ORSANCO

IN REVIEW | 1977

ILLINOIS
INDIANA
KENTUCKY
OHIO
NEW YORK
PENNSYLVANIA
VIRGINIA
WEST VIRGINIA

TO:

The Honorable James R. Thompson
Governor of Illinois

The Honorable Otis R. Bowen, M.D.
Governor of Indiana

The Honorable Julian Carroll
Governor of Kentucky

The Honorable Hugh L. Carey
Governor of New York

The Honorable James A. Rhodes
Governor of Ohio

The Honorable Milton J. Shapp
Governor of Pennsylvania

The Honorable Mills E. Godwin, Jr.
Governor of Virginia

The Honorable John D. Rockefeller, IV
Governor of West Virginia

The Commissioners of the Ohio River Valley Water Sanitation Commission — an interstate compact agency created jointly in 1948 by

the State of Illinois,
the State of Indiana,
the Commonwealth of Kentucky,
the State of New York,
the State of Ohio,
the Commonwealth of Pennsylvania,
the Commonwealth of Virginia, and
the State of West Virginia,

with the approval of the Congress of the United States — respectfully submit a review of the Commission's activities in 1977.

1977

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*As of December 1, 1977

CHAIRMAN'S MESSAGE

Ralph C. Pickard, Chairman

In the prelude to ORSANCO's inception in 1948, public outcry against the increasing contamination of the Ohio River and its tributaries was the chief impetus which banded eight Ohio River Valley states together to fight the pollutive influences menacing natural water supplies. In 1977, public opinion has reached a similar pitch, and again the Commission has proven responsive to the public chorus of concern. The alarm was sounded after several disturbing incidents focused the attention of Valley citizens on the importance of the Ohio River water supply. Last winter quantities of carbon tetrachloride moving down the Ohio River threatened a number of drinking water systems along the river. A toxic chemical dumped into the Louisville sewer system crippled the Morris Forman waste treatment plant and endangered downstream public water supplies. In late summer, a small, technically insignificant spill of radioactive material in the river's upper reaches increased vibrations of anxiety among an already sensitive public. The Commission's twenty-nine years have brought dramatic improvements in Ohio River water quality; however, the incidents of this past year emphasized the need for increased vigilance and active responsiveness to public fears about water quality.

The Commission has responded to public concern promptly and effectively. Through innovation, ORSANCO has devised new programs to meet the public demand for a safer, cleaner water supply. Through advancement of its functioning programs by continued reevaluation and updating, the Commission has made its procedures even more efficient and effective. And through cooperation with state, federal and local agencies, the Commission has helped to gather more meaningful data and to work toward establishing common water quality criteria for the Ohio River.

In the past year, ORSANCO has expanded its sampling program for organic substances. An innovative network to detect organic materials has been proposed to notify water users along the river when a potentially unsafe condition may exist. Federal and state confidence in the Commission's capabilities has made it possible to begin the formation of such a network, due to start in its initial phase in early 1978.

Throughout 1977, other Commission programs have been continually evaluated and updated, to make them more responsive to public needs. This year ORSANCO commissioned an independent study of its electronic monitoring network which concluded, "ORSANCO is currently the major source of data on the Ohio River." This responsibility requires continuing reassessment of monitoring efforts to insure the reliability and usefulness of the data collected.

Of course, none of these accomplishments could be realized without cooperation, not only the teamwork inherent in the Commission's very nature, but also the cooperation of diverse state and federal agencies, all working toward the common goal of improving our waterways. This year, in conjunction with the Ohio River Basin Commission, ORSANCO prepared an exhaustive assessment of the Ohio River Main Stem — a full picture of the Ohio River for a more interested and knowledgeable public.

Cooperation also characterizes the Commission's working committees, which include a public interest advisory group, a coalition of Ohio River water users, and advisory groups representing various industries. Because the Commission recognizes the public's right to know about water resources, ORSANCO cooperated with the U.S. Environmental Protection Agency and the City of Cincinnati to sponsor a September forum on organic substances specifically structured for the public.

This has been a demanding and eventful year for those concerned about water quality in the Ohio River Valley. But as public anxiety about water quality has reached its highest pitch since the forties, when the Commission was formed, ORSANCO has remained responsive to public concern. The challenge to provide an innovative, reliable system for monitoring all potential pollutants in the Ohio River is a great one, but the Commission is ready to do its share in meeting that goal and looks forward to continued cooperation and support from all concerned to insure its success.

OHIO RIVER BASIN STREAM QUALITY

A composite picture of the quality of the Ohio River and its major tributaries may be gleaned from data acquired in the Commission's surveillance program. The Commission keeps a watch on the river and takes appropriate action when water quality problems are indicated. A monthly bulletin, the **ORSANCO Quality Monitor,** reports water quality data to agencies and individuals concerned with water pollution control. When conditions warrant, a "Quality Update" is issued on a more immediate basis, advising members of the Commission, state agencies, and involved technical personnel of a specific water quality condition. If a particularly serious water quality problem harasses a section of the river, as during the 1977 hexachlorocyclopentadiene incident in Louisville, the Commission provides state officials with special weekly reports on water quality in the affected area. Data obtained through the Commission's monitoring system provided a base of information which actuated a Kentucky public advisory warning against recreational use of a 25-mile reach downstream from Louisville.

Recurring conditions call for more investigation. High cyanide and mercury levels in the past two years have motivated a study of point sources, in an attempt to account for high values. Since no permitted point sources apparently explained the levels, the problem may be partially attributed to nonpoint runoff, which impacts water quality in a number of ways and for which no completely effective controls have been developed.

1976 Quality Conditions

In 1976, water from the Ohio River was of sufficient quality to be used after reasonable treatment as a source for both public and industrial water supplies. Continuing improvement was discernible in a number of water quality characteristics, such as dissolved oxygen, alkalinity, and turbidity. Still, bacterial levels in some cases precluded safe use of the river for recreation involving body contact with the water. Some stream standards for the Ohio River differ from state to state, and a number of applicable state standards for several chemical and physical parameters were also exceeded during the year.

Early in the year, unseasonably warm weather caused tributary temperature limits to be violated at several points, though main stem temperatures remained acceptable. From March through June, very low river flows lessened normal seasonal variations in dissolved mineral constituents and favored above normal photosynthetic activity in the lower Ohio River Basin. On single occasions applicable standards were exceeded for arsenic, cadmium, mercury, and silver. Total copper levels were higher than the Ohio standard in all samples from Huntington and Cincinnati. At various sites in the basin, standards for total iron, lead, and manganese were exceeded; and Ohio and West Virginia limits for phenolic materials were surpassed at all locations upstream from Cincinnati. Among standards which were met throughout the year were those limiting ammonia, barium, chloride, chromium, fluoride, nickel, nitrate, selenium, sulfate, and total dissolved solids.

High pH values in spring and summer were probably attributable to photosynthesis. The maximum pH limit was surpassed at Cannelton Dam and Evansville in May and at Joppa, Illinois, a number of times during the spring and summer. The same period brought high pH readings for the Licking, Great Miami, and Wabash Rivers.

Summer months also yielded dissolved oxygen concentrations below state standards at almost half of the main stem electronic monitoring stations. Among the tributaries only the Allegheny and Licking River stations maintained acceptable dissolved oxygen levels.

During the summer and fall of 1976, fecal coliform bacteria counts exceeded applicable standards at all sampling locations. As winter approached, cyanide levels at all sampling sites where Ohio standards apply were beyond acceptable limits. High cyanide levels were also reported throughout the year at sampling sites on the Monongahela and Beaver Rivers.

The quality of the river in 1976 provided for the protection and propagation of fish and other aquatic life. Fish disease studies indicated no unusual parasites or bacterial conditions; nor did post-mortems reveal a significant number of tumors present in the tissue of fish taken from the Ohio River. In some cases, levels of PCB's found in fish flesh did, however, exceed standards established by the U.S. Food and Drug Administration.

Extremely cold temperatures in the winter of 1976-77 froze the Ohio River for its entire length, dramatically affecting the river's water quality

1977 Quality Conditions

Dramatic weather conditions punctuated the first half of 1977 and water quality data from the monitoring network reflects climatic changes. Because of abnormally cold temperatures in January and February, the entire Ohio River froze over for the first time in many years. From January 10 to February 20, complete ice cover was reported at all navigation dams. In January, the river flowed at only about one-fourth its average rate. The weather conditions caused high cyanide and phenol levels because natural in-stream processes which remove these constituents were inhibited by low water temperatures and lack of light penetration through the ice. January conductivity, hardness, chloride, and sulfate values were above normal, while turbidity was well below.

