

DOCUMENT RESUME

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The objective of the Federal Water Pollution Control Act Amendments of 1972 was to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Publicly owned treatment works were required to provide secondary treatment by July 1, 1977, and to use the best practicable technology by 1983. To assist publicly owned treatment works in providing secondary treatment, the act authorized the Environmental Protection Agency (EPA) to make grants of up to 75% of the costs. Federal funds approximating \$163 million are planned to be spent for construction of two municipal secondary treatment facilities in the St. Louis, Missouri, area. Findings/Conclusions: No significant change in Mississippi River water quality is expected to result from the planned investment of about \$216 million (including \$163 million in Federal funds) in secondary treatment facilities in St. Louis. Although EPA and other officials have mentioned possible long-range reductions in potentially cancer-causing materials, these benefits have not been validated or quantified. Large increases in energy use and large accumulations of sludge from secondary treatment operations are expected. These considerations will have an impact not only on energy and environmental issues but also on the St. Louis area residents who will have to bear increased operation and maintenance costs. According to St. Louis Sewer District officials, these costs will more than double. Sewer District officials felt that little benefit would result from upgrading two treatment plants from primary to secondary status. However, both Missouri and Illinois officials believed that more benefits would result if Federal funds were used for other projects in their States. Recommendations: The Congress should amend the law to eliminate the mandatory requirement for secondary treatment of discharges and to permit the Administrator of EPA to grant waivers, deferrals, or modifications on a case-by-case basis to this

requirement. The Administrator of EPA should reevaluate its policy of subordinating combined sewer overflow and collector sewer projects to municipal plant projects in view of the Clean Water Act of 1977 which allows States more flexibility in determining construction grant priorities. (RRS)

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BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Secondary Treatment Of Municipal Wastewater In The St. Louis Area-- Minimal Impact Expected

Federal funds approximating \$163 million are planned to be spent in constructing two municipal secondary treatment facilities in the St. Louis, Missouri, area. Although the additional treatment will not significantly improve the Mississippi River's water quality or uses, Public Law 92-500 nevertheless requires that secondary treatment facilities be built.

The Environmental Protection Agency's policy also emphasizes the construction of secondary treatment projects over projects to correct existing combined sewer overflow problems and to treat and control storm water discharges. As a result, some secondary treatment projects may be built which are not the most effective in improving water quality. GAO asks the Congress to amend the law to correct the situation.



GED-78-76

MAY 12, 1978



COMPTROLLER GENERAL OF THE UNITED STATES

WASHINGTON, D.C. 20548

B-166506

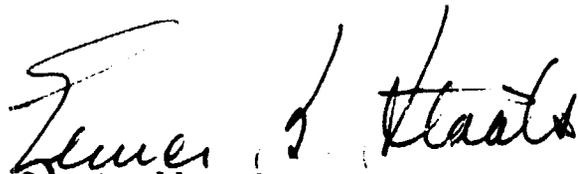
To the President of the Senate and the
Speaker of the House of Representatives

This report points out that planned expenditures of Federal funds for secondary treatment works in the St. Louis, Missouri, area will only minimally improve the quality of water in the Mississippi River.

Because available Federal funding for municipal waste water treatment projects falls far short of national needs, we believe available funds should be directed to those projects where improvements to water quality can be optimized. The national requirement to provide secondary treatment may be too rigid, and Environmental Protection Agency regulations may preclude the earliest financing of pollution control projects which have greater potential for improving water quality.

We made this review to determine what impact water pollution control activities near St. Louis would have on water quality and what additional benefits could be expected. Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Director, Office of Management and Budget; the Chairman, Council on Environmental Quality; and the Administrator, Environmental Protection Agency.


Comptroller General
of the United States

D I G E S T

Planned expenditures of \$163 million in Federal funds for secondary treatment projects in the St. Louis, Missouri, area would only minimally improve the quality of water in the Mississippi River.

Providing secondary treatment of discharges to fresh water basins, however, required by Public Law 92-500. Environmental Protection Agency regulations and guidelines require municipalities to fund projects identified as national priorities including secondary treatment before they may finance alternative pollution control projects having greater potential for improving the water quality and use of streams.

