Illinois
Indiana
Kentucky
Ohio
New York
Pennsylvania
Virginia
West Virginia

ORSANCO

IN REVIEW 1975

*members of the commission

ILLINOIS
Richard H. Briceland, Ph.D., Director, Environmental Protection Agency
(Vacancy)
(Vacancy)

INDIANA
William T. Paynter, M.D., State Health Commissioner
Ralph C. Pickard, Assistant Commissioner, State Board of Health
**Joseph L. Quinn, Jr., Terre Haute Gas Corporation

KENTUCKY
Robert D. Bell, Secretary, Department for Natural Resources and Environmental Protection
Kenneth O. Gibson, Sr., Senator, Commonwealth of Kentucky
Arnold L. Mitchell, Commissioner, Department of Fish and Wildlife Resources

NEW YORK
Peter A. A. Berle, Commissioner, New York State Department of Environmental Conservation
Lyle W. Hornbeck, Bond, Schoeneck and King
Joseph R. Shaw

OHIO
Christine M. Carlson, League of Women Voters
Lloyd N. Clausing, Director, Portsmouth Water Department
Ned E. Williams, Director, Ohio Environmental Protection Agency

PENNSYLVANIA
Wesley E. Gilbertson, Deputy Secretary, Department of Environmental Resources
Maurice K. Goddard, Ph.D., Secretary, Department of Environmental Resources
Marion K. McKay, Ph.D., Professor Emeritus, University of Pittsburgh

VIRGINIA
Denis J. Brion, State Water Control Board
(Vacancy)
(Vacancy)

WEST VIRGINIA
Luther N. Dickinson
N. H. Dyer, M.D., State Health Commissioner
Edgar N. Henry, Director, West Virginia Water Development Authority

UNITED STATES GOVERNMENT
Norman H. Beamer, District Chief, U.S. Geological Survey
Francis T. Mayo, Director, Municipal Environmental Research Laboratory, U.S. Environmental Protection Agency
Donald T. Williams, Chief, Planning, Ohio River Division, Corps of Engineers

OFFICERS
Wesley E. Gilbertson, Chairman
Arnold L. Mitchell, Vice Chairman
Albert J. Brooks, Secretary, Treasurer
Leo Weaver, Executive Director

LEGAL COUNSEL
Leonard A. Weakley, Taft, Stettinius & Hollister

As of June, 1976
*** Deceased*

TO:

The Honorable Dan Walker
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 Arch A. Moore, Jr.
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 —
respectively submit this review
of the activities
of the Commission in 1975.

chairman's message

Nineteen seventy-five has been a year of change and achievement for ORSANCO. The Commission has substantially increased its surveillance of Basin streams, enhanced its role in regional water quality management and its central focus as a forum.

This year, ORSANCO's plans for an improved and expanded monitoring system have approached full realization. With the aid of signatory states and federal agencies — the U. S. Corps of Engineers, the U.S. Geological Survey, and the U. S. Environmental Protection Agency — we have begun to scrutinize water quality variables and river reaches in keeping with today's needs. We have begun a program of monitoring aquatic life in the Ohio river waters. And we have undergone the important process of evaluating our own techniques. In our efforts to appraise water quality during 1975, we have discovered that although the traditional manifestations of water pollution in the Ohio River and its tributaries are being controlled, more subtle and complex problems have arisen. Trace levels of organic chemicals found to concentrate in fish, and pollution from agricultural and urban run-off are among the many new challenges we now face and must work to conquer in the future. There is still much to be done.

ORSANCO is not working alone. In 1975, we have received strong endorsement to meet on-going responsibilities as an instrument of the signatory states working in close cooperation with federal agencies, and with other inter-agency commissions involved in area-wide planning for water quality improvement. In the latter capacity, we are taking a lead role in several Basin-wide water quality work groups. It is our task to aid in the development of a consistent planning process, so that the desire of valley citizens for clean streams can become a reality.

In keeping with our important role as a forum, ORSANCO has continued to gain the response of federal and state agencies and industry as well as concerned citizens throughout the valley. Technical working groups are functioning to eliminate stream criteria conflicts, assure more consonant and effective implementation of state and federal, industrial and municipal permit programs, reassess mine drainage programs and further evaluate the ORSANCO program of surveillance and monitoring to support state and federal water quality assessment and evaluation efforts for valley streams. The ORSANCO Public Interest Advisory Committee, a fledgling group just two short years ago, has had a steadily increasing impact upon Commission activities during 1975.

ORSANCO has also increased its participation in water quality activities at the national level through testimony at Congressional hearings and cooperative efforts with national organizations and other interstate agencies. The long experience of ORSANCO and member states in water pollution control is beneficial in assessing national issues and formulating policies.

We welcome such strengthened interaction, because it is our recognition that when we harmonize our efforts with all interests, each of us can come to a better realization of our mutual goals. In the interjurisdictional setting, teamwork inspires creative action and lasting contributions to a healthier environment.

introduction

When the legislatures and governors of Illinois, Indiana, Kentucky, Ohio, New York, Pennsylvania, Virginia and West Virginia ratified the ORSANCO Compact in 1948, teamwork was not an often used means to solving problems of even a clear-cut inter-jurisdictional nature — stream pollution, for example. Now, interstate and inter-agency alliances — once experiments in government — have proven their merit.

This volume affirms what the concerted efforts of eight signatory states, the U. S. Environmental Protection Agency, and other federal and local organizations have contributed through the compact to the abatement of stream pollution in the Ohio Valley. It will also offer a comprehensive overview of progress made in treatment facilities for the population of the Ohio River region and an appraisal of water quality conditions in the Ohio River and its major tributaries. Most important, a review of the past year's work will shed light upon future tasks and upon currents in inter-jurisdictional cooperation for water pollution control.

