8th ANNUAL REPORT 1956

OHIO RIVER VALLEY WATER SANITATION COMMISSION

Outlining 8 years of accomplishment by 8 states in a regional crusade for clean streams

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State Water Commission

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*New appointment—see page 27

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OHIO RIVER VALLEY
WATER SANITATION COMMISSION

8th ANNUAL REPORT

ending June 30, 1956

PREPARED BY EDWARD J. CLEARY, EXECUTIVE DIRECTOR AND CHIEF ENGINEER

for transmittal to the Governors of

ILLINOIS, INDIANA, KENTUCKY
NEW YORK, OHIO, VIRGINIA
PENNSYLVANIA, WEST VIRGINIA

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POPULATION IN MILLIONS
10
9
8
3
2
POPULATION
OPERATING OR BUILDING TREATMENT WORKS
COMMISSION CAMPAIGN STARTED
2,800,000 (EST.)
3,165,000 (EST.)
7,500,000
2,500,000
1940
1948
1956

CLOSING THE GAP

• • • Eight years ago a regional crusade for clean waters was inaugurated by eight states. One object was to curb municipal sewage pollution—to close a widening gap between indiscriminate discharge of wastes and the installation of treatment facilities. Three-quarters of the gap has now been closed, as shown on the adjoining chart.

• • • Today, eight hundred communities in the Ohio River Valley comprising a population of 7,500,000, are served by sewage-treatment works that are now operating or will be placed in operation as fast as construction contractors can complete them.

• • • Meantime, two hundred additional communities with a population of almost 1,200,000 have completed final plans that have been approved for a construction start.

• • • Another object in this crusade for safeguarding water resources is the control of industrial wastes. Significant progress is being made. Two-thirds of the industries are now recorded as having done something about pollution control—they are meeting minimum requirements established by the Commission. And almost half of the total have completed adequate control facilities.

• • • But neither the record, nor the tribute to the state control agencies and the industries who have made it possible, establish any basis for complacency. Satisfactory control of industrial wastes will require more and unremitting effort. To this complex task the Commission is devoting major attention.

• • • Basic data assembly and interpretation, notably with regard to river-quality variations and water uses, has been substantially developed. This is providing the framework for appraisal and decision in the promulgation of additional pollution-control safeguards.

N.Y.
PENNA.
VA.
W.VA.
OHIO
KY.
IND.
ILL.
RELATIVE POPULATION LOAD
AND ABATEMENT PROGRESS
IN THE EIGHT-STATE
OHIO VALLEY DRAINAGE DISTRICT
No Treatment
Population Receiving Treatment
Under Construction

ONE JOB THREE-QUARTERS DONE

Eight hundred communities, with three-quarters of the sewered population of the Ohio River Valley, are today operating or constructing sewage-treatment works.

This represents part of the gratifying response that has been generated by eight states in their conduct of a regional crusade for clean streams. Meantime, two hundred additional communities, with a population of almost 1,200,000, have completed final plans that have been approved for construction.

Thus, eight years after the establishment of the Ohio River Valley Water Sanitation Commission, it can be reported that one job is three-quarters done. And that task is the curbing of indiscriminate discharge of municipal sewage into the streams of the district, which drain an area of 155,000 square miles.

Supplementing this important accomplishment toward safeguarding the water resources of the Ohio Valley is the effort being applied on an even bigger job – the control of industrial-waste discharges. This is detailed in following pages. Also described in this report are other jobs underway – river-quality monitoring, toxicity evaluation, assembly of basic data and public information programs – all of which constitute part of the Commission's business of promoting and coordinating water-pollution control.

WHY AND HOW IT BEGAN

On June 30, 1948, the states of Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia and West Virginia signed a compact. It was an agreement written by them, supported by their respective legislatures and approved by the Congress of the United States. Under the terms of the compact the eight states pledged a pooling of their resources and their police powers for the control of interstate water pollution.

To carry out this purpose the states created the Ohio River Valley Water Sanitation Commission. The membership includes three representatives from each state appointed by the governor of the state, and three from the Federal Government appointed by the President of the United States. The role of the commissioners is to execute the compact provisions and to assert such powers as may be necessary for the enforcement of obligations. For administration of Commission functions the states maintain a staff and headquarters at Cincinnati, the cost of which is assessed on a proportionate basis among them.

Signing of the compact gave substance to a dream. That dream envisioned the potentialities of joint action among the states in the Ohio Valley in tackling a job that neither one could do alone. Guided by the broad principle that no sewage or industrial-waste discharge originating within a signatory state shall injuriously affect the uses of interstate waters, the Commission is empowered to make determinations regarding control measures. Securing compliance with these measures then becomes an obligation of each state. To supplement state efforts the Commission is clothed with residual enforcement powers.

Ample evidence to support the assertion that a dream is being translated into reality is contained in this eighth annnal report. The record shows that the eight states that pledged their united support in a crusade for water-pollution control are redeeming that pledge in full measure. For example, here are the facts on control of municipal sewage discharges.

MUNICIPAL SEWAGE CONTROL

In the Ohio Valley there are 1,479 sewered communities with a total population of 10,000,000 people.

Today, 800 of these communities – comprising a population of 7,500,000 – are served by sewage-treatment plants that are either operating or will be placed in operation just as fast as construction contractors can complete them.

In 1948 when the Commission came into existence only an estimated 38 per cent of the population was served by sewage-treatment works operating or under construction. Today, despite an increase of 20 per cent in the population of the district, the figure is 75 per cent.

As was prophesied in our annual report three years ago, and now graphically portrayed in the chart on page 2, we are rapidly closing the gap; new sewage pollution has been curbed and existing pollution is being decreased.

The chart on page 2 offers an invitation to make a projection into the future. Using the period 1953-55 as a representative trend of progress (the 1955-56 trend is abnormal because of the huge Pittsburgh project) an intersection with the population trend line would occur in the 1964-65 period. The possibility of securing sewage-treatment facilities for the entire population by that time would not be beyond the realm of achievement on the basis of past performance.

But an event has occurred that now lends considerable uncertainty to such a projection. The new Federal Water Pollution Control Act, signed by the President on July 9, contains an authorization of $50 million annually for grants-in-aid to municipalities over a period of ten years. The total amount promised is not large. And every community, of course, will lay claim to a share. Until eligibility determinations are made with regard to these claims—some of which may

Today 85% of the 3,600,000 population adjacent to the banks of the Ohio River has sewage treatment plants in operation or under construction. Eight years ago virtually nothing was provided in the form of municipal treatment facilities.

persist over the entire ten-year period for which grants are authorized—there could be a retarding rather than stimulating effect from the federal-aid program.

For example, in the Ohio Valley there are 200 projects on which final plans have been approved for construction. It is not likely that many of these projects – which would serve a total population of 1,200,000 – will now be started until the status of eligibility for federal aid is established. In fact, some signatory states reported that municipalities were requesting a stay of compliance within hours after the federal act was signed.

Focusing attention on the Ohio River itself, a dramatic change is taking place. Eight years ago a glance at a map showing the 230 municipalities adjacent to its banks would have shown virtually nothing in the form of sewage-treatment facilities; eleven places, with a total population of only 22,000, were operating settling-tank facilities.

Looking at such a map today, here is what we find:

49 municipalities (pop. 450,000) have completed treatment plants (shown in red). Not included are seven institutions with a population of 7,000.

99 municipalities (pop. 2,600,000) have plants under construction (green). Not included are two institutions with a population of 2,700.

Thus, it can now be reported that 85 per cent of the 3,600,000 population adjacent to the banks of the Ohio River has sewage-treatment plants in operation or under construction.

WHAT HAPPENED THIS YEAR

Significant developments in the Ohio Valley district during the year ending on June 30, 1956, can be summarized as follows:

16 municipalities, three institutions (pop. 151,000) placed new treatment facilities in operation.

10 municipalities and one institution (pop. 329,000) placed in operation additions to their treatment works.

95 municipalities, two institutions (pop. 1,960,000) placed sewage treatment facilities under construction.

19 municipalities, three institutions (pop. 163,000) placed under construction additions to their sewage-treatment works.

Communities that placed new plants in operation this year include:

PLACE	POPULATION	WATERSHED
Corry, Pa.	7,911	Allegheny
Torrance State Hospital, Pa.	3,000	Allegheny
Nelsonville, Ohio	5,328	Hocking
Batavia, Ohio	1,445	Little Miami
Cambridge, Ohio	14,739	Muskingum
Killbuck, Ohio	767	Muskingum
New Philadelphia, Ohio	12,948	Muskingum
Marietta, Ohio	16,006	Ohio
Shadyside, Ohio	4,433	Ohio
Lisbon, Ohio	3,293	Ohio
Orient State Institute, Ohio	3,400	Scioto
Princeton, W. Va.	8,279	Kanawha
McMechen, W. Va.	3,518	Ohio
Point Pleasant, W. Va.	4,596	Ohio
Henderson, Ky.	16,837	Ohio
Madison State Hospital, Ind.	2,000	Ohio
Rising Sun, Ind.	1,930	Ohio
Bonnville, Ind.	5,092	Ohio
Lafayette, Ind.	35,568	Wabash
Pleasant Hill, Ohio	940	Miami
Sidney, Ohio	11,491	Miami
Dover, Ohio	9,852	Muskingum
East Liverpool, Ohio	24,217	Ohio
New Richmond, Ohio	1,960	Ohio
Dunbar, W. Va.	8,032	Kanawha
South Charleston, W. Va.	16,686	Kanawha
Parkersburg, W. Va.	29,684	Ohio
Weirton, W. Va.	24,005	Ohio
Wheeling, W. Va.	58,891	Ohio
Frankfort, Ky.	11,916	Kentucky
Whitesburg, Ky.	1,393	Kentucky
Louisville, Ky.	369,129	Ohio
Paducah, Ky.	32,828	Ohio
Aurora, Ind.	4,780	Ohio
Madison, Ind.	7,506	Ohio
Mt. Vernon, Ind.	6,150	Ohio
Tell City, Ind.	5,735	Ohio
Lincoln State Park, Ind.	500	Ohio
Dunkirk, Ind.	3,048	Wabash
Greenwood, Ind.	3,066	Wabash
Seymour, Ind.	9,629	Wabash
New Whiteland, Ind.	900	Wabash
Hutsonville, Ill.	647	Wabash
Jonesville High School, Va.	560	Tennessee

Communities that placed additions or improvements in operation this year include:

Slippery Rock, Pa.	2,294	Beaver
Dayton, Ohio	253,563	Miami
Oxford, Ohio	6,944	Miami
Minerva, Ohio	3,280	Muskingum
Wadsworth, Ohio	7,966	Muskingum
Federal Prison, W. Va.	725	Kanawha
Brownsburg, Ind.	1,578	Wabash
Greensburg, Ind.	6,619	Wabash
Kokomo, Ind.	38,672	Wabash
Rochester, Ind.	4,673	Wabash
Scottsburg, Ind.	2,953	Wabash

Construction of sewage-disposal facilities was started this year at the following communities:

Allegheny County Sanitary Authority (68 communities)	1,270,660	Ohio
Conway, Pa.	1,570	Ohio
Titusville, Pa.	8,923	Allegheny
Bremen, Ohio	1,187	Hocking
Middletown, Ohio	33,695	Miami

Additions or improvements placed under construction this year include:

Conneaut State Park, Pa.	500	Allegheny
Derry, Pa.	3,752	Allegheny
Edinboro, Pa.	1,567	Allegheny
Polk State Hospital, Pa.	3,500	Allegheny
Jamestown, N. Y.	43,354	Allegheny
Cortland, Ohio	1,259	Beaver
County Sanitarium, Ohio	340	Beaver
Covington, Ohio	2,172	Miami
Jackson Center, Ohio	698	Miami
New Carlisle, Ohio	1,640	Miami
Trotwood, Ohio	1,066	Miami
Salem, Ohio	12,754	Ohio
Greenfield, Ohio	4,862	Scioto
Mount Gilead, Ohio	2,351	Scioto
St. Albans, W. Va.	9,870	Kanawha
Campbellsville, Ky.	3,477	Green
Charleston, Ind.	4,785	Ohio
Salem, Ind.	3,271	Ohio
Bloomington, Ind.	28,163	Wabash
Mattoon, Ill.	17,547	Wabash
Paris, Ill.	9,460	Wabash
Robinson, Ill.	6,407	Wabash

Text continued on page 11

Second and largest of the Evansville, Ind., sewage-treatment plants to be completed, the West Side works is one of the most handsome public-works facilities in the Ohio Valley. With a capacity of 22 mgd, it provides sedimentation, chlorination, sludge digestion and incineration. The sludge-gas engine house, focal point of the architectural massing of the various plant units, is distinguished by glass walls and interior color treatment of machinery, floors and ceiling. Consulting engineer was Consoer, Townsend and Associates, Chicago.

One month after the May 18 ground-breaking ceremonies at Louisville, Ky., construction operations were in full swing on the $3,000,000 sewage-treatment works. This is a view of the conical, reinforced-concrete floor of a sludge digester. Consulting engineers are Metcalf & Eddy, Boston.

Louisville Courier-Journal photo

PITTSBURGH PROJECT
BIGGEST IN THE VALLEY

for which ground was broken on April 3, 1956, and pages from the ceremonial program prepared by the Allegheny County Sanitary Authority.

PITTSBURGH
SEWAGE TREATMENT
PROJECT

OHIO RIVER VALLEY WATER
SANITATION COMMISSION

SIGNATORY STATES AND GOVERNORS

ILLINOIS Hon. William G. Stratton	**OHIO** Hon. Frank J. Lausche
INDIANA Hon. George N. Craig	**PENNSYLVANIA** Hon. George M. Leader
KENTUCKY Hon. A. B. Chandler	**VIRGINIA** Hon. Thomas B. Stanley
NEW YORK Hon. Averell Harriman	**WEST VIRGINIA** Hon. William C. Marland

GROUNDBREAKING CEREMONY

TREATMENT PLANT SITE
3300 BLOCK - PREBLE AVE.

Wednesday, April 4, 1956

Program

2:00 P. M. Groundbreaking Ceremony

2:05 P. M. Introductory Remarks and Introduction of Speakers by Edmund S. Ruffin, Jr., Chairman of The Board, Allegheny County Sanitary Authority

2:10 P. M. Speakers:

Honorable George M. Leader, Governor of Pennsylvania

Dr. Berwyn F. Mattison, Secretary of Health, Commonwealth of Pennsylvania

John F. Laboon, Executive Director and Chief Engineer of Allegheny County Sanitary Authority

Honorable John J. Kane, Chairman, Allegheny County Commissioners

Honorable David L. Lawrence, Mayor, City of Pittsburgh

3:00 P. M. Closing

PARTICIPATING COMMUNITIES

In addition to the City of Pittsburgh, these 68 municipalities will be served by the new Pittsburgh Sewage Treatment Project:

BOROUGHS

Aspinwall	Heidelberg
Avalon	Homestead
Baldwin	Ingram
Bellevue	McKees Rocks
Bethel	Millvale
Ben Avon	Monroeville
Ben Avon Heights	Mt. Oliver
Blawnox	Munhall
Braddock	North Braddock
Braddock Hills	Pitcairn
Brentwood	Rankin
Bridgeville	Rosslyn Farms
Carnegie	Sharpsburg
Castle Shannon	Swissvale
Chalfant	Thornburg
Churchill	Trafford
Crafton	Turtle Creek
Dormont	Verona
East McKeesport	Wall
East Pittsburgh	West Homestead
Edgewood	West Mifflin
Emsworth	West View
Etna	Whitehall
Forest Hills	Wilkinsburg
Fox Chapel	Wilmerding
Greentree	

TOWNSHIPS

Baldwin	Penn
Collier	Reserve
Kennedy	Ross
Kilbuck	Scott
McCandless	Shaler
Mt. Lebanon	Stowe
Neville	Upper St. Clair
North Versailles	Wilkins
O'Hara	

PROJECT DESIGN DATA

Service Area	Approx. 205 Sq. Miles
Population Served (1970)	1,410,000 Persons
Average Sewage Flow	150 MGD
Sewage Character:	
Suspended Solids	*275 PPM*
5 Day B.O.D.	*300 PPM*
Degree of Treatment:	
Suspended Solids Removal	*70%*
Settleable Solids	*99%*
5 Day B.O.D.	*50%*
Sewage Bacteria	*98%*
Pumping Capacity	300 MGD
Mechanically Cleaned Racks	Four
Aerated Grit Chambers	Four
Preaeration:	
Two Tanks	
44 Minutes Detention Time @ 150 MGD	
Blower Capacity 3 @ 6000 cfm	
Sedimentation:	
Six Tanks	
2 Hours Detention Time @ 150 MGD	
Chlorination Plant	4 Units @ 6,000 Lbs. Per Day
Sludge Concentration	Total 3.25 MG Capacity
Incinerators:	
Four Units	
Capacity Total 92,000 Lbs. Per Hour	
Administration Building	
Maintenance Building, Machine Shop and Garage	
Plant Site	Approx. 48 Acres
Intercepting Sewer System:	
Tunnels	*Approx. 50 Miles*
Open Cut Sewers	*Approx. 33.5 Miles*
Diversion Structures and Pumping Stations	
Construction Costs:	
Treatment Plant	*$16,700,000*
Intercepting Sewers	*$61,300,000*
Construction Period	3 Years

STATUS OF MUNICIPAL AND INSTITUTIONAL SEWAGE-TREATMENT FACILITIES—JULY 1, 1956

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

STATUS	ILL.	IND.	KY.	N. Y.	OHIO	PA.	VA.	W. VA.	TOTAL	% OF TOTAL
Adequate treatment	39	96	98	5	158	65	29	19	509	34.4
	246,068	569,656 (a)	404,946	37,080	1,212,180 (d)	320,682	68,541	55,930	2,915,083	29.2
Treatment provided, not adequate	4	20	18	8	26	15	24	11	126	8.5
	10,336	122,862	130,688	13,628	219,165	59,760	29,590	30,598	616,627	6.2
Treatment provided, not adequate; improvements or additional plants under construction	0	5 (b)	1	1	24 (e)	4	0	2	37	2.5
	0	503,951	3,477	43,354	471,689	7,120	0	11,870	1,041,461	10.5
New treatment works under construction	1	9	4	0	30	72	1	11	128	8.7
	647	147,994 (c)	415,266	0	776,235 (f)	1,310,185	560	269,794	2,920,681	29.3
Final plans approved	4	25	13	2	24	103	13	16	200	13.5
	11,769	176,849	69,751	2,492	182,719	615,222	16,281	103,309	1,178,392	11.8
Final plans in preparation	0	4	1	0	13	14	2	8	42	2.8
	0	23,203	5,452	0	266,735	39,168	10,421	109,455	454,434	4.6
Preliminary plans or report approved or in preparation	0	7	7	2	20	28	11	26	101	6.8
	0	9,627	21,819	9,934	90,549 (g)	98,028	34,513	63,185	327,655	3.3
Treatment program under discussion	1	16	0	7	0	4	1	30	59	4.0
	3,196	28,725	0	5,453	0	3,237	1,568	55,396	97,575	1.0
Order, notice or recommendation for treatment issued by state	0	3	0	0	0	6	0	8	17	1.2
	0	23,811	0	0	0	23,454	0	10,294	57,559	0.6
Discharge of minor significance	0	79	18	4	44	12	5	10	172	11.6
	0	66,927	19,195	3,291	42,753	43,244	3,273	8,108	186,791	1.9
No action	8	9	20	1	9	0	11	30	88	6.0
	29,324	22,839	51,962	514	8,637	0	10,851	35,880	160,007	1.6
TOTAL	57	273	180	30	348	323	97	171	1,479	100.0
	301,340	1,696,444	1,122,556	115,746	3,270,662	2,520,100	175,598	753,819	9,956,265	100.0

(a) Includes East Side Evansville serving 30,000
(b) Evansville counted in this category
(c) Includes West Side Evansville serving 98,636
(d) Includes Little Miami plant serving 161,361 and 7 communities
(e) Cincinnati counted in this category
(f) Includes Mill Creek plant serving 610,720 and 17 communities
(g) Includes Muddy Creek plant serving 33,651 and 1 community

Operations are expected to be started again in October at the new treatment works constructed by the Northern Kentucky Sanitation District. This plant, which serves 16 communities whose wastes are discharged into the Cincinnati Pool of the Ohio River, was required under a court order obtained by near-by residents to cease operations because of odor difficulties. Certain structural changes in the plant and the installation of odor-control equipment were completed during the past year.

Penalty action requested by the Ohio Water Pollution Control Board against the City of Gallipolis has been delayed by an appeal of the city from a final order of the board denying renewal of sewage-discharge permit. (The Ohio board grants these permits so long as "reasonable progress" is being made toward the elimination of pollution.) In the first hearing in the common pleas court of Gallia County, the final order of the board was reversed. The Attorney General for Ohio, acting for the board, has carried the case to the appellate court where briefs have been filed; oral arguments on the appeal are scheduled for the 1956 fall term. Irrespective of the decision of the court of appeals, there is a possibility that the case will go to the Ohio Supreme Court for final decision. Action on the penalty case is delayed until a final decision is reached on the permit appeal.

