
DELTA QUEEN
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TO:

The Honorable James R. Thompson
Governor of Illinois

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

The Honorable John Y. Brown, Jr.
Governor of Kentucky

The Honorable Hugh L. Carey
Governor of New York

The Honorable James A. Rhodes
Governor of Ohio

The Honorable Richard L. Thornburgh
Governor of Pennsylvania

The Honorable John Dalton
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 1979.

1979

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*As of December 31, 1979

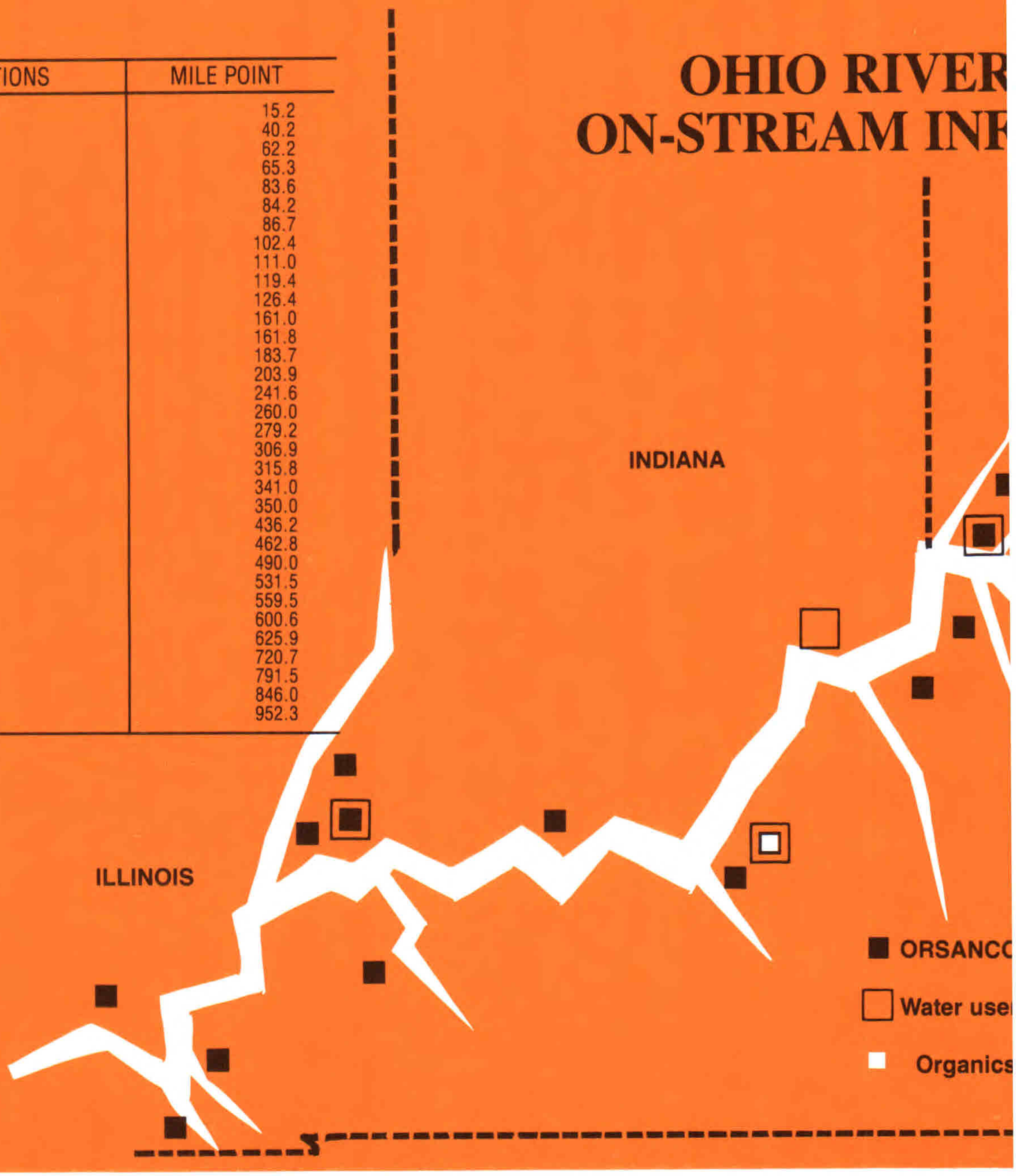
Warren L. Braun, Chairman

FROM THE CHAIRMAN

The key to the viability of a governmental agency is its ability to adapt to changing circumstances while continuing to address the initial fundamental needs. Despite the Commission's relative age among water pollution control agencies, the past year has reinforced my conviction that it continues to answer a well-perceived fundamental need, with a flexibility and a responsiveness unique in today's world of plodding governmental giants. In 1948, the conception of an interstate entity to deal with Ohio River water pollution problems was untried. Over a long and impressive history, the Commission's example has proved the concept to be a sound one.

The idea of interstate unity in meeting environmental problems is even more valid today — a fact which experiences in 1979 have dramatically demonstrated. With the increased momentum toward national self-sufficiency in energy production, valley leaders have expressed the need for a regional viewpoint on siting energy facilities, and they have turned to ORSANCO as a means to explore workable interstate arrangements. State and federal disagreements on water quality standards have refocused attention on the importance of a basin-oriented approach to such essential water pollution control decisions. The reduction of construction grant aid threatens both past accomplishments and future goals in wastewater treatment; the unified effort represented by the interstate agency is essential in providing solutions to the potential dilemmas arising from shortage of funds needed to meet water quality goals. The Commission's responsiveness to these issues will continue to assure the states that ORSANCO will provide them a vital tool in solving water pollution problems in the years to come.

Warren L. Braun

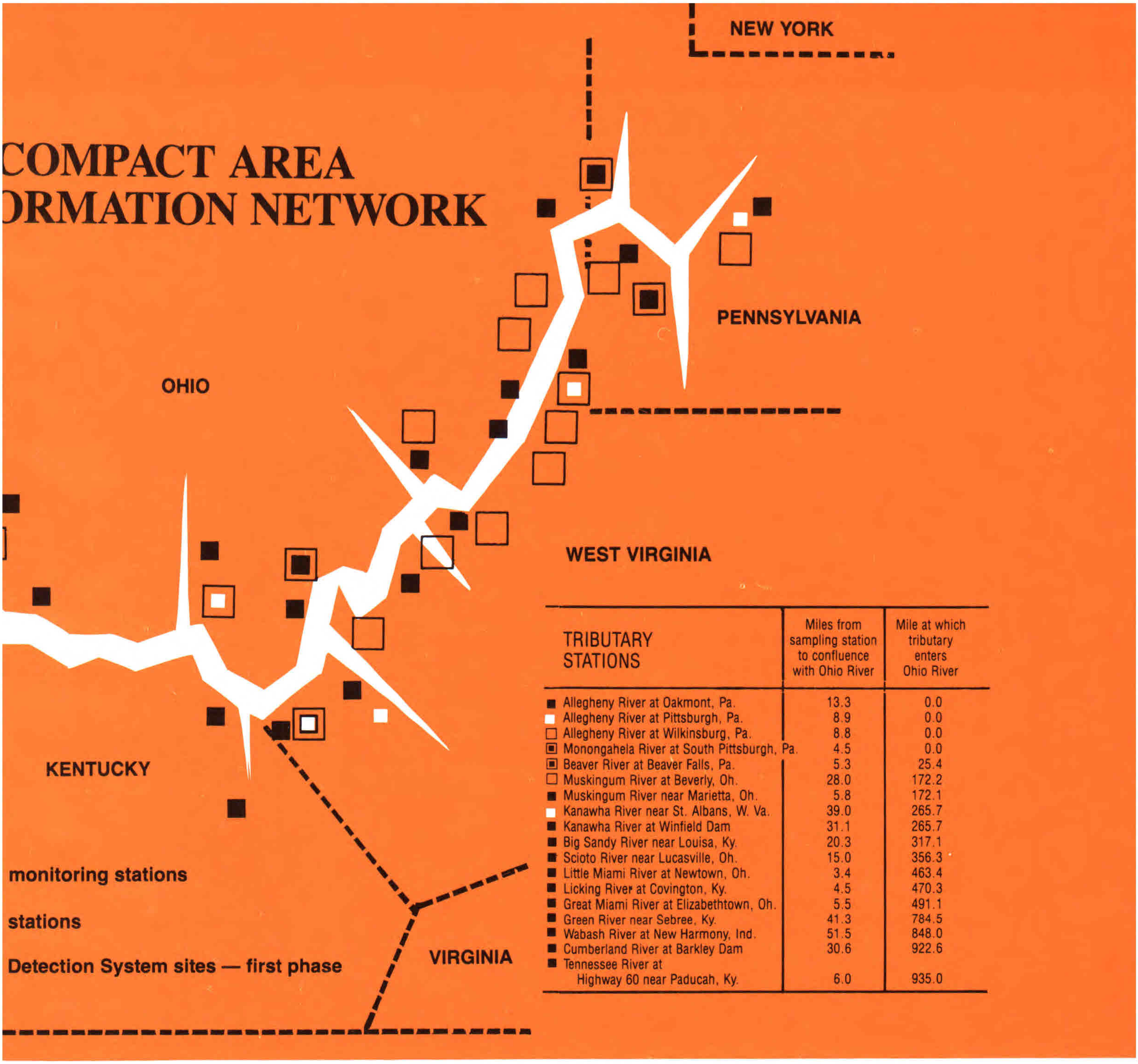


	OHIO RIVER STATIONS	MILE POINT
■	South Heights, Pa.	15.2
■	East Liverpool, Oh.	40.2
□	Weirton, W. Va.	62.2
□	Steubenville, Oh.	65.3
□	Yorkville, Oh.	83.6
■	Pike Island Dam	84.2
▣	Wheeling, W. Va.	86.7
■	Shadyside, Oh.	102.4
□	Moundsville, W. Va.	111.0
□	Natrium, W. Va.	119.4
■	Hannibal Dam	126.4
□	Willow Island, W. Va.	161.0
■	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, Oh.	490.0
■	Markland Dam	531.5
□	Madison, 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

