

**OHIO RIVER VALLEY
WATER
SANITATION
COMMISSION**

5th. Annual Report... of interstate
pollution-control activities to the Governors
of Illinois, Indiana, Kentucky, New York, Ohio,
Pennsylvania, Virginia, West Virginia

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OHIO RIVER VALLEY WATER SANITATION COMMISSION

414 WALNUT STREET CINCINNATI 2, OHIO

To the Chairman and
Members of the Commission

The theme of this report is action -- action by the signatory states, by municipalities, by industries, by the Commission -- in the control of water pollution. Five years have passed since a regional campaign was launched in the Ohio River Valley to secure such action.

From the record here presented you have reason to take satisfaction in what is being accomplished. There has been a lot of action. So much, in fact, that in some respects the task to which the efforts of the Commission have been dedicated has reached the halfway point to completion. At least this is the conclusion I draw from the tempo of present progress and certain statistical evidence.

All this is possible because many people and many interests have been enlisted in support of the Commission's program. Throughout the pages of this report, for example, you will find references to the contribution of industry representatives, aquatic-life specialists and advisory groups such as the Water Users Committee. They are rendering voluntary services to the advancement of our program far beyond the ability of the Commission to command within its budgetary limits.

Respectfully submitted,

Edward J. Cleary
EDWARD J. CLEARY

November 20, 1953

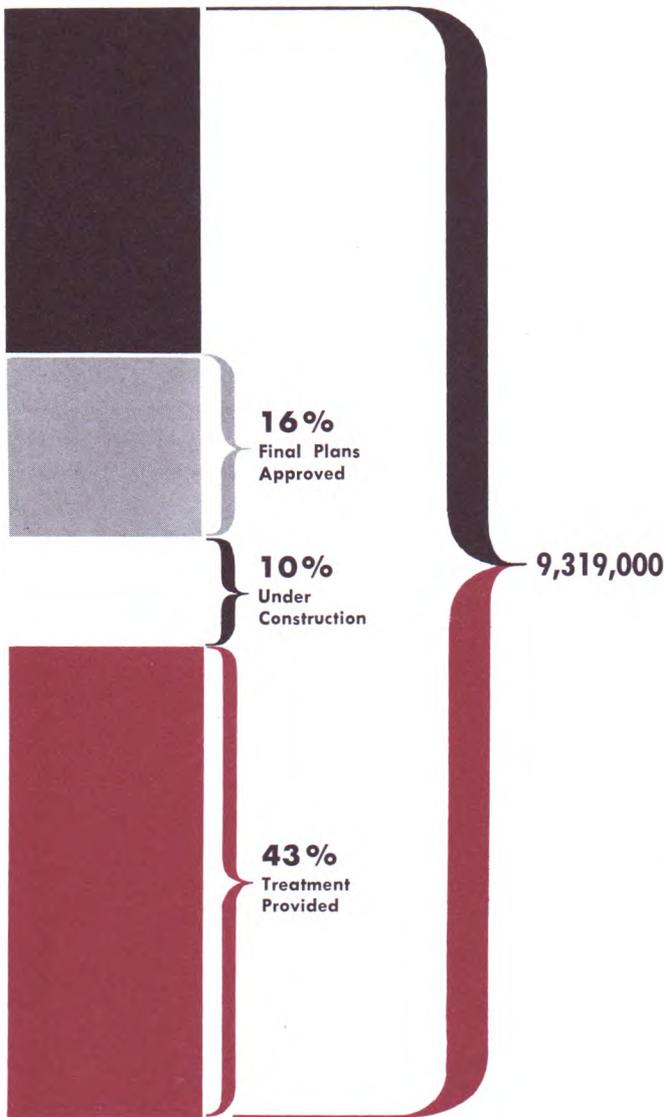
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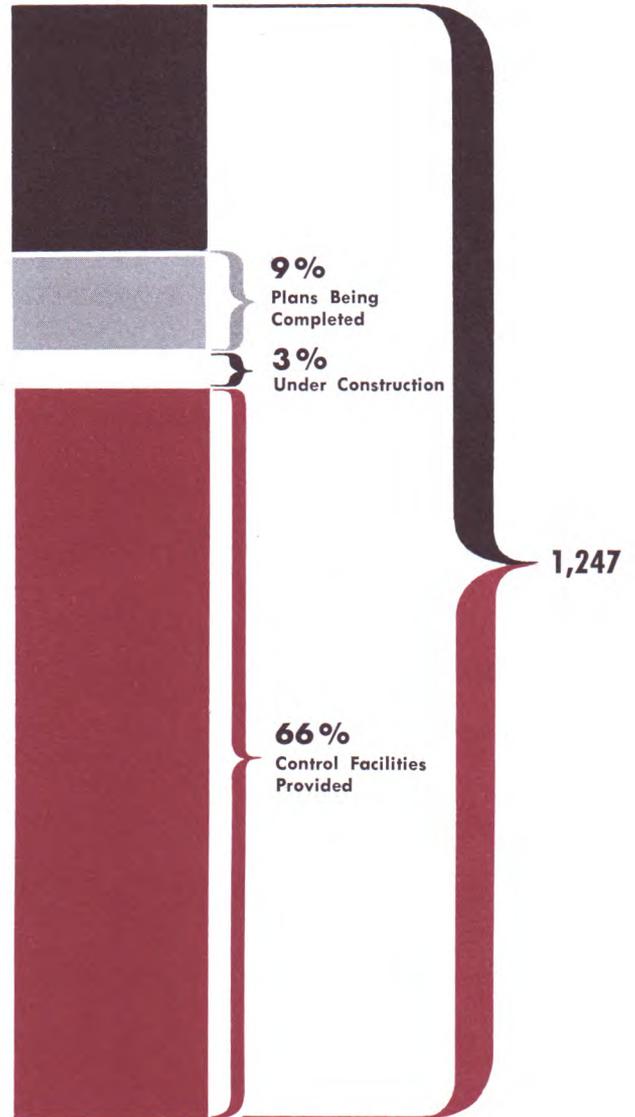
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Action

MUNICIPAL SEWAGE



INDUSTRIAL WASTES



PATTERNS OF PROGRESS in pollution control. The left graph shows total sewered population and the relative status of treatment plant installation. The graph on the right shows number of industries discharging directly into streams and the status of control facilities; there are many more thousands of industries in the Ohio Valley but they are discharging into municipal sewer systems.

. . . at a glance

- ★ Five years is a short time in a campaign of interstate stream-pollution control when we consider that the problem has been more than fifty years in the making. Yet in the brief period during which eight states in the Ohio River Valley have been joined in a regional campaign to curb the degradation of water resources a great transformation has occurred. New pollution has been curbed, existing pollution is being decreased and the trend of half a century has been reversed.
- ★ The eight states that met in Cincinnati on June 30, 1948 to sign a compact for joint action take pride in this progress, tangible evidence of which is depicted on the adjoining page. For municipalities it shows that 43 percent of the sewered population of 9,319,000 is receiving some form of treatment. Another 10 percent are building new facilities. And an additional 16 percent have final plans ready for construction. Not only are streams receiving less sewage pollution than they had before but the prospect for even cleaner streams lies immediately ahead because of new treatment works reaching completion.
- ★ On the industrial front the record shows that of the 1,247 industries discharging directly into Ohio valley streams 817 now are operating control facilities, 31 are constructing facilities and 117 are completing plans for installation of waste-reduction works. Substantial quantities of industrial waste are being treated in municipal disposal plants because the majority of industries are connected to city sewers.
- ★ These accomplishments grow more impressive when it is considered that the past several years have not been propitious for construction. The war emergency, with consequent curtailment of materials and then the moratorium on the issuance of public-works bonds, have handicapped progress in the building of sewage-treatment plants.
- ★ And it should be recalled that not all of the state regulatory agencies were equipped with adequate legislation to carry out the action contemplated by the compact. It was not until March 6, 1953 that the last of the signatory states succeeded in strengthening and amending its laws to comply with the compact pledge. And in two states—Kentucky and Ohio—it was found desirable to secure passage of entirely new legislation.
- ★ These are but the highlights of what has transpired during five years of action on the greatest regional campaign of pollution control ever undertaken in this nation. Details of what has happened and of the goals ahead are presented in the following pages.

Action

What the states of Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia, and West Virginia are doing to secure pollution control in the Ohio River Valley can be summed up in the phrase—they are demonstrating they can work together to do a job that no one of them could do alone. This is evidenced in their:

Pooling of resources and police powers by means of a compact approved by the Congress of the United States;

Support of an interstate commission to conduct investigations, hold public hearings, establish regulations and issue notices for compliance to municipalities and industries whose discharge of wastes may affect the quality of interstate waters; and

Enactment of necessary legislation to enable each state to carry out the pledge made in the Compact for "faithful cooperation" in securing compliance with regulations.

When on June 6 of this year certain amendments to the West Virginia pollution-control act became effective, every state signatory to the compact could report that it had fulfilled one of its major obligations to the interstate agreement. This means that each of the states now has the adequate legislation to accelerate control action; in two states this required a completely new law. The significance of this achievement in the short space of five years is dwarfed only by the progress made at the same time in securing actual reduction in pollution and preventing new pollution.

Among the actions taken in each of the states which have influenced the development of the Ohio River Valley program are the following:

ILLINOIS—Legislation was completely revamped two years ago to consolidate all pollution-control authority in one agency (except pollution from oil-field waste) and to facilitate the financing of sewerage works. This clarification has materially assisted in promoting the pollution-abatement program.

During the past year, a municipal treatment plant was placed under construction at Rantoul and one major plant improvement made at Olney; the secondary treatment facilities for the Village of Cissna were likewise placed under construction.

Industry-wise, the Peabody Coal Company has improved its acid-control facilities; General Motors plant at Danville has made treatment plant improvements, and the Texas Company at Lawrenceville has continued to improve its operations. Several canneries and slaughterhouses have made changes to improve their collection and waste-handling facilities.

Two extensive pollution surveys are being completed—the Embarrass River at Lawrenceville and Vermilion River at Danville. Adequate treatment facilities are now in operation for more than two-thirds of the 311,000 sewered population from Illinois in the Ohio basin. Of the 11 industrial plants which discharge directly to streams in the area eight now have adequate treatment or control facilities.

INDIANA—Progress in Indiana was reflected in construction of new plants and additions to existing facilities. Seven new municipal sewage-treatment works and major improvements to another were completed and placed in operation. Five new plants or additions were under construction.

The state's largest construction project, that at Indianapolis, has reached the stage where present contracts total

\$4 million for plant enlargements and for intercepting sewers \$4.6 million.

Of the 1,691,000 population connected to sewers in the Ohio valley portion of Indiana, some 71 per cent is provided with treatment facilities. Not all of the treatment facilities are considered adequate, however. Although new construction starts during the first half of 1953 were not up to expectations, a number of large projects did reach the stage where early receipt of bids is anticipated.

Highlight of the year in the industrial-waste control program has been the compliance of industries with the new regulation for the protection of waters from cyanide pollution. Known as Regulation SPC 2 it reads:

"Any person, firm or corporation engaged in manufacture or other process in which cyanides or cyanogen compounds are used shall have each and every room, where said compounds are used or stored, so constructed that none of said compounds can escape therefrom by means of building sewer, drain or otherwise directly or indirectly into any sewer system or water-course;

"Provided, however, that on application to and prior approval by the Stream Pollution Control Board, limited amounts, which it is determined would not be detrimental to public health or which would not pollute any lake, river, stream, drainage or roadside ditch or other water-course, shall not come under the provision of the paragraph above."

The installation of waste disposal facilities at the Morgan Packing Company at Austin and the Emge Packing Company, Fort Branch, were major accomplishments during the past year. Of the 215 industries discharging directly

. . . by the states

to streams in the Ohio River watershed 194 now have waste control facilities in operation of which 109 are considered completely adequate.

KENTUCKY—Operating under a completely new law that became effective in June 1950 the Commonwealth of Kentucky has centralized pollution-control operations in a single agency. A permit system for the discharge of wastes is being administered as a means for systematic and individual review of progress toward curbing pollution by municipalities and industries.

This year a regulation was adopted whereby no permits for sewer extensions would be approved for communities until evidence was submitted that installation of sewage-treatment facilities were either available or being definitely planned for construction. A similar regulation was recently adopted in West Virginia; Illinois and Indiana have employed such a regulation for a number of years.

The sewered population in Kentucky totals 1,112,000. Of this number some 46 percent are provided with treatment facilities or have plants under construction. Biggest source of untreated sewage is Louisville whose population of 369,129 represents one-third of the sewered population in the state; here the matter of financing a sewage disposal plant is currently under consideration.

Kentucky's position with regard to the Ohio River pollution abatement compact program is emphasized by the fact that 660 miles of the 981-mi. Ohio River actually forms part of the Commonwealth.

NEW YORK—The state water pollution control law, enacted in 1949, provides for the classification of all waters according to best usage. Such classification is legally established following a detailed sanitary survey of the respective drainage basins and public hearings conducted by the Water Pollution Control Board.

The total area in New York State tributary to the Ohio River, a section of the Allegheny River basin, is 1,955 square miles.

Required surveys of the Conewango Creek, French Creeks, and Brokenstraw Creeks Drainage Basin (tributary to the Allegheny River), embracing 930 square miles, were made in 1950. The public hearing prior to classification was held on March 27, 1952. The streams were officially classified on October 1, 1952. An abatement program was adopted by the Water Pollution Control Board on April 27, 1953 and progress is now being made toward the correction of violations. The city of Jamestown has employed engineers to prepare plans for secondary treatment facilities, and Chautauqua County has employed a sanitary engineer to devote full time to abatement of pollution caused by inadequate private disposal systems, principally around Chautauqua Lake. Excellent cooperation has been manifested by the industries of the area.

The survey of the Olean Creek Drainage Basin (tributary of the Allegheny River) was made in 1951 and embraced an area of 205 square miles. The public hearing prior to classification was held November 19, 1952. Action on adoption of official classification of the streams is anticipated in the near future.