Marietta, Ohio, at the dedication of its plant on June 27, 1956, proudly asserted: "This is our city's answer to the task allocated to it by the Ohio River Valley Water Sanitation Commission". The treatment works, which cost $822,000, provides sedimentation with supplementary pre-aeration and chemical treatment, sludge digestion and incineration. Consulting engineer was Alden E. Stilson & Associates, Columbus, Ohio.

Dedicated on May 19 was the Nelsonville, Ohio, sewage-treatment plant on the Hocking River. Designed for a population of 6,250, this trickling-filter installation cost $226,000. It was built by the Welsbach Corporation from designs furnished by Burgess and Niple, consulting engineers, Columbus, Ohio.

Skyphotos photo

STATUS OF INDUSTRIAL WASTE-CONTROL FACILITIES—JULY 1, 1956

for industries discharging effluents directly into streams

STATUS	ILL.	IND.	KY.	N. Y.	OHIO	PA.	VA.	W. VA.	TOTAL	% OF TOTAL
Adequate control facilities	6	146	103	4	200	88	21	86	654	45.5
Control provided, not adequate	9	56	60	20	187	54	11	52	449	31.2
Control facilities inadequate, improvements under construction	0	1	3	0	30	0	0	0	34	2.4
New control facilities under construction	0	3	0	1	2	12	1	15	34	2.4
Plans for facilities completed or in preparation	0	5	0	10	2	58	0	17	92	6.3
No action by company	0	7	0	17	1	23	10	117	175	12.2
TOTAL NUMBER OF INDUSTRIES	15	218	166	52	422	235	43	287	1,438	100.0
Complying with ORSANCO IW-1	15	154	125	4	346	213	31	77	965	67.1

CLASSIFICATION OF INDUSTRIES BY TYPE AND NUMBER

discharging effluents directly into streams — July 1, 1956

CLASSIFICATION	ILL.	IND.	KY.	N. Y.	OHIO	PA.	VA.	W. VA.	TOTAL
Brewery	0	1	0	0	1	2	0	0	4
Cannery	3	61	0	1	22	1	2	0	90
Chemicals	1	21	23	0	45	24	7	24	145
Coal Mining	5	11	73	0	24	1	11	201	326
Coke	0	0	0	0	11	2	0	2	15
Dairy Products	1	20	9	17	54	9	2	3	115
Distillery	0	4	33	0	1	4	0	0	42
Meat Packing	0	25	5	0	30	8	2	3	73
Metal-Finishing	0	22	6	17	47	78	1	15	186
Oil Fields	0	10	0	3	0	0	0	0	13
Oil Refinery	2	4	3	0	5	19	0	2	35
Paper and Pulp	0	11	0	0	33	2	0	1	47
Steel Works	0	2	2	1	76 *	26	0	10	117
Tannery	0	1	1	0	3	3	1	2	11
Textile	1	1	2	1	2	1	4	1	13
Miscellaneous	2	20	9	12	47	53	13	15	171
Power Plants	0	4	0	0	21	2	0	8	35
TOTAL	15	218	166	52	422	235	43	287	1,438

* Ohio issues separate permits for each waste discharge (acid-iron, scale and blast furnace dust) emanating from a single steel plant. Thus, the 76 operations represent the total conducted at 17 plants.

A BIGGER JOB WELL STARTED

In terms of scope and complexity the biggest challenge of the eight-state program is the control of industrial-waste pollution. Probably nowhere are there greater variety or more intensive concentrations of industrial operations than in the Ohio Valley. Many of these operations are the largest of their type to be found anywhere in the world. Some laid their foundations in the valley almost a century ago. More have had their origin only within the last decade, during which there has been a spectacular investment in new industrial facilities estimated at $10 billion. This is the broad perspective within which the Commission must view its task of safeguarding the quality of water resources.

STATUS OF CONTROL

One measure of where we stand with regard to industrial-waste control is provided by the accompanying status tabulation of the 1,438 plants that discharge effluents directly into the streams of the Ohio Valley district. This shows that:

654 – or 46% – have control facilities rated as adequate;

449 – or 33% – provide some form of control but more will be required;

68 – or 5% – are installing or improving control facilities.

It is also to be noted from the tabulation that 965 plants of the 1,438 total are complying with the Commission's minimum requirements for industrial-waste discharge, which were adopted one year ago. At that time the eight states reached agreement on policy and procedure for the determination of specific industrial-waste control measures as contemplated by the compact. Recognizing that certain restrictions would apply to the discharge of every industrial waste, regardless of additional controls that ultimately might be required on the basis of detailed surveys and other considerations, the Commission adopted these as minimum requirements.

The purpose of promulgating minimum requirements was to expedite action on the part of all industries in taking the obvious and necessary steps toward pollution control. As a minimum the Commission calls for the treatment or modification of every industrial discharge so as to maintain at least the following conditions in the receiving waters:

Freedom from anything that will settle to form putrescent or otherwise objectionable sludge deposits which interfere with reasonable water uses.

Freedom from floating debris, scum and other floating materials in amounts sufficient to be unsightly or deleterious.

Freedom from materials producing color or odor in such degree as to create a nuisance.

A LONG WAY TO GO

The fact that two-thirds of the industries in the Ohio Valley are doing *something* about pollution control is a tribute to the efforts of the eight states, whose resources and personnel have never matched the needs for coping with the problem. And it testifies to a more responsive attitude on the part of industrial management with regard to its responsibilities.

But neither the record, nor the tribute to those who deserve it, establish any basis for complacency. It must be frankly acknowledged that satisfactory control of industrial-waste pollution in the Ohio Valley will require more and unremitting effort.

Meantime, the Commission takes pride that this big job is well-started. Industrial-waste control is – and has been for several years–a primary focus of attention. And in this effort the Commission has enlisted the aid of industry representatives who are serving on advisory committees.

Not the least of Commission attention and staff effort has been in the conduct of detailed studies. These are designed to reveal where and how much more industrial-waste control should be exercised beyond the basic requirements already promulgated.

Three of these comprehensive studies – dealing with phenolic substances, chlorides and hardness – are now being compiled into report form with recommendations. In each report three major categories of study have been undertaken. They are: (1) development of quality criteria for various water uses; (2) an appraisal of river conditions in terms of quality variations, flow characteristics and assimilative capacity; and (3) proposals for the promulgation and execution of control measures.

PHENOLIC-WASTES CONTROL

Taste contamination of public-water supplies attributed to phenolic substances has plagued the Ohio Valley for a quarter of a century. In fact, it was an informal joint effort to curb phenol discharges from the then newly-developed by-product coke plants in the 1920's that brought together several states and laid the groundwork for the eventual establishment of the Ohio River Valley Water Sanitation Commission in 1948.

It is quite logical, therefore, that phenolic-wastes control should have commanded attention by the Commission since its inception. Thus, in the First

High hopes for elimination of pickle-liquor acid discharges from steel mills are centered around the Blaw-Knox Ruthner process, which is being tested in a $500,000 pilot plant following three years of laboratory development. George E. Kopetz, vice president-operations of the Blaw-Knox Co. explains a phase of the process to (left) Earl C. Smith, chairman, sub-committee on stream pollution abatement, American Iron and Steel Institute, and (right) Kenneth M. Lloyd, chairman, Ohio River Valley Water Sanitation Commission.

The project is sponsored by the Blaw-Knox Company and the following member companies of the Commission's Steel Industry Action Committee: Jones & Laughlin Steel Corp., National Steel Corp., Pittsburgh Steel Co., Republic Steel Corp., United States Steel Corp., Wheeling Steel Corp. and Youngstown Sheet & Tube Co.

Annual Report (1948-49) the Commission described its sponsorship of a program that enlisted the collaboration of several interested groups in treatment of phenolic wastes. Each succeeding report of the Commission has noted continuing development. In this effort substantial assistance over the years has been provided by the Commission's Steel Industry Action Committee and more recently by its Water Users Committee.

Because this work had been advanced to the point where conclusions might be drawn, the staff was in a position to expedite action on a resolution adopted by the Commission on January 11, 1956. Pointing out that the Commission had recently reached agreement on industrial-waste control policy and procedure and had thus paved the way for specific consideration of control measures for phenolic wastes, the resolution instructed the Executive Director to prepare a report on conditions and recommendations for control.

In part the resolution was inspired by a break-down in the functioning of a phenol-recovery plant that had been installed to prevent the very thing that happened. Operating difficulties at the recovery plant resulted in the thoughtless discharge of slugs of phenol. This in turn so burdened the water-purification facilities at the downstream City of Wheeling that in the period December 13-17 the City Council was moved to address the Commission because of the "extremely offensive odor and noxious tastes" of the Ohio River water.

At a meeting with City Manager Robert Plummer of Wheeling and other city officials on April 4, the Commission was informed that the episode of phenol contamination during the previous December climaxed an aggravation of many years at Wheeling with taste-and-odor problems. It was stated that consideration was being given by Wheeling to the abandonment of the Ohio River as a source of water supply.

Chairman Devendorf assured the Wheeling representatives that the Commission was cognizant of the problem, that studies had been underway for some time and that a comprehensive report on phenol-control measures was being readied for consideration.

With reference to the indiscriminate discharge of phenolic substances, the chairman pointed out that West Virginia (in which state the plant was located) and the plant officials involved, had agreed on measures to prevent a recurrence.

In connection with this situation Director Cleary made the following observation to the Commission: "Among other things, the Wheeling episode points to the necessity for some formal procedure whereby the states and the Commission will be immediately notified of any accidental spills, leaks or other discharges of an unusual nature into the waters of the Ohio Valley Compact district from an industrial plant, a municipality or a transportation facility. Such notification will at least provide opportunity to warn downstream users to make such preparation as they can to cope with the situation. And, in addition, it will save considerable expense on the part of this Commission and the states in their endeavor to locate the trouble spot. For example, the Wheeling investigation called for two weeks of effort by the Commission staff and the West Virginia State Water Commission, as well as special efforts by Pennsylvania and Ohio authorities, before the source of the trouble was located. Much of this effort could have been avoided if the plant involved had made an immediate report of its difficulties."

AN OLD INDUSTRIAL PROBLEM

Perhaps the most frustrating of the industrial-waste control problems in the Ohio Valley is that associated with the discharge of acid from active and abandoned mines. It is an old problem, salient details of which were outlined on pages 29-34 in the Second Annual Report of the Commission. Scientific developments to date have not been of a nature to permit this Commission and its signatory states to adequately cope with the problem. And the interest and leadership that the coal industry has applied to the problem have not measured up to the need.