SURVEILLANCE

Data derived from water monitoring systems provide a major gauge of progress in water pollution control. Information gathered with similar techniques at consistent sites over a period of time allows analysis of trends in water quality and helps to pinpoint areas of improvement, deterioration, and continuing problems. The Commission's surveillance program includes several different kinds of water quality monitoring — automated monitoring of several key quality indicators; sampling manually for physical characteristics, minerals, nutrients, trace metals and organics, radioactivity, and bacteria; and biological monitoring of fish tissues and populations. The program minimizes duplication of effort by the states bordering the Ohio River and allows them cost-effectively to meet the requirements of the

COMPACT AREA
RMATION NETWORK



TRIBUTARY STATIONS	Miles from sampling station to confluence 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 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 near St. Albans, W. Va.	39.0	265.7
Kanawha River at Winfield Dam	31.1	265.7
Big Sandy River near Louisa, Ky.	20.3	317.1
Scioto River near Lucasville, Oh.	15.0	356.3
Little Miami River at Newtown, 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 Sebree, Ky.	41.3	784.5
Wabash River at New Harmony, Ind.	51.5	848.0
Cumberland River at Barkley Dam	30.6	922.6
Tennessee River at Highway 60 near Paducah, Ky.	6.0	935.0

U.S. Environmental Protection Agency's Basic Water Monitoring Program at sites routinely sampled by ORSANCO.

When activated in 1961, the Commission's automated monitoring system was a highly innovative water quality network. Refined and improved, the same kind of monitor used 18 years ago collects data today at 22 sites along the Ohio and the lower reaches of the major tributaries. After 19 years of operation, the network now aids in quality control for the Ohio's navigation system and measures compliance with stream quality standards. It continues to yield one of the most extensive data bases on dissolved oxygen, pH, conductivity, and temperature in the country.

Additional water quality analyses are performed on samples gathered manually by surveillance specialists at 36 sites in the basin. Sampling frequency varies from monthly to quarterly, with even more frequent sampling of problem constituents. Amplifying these data collected by the Commission is water quality information furnished by water utilities in the Ohio River Basin.

All data from the surveillance program are analyzed immediately to identify any quality problems, so that the affected states may be notified and action taken to ameliorate any problems which may exist. In some situations the solution may involve additional sampling or perhaps an interstate problem-solving session, to supplement the individual state's independent enforcement efforts.

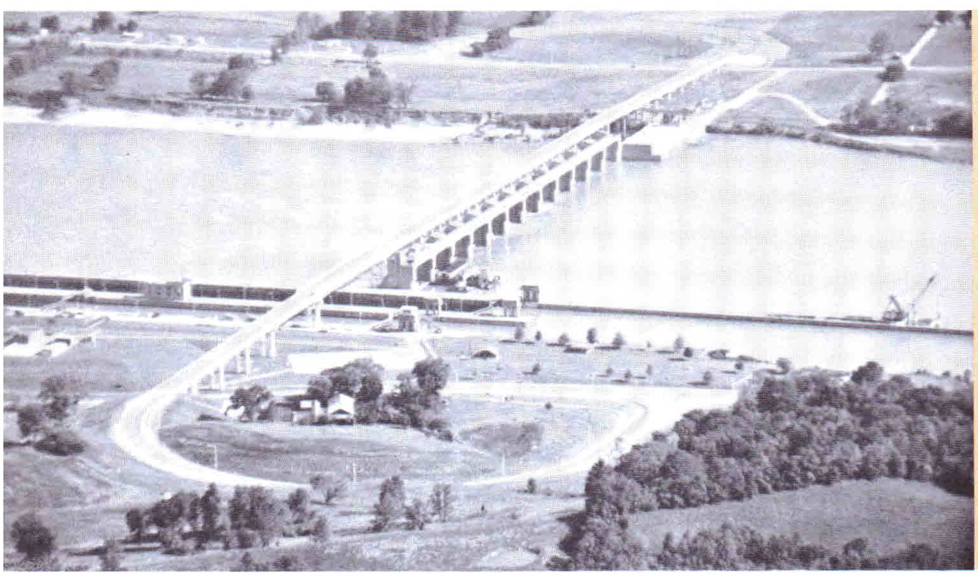
RADIOLOGICAL SAMPLING

The Commission reactivated its radiological monitoring in 1977, because the need for continuing baseline information about radioactivity in the river was an emerging priority. Results show ambient levels of radioactive materials in the Ohio which are well within limits established for safe drinking water.

Radioactive indicators monitored quarterly at six sites include total gross alpha and beta. Beta levels provide a general picture of contamination from a variety of sources, such as fallout and discharges from nuclear power facilities and from installations using radioactive materials. The highest total gross beta measured at any site was 41 picocuries per liter (pCi/l), which is below the maximum contaminant level of 50 pCi/l for treated drinking water. Only 15 percent of the values for total beta were above 10 pCi/l. Measured concentrations of other radioactive materials were equally low.

In 1979, with the increased public anxiety surrounding the Three Mile Island nuclear incident, the Commission's Public Interest Advisory Committee requested a reevaluation of radiological monitoring on the Ohio River. The subsequent survey revealed a substantial increase in monitoring by state and federal agencies since 1976. Recommendations for future radiological monitoring programs will be considered by the Commission in 1980.

Information from the surveillance program is used in the Ohio River navigation system.



Analyses performed at water utilities and industries in the valley augment the Commission's surveillance system.

BIOLOGICAL INVESTIGATIONS

A key element of the surveillance program is scrutiny of living organisms in major basin streams. Protection and continued propagation of aquatic life are essential to human health and welfare because of the importance of aquatic organisms in the food chain and their fundamental role in recreational and commercial use of water resources. The Commission's biological monitoring program investigates aquatic life in two major ways: through tabulation of fish species, size, abundance, and distribution, and by analysis of fish tissues to observe bioaccumulation of potentially harmful materials.

Fish are sorted and weighed prior to selection for tissue analysis.

The 1978 fish survey showed a sharp increase in species diversity in the upper reaches of the Ohio River, with the appearance of some game fish. Commercially valuable fish are more numerous the entire length of the river, and a sizeable sport fish population continues to thrive in the lower third of the Ohio.

Fish fillet analyses for trace metals and organics conducted by the U.S. Food and Drug Administration (FDA) revealed three of 37 samples which exceeded tolerance guidelines for safe human consumption. A catfish and a composite of minnows taken from the Monongahela River and another catfish from milepoint 606.8 on the Ohio contained more than the 0.30 parts per million (ppm) guideline for the pesticide chlordane — 0.31, 0.33, and 0.33 ppm, respectively. Concentrations of polychlorinated biphenyls (PCB's) in all samples were below the FDA's present limit of five ppm. Other chemicals were found in trace amounts of less than one ppm. The highest mercury level detected was 0.24 ppm, well below the tolerance limit of 1.0 ppm.

Whole fish analyses by the U.S. Fish and Wildlife Service generally paralleled the fillet results. Chlordane levels ranged from .027 ppm to 1.37 ppm, with three of 21 samples over .30 ppm. PCB concentrations detected in 22 samples ranged from .066 to 4.0 ppm.

Students visit a biological sampling site.

WATER QUALITY

Gathering an accurate picture of the condition of a complex river such as the Ohio is a challenging task, but every analysis performed on samples from the river brings the Ohio into clearer focus. Data collected through the surveillance program and from utilities and industries along the river are tabulated, along with information on river flow obtained from the National Weather Service. Measured levels of a wide variety of materials are compared to recommended stream criteria. When values do not meet the criteria, the appropriate state and federal agencies are notified and follow-up action initiated.