On the upper Ohio . . . 1914. Man's wastes enter the stream virtually unchecked.

On the upper Ohio . . . today. Water quality has improved, but subtle pollution problems remain.

tally for the valley

"Tally for the Valley" is an inventory of the status of pollution control facilities of sewered communities and industrial installations. It is compiled and revised annually from information submitted cooperatively by the states signatory to the compact. This information, together with facts gathered through the surveillance program, offers evidence of valley-wide progress in the installation of waste treatment works and points out specific needs for water quality improvement to meet established standards and criteria.

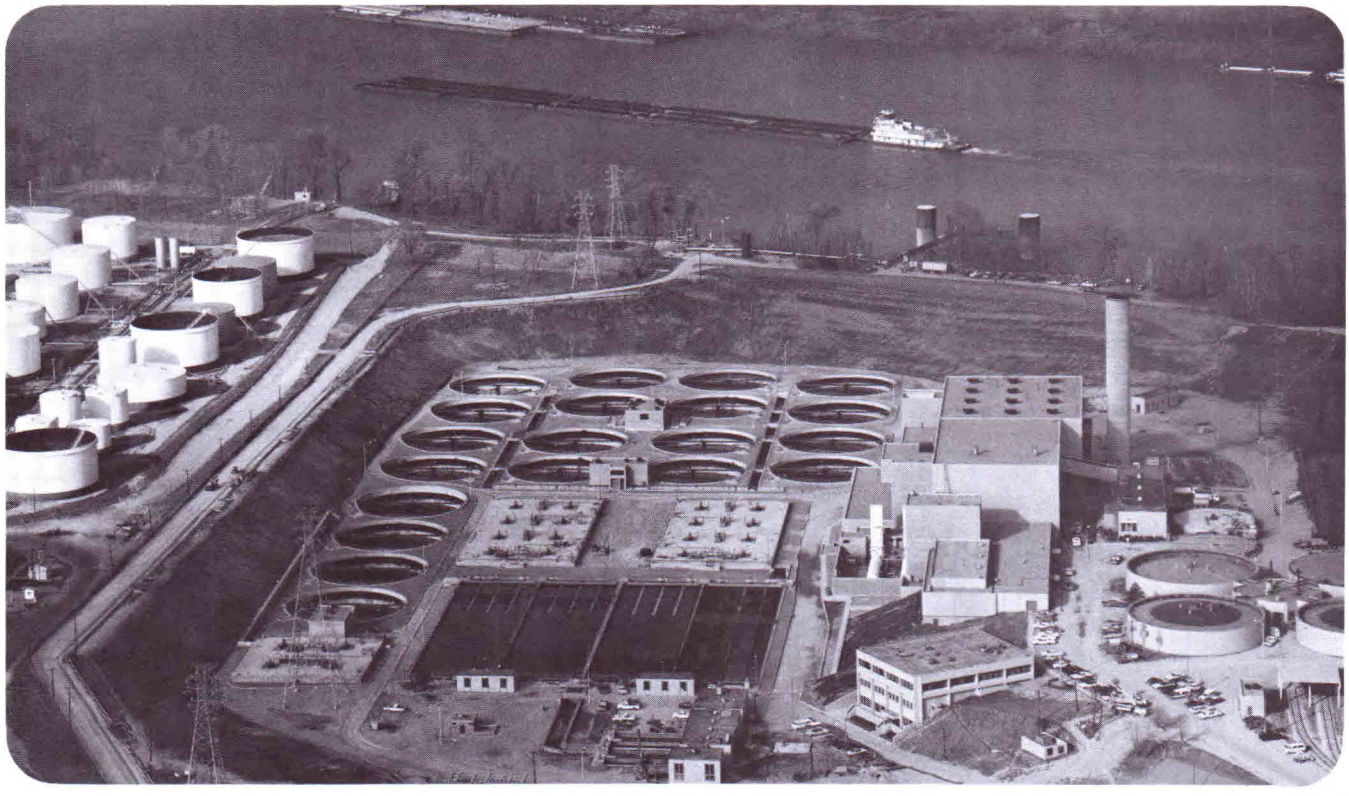
municipal treatment

Currently operating treatment facilities are now serving approximately 97 percent of the 12.8 million sewered population of the compact district. Existing facilities are also being improved in 141 communities, and new treatment plants are under construction in nine of the 232 sewered communities which do not currently have treatment works. The new plants will be serving a population of 34,000 out of 406,000 who live in communities where sewers exist but sewage treatment is not provided. As shown here, the number of communities and the population served by treatment facilities has increased significantly over the last ten years.

A DECADE OF PROGRESS IN THE COMPACT DISTRICT

	1965	1970	1975
Communities* with No Treatment	404	300	232
Population	754.000	560.000	406.000
Communities* with Treatment	1.299	1.477	1.643
Population	10.640.000	11.040.000	12.440.000
Total Communities* in the Compact District	1.703	1.777	1.875
Population	11.394.000	11.600.000	12.846.000

*Sewered



The Morris Forman treatment plant, scheduled for completion in 1976, will be serving the Louisville area. It inciudes secondary treatment and final clarification.

Photograph courtesy of Louisville and Jefferson County Metropolitan Sewer District

STATUS OF MUNICIPAL AND INSTITUTIONAL WASTEWATER CONTROL FACILITIES JULY 1, 1975

Number of communities (top) and population served (bottom).