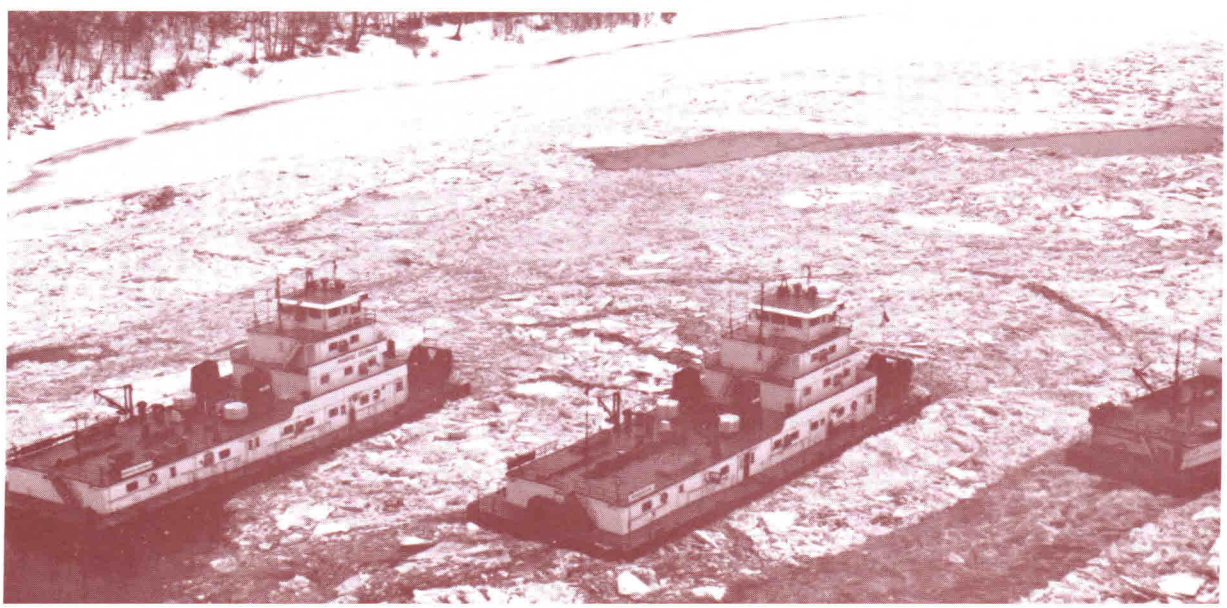
As spring approached and the ice thawed, flows began to increase. Stream flow in March and April was near normal with periodic incidents of high flows. In April, sections of eastern Kentucky, particularly near the Big Sandy River, experienced flooding. Suspended solids and Kjeldahl nitrogen values were unusually high, and visual observations indicated a heavy silt load in the Ohio River. Cyanide and phenol values decreased, although they remained above state standards in some cases. Because of high suspended solids levels, standards for copper, iron, lead, and zinc were violated a number of times at various points on the main stem and the tributaries.

May and June brought high air temperatures and subnormal rainfall. As a result, Ohio River flow was only 50 percent of normal in May and 40 percent in June. Water temperatures were above normal, exceeding limits at East Liverpool and Huntington on the main stem and on the Allegheny, Monongahela, Beaver, Big Sandy, Great Miami, and Wabash Rivers. June's combined low flow and high water temperatures caused dissolved oxygen concentrations below limits at nine main stem and six tributary monitoring sites. Cyanide values decreased to below detection limits at most stations, but occasional high phenol values continued to occur. Violations of the states' standards for copper were noted frequently, and mercury was detected at two locations in May and four in June.

Special samples of water and sediment were collected in February for pesticides and PCB analyses. The sediments were also examined for heavy metals. Of the 21 pesticides for which analyses were performed, three were detected in one or more water samples at levels of less than half a part per billion. PCB was found in one sample, while herbicides were found in four. In the sediment samples, six of the 21 pesticides as well as PCB were present in one or more samples. The pesticide chlordane was detected more frequently and in largest quantities. The highest concentrations of heavy metals in sediments were found near Cincinnati in Mill Creek. Water samples were again collected in May for pesticide and PCB analyses. All analyses were negative except for the pesticide malathion, which was found in the Big Sandy River.

Additional data about the quality of the Ohio River in 1976 is embodied in a report prepared by the Commission in accordance with Section 305b of the Water Pollution Control Act Amendments of 1972 to provide a water quality inventory for inclusion in the 1976 water quality reports of the main stem states — Illinois, Indiana, Kentucky, Ohio, Pennsylvania and West Virginia — which are, with New York and Virginia, members of the Commission. The 1977 report is scheduled for completion and submittal to the states on March 15, 1978.

Photographs courtesy of the U. S Corps of Engineers



RESPONDING TO PUBLIC CONCERN THROUGH... INNOVATION

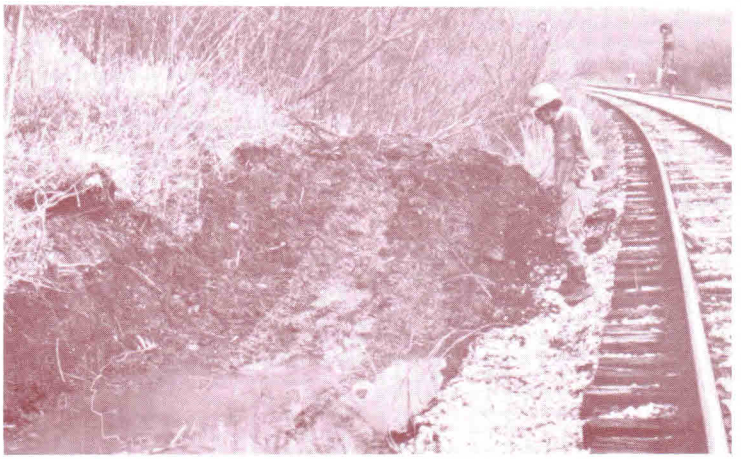
Detection of Organics

In 1977, spills and accidental discharges of toxic substances into the Ohio River and its tributaries made the Ohio the focal point for criticism of water quality monitoring and agencies designated to do the job. Public confidence in all water-oriented agencies plummeted, dramatizing the need for innovations in operative monitoring endeavors. Out of such a climate of negative public opinion, one of ORSANCO's most innovative programs was born — a program which would provide additional protection for citizens dependent on the Ohio River for drinking water. The genesis of the Early Organics Detection System began immediately after the carbon tetrachloride incident in February and was formalized in May, when the Commission voted to start work establishing a network to detect organic substances in the Ohio River. Fundamental to the Commission's envisioned system was a carefully planned notification framework, providing the earliest possible warning to water users along the river when potentially dangerous levels of certain organic contaminants appeared to be present.

By early 1978, operation of the first phase of an early organics detection system for the Ohio River will begin. At each of seven locales along the river and its tributaries, water will be sampled every weekday and analyzed for unusual levels of certain organic substances. A trace organics analytical instrument, a gas chromatograph, will be provided at each site. The cooperating water utilities are contributing the manpower needed to accomplish testing. Results of the gas chromatograph analyses will be transmitted via telephone lines to a facsimile machine at the Commission's Cincinnati offices and relayed, as appropriate, to state regulatory agencies and the U.S. Environmental Protection Agency. When unusual levels of organics are noted, additional samples will be taken and analyzed further in a contracted laboratory, which will be on a standby basis at all times.

The organics detection system has limitations. The simplified field techniques to be used provide for the detection of only a percentage of the thousands of currently identified organic compounds. Further, the number of sampling stations in the initial phase is inadequate. In the Commission's view, the minimum early organics detection system would provide at least eleven stations, with sampling every day. Because the needed funds were not immediately available, the limited system will be installed as a first step to realizing the Commission's goal of a workable early detection system for organic substances. These beginnings have been made possible by a $100,000 U.S. EPA Drinking Water Supply Program demonstration grant. Operating funds are provided by the states and U.S. EPA, through reprogramming of the Commission's appropriated funds. The cooperation of the participating water users represents a contribution of $38,000 in personnel and services provided.