Surveys of the remaining area of the Allegheny River drainage basin in New York, embracing 965 square miles, have been started. Because of limited facilities, it is expected this work cannot be completed before 1954.

New York has the smallest sewered population of any of the compact states draining into the Ohio River watershed—104,000. Sewage-treatment facilities have already been provided for 94,000, about half of which are considered completely adequate. Of the 29 industries discharging directly into streams 25 have control facilities in operation but only one is considered adequate.

OHIO—When the permit section of Ohio's Water Pollution Control Act became effective September 27, 1952, a new impetus was given to the state's pollution abatement program. Slightly more than 500 municipalities and a few less than 500 industries in the entire state are now under permit jurisdiction. Those lacking adequate waste-treatment facilities have been informed that renewal of the permits is contingent upon specific steps being taken toward the elimination of pollution.

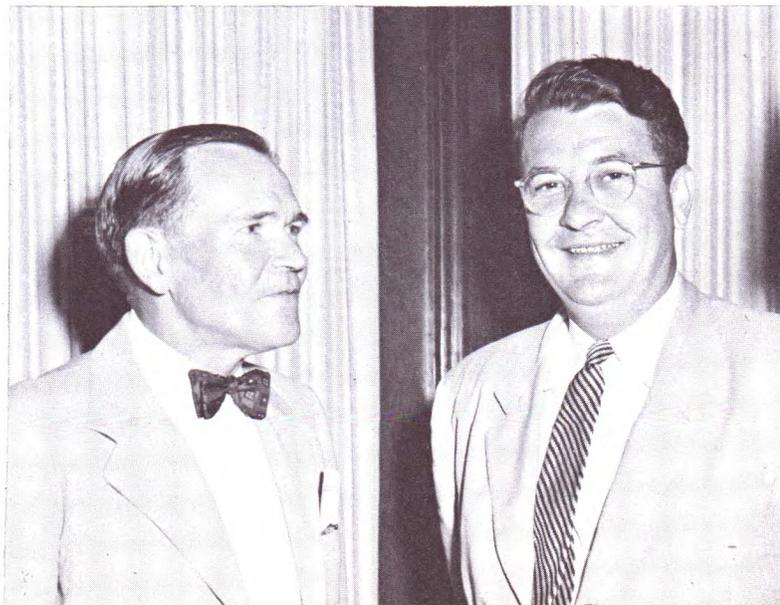
The Ohio General Assembly meeting in 1953 considered but decided not to change the Water Pollution Control Act which was passed in 1951. (An attempt to obtain an exemption or moratorium for villages under 5,000 population was defeated).

Ohio has the largest sewered population of the states draining into the compact area streams, the total being 2,978,000. Some 52 percent of the sewage is treated, more than half of which is considered adequate. Under construction are treatment works for fifteen communities to serve another 22 percent of the population. Final plans have been approved for construction of facilities to serve 44 communities.

On the industrial front there are 240 industries discharging directly into streams; 225 have some form of control facilities in operation, 34 of which are considered adequate. During the past year 13 industrial waste control facilities costing \$1,800,000 were put in operation.

PENNSYLVANIA—The 1953 General Assembly passed a bill authorizing the state department of health to make

Governor William C. Marland (right) of West Virginia appeared before the Commission with vice-chairman W. W. Jennings to applaud pollution-control progress and urge more action.



financial grants to municipalities to aid in defraying the cost of sewage-treatment works. The bill asserts the principle that: "The responsibility to preserve and improve the purity of the waters of the Commonwealth does not rest solely upon municipal government but is also a function and responsibility of state government acting in the interest of the general public health."

The bill provides that beginning in July 1954 and annually thereafter the state will pay toward the cost of operating, maintaining, repairing, replacing and other expenses relating to sewage treatment plants an amount not to exceed two percent of the costs for the acquisition and construction of such sewage treatment plants." An appropriation of \$2 million has been made for these purposes, and the provisions are retroactive to 1937 when Pennsylvania's pollution control law was enacted.

Progress on the Pittsburgh sewage treatment program, which includes facilities for 60 other municipalities at the headwaters of the Ohio River, has reached the point where final plans and specifications for the huge project are nearing completion; some plans have already been submitted for state approval by the Allegheny County Sanitary Authority.

Of the 2,231,000 sewered population discharging into the Ohio River watershed from Pennsylvania, 17 percent are now provided with treatment facilities. Three new treatment plants are under construction and final plans have been approved for 93 municipalities.

Of the 283 industries discharging directly into streams 113 are now provided with control facilities, 60 of which are considered adequate. Twenty-five have facilities under construction.

VIRGINIA—The 1952 General Assembly strengthened the state water-control law in the following respects: One change makes the discharge of untreated sewage from facilities serving 500 or more persons prima facie evidence of pollution. Thus, instead of the board having to prove pollution, the owner must prove that none exists.

In another change the board's order procedure was streamlined. Henceforth, when the board issues an order, it may require the owner to make monthly progress reports on what has been done to carry out the board's requirements. If the board determines that progress is unsatisfactory on the basis of such reports, or through any other source,

additional action may be taken via the order route, or the case taken directly to court for adjudication.

Another change authorizes the board to investigate any large-scale fish kill. If pollution is responsible, the board may collect from the offending owner damages sufficient to replace the fish killed with game fish which, in the opinion of the Commission of Game and Inland Fisheries, are suitable for such waters.

With a sewered population of 141,000 discharging in the Ohio watershed, Virginia reports that sewage-treatment facilities serving 50 percent are in operation, most of which are adequate. One new treatment plant is under construction and final plans have been approved for three more.

Of the 32 industries discharging directly into streams 15 have installed control facilities of which nine are adequate.

WEST VIRGINIA—Major weaknesses of the West Virginia statute were corrected in the 1953 legislative session, giving the State Water Commission one of the strongest pollution-control measures to be found among the states. One novel feature of the amended statute permits the state commission to authorize all persons not already having that right to employ powers of eminent domain to secure sites for waste-treatment purposes; this is designed to aid industries. Legislation was also enacted to enable the county courts, by the creation of public-service districts, to construct and finance sewerage facilities in unincorporated areas.

On January 14, 1953 the State Supreme Court of Appeals, in handing down a final decision in the City of Huntington case, upheld the constitutionality of the State Water Commission act and the authority of the commission to control pollution. Thus, adequate legislation, coupled with a favorable court decision, places West Virginia in a greatly strengthened position to fulfill its obligations under the interstate compact.

Of the 751,000 sewered population in West Virginia's area of the Ohio River basin nine percent is served with treatment works, construction of works is underway for 10 percent and final plans have been approved for facilities serving 30 percent more.

On the industrial side 301 plants are discharging directly into streams of which 100 have control facilities. Four have works under construction and 13 are in the plan stage of development.

SUMMARY OF SIGNIFICANT CHANGES SINCE JULY, 1952, IN MUNICIPAL SEWAGE-TREATMENT STATUS

| S T A T U S | Number of Communities (in color) and population served (in black) | | | | | | | | TOTAL |
|---|---|---------------|---------------|------------|---------------|--------------|-------------|-------------|---------------|
| | ILL. | IND. | KY. | N.Y. | OHIO | PA. | VA. | W. VA. | |
| New plants or plant additions placed in operation | 2 3,533 | 9 166,773* | 1 1,800 | 0 0 | 14 189,126 | 3 11,086 | 5 23,509 | 0 0 | 34 395,827 |
| New plants or plant additions placed under construction | 3 15,333 | 3 10,961 | 12 142,879 | 0 0 | 14 115,219 | 5 32,679 | 1 2,005 | 2 73,751 | 40 392,827 |
| Final plans approved | 0 0 | 1 58,479 | 2 7,535 | 1 1,492 | 6 31,054 | 9 23,296 | 0 0 | 0 0 | 19 121,856 |
| TOTAL | 5 18,866 | 13 236,213 | 15 152,214 | 1 1,492 | 34 335,399 | 17 67,061 | 6 25,514 | 2 73,751 | 93 910,510 |

* Includes Evansville (total pop. 128,636); plant (first of two) will serve 30,000

STATUS OF MUNICIPAL AND INSTITUTIONAL SEWAGE-TREATMENT FACILITIES — JULY 1, 1953

| S T A T U S | Number of Communities (in color) and Population Served (in black) | | | | | | | | | | | | | TOTAL | % OF TOTAL |
|---|---|------------------|------------------|---------------|------------------|------------------|---------------|----------------|--|--|--|--|--|--------------------|----------------|
| | ILL. | IND. | KY. | N. Y. | OHIO | PA. | VA. | W. VA. | | | | | | | |
| Adequate treatment | 33 219,708 | 76 397,205 | 78 232,950 | 7 40,910 | 114 825,770 | 53 274,136 | 17 55,189 | 13 38,062 | | | | | | 391 2,083,930 | 28.9 22.4 |
| Treatment provided, not adequate | 5 12,337 | 30 246,025 | 17 131,185 | 5 52,842 | 31 255,156 | 22 71,148 | 12 14,470 | 11 29,371 | | | | | | 133 812,534 | 9.8 8.7 |
| Treatment provided, not adequate, but improvements under construction | 2 8,946 | 3 563,125 | 0 0 | 0 0 | 11 469,490 | 7 25,808 | 0 0 | 2 2,250 | | | | | | 25 1,069,619 | 1.8 11.5 |
| New treatment works under construction | 1 6,387 | 2 4,536 | 13 143,204 | 0 0 | 15 662,010 | 3 29,780 | 1 2,005 | 3 76,201 | | | | | | 38 924,123 | 2.8 9.9 |
| Final plans approved | 20 44,459 | 30 222,081 | 15 116,244 | 2 10,353 | 44 321,831 | 93 572,635 | 3 7,205 | 20 231,377 | | | | | | 227 1,526,185 | 16.8 16.4 |
| Final plans in preparation | 0 0 | 2 47,441 | 1 7,952 | 0 0 | 5 115,326 | 76 1,080,859 | 0 0 | 4 114,829 | | | | | | 88 1,366,407 | 6.5 14.7 |
| Preliminary plans or report approved or in preparation | 0 0 | 7 38,455 | 6 33,400 | 0 0 | 12 237,774 | 26 89,953 | 12 30,332 | 8 55,481 | | | | | | 71 485,395 | 5.3 5.2 |
| Treatment program under discussion | 0 0 | 9 14,744 | 7 386,086 | 0 0 | 5 11,202 | 6 9,058 | 0 0 | 32 99,249 | | | | | | 59 520,339 | 4.4 5.6 |
| Order, notice or recommendation for treatment issued by state | 0 0 | 25 79,734 | 1 1,669 | 0 0 | 0 0 | 7 28,713 | 0 0 | 29 42,030 | | | | | | 62 152,146 | 4.6 1.6 |
| Sewage discharged to stream by permit or law | 0 0 | 0 0 | 0 0 | 0 0 | 0 0 | 13* 48,669 | 13* 30,570 | 0 0 | | | | | | 26 79,239 | 1.9 0.8 |
| Pollution of minor significance | 2 1,632 | 84 77,954 | 23 25,703 | 0 0 | 1 631 | 0 0 | 0 0 | 15 15,610 | | | | | | 125 121,530 | 9.3 1.3 |
| No action | 3 17,300 | 0 0 | 12 34,007 | 0 0 | 60 78,891 | 0 0 | 1 1,000 | 31 46,143 | | | | | | 107 177,341 | 7.9 1.9 |
| TOTAL | 66 310,769 | 268 1,691,300 | 173 1,112,400 | 14 104,105 | 298 2,978,081 | 306 2,230,759 | 59 140,771 | 168 750,603 | | | | | | 1,352 9,318,788 | 100.0 100.0 |

* Acid stream law (Pa.). Sewage permits (Va.).

Action

Abatement of pollution from municipalities on the Ohio River has commanded primary attention. To this end investigations have been completed, public hearings conducted, regulations adopted and notices for compliance issued to all communities from mile-point 0.0 (Pittsburgh) to mile-point 483 (below Cincinnati). This represents half the length of the river.

