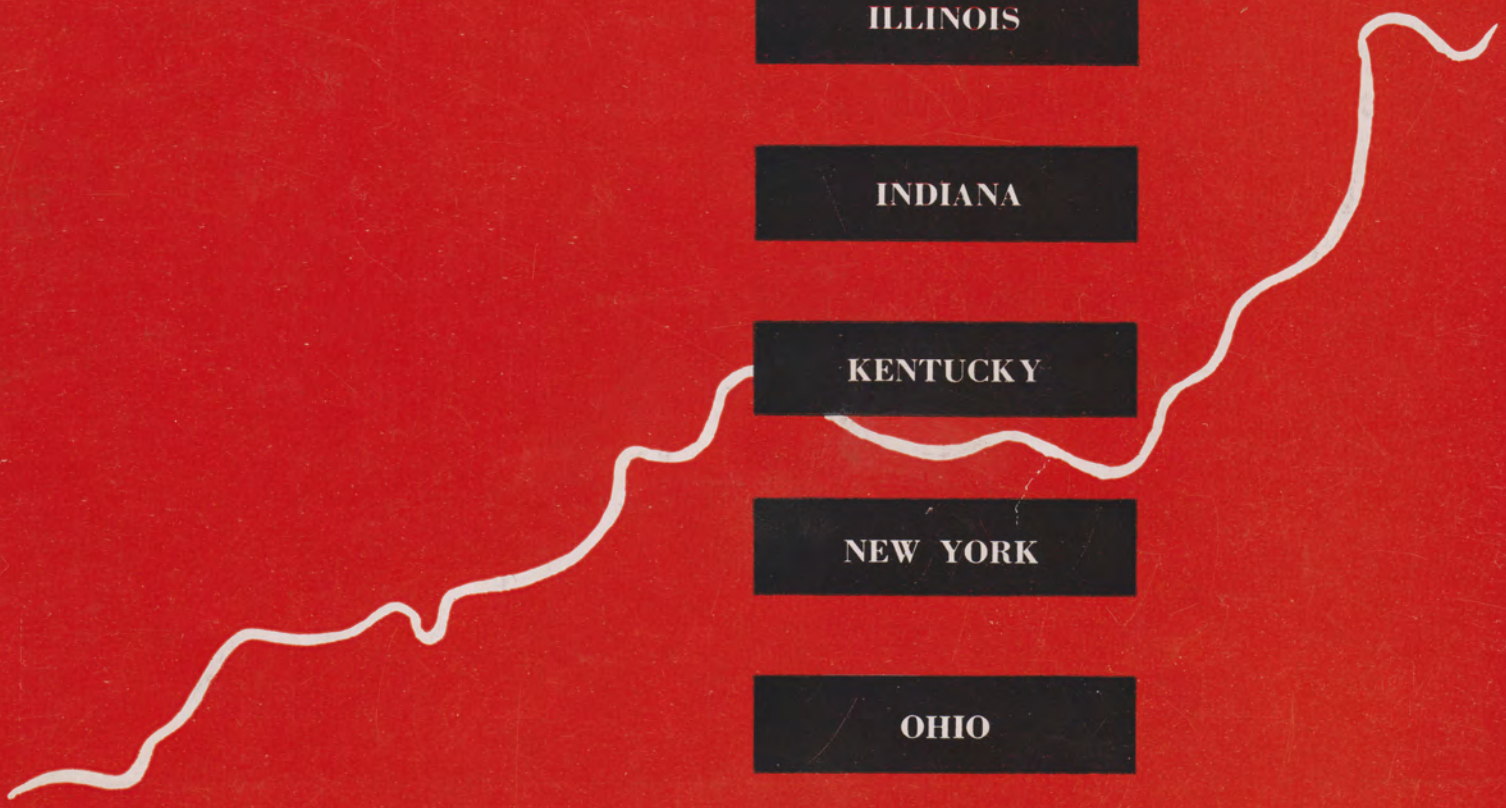
OHIO RIVER VALLEY WATER SANITATION COMMISSION

an interstate commission representing:



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2

nd annual report, 1950

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OHIO RIVER VALLEY
WATER SANITATION COMMISSION

414 WALNUT STREET CINCINNATI 2, OHIO

To the Chairman and
Members of the Commission:

What has transpired in the second year of a regional attack on stream pollution in the Ohio River valley is told in this report. It is an accounting of interstate action to restore degraded water resources. And the story is dramatized by the knowledge that the welfare of thousands of industries and millions of people in the valley hinges on the manner in which conflicts in water use can be resolved.

Mobilization for defense places a new and greater urgency on water conservation by pollution control in the Ohio River valley. Here, in the industrial heartland of the nation, the use and re-use of water is basic to industry operations and community life. Activities of the Commission in safeguarding these vital water resources thus assume a role of strategic importance.

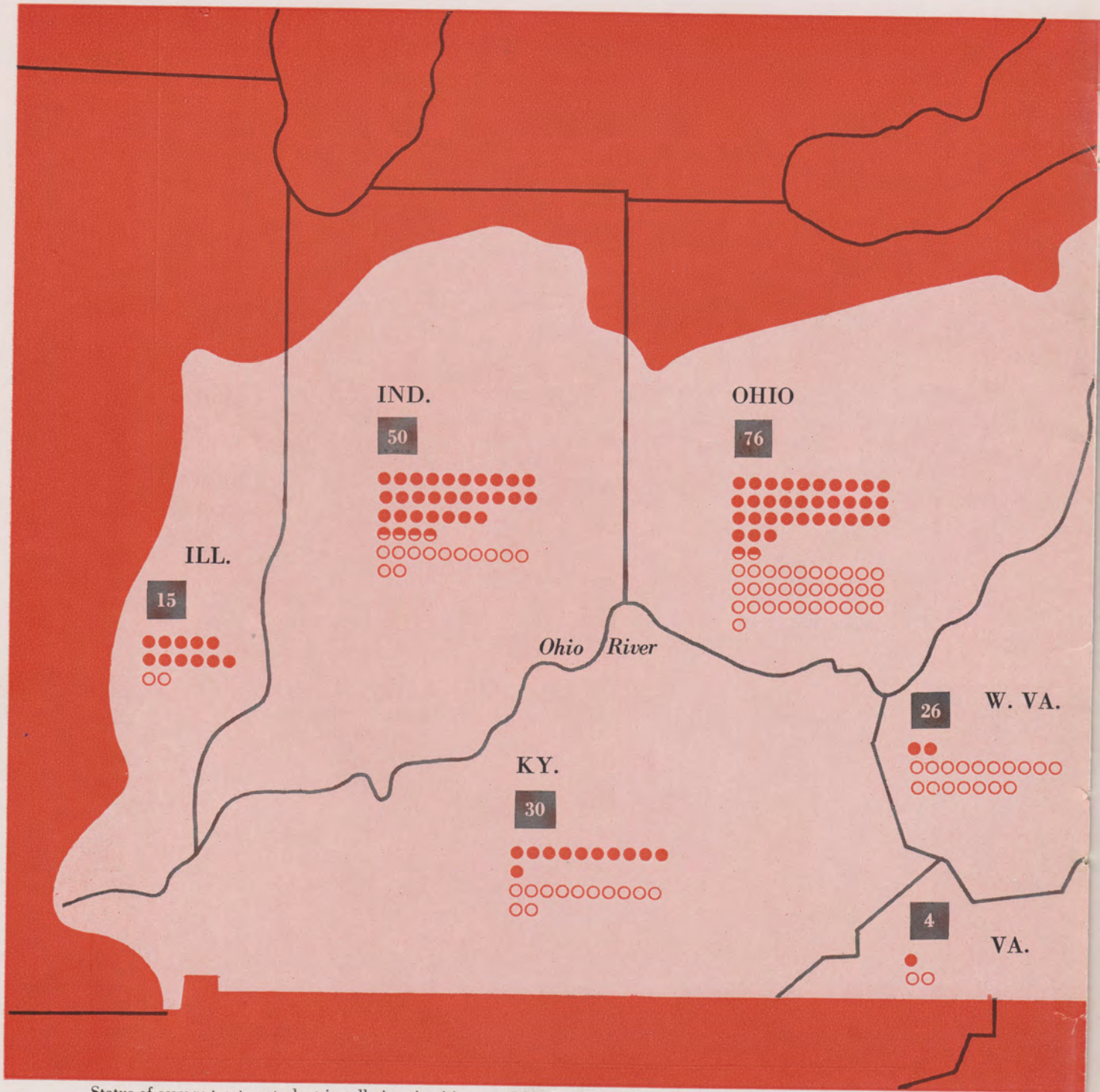
This summary of Commission activities has been prepared for transmittal to your respective Governors and legislators in order that they and their constituents may evaluate the program and its manner of execution.

Respectfully submitted,

Edward J. Cleary

EDWARD J. CLEARY
Executive Director
and Chief Engineer

November 25, 1950



Status of sewage-treatment plant installations in cities over 5,000 population. In each state the blocked number indicates number of such cities, the solid circles show plants built, the half-solid circles represent plants under construction and the outline circles indicate places where plans are being prepared.

SECOND YEAR OF ATTACK

An eight-state attack is under way in the Ohio River valley for the abatement of stream pollution and with it the restoration of degraded water resources. The outcome of his campaign is of vital concern to millions of people and thousands of industries. Nowhere has community growth and industrial expansion brought a greater foulness to streams than in the Ohio valley. And nowhere does a greater population and the industrial productivity of a region depend more on the use and re-use of the water flowing in these streams.

Use and abuse of the Ohio River as well as some of its tributaries is a matter of interstate responsibility. That is why the several states whose jurisdiction and interests encompass parts of the drainage basin joined together two years ago in a regional program of pollution abatement. What has happened in the second year of attack, as outlined in this report, will reveal substantial progress.

But it would be less than frank to intimate that two years of effort on a pollution problem that has been a century in the making already has produced marked results in terms of cleaner waters. Before the rivers in the valley will show the ultimate improvement that must be achieved, hundreds of municipal and industrial waste treatment plants must be put in operation. The physical task alone of building these facilities will take several years —probably a decade. This estimate assumes, of course, that defense mobilization plans will not curtail essential civilian construction. Meantime,

some disposal plants are being built; planning and design are under way on many more. But most importantly, the will to do the job has found expression in establishing the means for doing it. How well and how fast accomplishments will keep pace with desires depends on the continued support of the states, their people and their industries for clean streams.

BACKGROUND IN BRIEF

When the states of Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, West Virginia and Virginia signed a compact on June 30, 1948, pledging cooperation in the control of pollution they created a commission for this purpose. The Commission consists of three representatives from each state, and with it sit three representatives from the federal government. This body is charged with devising the means and establishing the policies for executing the compact agreement.

The district embraced by the compact includes an area of 155,000 square miles. Here live some 17,600,000 people. And here we find thousands of industrial establishments, some of them the largest of their kind in the world. This heavily populated territory is the industrial heartland of the United States. And water here is a basic resource.

Despite past efforts leading to installation of sewage-treatment facilities serving one-third the population, the streams of the district are overburdened with pollution. Into them still pour the sewered wastes from more than 5,000,000 people; and from industries come organic pollution wastes equivalent to at least another 7,000,000 people. In addition, there is further degradation of water quality from inorganic and toxic wastes, notably the drainage from active and abandoned coal mines, which is estimated to contain more than 2,500,000 tons of acid annually.

These streams furnish the primary source of domestic and industrial water supply for the district. Also, they must—and under certain conditions they could—serve to carry away waste discharges. The task of the Commission is to reconcile this conflict of uses.

Considered as an engineering problem, the reconciliation of dual use of rivers for water supply and waste discharges, is not too difficult to solve. Nature has provided rivers with properties for self-purification — provided they are not overloaded with pollution. From a technical standpoint, therefore, streams can be maintained in a condition to serve required needs if waste discharges are modified, treated or otherwise reduced below the point where they would overburden natural-purification processes.

Difficulties in the achievement of balanced use of rivers are primarily those associated with economics, education and enforcement. From the economic standpoint, for example, it should be obvious that stream clean-up measures call for the outlay of substantial sums of money. Treatment works are expensive. Municipalities are not easily convinced of their necessity. And industries, like municipalities, that have long enjoyed the privilege of indiscriminate discharge of wastes, can hardly be enthusiastic over capital expenditures from which the returns are not obvious.

All of which points up the problem of education —the development of understanding and a sense of common responsibility for the preservation of water resources. Degradation of water quality by pollution is not simply an offense against social decency. In the Ohio valley, at least, pollution abatement is a dollars-and-cents investment in survival. If water is foul, people still must drink it and take the consequences. And industries, most of whom require vast quantities of water, can turn to no substitute material.

Unless people are made aware of these things, and so few appreciate their import, progress in the control of pollution can be made with only the greatest difficulty. In this connection it can be pointed out that one of the most articulate groups helping to focus attention on the abuse of water resources have been the sportsmen of the country. It is a tribute to their efforts—and of small credit to the state-of-mind of the public—that in some places it is easier to compel abatement of pollution which kills fish than for the potential menace it may hold for public health or damage to water quality for industrial uses.

When educational efforts fail to generate action to support pollution-control measures, compulsion by enforcement is the final alternative. Provision for this lies in the laws of states themselves, reinforced by terms of the compact under which they are pledged to act in concert.

In summary, therefore, the Commission looks upon its campaign of interstate pollution control as one that involves engineering, economics, education and enforcement. On this basis it is taking action to provide in the minimum amount of time the means to secure maximum use of water resources.

WAR AND WATER

Mobilization for national defense and the consequent expansion of industrial production has placed a new urgency on water conservation. Industry needs water — 65,000 gallons for a ton of steel, 320,000 gallons for a ton of synthetic rubber, 50,000 gallons for a ton of explosives, to cite a few examples—and polluted streams cannot furnish the quality of water that industry must have.

If for no other reason than to make it possible for industry to effectively maintain and expand production capacity, pollution-abatement measures assume a role of strategic importance in the Ohio River valley greater than ever before. And there is a further pressing obligation. Domestic water supplies must be insured for the millions of people who man the industries and live in the communities of which these industries are an integral part.

Finally, more industrial production means more pollution. With a pollution load already greater in magnitude than the rivers of the valley can handle, an alarming prospect presents itself unless corrective measures are vigorously promoted. For example, announcement that the steel industry will expand its production by 10 percent in the next two years poses the question of how the industry will cope with the additional waste discharges, which are now far greater than can be properly tolerated by the streams into which they pour.

These are some of the reasons why the war emergency intensifies the need to hasten rather than slacken efforts for pollution control. The nation's power to produce for defense is in large measure based on water. And the Ohio River valley is a vital arsenal in the mobilization program.

COMMISSION'S PROGRAM

The Commission's program, as determined by agreement among the signatory states, presently is concerned with joint action in the following major areas of activity:

Enforcement of the compact provisions,
Analysis and forecast of stream conditions,
Activation of corrective measures to curb municipal and industrial pollution,
Public education for support of program,
Development of cooperative relationships,
Maintenance of a clearing-house.

Enforcement—Under Article VI of the compact the Commission is "authorized to adopt, prescribe and promulgate rules, regulations and standards for administering and enforcing" treatment requirements. The minimum requirement for sewage discharges is that they be treated to provide for substantially complete removal of settleable solids, and the removal of not less than 45 percent of the total suspended solids. However, a higher degree of treatment may be specified if this is determined to be necessary to "protect the public health or to preserve the waters for other legitimate purposes." Industrial wastes must likewise be modified or treated to such a degree as may be determined to be necessary for maintaining water-quality objectives.

Under Article IX of the compact, the Commission is empowered to issue orders upon municipalities and corporations for the discontinuance or modification of waste discharges. And the Commission can institute court action for the enforcement of such orders.

Stream Analysis—Basic to the Commission's operations are determinations of stream conditions and the purity objectives that should be established in order to assure maximum use of water resources.

On an inspection trip of the Ohio River members of the Commission are briefed by Sam Bailey, chief of engineering section, Louisville District, U. S. Corps of Engineers, on navigation improvements and their effects on river conditions.

CINCINNATI POST PHOTO

Investigations are being made to analyze the effect on streams of different pollution loads under varying conditions of run-off. On this basis answers to questions relating to oxygen balance, toxicity tolerances, acidity, alkalinity, hardness and other characteristics are being formulated. Also the opportunity is provided to make an appraisal of water-quality conditions resulting from changes in the regimen of streams; such changes include low-flow regulation, introduction of high-level navigation dams and the operation of water-power plants.

Most importantly, the stream analyses furnish a means to forecast potentialities for industrial expansion. The signatory states represented by the Commission will thus be aided in anticipating the needs of industry with regard to waste disposal requirements and water-supply quality conditions.

For these and other reasons the Commission looks upon stream-analysis information as basic to the exercise of sound judgment in devising effective and economic policies for water conservation.

Corrective Measures—Reduction of sewage and waste discharges to meet prescribed conditions is the immediate and ultimate objective of the Commission. On the municipal front, the campaign for installation of treatment works has been gathering momentum under the impact of the regulatory authorities in each of the signatory states. A detailed account of this situation is given on page 18.

The campaign on the industrial front is gaining the support of progressive top-management and is being pushed by the states. Exploratory conferences have been conducted by the Commission during the past year with groups of industries whose operations and waste problems are similar. This has resulted in the establishment of "action committees" by some industry groups. What these committees are doing, along with an appraisal of the industrial-waste abatement situation, is detailed on page 23.

Control of natural pollution resulting from soil erosion cannot be ignored as an element of water-quality improvement. However, this is not specified as a responsibility of the Commission. Drafters of the compact thus recognized the existence of long-established, specialized agencies on both the federal and state levels whose efforts are directed primarily toward soil conservation. While the Commission appreciates that it has neither the directive nor the resources to engage in soil-erosion activities, it is not unmindful of the intimate relationship between land and water use. Hence it is watching with keen interest, and endeavoring to support and extend, the work of existing agencies dealing with soil erosion.

Educational Efforts—An informed public, and one that is aroused to its responsibilities for supporting pollution-control efforts, is considered as the Commission's strongest weapon in the campaign for clean streams. As has been aptly stated: "Laws are not enforced in this country; they are obeyed."