Motivated by these considerations, the Commission on July 12, 1956, adopted a resolution petitioning the Surgeon General of the U. S. Public Health Service to consider the inauguration of a comprehensive program of research and development related to the prevention, reduction or control of acid mine drainage.

The Surgeon General was invited to consider the feasibility of establishing for this project a review committee of three to be nominated as follows: One member by the chairman of this Commission who will serve as chairman; one by the Surgeon General; and one by the chairman of the Coal Industry Advisory Committee of this Commission.

And the resolution further called upon its coal industry committee to make available its resources and counsel in advancing the Commission's desire to promote an aggressive program of action in curbing the discharge of acid mine drainage.

A NEW INDUSTRIAL PROBLEM

In mentioning mine-acid control as an old industrial-waste problem that compels attention, the Commission is not unmindful of the implications of a new industrial development.

A few years after the formation of ORSANCO a unique type of industry came to the Ohio Valley—that concerned with atomic-energy facilities. This industry produces radioactive wastes, the measurement and evaluation of which fitted no previous pattern of experience among state pollution-control agencies.

At present the Atomic Energy Commission maintains exclusive responsibility for waste-disposal reglations and controls so that health and safety are not endangered. However, on November 25, 1955, the Atomic Energy Commission announced the appointment of an Advisory Committee of State Officials to aid the AEC in a delineation of the role of state agencies with regard to jurisdiction and responsibility of radiation control measures. Included as a member of this committee was Mr. B. A. Poole, vice-chairman of the Ohio River Valley Water Sanitation Commission, and a commissioner representing Indiana.

Another member of our Commission, Mr. C. W. Klassen of Illinois, is on a committee of the National Research Council, which is developing recommendations on radioactive waste disposal. Thus, the Commission has two representatives placed in strategic positions to advise on what steps are to be taken.

Meantime, as described later in this report, the Commission and the signatory states are participating with the U. S. Public Health Service in the collection of samples of river water that are being analyzed and evaluated at the Robert A. Taft Sanitary Engineering Laboratory in Cincinnati. This project, which stemmed from a Commission resolution of April 5, 1955, requesting aid from the U.S. Public Health Service on matters relating to radiation hazards, is designed to develop information on background radioactivity of the Ohio River and some of its principal tributaries.

SUMMING UP

The record shows that a good start has been made on industrial-waste control. But the end—in terms of necessary accomplishment—is still a long way off. This does not imply that the Commission and its signatory states have shown any disposition to be less aggressive in pursuit of their duties. Quite to the contrary. It simply acknowledges that the scope and magnitude of the task will require relentless effort.

Many of the industries in the Ohio Valley—a few from a sense of public responsibility, some from a proper self-interest in waste conservation and water-quality protection, and others as the result of prodding from control agencies—have taken steps to reduce pollution. Much more needs to be done by some; and something must be done by all.

WATER QUALITY MONITOR STATIONS

Monitor stations at the 41 locations indicated on the map provide essential information relating to water quality.

OHIO RIVER STATIONS

	Mile point	Operated by
*1. Ambridge, Pa.	16.8	USGS
2. Dam 8—Newell, W. Va.	46.4	USGS-Com
3. Weirton Water Plant Weirton Steel Co., Weirton, W. Va.	61.6	WU
4. Amer. Gas and Elec. Service Corp. Windsor Plant	79.5	WU
5. Wheeling Steel Corp. Yorkville, Ohio	83.5	WU
6. Wheeling Water Plant Wheeling, W. Va.	86.8	WU
7. Columbia-Southern Chemical Corp. Natrium, W. Va.	119.0	WU
8. American Cyanamid Co. Willow Island, W. Va.	161.0	WU
9. Dam 22—Ravenswood, W. Va.	220.9	USGS-Com
10. Amer. Gas and Elec. Service Corp. Philip Sporn Plant	242.2	WU
11. Huntington Water Plant Huntington, W. Va.	304.2	WU
12. Portsmouth Water Plant Portsmouth, Ohio	350.9	WU
13. Cincinnati Water Plant Cincinnati, Ohio	462.8	WU
14. Dam 39—Florence, Ind.	531.7	USGS-Com
15. Louisville Water Co. Louisville, Ky.	600.5	WU
16. Dam 51—Golconda, Ill.	903.1	USGS-Com
17. Dam 53—Grand Chain, Ill.	962.6	USGS-Com

TRIBUTARY STATIONS

	Operated by
*18. Allegheny R. at Warren, Pa.	USGS
*19. Allegheny R. at Kittanning, Pa.	USGS
20. Allegheny R. at Wilkinsburg, Pa.	WU
21. Monongahela R. at Dam 8	USGS-Com
*22. Monongahela R. at Charleroi, Pa.	USGS
*23. Youghiogheny R. at McKeesport, Pa.	USGS
24. Monongahela R. at S. Pitts. Water Co., Pa.	WU
*25. Mahoning R. at Lowellville, Ohio	USGS-Com
*26. Beaver R. at New Brighton, Pa.	USGS
*27. Tuscarawas R. at Newcomerstown, Ohio	USGS
28. Muskingum R. at McConnellsville, Ohio	USGS
*29. Hocking R. at Athens, Ohio	USGS
*30. Kanawha R. at Winfield Dam, W. Va.	USGS-Com
*31. Big Sandy R. at Catlettsburg, Ky.	USGS-Com
*32. Scioto R. at Lucasville, Ohio	USGS-Com
*33. Licking R. at McKinneysburg, Ky.	USGS
*34. Miami R. at Elizabethtown, Ohio	USGS-Com
*35. Kentucky R. at Frankfort, Ky.	USGS
*36. Salt R. at Shepherdsville, Ky.	USGS
*37. Green R. at Dam 1, Ky.	USGS-Com
*38. Wabash R. near New Haven, Ill.	USGS-Com
*39. Tradewater R. at Olney, Ky.	USGS
*40. Cumberland R. at Smithland, Ky.	USGS-Com
*41. Tennessee R. at Kentucky Dam, Ky.	USGS-Com

*Additional stations from which data will be received beginning October 1, 1956.

OTHER JOBS UNDERWAY

A variety of endeavors constitute the comprehensive pollution-control program of the Commission. In addition to those catalogued elsewhere in this report, the following claim special mention: River-quality monitoring; water use and industrial-waste inventories; radioactivity background surveys; effect of high-dam navigation structures on stream regimen; appraisal of membrane-filter technique; toxicity evaluation; industry and other advisory committee activities; and public information efforts.

Ranking as one of the most important tasks is the assembly of basic data. This includes river-quality variations and trends, industrial-waste load quantities and characteristics, and quantitative assessment of water uses. The basic facts, and interpretation of what they mean, are essential for the rational pursuit of a pollution-control program.

It is gratifying to report that substantial progress has been made in river-quality monitoring. And statistical evaluation of these records is now forming the basis for appraisal of river conditions and proposals for present and future control measures.

WATER-QUALITY MONITORING

As a result of a monitoring program established five years ago with its Water Users Committee, and more recently supplemented under a cooperative project with the U. S. Geological Survey, the Commission is developing an invaluable record of water-quality variations in the Ohio River and some of its tributaries. These records provide the essential data for appraisal and promulgation of pollution-control measures, future surveillance of compliance with control requirements and for use as exhibits in any legal actions that may be found necessary.

Because of the broad usefulness of these records in all forms of water-resources planning and development, the Commission authorized their publication.

During the past year records were being compiled from 20 monitor stations. Thirteen of these are operated on a volunteer basis by the Commission's Water Users Committee; analyses are made on samples collected daily in some places and twice-weekly in others. At another six stations the U. S. Corps of Engineers collects samples each day and from these a 10-day composite is prepared for analyses by the Columbus District Laboratory of the U. S. Geological Survey. Results from a seventh station, maintained on the Muskingum River by the Ohio Department of Natural Resources in cooperation with the U. S. Geological Survey, are made available to the Commission.

Sixteen of the monitor stations are on the Ohio River, one on the Allegheny River, two on the Monongahela River and one on the Muskingum River. Experience with these stations and the importance of the information they are providing for the appraisal of water-quality conditions led the Commission to approve an expansion of the monitoring program to tributaries of the Ohio River system.

Accordingly, for the year beginning October 1, 1956 a cooperative arrangement with the U. S. Geological Survey and the U. S. Corps of Engineers will provide monitor data from 21 additional stations.

INDUSTRIAL-LOAD DATA

Refinement of industrial waste-control measures and the promulgation of tailored requirements as contemplated by the Commission calls for an inventory of the location, types and quantities of industrial discharges. Compilation of this basic data was initiated shortly after establishment of the Commission. And in accordance with Commission policy of dealing with individual industries only through appropriate state agencies, the burden of securing waste-load information has been accepted by each of the states.

The task is a big one because of the number, size and variety of industries within the eight-state district. Many industries have been in existence for a long time. Records of sewer locations, connections and volumes of flow have been either non-existent or inadequate; and suitable analyses of waste discharges were seldom made or are they up-to-date. Thus the assembly of information not only has been complex but has had to be paced in accordance with the availability of manpower and other resources possessed by the state agencies.

Some progress has been made. For example, the location and status of control for every industry discharging directly into streams of the district is on record for every year since 1953. These records have been summarized for publication in the annual reports of the Commission (see page 12 of this report for the current status of 1,438 industries). They provide the factual basis for Commission assessment of program development and progress.

Of even greater significance, now that the Commission is developing tailored control requirements, is the assembly of detailed data on the volumes and characteristics of waste discharges from individual industries. Attention has been concentrated on those industries discharging into the Ohio River, of which there are 218. Of this number, 38 are reported as contributing no significant waste load. Detailed information has been secured complete for 94 industries and partly complete for another 61. Information is lacking for 33 industries.

WATER-USE DATA

From a quantitative standpoint, data on water use of the Ohio River are scanty and scattered. But sufficient information has been compiled with the aid of the states, federal agencies and from private sources to provide the following preliminary summation.

Public Water Supplies—Nearly two million people in 116 communities utilize the Ohio River as a source of water supply. The distribution and population by states is as follows:

PUBLIC WATER SUPPLIES FROM THE OHIO RIVER

State	No. of Water Works	Communities Supplied	Population Supplied	Av. Daily Usage M.G.D.
Ill.	3	4	15,858	3.2
Ind.	3	4	164,132	26.9
Ky.	8	59	799,727	93.0
Ohio	9	34	876,823	108.5
Pa.	2	2	16,200	2.8
W. Va.	6	13	221,300	24.6
Totals	31	116	2,094,040	259.0

Industrial Water Usage—The largest industrial use of water is for cooling purposes in steam-electric stations and industrial establishments. Lesser, but nevertheless large, quantities of water are utilized by industry for process needs and boiler makeup purposes. The quantities for these uses are summarized below:

These data are from industries that are self-supplied from the Ohio River; they do not include the many industries that are served from public-water supplies or those that rely entirely on groundwater sources.