The Commission considers the Early Organics Detection System one vital part of a total intergovernmental program which includes sensitizing federal and state NPDES permit systems and attendant compliance monitoring of trace organics. The design of drinking water treatment systems which use rivers such as the Ohio as a source of water supply requires upgrading to include polishing facilities to remove trace organics.



After a tank car spill in Indiana, State Board of Health personnel construct a temporary dam to prevent dissemination of a toxic substance.

Photograph courtesy of the Indiana State Board of Health

The illegal dumping of a toxic substance into the Louisville sewer system necessitated a time-consuming and costly cleanup.

Spill Reporting

The events of the past year emphasized the importance of notification procedures for spills and accidental discharges. Though the Coast Guard, U.S. Environmental Protection Agency, and the individual states are legally responsible for dealing with spills and discharges, the signatory states have established an effective backup warning system through the Commission. As far back as 1959, the Commission operated the Hazard Alert System, to notify involved participants promptly of any spills or accidental discharges. In 1975, the Commission reexamined its role in spill-reporting and produced a manual outlining notification procedures. In response to the incidents of 1977, procedures were revised to improve the handling of spill reports and to minimize variability in response due to personal judgment.

Additional tools to aid in assessing spills are being developed. Time-of-travel charts for the Ohio River have been prepared for use in predicting how long it would take a particular spill to travel to any location on the river. The charts forecast the movement of the center of the spill's mass. Staff testing has indicated the charts' reliability under varying flow conditions when the river is at pool stage. Information based on the time-of-travel calculations has already been transmitted on an informal basis to other agencies concerned with water quality, and further field testing is under way. The charts will be completed in 1978 and made available to any agency requesting them.

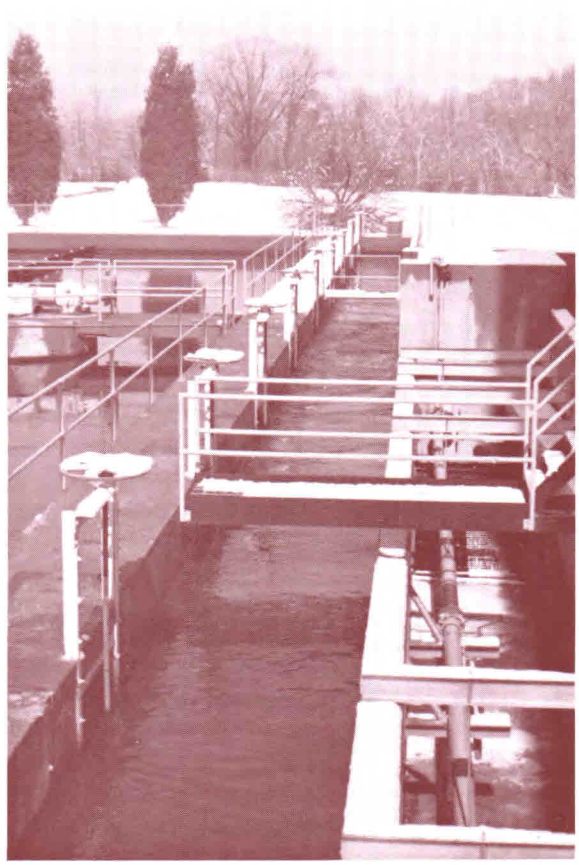
Organics: Special Project

The impact of trace organics on the quality of water supplies has become a topic of vital interest throughout the Ohio Valley. In 1973, a Commission study indicated that a number of organic constituents are formed during the drinking water treatment process, a phenomenon confirmed by U.S. Environmental Protection Agency studies. The influence of varied treatment processes on the presence of organics in water supplies was clearly a topic for further exploration, and the Commission sought and received funding to address that question. The project, "Organic Substances in the Ohio River and Associated Water Supplies," was subsequently instituted in late 1976, through funds provided by the eleven water utilities, the water supply research program of the U.S. EPA, and the Commission.

Substantial progress has been made in implementing the study. In July, treatment modifications were begun at Huntington, West Virginia, where the adsorption efficiency of granular-activated carbon is being studied. Other modifications are under way at Beaver Falls, Pennsylvania; Louisville, Kentucky; and Cincinnati, Ohio; while still others are planned to begin in early 1978. A second element of the project, which involves monthly sampling of raw and treated water for organic constituents, also began in July. The project is unique because, unlike other process modification studies, it incorporates an extensive program to insure the bacteriological integrity of the water during plant-scale modifications.

The study is providing a much-needed store of information about the effect of treatment processes on organic materials in the water, as another step in protecting the public from possible contamination of drinking water supplies. A two-year project, it will be completed in November, 1978.

The Cincinnati Water Works is among utilities participating in the ORSANCO study



ADVANCEMENT

SURVEILLANCE

Basic to the Commission's ongoing field surveillance program are the electronic monitoring network, the manual sampling program, and the water utilities data reporting system. In the past year the electronic system has been intensively evaluated, and major improvements are under way. The manual sampling program has been augmented to include a number of additional analyses. And, procedures to insure the quality of ORSANCO data have been formalized, with the publication of the **Quality Control Assurance Program for Primary In-Stream Monitor Network.**

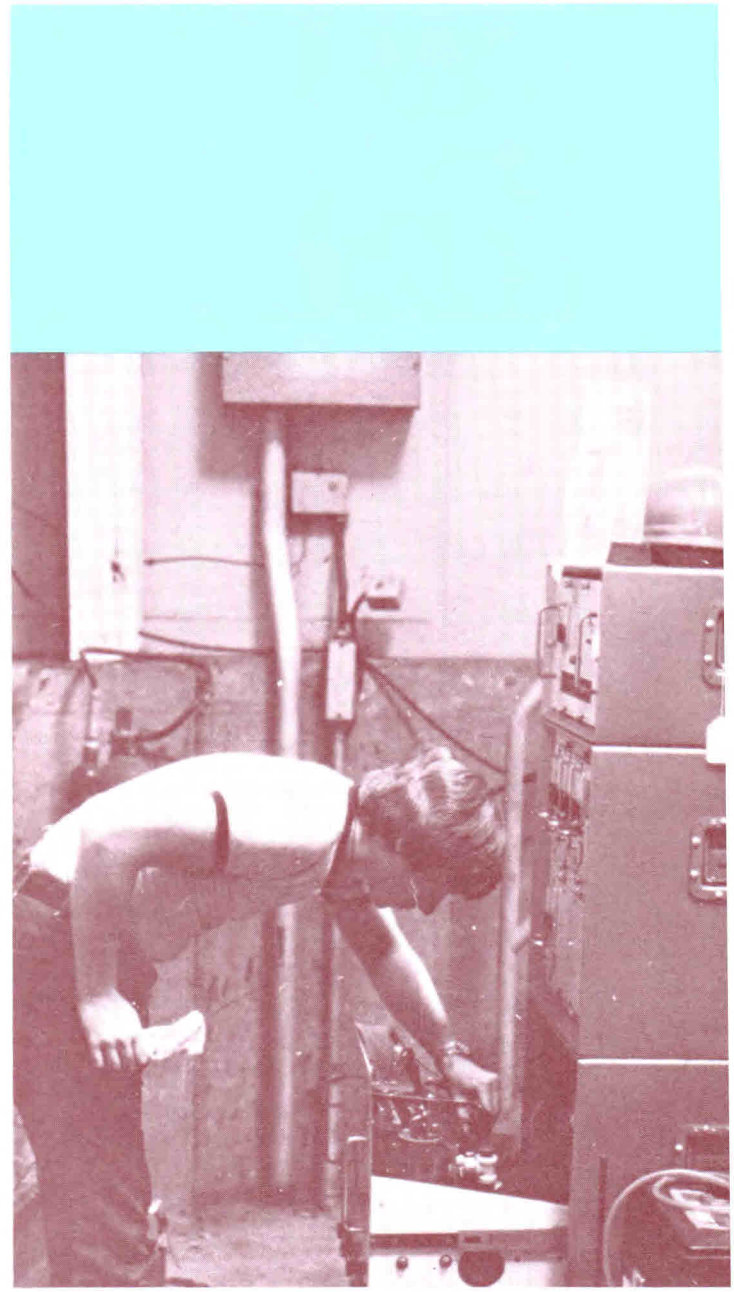
Electronic Monitoring System

Monitoring water quality in the Ohio River and its major tributaries is one of the principal responsibilities accorded the Commission by its member agencies. Since 1960, the electronic monitoring system has been a pivotal element of the Commission's entire surveillance program. The present surveillance network includes 22 operating electronic units, coupled with numerous sites where sampling is done manually. Automatic monitors measure four water quality parameters — dissolved oxygen, temperature, conductivity, and pH.