Accordingly, the staff and the commissioners have utilized every opportunity to speak before groups—civic, industrial and professional—to acquaint them with conditions and to generate action for their amelioration. National as well as international organizations concerned with water conservation have displayed an increasing interest in the operations of the Commission and in many cases it has been possible to address these groups and join with them in an exchange of ideas.

News releases on developments are issued frequently to more than 200 papers in the region, to several that are circulated nationally, and to all wire services. In addition, these releases as well as feature articles are furnished to national and regional magazines that serve the technical fields, industry, sportsmen, conservationists, civic groups, municipal and other governmental agencies.

Radio and television programs, in which the staff has participated or aided in the production, have offered another medium for the dissemination of information.

Issuance of reports and pamphlets on various aspects of the Commission's activity is assuming importance in accordance with increasing staff productivity. The first annual report of the Commission was published on November 15, 1949; distribution thus far has been about 6,500 copies. In September, 1950, the first of a series of manuals to be designated as Reference Data Publications came off the press. This manual is a handbook of recommended practices on "Preventing Stream Pollution From Pipeline Breaks." Other manuals dealing with various phases of industrial waste control are contemplated for production in the coming year.

Also published in September, 1950, was the engineering report "Wabash River—Pollution Abatement Needs." This describes how the findings were made to reach conclusions on sewage-treatment requirements in a 130-mile stretch of the river. It includes survey methods, field and laboratory data, stream analysis procedures, and recommendations.

Cooperative Relationships — Representing as it does eight signatory states, and operating in a field of water resources which encompasses many interests, there are numerous contacts and cooperative relationships to be maintained and developed by the Commission.

Closest liaison is necessary, of course, with the pollution-control agencies and health department authorities in the signatory states. Matters of mutual concern are constantly under discussion and examination. In addition, special projects are conducted jointly with one or more of the state agencies. Contacts with legislative and administrative officials likewise are pre-requisite for proper action.

Special relations are maintained with certain neighbor states in the basin who have expressed an interest in becoming parties to the compact agreement. One of these, the State of Tennessee, was an active participant in the original negotiations. Its legislature has voted to become a signatory to the compact provided the states of Alabama and North Carolina do likewise. In order to encourage participation of these three states the Commission has established a special committee to promote closer relations. And representatives of these states, appointed by their governors, have sat in on meetings of the Commission this year as observers.

The work and operations of interstate agencies similarly engaged in pollution control have elements of common interest and are studied with profit. An informal organization of the executive directors of these agencies makes possible occasional meetings where views can be exchanged.

Relations with agencies on the federal level are of paramount importance. In fact, three federal agencies are officially represented in all deliberations of the Commission. They include the U. S. Public Health Service, the U. S. Corps of Engineers and the U. S. Fish and Wildlife Service.

The U. S. Public Health Service, through its Division of Water Pollution Control and in accordance with the provisions of Public Law 845, has made a financial grant to the Commission for the conduct of industrial-waste investigations. Through the recent establishment of a regional basin-engineer office at Cincinnati, concerned with the assembly of comprehensive plans in the Ohio-Tennessee basin, the Division of Water Pollution Control has made provision for the integration of information on a state, interstate and federal level. Also at Cincinnati the Public Health Service maintains its

COURIER-JOURNAL & LOUISVILLE TIMES PHOTO

Important aid was given to the Commission's stream investigations program by the mobile laboratory placed into service this year by Kentucky. Dr. Bruce Underwood (left), state health commissioner is here shown turning over the new laboratory to F. Clarke Dugan, director of the division of sanitary engineering. Dr. Underwood is also a member of the Ohio River commission and Mr. Dugan serves on the engineering committee.

Environmental Health Center, which includes what is probably the most important laboratory in the world concerned with fundamental stream-purification problems. The specialized staff at this laboratory has been of great aid to the Commission through opportunities for consultation, the loan of special equipment and in the conduct of orientation courses concerned with stream surveys.

The U. S. Corps of Engineers, through its Ohio River Division office in Cincinnati and district offices in other parts of the basin, makes available to the Commission the maps, data and other services that form part of its extensive operations relating to river regulation. Flood-control structures and navigation improvements, which are designed and built by the Army Engineers, bear an intimate relationship to pollution-control measures. Consequently, the need and the opportunity for integration of thinking between the Commission and the Army Engineers is amply satisfied.

The U. S. Fish and Wildlife Service with its spe-

cial concerns in the field of conservation, the U. S. Coast Guard in its role of furnishing protection to life and property on water, and the U. S. Geological Survey in the field of water-resources investigation, are representative of other federal agencies with whom the Commission deals. Most recently, for example, the Geological Survey has assisted in Commission-directed water-quality surveys of the Ohio and Muskingum Rivers by furnishing flow data and mineral analyses.

Contact with the U. S. Atomic Energy Commission, on matters relating to the disposal of radioactive wastes, has been expedited through the appointment of a staff member as a consultant to the A.E.C.

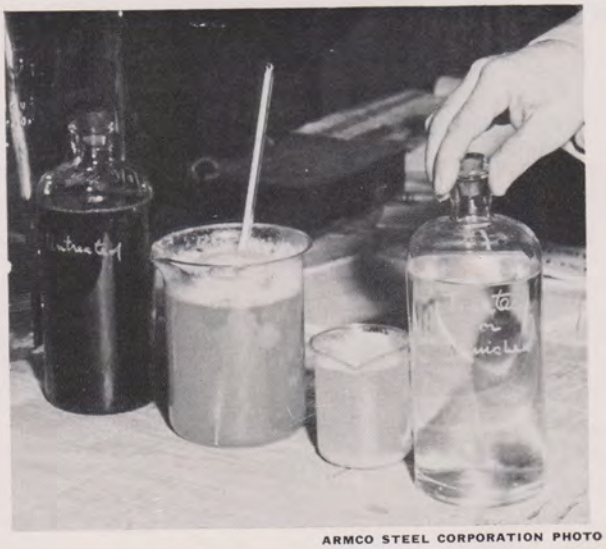
SPECIAL PROJECTS

Varied elements of the Commission's program have been sketched in the preceding pages. Certain projects on which work has been advanced this year and which lay claim for more detailed report include:

1. Determination of Wabash River pollution-abatement needs.
2. Compilation of a manual on prevention of pollution from oil pipeline breaks.
3. Phenol-waste destruction research.
4. Bacterial quality objectives.
5. Ohio River water-quality investigations.
6. Muskingum River brine pollution.
7. Status reports on municipal installations.
8. Inventory of industrial waste discharges.
9. Recommendations for pollution-control legislation in Kentucky.
10. Beryllium toxicity inquiry.
11. Statement to President's Water Resources Policy Commission.

Wabash River Findings—Determination of the permissible pollution limits in a 130-mile stretch of the Wabash River between Terre Haute, Indiana, and Mt. Carmel, Illinois, has been completed and a report submitted. A summary of the report and findings is included as Appendix A.

The Commission enjoyed unusual support in conducting this study as a joint enterprise. Eight agencies, representing public and private interests, were involved. They included: State of Indiana, State of Illinois, National Council for Stream Improvement, Terre Haute Paper Co., U. S. Public Health Service, U. S. Geological Survey, U. S. Corps of Engineers, and representatives of the Commission. Names of the individuals who took part in this work and the services rendered are given in Appendix A.



ARMCO STEEL CORPORATION PHOTO

Laboratory results on phenol waste treatment, showing progressive changes in removal and clarification, provided the clues for subsequent pilot-plant tests.

Oil Pipeline Manual—Recommended practices to prevent pollution of streams from oil pipeline breaks have been outlined in a manual prepared by the Commission's staff. Fifteen major oil companies that operate pipelines in the Ohio valley were consulted, along with other sources, in the preparation of this guidebook.

The task was undertaken because some of the signatory states had experiences indicating that not enough emphasis was being placed on pollution-control measures by pipeline repair crews in handling emergency breaks. Potential hazards from this type of pollution are serious because many transcontinental and feeder pipelines pass through the Ohio valley. Furthermore, it was discovered that there was little uniformity of practice or organization for coping with this hazard.

The manual outlines ways to minimize pipeline leaks and breaks, the organization and training of emergency repair crews, steps to be taken when a break occurs, and how to keep escaped oil from becoming a source of stream pollution.

Distributed to pipeline operators and to regulatory agencies, the manual is the first of a series of guidebooks that the Commission is developing to aid in curbing industrial waste discharges and promote compliance with pollution-control regulations in the eight state area.

Phenol-Waste Research—Recognizing that water-taste contamination from phenol waste was one of the most important pollution problems in the basin, and impatient with progress being made in phenol-treatment methods, the Commission decided to add its efforts in seeking suitable methods of treatment.

Toward this end the Commission sponsored and undertook the coordination of a joint research project. It has enlisted the generous collaboration of the Armco Steel Corporation, the Wallace & Tiernan Co., the Ozone Processes Division of the Welsbach Corporation and the Mathieson Chemical Corporation. In addition, the division of sanitary engineering of the Ohio State Health Department made available its mobile laboratory and is assisting in analytical work. Important help is also being furnished by the Cincinnati Environmental Health Center of the U. S. Public Health Service through consultation and specialized laboratory investigations. Collaborators and personnel associated with this work are listed on page 28.

Project operations were started one year ago. At that time the Armco Steel Corporation erected a field laboratory adjacent to its by-product coke plant at Hamilton. Here were conducted the studies, under phenol-production operating conditions, to determine the possibility of complete destruction by chemical oxidation methods.

Results from these "bottle" experiments have given affirmative answers, and it was demonstrated that there were at least three methods by which the phenolic constituents could be destroyed. The Wallace & Tiernan Co., for example, explored the potentialities of chemical coagulation and acidification in learning how chlorination could be employed to eliminate phenolic compounds.

Following this the Ozone Processes Division (Welsbach Corp.) investigated the potentialities of ozone oxidation and found that it also was an effective agency for destruction of phenols. Experimentation with chlorine dioxide, undertaken by the Matheison Chemical Corporation at the Armco field laboratory, proved this to be a third effective oxidant.

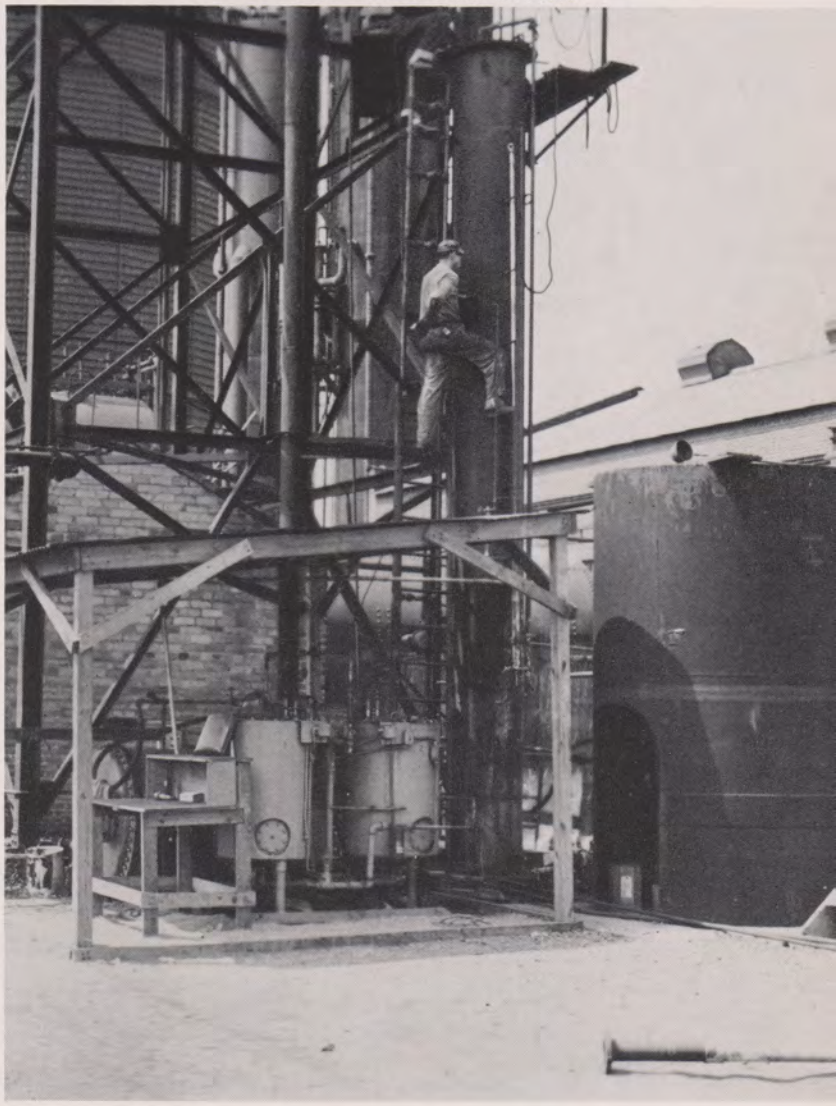
After the results and the experiences of all parties were pooled and analyzed, the Armco Steel Corporation agreed with the Commission to carry the work into a pilot-plant stage of investigation. The other collaborators agreed to furnish equipment and technicians to further the work.

The corporation subsidized and installed the required tanks, towers and appurtenances, and is supplying manpower and other services to operate them. At this writing initial pilot-plant work with ozone has been completed and chlorine-dioxide studies are underway. Plans have been laid for the operation of the pilot-plant using chlorine alone and in series with chlorine and chlorine-dioxide.

Concurrent with this joint-research project the Commission is maintaining contact with several

Pilot plant for phenol-waste treatment investigations, which is being operated at the Hamilton works of the Armco Steel Corporation under the direction of the Commission. Generous support of the Armco board of directors, who authorized construction of the plant, is providing new information of value to the Commission as well as many other industries.

ARMCO STEEL CORPORATION PHOTO



other phenol-research operations for exchange of information and proper evaluation of its own work.

Bacterial Quality Objectives—In order to reach decisions on acceptable limits and control of bacterial contamination, regarding which there are divergent standards, the Commission concluded that the matter commanded specialized study. In this connection it should be recalled that the report on river conditions in the Ironton area, adopted by the Commission on October 5, 1949, stated: ". . . the matter of establishing bacterial-quality objectives for the stream (the Ohio River in that vicinity) should receive continuing attention by the Commission in collaboration with the signatory states and other interested agencies."

Accordingly, the services of Col. H. W. Streeter, U. S. Public Health Service (retired) were obtained as consultant. Colonel Streeter, an international authority on water-quality investigations, was requested to: (1) review all available information and practice on the use and validity of bacterial-quality standards as related to water supply and recreational requirements; and (2) prepare a report and submit recommendations for the establishment of bacterial-quality objectives suitable for the Ohio River.

Colonel Streeter submitted his tentative report on October 3, 1950, to the engineering committee of the Commission. Certain changes were made and a standard written. This is now being circulated among regulatory authorities and others for comment prior to adoption by the Commission.

Ohio River Water Quality Survey—Water-quality conditions in the Ohio River and its tributaries are of basic interest to the Commission. Definition of the inroads of stream pollution demonstrates the magnitude of the problem with which the Commission is faced and should provide a baseline of reference to measure stream-improvement progress.

To secure this information the Commission authorized a staff-directed survey project. It was concluded that the survey should seek to determine these stream characteristics: oxygen balance, acidity-alkalinity balance, and complete mineral and coliform content.

It was decided that the initial survey should provide information on pollution conditions particularly at state lines, in the Ohio River above and below the entrance of major tributaries and major sources of pollution, and in the mouths of major tributaries.

The field work for this survey covering 27 points on the Ohio River and 9 in the mouths of major tributaries was completed between September 18 and 29, 1950. The states of Pennsylvania, Ohio, West Virginia, Kentucky, Indiana and Illinois participated in this project and each of them operated a laboratory. Coordination of the work was expedited by having state representatives participate in a pre-survey orientation conference held in Cincinnati. At this conference, the Cincinnati Environmental Health Center of the U. S. Public Health Service outlined and standardized the survey procedures to be used by each state field party and laboratory.

The Corps of Engineers made a valuable contribution to the survey by furnishing boats and operators for the use of sample collectors at most of the sampling points. Stream-discharge information was secured by contract from district offices of the U. S. Geological Survey. All mineral analyses were made by the district laboratory of the U. S. Geological Survey in Columbus, Ohio.

An analysis of the data obtained in the field survey is now being made. This study will supply information as to supplementary work necessary in future surveys, locate areas of major concern and supply essential technical background for corrective action in those areas. A separate report is under preparation covering the Ohio River survey.

Collaborating with the Commission, the signatory states and several municipal treatment plants on the Ohio, the U. S. Public Health Service has inaugurated a continuing water taste-and-odor investigation. This additional contribution to the Ohio River survey work is expected to provide, among other things, important clues in identifying the cause and source of certain types of pollution.

Muskingum Brine Pollution—Chloride contamination from industrial processing of brines has affected both surface and well water supplies in the Muskingum River area. This situation is of more than local concern because brine disposal is a problem of increasing magnitude in the Ohio River Basin. For that reason the Commission authorized, at the request of the State of Ohio, a staff study of the Muskingum.

Purpose of this investigation is to determine the nature and magnitude of brine-waste loads with relation to their effect on water quality. In addition, an effort will be made to secure an economic appraisal of brine pollution as measured in terms

of degradation of water supplies and damage to boats and river structures.

Field work has been started on the Muskingum and Tuscarawas Rivers between Barberton and Marietta, Ohio. The project is being conducted as a joint venture under the direction of the Commission's staff. The State of Ohio has aided in reconnaissance activities, and is furnishing the services of a sample collector and courier who picks up all the samples and transports them to Columbus. Here all samples are being analyzed at the district laboratory of the U. S. Geological Survey.

The Huntington District of the U. S. Corps of Engineers is making an important contribution to the survey by collecting samples at 16 of the 23 sampling points. Discharge information is being furnished by the division of water of the Ohio Resources Board and the U. S. Geological Survey.

