilitate the dissemination of information needed in the implementation of the strategy. Significant amounts of data are becoming available from the scientific community and, in several cases, information systems on toxics substances have been initiated. Specific uses of data which would be handled by the clearinghouse include comparing emerging data with existing data, establishing relative rankings of the hazard of substances for the setting of correction priorities, and conducting investigative and other studies related to pinpointing discharge sources.

Strategy Legislative and Budget Support

Implementation of the strategy may necessitate additional legislative and budget support of the members of the Compact. Accordingly, an initial strategy task should include a review of the pollution control laws and standards of the signatory states to confirm such laws and standards are in consonance with the strategy or recommend adjustments as necessary. In addition, estimations of budget and manpower requirements to support implementation should be prepared at the earliest feasible time with the extent of their availability factored into the timing of the work effort.

Public Awareness

Public support awareness and input will be vital to the success of the strategy. ORSANCO is in a position to serve as the lead agency for public interactions which will include:

- Input from public representation which rests on the Commission and provided by its Public Interest Advisory Committee.
- Preparation of strategy overviews and updates as public information pieces.

Strategy Implementation Responsibilities

Implementation of the various interim and long-term program tasks will require, in some cases, the efforts of the individual state and federal agencies, while in other instances the Commission may logically provide resources. The following outlines the areas of responsibilities as the strategy is implemented:

- STATE AGENCIES -

State agencies are best suited to accomplish the following long-term tasks outlined under:

1. **Identify and quantify environmental problem areas.**
2. **Develop corrective actions programs for identified problem areas.**
3. **Develop and maintain effective toxics monitoring programs.**

In order to assure the interstate coordination of the toxics strategy and to provide a mechanism for information exchange, ORSANCO will provide review and comment on the individual proposed state programs.

- ORSANCO -

Responsibilities of the Commission involve the activities which are interstate in scope. Appropriate committees will review and comment on existing and proposed state programs to: assure interstate coordination of the strategy, provide a mechanism for information exchange, and coordinate individual state actions between member states. Since the interim program is limited to the Ohio River mainstem, the Commission will provide lead input concerning program implementation, specifically those activities which involve the evaluation of existing data on Ohio River water quality and the establishment of approaches for corrective programs for point source discharges. Activities related to the establishment of a central clearinghouse to support this strategy should be, in large part, a Commission initiative.

- FEDERAL AGENCIES -

Agencies of the Federal Government are in a position to provide support to the strategy through programmatic and standards approvals as well as resource support if such activities are consistent with the established objectives. The establishment of a central data clearinghouse may require the direct support of the US EPA. EPA research efforts to develop toxic chemical analytical technology and methods, particularly in the use of gas chromatography, liquid chromatography and gas chromatographic-mass spectrometer instrumentation, have resulted in data libraries and specialized expertise. This information/data has significant potential application to the development of this strategy and its implementation. The US EPA should also be closely consulted as member state enforcement and monitoring programs are formulated.

ATTACHMENT 1

SUMMARY OF TASKS AND ASSOCIATED SCOPE OF ACTIVITIES
- INTERIM PROGRAM -

1. **Identify and evaluate environmental problem areas.**

   - Limit evaluation of surface waters and point source discharges to the Ohio River mainstem and conditions of major tributaries at their confluence.

   - Perform evaluation utilizing existing data (TSCA Data base, ORSANCO Organics Detection System and biological survey results, NPDES documents and other existing data bases). Perform appropriate additional surveys as necessary, to fill gaps in the data.

   - Evaluate for the presence of US EPA's "Priority Pollutants" and selected additional substances as indicated by review of existing data.

2. **Develop corrective action programs for identified problem areas.**

   - Establish screening bioassay and/or other screening monitoring requirements as needed for selected point source discharges.

   - Include bioassay monitoring requirements, other monitoring requirements and numerical limits as part of the NPDES permit where necessary.

   - Limit evaluation and implementation of corrective actions to point sources and apply through existing NPDES and RCRA programs.

   - Utilize the NPDES-Pretreatment Program to address toxics received by or discharged from publicly owned treatment works.

3. **Develop and maintain effective ambient toxics monitoring programs.**

   - Evaluate existing monitoring programs and develop recommendations to improve their effectiveness in addressing toxics substances.

4. **Establish and maintain a clearinghouse for toxics data.**

- Evaluate alternative arrangements and develop recommendations for clearinghouse services, including evaluation of information systems currently in use or under development and their use as part of this strategy.

Implementation Responsibilities - Interim Program

State Agencies -

- Conduct site-specific evaluation of point source discharges to the Ohio River mainstem.
- Participate as appropriate in water quality investigations.
- Evaluate corrective actions and programs (administered through the NPDES and RCRA programs).

Federal Agencies -

- Provide assistance in evaluation and operation of alternative arrangements for central clearinghouse.
- Participate as appropriate in water quality investigations.
- Provide technical assistance where possible.