Late in 1976, with the aim of maximizing the value of data from the electronic network and minimizing its overall operating cost, the Commission entered into a contract with WAPORA, Incorporated, for an independent evaluation of the system. The resulting study rejected elimination of the electronic monitoring network because of its established importance as a major source of data on the Ohio River — a valuable tool for determining quality factors in the operation of navigation and reservoir dams and in the assessment of compliance with state stream standards, as well as for modeling and research, planning, and evaluation of nonpoint source loads. In accordance with the consultant's recommendations for increasing cost-effectiveness, the Commission is modifying the system by replacing direct-line hourly transmission of data with daily transmission of 24-hour readouts via established telephone lines.

Additional Surveillance

In cooperation with the U.S. Geological Survey, water and sediment samples were taken in early 1977 at seventeen sites in the Ohio River Basin and analyzed for PCB's, pesticides, and trace metals. Results indicated the presence of PCB's in six sediment samples, while the organic substance chlordane was detected in thirteen. In water sampling, PCB's were found only at Beaver Falls, Pennsylvania, and pesticides were detected in only a few isolated instances.



Field Surveillance Specialist services an automatic monitor

MONITORING PROGRAM

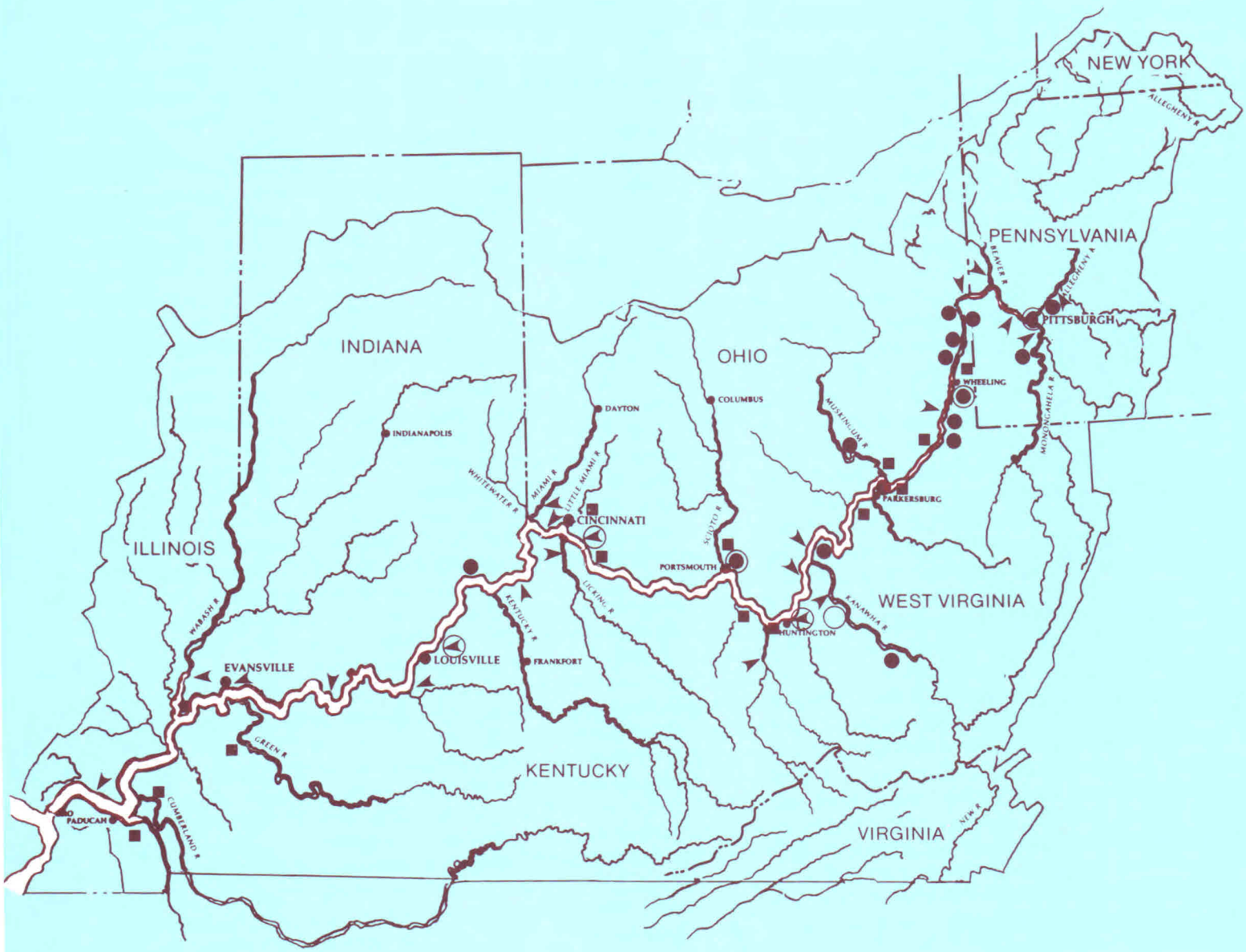
MONITORING ELEMENT	COOPERATING AGENCY	PARAMETER	NUMBER OF ACTIVE STATIONS	FREQUENCY OF SAMPLING
Electronic Monitor	U. S. Corps of Engineers	Temperature, Conductivity, pH and DO	14 Ohio River 8 Tributary 3 U. S. Corps	Hourly
Routine Site Sampling	PA Laboratory OH Laboratory	Physical, Mineral, Nutrients, Trace metals Bacteriological	22 Ohio River 14 Tributary	Chemical three times a month, Metals monthly
Water Users	Water Utilities	Physical, Mineral, Chemical, Bacteriological	19 Ohio River 10 Tributary	Weekly to daily
Organics Sampling 1. Water a. PCBs, Pesticides	U. S. Geological Survey	PCBs, Pesticides, Trace Metals PCBs, Pesticides	11 Ohio River 17 Tributary 11 Ohio River 13 Tributary	As scheduled
b. Trace Organics*	Contract Lab	Purgeables, Extractables	7 Ohio 12 Tributary	Variable
2. Sediment	U. S. Geological Survey	PCBs, Pesticides, Trace metals	11 Ohio River 17 Tributary	As scheduled
3. Fish	State agencies Federal agencies	PCBs, Pesticides, Trace metals	As prescribed	As scheduled
Early Organics Detection System	Water Utilities	Purgeable organics	5 Ohio River 2 Tributary	Five days a week
Radionuclides	U. S. Geological Survey	Gross α and β, Radium 226, Tritium, Strontium 90	6 Ohio River	As scheduled
Biologicals: Fish	State agencies Federal agencies	Species, Quantities, Distribution, Size, Anomalies	As prescribed	As scheduled
ADDITIONAL DATA Storet	U. S. EPA	Various	Not applicable	Not applicable
River Flow and Velocity Information	NOAA Flow Forecast Center U. S. Geological Survey	River Flows and Velocity	21 Ohio River 14 Tributary	Daily

*In cooperation with the special project, "Organic Substances in the Ohio River and Associated Water Supplies"

The Commission's monitoring program for organics in water also includes monthly sampling at six to eight varying localities. In coordination with the special project, "Organic Substances in the Ohio River and Associated Water Supplies," water taken in the project's normal monthly sampling is subjected to additional tests for detection of organic compounds.

The level of radioactive materials in water supplies is of special concern to the public. In September, 1976, the Commission voted to expand the monitoring program to include sampling for radiological data. Quarterly sampling is being conducted at six sites for alpha and beta particle activity, while background levels of tritium and strontium 90 are checked annually.

THE OHIO RIVER VALLEY COMPACT DISTRICT ON-STREAM INFORMATION NETWORK



- ■ manual sampling sites
- ● water user stations
- ▲ combined data collection locations
- ◯ Early Organics Detection System sites

The map and table indicate location of current mainstem and tributary surveillance sites – manual sampling sites, water user sites, locations combining electronic and manual sampling, and Early Organics Detection System sites.