Municipal Status Reports—In order to maintain a progress record of sewage-treatment facilities installed by municipalities in the Ohio River district, the Commission has instituted a system of "status reports." These are based on information supplied at regular intervals by each of the signatory states. The reports show the number of municipalities in which plants have been built, are under construction, are in the design stage or are without any plans.

For the first year these summaries were concerned only with the status of municipalities whose population was 5,000 or over. Now the summaries are being extended to provide information on all municipalities, regardless of size.

In addition to these reports, the Commission also receives from the states a detailed record on the design features and costs of each new treatment plant that has been approved for construction by the state agency.

Information submitted by the states and compiled by the Commission serves a dual purpose in that it is made available to the Ohio-Tennessee drainage-basin engineer office of the U. S. Public Health Service to aid in the drafting of comprehensive plans under Public Law 845.

Industrial Waste Inventory—Another important tabulation of information was begun this year in cooperation with the states and their industries. This is an assembly of data from all industries that are not connected to municipal sewer systems. This inventory is designed to show the amount and characteristics of the wastes produced by each plant, the type of treatment employed, and the status of facilities being planned for treatment if none are now being operated.

U. S. GEOLOGICAL SURVEY PHOTO

Flame photometer for rapid determination of sodium and potassium in water, which is being used in the Commission's investigation of brine pollution in the Muskingum River. This equipment forms part of the laboratory facilities at the Columbus, Ohio, office of the U. S. Geological Survey, with whom the Commission has contracted for special work on analysis.

Information relating to specific industrial plants is considered as confidential in nature.

Legislation for Kentucky—At the request of the commissioners representing the Commonwealth of Kentucky, legal counsel and staff were instructed to draft recommendations for legislation to strengthen Kentucky's efforts in pollution abatement. On the basis of these recommendations the 1950 General Assembly of Kentucky compiled and passed a bill establishing a state water pollution control commission. The bill became law on June 20, 1950.

The Kentucky legislation consolidates in a single agency duties and powers relating to pollution abatement that heretofore were distributed among three departments of the state—conservation, fish and game, and health. The Commission membership includes: the commissioner of health; commissioner of conservation; the attorney general; the director of the division of fish and game; and

two citizens, one of whom represents industrial management and the other represents municipalities. The secretary and administrative agent of the commission is the director of sanitary engineering of the state health department.

The commission is empowered to establish quality standards for waters in the state according to their uses and to issue orders for the abatement of waste discharges or adoption of remedial measures to curb pollution. Anyone now discharging wastes is required to obtain a permit from the commission, which will determine under what conditions such discharges may be continued. No new outlets for waste discharge, or changes in an existing system of disposal, can be made without first obtaining approval. Penalities for willful violation of the provisions of the act or orders issued by the commission includes fines up to $1,000, imprisonment of one year, or both.

Pollution-control activities in Kentucky will be closely integrated with the Ohio River interstate program since three members of the Kentucky commission—Henry Ward, Commissioner of Conservation; Earl Wallace, Director of the Division of Game and Fish, and Dr. Bruce Underwood, Commissioner of Health—are also commissioners on the Ohio River compact group. Mr. Ward presently is chairman of both agencies.

Strengthening and unification of pollution-control legislation within each of the signatory states was considered as basic to the success of the interstate compact. The adoption by Kentucky this year of suitable legislation, by New York last year of a comprehensive stream-pollution law, and the amendments made to the laws in Ohio and Illinois last year, were important steps in this direction.

Beryllium Toxicity Inquiry—Use of new chemical elements and compounds in the industrial field, and the possibility that they may find their way into waste discharges, points up the necessity for inquiry regarding their toxicity potentials. Beryllium is one of these. This substance is employed in certain atomic-energy activities, in the manufacture of steel and, until recently, was widely used as a phosphor for coating fluorescent light tubes. Moreover, plants engaged in processing beryllium oxide ore are located within the boundaries of the compact states.

Thus it was that the Commission sought to ascertain what may be an allowable concentration level of beryllium in streams used for water supply purposes. It was discovered that toxicity studies of this metal have been confined almost exclusively to physical contact and air contamination. Ingestion of beryllium through water supplies has not been studied because the possibility of hazard has not existed.

Unofficial comments from experts in the medical and industrial hygiene fields who have worked on beryllium toxicity indicate that the water hazard seems remote. Until further studies are completed it would appear that as much as one part per million of beryllium in a water supply might be tolerated with safety.

National Water Resources Policy—In acknowledging the invitation of President Truman's Water Resources Policy Commission to register the views of the Ohio River Valley Water Sanitation Commission with regard to the development of a national water resources policy, the Commission thoroughly discussed its position. Final agreement was reached on a statement which was orally presented at a public hearing conducted in Columbus, Ohio, on July 24, 1950.

The Ohio River Commission pointed out that its views emanated from an interstate agency whose responsibilities were restricted solely to conservation of waters through control of pollution. And it stated further that the signatory states had reached the conclusion, as evidenced by a compact agreement, that pollution control in interstate waters was a matter of state responsibility coupled with regional coordination and cooperation with federal agencies.

Conditioned in this fashion, it was the viewpoint of the Ohio River Commission that the federal government could usefully abet pollution abatement and serve the national interest in water conservation by:

1. Including in all studies of reservoir projects an investigation of the possible water pollution-abatement benefits to be derived from low-flow regulation provisions. Where local benefits predominate the beneficiaries should assume their proper share of the cost. And in no case should a guaranteed minimum flow in a stream—or its potential availability—be considered as a complete substitute for sewage or industrial waste-treatment requirements.

2. Accepting leadership in directing and promoting a campaign to curb the discharge of acid from active and abandoned coal mines. In the Ohio Basin alone more than 2,500,000 tons of acid each year enter the streams. As more mines are

COLUMBUS DISPATCH PHOTO

Representatives of the signatory states at their initial meeting to discuss plans for an appeal to the Supreme Court of the United States on the matter of West Virginia's participation in the compact.

Seated (left to right) are: Joseph P. Kinneary, first assistant attorney-general of Ohio; Mrs. M. Vashti Burr, deputy attorney-general of Pennsylvania; and William C. Marland, attorney-general of West Virginia.

Standing (left to right) are: William C. Bryant, chief counsel for Attorney General Herbert S. Duffy of Ohio; Leonard A. Weakley, general counsel for the Ohio River Valley Water Sanitation Commission; Squire Williams, Kentucky, first assistant attorney-general; T. G. Driscoll, assistant director of the Council of State Governments, Washington, D. C.; C. W. Klassen, compact commissioner from Illinois; Hudson Biery, compact commissioner from Ohio; Lucien S. Field, assistant attorney-general of Illinois; Edward J. Cleary, executive director and chief engineer of the Commission, and Charles Henderson, legal counsel representing the Federal Security Agency, Washington, D. C.

opened additional quantities of acid will be discharged unless corrective measures can be devised. This acid degrades the water supply of millions of people, has destroyed fishing and recreational facilities, and is the cause of damage to boats, bridges and navigation facilities, some of which have been constructed with federal funds and at great expense. In 1940 it was estimated by the U. S. Public Health Service that the annual damages caused by mine acid in the streams above the Ohio-West Virginia-Pennsylvania state line were $2,071,000. The federal government saw merit in attacking the problem during the middle thirties with Works Progress Administration funds. Seven states participated in this project, which involved construction of air-seals, and over $7,000,000 was expended. The project was discontinued in 1942 and no provisions were made for maintaining the seals. Consequently there are few, if any, benefits still accruing from the program.

3. Fostering support for modifications of federal income-tax laws that will permit industries to amortize the cost of waste-treatment plants at an accelerated rate. Bills have been introduced in the Congress for this purpose during recent years.

4. Emphasizing in the distribution of any federal financial aid for local public works the basic importance and high priority to be accorded to sewage disposal improvements.

5. Urging that in the development of synthetic fuel by the federal government proper recognition be accorded to water-supply safeguards. It is understood that water requirements for such plants are so large that in certain locations the entire flow of a stream might be evaporated. Therefore, it is urged that plans for synthetic fuel installations should include provisions for building upstream storage facilities to maintain stream flow as well as facilities for elimination of phenol or other wastes that might find their way into streams. Where synthetic fuel plants are considered as an essential element in national defense and safety, the neces-

sary facilities to safeguard existing water supplies should be a logical federal responsibility.

WEST VIRGINIA STATUS

On April 4, 1950, the Supreme Court of Appeals of West Virginia ruled in a three to two decision that the ratification of the Ohio River Valley Water Sanitation Compact by the Legislature of West Virginia in 1939 was unconstitutional. A petition by the West Virginia compact commissioners seeking a review of the state court's decision was filed in the Supreme Court of the United States on June 26, 1950. Four additional briefs supporting this request for review were filed jointly by the States of Ohio, Indiana, Illinois, Kentucky, Pennsylvania and New York, the Commonwealth of Pennsylvania, the United States and by the Interstate Commission on the Potomac River Basin.

On October 9 the Supreme Court of the United States granted the request for review. The hearing has been scheduled for early December.

The majority opinion of the West Virginia court interpreted the compact as: (1) Requiring the state to incur a financial obligation in violation of debt limitations imposed by the West Virginia constitution; and (2) resulting in a delegation of police power that is contrary to general principles of constitutional law. The minority members of the court expressed opposite views on both points.

The state court ruling was rendered in a proceeding which was instituted by the Attorney General of West Virginia on behalf of the compact commissioners from that state. They sought to compel the auditor of the state to issue a warrant upon the state treasury for the disbursement of funds appropriated by the state legislature to cover payment of West Virginia's proportionate share of Commission expenses for 1949. The same auditor previously had approved payment of West Virginia's share of the 1948 Commission expenses.

SERVICE ACTIVITIES

Operations associated with the conduct and administration of the Commission's affairs have called for substantial expenditures of effort, time and travel. In this connection the quarterly and other meetings of the commissioners, the executive committee and the staff, were of particular consequence. Details of these and other service activities are included here as part of the record.

Legal Counsel—All matters relating to the legal aspects of the Commission's business continue to be conducted by the firm of Taft, Stettinius and Hollister, under the able direction of Mr. Leonard A. Weakley, one of the partners. Mr. Weakley played an important part in aiding the Commonwealth of Kentucky with the drafting of a new stream-pollution control bill that has now been enacted into law. He has also been active for the Commission in discussions with other interested groups on federal tax legislation that would permit amortization of industrial waste-treatment facilities at an accelerated rate.

Mr. John B. Hollister, in association with William C. Marland, attorney-general of the State of West Virginia, is acting as the attorney for the West Virginia commissioners in their petition presented to the Supreme Court of the United States for a review of the West Virginia state supreme court ruling. Mr. Weakley is one of the counselors on this matter.

Staff Changes—On July 1, 1950, Mr. Ralph M. Strotman asked to be relieved of his part-time service to the Commission in the role of treasurer. He acted in this capacity since the Commission was formed in July, 1948. His resignation was accepted with regret and with a statement of appreciation for the manner in which he had discharged his duties as treasurer, particularly in establishing an accounting system for the Commission.

Mr. Robert K. Horton, sanitary engineer of the staff, was elected treasurer to succeed Mr. Strotman. All bookkeeping functions were transferred to the headquarters office.

Mr. William R. Taylor, a graduate chemical engineer, was appointed to the staff on June 1. Mr. Taylor has a background of practical experience in industry and the operation of sewage and water treatment plants. During the war he served overseas as an officer and instructor in the U. S. Army Air Force.

Mr. Kenneth S. Watson, assistant director, resigned from this post on October 1, 1950, to accept a position with one of the country's largest industrial establishments in charge of their waste-control program. His services as a commissioner from West Virginia for one year, and then as a member of the staff for the following year, contributed substantially to the development of Commission policy and program.

Commission Meetings — Four regular meetings were conducted during the year, and there were seven special meetings of the members of the execu-

tive committee. Five of the latter were called in connection with exploratory conferences held with industry groups. The engineering committee met at four all-day sessions for discussion of technical matters, recommendations on which were later presented to the Commission as a whole for action. All other committees conducted their business by correspondence and in conjunction with regular sessions of the Commission. A summary of the meeting dates with the nature of the business transacted is given on page 37.

Meetings and Speeches—Major professional meetings and promotional contacts made by the staff during the year numbered 85. Speeches on the work of the Commission were made at 30 of these meetings. The list includes:

NATIONAL MEETINGS

American Water Works Assn.—Chicago and Philadelphia
National Water Conservation Conference—Chicago
Federation of Sewage Works Assn.—Boston, Mass.
American Public Health Assn.—New York City
Accelerated tax depreciation conference—Washington, D. C.
American Electroplaters Society—Cincinnati
American Society of Civil Engineers—New York City
Technical Association of the Paper and Pulp Industries—New York City
National Council for Stream Improvement—New York City
President's National Water Resources Policy Commission—Columbus, Ohio
Inter-American Sanitary Engineering Assn.—Mexico City

SECTIONAL AND LOCAL MEETINGS

American Institute of Chemical Engineers—Pittsburgh, Pa., Louisville, Ky. and Wilson Dam, Ala.
Ohio Sewage and Industrial Wastes Treatment Conference—Cleveland and Cincinnati
Ohio Chamber of Commerce—Columbus, Ohio and Cincinnati, Ohio
Municipal officials—Wheeling, W. Va. and Huntington, W. Va.
West Virginia Sewage and Industrial Wastes Assn.—Charleston, W. Va.
Interstate Commission on the Potomac River Basin—Capon Springs, W. Va. and Washington, D. C.
Ohio County Wild Life League—Wheeling, W. Va.
Executive directors, interstate pollution-control agencies—New York City
Kentucky-Tennessee Section, A.W.W.A.—Lexington, Ky.
Dayton Society of Professional Engineers—Dayton, Ohio
Izaak Walton League—Dayton, Leesville, and Cincinnati, Ohio
Junior Chamber of Commerce—Terre Haute, Ind.
Ohio Section, A.W.W.A.—Dayton, Ohio
Kentucky Optimist Club—Covington, Ky.
Virginia Water Control Board—Richmond, Va.
Technical Association of the Paper and Pulp Industries—Middletown, Ohio
Engineering Society of Cincinnati, Cincinnati, Ohio
West Virginia Water Commission—Charleston, W. Va.
Masonic Lodge Group—Mason and Portsmouth, Ohio
Southwestern Section, Ohio Sewage Works Assn.—Dayton, Ohio
Indiana Stream Pollution Control Board—Indianapolis,
Tennessee Valley Authority—Chattanooga, Tenn.
Town Meeting—Columbus, Ohio
Meeting of Attorneys-General of signatory states—Columbus, Ohio
Chemical & Drug Association—Cincinnati
New York State Joint Legislative Committee—Lake George, N. Y.
West Virginia Coal Mining Institute—Charleston, W. Va.
Central States Sewage Works—Indianapolis, Ind.
Industrial Waste Conference—Purdue University, Lafayette, Ind.
Clay Sewer Pipe Assn.—Columbus, Ohio
Industrial Health Conference—Houston, Texas (paper presented by proxy)

INDUSTRIAL CONFERENCES

Schenley Distilleries at Frankfort, Lexington and Stamping Ground, Ky.
Wallace and Tiernan Co.—Newark, N. J.
Commercial Solvents Corp.—Terre Haute, Ind.
Mellon Institute—Pittsburgh, Pa.
Battelle Institute—Columbus, Ohio
Koppers Co.—Follansbee, W. Va.
Weirton Steel Co.—Weirton, W. Va.
Sharon Steel Co.—Fairmont, W. Va.
Dow Chemical Co.—Midland, Mich.
DuPont Waste Management Committee—Wilmington, Del.
Bituminous Coal Research, Inc.—Pittsburgh, Pa.
Bureau of Mines Pilot Plant—Morgantown, W. Va.
Bureau of Mines—Washington, D. C.
U. S. Geological Survey—Columbus, Ohio
Wheeling Steel Co.—Wheeling, W. Va.
Consolidation Coal Co.—Pittsburgh, Pa.
Pittsburgh Plate Glass Co.—Pittsburgh, Pa.
Frigidaire Co.—Dayton, Ohio
National Cash Register Co.—Dayton, Ohio
Electric Auto Lite Co.—Lockland, Ohio
Estate Heatrola—Hamilton, Ohio
Diamond Alkali Co.—Cincinnati and Painesville, Ohio
Wyandotte Chemical Co.—Cincinnati, Ohio
Pennsylvania Salt Mfg. Co.—Cincinnati, Ohio
Cincinnati Chemical Works Club—Cincinnati, Ohio
Harshaw Chemical Co.—Cincinnati, Ohio
Hamilton Mfg. Co.—Columbus, Indiana
Standard Steel Spring Co.—Newton Falls, Ohio
Westinghouse Corp.—East Pittsburgh, Pa.
Union Switch and Signal Co.—Pittsburgh, Pa.
Belmont Filtration Works—Philadelphia, Pa.

Mailings—Distribution of the annual report and news releases, outside of the regular mailings made to the commissioners, constituted the bulk of material sent from the office during the past year. Some 6,500 individually addressed copies of the annual report were distributed. News releases, of which there were 20, made a total mailing of 4,000 pieces. Now being mailed are the pipeline manual and the Wabash River report.

ON THE MUNICIPAL FRONT

Progress with regard to the planning and installation of sewage-treatment facilities by municipalities in the Ohio River valley has been promising. The record of activities from July 1, 1948 to July 1, 1950, in cities of 5,000 population and over reveals the following:

STATUS	NUMBER	POPULATION SERVED
Plants Built	9	86,250
Plants Under Construction	4	33,461
Detailed Plans Approved	48	806,706
Preliminary Plans Approved	83	2,813,021
No Action Yet Taken	51	592,922

This record of achievement is one that belongs to the state regulatory aegncies who are preceding conscientiously and with vigor in carrying out their responsibilities under the terms of the compact. Behind this assembly of figures lie years of strenuous effort, effective persuasion and, in some cases, legal compulsion.

RETARDING FACTORS

Much inertia on the part of municipalities remains to be overcome. Requirements for the installation of sewage-disposal facilities are not popular with taxpayers. It is much easier to secure approval for bond issues on schools, roads, bridges and water supply—public works from which returns are plainly evident—than for sewage treatment plants whose benefits are real but intangible.