STATUS	ILL	IND	KY	NY	OHIO	PA	VA	WV	TOTAL	% of TOTAL
Control currently acceptable	59 337.100	80 547.100	133 548.510	3 13.200	61 407.100	277 2.063.000	48 137.100	71 282.300	732 4.335.400	39.0 33.7
Treatment provided, improvement needed.	25 57.000	168 1.483.700	27 156.800	13 90.700	305 2.917.000	153 996.800	37 89.700	42 302.900	770 6.094.600	41.1 47.4
Treatment provided, improvements under construction	1 4.000	21 227.700	63 748.600		38 899.700	15 111.100		3 19.100	141 2.010.200	7.5 15.6
New treatment plants under construction		2 2.000			2 3.100	1 600		4 28.300	9 34.000	0.5 0.3
No treatment, construction not started		33 32.900	1 1.400	1 1.500	17 22.600	86 173.100	8 8.900	77 131.600	223 372.000	11.9 2.9
Total	85 398.100	304 2.293.400	224 1.455.300	17 105.400	423 4.249.500	532 3.344.600	93 235.700	197 764.200	1.875 12.846.200	100.0 100.0
Improvements completed		12 43.500	3 11.900		42 286.600	27 116.100			84 458.100	
New plant completed		5 4.900	3 3.900		2 2.600	20 54.700	2 2.100		32 68.200	

DEGREE OF TREATMENT AT MUNICIPALITIES AND INSTITUTIONS JULY 1, 1975

STATE	Compact District			Ohio Main Stem		
	Without Treatment	Primary & Intermediate	Secondary & above	Without Treatment	Primary & Intermediate	Secondary & above
Illinois - Number of Communities		25	60		5	5
Number of Plants		29	52		5	5
Population		75.600	322.500		15.800	2.300
Indiana - Number of Communities	35	17	252		6	19
Number of Plants		16	239		5	17
Population	34.900	75.700	2.182.800		33.400	245.000
Kentucky -						
Number of Communities	1	71	152	1	61	9
Number of Plants		21	152		11	9
Population	1.400	775.200	678.700	1.400	731.700	12.100
New York -						
Number of Communities	1	12	4			
Number of Plants		12	4			
Population	1.500	50.900	53.000			
Ohio -						
Number of Communities	19	103	301	2	52	11
Number of Plants		74	285		26	11
Population	25.700	1.228.100	2.995.700	3.600	760.200	147.500
Pennsylvania -						
Number of Communities	87	131	314		19	99
Number of Plants		65	169		12	20
Population	173.700	894.500	2.276.400		123.100	1.216.300
Virginia -						
Number of Communities	8	28	57			
Number of Plants		28	59			
Population	8.900	62.800	164.000			
West Virginia -						
Number of Communities	81	60	56	5	23	5
Number of Plants		56	56		20	5
Population	159.900	377.400	226.900	10.200	263.300	11.500
Total -						
Number of Communities	232	447	1.196	8	166	148
Number of Plants		301	1.016		79	67
Population	406.000	3.540.200	8.900.000	15.200	1.927.500	1.634.700
% of Total -						
Communities	12.4	23.8	63.8	2.5	51.6	45.9
Plants		22.8	77.2		54.1	45.9
Population	3.2	27.6	69.2	0.4	53.9	45.7

Along the Ohio main stem, treatment is provided for 309 communities containing a total sewered population of 3,640,000; eight municipalities with a cumulative sewered population of 15,000 are lacking sewage treatment facilities. Of considerable impact to the quality of the Ohio River water, however, is the progress being made in the construction of improved treatment facilities at eight large publicly owned treatment works. When completed, these will provide 70 percent of the sewered population with secondary or higher levels of treatment. The Louisville metropolitan and Hamilton County Metropolitan upgraded treatment facilities, for example, are scheduled for completion by mid- 1976. Since these augmented facilities will be treating wastes from two of the largest urban areas along the middle and lower reaches of the river, water quality in these reaches will be enhanced.

THE STATUS OF MAJOR MUNICIPAL TREATMENT WORKS UNDERGOING IMPROVEMENT

Agency and Plant	Status	Number of Communities	Population
Allegheny County (Pittsburgh) Authority (Pittsburgh, Pa.)	Completed	82	1,160,000
Hamilton County (Cincinnati) Metropolitan Sewer District (Cincinnati, Ohio)			
Mill Creek*	Under construction	18	483,000
Little Miami*	Under construction	18	120,000
Muddy Creek*	Completed	3	87,000
Campbell-Kenton County (Covington) Sanitary (Covington, Ky.)			
New Plant* (replacement)	Under construction	27	170,000
Jefferson County (Louisville) Metropolitan Sewer District (Louisville, Ky.)			
Morris Forman	Under construction	24	388,000
City of Evansville, Ind.			
Two plants	Completed	3	140,000

*Includes oxidation of reduced nitrogen to nitrate

In 1970, the compact states established secondary treatment requirements for municipalities discharging to the Ohio River, and requirements specified in the 1972 amendments to the Federal Water Pollution Control Act (Public Law 92-500) have generated a reclassification of many publicly owned secondary treatment works. Certain facilities, once granted the status of "controls currently acceptable," now fall into the category of "treatment provided, improvements needed." This shift is the outcome of U. S. EPA definitions of minimum effluent limitations for secondary treatment, ORSANCO effluent limitations, and statewide continuous planning activities.

industrial treatment

Over 1,000 of the 1,548 industries which discharge wastewater to compact streams have complied with state requirements, and 87 new or improved industrial treatment facilities have been under construction. However, 454 facilities are in need of further improvement.

On the Ohio main stem, 120 of the 200 industrial dischargers are in compliance with present regulations, and new or improved treatment facilities are in the process of being installed at nine of the 200 industrial operations. An additional 71 plants along the Ohio still require upgraded treatment facilities.