- ■ manual sampling sites
- ● water user stations
- ▲ combined data collection locations
- ◯ Early Organics Detection System sites

OHIO RIVER STATIONS	MILE POINT
South Heights, Pa.	15.2
East Liverpool, Oh.	40.2
Toronto, Oh.	59.1
Weirton, W. Va.	62.2
Steubenville, Oh.	65.3
Yorkville, Oh.	83.6
Pike Island Dam	84.2
Wheeling, W. Va.	86.7
Shadyside Dam	102.4
Moundsville, W. Va.	111.0
Natrium, W. Va.	119.4
Hannibal Dam	126.4
Willow Island Dam	161.8
Parkersburg, W. Va.	183.7
Belleville Dam	203.9
New Haven, W. Va.	241.6
Addison, Oh.	260.0
Gallipolis Dam	279.2
Huntington, W. Va.	306.9
Kenova, W. Va.	315.8
Greenup Dam	341.0
Portsmouth, Oh.	350.0
Meldahl Dam	436.2
Cincinnati, Oh.	462.8
North Bend (Miami Fort), Oh.	490.0
Markland Dam	531.5
Madison (Clifty Creek), Ind.	559.5
Louisville, Ky.	600.6
West Point, Ky.	625.9
Cannelton Dam	720.7
Evansville, Ind.	791.5
Uniontown Dam	846.0
Joppa, Ill.	952.3

OHIO RIVER TRIBUTARY STATIONS	Miles from sampling station to confluence of tributary with Ohio River	Mile at which tributary enters Ohio River
Allegheny River at Oakmont, Pa.	13.3	0.0
Allegheny River at Pittsburgh, Pa.	8.9	0.0
Allegheny River at Wilkinsburg, Pa.	8.8	0.0
Monongahela River at Charleroi, Pa.	42.6	0.0
Monongahela River at South Pittsburgh, Pa.	4.5	0.0
Beaver River at Beaver Falls, Pa.	5.3	25.4
Muskingum River at Beverly, Oh.	28.0	172.2
Muskingum River near Marietta, Oh.	5.8	172.1
Kanawha River at Cabin Creek, W. Va.	74.3	265.7
Kanawha River at Appalachian Power	39.0	265.7
Kanawha River at Winfield, W. Va.	31.1	265.7
Big Sandy River at Louisa, Ky.	20.3	317.1
Scioto River at Lucasville, Oh.	15.0	356.3
Little Miami River at Cincinnati, Oh.	3.4	463.4
Licking River at Covington, Ky.	4.5	470.3
Great Miami River at Elizabethtown, Oh.	5.5	491.1
Green River near Spotsville, Ky.	41.3	784.5
Wabash River at New Harmony, Ind.	51.5	848.0
Cumberland River near Grand Rivers, Ky.	30.6	922.6
Tennessee River at Highway 60 near Paducah, Ky.	6.0	935.0

Biological Monitoring

In the fall of 1976, the Commission coordinated a biological monitoring program in which a number of state and federal agencies participated. Fish were collected at eleven locks along the Ohio River and subsequently identified, measured, and weighed. When compared with data from previous years, results indicated fewer fish were collected, but the diversity of species in the river appeared to be greater.

Fish flesh from samples gathered were examined for PCB's, and the PCB tolerance limit for human consumption was exceeded in samples from six of the eleven sites. (No PCB's were detected in samples of water collected at the same time.) In the winter and spring of 1977, concern about the levels of PCB's detected in fish flesh motivated state agencies and the Commission to join in an extensive fish sampling effort. More than four hundred fish – predominantly minnow, catfish, and bass – were collected for PCB analysis by the U.S. Food and Drug Administration. Nine of the more than 400 samples were found to contain from 5.9 to 17.5 parts per million of PCB's. Only catfish and carp were included in the group of nine. FDA requirements specify that food intended for human consumption which contains more than 5 ppm PCB's may be seized if it is shipped across state lines.

Quality Control

The value of data rests on its quality, and the Commission has taken steps to insure that information gathered in its surveillance program is reliable. Published in April, 1977, the **Quality Control Assurance Program for Primary In-Stream Monitor Network** outlines procedures and sets standards for collection and shipping of samples, location of sampling sites, and analysis of samples collected.

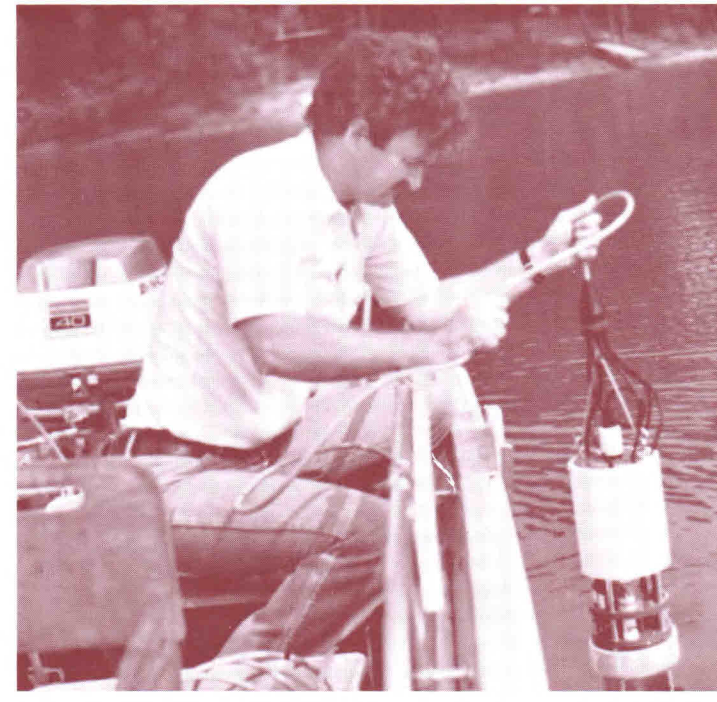
One technique for verifying the representativeness of samples taken from a particular site is to compare them to samples collected across an entire section of the river at the same milepoint. At three or more points across the river, readings are taken at a number of standard depths, creating a data grid. With the assistance of the U.S. Geological Survey, this cross-sectioning technique was used to evaluate each sampling site.

In order to insure further the quality of data collected, disguised water samples containing known quantities of certain materials are submitted to contract laboratories, the Pittsburgh Regional Laboratory of the Pennsylvania Department of Environmental Resources and the Ohio State Health Department Laboratory at Columbus. Analyses of the known samples enable evaluation of the accuracy and reliability of laboratory results, which have proven to be acceptable. The laboratory quality control program is carried out in close cooperation with the Quality Assurance Branch of U.S. EPA's Environmental Monitoring and Support Laboratory in Cincinnati.

Data Processing: STORET Link

One of the key responsibilities in collecting water quality data is the challenge of making it readily available in a usable form to those who need it. For that reason, the completion of a hookup in 1977 with the STORET system is of special importance. STORET, the U.S. Environmental Protection Agency's computerized data system, collects and disseminates basic water quality data on a national scale. Access is available to federal, state and local agencies, as well as to industry and universities.

Robot monitor data from the inception of the electronic network to the present has been transmitted to STORET, as daily minimum, maximum, and average values. Data from the manual sampling system and the water users in the Ohio River Valley are also being contributed to the STORET system. ORSANCO data are sent on a regular basis.



Cross-sectioning assures the representativeness of sampling sites.

Nonpoint Source Assessment

As progress continues in the control and abatement of water pollution originating from discrete point sources, nonpoint source pollution moves to center stage. "Nonpoint source" generally describes a pollutant which is diffuse in origin, caused by stormwater runoff and drainage from cities, farms, forests, mines, and construction sites.

As a new area of investigation and the focus for future concern, nonpoint pollution has received concentrated study. One measure of nonpoint contamination of streams is the amount of sediment carried to waterways, taking with it pollutants such as pesticides and other organic materials, trace metals, nutrients, and dissolved solids. The Commission's modeling efforts indicate that more than twenty-one billion pounds of sediment are delivered each year to the Ohio River from various nonpoint sources — 94 percent of the river's total sediment load. Once best practical treatment methods are employed by all industries and municipalities which discharge to the river, nonpoint sources will account for 99 percent of the river's sediment burden.

STATUS REPORT: WASTEWATER TREATMENT

Each year the eight member states complete an inventory of wastewater treatment facilities in the Ohio River Basin. The tally for 1977 shows that 113 communities, representing a combined population of more than 950,000 have improved their waste treatment status, either by updating existing facilities or completing new ones. More than 75 percent of the basin's population receives secondary or higher treatment of municipal wastes.

Improvements are under construction at 121 additional communities, while new plants are being built for another nine. These facilities will serve almost two million people.