ORSANCO -

- Evaluate quality of the Ohio River as related to toxic substances.
- Coordinate development of monitoring strategy and corrective actions and programs (administered through the NPDES and RCRA programs).
- Evaluate alternative arrangements for establishing a central clearinghouse for dissemination of toxic strategy support data.

SUMMARY OF TASKS AND ASSOCIATED SCOPE OF ACTIVITIES
- LONG-TERM PROGRAM -

1. **Identify and evaluate environmental problem areas.**

   - Evaluate quality of surface waters in the basin for the presence of toxic conditions resulting from toxic substances.
   - Review non-point sources and selected point source discharges in the basin to isolate existing and potential releases of toxic substances of concern.
   - Set priorities for follow-up actions for problem areas identified based on application of evaluation protocols.

2. **Develop corrective action programs for identified problem areas.**

   Develop and implement a systematic corrective actions policy which considers the following:

   - Established priorities for problem areas identified,
   - Site-specific water quality investigations,
   - In-place regulatory programs (NPDES, RCRA, others), and
   - Controls for non-point sources.

3. **Develop and maintain effective ambient toxics monitoring programs.**

   - Develop ambient monitoring programs for toxic substances of concern, to include analyses of:
     - wastewater effluents,
     - surface waters and indigenous aquatic communities,
     - fish tissue,
     - drinking water, and
     - sediments.
   - Coordinate program development and implementation, and share results among companion agencies in the Ohio River Basin.

4. **Establish and maintain a clearinghouse for toxics data.**

Establish clearinghouse services for toxics data in support of the strategy which would include information on:

- environmental and health effects,
- inventory of substances existing in the basin in significant quantities,
- profile of environmental conditions based on existing and future monitoring systems, and
- analytical methodology and hardware.

Implementation Responsibilities - Long-Term Program

State Agencies -

- Identification of problem areas
- Evaluation of problem areas.
- Development of corrective actions and programs for identified problem areas.
- Development and maintenance of effective monitoring programs.