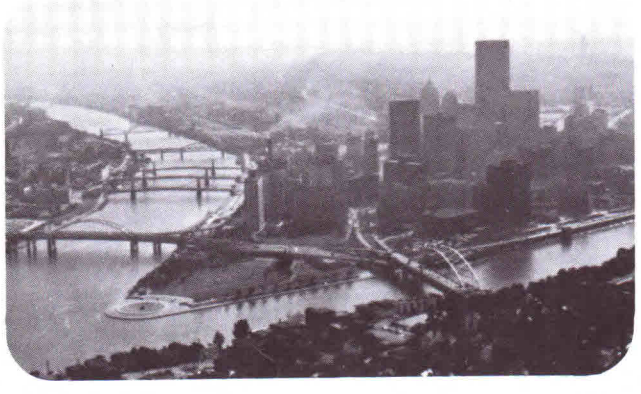
As previously noted for municipalities, stipulations in the amended Federal Water Pollution Control Act, as well as ORSANCO effluent limitations, have necessitated changing the classification of many industrial wastewater control facilities from "acceptable" to "inadequate." The subsequent promulgation by U.S. EPA of effluent load guidelines for individual manufacturing processes, the issuance of discharge permits based upon these guidelines, and the conclusions drawn from state and regional continuous planning studies have also resulted in more stringent requisites for industrial wastewater treatment. The current status of industrial waste control facilities within the compact district reflects the abovementioned changes.

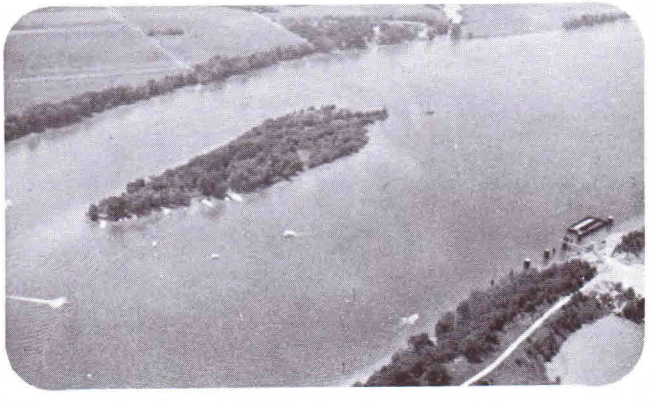
STATUS OF INDUSTRIAL WASTEWATER CONTROL FACILITIES JULY 1, 1975

STATUS	ILL	IND	KY	NY	OHIO	PA	VA	WV	TOTAL	% of TOTAL
Control currently acceptable	38	165	129	15	162	251	33	214	1007	65.0
Control Facilities, inadequate improvements in progress	6	15	13	2	30	2	3	12	83	5.4
New Control facilities under construction	1			1	1			1	4	0.3
Control facilities provided improvements needed	5	52	4	16	131	141	16	89	454	29.3
Number of industries	50	232	146	34	324	394	52	316	1,548	100.0
Completed improvements or new facilities	1	19		8	32	101	16	31	208	

nonpoint sources of pollutants

Following completion of control facilities for the more significant industrial and municipal point source discharges to the Ohio River, the impact of nonpoint sources of pollutants to the Ohio main stem and lower reaches of the major and minor tributaries may become more important for meeting stream standards. The term "nonpoint source" suggests that the origins of a pollutant are diffuse and intermittent in nature, and cover a large area. Storm water runoff from forested, agricultural and urban areas is perhaps the most common "source" of this type of pollution. In urban areas having combined sanitary and storm sewers, combined sewer overflow during some storm periods is also an important "source".





Approximately 5 percent of Ohio River Basin lands are urbanized and 87 percent are devoted to rural use. Nonpoint source pollutants — pesticides and certain organic materials, for example — reach the stream in run-off from these areas.

The map and table indicate locations of mainstem and tributary monitoring sites — points from which ORSANCO collects stream quality data. These are identified as robot monitor stations, manual sampling sites, water user stations (stations situated at water treatment plants), or combined data collection locations.

- ★ **robot monitor stations**
- ■ **manual sampling sites**
- ● **water user stations**
- ▲ **combined data collection locations**

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, W. Va.	84.2
▲ Wheeling, W. Va.	86.7
▲ Shadyside, W. Va.	102.4
● Moundsville, W. Va.	111.0
● Natrium, W. Va.	119.4
▲ Willow Island, W. Va.	161.8
● Parkersburg, W. Va.	183.7
■ Belleville Dam, W. Va.	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
● South Point, Oh.	318.0
▲ Greenup, Ky.	341.0
● Portsmouth, Oh.	350.0
■ Meldahl Dam, Oh.	436.2
▲ Cincinnati, Oh.	462.8
▲ North Bend (Miami Fort), Oh.	490.0
■ Warsaw, Ky.	528.1
● Madison (Clifty Creek), Ind.	559.5
▲ Louisville, Ky.	600.6
▲ West Point, Ky.	625.9
▲ Cannelton Dam	720.7
★ Hawesville, Ky.	728.4
▲ Evansville, Ind.	791.5
▲ Uniontown, Ky.	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 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 Philo, Oh.	66.8	172.2
● Muskingum River at Beverly, Oh.	28.0	172.2
■ Muskingum River near Marietta, Oh.	5.8	172.1
● New River at Glen Lyn, W. Va.	193.9	265.7
● Kanawha River at Cabin Creek, W. Va.	74.3	265.7
▲ Kanawha River at Winfield, W. Va.	31.1	265.7
★ Kanawha River at Pt. Pleasant, W.Va.	1.8	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 Elizabeth 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

district on-stream information network

water marks: a progress report

surveillance

monitoring

Monitoring provides data essential to the assessment of actual water quality conditions in the Ohio and its major tributaries and to the water quality planning process.