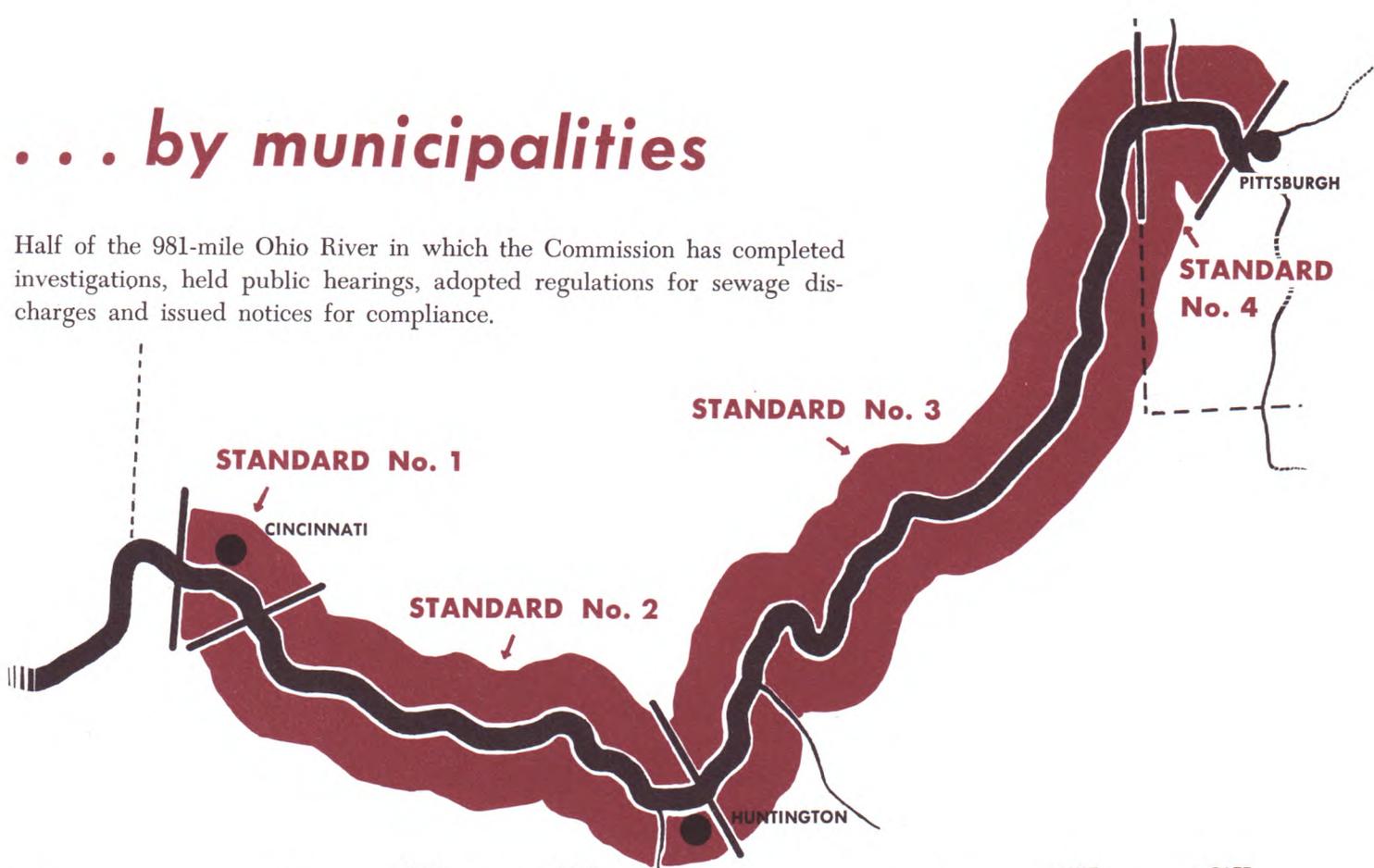
Municipalities in this stretch, numbering 113, are located in four different states—Pennsylvania, West Virginia, Ohio and Kentucky. Securing local compliance with Commission requirements is the immediate responsibility of the four state pollution-control agencies represented on the Commission. Following is a tabulation of the municipalities and their status. The category of action is indicated by a number, and the lower the number the greater the progress. The categories and their numbers are:

- | | |
|--|---------------------------------------|
| 1. Adequate treatment | 6. Preliminary plans in preparation |
| 2. Treatment provided, not adequate | 7. Treatment program under discussion |
| 3. Treatment plant or plant additions under construction | 8. Under state orders for compliance |
| 4. Final plans approved | 9. Temporary permit issued by state |
| 5. Final plans in preparation | 10. No sewerage system |
| | 11. No action |

| PLACE | STATE | MILE POINT | POP. | CATEGORY | PLACE | STATE | MILE POINT | POP. | CATEGORY |
|----------------------|-------|------------|---------|----------|-------------------------|----------|------------|--------|----------|
| Pittsburgh | Pa. | 0.0 | 676,806 | 5 | Baden | Pa. | 20.3 | 3,732 | 4 |
| Baldwin Township | " | 3.0 | 10,743 | 5 | Conway | " | 21.6 | 1,570 | 5 |
| Brentwood | " | 3.0 | 12,535 | 5 | Freedom | " | 23.4 | 3,000 | 4 |
| Mount Oliver | " | 3.0 | 6,646 | 5 | Rochester | " | 24.4 | 7,197 | 4 |
| Castle Shannon | " | 3.0 | 5,459 | 5 | Monaca | " | 24.4 | 7,415 | 4 |
| Reserve Township | " | 3.0 | 3,533 | 5 | Beaver | " | 26.2 | 6,360 | 4 |
| Mt. Lebanon Township | " | 3.0 | 26,604 | 5 | Borough Township | " | 27.0 | 2,750 | 4 |
| Dormont | " | 3.0 | 13,405 | 5 | Federal Housing Project | " | 27.8 | | 4 |
| Greentree | " | 3.0 | 2,818 | 5 | Midland | " | 36.5 | 6,491 | 4 |
| Ross Township | " | | 15,744 | 5 | Chester | West Va. | 43.3 | 3,758 | 5 |
| McKees Rocks | " | 3.0 | 16,241 | 5 | East Liverpool | Ohio | 43.5 | 24,217 | 9, 4 |
| Bellevue | " | 4.0 | 11,604 | 5 | Wellsville | " | 47.6 | 7,854 | 9, 4 |
| Avalon | " | 5.2 | 6,463 | 5 | New Cumberland | West Va. | 56.7 | 2,119 | 11 |
| Stowe Township | " | 5.3 | 12,210 | 5 | Toronto | Ohio | 59.1 | 7,253 | 9, 4 |
| Ben Avon Heights | " | 5.6 | 394 | 5 | Weirton | West Va. | 62.0 | 24,005 | 4 |
| Ben Avon | " | 5.7 | 2,465 | 5 | Steubenville | Ohio | 68.0 | 35,872 | 9, 4 |
| Emsworth | " | 6.2 | 3,128 | 5 | Follansbee | West Va. | 70.6 | 4,435 | 7 |
| Neville Township | " | 7.0 | 2,310 | 5 | Mingo Junction | Ohio | 71.0 | 4,464 | 11, 9 |
| Glenfield | " | 8.6 | 870 | 7 | Brilliant | " | 74.4 | 2,066 | 9, 6 |
| Coraopolis | " | 10.2 | 10,498 | 4 | Wellsburg | West Va. | 74.4 | 5,787 | 6 |
| Osborne | " | 10.8 | 496 | 5 | Rayland | Ohio | 81.6 | 726 | 9, 1 |
| Sewickley | " | 11.8 | 5,836 | 5 | Tiltonsville | " | 83.0 | 2,202 | 11, 9 |
| Edgeworth | " | 12.9 | 1,466 | 5 | Yorkville | " | 83.7 | 1,854 | 11, 9 |
| Leet Township | " | 14.5 | 1,905 | 7 | Martins Ferry | " | 88.8 | 13,220 | 9, 6 |
| Allegheny | " | | | | Bridgeport | " | 90.2 | 4,309 | 9, 6 |
| Housing Authority | " | 14.5 | | 6 | Wheeling | West Va. | 90.5 | 58,891 | 4 |
| Leetsdale | " | 14.8 | 2,411 | 5 | Brookside | Ohio | 91.0 | 845 | 11, 9 |
| Ambridge | " | 15.9 | 16,429 | 4 | Benwood | West Va. | 94.3 | 3,485 | 7 |
| Harmony Township | " | 18.0 | 912 | 4 | Bellaire | Ohio | 94.5 | 12,573 | 11, 9 |
| Aliquippa | " | 20.0 | 26,132 | 4 | McMechen | West Va. | 96.2 | 3,518 | 11 |

... by municipalities

Half of the 981-mile Ohio River in which the Commission has completed investigations, held public hearings, adopted regulations for sewage discharges and issued notices for compliance.



| PLACE | STATE | MILE POINT | POP. | CATE-GORY | PLACE | STATE | MILE POINT | POP. | CATE-GORY |
|------------------|-----------|------------|--------|-----------|--------------------|-------|------------|---------|-----------|
| Shadyside | Ohio | 97.6 | 4,433 | 11, 9 | Ironton | Ohio | 327.2 | 16,333 | 9, 3 |
| Glen Dale | West Va. | 99.4 | 1,467 | 7 | Russell | Ky. | 327.2 | 1,681 | 11 |
| Moundsville | " | 101.9 | 14,772 | 4 | Worthington | " | 332.7 | 695 | 6 |
| Powhatan Point | Ohio | 109.8 | 2,135 | 9, 1 | Greenup | " | 336.1 | 1,276 | 7 |
| New Martinsville | West Va. | 128.2 | 4,084 | 6 | New Boston | Ohio | 351.8 | 4,754 | 9, 5 |
| Paden City | " | 133.2 | 2,588 | 6 | Portsmouth | " | 356.0 | 36,798 | 9, 5 |
| Sistersville | " | 137.6 | 2,313 | 7 | Vanceburg | Ky. | 377.9 | 1,528 | 11 |
| Friendly | " | 141.6 | 216 | 10 | Manchester | Ohio | 397.3 | 2,281 | 11,9,4 |
| New Metamoras | Ohio | 142.0 | 781 | 11, 9 | Aberdeen | " | 408.4 | 551 | 11, 9 |
| St. Marys | West. Va. | 155.0 | 2,196 | 11 | Maysville | Ky. | 408.6 | 8,632 | 6 |
| Williamstown | " | 172.0 | 3,837 | 11 | Ripley | Ohio | 417.4 | 1,792 | 11,9,6 |
| Marietta | Ohio | 172.0 | 16,006 | 9, 4 | Higginsport | " | 424.6 | 385 | 11, 9 |
| Vienna | West Va. | 180.0 | 6,020 | 7 | Augusta | Ky. | 427.0 | 1,599 | 11 |
| Belpre | Ohio | 183.9 | 2,451 | 9, 6 | New Richmond | Ohio | 449.9 | 1,960 | 11, 9 |
| Parkersburg | West Va. | 184.6 | 29,684 | 4 | Silver Grove | Ky. | 459.4 | 859 | 6 |
| Ravenswood | " | 220.6 | 1,175 | 11 | Fort Thomas | " | 462.9 | 11,640 | 3 |
| New Haven | " | 245.5 | 969 | 11 | Southgate | " | 465.0 | 1,903 | 3 |
| Mason | " | 250.2 | 924 | 11 | Dayton | " | 467.8 | 8,977 | 3 |
| Pomeroy | Ohio | 250.3 | 3,656 | 9, 4 | Bellevue | " | 468.8 | 9,040 | 3 |
| Middleport | " | 252.1 | 3,446 | 9, 4 | Newport | " | 469.8 | 31,044 | 3 |
| Point Pleasant | West Va. | 265.2 | 4,596 | 7 | Cincinnati | Ohio | 470.0 | 503,998 | 9, 3 |
| Gallipolis | Ohio | 269.7 | 7,871 | 9, 4 | Covington | Ky. | 470.5 | 64,452 | 3 |
| Proctorville | " | 304.6 | 737 | 11, 9 | Ludlow | " | 472.5 | 6,374 | 3 |
| Huntington | West Va. | 308.3 | 86,353 | 5 | Bromley | " | 474.0 | 980 | 3 |
| Chesapeake | Ohio | 308.7 | 1,285 | 9, 2 | South Ft. Mitchell | " | 474.0 | 3,140 | 3 |
| Ceredo | West Va. | 314.8 | 1,399 | 7 | | | | | |
| Kenova | " | 315.7 | 4,320 | 7 | | | | | |
| Catlettsburg | Ky. | 317.2 | 4,750 | 6 | | | | | |
| Ashland | " | 322.6 | 31,131 | 6 | | | | | |
| Coal Grove | Ohio | 322.9 | 2,492 | 9, 5 | | | | | |



Action

Response to the Ohio River valley clean-streams program from industry is manifested in many ways. One index is the fact that 66 percent of the industries discharging directly into streams already have installed some form of control. Compared with last year this is an 18 percent increase. And even more significant is the knowledge that the number of industries in the "no action" class has been reduced by more than one-half. These and other statistical evidences of substantial progress are shown in the accompanying tabulation.

It would be a mistake, however, to conclude from these statistics that industrial-waste pollution represents a problem well under control. Important gains have been made. But a tremendous amount of effort needs to be expended in development of treatment measures, methods of analysis and quality criteria by both industrial groups and regulatory agencies to achieve desired goals. It is in this realm of common effort that the Commission takes particular pride in what is being accomplished by its industry committees.

INDUSTRY RELATIONSHIPS—Reflecting a policy that industries in the valley had a major stake in the water resources of the region, the Commission has encouraged the formation of industry-advisory committees. Seven such committees representing generic industry groups such as steel, metal-finishing, chemical salts, oil refining, coal, organic chemicals and distilleries, thus far have been established.

Broadly stated, the purpose of these committees is to share in the development and promotion of the eight-state pollution-abatement campaign. Specifically, the accomplishments of the committees are evidenced in these terms:

Consultations with the Commission and its member states in the establishment of water-quality objectives and waste treatment requirements;

Assembly of data as an aid in reaching technical decisions;

Conduct and coordination of research looking toward new methods of waste treatment;

Development of a rational program of pollution control based on the needs and economics of the Ohio River valley;

Dissemination and promotion of waste-control thinking within the ranks of specific industries and;

Support of the Commission's project on toxicity of substances in water, an operation being sponsored at The Kettering Laboratory which is opening new vistas in pollution control.

While it cannot be said that all of the committees have reached the same high level of performance, the work of some has far exceeded any normal expectations. Perhaps most important, the Commission-committee relationships

provide a mechanism for integration of viewpoints on some highly complex questions. Not the least of these relates to the development of a rational program of pollution control in which philosophies and facts have been thoroughly weighed. In the Ohio Valley—as in other river basins—the abatement of pollution means the imposition of regulations on an existing framework of physical and economic development. How this can be accomplished with a minimum dislocation of this framework is a nice exercise in ingenuity. This challenge is currently a matter of intimate discussion among the industry committees and the eight states represented by the Commission.

In a resolution on January 28, 1953 the Commission paid special tribute to the work of the industry and advisory committees saying, among other things, that their efforts "are bringing forth a clearer understanding of industrial pollution problems and methods for solving them through the conduct of research, the assembly of data and the preparation of manuals."

Following is a resume of committee activities that may be considered of general interest.

STEEL—In the two years following the first meeting of the Steel Industry Committee on April 13, 1950, the nine companies comprising the committee state that they demonstrated the feasibility of joint effort and mutual benefits to be derived from the operations of an industry committee devoted to pollution-abatement problems. As a result the committee extended an invitation to other basic steel producers in the Ohio basin to participate in its activities. Six additional steel companies accepted the invitation.