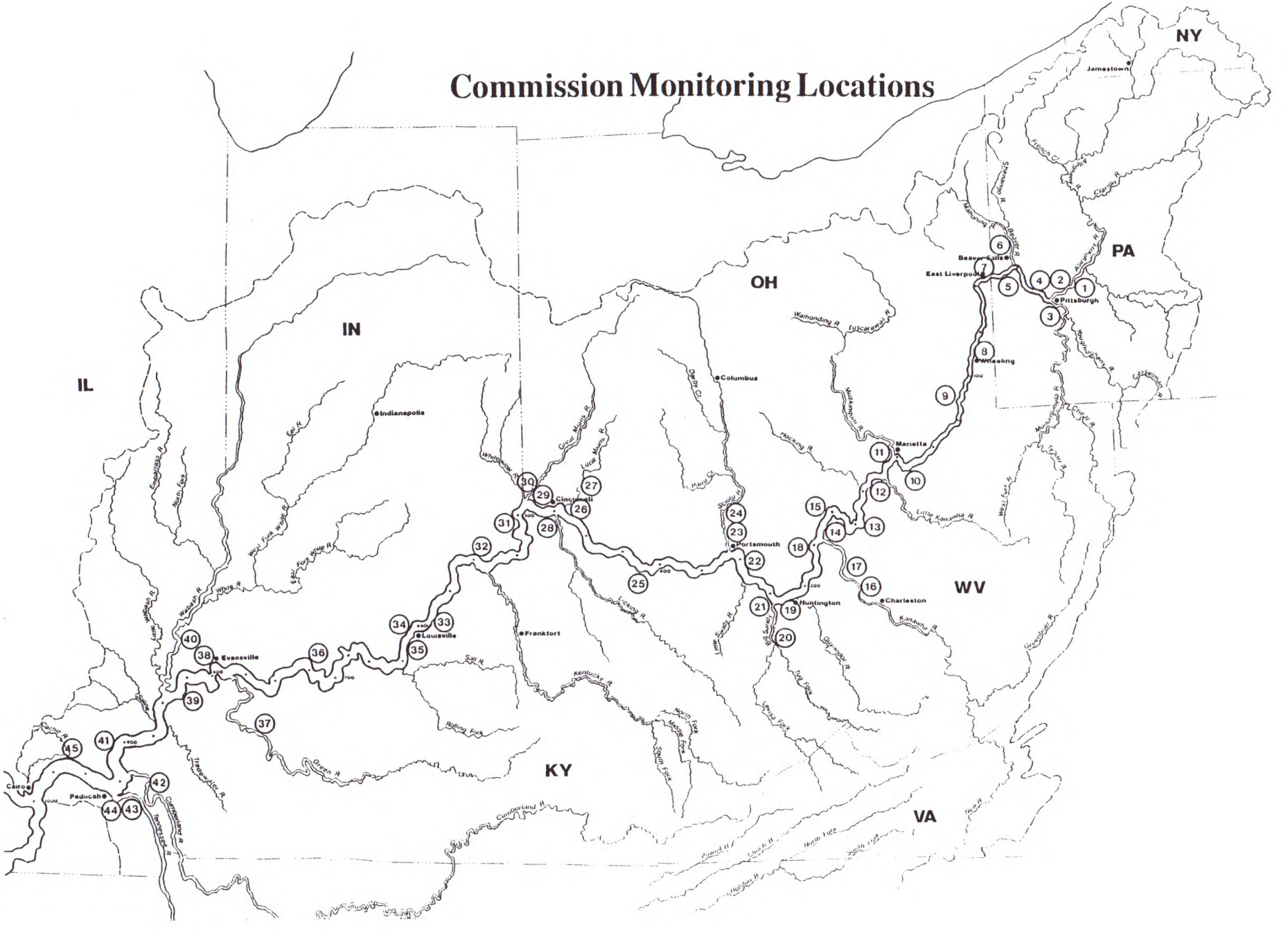
Federal Agencies -

- Provide support functions and/or research in operation of data clearinghouse, development and application of analytical methodology and formulation of state and ORSANCO monitoring and enforcement programs.

ORSANCO -

- Review and comment on interstate matters of proposed state programs pursuant to the strategy.
- Provide a mechanism for information exchange.
- Coordinate individual state actions between member states.
- Provide toxics data clearinghouse services.

Commission Monitoring Locations



Water Quality Monitoring Network

STATION	MILE POINT	TYPE(S)
1. Wilkinsburg (Allegheny)	8.5*	W
2. Pittsburgh (Allegheny)	7.4*	M,O
3. South Pittsburgh - Hays Mine (Monongahela)	4.5	M,W,O
4. Neville Island - West View	4.5	O
5. South Heights	15.2	M
6. Beaver Falls (Beaver)	5.3*	M,W
7. East Liverpool	40.2	M,O
8. Wheeling	86.8	M,W,O
9. Hannibal	126.4	M
10. Willow Island	161.8	M
11. Marietta (Muskingum)	5.8*	M
12. Parkersburg	190.3	W,O
13. Belleville	203.9	M
14. Racine	237.5	D
15. Addison	260.0	M
16. St. Albans (Kanawha)	38.3*	O
17. Winfield (Kanawha)	31.1*	M
18. Gallipolis	279.2	M
19. Huntington	306.9	M,W,O
20. Louisa (Big Sandy)	20.3*	M
21. Ashland	319.7	M
22. Greenup	314.0	D
23. Portsmouth	350.7	M,W,O
24. Lucasville (Scioto)	15.0*	M
25. Maysville	408.5	M
26. Cincinnati	462.8	M,W,O
27. Newtown (Little Miami)	7.5*	M
28. Covington (Licking)	4.5*	M
29. North Bend	490.0	M
30. Elizabethtown (Great Miami)	5.5*	M
31. Markland	531.5	D,M
32. Madison	558.5	W
33. Louisville	600.6	M,O,W
34. McAlpine	605.9	D
35. West Point	625.9	M
36. Cannelton	720.7	M
37. Sebree (Green)	41.3*	M
38. Evansville	791.5	M,W,O
39. Uniontown	846.0	M
40. New Harmony (Wabash)	51.5*	M
41. Smithland	918.5	M
42. Pinkneyville (Cumberland)	16.0*	M
43. Paducah (Tennessee)	6.0*	M
44. Paducah	935.5	O
45. Joppa	952.3	M

*From confluence with the Ohio River

TYPE: M - Manual Sampling
W - Water Users Network
O - Organics Detection System
D - Dissolved Oxygen

MASTER LIST WATER QUALITY MONITORING NETWORK

STORET PRIMARY STATION NO.	SECONDARY STATION NO.	DESCRIPTION	STATE/ COUNTY CODE	LAT. - LONG. NO.	TYPE
AR-8.9	231	Allegheny R. @ Wilkensburg, PA	42003	402855007952380	W
AR7.40	020DS	Allegheny R. @ Pittsburgh, PA	42003	402940007949300	O
AR7.4M	1234	Allegheny R. @ Pittsburgh, PA	42003	402940007949300	M
MR-4.5M	1237	Monongahela R. @ So. Pittsburgh, PA	42003	402436007957150	M
MR-4.0	237	Monongahela R. @ So. Pittsburgh, PA	42003	402438007957150	W
MR-4.50	01.5ODS	Monongahela R. @ So. Pittsburgh, PA	42003	402438007957150	O
OR976.50	030DS	Ohio R. @ West View, PA	42003	402934008004180	O
OR968.3M		Ohio R. @ Sewickley, PA	42003	403200208011013	M
OR9658M	1201	Ohio R. @ South Heights	42003	403412008013470	M
BR-5.3M	1242	Beaver R. @ Beaver Falls, PA	42007	404548008018550	M
BR-5.3	242	Beaver R. @ Beaver Falls, PA	42007	404548008018550	W
OR9408M	1500	Ohio R. @ East Liverpool, OH	39029	403820008031150	M
OR9408	120DS	Ohio R. @ East Liverpool, OH	39029	403820008031150	O
OR894	405	Ohio R. @ Wheeling, WV	54069	400418008043345	W
OR894.2	040DS	Ohio R. @ Wheeling, WV	54069	400418008043345	O
OR894.2	1406	Ohio R. @ Wheeling, WV	54069	400418008043345	M
OR8546M	1423	Ohio R. @ Hannibal Lock, OH	39111	393810008052310	M
OR8192M	1408	Ohio R. @ Willow Island Lock, OH	39167	392128008119090	M
MU-5.8M	1531	Muskingum R. Near Marietta, OH	39167	392813008129280	M
OR7965	409	Ohio R. @ Parkersburg, WV	54107	391613508133570	W
OR790.7	050DS	Ohio R. @ Parkersburg, WV	54107	391546008140040	O
OR7771M	1421	Ohio R. @ Belleville Lock, OH	39105	390707008144320	M