During 1975, the expanded monitoring program adopted by the Commission and initiated in 1974 reached almost full implementation. A substantial number of new stations were activated, other stations already part of the strategy were re-located, and full-scale manual sampling was instituted.

manual sampling

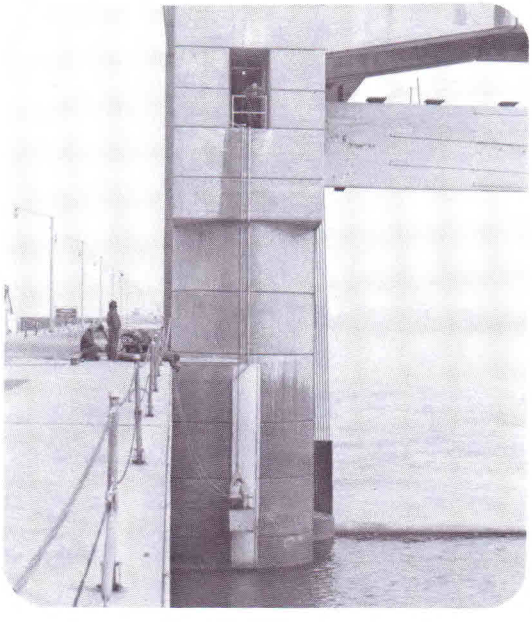
Samples are collected for general chemical analyses at thirty-five locations along the Ohio River and the lower reaches of major tributaries, and three surveillance specialists stationed in Wheeling, West Virginia, Ft. Mitchell, Kentucky, and Evansville, Indiana, routinely observe the river, collecting and examining the samples. Monthly analyses of trace metals and mineral analyses are conducted in cooperation with U.S. Geological Survey regional laboratories. The results of all investigations are made accessible via placement in U. S. EPA and U. S. Geological Survey data banks.

Cannelton Lock and Dam (above) . . . a new electronic monitor station being installed (right)

A Commission study team reviews the monitoring strategy.

coordination with the corps of engineers

The Surveillance Program facilitates a pooling of resources among government agencies involved with the environment. In 1975, the U. S. Corps of Engineers and the Commission entered into a contractual agreement which includes the sharing of both monitoring data and technical support services via the installation of three additional robot monitors on the Allegheny and Kiskiminetas Rivers. The mutual arrangement enhances the ability to assess stream quality at and near the headwaters of the Ohio and assists the Corps in synchronizing its reservoir operations on the Allegheny and Kiskiminetas Rivers with river quality conditions. The Corps also provides financial assistance for laboratory analyses performed by the U. S. Geological Survey under the manual sampling program.



analytical quality assurance

Verification of the quality and accuracy of data is vital. As a part of the ongoing quality control program, an evaluative process dependent upon river cross-sectioning was undertaken. In the summer of 1975, a study team composed of representatives from the U. S. Geological Survey worked in cooperation with representatives of ORSANCO to determine if discrepancies existed between actual river conditions and data from the augmented monitoring program and to pinpoint variations within a data set collected for all major water quality parameters at each river location from which samples are taken. Using electronic probes for measurement, the team traversed each of 37 sampling points on the Ohio and its major tributaries and validated each sampling location.

Cross-sectioning determines discrepancies between real river conditions and monitor data.

biological sampling

Surveillance of the river includes periodic scrutiny of aquatic life, and comparisons of the present overall composition of the fish population with related information established in 1957-60 and 1968-70 studies. Such biological investigations were conducted at eight lock and dam sites along the Ohio in 1975, with the cooperation of the Pennsylvania Department of Environment Resources, the Pennsylvania Fish Commission, the West Virginia Department of Natural Resources, Fish and Wildlife and Water Resources Divisions, the Ohio Department of Natural Resources, the Kentucky Department for Natural Resources and Environmental Protection, the Kentucky Department of Fish and Wildlife Resources, the Indiana Stream Pollution Control Board, the Illinois Environmental Protection Agency, the U. S. Environmental Protection Agency, the U. S. Fish and Wildlife Service, and the U. S. Corps of Engineers. The samples were taken at the following lock and dam sites: Dashields (mile point 13.3), Pike Island (mile point 84.2), Belleville (mile point 203.9), Gallipolis (mile point 279.2), Meldahl (mile point 436.2), Markland (mile point 531.5), Cannelton (mile point 720.7) and Lock & Dam #52 (mile point 903.1).

A comparison of the five species of fish having the greatest weight and abundance from the 1957-60 studies with those from the 1968-70 and 1975 samplings indicates that the species distribution has shifted in the Ohio River. Although the Gizzard shad, Carp, Shiners and Channel catfish continue to occupy a large portion of the sample collections, both by number and weight, the most significant changes have occurred in the upper river, where a greater diversity of species sought by both sport and commercial fisherman has been observed in the sample collections. The Crappie, Largemouth bass, Spotted bass, Sauger and Freshwater drum are now showing up in greater numbers, in comparison to the 1957-60 recoveries. These species are considered to be pollution sensitive. This trend parallels improvements in water quality conditions, in pH and dissolved oxygen, for instance, in the upper and middle portions of the river.

The State of West Virginia has in fact reported that over 100 Bass tournaments were held on its portion of the Ohio River during 1975, and that the rate of catch was excellent. Moreover, the West Virginia Department of Natural Resources is now stocking the Ohio River with Northern pike and Striped bass in an effort to establish substantial populations of these fish for sport and commercial catch in its portion of the river.