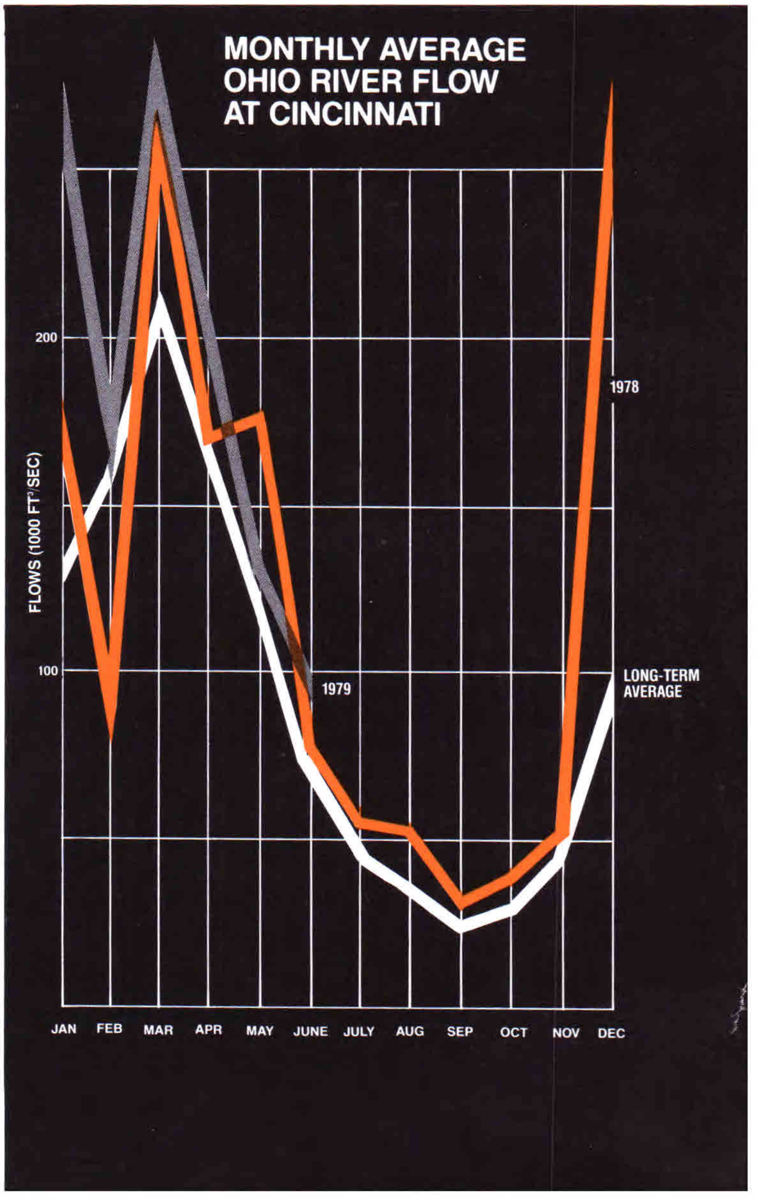
In 1978 and the first half of 1979, 75 percent of the Commission's numerical criteria were met consistently. Several water quality problems appeared to persist, however. Unusual flow patterns during the period may have impacted water quality conditions.

Stream Flow

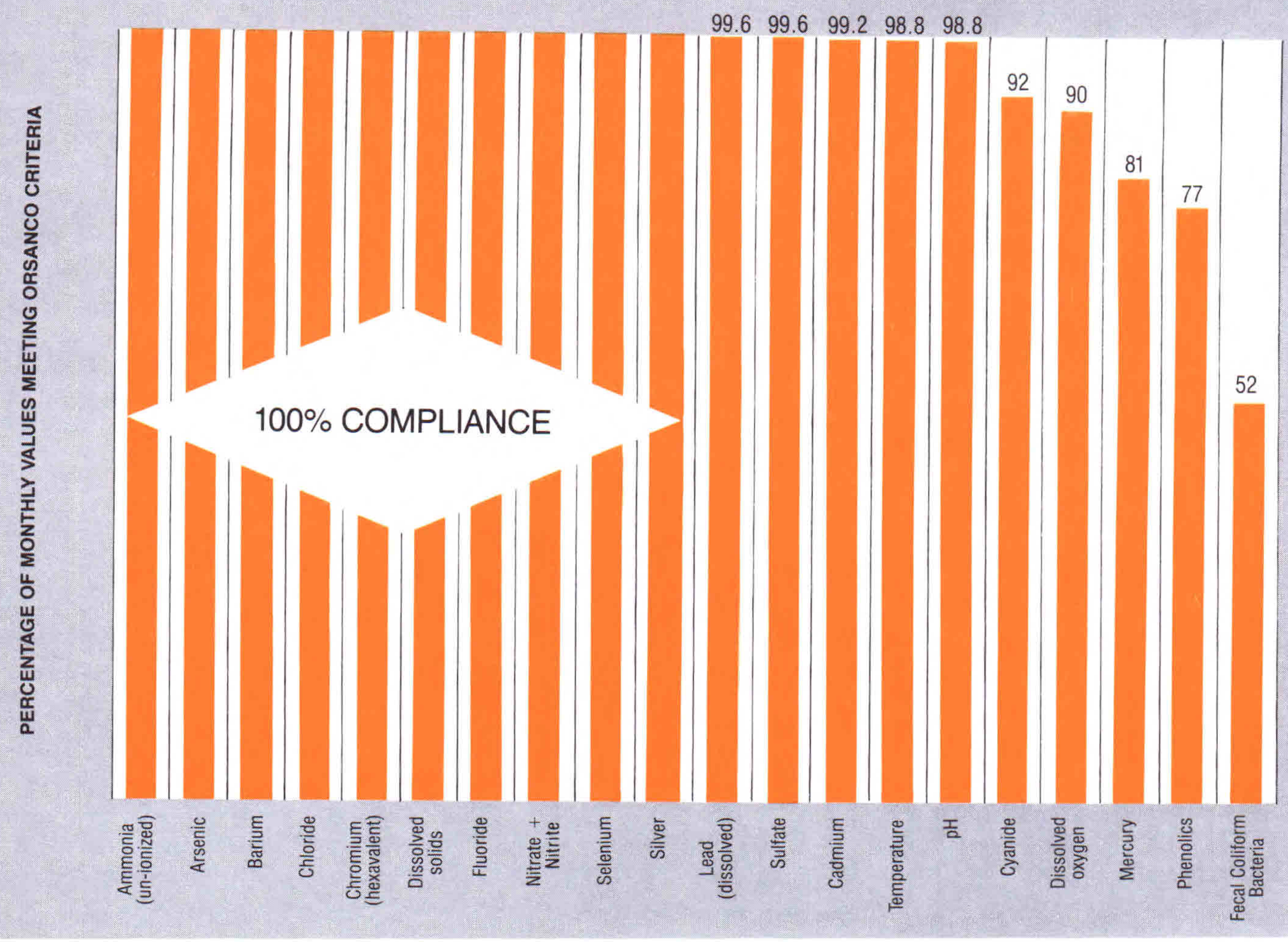
The amount of flow in a river directly affects water quality conditions. When flow is low, waste discharges have the greatest impact. At higher flows, the effects of runoff are greater. Considerable variation in flow over the course of a year is normal. On the Ohio River, it usually reaches a high point in March and dips to lowest levels in September. March flows are often ten times the September levels.

In the accompanying figure, long-term monthly average flows at Cincinnati are contrasted to monthly averages for 1978 and the first six months of 1979. Cincinnati is an approximate midpoint in the river, and flow at that location typifies the entire river's flow over the eighteen months. During the period, flow was at or above normal levels for all months except February, 1978. It was unusually high in December, 1978, when floods plagued several major tributaries in Kentucky.

The month of February in both years brought departures from the normal variation in flow levels, with decreases rather than the normal increases from January to February. In 1978, abnormally low temperatures in February caused freezing on many tributaries, thereby diminishing inflows to the Ohio. Another departure from the usual pattern occurred from April to May in 1978, when flow increased rather than decreased.



COMPLIANCE WITH RECOMMENDED STREAM QUALITY CRITERIA



Quality Conditions

In 1978 and the first six months of 1979, ten of the Commission's twenty numerical water quality criteria were met in all samples collected from the Ohio River. Constituents found to be within acceptable limits were:

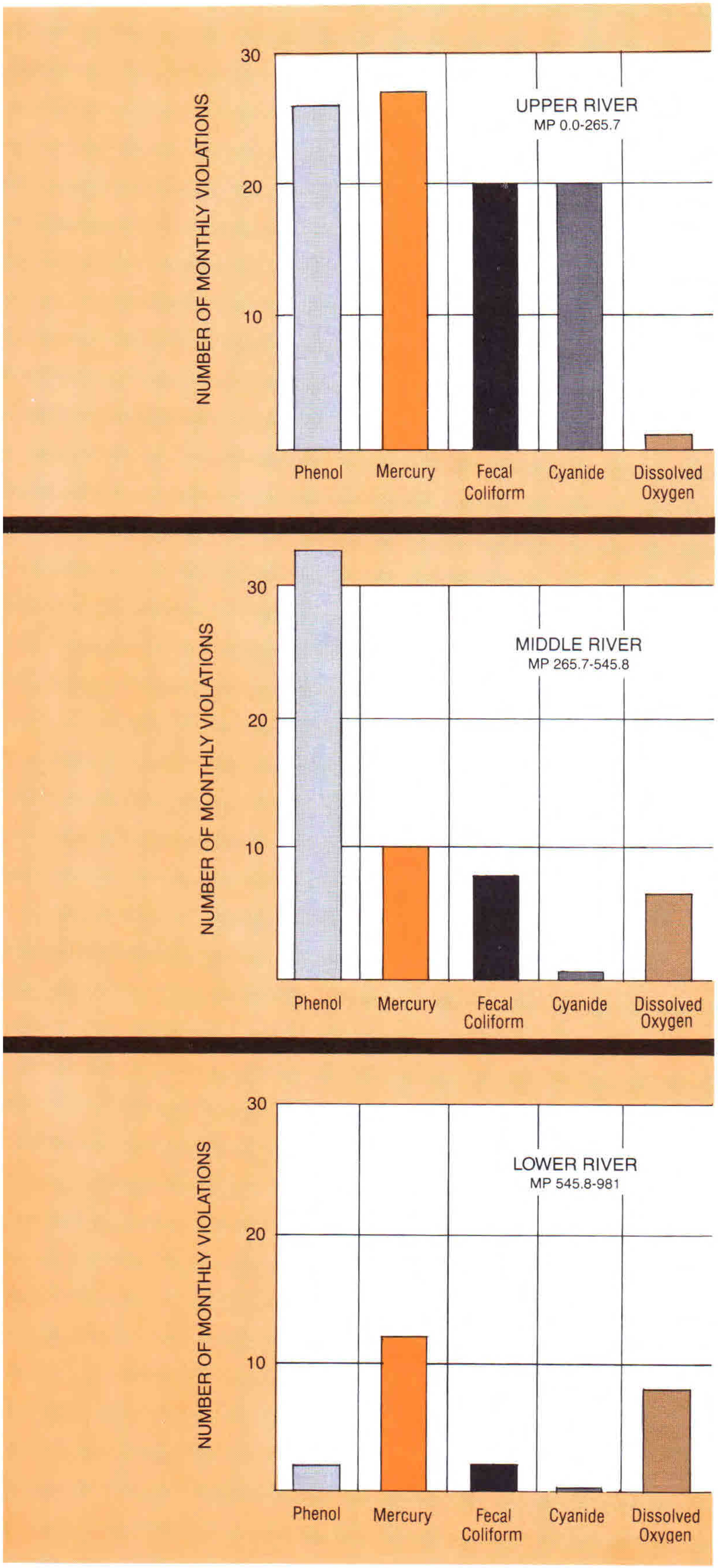
Ammonia (un-ionized)	Dissolved solids
Arsenic	Fluoride
Barium	Nitrate + nitrite nitrogen
Chloride	Selenium
Chromium (hexavalent)	Silver

Criteria for cadmium, dissolved lead, sulfate, temperature, and pH were met in over 99 percent of the samples collected. The remaining five criteria — recommended limits for cyanide, dissolved oxygen, fecal coliform bacteria, mercury, and phenolics — were not met in a significant number of the samples collected.

Failure to meet recommended criteria in a significant percentage of the samples collected suggests that a water quality problem exists which demands additional information and attention. How frequent are the criteria violations? When do they occur? What segments of the river are affected? The accompanying graphs provide greater insight into the nature of the Ohio River water quality problems which were identified during 1978.

The percentage of monitored values which meet recommended criteria provides one basis for comparison, as seen in the above bar graph. In each case the total number of values may vary — from 264 for phenolics, for instance, to 69 data sets for fecal coliform bacteria. Because dissolved oxygen, temperature, conductivity, and pH are gauged on a daily basis at a number of Ohio River sites, a far larger body of data exists; any month in which these criteria were not met is therefore counted as a criteria exception, out of a total possible of 168 for each parameter.

Values Exceeding ORSANCO Criteria Ohio River 1978



In 1978, criteria for fecal coliform bacteria showed the highest percentage of monthly violations, followed by phenolics, mercury, dissolved oxygen, and cyanide. The impacts of these findings and responsive action directed toward resolving any resultant water quality problems have been varied:

Fecal Coliform Bacteria These bacteria are generally regarded as indicators of contamination by domestic waste discharges or leachate. Two criteria are recommended for fecal coliform bacteria — one for public drinking water supply and another for water-contact recreation which usually applies from May through October. Because drinking water is disinfected during treatment to remove bacteria, the recreational criterion is more stringent.

In 1978, fecal coliform levels were actually highest in March and April, though the criteria were exceeded most frequently during the summer, when the more stringent requirements were in effect. High values during spring runoff are primarily attributable to storm and combined sewers. Failure to meet criteria during the summer months is indicative of inadequate disinfection by waste treatment plants discharging to the river. Two such cases — plants operated by Louisville, Kentucky, and Charlestown, Indiana — are currently being investigated by the Commission, in cooperation with the appropriate state and federal agencies.

In recent years, the reliability of fecal coliform measurement as an indicator of bacterial contamination has come into question, along with the need for universal disinfection of wastewater discharges. A special task force assembled in 1978 to study these issues concluded that fecal coliform levels remain the best indicators of contamination available, that the existing criteria are necessary to safeguard the desired water uses, and that pollution control programs to meet the criteria should continue.

Phenolics Phenolics may taint fish flesh or cause taste-and-odor problems for drinking water supplies. In past years, the phenolics criterion has been exceeded all along the river in all months of the year. In 1978, the bulk of the high values occurred in the upper and middle river during the winter months. Low water temperatures tend to inhibit the biological decomposition of phenolics. In 1979, when water temperatures were warmer in January and February, concentrations of phenolics were lower.

The states have periodically been notified of high levels of phenolics in the river and asked to assess the status of abatement efforts. Industrial sources, particularly steel mills, have been cited by the states as major sources of phenolics. Increasingly effective treatment, as presently required, should minimize the phenolics problem. Certain nonpoint sources also contribute phenolics; their impact will become clearer as control of point sources becomes more effective.

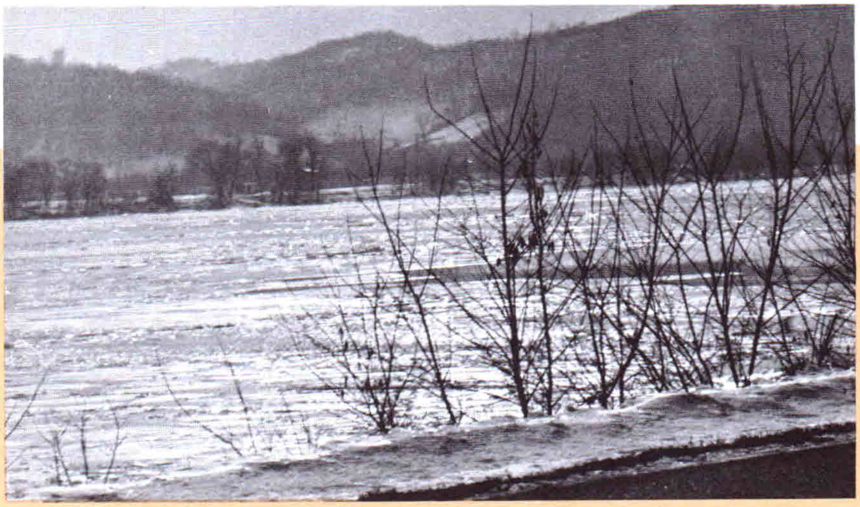
Mercury Mercury levels in water bodies must be limited to prevent bioaccumulation of high concentrations of mercury in fish and subsequent potential hazards to human health. In 1978, the laboratory detection limit for Commission samples was lowered from 0.5 micrograms per liter (μg/l) to 0.1 μg/l, causing an increase in detections of samples over the 0.2 μg/l criterion. Most of the excessive values fell between 0.3 and 0.5μg/l, though several unusually high values were found. In April of 1978, an extremely large concentration was detected in a sample from the Green River, a tributary which enters the lower Ohio from Kentucky. High values continued through May and June both on the Green and on the Ohio River below its confluence with the Green. Intensive sampling of the Green River and all appropriate waste discharges by the Kentucky Division of Water Quality and U.S. EPA failed to locate any major source of mercury. Since that time, high mercury concentrations have not recurred, indicating that the excessive values were the result of some unusual occurrence, rather than a continuing problem.

Another high concentration of mercury was recorded on the Monongahela River, a Pennsylvania tributary, in December, 1978. Though intensive sampling was immediately initiated by the Pennsylvania Department of Environmental Resources and ORSANCO, no further high mercury values were detected. Samples of fish collected in 1978 on the Ohio and the major tributaries did not reveal any concentrations of mercury above the limit set by the U.S. Food and Drug Administration for safe consumption.

Dissolved Oxygen Dissolved oxygen must be present in rivers to support aquatic life. Organic wastes cause reactions in the water which use up oxygen, so that dissolved oxygen levels are indicators of overall stream quality. Values are naturally lowest in the low flow, warm weather months when the impacts of oxygen-demanding waste discharges are greatest. In the summer of 1978, criteria were not met at sampling locations below the Cincinnati and Louisville metropolitan areas. Major waste treatment facilities, which were designed to alleviate the dissolved oxygen problems in those areas, were not yet fully operational in 1978. It is expected that when these facilities are complete and operating properly, the stream criteria will be met. No major fish kills have resulted from sporadic dips in the dissolved oxygen levels.