MASTER LIST WATER QUALITY MONITORING NETWORK

STORET PRIMARY STATION NO.	SECONDARY STATION NO.	DESCRIPTION	STATE/ COUNTY CODE	LAT. - LONG. NO.	TYPE
OR7210M	1510	Ohio R. @ Addison, OH	39053	385449008207390	M
OR7196	510	Ohio R. @ Addison (Kyger Creek), OH	39053	385313508208450	W
KR38.3	060DS	Kanawha R. @ St. Albans, WV	54079	382330008149560	O
KR31.1M	1450	Kanawha R. @ Winfield, WV	54079	383132008154400	M
OR7018M	1422	Ohio R. @ Gallipolis Dam, WV	54053	384054008211170	M
OR6741M	1412	Ohio R. @ Huntington, WV	54011	382557008225570	M
OR674.1	070DS	Ohio R. @ Huntington, WV	54011	382557008225570	O
OR6740	412	Ohio R. @ Huntington, WV	54011	382524008225030	W
OR661.3M	1610	Ohio R. @ Ashland, KY	21019	382710008235500	M
SR20.3M	1630	Big Sandy R. @ Louisa, KY	21127	381016008238050	M
SC15.0M	1538	Scioto R. @ Lucasville, OH	39145	385252008301030	M
OR6303	503	Ohio R. @ Portsmouth, OH	39145	384345008259495	W
OR630.9	080DS	Ohio R. @ Portsmouth, OH	39145	384345008259495	O
OR630.3M	1526	Ohio R. @ Portsmouth, OH	39145	384345008259495	M
OR572.5M	1611	Ohio R. @ Maysville, KY	21161	383842008345050	M
OR5182M	1504	Ohio R. @ Cincinnati, OH	39061	390411008425570	M
OR518.2	090DS	Ohio R. @ Cincinnati, OH	39061	390411008425570	O
OR5182	504	Ohio R. @ Cincinnati, OH	39061	390411008425570	W
LM-7.5M	1571	Little Miami R. @ Cincinnati, OH	39061	390633008424060	M
LR-4.5M	1634	Licking R. @ Kenton County, KY	21117	390305008429420	M
OR4910M	1508	Ohio R. @ North Bend, OH	39061	390630008448315	M
GM-5.5M	1551	Great Miami R. @ Elizabethtown, OH	39061	390911008447380	M
OR4495M	1600	Ohio R. @ Markland Dam, KY	21077	394629008457520	M

MASTER LIST WATER QUALITY MONITORING NETWORK

STORET PRIMARY STATION NO.	SECONDARY STATION NO.	DESCRIPTION	STATE/ COUNTY CODE	LAT. - LONG. NO.	TYPE
OR4215	702	Ohio R. @ Madison, IN (Clifty Creek)	18077	384409008522015	W
OR3804M	1601	Ohio R. @ Louisville, KY	21111	381642008542080	M
OR380.4	100DS	Ohio R. @ Louisville, KY	21111	381652008542080	O
OR3804	601	Ohio R. @ Louisville, KY	21111	381649508542105	W
OR3551M	1622	Ohio R. @ West Point, KY	21111	380205008554510	M
OR2603M	1721	Ohio R. @ Cannelton Dam, IN	18123	375358008642200	M
R41.3M	1656	Green R. @ Sebree, KY	21101	375530008718150	M
OR1895M	1703	Ohio R. @ Evansville, IN	18163	375820008734350	M
OR189.5	110DS	Ohio R. @ Evansville, IN	18163	375820008734350	O
OR1895	703	Ohio R. @ Evansville, IN	18163	375820008734350	W
OR1350M	1722	Ohio R. @ Uniontown, KY	18129	374800008759000	M
WA9295M	1741	Wabash R. @ New Harmony, IN	18129	380755008756250	M
OR62.5M	1820	Ohio R. @ Smithland Dam, IL	17151	370845008824250	M
CR16.0M	1640	Cumberland R. at Pinkneyville KY	21139	370110808814220	M
TR-6.0M	1650	Tennessee R. near Paducah, KY	21145	370216008831460	M
OR45.5	130DS	Ohio R. @ Paducah, KY	21145	370600008836300	O
OR28.7M	1821	Ohio R. @ Joppa, IL	17127	371200008851000	M