Although the general recovery of water quality and the associated revival of valuable fish populations in the Ohio River are cause for optimism, more subtle chemical pollutants were discovered in the catfish population sampled during 1975. By cooperative arrangement, the U. S. Food and Drug Administration analyzed these fish for the presence of pesticides and trace elements. The FDA analyses revealed no undue concentrations of trace elements such as mercury in the catfish, but concentrations of chlordane, a pesticide, and polychlorinated biphenyls (PCB's), a group of compounds used for a variety of industrial purposes, were detected. Although the actual quantities of these chemicals found in the river water are so small that they are difficult to measure, fish are efficient concentrators, and so the amounts found in the edible portions of fish may be of great concern. Investigations have since been underway to ascertain the sources of these chemical pollutants and to eliminate the chemicals from the bio-system of the stream.

knowledge of stream quality—one product of surveillance

Water quality in the Ohio River and its major tributaries is appraised using a combination of chemical, bacteriological and physical variables. The following discussion is founded upon in-depth analyses of data acquired through the monitor network and will focus upon the most noteworthy aspects of water quality for the calendar year 1974. A more detailed examination of 1974 water quality is presented in *Ohio River Main Stem: Assessment of 1974 and Future Water Quality Conditions* (prepared for Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia in partial fulfillment of the provisions of Section 305(b) of Public Law 92-500).

State stream standards are applied in the following evaluations of Ohio River main stem water quality. However, because standards for assessing water quality on the tributaries may vary both within a state and for distinct reaches of a given river, ORSANCO criteria are used to provide an overview in discussions of tributary water quality.

highlights on the ohio river main stem

Dissolved oxygen levels in the first sixty miles of the Ohio River met state standards, based on warm-water aquatic life requirements as the result of the late 1973 completion of secondary treatment facilities at the Allegheny County Sanitary Authority plant serving the Pittsburgh metropolitan area.

In addition, pH levels improved over prior years in the upper portion of the Ohio.

In the segment of the main stem from Cincinnati to below Louisville, the state DO standards and ORSANCO criteria were not met for varying periods during the summer and fall months. Completion of secondary facilities at major Cincinnati and Louisville area treatment plants within the next two years will result in compliance with DO levels under most river flow conditions. To assure that satisfactory DO levels are maintained throughout the length of the river, facilities for best practicable or secondary treatment of the other large industrial and municipal discharges will be necessary.

In addition to warm-water aquatic life, the Ohio River is classified for primary (body contact) recreation and public and industrial water supply. However, state total or fecal coliform standards for recreation and similar standards for public supply were met in only limited sections of the river. Required improvements in disinfection of municipal and some industrial discharges will minimize the effect of these effluents on fecal coliform levels in the river. Nonpoint sources of total and fecal coliform bacteria will be major determinants in future compliance with state standards.

Trace metal standards are based upon aquatic life and public water supply requirements. Occasional high values for hexavalent chromium, copper, lead and mercury exceeded the applicable aquatic life standards of one or more Ohio River states. Variations in levels of these and other parameters (nitrogen and phosphorus compounds, iron, manganese, arsenic, silver, and other trace materials) appear to be unrelated to municipal, industrial or tributary discharges and are probably primarily attributable to nonpoint sources of pollutants such as urban and rural runoff.

Other water quality characteristics, including temperature, dissolved solids, chloride, sulfate, fluoride, alkalinity and hardness, met state or generally accepted criteria throughout the year. Seasonal and long-term variations in the concentrations of these materials will continue to be determined by geological, meteorological and river flow conditions in the Ohio Basin.

tributary water quality

The water quality of major tributaries to the Ohio is not appraised in the report, *Ohio River Main Stem: Assessment of 1974 and Future Water Quality Conditions* and is therefore discussed in greater depth, according to specific parameter and its use.

Dissolved Oxygen — for Aquatic Life

During 1974, ORSANCO criteria for dissolved oxygen were met 100 percent of the time at monitor sites on the Monongahela, Allegheny, Big Sandy, Licking, Great Miami and Wabash Rivers.

Violations occurred during late summer months on three major tributaries to the Ohio. At the Beaver River monitor site, DO criteria infractions were recorded 50 percent of the time in August, approximately 35 percent of the time in September and 37 percent of the time in October. At Beverly, Ohio, on the Muskingum River, the DO criteria were not met approximately 22 percent of the time during August. In Winfield, West Virginia, at the monitor station on the Kanawha River, DO levels fell below the criteria approximately 22 percent of the time in July, 83 percent of the time in August, and 21 percent of the time in September. Industrial wastewater discharges to the Kanawha and municipal and industrial discharges to the Beaver are primarily responsible for the low DO levels at the monitors on these rivers. On the Muskingum River, low DO levels may be caused primarily by nonpoint sources of pollutants and in-stream biological activity.

pH — for Aquatic Life

pH levels in the acceptable range of 6.0 through 8.5 were recorded 100 percent of the time at electronic monitors on the Beaver, Muskingum, Kanawha, Big Sandy, Licking and Great Miami Rivers. Levels below 6.0 were recorded on the Monongahela in January, February, May, September, and October, and on the Allegheny in January and June. Levels in excess of 8.5 were recorded on the Wabash River during April, August and November.

Temperature — for Aquatic Life

Except for the January 1974 record at Winfield on the Kanawha River, temperature criteria were met 100 percent of the time at the nine tributary electronic monitor stations. January Kanawha River temperatures exceeded 50 degrees F., the criterial limit, five percent of the time, with a maximum hourly value of 51.4 degrees F. and a maximum daily value of 50.9 degrees F.