INDUSTRIAL USE OF OHIO RIVER WATER

State	No. of Industries	Cooling Purposes	Process Use and Steam Generation	Total Including Misc. Use
Ill.	1	725.0 mgd	0.0 mgd	725.0 mgd
Ind.	6	2476.1	21.2	2497.7
Ky.	16	2510.3	3.3	2546.0
Ohio	23	2125.7	3.4	2361.9
Pa.	17	593.2	29.3	897.5
W. Va.	17	703.4	58.4	765.0
Totals	80	9133.7	115.6	9793.1

Navigation and recreation — Paramount among non-consumptive uses of the Ohio River is commercial navigation. Tonnage moving on the river during 1955 is reported as 71,500,000 by the U. S. Corps of Engineers. (As a matter of orientation, total tonnage through the Panama Canal is about 45,000,000 annually and through the Suez Canal about 118,000,000 tons.) Over the past ten years Corps of Engineers records reveal a 111 percent increase in the amount of tonnage hauled on the Ohio.

Recreational importance of the river, as measured by small-boat use is assuming considerable proportions. In the Cincinnati stretch alone, newspaper surveys show an estimated 14,000 pleasure boats of all kinds. Most of these are 14 ft. or under in length, fitted with outboard motors. A great many are kept at owners' homes and moved to and from the river.

Data are yet too sketchy to make an estimate of the total number of small boats using the Ohio River. However, a 1956 tabulation of the U. S. Corps of Engineers shows that there are at least 102 small-boat harbors and 25 improved public landings; and each year, says the Corps, there is an appreciable increase in requests for permits to install launching ramps. Spot observations indicate that the number of informal launching spots probably runs into several hundred. At the public landing in Cincinnati there is an estimated 100 launchings on a Sunday; a private-landing operator reports that his present business justifies the prediction that he will be putting 500 boats daily into the river within the next five years.

Supplemental Irrigation—A major consumptive use of water in the compact district may be forecast from an increasing awareness on the part of farmers of benefits from applying supplementary water to crops. Agricultural demands for water often coincide with the period of lowest flow in the streams. In some areas this could result in critical reduction of dilution water and might call for a higher degree of treatment for sewage and industrial wastes than is now practiced or contemplated.

This situation points up the advantages of low-flow augmentation by means of storage reservoirs on tributaries. Already completed in the Ohio Valley under the U. S. Corps of Engineers flood-control program are 33 of a contemplated 81 reservoirs, some of which are designed to provide low-flow augmentation. Three reservoirs are currently under construction.

The problem of maintaining adequate stream flow during periods of agricultural withdrawals will be most acute, of course, in the tributaries to the Ohio River. And what happens in the tributaries will be reflected in the flow regimen of the main-stem.

The growth pattern of supplementary irrigation is revealed by what has happened in Illinois, Indiana, Kentucky, Ohio, Pennsylvania, and West Virginia during the period 1949 to 1954. In 1949, it is reported that 1,124 farms in these states were irrigating 20,330 acres. In 1954 the number of farms had increased to 3,727 and the acres irrigated had reached a total of 66,980. These data are from a study made by Prof. John R. Davis of Purdue University, who reported his findings in the August, 1956, *Journal* of the American Water Works Association, page 982.

An indication of the magnitude of potential water demands is provided by a Purdue University study of the moisture deficiencies and irrigation requirements of a 47,000-acre area in Indiana cited by Professor Davis. Here it was concluded that the daily water requirements of this area over a 60-day period would average 72 million gallons per day and could reach a maximum of 173 mgd.

Hydro-power—On the main-stem of the Ohio River there are few hydro-power facilities. The navigation dams in most cases provide a head of only a few feet. At Dam 41, Louisville, where the "Falls of the Ohio" existed, there is about 35 ft. of head; here the Louisville Gas and Electric Company has been operating the only sizeable hydro-electric plant on the Ohio—an installed capacity of 80,320 kw. Standby or station service hydro-power units, of the order of 75 kw each, are installed at Emsworth, Dashields and Montgomery dams in the upper Ohio, where the head is about 18 ft.

Possibility of a hydro-power installation of some 80,000 kw is envisioned at the new Markland Dam, some 65 miles below Cincinnati. This structure is now under construction by the Corps of Engineers as part of the "high-dam" navigation improvement program of the Ohio River. The Public Service Company of Indiana has applied to the Federal Power Commission for a permit to study hydro-power potentials.

Fishing Potential—A quantitative appraisal of the fishing potential in the Ohio River may be made from records compiled in 1955 by the Kentucky department of fish and wildlife resources. It should be recalled that the Ohio River, for some 700 of its 981 miles, is the property of the Commonwealth of Kentucky which maintains jurisdiction over all fishing activities. Information secured by Mr. Earl Wallace, director of the department and also a member of the Ohio River Valley Water Sanitation Commission reveals that:

Commercial fishing licenses issued in 1955 to Kentucky residents totalled 2,070, of which about 1,800 were for Ohio River use; in addition, 207 commercial fishing licenses for the Ohio River were issued to residents in the tri-state area of Illinois, Indiana, and Ohio.

The total commercial catch in Kentucky for 1955 was about 2,700,000 pounds, of which 2,000,000 is estimated to come from the Ohio River. Estimated value is $800,000. The type and weight of fish is reported as follows: Buffalo, 784,000 lb.; catfish 754,000; carp 644,000; sheepheads, 267,000; paddlefish 213,000; quillback, 65,000; suckers, 11,000 and sturgeon, 5,000 lb.

Sport-fishing licenses issued to out-of-state residents for fishing in the Ohio River only totalled 2,163. The number of fishing licenses for both residents and nonresidents was 405,964; income from licenses in 1955 was $719,401.

On the basis of a creel census in which 8,237 fishermen participated, these statistics were derived as representing the average per man: Hours fished, 4.11; cost per trip $3.20; number of trips per year 22.2; fish caught per trip, 3.91 and time to catch a fish, 0.96 hrs.

Cruising down the river on a Sunday afternoon — with time out for some sunning and swimming — is now inviting the attention of some 14,000 boatowners in the Cincinnati area alone. A few miles above this scene the first of Cincinnati's sewage-treatment works went into operation two years ago.

Photo by Gus Pasquarella, reprinted by courtesy of the Saturday Evening Post, copyright 1955, by Curtis Publishing Company.

TOXICITY EVALUATION

Six years ago the Commission inaugurated a comprehensive inquiry into the potential toxicity of chemical substances found in water. The investigation stemmed from a recommendation of the Executive Director on January 3, 1951, that the Commission "assume leadership in furthering a better understanding of the physiological aspects of water quality." An outline of what might be undertaken in such an inquiry and how it could prepare the Commission to deal more effectively with the control of industrial wastes formed part of the recommendation.

Acting on this recommendation the Commission authorized a contract with The Kettering Laboratory, in the department of preventive medicine and industrial health, College of Medicine, University of Cincinnati, to initiate the project. Funds made available have averaged $8,000 annually, some of which represented portions of grants under the Federal Water Pollution Control Act of 1948.

Valuable assistance in the form of literature abstracts relating to substances found in metal-finishing wastes was provided by the National Cash Register Company. More recently the Steel Industry Action Committee of the Commission, with funds supplied to Mellon Institute by the American Iron and Steel Institute, became a participant in the literature search. In addition, the American Iron and Steel Institute acting on a recommendation of the Steel Industry Committee, is now sponsoring a $42,000 two-year study constituting part of the ORSANCO toxicity-evaluation program.

The scope and implications of this inquiry into the physiological aspects of water quality are so broad that there were no illusions that accomplishment of its aims could be the sole responsibility of the Commission. But it was envisioned that the establishment of the project at The Kettering Laboratory would provide, among other things, a central clearinghouse for the assembly, indexing and exchange of information relating to the subject for the needs of the Commission and the guidance of others.

The project has been serving this laudable purpose. For example, when the American Petroleum Institute recently contracted with The Johns Hopkins University for a report on the status of toxicity information on refinery-waste discharges, the investigators were given a good start on the literature survey by consultation with The Kettering Laboratory staff and access to the card catalogue and abstract file of the ORSANCO-Kettering project. In turn, the API investigators added to this collection of basic data new information that they had gathered and in a form that had been developed at The Kettering Laboratory to standardize and facilitate review of reference data.

A similar exchange program has been established with Michigan State College where an investigation of chromium and cadmium toxicity is being made. Meantime, findings from the extensive original research sponsored by industrial and governmental organizations at The Kettering Laboratory are made available to the benefit of the ORSANCO project. Current evaluation of lead, fluoride and aluminum, to name a few, is based largely on work sponsored by organizations not otherwise identified with the ORSANCO project.

Thus far, reports and recommendations prepared by The Kettering Laboratory have had limited distribution. In part this reflected a desire to secure adequate review of various methods of presentation looking toward the adoption of a standardized format. A decision on this has now been reached; on the adjacent page is a reproduction of the tabulation sheet that has been developed to summarize the physiological aspects of water-quality for various substances. Each report will include this summary tabulation coupled with a discussion section and a reference bibliography.

After reports are completed in this form and presented to the Commission, it is the plan of The Kettering Laboratory to publish them in appropriate professional journals. Two reports—on chlorides and phenols—are being readied for publication. A third, on cadmium, is expected to be completed by the year-end. In various stages of completion are reports on chromium, zinc, nickel, cresol, naphthalene and pyridine.

The Kettering Laboratory has submitted for Commission and signatory-state staff study only:

A comparison of symptoms of poliomyelitis and cyanide poisoning.

Preliminary classification as to toxicity of chemical pollutants of surface and ground-waters.

Fluorides in water—maximum physiologically safe limit for continued human consumption.

Effects of some common inorganic salts in water on man and domestic animals.

Effects of copper on man.

Recommended physiologically safe limit for continued human consumption of lead in water.

Effects of cyanide and thiocyanate on man.

Effects of cobalt on man.

Memorandum on molybdenum in soil and plants and its effect on man and animals.

Memorandum on carbon tetrachloride toxicity.

Memorandum on acrylonitrile toxicity.

Memorandum on detergents, anionic surface active agents.

The safety of low concentrations of sodium arsenite in bathing water.

Memorandum on nitrobenzene and 2-4 dinitrophenol.

Memorandum on arsenic.