W - Water Users

M - Manual

O - ODS

MASTER LIST - BIOLOGICAL MONITORING NETWORK				
STORET PRIMARY STATION NO.	SECONDARY STATION NO.	DESCRIPTION	STATE/COUNTY CODE	LAT. - LONG. NO.
MR61.5F		MONONGAHELA RIVER AT MAXWELL LOCK	42051	400000007957340
MR11.2F		MONONGAHELA RIVER AT LOCK #2, PA	42003	402345007952070
AR52.6F		ALLEGHENY RIVER AT LOCK #8, PA	42005	405326007902900
AR14.5F		ALLEGHENY RIVER AT LOCK #3, PA	42003	403212007929030
OR9748F		OHIO RIVER AT EMSWORTH LOCK, PA	42003	403016008005220
OR9670F		OHIO RIVER AT DASHIELDS LOCK, PA	42003	403505008016000
OR949.3F		OHIO RIVER AT MONTGOMERY LOCK, PA	42007	403854008023080
OR9276F		OHIO RIVER AT NEW CUMBERLAND LOCK	39081	402945008035300
OR8970F	1405	OHIO RIVER AT PIKE ISLAND LOCK, WV	54069	400745008042060
OR8550F	1423	OHIO RIVER AT HANNIBAL LOCK, OH	39111	395830008048550
OR8190F	1408	OHIO RIVER AT WILLOW IS. LOCK, OH	39167	392128008115000
OR808.5F		OHIO RIVER AT MARIETTA, OH	39167	392407008128020
OR7770F	1421	OHIO RIVER AT BELLEVILLE LOCK, OH	39105	390830008144320
OR7430F		OHIO RIVER AT RACINE LOCK, WV	54053	385810008155000
KR84.0F		KANAWHA RIVER AT LONDON LOCK, WV	54039	381200008122150
KR32.0F		KANAWHA RIVER AT WINFIELD LOCK, WV	54079	383132008154400
OR7020F	1422	OHIO RIVER AT GALLIPOLIS LOCK, WV	54053	384054008211170

MASTER LIST - BIOLOGICAL MONITORING NETWORK				
PRIMARY STATION NO.	SECONDARY STATION NO.	DESCRIPTION	STATE/COUNTY CODE	LAT. - LONG. NO.
OR6741F	1412	OHIO RIVER AT HUNTINGTON, WV	54011	382557008225570
SR20.3F	1630	BIG SANDY RIVER AT LOUISA, KY	21127	381016008238050
OR6410F	1621	OHIO RIVER AT GREENUP LOCK, KY	21089	383830008251000
OR5448F	1511	OHIO RIVER AT MELDAHL LOCK, OH	39025	390245008422000
LR4.5F	1634	LICKING RIVER AT COVINGTON, KY	21117	390305008429420
OR5130F		OHIO RIVER AT CINCINNATI, OH	39061	390500008437000
OR4490F	1600	OHIO RIVER AT MARKLAND LOCK, KY	21077	384629008457520
OR3740F		OHIO RIVER AT MCALPINE LOCK, KY	21111	381640008547300
OR3551F	1622	OHIO RIVER AT WEST POINT, KY	21111	380205008554510
OR2600F	1721	OHIO RIVER AT CANNELTON LOCK, IN	18123	375358008642200
OR2049F		OHIO RIVER AT NEWBURGH LOCK, IN	18173	375551008722530
GR41.3F	1656	GREEN RIVER AT SEEBREE, KY	21101	375530008718150
OR1350F	1722	OHIO RIVER AT UNIONTOWN LOCK, KY	21225	374800008759000
OR63.0F	1820	OHIO RIVER AT SMITHLAND LOCK, IL	17151	371025008825450
TR6.0F	1650	TENNESSEE RIVER AT PADUCAH, KY	21145	370216008831460
OR18.4F		OHIO RIVER AT LOCK & DAM #53, IL	17153	371210008902300