In West Virginia, for example, there has been a lack of understanding in such important cities as Charleston, Clarksburg and Huntington concerning compliance with the orders of the state water commission. In fact, the authority of this regulatory agency to enforce its orders for pollution-abatement is now being tested in the state supreme court. Litigation of this kind is confusing to the citizens and has a retarding influence on vitally important health-improvement measures both within and beyond the borders of the state.

As for municipalities and their probable response to the war situation it is not unlikely that those cities who have been stalling for years in accepting their responsibilities to observe common decency in sewage disposal will now find new excuses for delay. Within a month after the start of the Korean war the authorities in one city cited this "crisis" as the reason why the city should be relieved of a court order to proceed with its sanitation program.

Without underestimating the Korean situation and the crisis it held for this particular city, it can be said that the regulatory agencies of the signatory states in the Ohio River valley are not at all convinced of the validity of such an excuse. They recall only too well that prior to the Korean war some municipalities were asking for postponement because they were faced with the crisis of high construction costs. During World War II the crisis of materials and manpower shortages was the reason for delay. And when materials were abundant in the Mid-Thirties and men were begging for jobs there was the crisis of financial depression.

With this background of experience it has become only too obvious to the regulatory agencies that the only crisis relating to sewage disposal with which the municipalities have failed to properly concern themselves is the jeopardy to which they are putting their neighbors downstream through the continued discharge of water-borne filth. This is the crisis with which the Ohio River Valley Water

Sanitation Commission is gravely concerned—and which it seeks to end through the efforts of its signatory states.

FINANCING DEVELOPMENTS

Lack of financial resources because of limitations on bonded indebtedness and the inability of municipalities to raise sufficient tax funds to satisfy service needs is almost universally cited as the principal obstacle in meeting sewage-disposal requirements. But the way out of this dilemma in many instances is through revenue-bond financing.

Among the larger cities in the nation (over 10,000 population) a recent survey reveals that 273 are financing sanitation improvements with sewer-service revenue bonds. Largest of these is New York City where a plan has been adopted that will provide annual revenues of $15,000,000 from a surcharge of some 33 per cent on water bills. Data from 450 cities using sewer-service charges in 1948 show total annual collection from this source approximating $25,000,000.

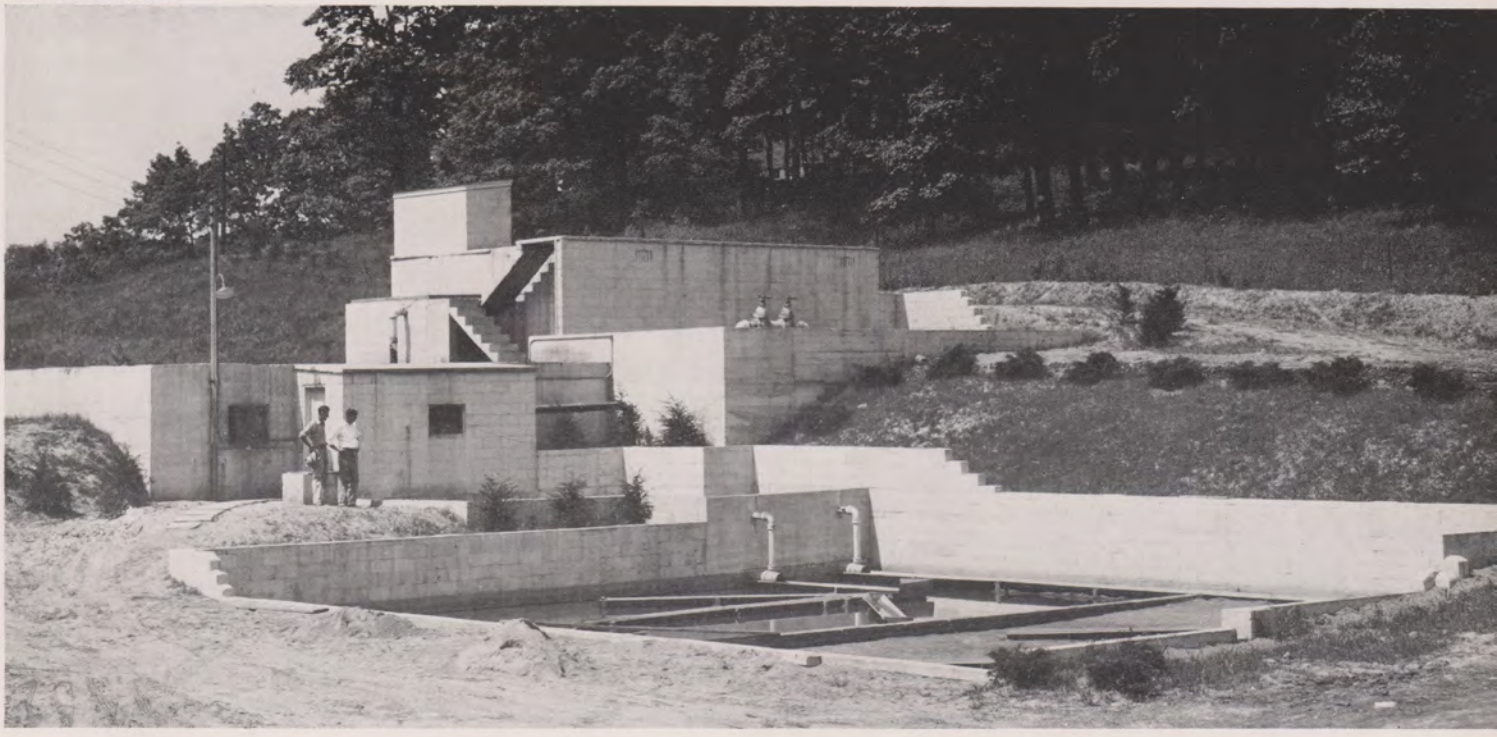
In Indiana, for example, eleven cities have inaugurated treatment plant construction or operation since June, 1949, all of which is being financed with a monthly service charge. These charges vary in amount from a minimum of $0.90 to $2.00 a month. In most cases the rates are based on water consumption, but some cities utilize a schedule reflecting size of water meter or number of fixtures. Bond issues to be retired from the service charges carried interest rates from 2.48 to 3.125 per cent on 30-year bonds. One 25-year bond issue was sold at 2.38 per cent and a 21-year issue carried a rate of 2.5 per cent. The size of the cities, incidentally, vary from 1,875 to 50,000 population.

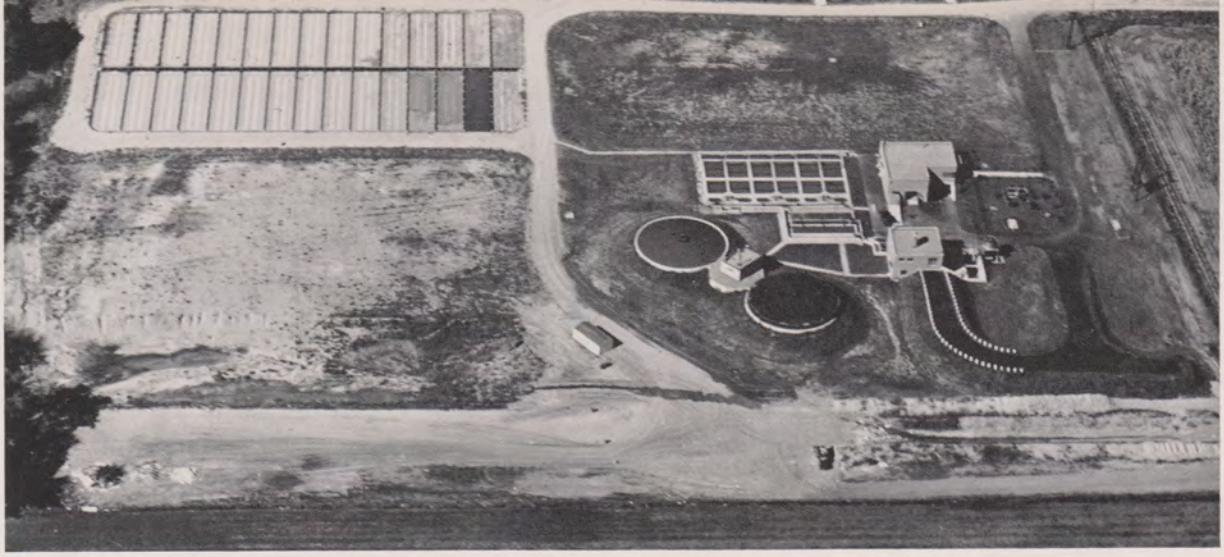
In Cincinnati, Ohio, where the population is 500,000, a "pay-before-you-go" sewer-service charge has been employed with great success. In two years the sum of $3,500,000 has been collected. With this backlog of funds the city has financed engineering costs, site purchase and other necessities without floating bonds prior to construction of disposal plant facilities, which is expected to begin this year.

In Pennsylvania the creation of the independent "authority" to finance, build and operate public

Sewage treatment plant for community of 500 built by the Brown and Vaughn Development Company in McCandless Township, Pennsylvania. Costing about $32,000, the plant comprises pumping station, Imhoff tank, trickling filter, intermittent sand filter and sludge drying beds.

EVANS STUDIO PHOTO





First of the municipal treatment plants to be completed in the state of Ohio since the interstate compact was signed is that at Newark. Designed by Paul Uhlmann, consulting engineer of Columbus, Ohio, the plant was placed in operation in October, 1949. Population served is 34,000.

INDIANA STATE HEALTH DEPARTMENT PHOTO

Jasper, Indiana activated-sludge treatment plant which has been designed to handle both sewage and garbage wastes from this municipality.

works has found great favor. At present there are 261 such local authorities, twenty-nine of which are concerned with sewage-disposal programs. In addition, there is a General State Authority empowered to finance sewage facilities serving state-owned properties.

An important aid to the Commission's program are the interest-free loans from the federal government, totalling almost two million dollars, that have been made available to advance the installation of sewage-disposal facilities serving 105 communities in the Ohio valley. The loans, which were approved by the U. S. Housing and Home Finance Agency, are being employed to prepare plans for 47 sewer and treatment plant projects in the eight states. Cost of the completed projects is estimated at $102 million. Serving almost sixteen percent of the total population of the valley, construction of these projects should provide a significant reduction in the pollution load now being discharged.

The breakdown, by states, of planning loans for communities in the Ohio valley shows that Illinois received $26,000 for two projects; Indiana, $445,000 for 17 projects; Kentucky, $76,000 for five projects; Ohio, $495,000 for 11 projects; Pennsylvania, $657,000 for five; Virginia, $6,000 for one; and West Virginia, $181,000 for six projects.

PROGRESS ON PROJECTS

Indicative of the action being taken on planning, design and construction of specific projects is the following progress report of major municipal treatment works on the Ohio River.

Pittsburgh — Under the direction of the Alle gheny County Sanitary Authority a comprehensive sewage collection and treatment program for Pittsburgh, 58 adjoining communities and 30 industries is being drafted. City council of Pittsburgh appropriated $2,000,000 for final plans, and recently the authority received a federal loan of $500,000 to further expedite the work.

Metcalf and Eddy, consulting enginers of Boston made the preliminary report and are now preparing final designs on certain phases of the project. Cost of the work, which will be financed with sewer-service revenue bonds, is exected to total more than $60,000,000.

Wheeling — Plans and specifications for sewage collection and treatment have been prepared. Treatment plant designs, furnished by Greeley and Hansen, consulting engineers of Chicago, call for sedimentation, sludge digestion and chlorination facilities to handle a flow of 31 million gallons daily. This project is estimated to cost $5,000,000.

Parkersburg — Final plans and specifications for Parkersburg and South Parkersburg have been completed by the city's consultants, Morris Knowles, Inc., Pittsburgh. Estimated cost of the interceptors and treatment plants is $3,500,000.

Huntington — Preliminary plans for a sewage-treatment works were prepared by Chester Engineers, Pittsburgh, and final plans have been completed for storm sewerage. Estimated cost of the program is $7,500,000. The state water commission has secured issuance of a court order to proceed with construction, the legality of which has been disputed and will be heard by the West Virginia Supreme Court of Appeals in January, 1951.

Covington-Newport — and 14 other adjoining cities comprising the Northern Kentucky Sanitation District—report that final designs for a comprehensive sewage disposal program are now more than half completed. Estimated to cost $5,000,000, the project includes interceptor sewers and a treatment plant to serve 150,000 people.

Vôgt, Ivers & Seaman, of Cincinnati, are the consultants on the work. Development of a revenue-bond financing method is well advanced by the district commissioners, and they expect construction of sewers and the treatment plant will be started in the spring of 1951.

Cincinnati — Bids for construction of the first (Little Miami plant) of two sewage-treatment plants will be received in December. Contracts for part of the equipment of this plant have already been let. It is estimated that construction of the plant, which will treat 28 million gallons daily, will be completed in two years. Total cost will be more than $4,500,000.

The city is also working on preliminary plans for a second treatment plant to handle 110 million gallons daily of sewage and industrial wastes. Cost is estimated at $20,000,000. City officials expect that contracts for this plant will be let during the period of construction of the Little Miami plant.

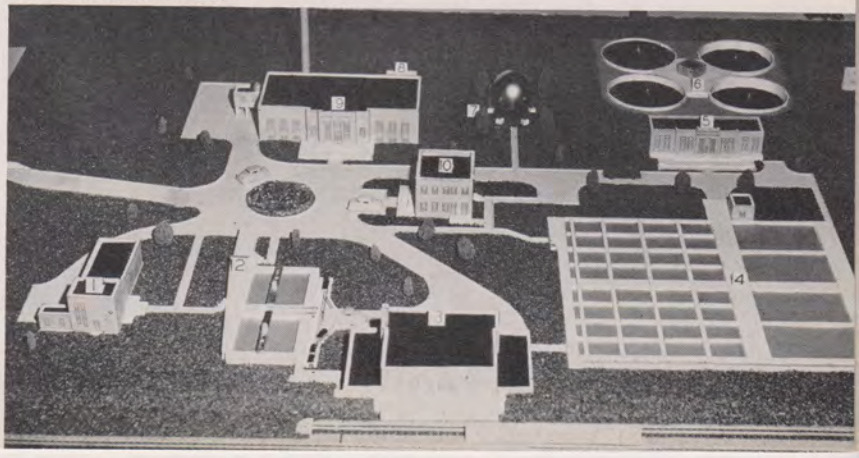
Havens and Emerson of Cleveland are consultants to the city on the sewage disposal program. Work is being financed partly through the collection of a sewer-service charge. Service charges based on a surcharge of 60 per cent on water bills, were inaugurated July 1, 1948, well in advance of the construction program. More than $3,500,000 has been collected, at the rate of $1,750,000 annually.

Louisville — In 1946 the state legislature authorized creation of the Louisville Metropolitan Sewer District to handle all sewerage and treatment plant improvements. Empowered to finance work with sewer-service charges, present collections are now being made at the rate of about $1,500,000 yearly. Metcalf and Eddy, consulting engineers of Boston were retained to draft a comprehensive plan for the program, which was submitted this year. Work now in progress includes construction of relief sewers and some intercepting sewers. The sewerage construction program is being coordinated with certain flood-control improvements being made by the Corps of Engineers.

Evansville — Construction plans and specifications for a sewage-treatment plant to handle a part of the waste discharges from this city have been completed. Capacity of this initial installation is six million gallons daily; the total volume of wastes from Evansville is estimated at 36 million gallons daily. Consulting engineers are Consoer, Townsend and Associates, Chicago. First bids on construction were called on November 6, 1950.

Cincinnati's Little Miami sewage disposal plant on which construction is expected to start this year. It provides primary treatment augmented with pre-aeration and chemical flocculation facilities. Sludge digestion and incineration are included.

CITY OF CINCINNATI PHOTO



ON THE INDUSTRIAL FRONT

One of the most important and fruitful undertakings of the Commission during the past year was the inauguration of its "industry-action" program. Shortly after the Commission was established in 1948 it had issued notices to some 1,400 industries in the Ohio valley regarding terms of compliance with compact provisions. This was done as a matter of record. The next step was to establish cooperative working relations with industry management. The results have been gratifying and give promise of being mutually productive.

Representatives of industry by generic groups, are being invited to meet with the executive committee of the Commission for exploratory conferences. Purpose of these conferences is three-fold:

> To acquaint industry at top level with the objectives of the Commission;
>
> To learn at first hand from industrial management the problems it faces in meeting pollution-abatement requirements, what has already been done to comply with requirements and what is proposed; and
>
> To determine how the industry group and the Commission might integrate their efforts.

INDUSTRY-ACTION COMMITTEES

Thus far the Commission has met with the steel industry, metal-finishing industries, the distillery group, chemical-brine processors and the oil producers. With but one exception, permanent, active committees have been established to serve their respective industry groups and coordinate this effort under Commission auspices. Progress reports based on the minutes of these committees would reveal these facts:

Steel Industry—Following an exploratory conference on March 2, 1950, management representatives of the steel industry authorized the formation of a permanent committee. The latter met on April 13, on June 23 and again on September 25. Subcommittee groups have held additional meetings. As many as thirty-two persons have participated in the meetings, representing the following companies:

Armco Steel Corp.	Republic Steel Corp.
Bethlehem Steel Co.	Sharon Steel Corp.
Carnegie-Illinois Steel Corp.	U. S. Steel Corp.
	Weirton Steel Co.
Detroit Steel Corp.	Wheeling Steel Corp.
Jones & Laughlin Steel Corp.	Youngstown Sheet & Tube Co.

One of the first tasks to which the steel-industry committee addressed itself was the development of a work program. In brief, this included six major objectives:

Plan the means for promoting within individual plants such steps as would aid them to define and correct specific pollution problems.

Develop an effluent objective or guide, which would indicate how far steel plants can feasibly proceed with present knowledge to reduce pollution of various types.

Determine objectionable effects or toxicity limits in surface waters of types of pollution having their origin in steel-mill wastes.