Dissolved Solids — for Public Water Supply

Dissolved solids criteria for public water supply specify a maximum monthly average conductivity of 800 micromhos/cm and a limiting single value of 1200. These criteria were met 100 percent of the time at the nine tributary electronic monitor stations, with one exception. In August, the limiting single value was exceeded 2.6 percent of the time at the Muskingum River monitor site, where maximum observed conductivity was 1220 micromhos.

Coliform — for Recreation and Public Water Supply

Total coliform counts are available from water treatment plants at Wilkinsburg on the Allegheny River and Beaver Falls on the Beaver River. The total coliform criteria for public water supply were not met for ten months on the Allegheny River and for the entire year on the Beaver River. The criteria for recreation were exceeded at both locations.

Threshold Odor — for Public Water Supply

At Wilkinsburg on the Allegheny, the threshold odor number criterion of 24 was met 100 percent of the time, with maximum values of 14 reported during May and June. The criterion was exceeded, however, throughout 1974 at Beaver Falls on the Beaver River, where values ranged from a minimum of 40 to a maximum of 90.

mine drainage

Mine drainage has been and continues to be a principal water pollution problem in the valley. During 1975, the Commission assessed the issue and its associated control programs in the seven coal producing states within the compact district. It established that conditions related to mine drainage are highly variable from state to state, that several state agencies are responsible for various aspects of the mine control program in each state, that the manpower and effort expended by a state are determined by such factors as the type and number of mining operations, nature and composition of the coal strata and associated inert materials, and that present control programs are generally effective in controlling drainage from active underground and surface mines. Present problems, it was concluded, center upon abandoned mines. Despite the fact that currently operating mines may not adversely affect the stream quality, completion of mining may cause problems unless detailed planning measures and abandonment requirements are incorporated into state requirements for new mines. A work group of the ORSANCO Engineering Committee was established to submit specific recommendations for state and regional mine drainage control programs and to develop premining planning requirements which will minimize future water quality problems resulting from mining activities.

underground injection of wastewaters

The issue of underground injections of wastewaters from industrial operations into porous formations beneath the earth initially came into Commission focus eight years ago when the possibility was posed that the injected wastewaters might spread from one state to another, thus becoming an inter-jurisdictional issue. For this reason, the Commission, with cooperative funding from the U. S. Geological Survey, initiated the Mt. Simon Sandstone study. The Mt. Simon formation was chosen because it is employed for underground injection of wastewaters, it is highly porous, and it stretches through the geological strata beneath most of the Ohio River basin. The study is providing an extensive description of the formation, its geological attributes, its physical and chemical nature, and the composition of its water. Geological cross-sections and maps detailing the structural nature of the formation have also been developed. The results of the project will supply the fundamental facts necessary for appraising the suitability of the sandstones for receiving liquid wastes. The findings pertinent to this study were examined in depth during 1975, and the complete report is scheduled for publication in 1976.

More specific data on operations of all deep well injection systems was amassed during 1975 in order to bring the ORSANCO *Registry of Wells* up-to-date. The *Registry* has furthered a mutually beneficial exchange of information between the Commission and signatory states of the compact because of its delineation of the operational details and current status of deep wells within the basin.

spills and accidental discharges

In 1975, the Commission, after coordination with the Coast Guard and the U. S. Environmental Protection Agency, determined that an earlier Commission procedure should be re-established for reporting spills and accidental discharges to basin streams. The Commission thus reinstituted a Hazard Alert System this year, issuing a guide which informs readers of the appropriate communications channels to be taken should a spill occur and which directs the individual reporting the spill to current state, regional and national response centers. The Hazard Alert System complements efforts of the Coast Guard, the U. S. EPA and the compact states. It is specifically designed to assure that water users receive timely notification of incidents which may adversely affect their operations.

A sizeable number of spills occur on the Ohio each year because the river is a major commercial transportation artery.

administrative highlights

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

the Commission

- Wesley E. Gilbertson entered his second term as Chairman of the Commission.
- Arnold L. Mitchell continued on as Vice Chairman.
- Albert J. Brooks was re-elected Secretary-Treasurer of the Commission.
- Kenneth O. Gibson was appointed by Governor Wendell H. Ford as a member of the Commission, representing the Commonwealth of Kentucky and replacing Dale H. Farabee.
- John S. Hoffman succeeded Thomas O. Harris as ex officio Commissioner from the Commonwealth of Kentucky.
- Ogden R. Reid replaced James L. Biggane as ex officio Commissioner from the state of New York.
- Thomas R. McNamara, appointed by Governor Mills E. Godwin, Jr. to represent the Commonwealth of Virginia, succeeded Andrew M. McThenia, Jr.
- Luther N. Dickinson became U. B. Yeager's successor, from the state of West Virginia.

the Staff

- William L. Klein was named Assistant Executive Director by administrative designation. Jessica D. Barron, Ph.D. joined the administrative staff as Information Specialist.
- As part of the implementation of the monitoring strategy, A. D. "Andy" Sidio of the Federal Environmental Protection Agency joined the staff on assignment through the Intergovernmental Personnel Act as Manager of Surveillance. Thomas Lux, James Taft, and Glenn White were selected as Surveillance Specialists; June E. Schlueter is now Secretary to the Surveillance Program.
- Majid Chaudry, Ph.D., joined the Technical Services staff as Environmental Engineer.

publications: 1975

Ohio River Main Stem: Assessment of 1974 and Future Water Quality Conditions. March, 1975. A detailed examination of 1974 water quality on the Ohio River main stem. Prepared for Illinois, Indiana, Kentucky, Ohio, Pennsylvania and West Virginia in partial fulfillment of the provisions of Section 305(b) of Public Law 92-500. (limited quantity available).