Cyanide As with phenolics, cyanide concentrations are highest when stream temperatures are lowest because of the inhibition of decomposition processes. This effect is more pronounced with cyanide; values exceeding the criterion occurred only in the winter months. In 1978, concentrations of cyanide were highest in February, a month which brought record low temperatures throughout the basin. A total of 21 values in excess of the criterion was recorded in 1978. In the first half of 1979, when temperatures were warmer, only four values exceeded the criterion — all in the month of February, when temperatures were again below normal.

All of the values exceeding the criterion were observed on the upper river, as has been the case each year since 1975, when the present sampling program was initiated. On the middle river, cyanide was detected in concentrations below the criterion. On the lower river, no cyanide was detected. The states along the upper river — Pennsylvania, Ohio, and West Virginia — have investigated the cyanide problem and concluded that once adequate treatment is provided at all industrial sources, as required by discharge permits, the problem will be solved.



Seasonal changes directly affect Ohio River water quality.

STREAM QUALITY CRITERIA

Historically, stream quality criteria have been used to assess the acceptability of water for specific purposes — drinking water supplies, industrial water use, protection of aquatic life, and recreation. The states have adopted water quality standards, which designate uses for specific stream segments and the criteria to protect those uses. Under the provisions of the Federal Water Pollution Control Act, state standards must be approved by the U.S. EPA Regional Administrator and reviewed every three years.

Since the enactment of the Federal Water Quality Act of 1965, states bordering the Ohio River have developed significantly dissimilar standards for the mainstem of the river. For example, three different standards for phenolic materials applied to one location in the upper river. To resolve such conflicts, a committee composed of state and federal water pollution control personnel was established by the Commission in 1975.

In its initial sessions, the Stream Quality Criteria Conflicts Committee agreed to a number of guidelines affecting adoption of water quality standards. It was determined that:

1) Standards for the same waters should be identical;
2) Establishment of different standards for individual segments of the same river should be supported by historic water quality data;
3) Water quality criteria recommended by the Commission should provide the basis for the states' review and revision of their present standards for the Ohio River, as required by federal law; and
4) The Ohio River has been and should continue to be classified for all uses.

The Commission adopted in 1976 the *ORSANCO Stream Quality Criteria and Minimum Conditions,* along with a policy statement which reads in part:

> Criteria of quality are intended as guides for appraising the suitability of interstate surface waters in the Ohio Valley for various uses and to aid decision-making in the establishment of water-control measures for specific streams or portions thereof. Therefore, the criteria are not to be regarded as *standards* that are universally applicable to all streams. What is applicable to all streams at all places and at all times are certain minimum conditions, which will form part of every . . . standard.

The criteria adopted by the Commission were the result of a considered review of existing applicable state standards, present and historic quality conditions, and recommendations of U.S. EPA.

After the Commission's action, the criteria were forwarded to each state with the recommendation that they be adopted without deviation to assure consistent water quality standards for the entire length of the Ohio River. The Commission further recommended that the Ohio River criteria be used as a basis for review of state standards for interstate tributaries, with the understanding that use designations, natural quality conditions, and other variables might necessitate adoption of significantly different tributary standards. A coordinated review by the EPA regions with jurisdiction over sections of the mainstem and major tributaries was also suggested.

Five of the eight states have revised their stream quality standards: Indiana, Ohio, and Virginia in 1976 and 1977; Kentucky and Pennsylvania in 1979. U.S. EPA Region V has indicated its intention to promulgate certain standards for Indiana and Ohio. As of December, 1979, Illinois, New York, and West Virginia had not finished amending their standards. Only Virginia has completed the entire revision process, including approval by U.S. EPA.

Four U.S. EPA regions are responsible for approving water quality standards adopted by the eight ORSANCO states. The three regions with jurisdiction over the mainstem have initiated action to assure uniform application of U.S. EPA policy. By public notice in the *Federal Register,* U.S. EPA has requested data and information on water quality standards for the Ohio River and opinions about the extent to which uniform standards should be established. The Commission, members of the advisory committees, and individual states have responded to this request.

ORGANICS AND WATER TREATMENT

Evansville Water Works was among participants in the organics project.

The 70's have generated a growing sophistication in detection techniques and, along with it, an expanding concern about trace organic materials in drinking water supplies. Federal regulations have been adopted to limit amounts of specific organic chemicals in potable water, and research has been initiated to identify long-range health effects of trace organics in drinking water. A special study completed in 1979 has had a bearing on decisions regarding organic substances in water supplies.

The study, which began in 1976, was supported by 11 mainstem and tributary public water utilities, U.S. EPA, and the Commission. Its purpose was two-fold: (1) to assess the impacts of various treatment modifications on levels of chloroform and related compounds, called trihalomethanes (THM's), in finished drinking water; (2) to determine levels of THM's and other selected organic compounds in raw and treated waters.

Process modifications were investigated at seven participating utilities. Because the disinfection of water with chlorine affects trihalomethane levels, three changes in the chlorination process were studied — alterations in the chlorine application point, use of chlorine dioxide instead of chlorine, and application of ammonia to convert free chlorine to a combined form. Another method used to reduce the THM content was filtering of water through granular activated carbon, which adsorbs certain organic materials. Extensive bacteriological monitoring accompanied each process modification study to ensure the bacteriological integrity of the finished water. Monthly sampling of raw and finished waters at each utility completed the project.

The monthly samples obtained through the project were helpful in providing a data base on organic materials in Ohio River waters. Chloroform was detected in raw waters at levels generally less than one microgram per liter (μg/l), and concentrations of other trihalomethanes were generally less than 0.1μg/l. Some organics other than THM's, including carbon tetrachloride and chlorobenzene, were found in raw and treated waters at concentrations up to 1 μg/l; trace amounts of polyaromatic hydrocarbons, such as naphthalene, were also detected in winter months.

Process studies showed that trihalomethanes were formed during treatment through the reaction of chlorine with humic materials present in the raw water. THM levels varied seasonally, reaching highest concentrations in winter and lowest values in summer. Levels also varied from utility to utility, depending on the raw water source and the treatment process. The following table gives a general picture of THM's found in the treated water:

	Concentration, μg/l	
	Mean Annual	Maximum
Chloroform	35	180
Bromodichloromethane	13	54
Dibromochloromethane	5.6	33
Bromoform	0.4	4.4
Dichloroiodomethane	0.1	1.0
Total trihalomethanes	54	—

U.S. EPA has adopted a 100μg/l limit for total THM's in drinking water.

Data from the ten utilities using surface water sources showed that 37 percent of the humic materials with potential to form THM's were removed by treatment. Twenty-three percent were converted to trihalomethanes. Forty percent passed into the distribution system, where additional THM's may have been formed.

All changes tested in the chlorination process were found to reduce trihalomethane concentrations in the finished water. Granular activated carbon substituted for sand in the filters effectively removed trihalomethanes for an average of two months; however, carbon left in place for long periods actually released THM's after its adsorption properties had been exhausted. Bacterial densities in the effluent from the carbon filters increased when the water temperatures were warmer than 10° C.

WASTEWATER TREATMENT

A discharger must have a permit which stipulates allowable quantities of specified materials in its effluent. Where additional treatment is required, a schedule for improvements is established. Providing wastewater treatment is costly, however, and progress in meeting quality standards depends upon not only availability of funds to construct wastewater treatment facilities, but the willingness of towns and industries to spend the money required to operate these facilities properly.

Municipalities

The Water Pollution Control Act Amendments of 1972 established an ambitious program of federal aid to communities for the development of water pollution abatement facilities. More than two billion dollars has been awarded by U.S. EPA for projects in the Ohio River Compact district from 1974-78. Funds are allotted by steps — for initial project studies, facility design, and final construction costs. The accompanying graph shows the relative number of grant awards for each phase. Eighty-five percent of the grant funds awarded in the district has been dedicated to actual construction of facilities.

A glance at actual dollar allocations for each of the five years reveals that the flow of federal aid peaked in 1977. Indications are that federal support of such programs will continue to decrease, thereby increasing state and local responsibility for meeting pollution control goals.