GAO therefore recommends that the Congress amend the law to eliminate the mandatory requirement for secondary treatment of discharges to fresh water and to permit the Administrator of the Environmental Protection Agency to grant waivers, deferrals, or modifications to this requirement when dischargers can demonstrate that the environmental impact of secondary treatment will be minimal or insignificant. (See p. 23.)

The critical importance of the recommendation is demonstrated below.

The estimated national needs for constructing publicly owned waste treatment works (\$150 billion) far exceed the Federal funds which have been provided or authorized for future years (\$44 billion). The limited funds available for constructing treatment works should be directed toward those projects which can best improve water quality at the lowest cost.

The Congress and the Agency have chosen to clean up the Nation's waterways by imposing

uniform waste treatment standards on polluters and by requiring compliance within a given time period. The advantages of this approach are that:

- Compliance in meeting the standards and moving toward a national goal is measurable and enforceable.
- Equal treatment is provided to all municipal polluters.
- Program administration is eased.

The main disadvantage is that this approach focuses more on technology than on improving the water quality and use of recipient streams.

GAO studied a 34-mile stretch of the Mississippi River at St. Louis (see p. 7) that included 18 major dischargers: 8 municipal treatment plants and 10 industrial plants. The Metropolitan St. Louis Sewer District operates two of the municipal plants (Lemay and Bissell Point), which account for about 60 percent of the major municipal and industrial discharges in the area and 90 percent of the municipal discharges. (See p. 6.) Secondary treatment is planned at both plants.

GAO's analysis of river water quality data available at the St. Louis Sewer District indicated that, for most water pollution parameters (such as dissolved oxygen and suspended solids), secondary treatment would improve water quality only minimally. For example, a large amount of fecal coliform is added in the St. Louis area. However, the reduction of this pollutant through secondary treatment is not expected to have any measurable effect on public health or water supply operations in the Mississippi River. Overall, the extent to which secondary treatment will help to improve river water uses appears negligible. (See pp. 14 through 21.)

In addition to the millions of Federal dollars to be spent on installing secondary treatment facilities, large increases in

energy use and large accumulations of sludge from secondary treatment operations are expected. These important considerations will have an impact not only on energy and environmental issues but also on the residents of the St. Louis area who will have to bear the increased operation and maintenance costs. These costs will more than double, according to St. Louis Sewer District officials.

Officials of the St. Louis Sewer District, the States of Missouri and Illinois, and two Environmental Protection Agency regional offices agreed that upgrading the Lemay and Bissell Point plants from primary to secondary treatment would not measurably improve the river's quality. They also said that the river's uses would not be increased due to its large assimilative capacity.

Agency regional officials in Missouri and Illinois stated, however, that while there would be no measurable change in the quality of water or in the uses of the Mississippi in the St. Louis area resulting from secondary treatment, suspected carcinogenic materials may be removed by such treatment. But much uncertainty exists regarding the ability of secondary treatment to do so. (See p. 26.)

Missouri and Illinois officials believed more benefits would result if Federal funds were used for other projects in their States. (See pp. 32 and 35.) According to St. Louis Sewer District officials, combined sewer problem correction projects would be more beneficial than secondary treatment projects. And according to Missouri officials, the law and Agency regulations must be modified to provide the State more flexibility in setting priorities for water quality projects. (See p. 32.)

After GAO's review, the Congress amended the law to give the States sole authority for determining project priorities unless the Agency, after opportunity for public hearings, determines that certain projects will not contribute to the law's enforceable requirements.

According to the National Commission on Water Quality, the Environmental Protection Agency does not believe projects relating to combined sewer overflows, storm sewers, or new sanitary collector sewers are required to meet the 1977 secondary treatment levels. It will fund projects to correct existing combined sewer overflow problems only after provisions have been made for secondary treatment at municipal waste water plants. (See pp. 29 to 31.)

Accordingly, GAO believes that the Agency's policy requiring secondary treatment before it will fund the correction of combined sewer overflow problems may be too restrictive because it may preclude consideration of more beneficial projects. GAO recommends that the Administrator of the Agency, in accordance with the latest amendments to the law, allow States more flexibility in determining which types of projects should receive construction grant funds. (See p. 38.)

Neither Illinois and Missouri nor the Agency agreed with GAO's recommendation that the law be amended to eliminate the mandatory requirement for secondary treatment. The Metropolitan St. Louis Sewer District said the report was essentially correct and presented important facts which must be considered in evaluating the cost effectiveness of secondary treatment in the St. Louis area.