Implement the establishment of research projects on waste treatment looking toward

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Left: Without water industry cannot survive. Through control of pollution industry can make a major contribution to the conservation of its most essential resource.
ELWOOD M. PAYNE PHOTO

more effective methods for pollution control.

Develop a manual for educating plant-operating personnel in the importance of pollution control and the results that can be achieved by the exercise of care and "good housekeeping" principles.

Serve as the agency to permit the steel industry to cooperate with other industries in exploring the possibility of wastes from one group of plants being used to neutralize wastes from another group.

At the April 13 meeting four members of the parent committee were designated as coordinators of subcommittees to undertake promotion of special programs. These subcommittees and coordinators are: By-product coke plant effluents, Grant Pettit, Armco Steel Corp.; acid-pickle liquor, Thomas F. Reed, U. S. Steel Corp.; settleable solids disposal, F. R. Pullen, Bethlehem Steel Co.; coating and plating wastes, Ralph Drews, Republic Steel Corp.

All the subcommittees, whose membership includes specialists in each field, have met at least once. Two of the subcommittees, faced with what are considered the most exacting problems, have met three times. The following program now being executed by the by-product coke plant and the acid-pickle liquor committee is typical of the work which is being done by the other groups. It includes:

Educational efforts among all steel plants in the Ohio valley with regard to their pollution problems.

Devising and distributing necessary report forms which will permit all plants within, and some without, the Ohio valley to define their pollution problems.

Standardizing sampling and analyses procedures to facilitate definition of waste loads.

Establishing contact with, and coordinating information from, related research projects to prevent duplication of efforts.

Preparing a draft of recommended effluent objectives.

Metal-Finishing Committee—The metal-finishing industry action committee had its inception at a meeting on June 20, 1950. Management representatives agreed with Commission members that a cooperative effort coordinated by the Commission offered opportunity for expediting work on waste disposal problems. To accomplish this they set up a committee subject to the approval of their respective companies. Each of the companies represented gave hearty endorsement to the program.

Since there has been no clearing-house within the metal-finishing industry concerned primarily with waste disposal measures, the committee adopted as its first task the development of a comprehensive work program. This program recognized that there

STEEL INDUSTRY ACTION COMMITTEE OF THE COMMISSION

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F. R. Pullen, Fuel Engineer
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Johnstown, Pa.

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Pittsburgh, Pennsylvania
**(Deceased August 23, 1950)*

G. M. Dreher, Chemical Engineer
Jones & Laughlin Steel Corp.
Pittsburgh, Pennsylvania

Earl Smith, Chief Metallurgist
Republic Steel Corp.
Cleveland 1, Ohio

Ralph Drews, Metallurgist
Manufacturing Division
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Weirton Steel Company
Weirton, West Virginia

Joseph Sample, Chief Chemist
Weirton Steel Company
Weirton, West Virginia

J. H. Strassburger, Manager
Dept. of Service & Maintenance
Weirton Steel Company
Weirton, West Virginia

V. E. Cornell, Chief Engineer
Wheeling Steel Corp.
Wheeling, West Virginia

Preston Jordon,
Technical Advisor
Wheeling Steel Corp.
East Steubenville, Ohio

H. A. Stobbs, Special Engineer
Wheeling Steel Corp.
Wheeling, West Virginia

R. M. Fenton, Ass't Engineer
Youngstown Sheet & Tube Co.
Youngstown, Ohio

are some 2,000 metal-finishing shops in the Ohio basin—about one-quarter of the total in the United States. Most of the shops are small and accordingly the program was patterned specifically to serve needs of the small as well as the large operators.

Representatives from the following companies are on the committee:

American Radiator & Standard Sanitary Corp.
Arvin Industries, Inc.
Electric Auto-Lite Co.
General Motors Corp.
Hamilton Mfg. Corp.
Houdaille-Hershey Corp.
National Cash Register Co.
Standard Steel Spring Co.
Talon, Inc.
Westinghouse Electric Corp.

In addition the American Electroplaters' Society, whose membership includes many of the small platers, is represented on this committee.

Under the chairmanship of Walter L. Pinner, manager of research, Houdaille-Hershey Corp., the group has organized sub-committees to prepare a series of manuals on the separate phases of the problem. These include:

Survey-Methods Manual — Being prepared under the direction of William H. Toller, Jr., chemical engineer, of Houdaille-Hershey Corp., this manual will outline in detail the manner in which the volume of waste flows should be determined.

Analysis-Methods Manual—After flows have been measured the second step in the definition of a waste problem calls for the determination of concentration of contaminants. This manual will seek to outline the best methods of analyses available within required limits of accuracy. The manual will be based on results of a research project sponsored by the American Electroplaters' Society and which will be field-tested by the committee. William J. Neill, president of the A.E.S. is directing this work.

Waste-Treatment Manual—Here will be presented an evaluation of methods of treatment with respect to cost of operation, ease of control and degree of treatment. Hubert S. Kline, industrial-hygiene engineer of the General Motors Corp., will direct this study. It is expected that this will point to methods of treatment on which further study should be extended, using existing plant installations for experimental work.

Toxicity Limits — Under the direction of Robert G. Chollar, research director of National Cash Register Co., all available information will be assembled on tolerance limits of plating waste-water contaminants with respect to their effect on humans, fish and sewage-treatment plant operations. This work

METAL-FINISHING INDUSTRY ACTION COMMITTEE OF THE COMMISSION

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John J. Williams, Plant Mgr.
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Meadville, Pa.

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Mansfield, Ohio, Works
Westinghouse Electric Corp.
Mansfield, Ohio

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Lockland, Ohio

Harry W. McElhaney, Head
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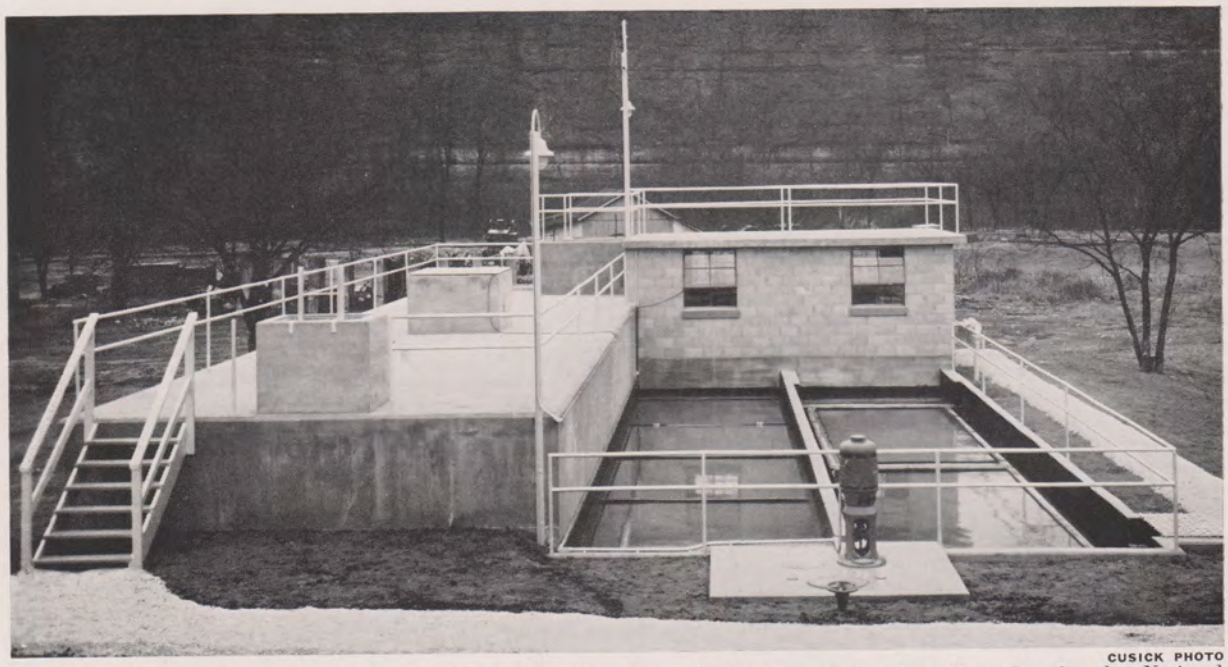


CUSICK PHOTO

Sedimentation and digester facilities for the bio-filtration plant placed in operation last December by the National Distillers Products Corporation to treat wastes from the Old Grand Dad Distillery near Frankfort, Kentucky.

will be correlated with a separate project conducted by the Commission with respect to toxicity tolerance limits.

Basic Waste-Control Measures—This manual being prepared under the direction of Mr. Pinner will point up the possibilities of reducing wastes from metal-finishing plants through better "housekeeping" procedures. Here will be noted proved methods that will also result in reducing operating costs.

Liaison with Steel-Industry Committee — In accordance with the Commission plan to coordinate the activities of the industry action committees to prevent duplication of effort, the metal-finishing committee appointed Clyde C. Cupps, assistant chief engineer, of Standard Steel Spring Co. as liaison representative to the steel committee. That committee in turn has requested Ralph Drews of Republic Steel Corp. to meet with the metal-finishing committee. The liaison program will be integrated so as to provide an overall picture of the past and present research projects and how results might be coordinated.

Distillery Industry—On April 20 representatives of the distillery industry, including observers for the Distilled Spirits Institute and the Kentucky Distillers Association, met with the executive committee of the Commission. Following this exploratory conference the board of directors of the Distilled Spirits Institute voted to refer to its technical committee the manner in which the cooperative relations could be established. Accordingly, Dr. Frank Shipman, chairman of the technical committee, arranged for this group to meet with the Commission staff on September 14 at which time a subcommittee on pollution-control activities was appointed. Represented at this meeting were:

Brown-Forman Distillers Corp.	Fleischmann Distilling Corp.
Distilled Spirits Institute	National Distillers Products Corp.
Distillers Feed Research Council	Jos. E. Seagram & Sons, Inc.
Schenley Distillers	Hiram Walker & Sons, Inc.

The subcommittee has established two groups with the following assignments and membership:

Development of analytical methods and sampling methods for determination of pollution loads —Alex Davidson, Schenley Distillers, chairman; Nelson Roberts, Joseph E. Seagram & Sons, Inc.; J. W. Spanyer, Jr., Brown-Forman Distillers Corporation; Russell Blair, Hiram Walker & Sons, Inc.; and James Banks, Schenley Distillers.

Investigation of treatment methods—Lester Rodenberg, National Distillers Products Corporation, chairman; E. M. Stallings, Joseph E. Seagram & Sons; W. R. Gouveia, Fleischmann Distilling Corporation; and John Wight, Frank L. Wight Distilling Company.

Chemical Brine Industry—On April 19, 1950, representatives of the brine and rock-salt processing industry met with the executive committee. The following companies participated:

Allied Chemical & Dye Corp. (Solvay Process Division)	Mathieson Chemical Corp.
Diamond Alkali Co.	Pennsylvania Salt Mfg. Co.
Dow Chemical Co.	Pittsburgh Plate Glass Co. (Columbia Division)
	Wyandotte Chemicals Corp.

Thomas Powers, project engineer of the waste-disposal division of the Dow Chemical Company was elected temporary chairman to act for this group. It was their conclusion that since all the companies already hold membership in the Manufacturing Chemists' Association, which has an active water-pollution abatement committee, it might be best for them to function as a subcommittee in their relations with the Commission. This subcommittee held its first meeting on October 10.

Oil Producers—An exploratory conference relating to oil and brine pollution was conducted on April 19 by the executive committee with representatives from the following companies:

Ashland Oil & Refining Co.	Ohio Oil Co.
Carter Oil Co.	Sinclair Oil & Gas Co.
Independent Petroleum Assn.	Sun Oil Co.
Kingwood Oil Co.	Texas Oil Co.

Several industry spokesmen declared that pollution problems in the oil-producing industry were created, in the majority of cases, by irresponsible small operators. They reported further that the large companies and the responsible "independents" were now attempting to prevent pollution by collection and disposal of oil wastes, by maintenance of brine lagoons from which discharges were made only at times when sufficient stream dilution was available, and by injecting brines back into ground. They called attention to pollution problems created by so-called "fly-by-night" operators.

Among other things the discussion revealed that no data were available on the total volume of brine produced in the district or the volume now being injected back into the ground. Estimates indicated

COURIER-JOURNAL & LOUISVILLE TIMES PHOTO

Live-stock feed produced by Brown-Forman Distillers Corporation, from former waste materials dumped into streams is inspected by Joseph L. Quinn, Jr., past-chairman of the Ohio River Valley Water Sanitation Commission and Maurice LeBosquet, U. S. Public Health Service representative on the Commission. Explaining the process is Dr. Frank M. Shipman, technical director of Brown-Forman.

COMMISSION COMMITTEE ON BRINE WASTES AND OTHER SOLUBLE INORGANIC SALTS

(Acting as a subcommittee of the Manufacturing Chemists' Association Water Pollution Abatement Committee)

Dr. U. I. Greene, Staff Eng'r.
Central Engineering Division
Diamond Alkali Co.
Painesville, Ohio
(Chairman of Committee)

L. W. Jillson, Chemical Eng'r.
Wyandotte Chemicals Corp.
Wyandotte, Michigan

Dr. L. K. Herndon,
Research Director
Mathieson Chemical Corp.
Niagara Falls, New York

Walker Penfield,
Assistant to Vice-President
Pennsylvania Salt Mfg. Co.
Philadelphia 7, Pennsylvania

J. A. Neubauer, Tech. Director
Columbia Chemical Division
Pittsburgh Plate Glass Co.
Pittsburgh 13, Pennsylvania

Homer D. Lyon, Chemical Engineer
Carbide & Carbon Chemicals Corp.
South Charleston, West Virginia

that for every barrel of oil there would be some 2½ barrels of brine. Cost of injection of waste brine on one operation varied from 2½c to 3c per barrel.

Injection of brines, however, was not considered the universal answer to the problem. Each oil reservoir presents a different set of conditions, and careful exploration is needed to determine the feasibility of injection. Furthermore, there are about 2,500 independent producers in the tri-state area of Illinois, Indiana and Kentucky, and it was said that many of them were too small to finance construction of injection wells or install collection systems. For this reason most of the independents are using storage lagoons with controlled discharge at high stream flows.

Cooperative disposal systems, in which both the independents and the large companies participate, are now in use in some places and seem to offer the best approach to the problem. Disposal of brines in Texas as developed by the East Texas Salt Water Disposal Co. was cited as an outstanding example of successful solution to the problem. This venture has not only provided the means for eliminating brine wastes from surface streams but the injection has built up pressure in neighboring wells to produce more oil.

An estimate of the number of marginal wells indicated that in the tri-state area (Ill., Ind., Ky.) there are some 28,000 "old" wells, each producing from ½ to 1 bbl. oil per day. Several representatives stated that it would not be economically practicable to dispose of the brines from these wells by injection into the ground, and therefore their companies would be forced to shut down most or all of them if injection disposal measures were universally required.

The consensus of those present at the meeting was that a joint approach to the problem, as suggested by the Commission would be of benefit to the oil industry in solving its brine problem. Such cooperative action would eliminate duplication of effort, save money and permit uniform handling of the problem in all the signatory states. Representatives of the companies concluded that they would consult among themselves and with their existing association groups looking toward that end. Meantime, the Commission stated it would note what developments took place and on this basis determine the need for further action.

PHENOL WASTE RESEARCH

A notable example of the cooperation of industry with the Commission in developing means for the treatment of waste discharges is that relating to phenol elimination. Details of what has transpired are given on page 11.

Suffice it to say here that the progress made in developing new information on phenol destruction —of value not only to the Ohio valley area but to the nation at large—is due to the unselfish collaboration and pooling of resources of many people. It is with satisfaction, therefore, that the Commission lists in the accompanying tabulation the names of those who have assisted and are aiding the successful prosecution of the phenol research project.