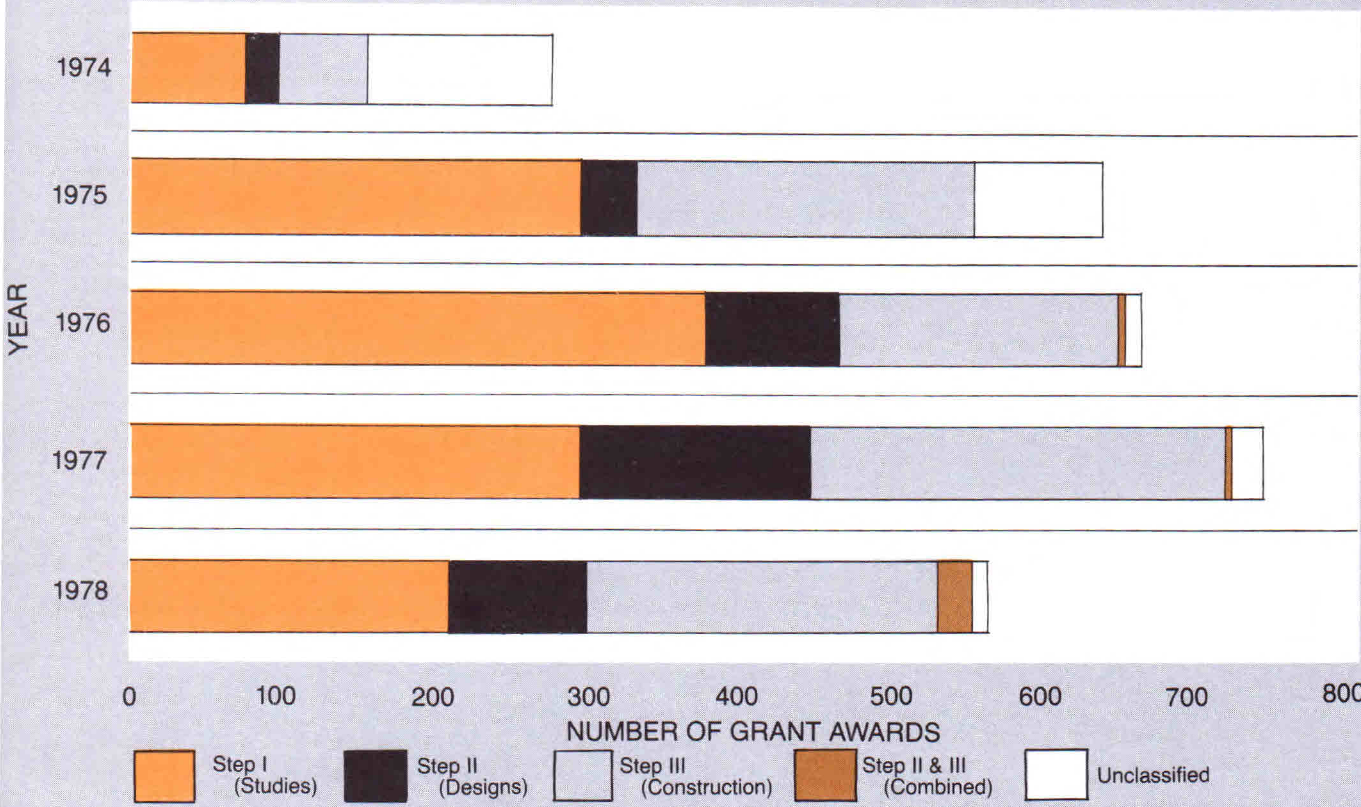
Industries

More than two thousand manufacturing industries discharge into Ohio Basin streams. Thousands more pipe wastewaters to publicly owned treatment plants. No compilation of industrial expenditures for wastewater treatment in the compact area exists; however, a limited sampling of metropolitan areas by the U.S. Bureau of the Census gives an indication of spending in the area. Selected industries in 25 metropolitan areas in the basin report costs for treatment improvements of 44.8, 73.4, and 118 million dollars for the years 1975-77, respectively. These figures represent an average annual increase of 65 percent.

Estimates for required future spending by industry continue to soar as new regulations come into effect. A recent federal study predicts national water cleanup costs for industries will reach 66 billion dollars from 1977 through 1986; industries in the highly developed Ohio River Basin will pay a major share.

The paucity of data on actual expenditures in the Ohio River Basin is of enormous concern, because of the need to identify the substantial industrial contribution to water pollution control in the district. The Commission has initiated a program for collection of such information, and a clearer picture of expenditures for water pollution control is anticipated in the future.

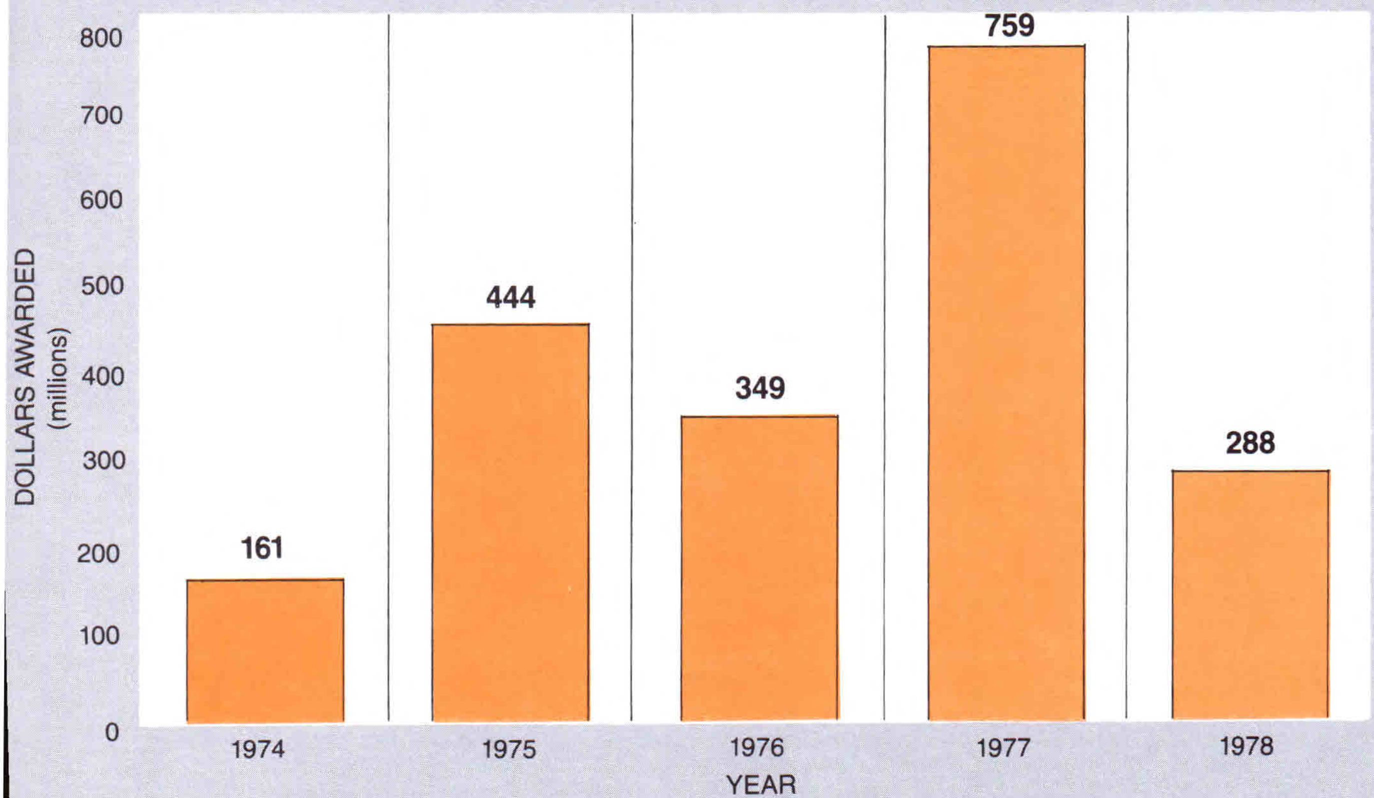
U. S. EPA GRANT AWARDS BY STEP* / OHIO RIVER COMPACT AREA



Source: U. S. EPA Grants Information and Control System

*Includes projects located within counties wholly or partially in the compact area.

U. S. EPA WASTEWATER GRANTS* / OHIO RIVER COMPACT AREA



Source: U. S. EPA Grants Information and Control System

*Includes projects located within counties partially or wholly in the compact area.

John Quarles

PUBLIC DECISION-MAKING

In recognition of increasing public interest in environmental issues, the Commission hosted an expanded annual meeting in May. The day-long event was planned to give the public and members of the Commission a clear picture of proposed programs and an opportunity for suggesting changes in priorities. Nearly 100 spectators attended the meeting, which was held prior to the Commission's regular business session.

Identified as priority goals in the FY1980 program were the continued effectiveness of the monitoring system and the spill response and detection programs. Commission resources were also dedicated to increasing state, interstate, and federal coordination of several key water pollution control functions, with particular emphasis on the resolution of stream quality criteria conflicts which continue to impact Ohio River quality assessments. Increased attention was pledged to both the construction and operation of effective wastewater treatment facilities for cities and industries discharging into the Ohio. Intensified interstate coordination of state water quality planning programs was also identified as a major goal for the coming year.