In commenting on GAO's recommendation that States be allowed more flexibility in determining which types of construction projects should receive grant funds, the Agency said it would consider projects other than secondary treatment when it can be demonstrated that the projects will produce greater water quality improvements than secondary treatment for dry-weather flows. (See apps. II to V.)

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ABBREVIATIONS

BCD	biochemical oxygen demand
EPA	Environmental Protection Agency
GAO	General Accounting Office
MGD	million gallons daily
MSD	Metropolitan St. Louis Sewer District

GLOSSARY

Biochemical oxygen demand (BOD)	A measure of organic waste load which indicates the amount of oxygen drawn upon in the process of waste decomposition. BOD5 represents the amount of oxygen consumed over a 5-day period.
Carcinogen	Cancer-causing material.
Dissolved oxygen	The oxygen dissolved in water. Dissolved oxygen is necessary for life of fish and other aquatic organisms.
Effluent	The waste water discharged by an industry or municipality.
Fecal coliform	A group of bacterial organisms common to the intestinal tracts of man and animals. Its presence in water indicates the potential existence of pathogenic bacterial contamination.
Nonpoint sources	Sources of pollution that are difficult to pinpoint and measure. Common examples include runoff from agriculture and forest lands, runoff from mining and construction, and storm runoff from urban areas.
Pathogenic	Causing or capable of causing disease.
Phenols	Wastes, more commonly known as carbolic acid, which cause taste and odor problems in fish flesh and municipal water supplies.
Primary treatment	Treatment usually involving screening and sedimentation for the removal of the larger solids in waste water. About 60 percent of the suspended solids can be removed by primary treatment.

Secondary treatment

Treatment using biological processes to accelerate the decomposition of sewage, particularly oxygen-demanding organic material. Effective secondary treatment removes virtually all floating and settleable solids and about 85 percent of the BOD and suspended solids.

Suspended solids

Small particles of solid pollutants in sewage that contribute to turbidity.

Water-year

Represents a 12-month period from October 1 through September 30. The year is determined by the calendar year in which it ends.