PHENOL-WASTE RESEARCH PROJECT PARTICIPANTS

ARMCO STEEL CORPORATION
L. F. Reinartz, Ass't. Vice-President
J. B. Whitlock, General Maintenance Engineer
G. A. Pettit, Industrial Waste Engineer
A. Thomas, Chief Chemist
M. Dannis, Research Chemist
F. I. Wilks, Coke Plant Sup't

WALLACE & TIERNAN CO., INC.
H. S. Hutton, Sales Manager
A. E. Griffin, Director, Technical Service Division
N. S. Chamberlain, Chemist

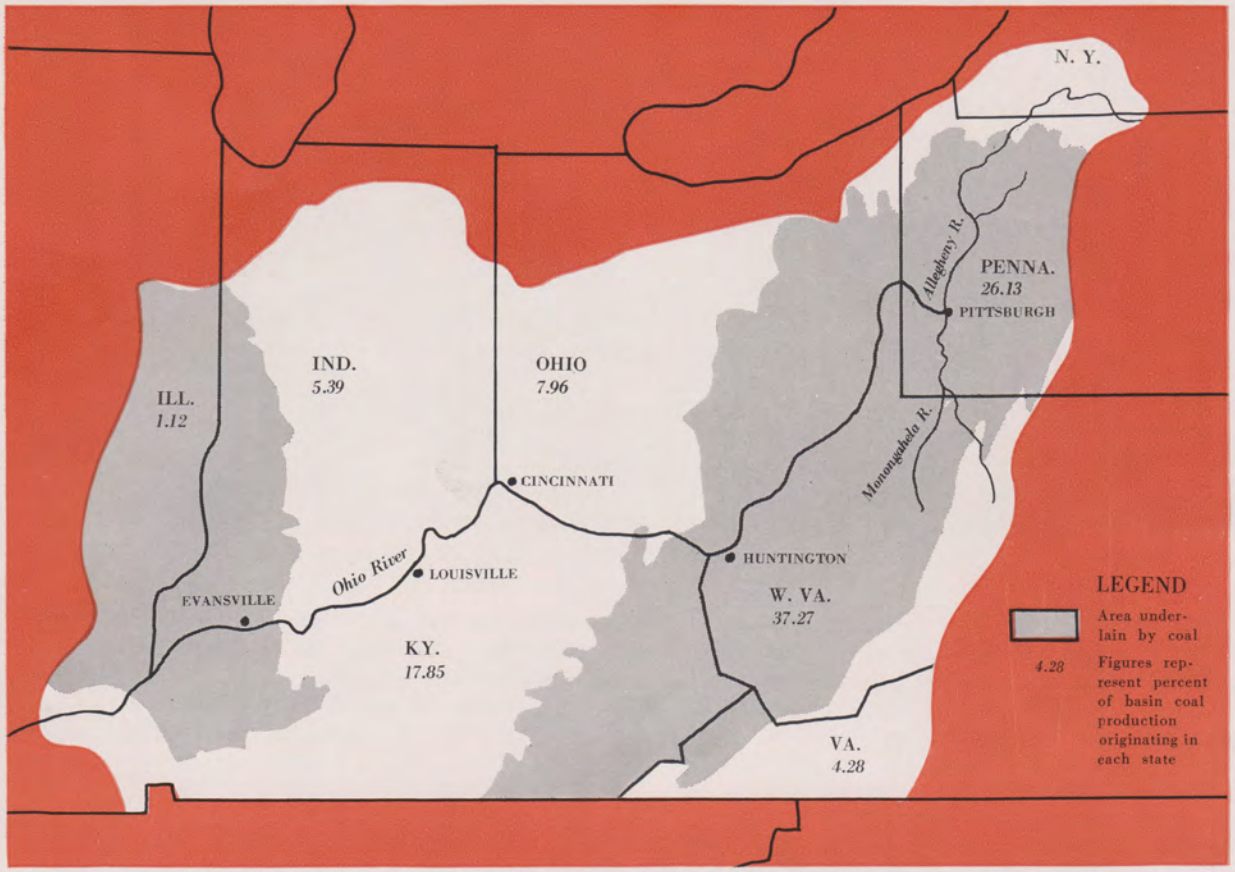
WELSBACH CORPORATION
Victor Hann, Director, Ozone Processes Division
S. Niegowski, Chemist
R. Bowen, Chemist

MATHIESON CHEMICAL CORP.
R. N. Aston, Chemist, Chloride Division
E. Birkett, Chemist

U. S. PUBLIC HEALTH SERVICE
V. G. MacKenzie, Officer in Charge, Environmental Health Center
M. B. Ettinger, Scientist, Environmental Health Center

OHIO DEPT. OF HEALTH
F. H. Waring, Chief Engineer
B. M. McDill, Engineer
M. L. Riehl, Chief Chemist
G. Manos, Chemist
D. Stewart, Chemist
J. Wolfs, Assistant Engineer

OHIO RIVER VALLEY WATER SANITATION COMMISSION
E. J. Cleary, Executive Director and Chief Engineer
J. E. Kinney, Sanitary Engineer and Project Coordinator



Areas underlain by coal in the district encompassed by the Ohio River compact commission. Figures shown for each state indicate percentage production of coal. Coal is mined in seven of the eight states.

MINE-ACID DRAINAGE

Perhaps the most baffling of the industrial waste problems in the Ohio River basin is that associated with the control of acid drainage from active and abandoned coal mines. The Commission has been exploring this situation carefully. Here are some of its findings:

Appraisal of the problem—Coal-mining operations result in the discharge into the streams of the Ohio basin the equivalent of more than 2,500,000 tons of acid each year. These acid wastes, which also carry hardness constituents and iron, affect such a large portion of the valley's surface streams that it can be said to represent the most serious water-pollution problem.

Of even greater consequence is the future pollution load that can be expected from this source. Deposits of coal underlying the United States represent resource reserves reaching hundreds of years into the future. Unless acid-drainage control measures are devised the mining of this coal can mean vast quantities of additional acid in streams already gravely polluted, as well as the contamination of hundreds of miles of clean streams not yet affected.

Mine-acid pollution, which has already affected hundreds of miles of streams in the Ohio basin, would not have grown to this magnitude, or have been tolerated, if means for curbing this waste had been developed. But it must now be evident—to the mining industry as well as pollution-control agencies—that the time has passed when we can afford to exploit one natural resource (coal) at the expense of another (water supply). From a long-range view it is not difficult to conceive that the water resources being destroyed are more vital than the coal resources being developed.

Coal and water — The following facts emerge

Open-cut or strip coal-mining operations, such as that pictured above, can lead to the creation of acid-drainage conditions with resultant degradation of water-quality in streams. The Indiana Coal Producers Association, in cooperation with the Indiana Stream Pollution Control Board, believes it has found an answer to the problem—by building dams across excavated areas to form lakes, the acid-retained drainage waters not only become neutralized but provide new opportunities for recreation.

INDIANA COAL PRODUCERS ASS'N PHOTOS

from a review of coal production and water use. Seven states in the Ohio basin produce three-quarters of all the coal that is mined in the United States. Major water treatment plants in six states, serving 3,700,000 persons, draw their supplies from the Monongahela, Allegheny and Ohio Rivers. This does not include service provided by a number of smaller plants located on polluted tributaries. And it does not include industrial users of water, for which detailed information is not available but is known to exceed by far the domestic demands. Water consumption from one of the largest steel operations, for example, is reported to be more than a billion gallons daily from one river.

Aside from water supply, the rivers also serve important navigation needs, and potentially they could be a valuable asset measured in terms of recreational opportunities. Because of varied uses and values of the surface streams in the Ohio basin the conclusion is reached that water is the valley's most important natural resource.

The accompanying map has been prepared to show the geographic limits of the Ohio River compact commission district and the portions underlain by coal. Percentage figures shown for each state indicate the relative production originating within that state, based on 1947 U. S. Bureau of Mines data. Total coal production for these states in 1947 was some 472,000,000 tons. It will be noted that seven of the eight states in the compact district are mining coal, with West Virginia and Pennsylvania the major producers.

Estimate of damages—Drainage from coal-producing operations in the Ohio basin was estimated by the U. S. Public Health Service, prior to the mine-sealing program in the thirties, to discharge annually into the Ohio and its tributaries an approximate equivalent of 2,500,000 tons of sulfuric acid. Some of this acid production was curbed by installation of air seals. But since there has been no activity of consequence in the sealing field for a decade, during which additional mines have been abandoned and many new ones opened, the 2,500,000-ton discharge is now considered conservative.

Slightly over half of this acid has its origin in abandoned mines. The mine discharge also carries large quantities of ferrous sulfate (copperas) and aluminum sulfate which add greatly to the hardness of the receiving streams. The iron and manganese imparted to the stream by the acid drainage are also objectionable from a water-supply standpoint.

Mine-acid is corrosive to all metal structures with which it comes in contact, particularly in the smaller streams where its concentration may be higher. A measure of its detrimental effects is contained in the following estimate made by the U. S. Public Health Service.

ANNUAL DAMAGES FROM MINE-ACID DRAINAGE
(As determined by U. S. Public Health Service—1940 Cost)

Domestic water supplies	$ 364,000
Industrial water supplies	407,000
Steamboat and barges	1,143,000
Power plants	76,000
River and harbor structures	76,000
Floating equipment (U.S.E.D.)	5,000
Total Annual Damages	$2,071,000

(Above Ohio, West Virginia, Pennsylvania state lines.)

NOTE: Considerable mileage of acid-polluted tributary streams not included in this estimate.

Summarizing conditions subject to accurate determinations during 1940 for only that section of the Ohio basin above the Ohio-West Virginia-Pennsylvania state lines, the conclusion is reached that mine drainage was responsible for $2,071,000 of damages annually. Under present-day cost conditions this estimate could easily be doubled. Even after such revision upward, however, the resultant damage estimate will be on the conservative side since no allowance has been made for the increase in mine-acid entering streams or the increase in water usage since 1940. This figure would also be considerably increased if it covered all portions of the basin affected by mine drainage.

In addition to acid drainage damage strip-mining operations contribute quantities of silt to watercourses. And coal-conditioning plants, which operate washing devices to reduce the ash content of coal, also add silt and fine coal to surface streams. This black pollution, readily visible for many miles below such plants, rapidly coats the bed of receiving streams.

Corrective action—Any discussion of stream pollution from coal mines invites a statement on action to cope with this problem.

Air-sealing of abandoned mines, the merits of which have been debated considerably in recent years, was once thought to provide an effective means to control acid discharges. In the mid-thirties the apparent feasibility of sealing operations and the critical need for projects to place unemployed at work led to a mine-sealing program that lasted until 1942. This project was conducted by the states acting as agents for the U. S. Public Health

SIGNIFICANT COURT CASES RELATING TO STREAM POLLUTION AND THE COAL MINING INDUSTRY

Case and State	*Type of Pollution*	*Action of Court*	*Remarks*
Sanderson vs. The Pa. Coal Co., Penna. (1) (1878) 86 Pa. 401 102 Pa. 370	Destruction of private fish pond by mine acid.	Damage suit tried in Lackawana County Court and twice in Supreme Court, Pa. Court finally ruled that trifling inconvenience to an individual must sometimes give way to necessities of a great community.	Court affirmed the fact that Pennsylvania coal industry was more important than this private fish pond.
Pennsylvania Railroad et al vs. Sagmore Coal Co. 281 Pa. 233 126 A 386 Sagmore Coal Co. vs. Mountain Water Supply Co. 267 U. S. 592	Mine drainage destroyed Indian Creek, Penna., as source of water supply (1924) for several communities and the Pennsylvania Railroad (1).	Fayette County Court refused to grant an injunction against coal company and was reversed by state supreme court. Supreme Court of United States upheld state supreme court in that mining company must cease to discharge mine water into creek after certain date.	Court affirmed the principle that this discharge destroyed the public water supply of a large number of people and an important industry and thus must be discontinued.
Shinnston Water Supply West Virginia (16), (17), 1948. (Common law trespass action in Harrison County Circuit Court.)	Acid mine drainage destroyed Robinson Run as source of water supply for Shinnston and environs. City reservoir was seriously silted by strip mining.	Three mining companies involved. One company settled before suit was instituted. Two other companies settled after cases were instituted in the circuit court.	Damages were recovered as follows: Company A—$17,000 Company B— 50,000 Company C— 3,500 Total —$70,500
Black and Goebel, Westmoreland Co., Pennsylvania, 1949 (18) (Comm. of Pa. ex rel Chidsey, Attorney General, Appellant vs. Black et al) 363 Pa. 229	Strip mine drainage into Powder Mill Run and Loyalhanna Creek both clean streams.	Sanitary Water Board sought an injunction against mining company in Dauphin County Court since mining was started without permit. Court ruled that mining could continue if stream were not polluted and brushed aside the contention that permit was necessary. When appealed to state supreme court, the lower court was reversed on permit question.	As a result of court action it is understood that the Black and Goebel lease has been cancelled. Supreme Court ruled that Commonwealth was justified in seeking assurance that new mining operations will not destroy purity of stream before issuing permit.
McDonald Water Supply Case (19) (21) Pennsylvania, 1945 (Turberville vs. West Penn Water Co. et al) 60 D & C 557	Strip mining destroyed stream as a source of water supply for the West Penn Water Company which supplied the town of McDonald and environs as well as several large industries.	Water Company brought suit in equity before Court of Common Pleas of Allegheny County to enjoin pollution. The suit was pressed to trial and a compromise settlement reached representing the valuation of the supply destroyed.	As a result of strip-mine drainage destroying the water supply and the imminence of a court injunction, the mining companies paid to the water company $500,000 damages.

Service, and the actual work was done by the Works Progress Administration. Seven of the eight Ohio compact states participated in the sealing program. Over $7,000,000 was spent on this stream-improvement project. Unfortunately, the conduct of this project made it impossible to accumulate the type of analytical information before and after sealing to permit a proper evaluation of its merits. Probably of greater consequence, however, is the fact that when the sealing program was discontinued in 1942 no provisions were made for maintaining the seals. Therefore, few stream benefits are still accruing from that program.

The Commonwealth of Pennsylvania has concerned itself with mine-acid pollution for many years, and its Sanitary Water Board launched two

research projects at the Mellon Institute in 1947 in an effort to find an answer to the problem. Pennsylvania has continued to demonstrate leadership since that time by maintaining these fellowships at a cost of several hundred thousands of dollars. Meantime, the state sanitary water board is refusing to issue permits for the operations of new coal mines whose drainage would pollute otherwise clean streams.

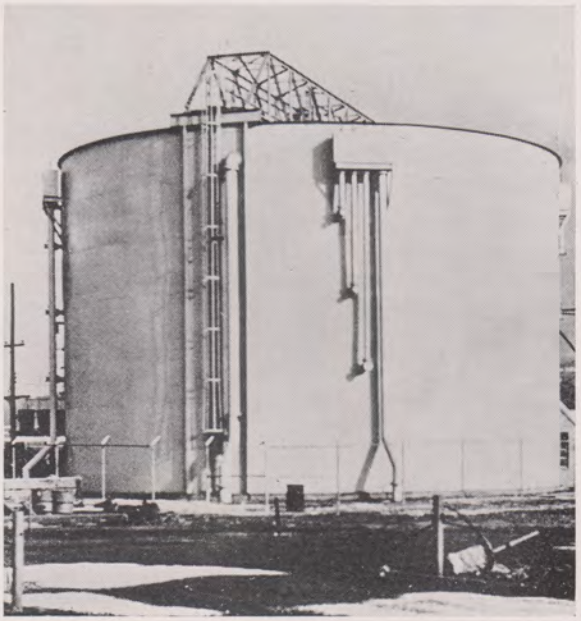
Most recently, in Indiana, the state stream pollution control board has enlisted the cooperation of the Indiana Coal Producers Association in developing a program for the neutralization of acid drainage, particularly that originating from stripping operations. It has been found that by construction of small dams across hollows to form lakes, the acid-retained drainage waters eventually become neutralized. In fact, some of the lakes soon are recognized as good fishing spots.

In 1943 Bituminous Coal Research, Inc., the voluntary research organization for the industry, recognized the mine-pollution problem to the extent of including in its program a research project at West Virginia University. One or two small projects have been maintained by that organization each year since that date. A total of $22,000 was spent during 1949 to support a project at West Virginia University and one at the U. S. Bureau of Mines station in Pittsburgh. These efforts of the industry are recognized as a progressive move in the proper direction. But recent reports that this research is to be curtailed implies a failure on the part of the coal industry to recognize the magnitude of its waste problem and the aggressive attack that should be expected to emanate from an industry of this size.

Although the coal industry occupies a dominant role in the economic life of the nation, its record in pollution control falls far short of the efforts being expended by other industries. This great industry, with the nation's most serious unsolved stream-pollution problems, shows an expenditure of only $100,000 on waste-abatement research, and there are no pollution-control staffs representing individual companies at work on the problem.

Legal Actions—In completing this review of the mine-acid drainage problem it is appropriate to consider briefly some of the major court cases that have resulted from such pollution. Details of five cases are shown in the accompanying summary.

The first two cases illustrate somewhat opposing but sound principles of equity. In the Sanderson case the court ruled that the Pennsylvania coal industry was more important than a private fish pond, and therefore the inconvenience of the individual had to give way to the necessities of a great community. In the Indian Creek case the court found that mine drainage was destroying a public water supply as well as that of an industry and therefore must be curbed. The Pennsylvania courts were upheld in the latter case by the Supreme Court of the United States.



RUST ENGINEERING COMPANY PHOTO

Multiple-tray clarifier tank, which forms part of the $800,000 waste disposal facilities built by the Pittsburgh Plate Glass Company at Creighton, Pennsylvania. This installation removes some 400 tons of fine solids that previously were discharged into the Allegheny River.

In the third case, strip and underground mine drainage destroyed the water supply of Shinnston, West Virginia. When faced with court action the mining companies gave way before the principles of right and justice and settled the matter by paying the city a total of $70,500 damages. This money is being used to develop a new source of supply. It is understood that the water supply of Lumberport, adjacent to Shinnston, has also been destroyed by mining activities and court action may be imminent.

In the Black and Goebel case the Pennsylvania supreme court upheld the right of the commonwealth to assure itself, before issuing a permit, that new mining operations will not destroy the

purity of the receiving streams. Because a public water supply was destroyed by the strip-mining activities of three companies these companies elected to settle the matter when faced with court action. A sum of $500,000 was paid to the water company for development of a new source of supply.

These and other findings lead the Commission to the obvious conclusion that the time is past due for coal producers to curb waste discharges for which there are established methods of control (desilting works, for example), and for the industry to assume leadership in promoting action for a solution to the mine-drainage problem.

INDUSTRY AND WASTE CONTROL

Taken as a whole, industry has been tardy in grasping the significance of pollution-abatement efforts. Part of this points up the fact that management has lost sight of the basic importance of water in production operations. For example, some industry spokesmen have argued before the Commission that pollution-abatement requirements are putting them at a competitive disadvantage. It is seldom acknowledged however, that industry might stand to gain competitive advantages from a stream clean-up program.

Yet it would appear obvious from a study of operating costs that there is hardly an industry that would not be in a stronger profit-making position if it could get better water at a lower price. Most industries are paying a substantial premium to have their present raw water supplies converted into a product suitable for their use—whether they process it themselves or buy it already processed. And the more polluted the source, the higher the premium. Anything, therefore, to insure better water quality, such as will be accomplished through pollution abatement, would seem to favor industry rather than penalize it.

Throughout this annual report there are evidences that the attitude of industry toward waste control is changing. But those leaders who would get on with the task are far from satisfied that all segments of industry are aware of their responsibilities.

This viewpoint is one that is shared by the Ohio River Valley Water Sanitation Commission. Concerned as it is with pollution-abatement progress in the most heavily industrialized area in the nation, the Commission is not convinced that many plant managers have taken seriously even the initial steps toward solving their waste disposal problem —and these are nothing more than a determination of where these wastes originate, where they go, and in what quantities.

A few companies with whom the Commission has had contact—among them leaders in the economy of our nation—have done things toward the abatement of stream pollution that has markedly advanced the clean-streams program. They have stated, and properly expect, that all others who pollute streams should be energized to do their part of the job.

Obviously, it is up to the regulatory agencies to make certain that this expectation is realized. That, at least, represents the viewpoint of members of the Ohio River Valley Water Sanitation Commission. It is a viewpoint that is strengthened on every occasion that the Commission's staff meets in confidential discussion with progressive elements of industry. Briefly, this is what transpires:

Company A has defined its problem, knows what plant changes are required to segregate or reduce its wastes, hired a consultant to design treatment facilities and has prepared an estimate of costs.