... by industry

The program of the committee is represented by the activities of five sub-committees;

Coke Plant Effluents—A survey of 17 coke plants representing 80 percent of the coke-producing capacity in the Ohio basin, provided the data for a manual, "Reducing Phenol Wastes from Coke Plants." This report described sources, volumes and concentrations of phenolic wastes from coke plants and methods for reduction of these wastes by process changes of treatment.

A second report evaluating methods of treatment is now in preparation. This report will describe the effects of phenol wastes on subsequent water uses in terms of taste and odor levels, toxicological effects, sensitivities of analytical techniques available, stream-purification capacity and costs of treatment to achieve various degrees of purification of wastes.

Four river surveys are now underway to determine fade-out characteristics of phenol, a taste-producing substance that interferes with water supplies.

Settleable Solids—A similar survey on flue-dust wastes has been made involving data from 76 installations. The draft of a manual on the findings of this survey has been prepared. In addition to describing the problem as it exists in steel mills, data will be given on an evaluation of the physi-

cal and economic limitations of treatment processes. A survey on handling of mill-scale wastes is now underway.

Pickle Liquor—An analysis of methods for treating spent solutions resulting from sulfuric acid pickling to reduce stream pollution is included in a report by the Steel Committee on "Disposal of Spent Sulfate Pickling Solutions." Some 19 methods are now being evaluated on the basis of physical and economic limitations for the benefit of the Commission and the steel industry.

Methods of Analysis—Extensive laboratory research by this sub-committee has materially assisted in the development of methods of analysis by which the steel industry wastes can be measured.

Water Quality—This sub-committee activity provides abstracts of the literature on the toxicity of steel-mill wastes that are reviewed by Kettering Laboratory and the Aquatic Life Advisory Committee; and it is developing information on the effects of steel-mill wastes on other water uses as well as the effects of other industrial waste on steel production. Over 700 articles have been abstracted by the committee project established at Mellon Institute to determine what is known about the effects of steel-mill wastes. Some 31 steel companies have been asked to supply information on the effects of other industrial wastes on steel production.

STATUS OF INDUSTRIAL WASTE-CONTROL FACILITIES — JULY 1, 1953 for industries discharging wastes directly to streams

| STATUS | ILL. | IND. | KY. | N.Y. | OHIO | PA. | VA. | W. VA. | TOTALS | % OF TOTALS | 1952 TOTALS | CHANGE IN TOTALS | % CHANGE |
|--|------|------|-----|------|------|-----|-----|--------|--------|-------------|-------------|------------------|----------|
| Adequate treatment or control facilities | 8 | 109 | 68 | 1 | 34 | 60 | 9 | 34 | 323 | 26 | 282 | + 41 | + 15 |
| Inadequate treatment or control facilities | 2 | 68 | 35 | 19 | 83 | 8 | | 33 | 248 | 20 | 234 | + 14 | + 6 |
| Inadequate -- preparing plans for improvement | | 9 | 4 | | 104 | 8 | 1 | 11 | 137 | 11 | 46 | + 91 | +198 |
| Adequacy undetermined | 1 | 8 | 27 | 5 | 4 | 37 | 5 | 22 | 109 | 9 | 131 | -22 | - 17 |
| Total facilities in operation | 11 | 194 | 134 | 25 | 225 | 113 | 15 | 100 | 817 | 66 | 693 | +124 | +18 |
| Facilities under construction | | 1 | 1 | | | 25 | | 4 | 31 | 3 | 42 | - 11 | -26 |
| Plans completed or in progress | | 7 | 1 | | 7 | 89 | | 13 | 117 | 9 | 150 | - 33 | -22 |
| Need for facilities undetermined | | 4 | | | 2 | 26 | 8 | 160 | 200 | 16 | 196 | + 4 | + 2 |
| No formal action by the company | | 9 | | 4 | 6 | 30 | 9 | 24 | 82 | 6 | 189 | -107 | -57 |
| Total number of industries reported | 11 | 215 | 136 | 29 | 240 | 283 | 32 | 301 | 1247 | 100 | 1270 | - 23 | - 2 |
| Data pertains only to number of plants, without regard to type or volume of waste. Information supplied by state pollution control agencies. | | | | | | | | | | | | | |

METAL-FINISHING COMMITTEE—Since its first meeting on June 20, 1950, this committee has devoted special efforts to the preparation of manuals, three of which have been published and a fourth almost completed.

“Planning and Making Industrial Waste Surveys” gives detailed instructions for measuring volume of flow, obtaining representative samples and calculating waste load. The scope of the manual is such that it has application in all industries. It was prepared for the use of operating men whose normal duties may be quite remote from the conduct of a waste survey but who, nevertheless, may be called upon to do the actual job.

“Methods of Analysis for Metal-Finishing Wastes,” which is now being readied for publication, describes procedures that have been field-tested and recommended by the committee as suitable for measuring concentrations of contaminants in plating-waste effluents.

“Plating-Room Controls for Pollution Abatement” is a guide book describing principles and practices that will assist a plating establishment in reducing waste loads.

“Methods for Treating Metal-Finishing Wastes” provides an evaluation of various disposal methods and supplies the facts on which the method best-suited for a specific situation might be determined. The merits and limitations of 20 methods of treatment are included.

To help the Commission determine limits for treatment of metal-finishing wastes, a sub-committee on toxicity limits has already abstracted over 1,000 articles on toxicity of metal-finishing wastes to man, animals and aquatic life. This work is being evaluated by Kettering Laboratory and the Aquatic Life Advisory Committee.

There are more than a thousand plating establishments in the Ohio basin. Through the activities of a liaison sub-committee these industries are being kept informed of the information developed by the committee.

The entire committee has taken an active part in discussions on policy questions and procedures for the control of industrial waste pollution. And this effort has promoted the interchange of viewpoints among the Commission members and representatives of other industry groups.

COAL COMMITTEE—Mining and processing of coal causes stream pollution. And seven of the eight states in the Ohio River compact area produce three-quarters of all the coal that is mined in the United States. This is one index of the magnitude of the problem that is commanding the attention of the Bituminous Coal Industry Advisory Committee of the Commission. The committee which was organized on August 29, 1951, includes sixteen representatives of major producers and coal associations.

Pollution problems of the industry fall into two categories—acid mine drainage and suspended solids. Acid formation arises from oxidation of sulfidic materials in and near coal deposits, with subsequent leaching of the acid by infiltrating water. Control of acid is not only baffling from a technical standpoint but it invites definition of legal responsibilities since both abandoned mines—whose ownership is questionable—and active mines produce acid.

Research on mine-acid control at the Mellon Institute, long sponsored by the Commonwealth of Pennsylvania, has received financial support from the committee. Most recently the committee volunteered through one of its member companies to furnish facilities at a working mine for field-testing a method of reducing acid formation. The method is based on research at The Johns Hopkins University under sponsorship of the Interstate Commission on the Potomac River.

Reduction of suspended solids, resulting from clay and fine coal particles in washery effluents, is currently under study by a technical sub-committee. Among other things a questionnaire has been circulated among operators to provide data to aid in the compilation of a manual of treatment methods.

CHEMICAL-SALTS COMMITTEE—This committee is composed of companies whose major activity is the processing of salt brine, either natural or artificial. They produce a number of products—soda ash, caustic soda, chlorine, sodium chloride and other inorganic salts, together with various chlorinated organic chemicals.

The primary problem of the industry is the high chloride content of plant effluents, particularly those from soda ash plants using the Solvay process. No feasible method of treatment for reduction of chlorides is as yet known. Impoundment, with discharge of waste at times of high stream flow can be practiced to minimize chloride pollution effects.

Since its first meeting on January 24, 1951, the committee has conducted a study on suggested methods of disposal of waste products from the soda-ash industry culminating in a report to the Commission, published in part in the Third Annual Report. The committee is currently represented on a sub-committee of the Commission engaged in developing a recommendation for a chloride and hardness objective for the Ohio River.

In addition, the committee is participating in the work of the Aquatic Life Committee and is associated with the activities of a joint sub-committee in the development of industrial-waste sampling methods.

ORGANIC CHEMICAL COMMITTEE—Organized in October 1952, the Organic Chemical Industry Committee is concerned with probably the most varied and complex of the pollution-abatement problems in the Ohio Valley. The volume and character of waste produced by organic chemical plants is subject to frequent changes because of the dynamic nature of the industry in terms of product manufactured and methods of production. Each waste presents a separate and distinct problem, many of which call for new and unusual treatment techniques.

In many cases, the composition of an organic chemical plant effluent cannot be determined because of the difficulty in identifying individual organic compounds of complex nature. More than three-quarters of a million organic compounds are known; the task of simply developing a method of analysis for each is staggering. Among other things, the committee is seeking to devise a general method of evaluating the effect of organic chemical effluents.

To attack the difficult problem of organic chemical waste disposal, the committee has gathered together experts in every field of chemical manufacture—men versed in research, production, development, management, water supply and, of course, waste disposal. In working as a committee, the diversified talents of these experts insure consideration of every facet of a pollution problem.

Sub-committees have been appointed to consider various aspects of the organic chemical industry problem. Currently separate groups are working on these matters: methods of analysis for organic chemical waste which would be more or less universally applicable; evaluation of the pollution load of the industry; a study of possible benefits which could arise from intelligent stream-flow regulation and low flow augmentation; recommendation of stream quality objectives to the Commission; compilation of information on disposal and treatment of organic chemical waste; determination of the types of equipment which contribute to stream pollution and the effect of their operation on the waste load; the stream pollution factor in evaluation of new plant location; the combined treatment of municipal and industrial wastes in municipal sewage plants; and the quality of water required for organic chemical process operations.

Special attention is being directed by this committee to waste problems resulting from the manufacture of antibiotics, a fast-growing segment of the organic chemical industry. A manual is in preparation that will provide information on the manufacture of antibiotics, the types of wastes resulting, analytical procedures and an evaluation of the methods of treating the wastes. The compilation of this manual represents the activity and conclusions of several sub-committees.

The organic chemical industry overlaps other industries, such as oil refining and steel. The committee has established effective liaison with the other industry committees so as to permit maximum accomplishment with minimum duplication of effort.

OIL REFINING COMMITTEE—Within a year from its first meeting on October 17, 1952, the Oil Refining Industry Committee has developed a program resulting in the following activities:

Methods of Analysis sub-committee, after critical field testing, recommended nine methods of analysis to be used in a refinery survey. Close liaison has been developed between this group and the American Petroleum Institute sub-committee on sampling and testing. This joint effort is aimed at developing better methods of analysis while minimizing duplication of effort. Through similar liaison activities this sub-committee has also provided comments and evaluation of analytical procedures proposed by other development groups and industry committees.

Refinery Survey sub-committee is determining the pollution load from refineries in the Ohio basin, based on a survey at each refinery. This survey also provides for additional field-testing of methods of analysis and for the assembly of information on types of waste for which treatment methods are required.

Methods of Treatment sub-committee has developed a flow sheet on refinery operations that designates sources of waste and the types of material in the waste. It is now compiling information on the latest developments in the treatment of these wastes. This information will consider the economic and physical limitations of various treatment methods. There is close liaison with the American Petroleum Institute committee on disposal of refinery wastes.

Water Quality sub-committee is compiling information on the effects of refinery wastes on other water uses as well as the effects of other wastes on oil refining operations. The program of this sub-committee, still in the development stage, calls for close cooperation with the program of the steel and metal-finishing industry committees as well as with Kettering Laboratory and the Aquatic Life Advisory Committee.

The Oil Refining Industry Committee is also taking an active part in the development of an understanding of the problems of pollution abatement administration so as to obtain further industrial support of the program. This increasing support is evidenced by the fact that ten oil refining companies, not members of the committee, are, at their request, receiving copies of minutes of the committee meetings.

Action

In carrying forth its assigned task of adopting and enforcing regulations for control of interstate pollution the Commission coordinated and supplemented operations underway in the eight states in the following manner:

- Conducted public hearing, adopted treatment standards No. 3 and No. 4 and issued notices for compliance in the 301-mile stretch of the Ohio River between Pittsburgh and Huntington.
- Adopted procedures for issuing compliance notices and to provide for systematic review of progress by municipalities in the 483-mile stretch of the Ohio River (Pittsburgh to Cincinnati) wherein regulations have been established.
- Completed investigations on the remaining half of the 981-mile Ohio River preparatory to the conduct of a public hearing this year on sewage-treatment requirements.
- Continued evaluation studies of potential toxicity of certain industrial wastes at The Kettering Laboratory, University of Cincinnati Medical School, in cooperation with the metal-finishing and steel industry committees.
- Assembled data on variations of water quality throughout the entire Ohio River based on weekly monitoring reports from municipal and industrial water-treatment plants represented by the Commission's Water-Users Committee.
- Promoted development of analytical methods for measuring industrial wastes in cooperation with industry committees, signatory states and certain national groups concerned with testing procedures.
- Aided preparation of recommendations for water-quality suitability by the Aquatic Life Committee of the Commission.

Details on the progress and development of these actions are as follows:

TREATMENT STANDARDS 3 AND 4

Following an investigation made by the staff, with findings set forth in a report dated March 1, 1953 and titled *Ohio River Pollution Abatement Needs—Pittsburgh to Huntington Stretch*, the Commission conducted a public hearing in Pittsburgh on March 31.

From the evidence presented the hearing board recommended that the Commission take appropriate action to adopt treatment requirements higher than those specified as the minimum in the compact. Such action was taken at a meeting of the Commission on April 29 and compliance notices were issued to 83 municipalities and institutions and 70 industries discharging sewage. The report of the hearing board is given on page 26.

COMPLIANCE-NOTICE PROCEDURE

At its meeting of July 2, 1952 the Commission adopted a procedure and authorized the issuance of formal notices of compliance to municipalities and industries affected by treatment standards. At that time Treatment Standards 1 and 2 for sewage already had been adopted; since then Treatment Standards 3 and 4 for sewage have been adopted. These requirements are concerned only with

sewage discharged in certain sections of the Ohio River.