The responsible investigator on the ORSANCO-Kettering project is Dr. Jules S. Cass. Director of The Kettering Laboratory is Dr. Robert A. Kehoe.

A SUMMARY TABULATION FROM THE ORSANCO-KETTERING PROJECT ON THE PHYSIOLOGICAL ASPECTS OF WATER QUALITY

This form of presentation was developed as part of the standardized report on findings from a critical evaluation of information from published and unpublished sources. The reports represent the end-product of the inquiry being sponsored by the Commission at The Kettering Laboratory. Purpose of the inquiry is to define ranges of concentrations and dosages of substances that are safe or unsafe, desirable or undesirable, in water supplies.

		PHENOL[a] MAN
SAFE RANGE		
Long Period	in water	No pertinent information noted. (Drinking waters contain nil to small quantities(ppb) of phenolic substances, but no prolonged records of the concentrations of these substances were found).
Short Period	single dose in water	800mg (calc: 3200ppm in 250cc of water)
	daily dose in water	60 to 200 mg (calc: 24 to 80 ppm in 2500cc of drinking water daily), few days.
	skin	<10,000 ppm (1 percent), limited area.
HARMFUL RANGE		
Distress		No pertinent information noted.
Toxic	single dose in water	5g phenol (calc: 20,000 ppm in 250cc of water).
	skin contact in water	>12,000ppm phenol (1.2 percent), long period.
		>20,000ppm phenol (2 percent), hours.
Fatal	single dose in water	>1.5g of a 3 percent sol of phenol (calc: 30,000ppm in 50cc of water), adult; 200 to 300 mg phenol, infant.
	skin contact	>20,000 ppm phenol (2 percent), solvent unstated, greater part of body surface, adult.
PERCEPTIBLE RANGE		
Taste	in water	0.7 to 1 ppm
	" " chlorophenols	0.05 to 20ppb (lab studies).[b]
Odor	in water	5 ppm 60°C; about 7 ppm 65°C (lab studies).
	in air	about 5ppm
Color		Does not apply
Texture		Does not apply.
METABOLISM		
Essential Nutrient		No
Beneficial Nutrient		No
Daily Intake		No pertinent information noted.
Daily Output		As total volatile phenolics: 8-100mg in urine; feces 19-42 ppm; sweat 1.6-5.5ppm.

SOURCES IN THE ENVIROMENT

(as total volatile phenolics)

WATER		SOIL
Drinking water	nil to traces	No information noted.
Ground water	no information noted	
Surface water	nil to ?ppb[c]	**ANIMAL**
		Food: nil-6 ppm, rabbits.
		Non-food: no information noted.
AIR		**PLANT**
Industrial	no information noted	Food: 88-600 ppm, animal feed.
Urban	" " "	Non-food: no information noted.
Rural	" " "	

(a) All figures refer to phenol, per se, unless otherwise noted.

(b) These figures include individual chlorophenols (reagent grade) and chlorophenols formed in solutions of phenol with Cl_2 added.

(c) Data are not adequate to represent the range of concentrations present in uncontaminated water.

MEMBRANE-FILTER EVALUATION

Looking toward the adoption of a speedier and more precise means for ascertaining the bacterial quality of water, the Commission has initiated a comparative evaluation of the membrane-filter technique with orthodox methods of coliform determination. The program is being carried out with the aid of the Water Users Committee of the Commission and the U. S. Public Health Service.

Bacterial pollution originates primarily from discharges of sewage. The index for its measurement is the coliform organism, a normal inhabitant of the intestine. Coliform bacteria in themselves are not disease-producing. But their presence in water is presumptive evidence of sewage contamination and with it probability of the presence of other intestinal organisms that cause typhoid, cholera and dysentery.

Coliform content of water is measured currently by successively diluting a sample with sterile water. Each dilution is then inoculated into a sterile nutrient broth contained in a fermentation tube. The tubes are incubated at a temperature of 37 degrees Centigrade and examined at the end of 24 and 48 hours for the presence or absence of gas. Based on the dilution ratio and the number of tubes in a single series containing gas, a computation can be made of the "Most Probable Number" of coliform organisms present.

A much simpler procedure for estimating coliform density was devised in Germany during World War II as an emergency method for checking the safety of water supplies in bombed areas. It involves the use of a specially prepared filter paper disk or membrane of a specified size. A given quantity of water is filtered through this disk. Thus bacterial organisms are retained on the surface of the disk. After an 18-hour period of incubation these organisms grow into colonies, which can be identified as to type and counted.

The membrane-filter technique, which is being subjected to comparative study by the U. S. Public Health Service and at several waterworks plants throughout the nation, has not yet been officially endorsed as a substitute for the fermentation-tube method. The Commission program is designed to supplement these comparative studies using results from Ohio River tests.

Members of the Water Users Committee who now provide river-quality monitoring data for the Commission, were given special training in the membrane-filter technique at the Robert A. Taft Sanitary Engineering Center of the U. S. Public Health Service. The Commission subsidized travel and maintenance costs for the trainees and has authorized purchase of $1,500 worth of equipment and supplies for the conduct of tests at six monitor points.

These stations, and the men responsible for their operation are: Wilkinsburg-Penn Joint Water Authority, Mr. R. B. Adams; Weirton, W. Va., Water Treatment Plant, Mr. F. J. DeFranco; Wheeling, W. Va., Water Treatment Plant, Mr. A. R. Todd; Portsmouth, Ohio, Water Treatment Plant, Mr. H. C. Growdon; Cincinnati, Ohio, Water Treatment Plant, Mr. Dan Enright; Louisville, Ky., Water Treatment Plant, Mr. W. L. Williams.

The membrane-filter technique at these points is expected to go in operation sometime in October.

Compilation of the data and results will be evaluated by Mr. Harold W. Streeter, staff consultant; Mr. Streeter, who was director of the U. S. Public Health Service laboratory in Cincinnati at the time of his retirement in 1948, has devoted a life-time to bacteriological and other phases of water examination.

BACKGROUND RADIATION SURVEY

Responding to a resolution of the Commission, the Sanitary Engineering Center of the U. S. Public Health Service initiated during the past year a survey of background radiation in the Ohio River and its tributaries. To date, 40 samples of water from some 34 locations, have been assayed for gross radioactivity. Sampling points include 13 locations on the Ohio River main stem and 21 locations on tributaries. Samples were collected during the period December 27, 1955, to May 8, 1956.

In commenting on the survey results, the Public Health Service stated that the water samples indicated no actual or potential hazard to the public health at this time.

It was also stated that more complete evaluation of radioactivity background levels of the Ohio River and its tributaries will require additional stream sampling together with analysis of river muds and stream biota. The initial survey of water quality is nearly complete, and the Sanitary Engineering Center will devote its effort during the fall of 1956 to gathering similar data for the river mud and biota.

With regard to future evaluation of radioactivity levels, the progress report of the Sanitary Engineering Center observed that: "Information already gathered for river water, together with that planned for stream biota and mud, is considered to be the minimum acceptable amount of data to roughly define radioactivity background levels in streams of the Ohio River basin. It is anticipated that with the development of state radiological monitoring programs, future work anticipated by the Public Health Service, and the efforts of private users of radioisotopes, considerably more data will become available in the next few years. In this way there will accumulate sufficient data to adequately define radioactivity background levels for the area."

The Atomic Energy Commission is conducting a "pre-operational radiation monitoring program" in the vicinity of the power reactor that is being built on the Ohio River at Shippingport, Pa. The installation at Shippingport is the first full-scale electric-generating

station utilizing nuclear energy in the United States. This program is administered by the Pittsburgh area office of the AEC of which Mr. Lawton D. Geiger is manager. A cooperative arrangement exists between the AEC and the Sanitary Engineering Center of the Public Health Service whereby some river water and algae samples are exchanged for duplicate analysis.

Monitoring at Shippingport began early in 1956. Sampling and analytical work is being done by the industrial hygiene department of the Bettis Plant, which is operated for the Atomic Energy Commission by the Westinghouse Electric Corporation. After start-up of the plant, reports the AEC, the site monitoring will be continued by the Duquesne Light Company as a part of plant operations.

Four sampling stations have been selected along the Ohio River. Two of these are up-river from the reactor site (mile 34.8) – at the Phillips power station of the Duquesne Light Co. (mile 15.2) and at Montgomery Dam (mile 31.7). The down-river points are at the water intake serving the city of Midland, Pa. (mile 35.9) and at Dam No. 7 (mile 36.5). At each of these locations water will be withdrawn continuously from the river through sampling equipment which will produce a sample of about three or four gallons per week.

River water samples will be measured for total alpha and beta-gamma radioactivity. Each sample will be analyzed for potassium, and one sample each week will be analyzed for uranium. Any sample showing radioactivity significantly above the usual average will be analyzed for specific radioactive elements including potassium, radium, thorium, strontium and iron.

In cooperation with the Public Health Service, states the AEC, algae samples will be obtained from the river in May, June, July, August and September. The algae samples will be measured for total alpha and beta-gamma radioactivity and for potassium.

Three samples of mud will be collected during the summer months at periods of low river flow from pools behind dams. Each sample will be measured for gross alpha, beta and gamma radioactivity and gross acid-soluble alpha and beta-gamma radioactivity. Special analyses may include potassium, radium, thorium, strontium and radioactive iron.

HIGH-DAM INVESTIGATION

During low water the Ohio River is "pooled" by a series of navigation dams to provide a minimum 9 ft. channel for its entire length of 981 miles. Many of these dams are of the movable type. They are fitted with wickets, which may be raised or lowered at will. In time of high water the wickets are lowered into the bed of the river to provide an open channel for unobstructed movement of boats.

Plans of the U. S. Corps of Engineers for improving navigation facilities on the river call for replacement of the old wicket-type dams with higher, gated-dams. By 1953, these plans had reached the point where construction was imminent at three places – New Cumberland, W. Va. (mile 54.4); Greenup, Ky. (mile 341.0) and Markland, Ind. (mile 531.5). Because the higher dams would create pools of almost double the depth and three times the length of those that now exist, the Commission determined that a study should be initiated relative to the influence of this change in river regimen on self-purification and water quality.

In a resolution on April 29, 1953, the Commission requested the U. S. Public Health Service to undertake such a study and invite the participation of the U. S. Corps of Engineers, both agencies being represented in the membership of the Commission. The resolution outlined some twelve questions regarding which scientific investigation might be pursued; among these was included the influence of the deeper, longer pools on reaeration and deoxygenation rates, stratification, sludge deposition and coliform densities.