Company A then poses this question: If we go

Oil-waste treatment plant built by the Rock Island Refinery Corporation at New Augusta, Indiana. At left is a flocculation tank; oil separator tanks are shown in center, and chemical treatment house at right.

INDIANA STATE DEPARTMENT OF HEALTH PHOTO

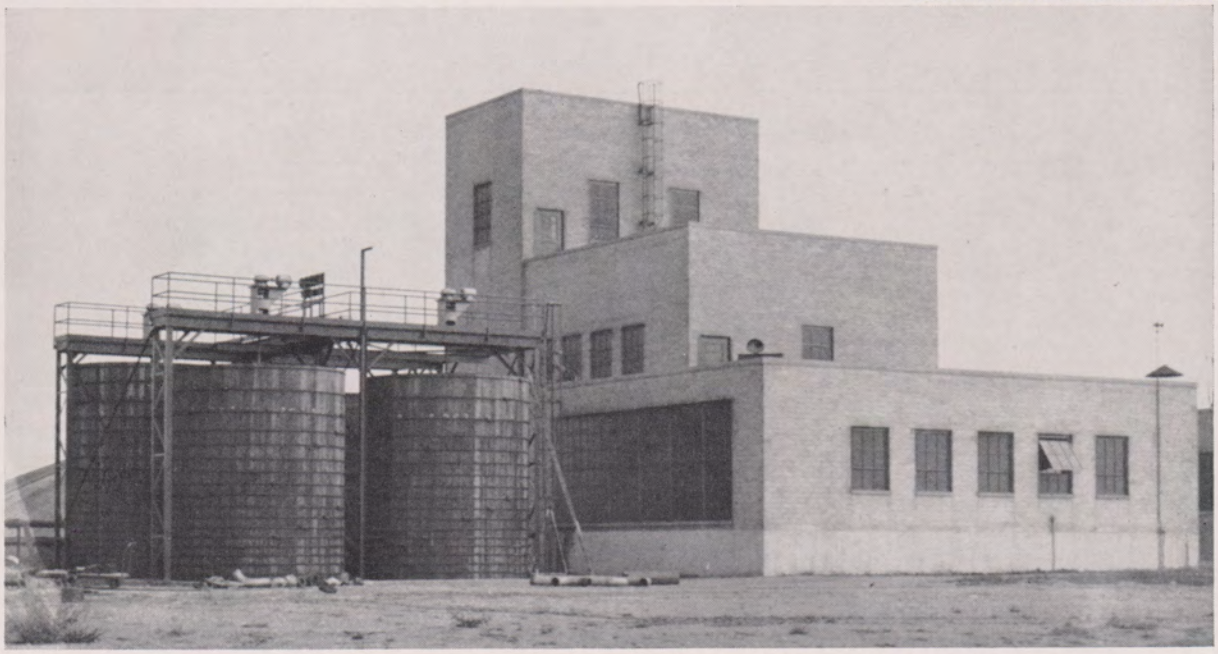
to our board of directors for funds to execute this program, what assurance can we give to the board that Company B upstream, or Company C downstream—or even competitor Company X in an adjacent watershed—is under similar compulsion to do its part in curbing waste discharges?

The Commission and the eight states it represents believe they have a realistic answer for this realistic question. It is this: The majority of the states in the basin are signatories to the Ohio River compact. Among other things, this provides for establishment of uniform legislation so that each state will be operating under similar pollution abatement restrictions. Furthermore, the compact under which the states are pledged to operate establishes a minimum degree of treatment for wastes, thus providing a floor above which waste discharges must conform. And finally, the compact provides legal powers for the enforcement of its provisions.

It would seem apparent, therefore, that an industry which goes ahead with its pollution-abatement program can do so with more than faith and hope that other industries will be required to do likewise.

Plating-waste treatment plant built by the Electric Auto-Lite Company at Lockland, Ohio. Effluent produced by this plant is of such a high quality that it can be reclaimed for industrial process water uses at a cost within the range of that paid for municipal water.

ELECTRIC AUTO-LITE COMPANY PHOTO



MEN AND JOBS

Operations of the Commission are directed by a group of 27 representatives. There are three members from each signatory state, appointed by the governor, and three representatives of the federal government, appointed by the President of the United States. No commissioner receives any compensation.

Selection of members of the board has provided representation from the fields of public health, engineering, industrial management, fish and wildlife conservation, the legal and educational professions and the press. Therefore, in the formulation of policy, the Commission enjoys the benefit of a wide variety of viewpoints.

Administration of Commission activities and the execution of policy is carried out by a salaried staff. At present this staff numbers seven. Legal counsel is retained by appointment.

Names of the officers of the Commission, the commissioners, the legal counselor, the treasurer, the secretary and the staff are shown on the front inside cover of this report. The resident-deputy for United States Commissioner Leonard A. Scheele is Mr. Maurice LeBosquet, sanitary engineer-director, U. S. Public Health Service. Serving in the same capacity for United States Commissioner Robert G. West is Mr. Edward Landenberger, civil engineer, U. S. Corps of Engineers.

COMMITTEE ASSIGNMENTS AND MEMBERSHIP

EXECUTIVE COMMITTEE

Henry Ward
Clarence W. Klassen
Hudson Biery
Martin F. Hilfinger
E. A. Holbrook
W. W. Jennings
Maurice LeBosquet
E. Blackburn Moore
Blucher A. Poole
Joseph L. Quinn, Jr.
Earl Wallace
J. J. Woltmann

ENGINEERING COMMITTEE

Clarence W. Klassen, Chairman
F. H. Waring, Vice-Chairman
Earl Devendorf
F. Clarke Dugan
O. Lloyd Meehean
Richard Messer
H. E. Moses
Blucher A. Poole
Maurice LeBosquet
Edward Landenberger
Harry K. Gidley
W. W. Towne

INTERSTATE RELATIONS

Hudson Biery, Chairman
W. W. Jennings
Henry Ward
Ross H. Walker

BY-LAWS COMMITTEE

Henry Ward, Chairman
H. E. Hilleboe, M.D.
Alternate—Earl Devendorf
W. W. Jennings
J. D. Porterfield, M.D.
Alternate—F. H. Waring
T. Brady Saunders

FINANCE COMMITTEE

Blucher A. Poole, Chairman
Kenneth M. Lloyd
E. Blackburn Moore
Herbert P. Sorg
J. J. Woltmann

POLICY COMMITTEE

E. A. Holbrook, Chairman
Martin F. Hilfinger
Clarence W. Klassen
Blucher A. Poole
Henry Ward

PUBLIC RELATIONS COMMITTEE

Joseph L. Quinn, Jr., Chairman
N. H. Dyer, M.D.
Charles B. McCabe
O. Lloyd Meehean
Earl Wallace
Robert G. West

AUDIT COMMITTEE

Ross H. Walker, Chairman
Roland R. Cross, M.D.
J. D. Porterfield, M.D.
Alternate—F. H. Waring
Joseph L. Quinn, Jr.
Bruce Underwood, M.D.

SOIL EROSION

O. Lloyd Meehean, Chairman
E. A. Holbrook
Ross H. Walker
Henry Ward
J. J. Woltmann

PENSION PLAN COMMITTEE

Blucher A. Poole, Chairman
Martin F. Hilfinger
John D. Porterfield, M.D.
Ross H. Walker
Earl Wallace

PUBLIC AGENCIES COMMITTEE

W. W. Jennings, Chairman
L. E. Burney, M.D.
O. Lloyd Meehean
Leonard A. Scheele, M.D.
Bruce Underwood, M.D.
Alternate—F. C. Dugan
Norris W. Vaux, M.D.
Alternate—H. E. Moses
Robert G. West
J. J. Woltmann

The chairman and vice-chairman are elected by the members of the Commission to hold office for one year. For the fiscal year 1949-1950, Mr. Joseph L. Quinn, Jr. served as chairman and Mr. Henry Ward was vice-chairman. On July 1, 1950, Mr. Ward took office as chairman and Mr. Clarence W. Klassen became vice-chairman.

Mr. Ward brings to the chairman's post the background gained as a leader in conservation measures, a veteran state legislator and a newspaperman. He has been directing major efforts to the preservation of land and water resources within his state and to the development of recreational areas. He laid the foundation for special knowledge in this work in 1934 when he became a member of the Kentucky House of Representatives. For five consecutive sessions as a representative, and then for two sessions as a member of the Kentucky Senate, he was identified with the promotion of conservation legislation.

Mr. Ward's newspaper experience began in 1928 when he joined the editorial staff of the Paducah Sun Democrat. Eventually he became associate editor of that paper.

In his role as majority leader of the House of Representatives in 1940, Mr. Ward sponsored the act which made Kentucky a signatory to the Ohio River interstate anti-pollution compact. Most recently, as a compact commissioner, he aided in the formulation of a new law that established a state water-pollution control commission to expedite Kentucky's stream clean-up program. He is now chairman of that agency.

Chairman Henry Ward of Kentucky and Vice-chairman Clarence W. Klassen of Illinois who took office on July 1, 1950.

MEETING DATES AND PLACES

July 6—Commission—Cincinnati
7—Enginering committee—Cincinnati

Oct. 4—Engineering committee—Cincinnati
5—Commission meeting and Ohio River inspection trip on M/S "The Surveyor" of the U. S. Corps of Engineers.

Nov. 28—Executive committee—West Lafayette, Ind.

Jan. 10—Engineering committee—Cincinnati
11—Commission meeting followed by joint conference with National Water Pollution Control Advisory Board—Cincinnati

March 1—Executive committee—Cincinnati
2—Executive committee and steel industry representatives—Cincinnati

April 4—Engineering committee—Louisville, Ky.
5—Commission meeting—Louisville, Ky.
19—Executive committee and chemical-brine industry representatives—Cincinnati
19—Executive committee and oil-producing industry representatives—Cincinnati
20—Executive committee and distillery-industry representatives—Cincinnati

June 19—Executive committee—Cincinnati
20—Executive committee and metal-finishing industry representatives—Cincinnati

MONEY RECEIVED AND SPENT

Funds for operating the Commission are appropriated by the signatory states in accordance with Article X of the Compact. Here it is stated:

> "The signatory States agree to appropriate for the salaries, office and other administrative expenses, their proper proportion of the annual budget as determined by the Commission and approved by the Governors of the signatory States, one-half of such amount to be prorated among the several States in proportion to their population within the District at the last preceding Federal census, the other half to be prorated in proportion to their land area within the District."

The Commission retains the services of William H. Mers Company, certified public accountants, Cincinnati, to make an examination of its books and records. Reproduced is the Auditor's certificate of report. All books and records of the Commission are available for inspection in Cincinnati by authorized representatives of the signatory states.

STATEMENT OF RECEIPTS AND DISBURSEMENTS

Year Ended June 30, 1950

RECEIPTS:		
From Signatory States		$89,270.00
(For details see schedule of accounts receivable attached)		
From Federal Security Agency		29,000.00
(Grant from P. L. 845 fund)		
TOTAL RECEIPTS		$118,270.00
DISBURSEMENTS:		
Salaries	$29,551.27	
Dues and subscriptions	289.83	
Telephone and telegraph	1,113.74	
Printing and office supplies	3,441.98	
Postage	761.39	
Meetings	1,050.99	
Travel — commissioners	3,420.21	
Travel —staff	2,922.23	
Electric	254.11	
Insurance	355.04	
Office rent and remodeling	2,420.00	
Miscellaneous	980.20	
General office equipment and furnishings	3,825.90	
Legal services	2,400.00	
Auditing	150.00	
Consulting services	300.00	
Phenol waste study	1,210.43	
The Wabash Project	11,463.02	
Industrial Waste Control Project (Expended from Federal Security Agency Fund)	11,537.75	
TOTAL DISBURSEMENTS		$ 77,448.09
EXCESS OF RECEIPTS OVER DISBURSEMENTS		40,821.91
(Indicating the net income of the Commission on a receipts and disbursements basis for the fiscal year ended June 30, 1950)		
Add: BALANCE OF CASH, JULY 1, 1949		9,019.56
BALANCE OF CASH, JUNE 30, 1950		$ 49,841.47

The above cash balance of $49,841.47 is comprised as follows:

Cash on deposit with The Central Trust Company	$49,316.47
Petty cash on hand	100.00
Cash on deposit with American Airlines, Inc.	425.00
	$49,841.47

STATEMENT OF UNUSED RESOURCES

Year Ended June 30, 1950

CASH:		
On deposit:		
The Central Trust Company	$49,316.47	
American Airlines, Inc.	425.00	
		$49,741.47
On hand:		
Petty cash		100.00
TOTAL CASH		$49,841.47
ACCOUNTS RECEIVABLE:		
Commonwealth of Virginia	$ 3,750.00	
State of West Virginia	12,250.00*	
TOTAL ACCOUNTS RECEIVABLE		$16,000.00
TOTAL UNUSED RESOURCES		$65,841.47

SCHEDULE OF ACCOUNTS RECEIVABLE

Year Ended June 30, 1950

	Balance July 1, 1949	Budget for Fiscal Year	Total	Receipts During Fiscal Year	Balance June 30 1950
State of Ill.	$1,120.00	$5,600.00	$ 6,720.00	$6,720.00	$
State of Ind.		17,300.00	17,300.00	17,300.00	
Commonwealth of Kentucky		21,500.00	21,500.00	21,500.00	
State of N. Y.	230.00	1,150.00	1,380.00	1,380.00	
State of Ohio		22,600.00	22,600.00	22,600.00	
Commonwealth of Penna.	3,170.00	15,850.00	19,020.00	19,020.00	
Commonwealth of Virginia	750.00	3,750.00	4,500.00	750.00	3,750.00
State of West Virginia		12,250.00	12,250.00		12,250.00*
TOTALS	$5,270.00	$100,000.00	$105,270.00	$89,270.00	$16,000.00

*NOTE: The Auditor of the State of West Virginia refused to approve the payment of this account and the matter is now in litigation. The receipt of this amount is subject to the final outcome of this litigation.

WM. H. MERS & CO.
CERTIFIED PUBLIC ACCOUNTANTS
DIXIE TERMINAL BUILDING
CINCINNATI

CERTIFICATE

In our opinion, the accompanying statement of receipts and disbursements, statement of unused resources, and schedule of accounts receivable present fairly the operations of the commission on a receipts and disbursements basis for the fiscal year ended June 30, 1950 and its financial condition on June 30, 1950.

Wm. H. Mers & Co.
Certified Public Accountants

July 10, 1950
Cincinnati, Ohio

APPENDIX A

abstract of the report

WABASH RIVER—POLLUTION-ABATEMENT NEEDS

The need for pollution-abatement in the Wabash River, particularly in that stretch below Terre Haute, Ind., has long been recognized. Precise information was lacking, however, with regard to natural-purification chararteristics of the river under varying loads and runoff. This hindered establishment of an economical basis for present and future waste-treatment requirements.

To secure this information and thus expedite formulation of a sound program for conservation of water resources, a study was authorized by the Ohio River Valley Water Sanitation Commission following a request from the commissioners of Indiana and Illinois. These states are jointly concerned with the Wabash River, since it serves as the boundary between them. Under the direction of the Commission this study was made with the aid of seven participating agencies. Field operations began on July 18, 1949.

Background—The section of the river with which this investigation was concerned is that extending from Terre Haute, Indiana, to a point 10 miles below Mt. Carmel, Illinois, a water distance of 130 miles. Terre Haute and Vincennes, which are some 85 river-miles apart, contribute heavy loads of sewage and industrial wastes. Agricultural pursuits characterize the principal activity in the remainder of the area.

Because of unusual industrial activities, pollution entering the Wabash River at Terre Haute is far greater than might be anticipated from a city of this size. Population of the city is 64,000. The load from this population coupled with that from industries connected to the city sewer system produces a total municipal discharge of 210,000 population equivalents. But additional industries that discharge directly into the river contribute a further population equivalent of 412,000. Thus the total waste discharge in the Terre Haute area has a population equivalent of 622,000.

Objectives—Broadly speaking, the investigation was concerned with two major objectives: (1) collecting and analyzing hydrologic, waste-discharge and water-quality data; and (2) evaluating this information in terms of statutory requirements. With regard to the latter, a primary consideration was the interstate compact agreement, to which Indiana and Illinois are signatories.

The compact establishes the minimum amount of treatment for municipal sewage as that which will "provide for substantially complete removal of settleable solids, and the removal of not less than forty-five percent of the total suspended solids." However, the compact also provides that: "in specific instances such higher treatment shall be used as may be determined to be necessary by the Commission." With regard to industrial wastes the compact provides that they shall be modified or treated "to such degree as may be determined to be necessary by the Commission."

Under compact requirements, therefore, nothing less than primary treatment would be acceptable. The question then resolved itself into a determination of whether primary treatment alone would maintain the river in a condition suitable to serve intended uses. These uses, in order of importance, are for water supply, maintenance of fish life as well as recreational values and the disposal of sewage and industrial wastes.

Analysis—Basic to the establishment of treatment requirements is an analysis of the factors that influence natural-purification characteristics of the receiving body of water. Such an evaluation was made with the aid of observed data checked against calculated performance under varying conditions. In this way the capacity of the river to assimilate pollution was defined. Once this had been done, computations were made to determine the reduction in pollution loads required from waste-treatment processes in order to maintain desired quality objectives in the river. Methods of analysis and the results are all detailed in a separate report.

WATER-QUALITY OBJECTIVES

Water-quality objectives established with respect to dissolved-oxygen conditions in the river were:

> *The average 24-hr. dissolved-oxygen content of the water shall not be less than 50 percent saturation except during one week of lowest flow that has a probability of occurrence once in ten years.*

This objective meets regulations of the Indiana Stream Pollution Control Board (adopted November 8, 1945) which state: "Generally, the oxygen content of the receiving water, after being mixed

with and affected by the wastes, shall be no less than 50 percent saturation. A lower concentration will be tolerated temporarily only so long as it is not injurious to aquatic life, and in no case shall it fall below 25 percent saturation."