The procedure calls for the issuance of a notice to each polluter (municipality, corporation or individual) signed by the chairman and executive director of the Commission and by the three commissioners of the state in which the polluter is located. The notice sets forth the requirements for sewage treatment and calls upon the affected party to advise the state regulatory agency as to the extent to which this standard is being met or when treatment works can be completed for that purpose.

The state agency, in turn, reports to the Commission on the status of compliance. Such reports are made at six-month intervals, during the regular January and July meetings.

At the Commission headquarters a docket-file has been established for each municipality, corporation or individual. This file contains a copy of the notice, a registered mail receipt for all notices mailed by the Commission (or when the notice is mailed by the state, a copy of the forwarding letter and answer) and copies of the semi-annual status report received from the state agency. In this fashion a complete record is being developed for each polluter should there be any necessity for legal enforcement under the term of Article IX of the Compact.

. . . by the commission

TOXICITY EVALUATION

Three years ago the Commission undertook the sponsorship of a unique project with the following purposes:

To evaluate critically the currently available data on the acute and chronic toxicity for man and animals of the known pollutants of the waters of the eight states signatory to the Ohio River Valley Water Sanitation Compact; and

To ascertain for which pollutants data are lacking and to develop means for the acquisition of such information on the basis of which recommendations on water-quality might be made.

This work is being carried out for the Commission under contract with The Kettering Laboratory of Applied Physiology, which is part of the Medical School of the University of Cincinnati; director of the laboratory is Dr. Robert Kehoe and the principal investigator on the ORSANCO work is Dr. Jules Cass. The project invites the closest collaboration with the industry committees of the Commission because limitations to the discharge of certain pollutions wastes will be influenced by the Kettering findings.

With regard to recommendations on the maximum allowable concentrations of substances in water—which is the consideration of primary concern to the Ohio River Commission and its signatory states—two final reports have been prepared. One of these relates to lead and the other to fluorides. Since these limits are currently under consideration by the Commission and its industry committees it is not appropriate to discuss the findings at this time.

Meantime, interim recommendations have been made on concentrations of copper as well as the chloride and sulfate compounds of sodium, potassium, calcium and magnesium that affect man and animals. Partly complete are recommendations on maximum allowable concentrations of chromium and cyano-compounds. Preliminary classification has been made of some 180 chemical pollutants of surface and ground waters.

The efforts of the National Cash Register Company, which is a member of the Commission's Metal-Finishing Industry Action Committee, have been particularly helpful in promoting this project. The company has assigned one full-time member of its research staff continuously during the past three years to literature investigations and abstracts. From a review of more than 3,500 studies on toxicity some 1,500 abstracts and summaries have been supplied to Kettering for cataloging and evaluation. Mr. Lawrence Hibbert of the National Cash Register Company

is chairman of the metal-finishing sub-committee on toxicity.

More recently the Steel Industry Action Committee sub-committee on toxicity, of which Mr. Grant A. Howell, U. S. Steel Corporation, is chairman, has sponsored collaboration on this work. An abstract team of four people under direction of Dr. Richard Hoak at Mellon Institute, financed by a grant from the American Iron and Steel Institute, are engaged on this task for the steel committee.

Negotiations are currently underway by the ORSANCO Oil Refining Committee looking toward collaboration in development of toxicity information on substances within its particular field of interest.

Commission sponsorship of this work for two years was materially aided by the use of a portion of the funds allotted to it under the industrial-waste research grant provisions of Public Law 845. Such funds are no longer available. The Commission has made provision in its budget to continue support of the work, although the amount available is considered far from adequate.

Notice of Requirement For Sewage Treatment

(Standard No. 3)

You are hereby notified that on April 29, 1953 the Ohio River Valley Water Sanitation Commission, acting in accordance with and pursuant to authority contained in Article VI of the Ohio River Valley Water Sanitation Compact, established, subject to revision as changing conditions may require, the following standard of treatment for all sewage from municipalities or other political subdivisions, public or private institutions or corporations discharged or permitted to flow into that portion of the Ohio River extending from the Allegheny County-Beaver County line in Pennsylvania, located approximately 15 miles downstream from the confluence of the Allegheny and Monongahela Rivers at Pittsburgh, to U. S. Corps of Engineers Dam No. 27, located about five miles upstream from Huntington, W. Va., and being 301.0 miles downstream from Pittsburgh, Pennsylvania:

- (a) Substantially complete removal of settleable solids; and
- (b) Removal of not less than forty-five percent of the total suspended solids; and, in addition
- (c) Reduction in coliform organisms in accordance with the following schedule:
 - Not less than 80 percent reduction during the months May through October.
 - Not less than 85 percent reduction during the months November through April.

Under the terms and provisions of the Ohio River Valley Water Sanitation Compact all sewage from municipalities or other political subdivisions, public or private institutions, or corporations, discharged or permitted to flow into the above described portion of the Ohio River will be required to be treated in accordance with the above established standard within a time reasonable for the construction of the necessary works. As one of the municipalities, subdivisions, institutions or corporations subject to the provisions of the Ohio River Valley Water Sanitation Compact, you are herewith called upon to advise the

as to the extent to which you are now meeting the standard of sewage treatment above set forth and, in addition, to advise as to the minimum period of time which, in your opinion, will be required in order to complete construction of works necessary to meet that standard.

Issued this _____ day of _____, 1953 at Cincinnati, Ohio.

To _____

Ohio River Valley Water Sanitation Commission



Chairman

Executive Director & Chief Engineer

Commissioner for

METHODS OF ANALYSIS

Lack of analytical methods for measuring the pollution properties of some industrial wastes, and differences of opinion regarding the validity of certain methods of analysis, suggested to the Commission and its industry committees that a study of this situation should be undertaken. When regulations are promulgated for the control of wastes the Commission will specify the analytical methods by which compliance and performance are to be measured and it is necessary, therefore, to reach agreement. The industry committees have been invited to make recommendations with regard to methods.

As a result, various industry committees have established sub-committees on analytical procedures. This has called for direct liaison with other state, national and professional agencies who are working on the problem. For example, the American Petroleum Institute committee on disposal of refining wastes and the ORSANCO oil refining committee have developed the closest coordination of programs. Also joined with this cooperative venture is the American Society for Testing Materials Committee D-19

Commissioners Holbrook (Pa.), Jennings (W. Va.) and Biery (Ohio) in a final huddle before opening a public hearing at Pittsburgh for establishment of treatment requirements.



on industrial waters. Meantime, the industry committees have recommended and supplied data to substantiate some methods to be included in the 10th edition of Standard Methods for the Examination of Water and Sewage.

Methods already proposed by the industry committees are being given extensive field-testing by member companies and then are reviewed and evaluated by each of the eight state pollution-control agencies through the Engineering Committee of the Commission.

Correlation of methods of analysis for waste discharges with analytical procedures employed for stream surveys is being accomplished with the assistance of Mr. William Lamar, district chemist of the U. S. Geological Survey. Additional correlation between these methods and those used in toxicity studies is being developed with the cooperation of The Kettering Laboratory.

The Commission's Aquatic Life Advisory Committee has been asked to standardize the procedure for bio-assay. This technique is to be utilized directly in the determination of the toxic effects of wastes on aquatic life in a stream.

AQUATIC-LIFE ADVISORY COMMITTEE

Early in 1952 a group of aquatic biologists and fisheries' scientists were invited to act as an Aquatic-Life Advisory Committee to assist the Commission in the formulation of criteria for water quality with reference to the protection of fish crops. Requirements of water suitable for fish are not well defined and certain standards that have been employed by various regulatory agencies lack uniformity.

The functions of this committee are designed to provide scientific evaluation of existing information that may be useful to the Commission in the promulgation of specific regulations. Activities of the committee are integrated with the work of The Kettering Laboratory and the industry committees in so far as problems of fish life are concerned. Committee recommendations are transmitted to the Commission for its consideration and action.

One of the first matters to engage committee attention was to define what is meant by water suitability for maintaining fish life. A second objective is to evaluate available scientific knowledge applicable to problems of maintenance of waters suitable for fish life with reference to completeness and adequacy; coincident with this the committee intends to point out the gaps in scientific knowledge and propose needed research. Finally, because bio-assay techniques appear to be the most practical method for the determination of water suitability where pollutants are complex and natural waters are variable, the committee will propose standard procedures and criteria for the application of results from these methods.

Recommendations are now being completed with regard to oxygen requirements and temperature considerations.

Names of committee members are given on page 25.

WATER-USERS COMMITTEE

Recognizing that information on water quality is necessary to develop a proper knowledge of river variations, the effects of waste discharge, and a better understanding of pollution-abatement needs, the Commission concluded that continuous monitoring of water quality at selected points on the Ohio River would be a desirable undertaking. The Commission also appreciated that among those most vitally concerned with pollution conditions were the municipal and industrial plant managers faced with the task of processing river water.

Accordingly, the matter was discussed with a group of water-plant managers, looking toward the establishment of a procedure whereby the Commission might secure regular and systematic analyses of Ohio River water. This led to the formation of the Water Users Committee on January 7, 1952. Without recompense of any kind, this committee has generously undertaken to engage in a program to:

Furnish a continuous twice-weekly analysis of Ohio River quality at various points. Evaluation of these records is providing important facts to aid in the formu-

lation of waste treatment requirements and otherwise serve to gage the progress of pollution-abatement activities.

Make recommendations to the Commission on matters involving water quality.

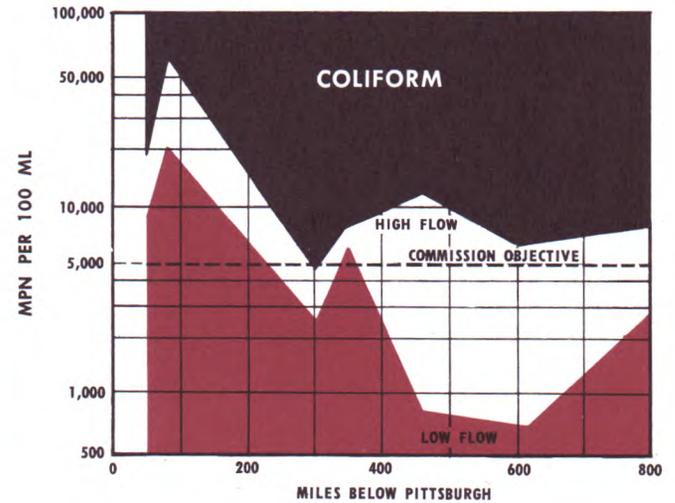
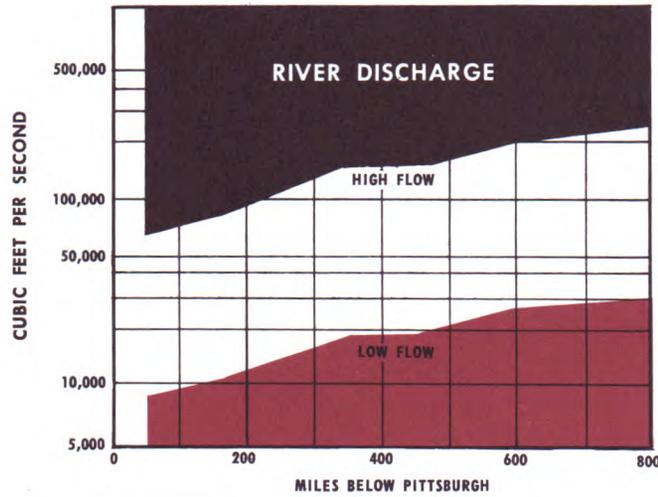
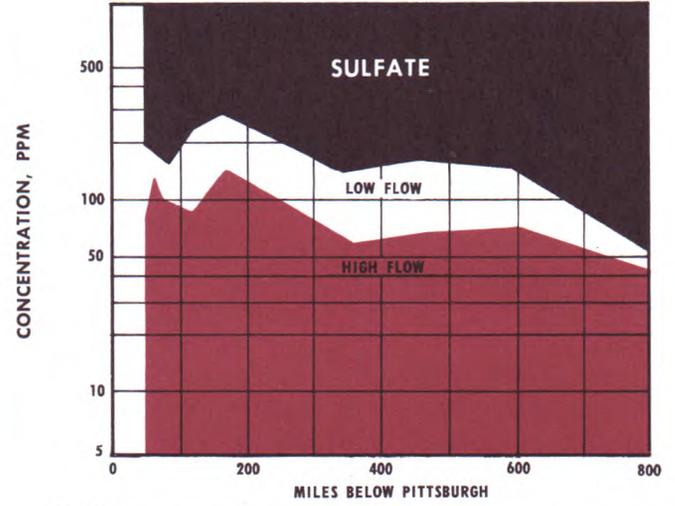
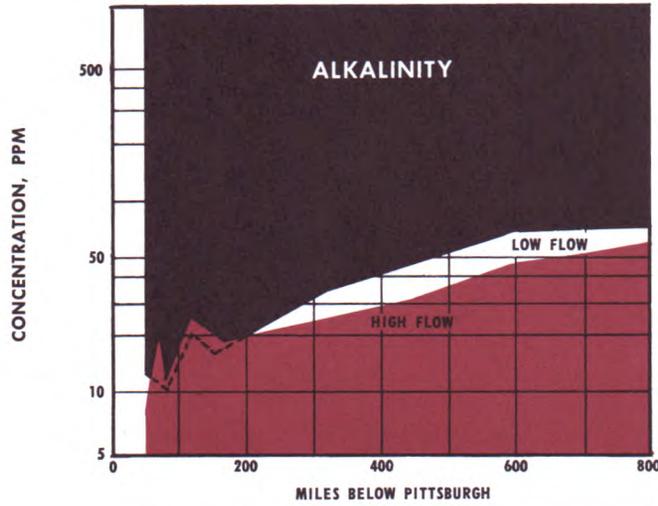
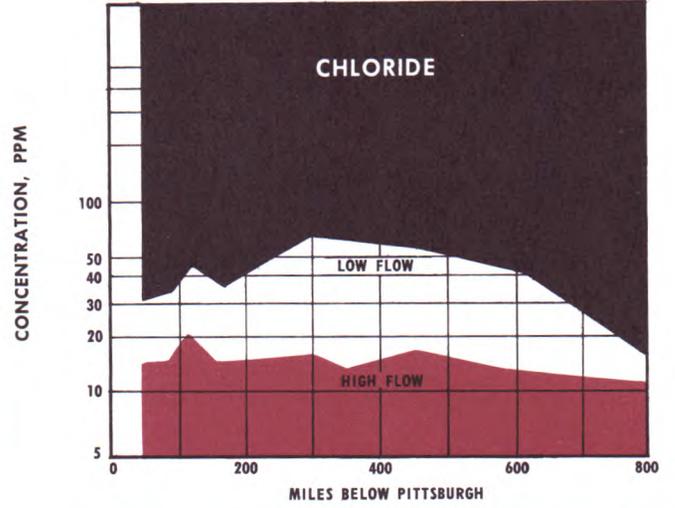
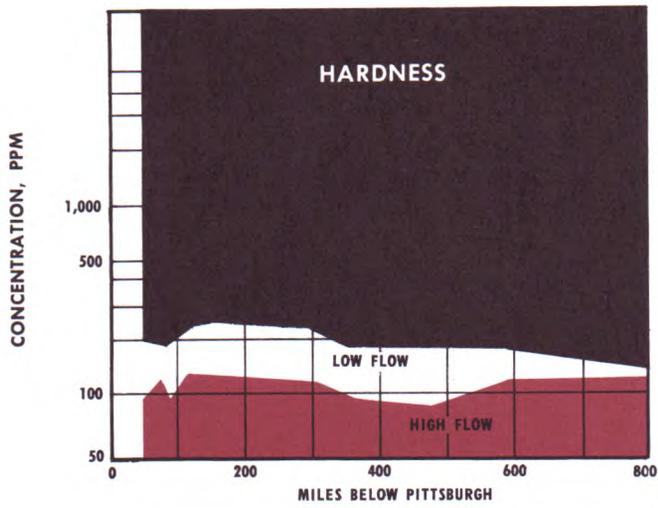
Encourage exchange of information on treatment of Ohio River water among plant operators.