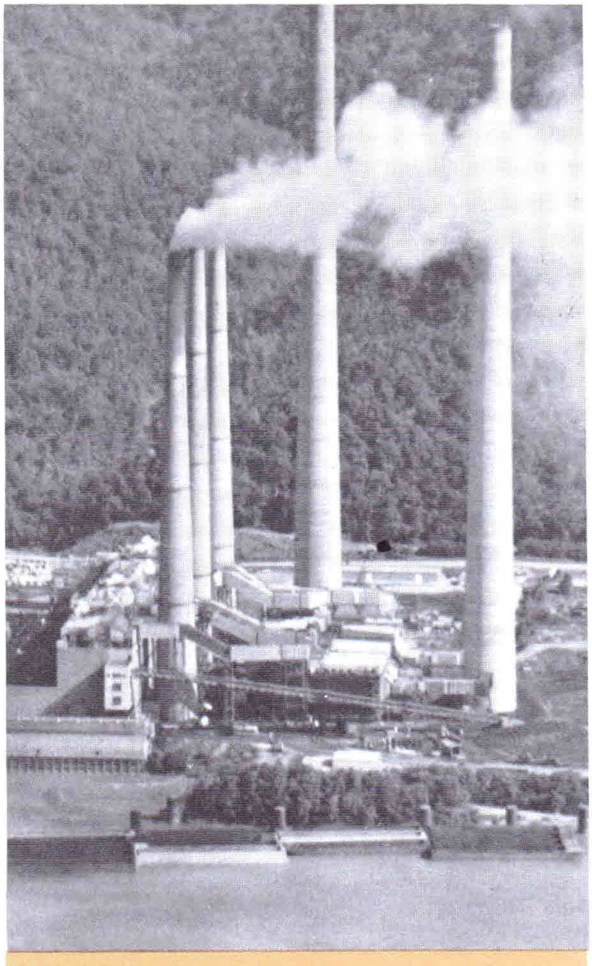
A special feature of the annual meeting was an in-depth look at the problem of siting major facilities. Speakers clarifying aspects of the problem included Boyd R. Keenan and James J. Stukel, Co-Directors of the Ohio River Basin Energy Study (ORBES); John Quarles, former deputy administrator of the U.S. EPA; and Eugene F. Mooney, then ORSANCO Commissioner and Secretary of the Kentucky Department for Natural Resources and Environmental Protection.

Emphasizing the need to devise a strategy across the country for siting power plants, Professor Keenan outlined the goals of ORBES. Stukel detailed some of the interstate air quality problems caused by energy production in the Ohio River Basin.

John Quarles focused on the effects of federal regulations on industry. The regulatory framework, Quarles maintained, is highly technical and complex; it broadens the local political process, thereby increasing the possiblility of stumbling blocks; and it raises critical manpower concerns. Quarles recalled the defeat of several land-use bills in Congress in 1974, noting that only five years later "We have a system of controls over the way land is used, originating from federal laws, but it is not a system of controls developed either consciously or coherently. It has resulted from a series of piecemeal legislative programs, each of which was addressing an important but distinct subject."

Mooney concluded the program by describing the findings of the Commission's own task force on facility siting, recommending that the Ohio Valley states improve communications and coordination among existing siting agencies in the region. Mooney challenged the members of the Commission to take action on this issue: "Eight ORSANCO states share the challenge of producing and transporting adequate energy supplies, while at the same time ensuring that resultant environmental degradation is minimized or at best equitably distributed. . . . The river valley is and will remain a prime location for energy and industrial development, with accompanying environmental costs. We must arrange some sensible way equitably to share the benefits and burdens that go along with such development."

ENVIRONMENT AND ENERGY



Existing power facilities along the mainstem have a combined generating capacity of 51,584 MW; 21 more plants are planned or under construction.

Pressures to increase national energy production are felt most acutely in the Ohio River Valley, which is one of the nation's most fertile grounds for energy development. The region holds a large share of the nation's coal supplies, ample water for both processing and transportation, and a number of sites suitable for energy-related facilities. The environmental impacts of these facilities are of deep concern, so much so that a special committee has been studying state and federal procedures used to choose sites for such facilities, in order to assess the need for a regional approach to siting decisions impacting the Ohio River.

In a survey of heads of state agencies in the Ohio River district, 14 of 19 responding indicated support for some regional mechanism for siting energy-related facilities. Only two expressed direct opposition to the idea; the other respondents were neutral. The near consensus is probably attributable to specific problems which have arisen in the past few years in the district: interstate air pollution conflicts, disagreements over consumptive use of water in energy-related activities, concern for public safety in siting nuclear facilities, assessment of the environmental impacts of anticipated synthetic fuel plants. All of these are interstate concerns.

After the annual meeting's session on siting, a subsequent study of state and federal procedures, and the survey of state opinions on the matter, the Commission elected to pursue the resources needed for a study of possible interstate arrangements for facility siting.

Specific objectives of the study are to minimize potential interstate conflicts in siting energy-related facilities, to integrate regional siting considerations within state siting processes, and to aid the states and federal agencies in their assessment of the regional impacts of siting. The study will provide recommendations for alternative courses of action for accomplishing these goals.

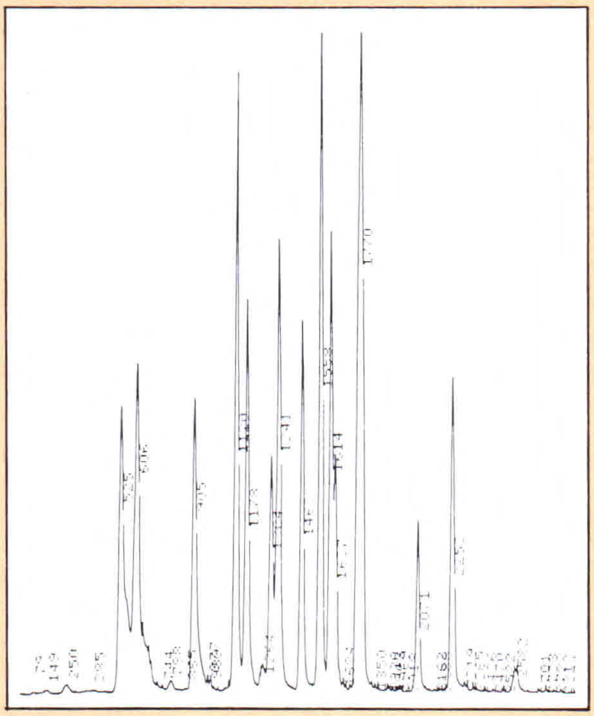
EMERGENCY DETECTION AND RESPONSE

A river is a dynamic system. Effective monitoring networks must take into account the fact that a river's water quality may vary daily. Spills and discharges into the waterway — accidental or otherwise — are of special concern. The ineffectiveness of monitoring procedures which carry a built-in delay of days or weeks for laboratory analysis was dramatized in 1977 when large amounts of carbon tetrachloride entered Ohio River drinking water supplies undetected. That year an early warning system to detect organic substances in the Ohio River was conceived.

Structured to give water users timely notice of unusual amounts of organic materials in water supplies, the first phase of the system has been operating for over a year, with striking results. Recently, through additional financial aid provided by U.S. EPA, the network moved from weekday to daily operation. Expansion from seven sites to the 11 proposed by the Commission will be realized in early 1980.

The idea of the Organics Detection System was an innovative one, with a number of potential stumbling blocks. The network's procedures allow measurement of only a limited number of organic compounds. Its effectiveness rests on the willingness of the participating utilities and industries to provide both manpower and resources. The system's highly sophisticated equipment is operated by plant personnel, who have required special training in its function and theory. To undertake such an endeavor, particularly in light of its demonstrated importance to the public, was risky — at the very least. While success would open new frontiers in pollution control, failure would mean a dramatic loss of public confidence.

Despite the first year's operational problems, resulting from lack of funds for backup equipment and from expected startup difficulties, the system has continued to operate at an increasing level of efficiency. A number of spill events have been detected, treatment plants warned, and the causes of continuing quality problems eliminated. What has been most striking in the system's first 18 months is the body of data which is beginning to form, showing low levels and limited numbers of organic materials in the Ohio River and the major tributaries. Detections have been made, but fewer organic materials have been found in smaller quantities than might have been predicted from earlier studies.



Gas chromatograms obtained through the Organics Detection System identify substances by peaks created through time, as this sample chromatogram shows.