TABLE 1. MANUAL SAMPLING LOCATIONS/DESCRIPTION

STATION #	FLOW STATION	STATION NAME	MILE POINT	STATION DESCRIPTION (Sample Location)
1234	Acmetonia	Allegheny R. at Pittsburgh	7.4	Pittsburgh Waterworks intake (Submersible pump in intake structure building)
1237	Braddock	Monongahela R. at South Pittsburgh	4.5	Pennsylvania-American Water Co. intake Beck's Run (raw water tap in pumping station)
1201	Dashields	Ohio R. at South Heights	15.2	Dusquesne Light Power Plant (intake structure on river bank)
1242	Beaver Falls	Beaver R. at Beaver Falls	5.3	Beaver Falls Waterworks intake (inlet chamber in the treatment building)
1500	E. Liverpool	Ohio R. at East Liverpool	40.2	East Liverpool Waterworks intake (tap in raw water line from pumping station to treatment plant)
1406	Wheeling	Ohio R. at Wheeling	86.8	Wheeling Water Department intake (raw water tap at plant)
1423	Moundsville	Ohio R. at Hannibal	126.4	Hannibal Lock and Dam near Hannibal, OH (outside up-stream guide wall)
1408	Willow Island	Ohio R. at Willow Island, OH	161.8	Willow Island Lock and Dam near Newell Run, OH (outside up-stream guide wall)
1531	Marietta	Muskingum R. at L&D #2	5.8	Lock and Dam #2 near Devola, OH (outside up-stream guide wall)
1421	Parkersburg	Ohio R. at Belleville	203.9	Belleville Lock and Dam near Reedsville, OH (outside up-stream guide wall)
1510	Pomeroy	Ohio R. at Addison	260.0	Kyger Creek Power Plant near Addison, OH (raw water tap near intake structure)
1450	Winfield	Kanawha R. at Winfield	31.1	Hydroelectric plant on west side of Winfield L&D (concrete structure above dam and hydroelectric facility)
1422	Gallipolis	Ohio R. at Gallipolis	279.2	Gallipolis Lock and Dam near Gallipolis Ferry, WV (outside up-stream guide wall)
1412	Greenup	Ohio R. at Huntington	306.0	WV-American Water Co. intake on 24th Street in Huntington, WV (raw water tap in basement of building)
1610	Ashland	Ohio R. at Ashland	319.7	Ashland Waterworks in Ashland, KY (raw water line in basement)
1630	Louisa	Big Sandy R. at Louisa	20.3	Kentucky Power Co. plant on US 23 near Louisa, KY, (raw water tap in intake structure)

TABLE 1. MANUAL SAMPLING LOCATIONS/DESCRIPTION

STATION #	FLOW STATION	STATION NAME	MILE POINT	STATION DESCRIPTION (Sample Location)
1526	Greenup	Ohio R. at Portsmouth	350.7	Portsmouth Water Treatment Plant intake New Boston, OH (raw water line in basement of plant)
1538	Lucasville	Scioto R. at Lucasville	15.0	State Highway Bridge Rt. 348 crossing Scioto R. near Lucasville, OH (from center of bridge)
1611	Meldahl	Ohio R. At Maysville	408.5	Maysville Waterworks intake (raw water line in plant)
1504	California	Ohio R. at Cincinnati	462.8	Cincinnati Waterworks intake near California (raw water line in the basement of the round building)
1571	Little Miami	Little Miami R. at Newtown	7.5	Newtown Road bridge crossing L. Miami (as close to mid-channel as possible from bridge or below bridge according to safety practices)
1634	Covington	Licking R. at Covington	4.5	Kenton County Waterworks intake, (raw Water tap in basement of plant)
1508	Covington	Ohio R. at North Bend	490.0	Cincinnati Gas & Electric Co., Miami Fort intake (raw water tap in condenser pit of plant)
1551	Cincinnati	Great Miami R. at Elizabethtown	5.5	Lost Bridge crossing G. Miami R. near Elizabethtown, OH (mid-stream from bridge)
1600	Markland	Ohio R. at Markland	531.5	Public Service of Indiana hydroelectric plant intake (raw water line near electronic monitor)
1601	McAlpine-Up	Ohio R. at Louisville	600.6	Louisville Water Co. pumping station on Zorn Avenue (raw water line at station near electronic monitor)
1622	McAlpine-Low	Ohio R. at West Point	625.9	Louisville Gas and Electric Co. Mill Creek Plant (raw water line in the basement of the plant near electronic monitor)
1721	Cannelton-Up	Ohio R. at Cannelton	720.7	Cannelton Lock and Dam near Cannelton, IN (outside up-stream guide wall)
1656	Spottsville	Green R. at Sebree	41.3	Big Rivers Electric Plant near Sebree, KY (intake structure outside walkway)