A progress statement on the course of the investigation, prepared by J. W. Wiseman, Public Health Service, was presented to the Commission on July 12, 1956. It said: "Preliminary studies were made and a summary presented to the Engineering Committee of the Commission on July 6, 1955. Tentative conclusions at that time were as follows:

1. "Investigations and studies of effects of proposed relatively high navigation dams on the Ohio River should be directed toward specific areas.

2. If settleable organic wastes are present, the proposed navigation improvements would likely result in accumulation of sludge deposits over a longer period with the location closer to the source of waste. This would be accompanied by a greater effect in lowering the dissolved oxygen content. However, with the concurrent program of pollution abatement which requires removal of settleable organic waste at the source, the problem is not considered of significant importance.

3. The proposed type of structure should not lessen the cleansing action of the river during high flows.

4. The new conditions will include several factors affecting reaeration. No conclusions have been reached as to the net effects. Further study is planned where changes in reaeration would be of significance. Included will be studies of waste dispersion and stratification.

5. Changes in navigation structures could have an effect on bacterial concentrations. Except in possible special instances the effects should be beneficial. No further investigation of specific instances of possible damage are proposed.

6. The scope of this investigation and study does not include consideration of possible effects on physical plant of waste disposal facilities.

"Subsequent to July, 1955, consultations were held with the Corps of Engineers relative to further detailed studies which should be made. In accordance

with tentative conclusions '1' and '4' it was decided that detailed studies should be made of the area which would be affected by the Markland Pool, with particular reference to dissolved oxygen conditions.

"Changes which have been made in the Cumberland River in the Nashville area offer an opportunity to make studies which will compare waste-assimilation characteristics between conditions prevailing before and after replacement of low navigation dams with comparatively high navigation dams. Data obtained by the Tennessee State Department of Health, prior to replacement of the old structures have been made available. These data will be used in comparison with data taken under present conditions. A field crew is now in the area obtaining the new data.

"Data will be obtained on the Ohio River in the Cincinnati area for use in applying the Cumberland River findings to predict conditions which will prevail after completion of Markland Dam. This work is scheduled for August or September of this year.

"Upon completion of the Markland study, consideration will be given to the need for similar examinations at specific locations elsewhere along the Ohio River, if possible effect of navigation changes may be significant.

"Should the studies indicate that a material reduction in waste assimilating capacity of the river in the Cincinnati area is to be expected the study would be extended to determine compensating effects of flow regulation from authorized and possible reservoir storage.

"Also, we would recommend that post-construction information be obtained to verify any conclusions which may be reached.

"It is hoped that the proposed action, arranged in co-operation with the Corps of Engineers, will provide information on which to base conclusive findings. At least it seems reasonable to assume that substantial information pertinent to the problem will be obtained. Other studies will be formulated, if needed, to supplement the present proposed studies."

ADVISORY COMMITTEE ACTIVITIES

Special groups to advise or otherwise aid the Commission in the conduct of its regional pollution-control program have been established from time to time. Committees now active, and their chairmen, include:

Aquatic Life – Dr. L. L. Smith, Jr.; Department of Entomology and Economic Zoology, University of Minnesota.

Chemical Industry – Richard S. Rhodes, Assistant to the President, Koppers Co., Inc., Pittsburgh, Pa.

Coal Industry – Henry F. Hebley, Research Director, Consolidation Coal Co., Pittsburgh, Pa.

Metal-Finishng–L. J. Hibbert, Assistant Director of Research, National Cash Register Co., Dayton, Ohio.

Oil Refining – T. A. Anderson, Manager, Quaker State Oil Refining Co., St. Marys, W. Va.

Pulp and Paper – Virgil A. Minch, Research Laboratories, Mead Corporation, Chillicothe, Ohio.

Steel Industry – Joseph A. Sample, Chief Chemist, Weirton Steel Co., Weirton, W. Va.

Water Users – W. L. Williams, Chemist, Louisville Water Company, Louisville, Ky.

These groups include some 150 experts in their respective fields. Briefly summarized, these were some of the developments of continued activity of the committees during the year:

Industry Committees – Principal attention of the industry groups has been focussed on the Commission's request to assemble facts and information that will aid in reaching decisions on water quality and control procedures with regard to phenols, chlorides and hardness.

The data jointly gathered on phenols by the Steel Committee, the Water Users Committee and the Commission staff over the past five years are now being evaluated and separate reports are being written by the Steel Committee and the Commission staff. Before the year-end it is expected that these reports will be presented to the Engineering Committee of the Commission for discussion followed by recommendation for action.

On the matter of chlorides control the Engineering Committee invited all the industry committees to meet on May 23, 1956, to hear a presentation of staff findings, to receive a report of the Chemical Industry Committee and to learn the views of other industry representatives. These reports, along with the recommendations of the Engineering Committee are expected to receive Commission attention within the next few months.

The Chemical Industry Committee submitted to the Commission, with request for release for publication in a technical journal, two general reports designed to aid chemical companies in their control of water pollution. One was titled "Operating and Design Practice as Related to Pollution Control in the Chemical Industry;" the other, "Site Selection for Chemical Plants – with Particular Reference to the Treatment and Disposal of Water-Borne Wastes." Both of these reports will be published in *Industrial Wastes* magazine during the coming year. This same journal published in its July-August issue the report of the Chemical Industry Committee titled "Detergents in Sewage and Surface Water."

A group of member-companies of the Steel Industry Committee have under construction a $500,000 pilot plant for investigation of a new process of acid and iron recovery for pickle-liquor wastes. Located at Niles, Ohio, it will test the Blaw-Knox Ruthner process. The project is being financed and sponsored jointly by the United States Steel Corporation, Republic Steel

Corporation, Youngstown Sheet and Tube Company, Jones and Laughlin Steel Company, Wheeling Steel Company, Weirton Steel Company, Pittsburgh Steel Company, and the Blaw-Knox Company. Meantime, the committee is continuing its evaluation studies of several other processes for coping with the pickle-liquor disposal problem. During the year the committee also completed an initial draft of procedures for analyzing waste effluents from steel mills.

Aquatic-Life Committee – The second progress report of the committee was released by the Commission for publication in the May, 1956, issue of *Sewage and Industrial Wastes.* This report sets forth findings and conclusions with regard to temperature, dissolved solids, settleable solids, chloride ion, fluoride ion and color. In addition, it includes data and discussion to further support the validity of dissolved-oxygen requirements set forth in an earlier report.

The first report of the committee was published in the March, 1955, issue of the same journal. It included recommendations for dissolved-oxygen requirements, an evaluation of the effect of hydrogen-ion concentration, and an outline of criteria for judging toxicity of wastes by bioassays.

In March the Commission published the committee's "Procedures for Investigation of Fish-kills – a Guide for Field Reconnaissance and Data Collection." Recognition of the importance of this publication was given by the Commission on April 3rd in a resolution. Among other things, it stated that the unusual practical merits of the handbook commended it for distribution among the signatory states and it went on to express appreciation to the committee for this further evidence of devoted public service and its continuing voluntary contribution of expert counsel.

Water Users Committee – As detailed elsewhere in this report, the committee continued monitoring of river quality, conducted a three-month correlation study of phenolic content with taste-and-odor conditions at water treatment plants, and participated in development of a membrane-filter evaluation program.

COMMUNITY-ACTION CAMPAIGNS

At the invitation of the Sanitary Water Board of the State of Illinois the Commission conducted community-action campaigns in two communities where the matter of sewage-treatment projects hinged on the adoption of bond issues. The Sanitary Water Board had concluded that the reason why the citizens of Danville and Charleston failed to support these bond issues in previous years was because they were not adequately informed or convinced regarding the importance of clean streams.

Accordingly, the public-education program facilities developed by the Commission in 1951 (see page 16, Third Annual Report) and used with success since that time, were employed in Danville and Charleston. Approximately seven weeks of the time of staff member Elmer Rohmiller was devoted to both campaigns.

The campaigns involved organization and enlistment of the support of some 40 community groups and service clubs. It included presentation at schools and meetings of talks, booklets and motion pictures, and a series of radio and television programs. The latter featured panel discussion of issues by city, state and service club officials coupled with a regular schedule of spot announcements during the thirty days preceding the balloting.

The services of Girl and Boy Scouts were used in door-to-door distribution of pamphlets and in a Junior Chamber of Commerce-sponsored "Get out the Vote" campaign at each polling place. The Jaycees furnished a "I Have Voted" tag to voters who in turn could give them to their favorite Scouts. Prizes of merchandise donated by merchants were awarded to the Scouts who collected the largest number of tags.

Among other devices to arouse citizen interest was the use of glue-backed car-bumper strips. Carrying a message to "Vote Yes," they were furnished to garages, new and used-car dealers, industries with parking lots, and business establishments operating delivery trucks. Professional and industrial groups through their local organizations added immeasurably to the campaign by their endorsements and resolutions.

At Danville (population 38,000) the bond issue of over four-million dollars was carried by better than a 5 to 1 margin. At Charleston (population 9,000) the bond issue of $400,000, which had been decisively rejected only a year earlier, was also approved.

PUBLIC INFORMATION PROGRAM

Mounting nationwide concern with water-resources conservation has promoted a lively interest in the eight-state Ohio Valley pollution-control crusade. This has asserted itself by a substantial increase in the number of requests for information from individuals, organizations, state agencies, Congressional committees, professional groups, magazines, newspapers and other media of communication.

The *Saturday Evening Post*, issue of December 24, 1955, presented an informative article on the program under the title: "Rebirth of a Great River." And in the June, 1956 issue of *Fortune* magazine the role of the Commission is delineated in an article on industrial development titled, "The Boiling Ohio."

Throughout the valley the newspapers continue, as they have done in the past, to provide a generous allotment of news and editorial-page space to the water-pollution control crusade. Some 150 papers are regularly supplied with news-releases from the Commission.

International interest in the program has been manifested in many ways, not the least of which is the purchase of Commission manuals on practice by foreign government agencies and industries.

In July, 1956, Kenneth M. Lloyd of Ohio (center) took office as chairman and Blucher A. Poole of Indiana (left) became vice-chairman. Presenting the gavel is retiring chairman Earl Devendorf of New York.

COMMISSIONERS AND COMMITTEES

Provisions of the Ohio River Valley Water Sanitation Compact are executed by a commission consisting of 27 members. Each of the eight states is represented by three members appointed by the Governor of the state. The federal government has three representatives appointed by the President of the United States. Commissioners serve without compensation. They are reimbursed for expenses in connection with their official duties.

Operating funds are provided by the eight signatory states, the individual amounts being pro-rated according to the area and population of each state within the compact district. For the first year the states appropriated on the basis of a $40,000 budget; in each of the succeeding five years the budget was $100,000. During the past two years the budget was $130,000.