To meet more stringent state and federal requirements, modifications are still needed in municipal treatment for almost 800 communities. Another 195 cities and towns require treatment plants.

STATUS OF MUNICIPAL AND INSTITUTIONAL WASTEWATER CONTROL FACILITIES—JULY, 1977

Number of communities (top) and population (bottom)

STATUS	ILL.	IND.	KY.	N. Y.	OHIO	PA.	VA.	W VA	TOTAL	% OF TOTAL
Control currently acceptable	84 388,900	50 408,100	164 1,005,100	1 8,500	64 300,600	279 1,962,500	114 136,000	85 328,300	841 4,538,000	42.8 35.6
Treatment provided, improvements needed	1 2,600	218 1,811,600	33 160,100	12 77,000	290 2,562,800	157 995,500	34 53,300	52 344,300	797 6,007,200	40.6 47.2
Treatment provided, improvements under construction	4 7,500	5 20,600	32 252,400	4 18,500	46 1,308,300	22 226,400	4 28,300	4 20,300	121 1,882,300	6.2 14.8
New treatment works under construction	1 800	1 3,700				4 7,800	3 300		9 12,600	0.5 0.1
No treatment, construction not started		30 25,400	1 1,400		14 13,500	70 138,200	16 8,600	64 110,800	195 297,900	9.9 2.3
Total	90 399,800	304 2,269,400	230 1,419,000	17 104,000	414 4,185,200	532 3,330,400	171 226,500	205 803,700	1,963 12,738,000	100 100
Improvements completed	1 8,100	22 143,000	24 388,600	1 8,500	16 232,800	17 82,100	5 2,500	5 12,500	91 878,100	
New treatment works completed		1 1,700			3 2,700	6 45,200	7 1,600	5 32,200	22 83,400	

STATUS OF INDUSTRIAL WASTE CONTROL FACILITIES—JULY, 1977

Control currently acceptable	26	149	129	21	162	262	209	291	1,249	69.2
Control facilities inadequate, improvements needed	1	65	4	9	120	118	63	88	468	25.9
Control facilties under construction	4	14	13	3	36	9	5	5	89	4.9
No effective action										
Number of industries	31	228	146	33	318	389	277	384	1,806	100
Control facilities Improvements completed	1	37		5	45	9	22	20	139	

Degree of Treatment by State—July 1, 1977

DEGREE OF TREATMENT	ILL.	IND.	KY.	N. Y.	OHIO	PA.	VA.	W. VA.	TOTAL	% OF TOTAL
No Treatment										
Communities	2	31	1		14	85	17	64	214	10.9
Plants	0	0	0		0	0	0	0	0	0
Population	2,000	29,200	1,400		13,500	150,000	8,600	110,800	315,500	2.5
Primary & Intermediate										
Communities	9	15	49	10	89	101	48	52	373	19.0
Plants	9	15	22	10	61	47	47	48	259	18.2
Population	21,000	46,400	349,800	30,700	1,135,100	607,700	115,400	360,300	2,666,400	20.9
Secondary and Higher										
Communities	79	258	180	7	311	346	107	89	1,377	70.1
Plants	95	243	156	7	288	181	106	87	1,163	81.8
Population	376,800	2,193,800	1,067,800	73,300	3,036,600	2,572,700	102,500	332,800	9,756,300	76.6
Total										
Communities	90	304	230	17	414	532	171	205	1,963	100
Plants	104	258	178	17	349	228	153	135	1,422	100
Population	399,800	2,269,400	1,419,000	104,000	4,185,200	3,330,400	226,500	803,900	12,738,200	100

Progress in industrial wastewater treatment has been substantial; however, the widely varying nature of industrial discharges precludes the use of measurement based on degree of treatment or the population equivalent of the treated wastewater. During the past year improvements were completed by 139 industries, and facilities at 89 plants were modified or upgraded. Still, 468 industrial dischargers require modifications to meet current regulations. On July 1, 1977, 1,249 of the 1,806 industrial dischargers in the Ohio River Basin provided control facilities which complied with state and federal requirements.

COOPERATION

ORSANCO's Working Committees

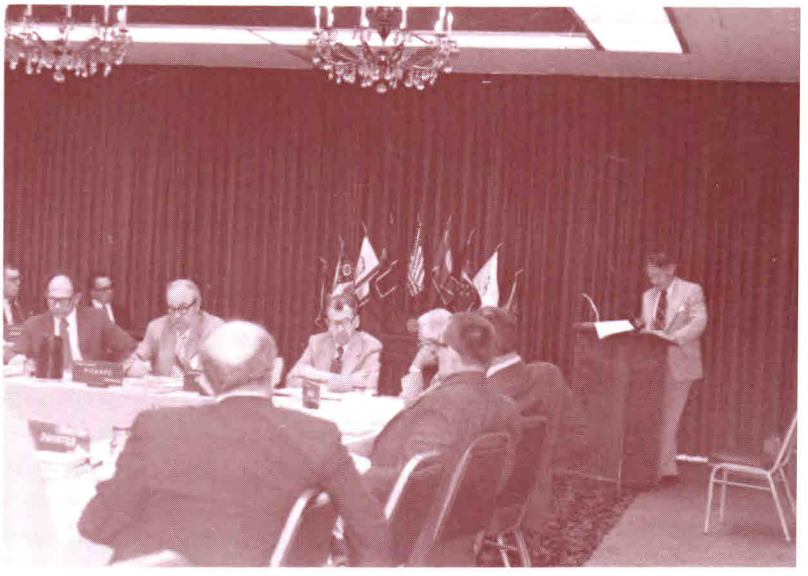
Throughout its years of development, the Commission has established a number of committees to deal with particular challenges in achieving the level of water quality required to meet all legitimate needs for the Ohio River and its tributaries. The chief technical arm of the Commission is the Engineering Committee, composed of key water pollution control officials from each of the states and representatives of the U.S. Geological Survey, the U.S. Corps of Engineers, and the U.S. Environmental Protection Agency. The Engineering Committee oversees a number of work groups which are also interstate and interagency coalitions. Another group of committees, the Industry Advisory Committees, provides expertise from industries which impact water quality, such as the power and chemical industries.

Particularly active in 1977 has been the Water Users Committee, which is composed of representatives from municipalities and factories using the Ohio River as a water supply. The special project, "Organic Substances in the Ohio River and Associated Water Supplies," has been implemented partially through the committee's cooperation and water users' funds. And the first phase of the Early Organics Detection System, scheduled for inauguration in early 1978, would not be possible without the active involvement of the Water Users Committee.

Water Quality Criteria Conflicts

The effort to develop uniform water quality criteria for the entire main stem of the Ohio River and the interstate reaches of its tributaries has been the particular realm of the Committee on Water Quality Criteria Conflicts, formed in 1972. In the past year, based on the committee's recommendations, the Commission has adopted stream quality criteria for traditional parameters, as well as for heavy metals and radionuclides. Most recently, the group has been involved in compilation of information on pesticides and organic substances. As a result of their work, criteria for PCB's were developed and adopted by the Commission in September, 1977.

The Commission has actively encouraged the six main stem states to adopt these recommended criteria, and representatives from ORSANCO have attended public hearings to argue the importance of uniform water quality criteria for the entire Ohio River main stem.