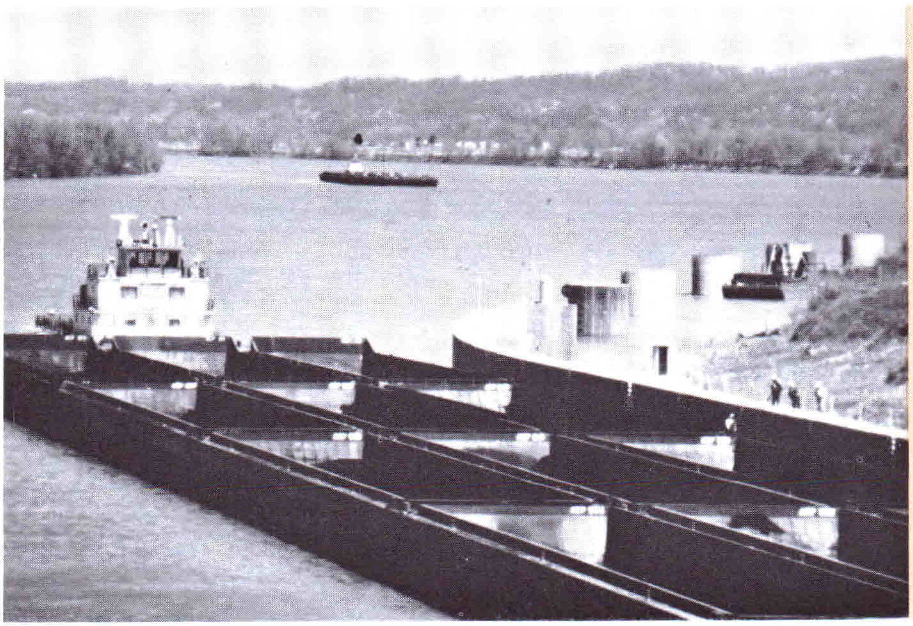
Retention Time	Compound
525	Methylene Chloride
606	Trichlorofluoromethane
905	1,1-Dichloroethane
1120	Chloroform
1178	1,2-Dichloroethane
1304	1,1,1-Trichloroethane
1341	Carbon Tetrachloride
1463	Bromodichloromethane
1558	1,2-Dichloropropane
1614	Trans-1,3-Dichloropylene
1637	Trichloroethylene
1770	Dibromochloromethane and/or 1,1,2-Trichloroethane and/or Cis-1,3-Dichloropropylene
2071	Bromoform
2253	Tetrachloroethylene
2582	Chlorobenzene

Spill Response

Accidents which occur along a river may involve numerous jurisdictions — local, state, and federal — as well as industry. The interstate commission is structured to assist in such cases, and ORSANCO has been helping to coordinate spill response communications since 1959.

In the past several years, the Commission's involvement in spill response has been increasing. Every year more spill events are being processed through ORSANCO's response mechanism. The advent of the Organics Detection System brought a mechanism to detect additional spills. To improve communications even further, the Commission hosted a meeting in 1979 of state and federal spill response personnel for the Ohio River Basin. The interchange of views which the gathering provided was so valuable that a yearly meeting of the same group is planned.

In addition, each year a spill response manual listing pertinent information and telephone numbers is issued free of charge to response personnel, industry representatives, and other interested individuals. Time-of-travel charts based on an Ohio River quality model have been formulated to aid in predicting a spill's arrival time at any location on the Ohio River; such predictions have been of great assistance to local communities, as well as state and federal agencies, in determining when precautionary measures should be taken.



Freight traffic on the Ohio River is expected to increase more than 200 percent by the year 2000.

Photograph courtesy of the U. S. Corps of Engineers

Transportation Hazards

During the transport of hazardous and toxic materials, spill prevention is vital. Barge and boat accidents on rivers and streams may imperil water quality; transportation-related spills on land may contaminate adjacent surface- and groundwater supplies. Transportation mishaps have caused a large share of the basin's most serious environmental emergencies. Because of the gravity of the problem, ORSANCO brought together representatives from state and federal agencies and from the chemical and transportation industries to work toward mitigation of hazards resulting from transportation-related spills. The group, which is serving as an advisory committee to the Commission, concluded that the transportation industry recognizes the importance of preventing loss of toxic, hazardous, and harmful cargo. However, several urgent needs were identified: a central response agency to compile and disseminate information about transportation-related incidents in the Ohio River Basin, establishment of safe levels of various toxic chemicals, and development of programs to reduce the possibility of accident during transport of hazardous and toxic materials.

ADMINISTRATIVE HIGHLIGHTS

Three representatives from each of the eight member states and three representatives from the United States government comprise the Commission. Appointed by the chief executives of the states and of the nation, these members serve at no recompense from the Commission, though their expenses in performing Commission-related duties are reimbursed.

Warren L. Braun was elected to a second term as Chairman of the Commission. Dr. Richard S. Engelbrecht became Vice Chairman and Lloyd N. Clausing Secretary. Albert J. Brooks was reelected Treasurer.

Dr. Ronald G. Blankenbaker succeeded Dr. William T. Paynter as ex officio Commissioner from the State of Indiana. Jackie Swigart replaced C. Frank Harscher, III, who served as ex officio Commissioner from Kentucky following the resignation of Eugene F. Mooney. Robert F. Flacke replaced Peter A. A. Berle as ex officio Commissioner from the State of New York.

Augusta A. Prince was appointed by Governor James A. Rhodes to replace Christine M. Carlson as Commissioner from the State of Ohio.

Commission officers Warren Braun and Richard Engelbrecht

Executive Director Leo Weaver

Present and past Engineering Committee Chairmen Ernest Rotering and Oral Hert

Wesley E. Gilbertson resigned his Pennsylvania Commission seat at retirement. Commissioner Gilbertson served the Commission for twelve years and was Chairman of the Commission from 1974 to 1975.

ORSANCO STAFF*

Administration

Leo Weaver — *Executive Director and Chief Engineer*
William L. Klein — *Assistant Executive Director*
Deborah S. Decker — *Information Specialist*
Janet S. Fischesser, Janice Squires — *Secretaries*

Finance

Albert J. Brooks — *Manager*
Kathi L. Allender — *Accounting Assistant*

Surveillance

Glenn E. Moore — *Manager*
John L. Keyes — *Senior Surveillance Specialist*
Jan R. Taylor — *Surveillance Specialist*
Robert D. Timmerman, Jr. — *Surveillance Specialist*
Glenn E. White — *Surveillance Specialist*
William Pearson — *Laboratory Technician*
Joyce Smitley — *Laboratory Technician*
Lillian G. Revenco — *Secretary*

Project: Early Warning — Organics Detection System

Glenn E. Moore — *Project Director*
John P. Haberman — *Senior Chemist*
Kuo-Hsien Cheng — *Assistant Chemist*

Technical Services

Robert J. Boes — *Manager, Assistant Chief Engineer*
Peter A. Tennant — *Water Resources Engineer*
Alan H. Vicory, Jr. — *Environmental Engineer*
Jane W. Renaldo — *Secretary*

Data Processing

Leonard McDonough — *Manager*
Timothy J. Van Epps — *Senior Analyst*
Donna M. Carroll — *Computer Operator*

*As of December 31, 1979

Art — Ray Loos

Photography — Deborah S. Decker, John L. Keyes, Robert D. Timmerman, Jr.

Cover Photos:
Fisherman — Bob Gooch
Coal barge — U. S. Corps of Engineers

FINANCIAL REPORT

The following information relative to revenues, expenses, and statement of resources was extracted from the Annual Auditors Report of Wm. H. Mers & Co., Certified Public Accountants, for the year ended June 30, 1979.

OHIO RIVER VALLEY WATER SANITATION COMMISSION
STATEMENT OF REVENUES AND EXPENSES FOR YEAR ENDED JUNE 30, 1979

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	$338,940.00	
Safe Drinking Water Act		
Early Warning — Organics Detection System Grant	37,293.00	
Organic Substances in the Ohio River Research Grant	124,186.00	
Total from U. S. Environmental Protection Agency		$ 500,419.00
From U. S. Corps of Engineers:		
Electronic Monitoring Support	$ 57,800.00	
Allegheny and Pittsburgh District Support	44,850.00	
River Stage Measuring System	32,632.37	
Total from U. S. Corps of Engineers		$ 135,282.37
From Water Utilities		11,650.00
Other Revenues		16,494.91
Total revenues		$1,038,846.28
Expenses:		
Basic Program	$837,999.54	
Organic Substances Project	222,222.76	
River Stage Measuring System	32,632.37	
Synfuel Study — ORBC	3,944.67	
Total expenses		$1,096,799.34
Excess of expenses over revenues		$ 57,953.06

STATEMENT OF RESOURCES AT JUNE 30, 1979

Cash		$ 62,749.24
Deposits		1,196.27
Accounts Receivable:		
U. S. Environmental Protection Agency	$ 50,688.00	
U. S. Corps of Engineers	15,632.37	
Employee advances	1,122.75	
Total accounts receivable		$ 67,443.12
Total		$ 131,388.63
Less:		
Accounts payable	$ 26,003.58	
Advance payment — Ohio River Basin Commission	51,055.33	
U. S. Geological Survey	1,190.07	
Total		$ 78,248.98
Available resources June 30, 1979		$ 53,139.65
Available resources at beginning of year	$111,092.71	
Excess of expenses over revenues	57,953.06	
Available resources at end of year		$ 53,139.65

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

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

NEW YORK

Division of Water
Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233
(518) 457-6674

OHIO

Office of Wastewater Pollution Control
Environmental Protection Agency
Post Office Box 1049
Columbus, Ohio 43216
(614) 466-7427

PENNSYLVANIA

Bureau of Water Quality Management
Department of Environmental Resources
Post Office Box 2063
Harrisburg, Pennsylvania 17120
(717) 787-2666

VIRGINIA

State Water Control Board
Post Office Box 11143
Richmond, Virginia 23230
(804) 257-0056

WEST VIRGINIA

Division of Water Resources
Department of Natural Resources
1201 Greenbrier Street
Charleston, West Virginia 25311
(304) 348-2107

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OHIO RIVER VALLEY WATER
SANITATION COMMISSION
414 WALNUT ST. CINCINNATI, OHIO 45202

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