Under Public Law 845, the Federal Water Pollution Control Act of 1948, the Commission received additional funds of $29,000 in 1949; $24,537.75 in 1950 and $22,084 in 1951.

A financial statement for the fiscal year of this report is given on page 28.

New Officers – Mr. Earl Devendorf of New York served as chairman during the past year. Elected to take office in July, 1956, was Mr. Kenneth M. Lloyd of Ohio as chairman and Mr. Blucher A. Poole of Indiana as vice-chairman.

Mr. Lloyd, a member of the Commission since its establishment in 1948, is secretary and legal counsel of the Mahoning Valley (Ohio) Industrial Council. In this post since 1935, he has devoted major efforts in behalf of industrial and water resources developments in the midwest. For the past fifteen years he has been chairman of the advisory committee of the Ohio Water Resources Board. In 1955 he was appointed by President Eisenhower as a life-time member of the advisory board of the St. Lawrence Seaway Development Corporation.

A lawyer by profession, Mr. Lloyd's counsel has been sought on many matters relating to the promotion of industrial development. As treasurer of the Ohio Valley Improvement Association he has long been identified with that organization's endeavors for improvement of navigation facilities on the Ohio River.

In 1955 Mr. Lloyd received a citation for distinguished service from the Ohio Chapter of the International Association of Personnel in Employment Security, the first non-public employee in Ohio to receive this citation. For service on the War Finance Commission of Ohio (1941-1945) he received the Distinguished Service Medal of the U. S. Treasury Department. Mr. Lloyd is a graduate of the University of Michigan, where he received his law degree in 1932.

A listing of the commissioners, the officers and the staff is given on the front inside cover of this report. Mrs. H. A. Ballman, a member of the staff, was elected on January 11, 1956 to serve as treasurer. She succeeds Mr. Robert K. Horton who was appointed assistant director on January 1, 1956.

Membership Changes—Five commissioners resigned during the year and four new members have thus far been appointed. For Kentucky, Mr. Laban P. Jackson, commissioner of conservation, was appointed to fill the vacancy created by the resignation of Henry Ward. Mr. Ward, chairman of the Commission from July, 1950 to July, 1951, was a charter member who signed the compact and served continuously from 1948 until his resignation in December, 1955.

Also for Kentucky, Dr. Russell E. Teague, commissioner of health, became a member upon the resignation of Dr. Bruce Underwood in January, 1956. Dr. Underwood was a member of the Commission since 1948. Dr. Teague is no stranger to the activities of the Commission; he served as a representative from Pennsylvania from 1951-1955 during his tenure as secretary of health in that state.

For Pennsylvania, Dr. M. K. McKay, of Pittsburgh was appointed on August 9, 1956 to succeed Mr. Elmer A. Holbrook. Mr. Holbrook resigned on June 1, 1956, having served continuously as a commissioner since 1948; he was one of the original signers of the compact. Dr. McKay brings to the Commission the background gained as a delegate from Pennsylvania on the negotiating committee for the adoption of the interstate compact agency.

For West Virginia, Mr. John Lester, executive secretary of the State Water Commission was appointed on August 7 to succeed Mr. Harry K. Gidley. Mr. Gidley, who was chief engineer of the State Health Department, resigned after two years of service on the Commission to enter private practice as a consulting engineer. Mr. Lester has been a member of the Engineering Committee of the Commission.

For the Federal Government no appointment has yet been made to fill the vacancy created on the Commission by the resignation of Dr. Leonard A. Scheele as Surgeon General of the U. S. Public Health Service.

Commission Committees—Certain functions of Commission business are conducted through standing committees, the membership and composition of which are shown in the accompanying box. The Engineering Committee is not restricted to members of the Commission, being composed of the executive engineer officers of the signatory state pollution-control agencies.

COMMITTEE ASSIGNMENTS

(for year ending June 30, 1957)

Engineering

A. H. Paessler, *Chairman*
Louis F. Birkel
Earl Devendorf
Clarence W. Klassen
William Brewer
John W. Lester
O. Lloyd Meehean
H. E. Moses
B. A. Poole
W. W. Towne
F. H. Waring

Executive Committee

Chairman	Kenneth M. Lloyd
Vice-Chairman	B. A. Poole
Illinois	Clarence W. Klassen
Indiana	Joseph L. Quinn, Jr.
Kentucky	Russell E. Teague
New York	Earl Devendorf
Ohio	Hudson Biery
Pennsylvania	H. E. Moses
Virginia	Ross H. Walker
West Virginia	W. W. Jennings
Federal	Edwin E. Abbott

Audit

J. L. Quinn, Jr., *Chairman*
Laban P. Jackson
Berwyn E. Mattison

Finance

Ross Walker, *Chairman*
Ralph E. Dwork
W. W. Jennings

Pension Trust

Ross H. Walker
Clarence W. Klassen
Robert K. Horton

By-Laws

Hudson Biery, *Chairman*
Maurice E. Gosnell
E. Blackburn Moore

FINANCIAL REPORT

For Year Ended June 30, 1956

STATEMENT OF RECEIPTS AND DISBURSEMENTS

RECEIPTS:

From signatory states	$104,910.00
Interest earned on bank deposit	272.24
Sale and handling of publications	526.00
Total receipts	$105,708.24

DISBURSEMENTS:

Auditing	$ 450.00	
Consulting services	4,800.00	
Contractual services	149.35	
Electric and water	604.26	
Employees' pension trust	5,155.78	
General office equipment and furnishings	1,545.74	
Insurance	203.83	
Legal services	3,600.00	
Maintenance and repairs	625.89	
Meetings	1,115.30	
Miscellaneous	690.80	
Office rent	6,954.00	
Office supplies	1,402.50	
Postage	715.04	
Printing	4,328.24	
Research:		
University of Cincinnati (Kettering Laboratory)	5,000.00	
Salaries	59,564.75	
Service fees and subscriptions	357.88	
Social security tax	729.62	
Telephone and telegraph	1,587.60	
Travel:		
Advisory committee	1,277.36	
Commissioners	5,736.67	
Staff	4,867.17	
U. S. Geological Survey	8,000.00	
Total disbursements		$119,461.78
Excess of disbursements over receipts		$ 13,753.54

NOTE 1: An amount of $40,430.00 was received from the Commonwealth of Pennsylvania on July 6, 1956, in payment of their share of the annual budget for the twelve months ended June 30, 1956, and for the twelve months ended June 30, 1957.

NOTE 2: An amount of $4,875.00 was received from the Commonwealth of Virginia on July 10, 1956, in payment of their share of the annual budget for the twelve months ended June 30, 1956.

STATEMENT OF UNUSED RESOURCES

June 30, 1956

Available resources for period to June 30, 1955	$ 54,942.33
Add: Annual budget— July 1, 1955 to June 30, 1956	130,000.00
Interest earned on bank deposit	272.24
Sale and handling of publications	526.00
	185,740.57
Less: Disbursements July 1, 1955 to June 30, 1956	119,461.78
Available resources for period to June 30, 1956	66,278.79
Add: Receipt from the Commonwealth of Kentucky which is applicable to their contribution for the twelve months ended June 30, 1957	300.00
Total resources June 30, 1956	$ 66,578.79

The above amount of $66,578.79 is comprised as follows:

Cash on deposit with the Central Trust Company	$ 39,682.23
Petty cash on hand	200.00
Cash on deposit with American Airlines, Inc.	425.00
Accounts receivable:	
State of Illinois	645.00
Commonwealth of Pennsylvania	20,215.00
Commonwealth of Virginia	4,875.00
Advances for Employees (Hospitalization expense and employee pension trust contributions are advanced by the commission and repaid by the employees through regular payroll deductions)	536.56
	$ 66,578.79

SCHEDULE OF ACCOUNTS RECEIVABLE — JUNE 30, 1956

	Annual Budget July 1, 1955 to June 30, 1956	Receipts July 1, 1955 to June 30, 1956	Balance June 30, 1956
Illinois	$ 6,695.00	$ 6,695.00	$ 645.00
Indiana	22,945.00	22,945.00	.....
Kentucky	27,560.00	27,560.00	.....
New York	1,430.00	1,430.00	.....
Ohio	30,420.00	30,420.00	.....
Pennsylvania	20,215.00	.....	20,215.00
Virginia	4,875.00	.....	4,875.00
West Virginia	15,860.00	15,860.00	.....
TOTALS	$130,000.00	$104,910.00	$25,735.00

In our opinion, the accompanying statement of receipts and disbursements, statement of resources and schedule of accounts receivable present fairly the operations of the Ohio River Valley Water Sanitation Commission on a receipts and disbursements basis for the fiscal year ended June 30, 1956, and its financial condition on June 30, 1956.

Wm. H. Mers & Co., Certified Public Accountants

REGULATORY AGENCIES OF THE SIGNATORY STATES

Operations of the Ohio River Valley Water Sanitation Commission are designed to promote and coordinate pollution control on a regional basis. Guided by the principle that no sewage or industrial-waste discharge originating within a signatory state shall injuriously affect the uses of interstate waters, the Commission makes determinations regarding control measures.

Securing compliance with these measures then becomes an obligation of each state. The Commission does not deal directly with any municipality or industry regarding compliance. Whenever, however, in the opinion of the Commission, satisfactory compliance is not being or cannot be obtained through the effort of state agencies, enforcement procedures prescribed in Article IX of the compact may be employed.

Listed on this page are the names and addresses of the regulatory agencies in the signatory states. Questions concerning compliance with water-pollution control requirements should be addressed to the agency in the state in which a municipality or industrial plant is located. The state agency will arrange for such contact or consultation with the Commission as may be necessary or requested.

ILLINOIS	Technical Secretary State Sanitary Water Board Springfield, Illinois
INDIANA	Technical Secretary Indiana Stream Pollution Control Board 1330 West Michigan Street Indianapolis 7, Indiana
KENTUCKY	Executive Director Kentucky Water Pollution Control Commission 620 South Third Street Louisville 1, Kentucky
NEW YORK	Executive Secretary New York State Water Pollution Control Board New York State Dept. of Health Albany 1, New York
OHIO	Engineer in Charge Sewage and Industrial Wastes Unit Division of Sanitary Engineering Ohio Department of Health Columbus 15, Ohio
PENNSYLVANIA	Sanitary Water Board Box No. 90 Harrisburg, Pennsylvania
VIRGINIA	Executive Secretary State Water Control Board 415 West Franklin Street Richmond 20, Virginia
WEST VIRGINIA	Executive Secretary State Water Commission 1709 Washington Street, East Charleston, West Virginia

OHIO RIVER VALLEY WATER SANITATION COMMISSION — EIGHTH ANNUAL REPORT