TABLE 1. MANUAL SAMPLING LOCATIONS/DESCRIPTION

STATION #	FLOW STATION	STATION NAME	MILE POINT	STATION DESCRIPTION (Sample Location)
1703	Evansville	Ohio R. at Evansville	791.5	Evansville Waterworks Filtration Plant (raw water tap in basement)
1722	Uniontown	Ohio R. at Uniontown	846.0	Uniontown Lock and Dam near Hovey, IN (outside up-stream guide wall)
1741	New Harmony	Wabash R. at New Harmony	51.5	White Co. Bridge Commission Toll Bridge at New Harmony (middle bridge-pier beneath roadway)
1640	None	Cumberland R. at Pinkneyville, KY	16.0	Critteden-Livingston Water Plan (raw water line in lower level of building)
1650	None	Tennessee R. at Paducah	6.0	Ashland Oil Terminal on Highway 62 east of Paducah, KY (barge unloading dock at terminal)
1820	Shawneetown	Ohio R. at Smithland	918.5	Smithland Lock and Dam near Hamletsburg, IL (outside up-stream guide wall)
1821	Joppa	Ohio R. at Joppa	952.3	Electric Energy Inc. power plant near Joppa, IL (raw water tap in intake structure near electronic monitor)

TABLE 2. CHEMICAL PARAMETERS AND SAMPLING FREQUENCY

Manual Sampling Network

Monthly Parameters	Quarterly Parameters (Jan., Apr., Jul., Oct.)	Recreation Season (May through Oct.)
Flow	Barium	Fecal Coliform
Temperature	Chromium	Dissolved Oxygen
pH	Nickel	
Dissolved Oxygen	Selenium	
Specific Conductance	Silver	
Alkalinity		
Suspended Solids		
Total Hardness		
Sulfate		
Chloride (tributaries only)		
Cyanide		
Phenol		
Aluminum		
Arsenic		
Cadmium		
Copper		
Iron		
Lead		
Mercury		
Magnesium		
Manganese		
Zinc		
Total Phosphorus		
Orthophosphate		
Total Kjeldahl Nitrogen		
Ammonia		
Nitrate-Nitrite		
BOD		

TABLE 3. FECAL COLIFORM/DISSOLVED OXYGEN SAMPLING LOCATIONS

(May through October)

Fecal Coliform

MILE POINT	STATION NAME	STATION DESCRIPTION
AR 8.9	Wilkinsburg-Penn	Wilkinsburg-Penn Water intake
OR 11.7	Sewickley	Launch ramp at Sewickley Hwy Bridge
OR 54.4	New Cumberland	New Cumberland Lock & Dam
OR 86.8	Wheeling	Wheeling Water Plant intake
OR 190.3	Parkersburg	E.I. Dupont Plant intake
OR 306.9	Huntington	Huntington Water Plant intake
OR 350.7	Portsmouth	Portsmouth Water Plant intake
OR 462.8	Cincinnati	Cincinnati Water Plant intake
OR 477.5	Anderson Ferry	Mid-channel, off ferry boat
OR 495.5	Tanners Creek	Indiana-Michigan Power Station Intake
OR 600.6	Louisville	Louisville Water Plant intake
OR 625.9	West Point	LG&E Mill Creek Plant intake
OR 791.5	Evansville	Evansville Water Plant intake

Dissolved Oxygen/Temperature

OR 31.7	Montgomery L&D	Pittsburgh COE hydrolab monitor
OR 203.9	Belleville L&D	Huntington COE hydrolab monitor
OR 237.5	Racine Hydro Plant	American Electric Power electronic monitor
OR 260.0	Kyger Creek Station*	American Electric Power electronic monitor
OR 341.0	Greenup Hydro Plant	American Electric Power electronic monitor
OR 436.2	Meldahl L&D	Huntington COE hydrolab monitor
OR 531.5	Markland Hydro Plant	Public Service of Indiana electronic monitor
OR 606.8	McAlpine Hydro Plant	Louisville Gas & Electric electronic monitor
OR 625.9	West Point*	Louisville Gas & Electric electronic monitor
OR 720.7	Cannelton L&D*	Louisville COE electronic monitor
OR 776.1	Newburgh L&D*	Louisville COE hydrolab monitor
OR 918.5	Smithland L&D*	Louisville COE hydrolab monitor

* Additional stations monitored during critical periods of low river flow and high temperatures.

WATER USERS NETWORK

TABLE 4. CHEMICAL PARAMETERS AND SAMPLING FREQUENCY

LOCATION	MILEPOINT	ALKALINITY	CHLORIDE	FECAL COLIFORM	PH	TEMPERATURE	DISSOLVED SOLIDS	SPECIFIC CONDUCTANCE	TOTAL HARDNESS	TURBIDITY	THRESHOLD ODOR	FLUORIDE	SULFATE
WILKINSBURG	8.5 (AL)	D	M	5W	5W	D	M	M	D	D	D	D	M
HAYS MINE	4.5 (MON)	W	W	W	D	D	M	-	W	D	D	D	M
BEAVER FALLS	5.3 (BEAVER)	D	2W	-	D	D	-	-	2W	D	D	D	W
WHEELING	86.8	D	D	D	D	D	-	-	D	D	-	D	-
PARKERSBURG	190.3	W	W	-	W	W	W	-	-	-	-	-	-
KYGER CREEK	260	5W	5W	-	6W	6W	M	6W	5W	6W	-	-	M
HUNTINGTON	306.9	D	4W	D	D	D	-	-	D	D	4W	D	W
PORTSMOUTH	350.7	W	W	W	W	W	-	-	W	W	-	W	-
CINCINNATI	462.8	W	W	W	W	M	M	M	W	W	M	-	W
CLIFTY CREEK	558.5	5W	6W	-	6W	-	-	6W	6W	6W	-	-	-
LOUISVILLE	600.6	D	M	D	D	D	M	-	D	D	D	D	M
EVANSVILLE	791.5	D	D	D	D	D	-	-	D	D	D	-	D