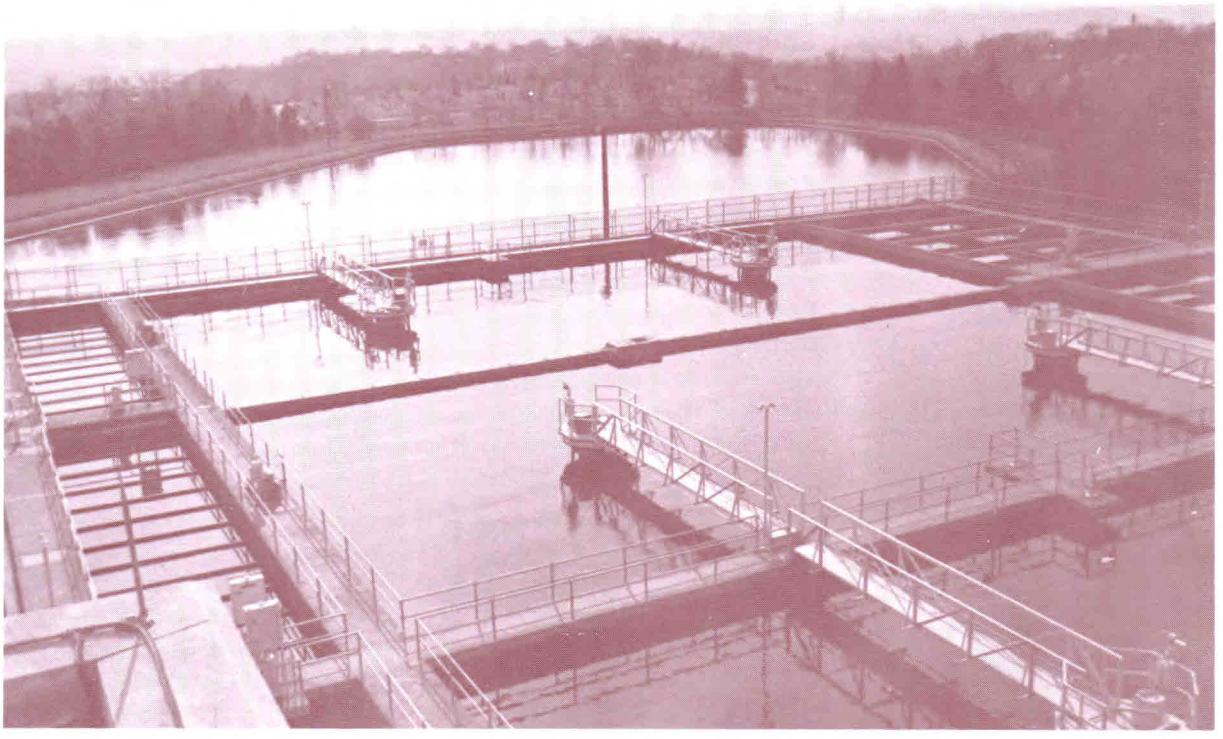
Engineering Committee Chairman Oral H. Hert reports to the Commission.

Mine Drainage

In 1976, a work group on mine drainage was organized to review state programs for regulating mining activities, to develop procedures for assessing mine drainage problems, and to recommend programs for correcting mining conditions deleteriously impacting water quality in the Ohio River Basin. The group has undertaken the task of formulating model programs for most effective control of pollution from underground and surface mines, coal preparation facilities, and refuse disposal areas. A model has been developed for management of underground mines, providing a basis for evaluation of individual state programs which address subsurface mining.

Monitoring Strategy and Data Evaluation

In an advisory role, the Monitoring Strategy and Data Evaluation Committee helps to determine strategy for the Commission's water quality monitoring program and for data utilization. The committee has been instrumental in the development of the Early Organics Detection System, offering valuable advice on site selection and data transmission. The group also reviewed the independent evaluation of the electronic monitoring network and advised implementation of the study's recommendations.



Ohio River water utilities, such as the Wilkinsburg-Penn Joint Water Authority, provide vital assistance to ORSANCO programs through the Water Users Committee.

NPDES

The NPDES Coordinating Committee has as its chief role coordination of state efforts in implementing National Pollutant Discharge Elimination System permits for waste dischargers and subsequent enforcement of those permits. Because the national deadline for installation of treatment facilities utilizing best practicable technology fell in 1977, the committee spent much of its time assessing progress in that area.

The coordinating committee also provided input into the development of new federal pretreatment regulations and established direct communications with the U.S. EPA task force evaluating the NPDES permit program at mid-stream.

Industry Advisory Committees

The Commission's Industry Advisory Committees dramatically demonstrate industry's active participation in efforts to eliminate water pollution. In 1977, the Chemical Industry Committee made impressive strides toward reaching that goal. Recognizing the need for carefully designed safeguards against spills of hazardous substances, the committee developed recommendations for chemical companies to facilitate prevention, control, and reporting of spills. A periodic review of spill prevention programs within individual plants was suggested to minimize the danger of accidental discharge of hazardous materials. Another field of study for the committee was the Resources Conservation and Recovery Act, which deals with the handling and disposal of hazardous residues. A subcommittee developed a document offering guidance for regulatory agencies in identifying small business operations subject to the act and suggestions in approaching companies to obtain a cooperative response. A third important output of the committee was an inventory of PCB's utilized by companies in the basin.

The Power Industry Committee, which represents another important industrial faction, worked diligently in 1977 to update an inventory of power plants operating and proposed for construction along the Ohio River.

Public Interest

The Public Interest Advisory Committee (PIACO) reviews Commission activities, offering suggestions as to how the Commission can be most responsive to the interests of the public-at-large. At the request of the Commission, PIACO also began to tackle the question of public sensitivity to spills and accidental discharges. The committee is developing ideas on how and when such spills are most effectively reported to the public.

PUBLIC INTERCHANGE

A National Course of Action

Focus on the Ohio River Basin as an area of vital concern in water quality led to the Commission's participation in Congressional hearings on toxic and hazardous chemicals. On July 20, 1977, Commission Chairman Ralph C. Pickard and Executive Director Leo Weaver appeared before the Oversight and Review Subcommittee of the House Committee on Public Works and Transportation to present ORSANCO's viewpoint on the question of toxic substances and their potential impact on water quality.

In his message to the committee, Pickard described the Commission's role in the spill incidents of the past year. He offered a number of recommendations for dealing with toxic substances in water supplies. First, Pickard suggested that water supply and water pollution control sections of state and federal governments be more closely coordinated and that their procedures for spill response, as well as the procedures of industry, be reexamined. He noted that agencies must have competent staffs and equipped laboratories readily available. Pickard also recommended clarification of the chain of responsibility for disposal of toxic wastes, adding that the adequacy of state and federal resources for compliance monitoring must be established. Because of the increasing probability that some organic materials will enter water sources, a polishing element for drinking water treatment was encouraged. Finally, Pickard stressed the need for an inventory of organic compounds contained in point source discharges, emphasizing the necessity for establishing the toxicity levels of such chemicals.

Main Stem Study

One of the key cooperative efforts of 1977 was an extensive evaluation of Ohio River water quality, as part of a detailed investigation of water resources and needs for the Ohio River main stem. The report was undertaken for the Ohio River Basin Commission (ORBC), a regional planning agency established under the authority of the Water Resources Planning Act.

Data from the ORSANCO monitoring program provided information for the water quality appraisal. The assessment considers effects caused by both point and nonpoint sources on water quality.

Through trend analyses, the report concludes that Ohio River water quality is improving in some quality characteristics, such as oxygen content and temperature. Characteristics of continued concern are suspended solid content and levels of cyanide, mercury, lead, iron, phosphorus, and phenols. Fecal coliform levels remain high along the river's entire span; however, acid mine drainage has apparently decreased at many of the locations for which information is available. The report concludes that nonpoint sources exert a substantial negative impact on Ohio River water quality and demand further study.

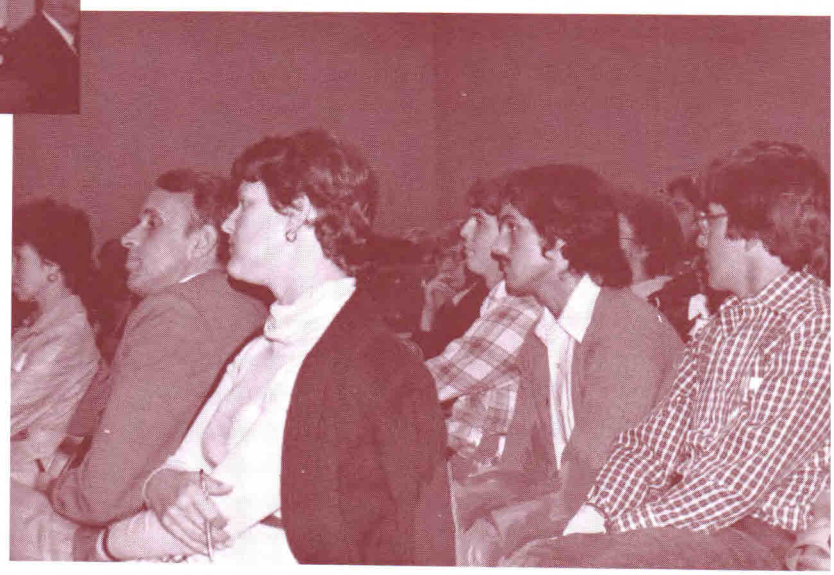
ORSANCO's Engineering Committee reviews ORBC report.