In order that analytical results supplied by monitors along the river would be comparable, the committee agreed on standardized procedures for both testing and reporting. Execution of the monitoring project was initiated under the chairmanship of Dr. A. R. Todd of the City of Wheeling, and is currently being developed under the direction of Mr. Dan Enright, City of Cincinnati, chairman, and Mr. Henry Stobbs, Wheeling Steel Company, vice-chairman. A member of the Commission staff, Mr. W. R. Taylor, served as coordinator.

An important contribution to the monitoring program is the special service being rendered by the U. S. Geological Survey, which supplies advance information on river flow conditions from five gaging stations. With these data it is possible to compute adjusted concurrent flows at the water-plant sampling points and thus correlate analytical results with flow conditions. The U. S. G. S. data are being supplied from the office of Mr. Floyd F. Schrader, district engineer, Louisville, Kentucky.

Promoting public support for pollution control, the Commission exhibit asks "Are you a gambler?" Those who pick up the phone to get a hot tip are told how dirty streams may cause them to gamble with their health, happiness and future.





SEASONAL VARIATIONS IN OHIO RIVER QUALITY

High flow period: December 1951 - May 1952 and December 1952 - April 1953

Low flow period: June 1952 - November 1952

Quantities shown are averages for the periods.

Operating Procedure—Location of the participating water plants was chosen so that the resulting data would reflect changing conditions due to influences of tributary streams and sources of pollution. For example, in the highly industrialized Wheeling area, sampling points are much closer together than in the less critical downstream areas.

Another factor in choosing locations was the availability of laboratory facilities and personnel for expert and routine testing. Some places that were desirable as monitor points from the standpoint of location could not be used because of limited facilities or personnel.

Among other matters, the committee has concerned itself with uniformity of methods of analysis. In addition the committee has made recommendations in connection with the conduct of a proposed federal radioactivity survey of the river, and has surveyed Ohio River water-treatment plants to determine which pollutants cause the most difficulty. The results of the survey indicated that tastes and odors, phenols, sewage and hardness, in that order, were matters of principal concern.

The committee is also making weekly phenol analyses to furnish data for the ORSANCO Steel Industry Committee's study of phenol assimilation rates in the Ohio River. Five water plants are furnishing this information: Weirton, Wheeling, Natrium, Cincinnati and Louisville.

Meantime, each member of the committee has been compiling Ohio River water-quality data. Reports of daily coliform results, along with twice-weekly determinations of stream temperature, turbidity, threshold odor, alkalinity, pH, total and noncarbonate hardness, chloride and sulfate are supplied to the Commission for plotting and evaluation.

SAMPLING STATIONS ON THE OHIO RIVER

| Location (Water Intake) | River miles below | |
|----------------------------|-------------------|--|
| | Pittsburgh | Laboratory |
| Weirton, W. Va. | 61.6 | Weirton Steel Co. Weirton Water Plant |
| Beech Bottom, W. Va. | 79.5 | American Gas and Electric Service Corp. |
| Yorkville, Ohio | 83.5 | Wheeling Steel Corp. |
| Wheeling, W. Va. | 86.7 | Wheeling Water Plant |
| Natrium, W. Va. | 119.0 | Columbia-Southern Chemical Corp. |
| Willow Island, W. Va. | 161.0 | American Cyanamid Co. |
| Huntington, W. Va. | 304.0 | Huntington Water Co. |
| Portsmouth, Ohio | 350.0 | Portsmouth Water Plant |
| Cincinnati, Ohio | 463.0 | Cincinnati Water Plant |
| Louisville, Ky. | 601.0 | Louisville Water Co. |
| Evansville, Ind. | 792.0 | Evansville Water Plant |

Evaluation of data—In graphical form on the opposite page certain data are summarized to provide a picture of changes in water quality. It should be noted that these graphs were prepared from limited data and that further results may modify the seasonal trends experienced to date. Tentatively, these conclusions can be drawn:

★ Examination of the data indicates that, in general, concentrations of all substances tend to level out at higher flows; low river stages result in much more variable concentrations.

★ The plot of coliform densities is of particular interest. During the high flow period, the average coliform concentrations were considerably above the Commission objective, except at Huntington (mile 304). Shorter times of flow associated with high flows and decreased die-away rate caused by lower temperatures are factors in the high concentrations found. During the summer low-flow period, coliform densities on the lower two-thirds of the river are below the Commission's objective, owing to the influence of self-purification.

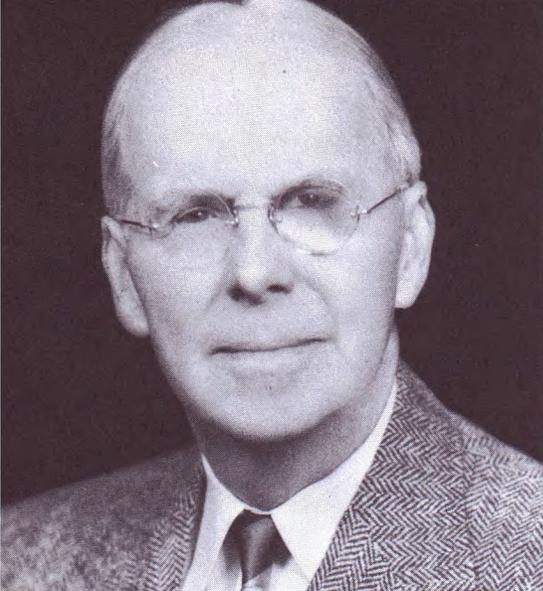
★ Hardness concentrations are at a fairly constant level for the length of the river during the high flow periods. The concentration during low flows tends to diminish in passing downstream, though not in proportion to the increase in river flow, indicating hardness additions throughout the length of the river.

★ Chloride concentrations also show a fairly constant level for the length of the river during high flows, indicating gradual addition of chloride. The low flow pattern indicates a major chloride addition between Natrium and Huntington, with subsequent dilution at downstream points.

★ Alkalinity variations show a confused pattern in the Weirton-Wheeling area, probably indicating variable effects of acid mine-drainage. This effect disappears in the vicinity of Willow Island and alkalinity increases steadily downriver at both low and high flows.

★ Sulfate concentration decreases steadily downriver at both high and low flows with slight exceptions at Louisville and Cincinnati. This situation would appear to indicate a major source of pollution far upriver with subsequent dilution. Probably acid mine drainage is responsible for this major addition in the headwaters.

This report is the first published summary of the committee's work. The efforts of the Water Users Committee are providing basic information to the Commission, the importance of which will become increasingly evident as time goes on and the analytical results cover a longer period. Members of the committee are listed on page 25.



HOWARD E. MOSES, chairman of the Commission for 1953-54, brings to this office the viewpoints of a public-health administrator who has had a continuous record of 45 years service to the Commonwealth of Pennsylvania. As chief engineer and director of the Pennsylvania bureau of sanitary engineering, Dr. Moses has had supervision of public water supplies serving 8,000,000 people and has played a major role in the management of his state's stream pollution-control program. He was one of the participants in the negotiations that led to the formation of the 8-state compact commission for pollution abatement on interstate streams.

Dr. Moses joined the Pennsylvania State Health Department ten years after his graduation from Dickinson College in 1898. All of his activities have been related to the application of engineering to environmental sanitation problems including bathing beaches, shellfish harvesting, flood and catastrophe services and civil defense. He is chairman of the Conference of State Sanitary Engineers.

COMMITTEE ASSIGNMENTS

(for year ending June 30, 1954)

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- C. W. KLASSEN
- EDGAR LANDENBERGER
- O. LLOYD MEEHEAN
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- W. H. WISELY

Pension Trust

- JOHN D. PORTERFIELD
- ROSS H. WALKER
- ROBERT K. HORTON

CALENDAR OF MEETINGS

- JULY, 1952** 1—Engineering Committee—Cincinnati
1—Executive Committee—Cincinnati
2—Commission—Cincinnati
- SEPT., 1952** 9—Organic Chemical Committee—Cincinnati
23—Steel Committee—Pittsburgh
29—Metal-finishing Committee—Cincinnati
30—Engineering Committee—Cincinnati
30—Executive Committee—Cincinnati
- OCT., 1952** 1—Commission—Cincinnati
15—Steel Committee—Pittsburgh
16—Water Users Committee—Wheeling, W. Va.
17—Oil Refining Committee—Cincinnati
- NOV., 1952** 13—Organic Chemical Committee—Cincinnati
- DEC., 1952** 2—Steel Committee—Pittsburgh
- JAN., 1953** 6—Coal Committee—Cincinnati
13—Steel Committee—Pittsburgh
14—Metal-Finishing Committee—Columbus, Ohio
16—Oil Refining Committee—Cincinnati
20—Water Users Committee—Cincinnati
27—Engineering Committee—Cincinnati
27—Executive Committee—Cincinnati
28—Commission—Cincinnati
- FEB., 1953** 5—Organic Chemical Committee—Cincinnati
26—Steel Committee—Pittsburgh
- MAR., 1953** 31—Public hearing on Pittsburgh-Huntington stretch of the Ohio River—Pittsburgh
- APRIL, 1953** 7—Aquatic Life Committee—Cincinnati
10—Oil Refining Committee—Cincinnati
14—Water Users Committee—Cincinnati
16—Organic Chemical Committee—Cincinnati
21—Metal-Finishing Committee—Columbus, Ind.
28—Engineering Committee—Cincinnati
29—Commission—Cincinnati
- MAY, 1953** 9—Aquatic Life Committee—Cincinnati
19—Steel Committee—Youngstown, Ohio
- JUNE, 1953** 2—Executive Committee—Cincinnati
4—Water Users Committee—Marietta, Ohio
11—Organic Chemical Committee—Cincinnati
23—Coal Industry Committee—Cincinnati
25—Chemical Salts Committee—Cleveland
26—Oil Refining Committee—Cincinnati

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GRANT A. PETTIT, *Industrial Waste Engineer*
ARMCO STEEL COMPANY
Chairman of the committee

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U. S. STEEL CORPORATION
Co-chairman of the committee

EMIL KERN, *Vice-President*
ALLEGHENY-LUDDUM STEEL CORPORATION

P. R. BISH, *Research Laboratory*
ALLEGHENY-LUDDUM STEEL CORPORATION

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BETHLEHEM STEEL COMPANY

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COPPERWELD STEEL COMPANY

G. E. MUNS, *Manager, Fuel Division*
CRUCIBLE STEEL COMPANY OF AMERICA

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INLAND STEEL COMPANY

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JONES AND LAUGHLIN STEEL COMPANY
Chairman, Subcommittee on Coke Plant Effluents

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PITTSBURGH STEEL COMPANY

EDWARD J. ROEHL, *Manager, Research and Development*
THOMAS STRIP DIVISION, PITTSBURGH STEEL COMPANY

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REPUBLIC STEEL CORPORATION

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REPUBLIC STEEL CORPORATION

RALPH DREWS, *Metallurgist*
REPUBLIC STEEL CORPORATION

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J. E. KINNEY
Committee coordinator

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COLUMBUS METAL PRODUCTS, INC.
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Louisville Works, AMERICAN RADIATOR AND STANDARD SANITARY CORPORATION

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K. S. WATSON, *Coordinator of Waste Treatment Manufacturing Facilities Service Department*
GENERAL ELECTRIC COMPANY

DAVID MILNE, *Supervisor*
Production Engineering Section
GENERAL MOTORS CORPORATION

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Industrial Hygiene and Sanitary Engineering
FRIGIDAIRE DIVISION, GENERAL MOTORS CORPORATION
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Huntington Division, HOUDAILLE-HERSHEY CORPORATION
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NATIONAL CASH REGISTER COMPANY
Chairman, Subcommittee on Toxicity

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JAMES B. HARDWICK, *Development Engineer*
JOSEPH E. SEAGRAM AND SONS, INC.