D = DAILY W = WEEKLY 5W = 5 PER WEEK M = MONTHLY - NOT AVAILABLE

TABLE 5. ORGANICS DETECTION SYSTEM MONITORING STATIONS

STORET PRIMARY NO.	STATION NAME	MILE POINT	STATION DESCRIPTION
AR7.40	City of Pittsburgh Water Treatment Plant	7.4	Allegheny River at Pittsburgh, PA
MR24.5	PA-American Water Company Hays Mine Lab	4.5	Monongahela River at Becks Run, PA
OR976.50	West View Water Authority	4.5	Ohio River at Neville Island, PA
OR9408	City of East Liverpool Water Works	40.2	Ohio River at East Liverpool, OH
OR894.2	Wheeling Water Treatment Plant	86.8	Ohio River at Wheeling, WV
OR790.7	E.I. duPont deNemours & Co.	190.3	Ohio River at Parkersburg, WV
KR38.3	Appalachian Power Company	38.3	Kanawha River at St. Albans, WV
OR674.1	Huntington, WV-American Water Co.	306.9	Ohio River at Huntington, WV
OR630.9	City of Portsmouth Water Treatment Plant	350.1	Ohio River at Portsmouth, OH
OR518.2	City of Cincinnati Water Works	462.8	Ohio River at Cincinnati, OH
OR380.4	Louisville Water Company	600.6	Ohio River at Louisville, KY
OR189.5	Evansville Water Works	791.5	Ohio River at Evansville, IN
OR45.5	Paducah Water Works	935.5	Ohio River at Paducah, KY

Organics Detection System

TABLE 6. CHEMICAL PARAMETERS AND SAMPLING FREQUENCY

Halogenated Purgeable Organics	Aromatic Purgeable Organics
Bromodichloromethane	Benzene
Bromoform	Chlorobenzene
Carbon Tetrachloride	1,2 Dichlorobenzene
Chloroform	1,3 Dichlorobenzene
Dibromochloromethane	1,4 Dichlorobenzene
1,1 Dichloroethane	Ethylbenzene
1,2 Dichloroethane	Toluene
1,1 Dichloroethylene	Styrene
1,2 Dichloropropane	
Methylene Chloride	
Tetrachloroethylene	
1,1,1 Trichloroethane	
Trichloroethylene	
Trichlorofluoromethane	

Daily analysis, seven days per week at eleven stations.

Daily analysis, five days per week at two stations.

TABLE 7. FISH SAMPLING LOCATIONS

RIVER	MILE POINT	LOCATION
Allegheny	52.6*	Lock & Dam #8
Allegheny	14.5*	Lock & Dam #3
Monongahela	61.2*	Maxwell Lock & Dam
Monongahela	11.2*	Lock & Dam #2
Ohio	6.2	Emsworth Lock & Dam
Ohio	13.3	Dashields Lock & Dam
Ohio	31.7	Montgomery Lock & Dam
Ohio	54.4	New Cumberland Lock
Ohio	84.2	Pike Island Lock & Dam
Ohio	126.4	Hannibal Lock & Dam
Ohio	161.8	Willow Island Lock
Ohio	203.9	Belleville Lock & Dam
Ohio	238.0	Racine Lock & Dam
Kanawah	82.8*	London Lock & Dam
Kanawha	31.1*	Winfield Lock & Dam
Ohio	279.2	Gallipolis Lock & Dam
Ohio	341.0	Greenup Lock & Dam
Ohio	436.2	Meldahl Lock & Dam
Ohio	531.5	Markland Lock & Dam
Ohio	606.8	McAlpine Lock & Dam
Ohio	720.7	Cannelton Lock & Dam
Ohio	776.0	Newburgh Lock & Dam
Ohio	846.0	Uniontown Lock & Dam
Ohio	918.5	Smithland Lock & Dam
Ohio	926.6	Lock #53

One-half of all locations sampled each year on alternating basis.

*** From the confluence of the Ohio River**

TABLE 8. CHEMICAL PARAMETERS FISH TISSUE ANALYSIS

Polychlorinated Biphenyls (PCBs)	Cadmium
Aldrin	Lead
Chlordane	Mercury
Dieldrin	% Fat
Endrin	
Total DDT	
Methoxychlor	
Haxachlorobenzene	
Polyaromatic Hydrocarbons (PAHs)*	

*Infrequent, at selected locations
All other parameters on annual basis