Report and Notification of Spills and Accidental Discharges. July, 1975. A compilation of procedures for notifying appropriate sources in the event of a spill or an accidental discharge and for minimizing their effects upon users of waters within the jurisdiction of the Compact.

Revenue Programs for Wastewater Agencies. August, 1975. A detailed explanation of inter-community wastewater collection and treatment system sharing cost for the lay person; Prepared by the Engineering Committee with the cooperation of members of the Chemical Industry Advisory Committee.

Study of Prospective Water Pollution Control Activities for the Ohio River Valley Water Sanitation Commission (ORSANCO). March, 1975. A comprehensive examination and analysis of the ongoing role and program of the interstate agency, including recommendations for future agency action; Prepared by Wendell and Associates for the United States Environmental Protection Agency, Region V.

Thermal Discharges to the Ohio River: An Evaluation of River Temperature Relationships. 1964-1974. December, 1975. An evaluation of the impact of heat emitted to the Ohio River from power plants, including a complete inventory of power generating facilities in operation along the Ohio and an examination of the effects of their discharges in relation to river flow, air temperature, and aquatic life.

Financial Report

The following information relative to revenues, expenditures, 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, 1975.

OHIO RIVER VALLEY WATER SANITATION COMMISSION

STATEMENT OF REVENUES AND EXPENSES PAID FOR YEAR ENDED JUNE 30, 1975

Revenues:		
From signatory states:		
State of Illinois	$ 11,088.00	
State of Indiana	40,942.00	
Commonwealth of Kentucky	45,760.00	
State of New York	2,332.00	
State of Ohio	56,386.00	
Commonwealth of Pennsylvania	32,164.00	
Commonwealth of Virginia	7,524.00	
State of West Virginia	23,804.00	
Total from signatory states		$220,000.00
From U. S. Environmental Protection Agency (Grant by authority of Federal Water Pollution Control Act)		347,623.09
Other revenue:		
Interest earned on bank deposit	5,331.66	
Sale of publications	574.90	
Miscellaneous	39.00	
Total other revenue		5,945.56
Total revenues		573,568.65
Expenditures:		
From current year funding	577,750.87	
From prior year funding	28,223.56	
Total expenditures		605,974.43
Excess of expenditures over revenues		$ 32,405.78

STATEMENT OF RESOURCES AT JUNE 30, 1975

Cash:		
Central Trust Company	$ 4,300.55	
On hand	200.00	
		$ 4,500.55
Deposits:		
American Airlines	425.00	
Ohio Bureau of Workmen's Compensation	238.00	
		663.00
Accounts receivable:		
U. S. Environmental Protection Agency	53,560.63	
Signatory states	11,068.00	
Advances for employees: Travel advances	445.00	
		65,073.63
		70,237.18
Less:		
Accounts payable — payroll withholdings	255.93	
Excess of advances over expenses of U. S. Geological Survey Grants entitled Characteristics of Subsurface Formations for the Storage or Disposal of Wastewater	20,277.77	
		20,533.70
Available resources before encumbrances at June 30, 1975		$ 49,703.48
Available resources before encumbrances at June 30, 1974	$ 82,109.26	
Less excess of expenses paid over revenues	32,405.78	
Available resources before encumbrances at June 30, 1975		$ 49,703.48
Less unexpended encumbrances		29,359.49
Available resources after encumbrances at June 30, 1975		$ 20,343.99

ORSANCO Staff*

Leo Weaver — Executive Director & Chief Engineer
William L. Klein — Assistant Executive Director
Albert J. Brooks — Office Manager
Jessica D. Barron — Information Specialist
Janice Squires, Donna M. Carroll — Secretaries

SURVEILLANCE PROGRAM

A. D. Sidio — Manager
John Donnelly — Head, Data Acquisition Engineering
Thomas Lux — Surveillance Specialist
Glenn White — Surveillance Specialist
James Taft — Surveillance Specialist
June E. Schlueter — Secretary

TECHNICAL SERVICES

Robert J. Boes — Manager
Majid Chaudhry — Environmental Engineer
Jane Renaldo — Secretary

DATA PROCESSING

Edward L. McDonough — Manager
Richard Smith — Senior Analyst
Alice Gosney — Supervisor, Computer Operations
Robert Laugel — Programmer/Analyst
Lou Ann Hughes — Secretary

**As of June, 1976*

Credits:
ART — Ros Reich
Wilder Fearn Assoc.
George Williams

regulatory agencies of the signatory states

ILLINOIS
Environmental Protection Agency
State of Illinois
2200 Churchill Road
Springfield, Illinois 62706
(217) 525-5467

INDIANA
Indiana Stream Pollution Control Board
1330 West Michigan Street
Indianapolis, Indiana 46206
(317) 633-4420

KENTUCKY
Department of Natural Resources
Capital Plaza Tower
Frankfort, Kentucky 40601
(502) 564-3410

NEW YORK
Environmental Health Services
NYS Department of Environmental Conservation
50 Wolf Road
Albany, New York 12201
(518) 457-7362

OHIO
Ohio Environmental Protection Agency
P.O. Box 1049
Columbus, Ohio 43216
(614) 466-2390

PENNSYLVANIA
Department of Environmental Resources
P.O. Box 2351
Harrisburg, Pennsylvania 17120
(717) 787-2666

VIRGINIA
State Water Control Board
P.O. Box 11143
Richmond, Virginia 23230
(804) 770-2241

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

ORSANCO
414 Walnut Street
Cincinnati, Ohio 45202
(513) 421-1151