Robert G. Chollar, director of research of the National Cash Register Co. and chairman of the Metal-Finishing Industry Committee, summarizes the results of a survey with the aid of Allen Reed, Electric Auto-Lite Co.; Walter Pinner, Houdaille-Hershey Corp. and Harry McElhaney, Talon, Inc.

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RUSSELL BLAINE, *Chemist*
HIRAM WALKER AND SONS, INC.

JOHN WIGHT
FRANK L. WIGHT DISTILLING COMPANY

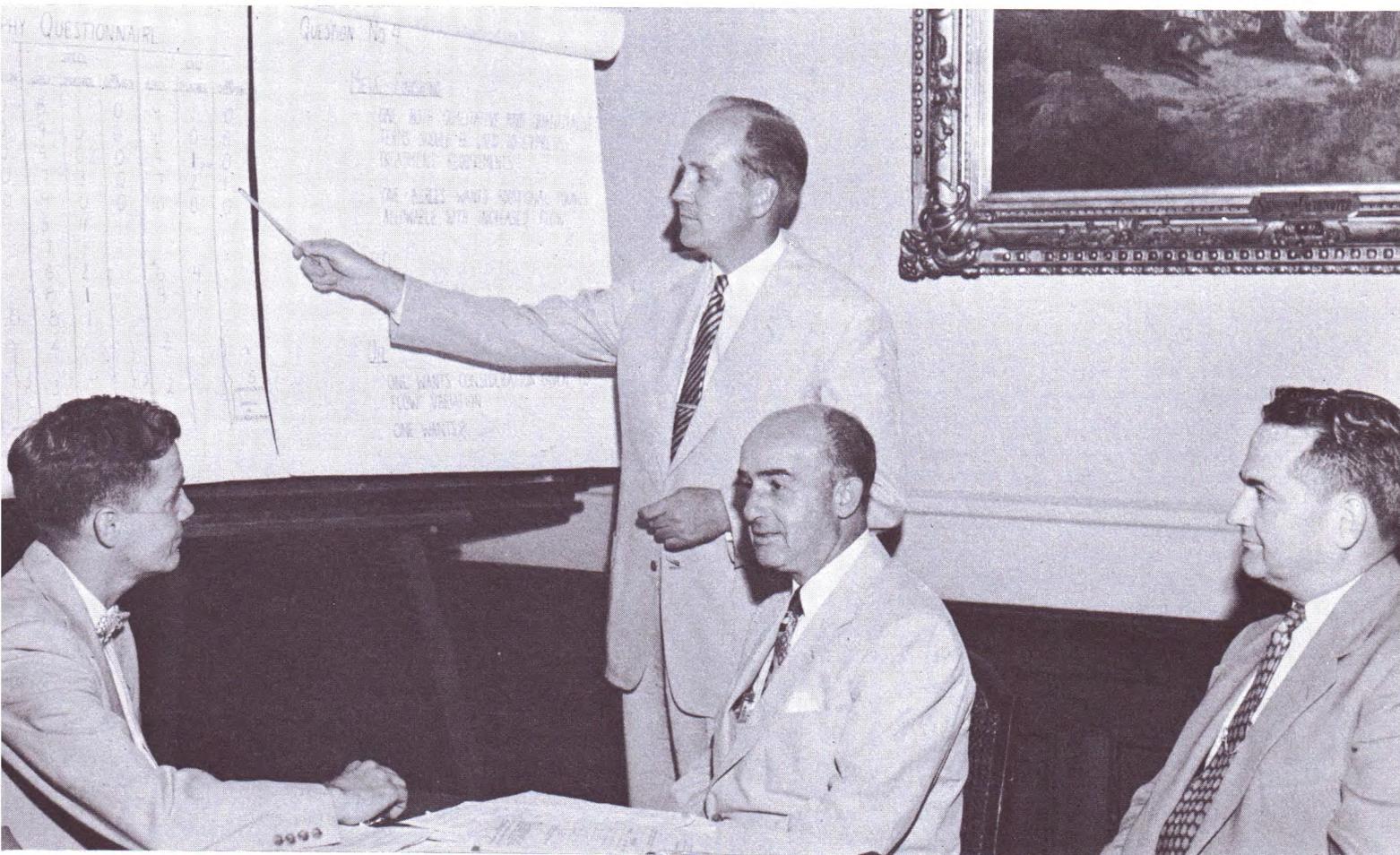
ROBERT K. HORTON
Committee coordinator

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CENTRAL ENGINEERING DIVISION, DIAMOND ALKALI COMPANY
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PITTSBURGH PLATE GLASS COMPANY

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Committee coordinator

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INDIANA COAL OPERATORS ASSOCIATION
(Deceased June 4, 1953)

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INDIANA COAL PRODUCERS ASSOCIATION

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JEWEL RIDGE COAL CORPORATION

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OHIO RECLAMATION ASSOCIATION

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AND ASSOCIATED COMPANIES, SUBSIDIARY)

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Committee coordinator

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QUAKER STATE OIL REFINING CORPORATION
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GULF OIL CORPORATION

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LOUISVILLE REFINING COMPANY

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LOUISVILLE REFINING COMPANY

R. E. LUTON, *Manager of Refineries*
THE OHIO OIL COMPANY

M. W. NICHOLAS, *Manager of Refineries*
THE OHIO OIL COMPANY

J. A. BIEHL, *Chemist*
THE OHIO OIL COMPANY

A. E. HARNSBERGER, *Manager*
Refinery Technical Department
THE PURE OIL COMPANY

H. A. ALVES, *Process Engineer, Refinery Division*
THE PURE OIL COMPANY

G. F. EISELE, *Technical Foreman*
THE PURE OIL COMPANY
Chairman, Subcommittee on Methods of Analysis

C. O. ANDERSON, *Refinery Superintendent*
ROCK ISLAND REFINING CORPORATION

L. M. FERGUSON, *Design Engineer*
SINCLAIR REFINING COMPANY

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SOCONY-VACUUM OIL COMPANY, INC.
Chairman, Subcommittee on Water Quality

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Research-Development Department
SOCONY-VACUUM LABORATORIES

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SOHIO PETROLEUM COMPANY

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L. SONNEBORN SONS, INC.

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Technical Service
STANDARD OIL COMPANY (Indiana)

DONALD G. STEVENS, *Chief, Technical Services*
STANDARD OIL COMPANY (Ohio)

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STANDARD OIL COMPANY (Ohio)
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SUN OIL COMPANY

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Lawrenceville Refinery
THE TEXAS COMPANY

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THE TEXAS COMPANY

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THE TEXAS COMPANY

P. N. KLEIN, *Chemist*
THE TEXAS COMPANY

C. W. KLASSEN
Commission liaison member

J. E. KINNEY
Committee coordinator

ORGANIC CHEMICAL COMMITTEE

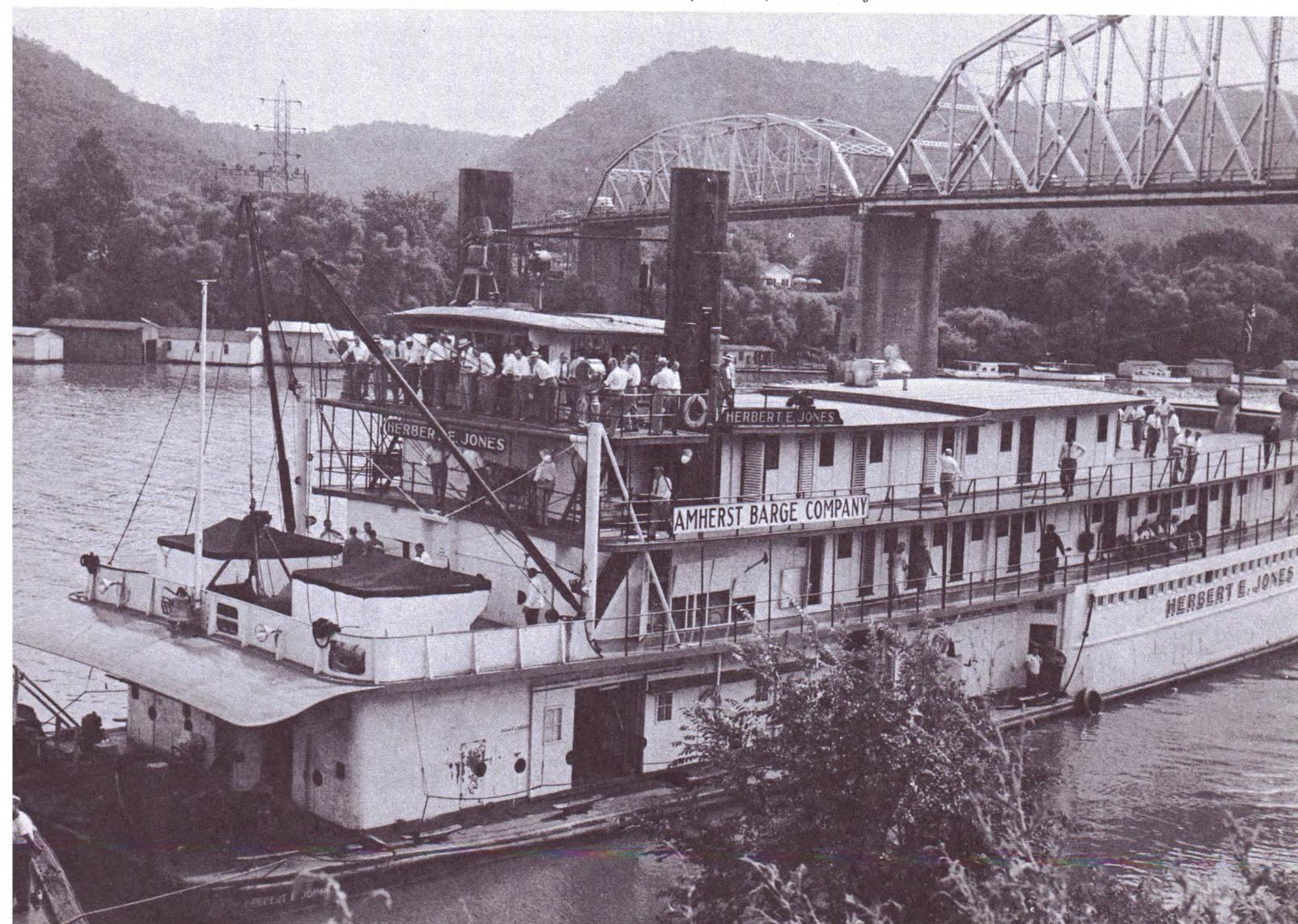
W. T. DICKENS, *Plant Manager*
MONSANTO CHEMICAL COMPANY
Chairman of the committee

GEORGE F. JENKINS, *Supervisor of Design*
UNION CARBIDE AND CARBON CORPORATION
Vice-chairman of the committee

CHESTER H. ALLEN, *Director, Public Relations and Safety*
HILTON-DAVIS CHEMICAL COMPANY
Secretary of the committee

AUSTIN HELLER, *Supervisor, Waste Disposal*
ALLIED CHEMICAL AND DYE CORPORATION

Industry committee members joined the Commission on an inspection of the heavily industrialized Kanawha River area.



JOHN F. VOGLER, *Staff Sanitary Engineer*
AMERICAN CYANAMID CORPORATION

G. M. NEAS, *Staff Engineer*
AMERICAN VISCOSE CORPORATION

L. W. ROZNOY, *Assistant Supervising Engineer—Planning*
CELANESE CORPORATION

JAMES CRANE, *Projects Engineer*
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Engineering Division
ELI LILLY AND COMPANY

RICHARD G. WELDELE, *Manager*
Mechanical and Chemical Engineering Department
ELI LILLY AND COMPANY

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Assistant to Director of Production
MATHIESON CHEMICAL CORPORATION

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WILLIAM S. MERRELL COMPANY

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CHARLES PFIZER AND COMPANY

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PROCTER AND GAMBLE COMPANY

V. E. GEX, *Process Engineer*
PROCTER AND GAMBLE COMPANY

R. S. HYATT, *Heat and Power Engineer*
PROCTER AND GAMBLE COMPANY

WYATT E. WILLIAMS, *Design Engineer*
STANDARD ULTRAMARINE AND COLOR COMPANY

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Commission liaison member

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Committee coordinator

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CINCINNATI, OHIO, WATER PURIFICATION PLANT
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Vice-Chairman of the committee

F. J. DEFranco, *Superintendent and Chief Chemist*
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P. D. SIMMONS, *Bacteriological Chemist*
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AMERICAN GAS AND ELECTRIC SERVICE COMPANY

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AMERICAN CYANAMID CORPORATION

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PORTSMOUTH, OHIO, WATER TREATMENT PLANT

W. L. WILLIAMS, *Assistant Superintendent*
LOUISVILLE, KENTUCKY, WATER TREATMENT PLANT

JAMES CLAYTON, *Chemist*
EVANSVILLE, INDIANA, WATER TREATMENT PLANT

WILLIAM R. TAYLOR
Committee coordinator

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Division of Entomology and Economic Zoology
UNIVERSITY OF MINNESOTA
Chairman of the committee

DR. BERTIL G. ANDERSON, *Head*
Department of Zoology and Entomology
THE PENNSYLVANIA STATE COLLEGE

DR. WALTER A. CHIPMAN, *Chief*
Special Shellfishery Investigations
U. S. SHELLFISH LABORATORY

PROF. THEODORE OLSON
School of Public Health
UNIVERSITY OF MINNESOTA

DR. EDWARD SCHNEBERGER, *Superintendent*
Fish Management Division
WISCONSIN CONSERVATION COMMISSION

DR. WILLIAM A. SPOOR, *Department of Zoology*
UNIVERSITY OF CINCINNATI
and . . . STONE INSTITUTE OF HYDROBIOLOGY

DR. CLARENCE M. TARZWELL, *Chief, Biology Section*
Environmental Health Service
U. S. PUBLIC HEALTH SERVICE

DR. O. LLOYD MEEHEAN, *Chief*
U. S. FISH AND WILDLIFE SERVICE
Commission liaison member

JOHN E. KINNEY
Committee coordinator

REPORT ON PUBLIC HEARING HELD AT PITTSBURGH, PENNSYLVANIA ON MAR. 31, 1953

resulting in establishment of Treatment Standards No. 3 and No. 4 by the Commission

The undersigned, appointed pursuant to action taken by the Commission at its meeting of January 28, 1953, constitute the Hearing Board empowered and instructed to conduct a public hearing with regard to the degree of treatment which shall be given to sewage discharged or permitted to flow into the waters of the Ohio River between Pittsburgh, Pennsylvania and Huntington, West Virginia. In accordance with the direction of the Commission, the undersigned submit the following report of the conduct of such hearing together with their findings and recommendations based upon the testimony and other evidence presented at that hearing.