The established objective of 50 percent saturation also satisfies conditions sought by the Illinois authorities, namely assurance that fish life in the river would be protected.

In conjunction with the minimum dissolved-oxygen objective, other criteria on which treatment requirements were based included:

1. *The drought flow (minimum weekly average) to be expected at Terre Haute once in ten years. This was determined to be 860 cfs.*
2. *The average temperature during the most critical month (August). This was determined as 26.3 deg. C.*

CONCLUSIONS ON TREATMENT

On the basis of observed conditions coupled with stream analysis, and in accordance with established quality objectives, the conclusions were:

TERRE HAUTE REQUIREMENTS

Oxygen Conditions—Maintenance of desired dissolved-oxygen water-quality objectives requires treatment facilities for the Terre Haute pollution load capable of providing substantially complete removal of settleable solids and a total reduction of 52 percent in biochemical-oxygen-demand. Whenever conditions permit, an overall reduction in biochemical-oxygen-demand of less than 52 percent may be applied if, as a result, there is no impairment to the water-quality objective of a minimum dissolved-oxygen content of 50 percent saturation in the river below Terre Haute.

Bacteriological Conditions — Chlorination of Terre Haute sewage is advisable because of the high concentration of coliform organisms discharged, the influence of which is felt as far downstream as Vincennes. Chlorination could be expected to improve the quality of water reaching the Vincennes intake, as well as enhance the recreational potentialities of the stream.

Tastes and Odors—Reports from Vincennes that the water supply is affected on occasion by phenolic tastes, and alleged poor flavor of fish taken from the river, suggest that consideration be given to requirements for industrial waste treatment at Terre Haute to curtail the discharge of taste-and-odor-producing substances.

Allocation of Treatment—Allocation of treatment requirements among the various polluters at Terre Haute is a matter that commends itself for attention

PRINCIPAL PARTICIPANTS IN THE WABASH RIVER STUDY

State of Indiana
- *B. A. Poole, Technical Secretary*
  Indiana Stream Pollution Control Board
- *Ralph H. Holtje, Chief*
  Stream Pollution Section
- *L. A. Emelity, Sanitary Engineer*
- *Robert C. Rice; Roland S. Yunghaus;*
- *H. E. Stout; and Stephen R. Kin*

Terre Haute Paper Company
- *R. F. Burns, Production Manager*

U. S. Geological Survey
- *D. M. Corbett, District Engineer*
- *L. W. Furness, Hydrologist*

U. S. Corps of Engineers
- *Robert G. West, Assistant Division Engineer*
- *Col. J. L. Persons, District Engineer*
- *John W. Wiseman, Sanitary Engineer*
- *Sam M. Baily, Chief of Engineering Division*

State of Illinois
- *C. W. Klassen, Chief Sanitary Engineer*
  Department of Public Health
- *William A. Hasfurther, Sanitary Engineer*
- *R. M. Scott, Bacteriologist*
- *Robert Schiffman, Biologist*

National Council for Stream Improvement
- *Dr. Harry Gehm, Technical Director*
- *Prof. C. J. Velz, University of Michigan*
- *Prof. Don E. Bloodgood, Purdue University*
- *J. F. Kinnaman; N. J. Lardieri; P. W. Lin*

U. S. Public Health Service
- *Maurice LeBosquet, Sanitary Eng'r Director*
- *J. N. Wilson, Aquatic Biologist*

Ohio River Valley Water Sanitation Commission
- *Edward J. Cleary, Executive Director*
  and Chief Engineer
- *Robert K. Horton, Sanitary Engineer*
  and Project Coordinator

by the Indiana Stream Pollution Control Board. State, municipal and industrial relationships, as well as technical considerations, are involved in this decision. Among the factors to be weighed are the relative size of domestic and industrial pollution loads and the responsibility to be assigned for their reduction. The equities involved are a matter for decision by the state authority.

VINCENNES REQUIREMENTS

Regarding the treatment of municipal and industrial wastes at Vincennes, the conclusion was reached that treatment of all wastes providing for substantially complete removal of settleable solids and the removal of not less than 45 percent of the total suspended solids would be adequate to insure maintenance of desired dissolved-oxygen water quality objectives in the Wabash River below this city.

APPENDIX B

Copy of a Resolution Adopted by the

OHIO RIVER VALLEY WATER SANITATION COMMISSION

at its meeting on October 4, 1950

Addressed to:

The President of the United States
Members of the Congress of the United States
National Security Resources Board
National Production Authority
All other federal, state and municipal agencies, as well as industries concerned with water use and national defense.

WHEREAS: Mobilization of the nation's productive capacity requested by the President of the United States and approved by the Congress in The Defense Production Act of 1950 calls for maximum use and expansion of industrial facilities; and

WHEREAS: Industrial production cannot be maintained or expanded without the basic resource of clean water, nor can the communities that supply the manpower and services essential to industry continue to exist without safeguards to their water supplies; and

WHEREAS: Water resources are being degraded and even destroyed by gross pollution, particularly in the Ohio River valley where the streams must be used for the conflicting purposes of water supply and waste disposal; and

WHEREAS: Eight states in the Ohio valley have been engaged for two years through an interstate compact approved by the Congress of the United States to preserve limited water resources by the abatement of existing pollution and the control of new pollution; and

WHEREAS: Water-conservation efforts through pollution control in the Ohio River valley as well as programs with similar aims in other parts of the country have now been advanced to the point where construction of some municipal and industrial waste control facilities are under way and others are ready to be activated; and

WHEREAS: Disturbing reports already are reaching this Commission that installation of some waste-treatment projects may have to be postponed because steel and other materials are in short supply;

THEREFORE BE IT RESOLVED: That the Ohio River Valley Water Sanitation Commission recognizes the new urgency created by defense mobilization for hastening stream pollution-abatement programs. In so doing it petitions the President and the Congress of the United States, the director of the National Security Resources Board, the director of the National Production Authority and all federal agencies designated to execute policies relating to defense mobilization, all state agencies, all municipalities and all elements of private industry to join with it in recognizing that installation of pollution-abatement measures are in the national interests; and

BE IT FURTHER RESOLVED: That the Ohio River Valley Water Sanitation Commission would consider it a grave error in judgment if the mobilization program failed to provide adequate allocation of materials and other necessities to construct facilities necessary to advance water conservation by pollution control. In reaching this conclusion the Commission would point out that pollution-control measures so urgently needed in the Ohio River valley have been retarded for almost a decade because of World War II, and now that their execution has been advanced to the point of imminent construction any further delays would menace public health and national welfare.

APPENDIX C

PART OF

2nd Annual Report

OHIO RIVER VALLEY
WATER SANITATION
COMMISSION

Digest of Organization and Legal Authority of Wat

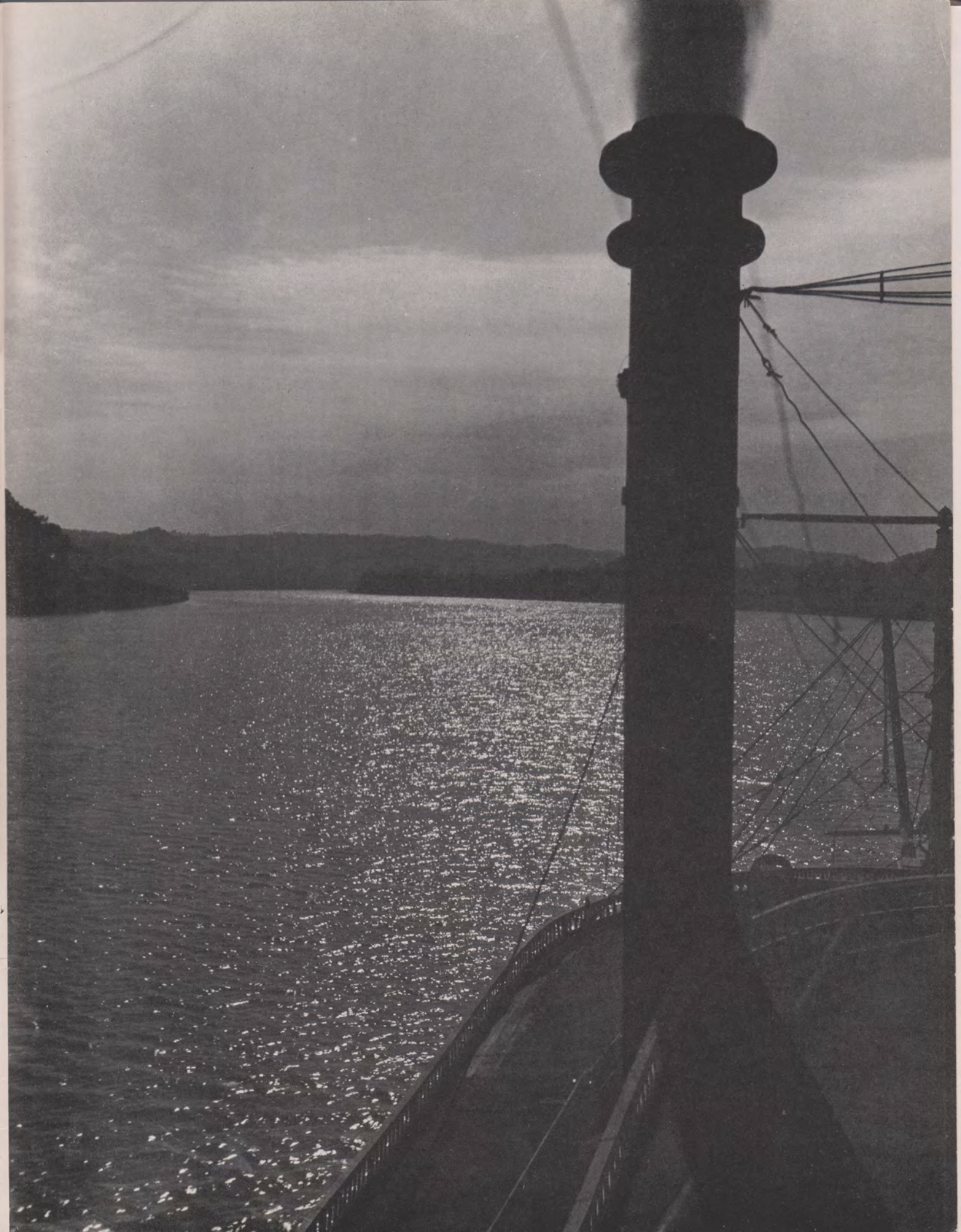
	ILLINOIS	INDIANA
Name Of Agency	State Water Board.	Stream Pollution Control Board.
Enabling Act And Effective Date	Act of 1929. Amended in 1945 and again in 1949. Effective July 1, 1929.	Chapter 214, Acts of 1943. Amended– Chapter 214, Acts of 1943. Amended- Chapter 132, Acts of 1945. Administration Adjudication Act (Chapter 365, Acts of 1947).
Membership	Director, Dept. of Public Health. Director, Dept. of Agriculture. Director, Dept. of Conservation. Director, Dept. of Public Works and Buildings. Representative of the manufacturing interests of the state (appointed by Governor for 4-year term). Technical Secretary - Chief sanitary engineer of Dept. of Public Health.	Secretary, State Board of Health. Director, Dept. of Conservation. Lieutenant-Governor of Indiana. Four members appointed by the Governor for 4-year terms; no more than two of the same political party. Technical Secretary - appointed by secretary of State Board of Health.
Organization Of Agency	Functions primarily through the sanitary engineering division of the Department of Health since the chief sanitary engineer serves as Technical Secretary and is authorized to handle all correspondence, inspections and investigations in carrying out the program.	Board is separate and distinct entity, but having no appropriations of its own relies on State Board of Health. Technical Secretary handles correspondence, investigations, surveys, and prepares reports and data at direction of Stream Pollution Control Board.
Legal Authority	Adopt rules and regulations, serve notice on pollution offenders, hold hearings, and issue orders, review plans and furnish permits for waste disposal. May commence action against offenders in Circuit or Superior Court.	Set standards, make regulations, hold hearings, issue orders, review waste disposal plans, require sealing of mines, oil and gas wells, brine wells, etc. May institute action for non-compliance against offenders in Circuit Court of county. (State law provides for bond issues to carry out orders of Board where necessary.)
Penalty For Non-Compliance	$100 fine, 30 days imprisonment or both. Each day's continued violation constitutes a separate offense.	$25-$100 fine and imprisonment not to exceed 90 days. Also $100 per day may be recovered in civil suit by the State.

r Pollution Control Agencies in States Signatory to The

KENTUCKY	NEW YORK	OHIO
Water Pollution Control Commission.	Water Pollution Control Board.	No separate agency set up. Authority to carry out provisions of compact is the direct responsibility of the Dept. of Health.
House Bill No. 271, 1950. Effective June 20, 1950.	Chapter 666, Laws of 1949. Now Article 6, Public Health Law.	Original authority relative to pollution of streams and water supply given to Ohio Dept. of Health in 1908. Amplified-extended in 1919, 1921, 1935, 1945, and 1949.
Commissioner, Dept. of Health. Commissioner, Dept. of Conservation. Attorney General. Director, Division of Game and Fish. Two members appointed by Governor for 4-year terms, one from industrial management, one to represent municipalities. Technical Secretary - Director, Division of sanitary engineering, State Department of Health.	Commissioner, Dept. of Health, Ch'm. Commissioner, Dept. of Conservation; Commissioner, Dept. of Agriculture and Markets. Commissioner, Dept. of Commerce. Superintendent, Dept. of Public Works. Executive Secretary appointed by Board. Must be qualified sanitary engineer.	
Technical Secretary shall exercise such authority as the Commission may delegate to him. Division of Game and Fish is authorized to contribute out of its funds to the Commission.	Water Pollution Control Board created within Department of Health. State appropriates $70,000 to Department of Health, and $10,000 to Conservation Department for expenses. Technical services furnished the Board by the Department of Health and Conservation Department. Other necessary personnel may be employed.	Department of Health is administered by Director of Health.
Develop comprehensive program for prevention, control and abatement of water pollution, approve projects for loans, accept and administer loans and grants from Federal Government and other sources to carry out its functions; establish water quality standards, adopt rules and regulations, conduct hearings, issue orders, issue permits, institute court proceedings to compel compliance.	Classify waters and establish standards, review plans for waste disposal and furnish permits. Serve notice of hearing, hold public hearings, issue orders, institute court proceedings and subpoena witnesses. Board may issue immediate cease and desist orders in case of emergency public health hazards.	Department of Health has general supervision of sewage and industrial wastes, reviews and approves plans for waste disposal, has authority to adopt and enforce orders, hold hearings, and institute court proceedings. Authority to zone and classify streams provided by regulation. (Sec. 1240-3 G. C.)
$1,000 fine and $1,000 for each day violation continues.	$100 - $500. Continued violation—$100 - $500 for each day, or imprisonment not to exceed one year.	$100-$500. Each violation which continues for a 30-day period shall be deemed a separate offense. Ohio Supreme Court has allowed writs of mandamus to compel compliance with orders issued by the Department of Health.

ıe Ohio River Valley Water Sanitation Commission

PENNSYLVANIA	VIRGINIA	WEST VIRGINIA
Sanitary Water Board.	State Water Control Board.	State Water Commission.
Administrative Code—1923. Amended in 1929.	Chapter 399, Acts of Assembly of 1946; Effective July 1, 1946; as amended by Chapter 521, Acts of 1948. Now designated as State Water Control Law. Title 62, Chapter 2, 1950 Code of Virginia.	Chapter 16, Article 11 of the code of West Virginia as amended in 1945 and 1947.
Secretary of Health, Chairman. Secretary of Forests and Waters. Secretary of Mines. Executive Director, Pennsylvania Fish Commission. Three members appointed by Governor.	Five citizens, appointed by Governor for a 4-year term. No officer, employee, or representative of any certificate-holder shall be appointed by the Board. Executive secretary appointed by Board shall devote his whole time to the performance of his duties. Health Department is consultant.	Commissioner of Health. Chairman, Game & Fish Commission. Thre members appointed by Governor for 6-year term. Executive Secretary appointed by Water Commission. On State Water Commission request, technical assistance is furnished by the Division of Sanitary Engineering and by the College of Engineering of West Virginia University.
It is a Board within the Department of Health, the latter serving as the agent of the Board. Bureau of Sanitary Engineering of the Department of Health performs the active work of the Board. Funds for operation provided through Pennsylvania's appropriation to the Department of Health.	The Board is separate from the Department of Health and operates with a separate staff. All sewerage and sewage-treatment works are under the general supervision of the State Department of Health and the Board jointly. The State Department of Health has no jurisdiction over industrial wastes or industrial waste-treatment plants.	Commission is separate from Department of Health with separate staff.
Board has power to make complete survey of the waters of the Commonwealth, set standards, adopt, prescribe, and enforce such rules and regulations as may be deemed necessary for the protection of the purity of the waters; review waste disposal plans and issue permits; conduct scientific experiments and research. Above provisions do not apply to acid mine drainage until such time as practical means for such pollution shall become known.	Establish standards, conduct scientific experiments, investigations and research, review plans for waste disposal; issue, revoke, or amend certificates for discharge of wastes, issue orders, conduct hearings. Board shall review and approve treatment plans approved by Department of Health. Board may compel enforcement of orders by injunction, mandamus or other appropriate remedy.	Stream zoning based on pollution conditions found in the stream is the basis of the West Virginia program. Division of Sanitary Engineering reviews sanitary sewage disposal plans. Commission reviews industrial waste-treatment plans, cites offenders for hearing before Commission, holds hearings and issues orders. Commission shall not institute proceedings against any person engaged in the mining of coal and draining mines in compliance with existing law.
Not less than $500 nor more that $5,000. Imprisonment not more than one year.	$50 to $500. Each day of continued violation shall constitute a separate offense.	$25 to $100, also imprisonment not to exceed 90 days. Each day violation continues shall constitute a separate offense.




OHIO RIVER VALLEY
AN INTERSTATE AGENCY
ESTABLISHED JUNE 30, 1948
WATER SANITATION COMMISSION