SYMPOSIUM: A PUBLIC FORUM

One highlight of this year of increased public interest in water quality was a symposium in conjunction with the City of Cincinnati and the U.S. Environmental Protection Agency. The symposium, "Organic Constituents in the Water Environment," provided the public with an in-depth look at the impact of organic materials on water supplies. Notable speakers from government, education, industry, environmental engineering, and the private sector contributed their special knowledge to the discussion and solicited questions and comments from the audience. Among topics considered were the toxicity of organic substances and the capacity of available technology to detect and remove them from the water. The role of industry and the responsibilities of various levels of government in achieving a safe water supply received concentrated attention.

The symposium garnered widespread public interest and media attention. Almost two hundred persons, many of whom were area high school students and representatives of public interest groups, attended the day-long session.

Deputy U.S. EPA Region IV Administrator John A. Little describes federal responsibilities in the control of organic substances in water supplies.



ADMINISTRATIVE HIGHLIGHTS

Commission

The Commission is composed of three representatives from each of the eight member states and three representatives from the United States Government. Commissioners receive no salary but are reimbursed for expenses incurred while performing Commission activities.

Ralph C. Pickard was elected to his second term as Chairman of the Commission.

Ned E. Williams became Vice Chairman.

Dr. Richard S. Engelbrecht was elected Secretary of the Commission.

Albert J. Brooks was reelected Treasurer of the Commission.

Michael P. Mauzy became Illinois Ex officio Commissioner as Acting Director of the Illinois Environmental Protection Agency. Mauzy replaced Dr. Leo M. Eisel, who followed Dr. Richard H. Briceland.

Robert A. Holt was appointed by Governor Otis R. Bowen as a member of the Commission representing the State of Indiana.

Dr. Frank L. Stanonis was appointed by Governor Julian Carroll as Commissioner from the Commonwealth of Kentucky, replacing Kenneth O. Gibson, Sr.

Rolland E. Kidder resigned his post as representative to the Commission from the State of New York.

Dr. George E. Pickett became Ex officio Commissioner from West Virginia, succeeding Dr. N. H. Dyer. Dr. Dyer was one of the original signers of the ORSANCO Compact and served as Commission Chairman for the year 1969-70.

Richard C. Armstrong of the U.S. Corps of Engineers was appointed by President Jimmy Carter as federal representative to the Commission.

Jack E. Ravan left his Commission post as federal representative when he resigned as Regional Administrator, Region IV, U.S. Environmental Protection Agency.

Staff

Administration: Deborah S. Decker joined the administrative staff as Information Specialist, replacing Jessica D. Barron, who resigned to accept other employment. Nancy Harmon-Stewart assumed the position of Accounting Assistant. Janet S. Fischesser became Executive Secretary.

Surveillance: John L. Keyes joined the Surveillance staff and is designated Senior Surveillance Specialist, and Bruce Hurst replaced James D. Taft as Surveillance Specialist. Lillian G. Revenco became Secretary for Surveillance, succeeding June E. Schlueter, who resigned to accept other employment. Lorraine Hahn left her position as Laboratory Technician.

Special Projects: Bill G. Razor became Senior Chemist and head of the special project, "Early Organics Detection System." He was re-assigned from the position of Principal Investigator with the project, "Organic Substances in the Ohio River and Associated Water Supplies." Razor was replaced by Richard J. Miltner, whose position as Project Engineer has been filled by Bonnie Barger Cummins, under the new designation of Project Scientist.

Data Processing: Timothy J. Van Epps joined the staff as Senior Analyst, succeeding Richard N. Smith, who resigned to accept another position. Also added to the Data Processing staff was Jeffrey L. Medaugh as Programmer/Analyst, filling a vacancy from 1976.

FINANCIAL REPORT

The following information relative to revenues, expenses, and statement of resources was extracted from the Annual Audit Report of Wm. H. Mers & Co., Certified Public Accountants for the year ended June 30, 1977.

OHIO RIVER VALLEY WATER SANITATION COMMISSION
STATEMENT OF REVENUES AND EXPENSES FOR YEAR ENDED JUNE 30, 1977

Revenues:		
From signatory states:		
State of Illinois	$ 18,900.00	
State of Indiana	69,788.00	
Commonwealth of Kentucky	78,000.00	
State of New York	3,975.00	
State of Ohio	96,112.00	
Commonwealth of Pennsylvania	54,825.00	
Commonwealth of Virginia	12,825.00	
State of West Virginia	40,575.00	
Total from signatory states		$375,000.00
From U.S. Environmental Protection Agency:		
Water Pollution Control Act — Grant	$314,857.00	
Safe Drinking Water Act — Grant	23,790.00	
Total from U.S. Environmental Protection Agency		338,647.00
From U.S. Corps of Engineers		37,333.36
From Water Utilities		75,000.00
From Ohio River Basin Commission		50,000.00
From U.S. Geological Survey Grants		3,086.52
Other revenues		9,371.30
Total revenues		888,438.18
Expenses:		
Basic Program	$715,267.08	
Organic Substances Project	42,481.67	
Ohio Main Stem Study	41,394.71	
U.S. Geological Survey Study	3,086.52	
Total expenses		802,229.98
Excess of revenues over expenses		$ 86,208.20

STATEMENT OF RESOURCES AT JUNE 30, 1977

Cash		$125,718.03
Deposits		763.00
Accounts Receivable:		
U.S. Environmental Protection Agency	$ 25,358.00	
Water Utilities	4,125.00	
Employee travel advances	1,020.59	
		30,503.59
Total		156,984.62
Less:		
Accounts payable		3,698.19
Advance payments:		
U.S. Geological Survey Grant	$ 7,263.07	
U.S. Environmental Protection Agency	8,762.00	
Signatory states	3,975.00	
Water Utilities	7,950.00	
		27,950.07
Total		31,648.26
Available resources June 30, 1977		$125,336.36
Available resources at beginning of year	$ 39,128.16	
Excess of revenues over expenses	86,208.20	
Available resources at end of year		$125,336.36

ORSANCO STAFF*

Leo Weaver — Executive Director and Chief Engineer
William L. Klein — Assistant Executive Director
Albert J. Brooks — Office Manager
Nancy Harmon-Stewart — Accounting Assistant
Deborah S. Decker — Information Specialist
Janet S. Fischesser, Janice Squires,
Karyn L. Colyer — Secretaries

Surveillance Program

A. D. Sidio — Manager
John P. Donnelly — Head, Data Acquisition Engineering
John L. Keyes — Senior Surveillance Specialist
Bruce E. Hurst — Surveillance Specialist
Thomas S. Lux — Surveillance Specialist
Glenn E. White — Surveillance Specialist
Ruth A. Lustman — Laboratory Technician
Lillian G. Revenco — Secretary

Technical Services

Robert J. Boes — Manager, Assistant Chief Engineer and Director of Special Projects
A. Majid Chaudhry — Environmental Engineer
Peter A. Tennant — Water Resources Engineer
Jane W. Renaldo — Secretary

Data Processing

Leonard McDonough — Manager
Timothy J. Van Epps — Senior Analyst
Jeffrey L. Medaugh — Programmer/Analyst
Donna M. Carroll — Computer Operator

Project: Organic Constituents in the Ohio River and Associated Water Supplies

Richard J. Miltner — Principal Investigator
Bonnie Barger Cummins — Project Scientist

Project: Early Organics Detection System

Bill G. Razor — Senior Chemist

Credits:
Ray Loos — Art
Cover photo: Courtesy of the
(bottom) U.S. Corps of Engineers

*As of December 1, 1977

REGULATORY AGENCIES OF THE SIGNATORY STATES

ILLINOIS
Division of Water Pollution Control
Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706
(217) 782-2829

INDIANA
Stream Pollution Control Board
State Board of Health
1330 West Michigan Street
Indianapolis, Indiana 46206
(317) 633-0166

KENTUCKY
Department for Natural Resources and
Environmental Protection
Division of Water Quality
U.S. 127 South, Century Plaza
Frankfort, Kentucky 40601
(502) 564-3410

NEW YORK
Division of Pure Waters
Department of Environmental Conservation
50 Wolf Road
Albany, New York 12201
(518) 457-7362

OHIO
Environmental Protection Agency
P.O. Box 1049, 361 East Broad Street
Columbus, Ohio 43216
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Bureau of Water Quality Management
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P.O. Box 2063
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(804) 786-1411

WEST VIRGINIA
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1201 Greenbrier Street
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Cincinnati, Ohio 45202
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