1. The hearing was held, with all members of the Hearing Board present, on the 31st day of March, 1953, at Courtroom No. 6, sixth floor, U. S. Post Office and Court House, Seventh Avenue and Grant Street, Pittsburgh, Pa., commencing at 10:00 o'clock, A. M. A complete stenographic transcript was made of the proceedings had at the hearing and a copy thereof is filed herewith.

2. Prior notice of the hearing had been published and had been served upon interested parties in the manner and to the extent set forth in the transcript of proceedings filed herewith.

3. Parties interested in the subject matter of the hearing were present or were represented to the extent indicated by the roster of appearances which is attached to the transcript of proceedings filed herewith.

4. A written report of the Commission staff setting forth information, data, testimony and other evidence, relevant and material to the subject matter of the hearing, was presented in evidence and was supported by oral testimony of members of the staff. A copy of that report is attached as an exhibit to the transcript of proceedings filed herewith.

5. Full opportunity was given to all parties present or represented at the hearing to introduce evidence or testimony relevant or material to the subject matter of the hearing and to express their views with regard to the report and recommendations of the staff. No evidence other than that presented by the staff was ordered. All views expressed by those present have been duly considered by the Board in reaching the conclusions and recommendations set forth below.

6. Opportunity for the submission of written evidence or views pertinent to the subject matter of the hearing was expressly provided to any interested party, subject to the condition that it be submitted to the Hearing Board on or before the 15th day of April, 1953. No such additional evidence or views were submitted to this Board prior to the expiration of the period specified.

7. From a consideration of the evidence presented at the hearing, this Board finds that the information and other data submitted as above stated by the staff are accurate and pertinent to the subject matter of the hearing, and the Board further finds that the conclusions of the staff which are expressed in the written report presented at the hearing, as above stated, are reasonable and are fully supported by the evidence and data therein contained.

8. The Board finds that standards of treatment for sewage to be discharged or permitted to flow into this section of the Ohio River, should be adopted by the Commission and put into effect, which (1) will maintain satisfactory oxygen levels in that stretch of the Ohio River between the Pennsylvania-Ohio-West Virginia state line and Huntington; (2) will provide adequate protection for public water supplies by reducing the presence of coliform organisms at all water supply intakes located in this section of the Ohio River to not more than 5,000 per 100 milliliters, as a probable monthly average; (3) will under normal summer flow conditions maintain in substantial areas of the Ohio River be-

tween Moundsville, West Virginia and Huntington a water quality, suitable for recreational purposes, of not more than 1,000 coliform organisms per 100 milliliters as a probable monthly average; and (4) will otherwise accomplish the objectives of the Ohio River Valley Water Sanitation Compact with respect to the discharge of sewage into this stretch of the Ohio River. On the basis of information and data submitted at the hearing the Board is of the opinion that the establishment of the standards of treatment for sewage which are hereinafter recommended is based upon these considerations, is reasonable and is in conformity with the provisions of the Ohio River Valley Water Sanitation Compact.

9. Therefore, this Board recommends that the Commission take appropriate action to establish, subject to revision as changing conditions may require, the following standards for the treatment of sewage:

TREATMENT STANDARD No. 3

All sewage from municipalities or other political subdivisions, public or private institutions or corporations discharged or permitted to flow into that portion of the Ohio River extending from the Allegheny County-Beaver County Line in Pennsylvania, located approximately 15 miles downstream from the confluence of the Allegheny and Monongahela Rivers at Pittsburgh, to U. S. Corps of Engineers Dam No. 27, located about five miles upstream from Huntington, W. Va., and being 301.0 miles downstream from Pittsburgh, Pa., shall be so treated as to provide for:

- (a) Substantially complete removal of settleable solids; and
- (b) Removal of not less than forty-five percent of the total suspended solids; and, in addition
- (c) Reduction in coliform organisms in accordance with the following schedule:
 - Not less than 80% reduction during the months May through October.
 - Not less than 85% reduction during the months November through April.

TREATMENT STANDARD No. 4

All sewage from municipalities or other political subdivisions, public or private institutions or corporations discharged or permitted to flow into that portion of the Ohio River extending from the point of confluence of the Allegheny and Monongahela Rivers at Pittsburgh, designated as Ohio River mile point 0.0, to the Allegheny County-Beaver County line in Pennsylvania, located approximately 15 miles downstream from the confluence of the Allegheny and Monongahela Rivers, shall be so treated as to provide for:

- (a) Substantially complete removal of settleable solids; and
- (b) Removal of not less than forty-five percent of the total suspended solids; and
- (c) Reduction in biochemical-oxygen-demand of approximately fifty percent; and, in addition
- (d) Reduction in coliform organisms in accordance with the following schedule:
 - Not less than 80% reduction during the months May through October.
 - Not less than 85% reduction during the months November through April.

Respectfully submitted,

(s) HUDSON BIERY, Chairman
(s) E. A. HOLBROOK
(s) W. W. JENNINGS

Cincinnati, Ohio, April 24, 1953

SEWAGE-TREATMENT STANDARDS 1, 2, 3 and 4
established by the
OHIO RIVER VALLEY WATER SANITATION COMMISSION

TREATMENT STANDARD No. 1

Adopted April 6, 1949

All sewage from municipalities or other political subdivisions, public or private institutions or corporations discharged or permitted to flow into that portion of the Ohio River, commonly known as the "Cincinnati Pool," extending from U. S. Corps of Engineers Dam No. 36, located about three miles upstream from Cincinnati, Ohio, and being 461 miles downstream from Pittsburgh, Pa., to U. S. Corps of Engineers Dam No. 37, located at Fernbank, Cincinnati, Ohio, and being 483 miles downstream from Pittsburgh, shall be so treated as to provide for:

- (a) Substantially complete removal of settleable solids; and
- (b) Removal of not less than forty-five percent of the total suspended solids; and, in addition
- (c) Reduction by not less than 65% of the biochemical oxygen demand of organic wastes, provided, however, that whenever conditions permit, such lesser degree of reduction of biochemical-oxygen-demand, but not lower than 35%, may be applied to organic wastes if as a result there will be no impairment in the Cincinnati Pool of a water-quality standard of 4.0 parts per million of dissolved oxygen at the bottom of the oxygen sag in the Ohio River below Cincinnati.

TREATMENT STANDARD No. 2

Adopted April 2, 1952

All sewage from municipalities or other political subdivisions, public or private institutions or corporations discharged or permitted to flow into that portion of the Ohio River extending from U. S. Corps of Engineers Dam No. 27, located about five miles upstream from Huntington, West Virginia, and being 301 miles downstream from Pittsburgh, Pennsylvania, to U. S. Corps of Engineers Dam No. 36, located about three miles upstream from Cincinnati, Ohio, and being 461 miles downstream from Pittsburgh, Pennsylvania, shall be so treated as to provide for:

- (a) Substantially complete removal of settleable solids; and
- (b) Removal of not less than forty-five percent of the total suspended solids; and, in addition
- (c) Reduction in coliform organisms in accordance with the following schedule:
 - Not less than 90% reduction during the months May through November.
 - Not less than 80% reduction during the months December through April.

TREATMENT STANDARD No. 3

Adopted April 29, 1953

All sewage from municipalities or other political subdivisions, public or private institutions or corporations discharged or permitted to flow into that portion of the Ohio River extending from the Allegheny County-Beaver County line in Pennsylvania, located approximately 15 miles downstream from the confluence of the Allegheny and Monongahela Rivers at Pittsburgh, to U. S. Corps of Engineers Dam No. 27, located about five miles upstream from Huntington, W. Va., and being 301.0 miles downstream from Pittsburgh, Pa., shall be so treated as to provide for:

- (a) Substantially complete removal of settleable solids; and
- (b) Removal of not less than forty-five percent of the total suspended solids; and, in addition
- (c) Reduction in coliform organisms in accordance with the following schedule:
 - Not less than 80% reduction during the months May through October.
 - Not less than 85% reduction during the months November through April.

TREATMENT STANDARD No. 4

Adopted April 29, 1953

All sewage from municipalities or other political subdivisions, public or private institutions or corporations discharged or permitted to flow into that portion of the Ohio River extending from the point of confluence of the Allegheny and Monongahela Rivers at Pittsburgh, designated as Ohio River mile point 0.0, to the Allegheny County-Beaver County line in Pennsylvania, located approximately 15 miles downstream from the confluence of the Allegheny and Monongahela Rivers, shall be so treated as to provide for:

- (a) Substantially complete removal of settleable solids; and
- (b) Removal of not less than forty-five percent of the total suspended solids; and
- (c) Reduction in biochemical-oxygen-demand of approximately fifty percent; and, in addition
- (d) Reduction in coliform organisms in accordance with the following schedule:
 - Not less than 80% reduction during the months May through October.
 - Not less than 85% reduction during the months November through April.

COMMISSION PUBLICATIONS

FIRST ANNUAL REPORT—Nov. 1949

Background leading to establishment of Commission; plans and goals; reproduction of the compact.

PREVENTING STREAM POLLUTION FROM OIL PIPELINE BREAKS

Sept. 1950—A guidebook of recommended practice. (Out of print)

SECOND ANNUAL REPORT—Nov. 1950

An accounting of activities and projects; status of municipal sewage-treatment programs; development and work of industry-action committees.

WABASH RIVER POLLUTION-ABATEMENT NEEDS

Aug. 1950—Recommendations, analysis and data for water conservation by pollution control between Terre Haute, Ind., and Mt. Carmel, Ill. (Out of print)

BACTERIAL-QUALITY OBJECTIVES FOR THE OHIO RIVER

June 1951—A guide for the evaluation of sanitary condition of waters used for potable supplies and recreational uses.

PHENOL WASTES TREATMENT BY CHEMICAL OXIDATION

June 1951—Report of a cooperative research project which shows how phenols can be destroyed by three methods of chemical oxidation—using chlorine, ozone and chlorine dioxide. (Out of print)

POLLUTION PATTERNS IN THE OHIO RIVER—1950

June 1951—Water-quality conditions and changes revealed by a simultaneous sampling of the 963-mile stretch from Pittsburgh to Cairo. (Out of print)

PLATING-ROOM CONTROLS FOR POLLUTION ABATEMENT

July 1951—A guidebook of principles and practice for curbing losses of solutions and metals that otherwise might find their way into water courses.

BRINE CONTAMINATION IN THE MUSKINGUM RIVER

Aug. 1951—Determination of the nature and magnitude of brine-waste discharges from salt processing operations and their effect on water quality. (Out of print)

CLEAN STREAMS FOR THE OHIO VALLEY

Sept. 1951—A non-technical public education booklet which outlines the water pollution problem and its solution through treatment plants.

THIRD ANNUAL REPORT—Nov. 1951

Outline of program activities, including details of technical studies, river investigations and educational campaign.

OHIO RIVER POLLUTION-ABATEMENT NEEDS—HUNTINGTON TO CINCINNATI STRETCH

Feb. 1952—Findings on treatment requirements for maintaining oxygen and bacterial-quality objectives used as the basis for Treatment Standard No. 2. (Limited supply)

PLANNING AND MAKING INDUSTRIAL WASTE SURVEYS

April 1952 (44pp., 27 illus.)—Detailed instructions for measuring volume of flow, obtaining representative samples and calculating waste load. (Price \$1.00)

HOW TO GET SEWAGE TREATMENT WORKS IN OHIO

June 1952 (40pp.)—A guide describing recommended step-by-step engineering and financial procedures for cities or villages undertaking a sewage works project. (Price \$1.00)

DISPOSAL OF SPENT SULFATE PICKLING SOLUTIONS

Oct. 1952 (76pp., 17 illus.)—An analysis of methods for treating spent solutions resulting from sulfuric acid pickling to reduce stream pollution. Compiled by the Steel Industry Action Committee of the Commission. (Price \$2.00)

FOURTH ANNUAL REPORT—Nov. 1952

Graphic presentation of inter-relationships of varied groups and activities that comprise program. Depicts goals and accomplishments.

METHODS FOR TREATING METAL-FINISHING WASTES

Jan. 1953 (72pp., 16 drawings) An evaluation of various disposal methods and their applicability to specific waste control conditions, Compiled by Metal-Finishing Industry Action Committee of the Commission. (Price \$2.00)

REDUCING PHENOL WASTES FROM COKE PLANTS

Jan. 1953 (36pp., drawings and tables)—The sources, volumes and concentrations of phenolic wastes and methods for reduction by process changes or treatment. (Price \$1.00)

MULTIPLE-PURPOSE RESERVOIRS AND POLLUTION CONTROL BENEFITS

Jan. 1953—Description and status of the 80-unit reservoir program of the U. S. Corps of Engineers in the Ohio River Basin with reference to its present and anticipated effects on pollution abatement. (Limited supply)

OHIO RIVER POLLUTION-ABATEMENT NEEDS—PITTSBURGH TO HUNTINGTON STRETCH

March 1953—Findings on treatment requirements for maintaining oxygen and bacterial-quality objectives used as the basis for Treatment Standards No. 3 and No. 4. (Limited supply)

OHIO RIVER POLLUTION-ABATEMENT NEEDS—CINCINNATI TO CAIRO STRETCH

Nov. 1953—Findings on treatment requirements for maintaining oxygen and bacterial-quality objectives for use at public hearing.

Written and
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