CHAPTER 1

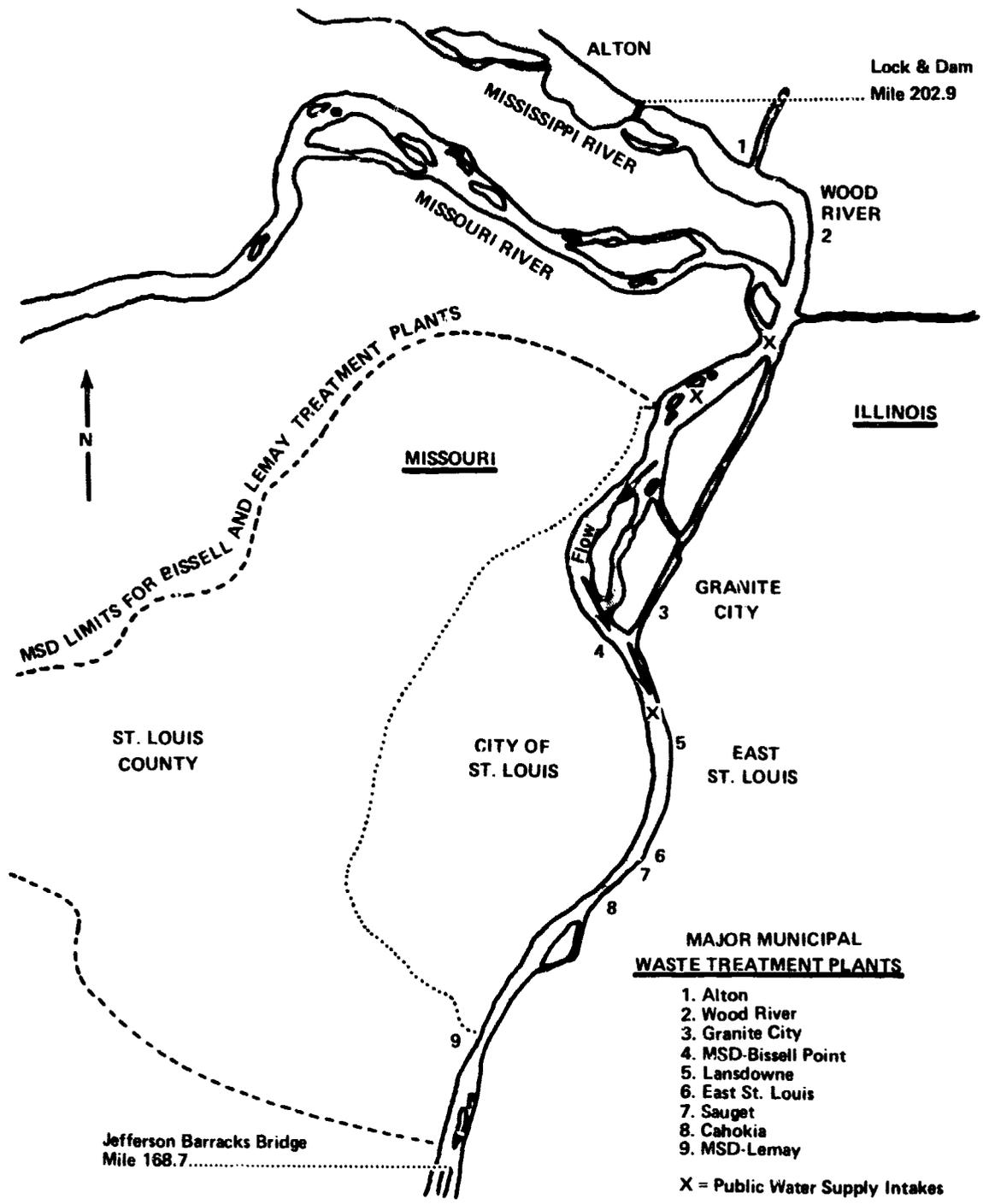
INTRODUCTION

The objective of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500, 33 U.S.C. 1251 et seq.) was to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The act called for eliminating the discharge of all pollutants into navigable waters by 1985. An interim goal, to be achieved by July 1, 1983, was established for attaining, wherever possible, water quality sufficient for the protection and propagation of fish, shellfish, and wildlife and for recreation in and on the Nation's waters. Further, publicly owned treatment works were required to provide secondary treatment 1/ by July 1, 1977, and to use the best practicable treatment technology by 1983.

To assist publicly owned treatment works in providing secondary treatment, the act authorized the Environmental Protection Agency (EPA) to make grants of up to 75 percent of the costs and provided \$16 billion for fiscal years 1973-75. Subsequent legislation has provided or authorized an additional \$26 billion for the program through fiscal year 1982. As of October 30, 1977, about \$18.1 billion and \$6.5 billion had been obligated and spent, respectively. Although the July 1, 1977, deadline has passed, the Clean Water Act of 1977 allowed the EPA Administrator to extend the time limit to the earliest date practicable for compliance with secondary treatment. In no event shall a time modification extend beyond July 1, 1983.

The act prescribed that States receiving grants are to submit programs for preventing, reducing, and eliminating pollution. They are also to have a "continuing planning process," under section 303(e), which considers among other things effluent limitations, water quality standards, authorities for intergovernmental cooperation, an inventory and priority ranking of needs for waste water treatment works, and areawide waste management plans. These planning activities cover large areas of the States usually designated as river basins. Waste water management planning under section 208 of the act is concerned, in most cases, with only a particular part of a river basin identified as having substantial water quality control problems.

1/See glossary.



MAP OF ST. LOUIS METROPOLITAN AREA SERVED BY MAJOR MUNICIPAL WASTE TREATMENT PLANTS

THE MISSISSIPPI RIVER

The Mississippi River flows in a southerly direction immediately east and adjacent to the city of St. Louis, Missouri. (See map on p. 2.) The east bank of the river across from St. Louis is occupied by the city of East St. Louis, Illinois, and several small municipalities. About 75 percent of the area's population and industry is on the west, or Missouri, side of the river.

As it passes St. Louis, the Mississippi River has an average flow of about 114 billion gallons a day. The smallest flow on record was about 12 billion gallons a day in December 1863, and the largest was about 659 billion gallons a day in June 1903. These records were established before major channelization and impoundment efforts (construction of locks and dams) in the Mississippi and Missouri Rivers and their tributaries upstream of St. Louis.

The Missouri River flows into the Mississippi River just north of St. Louis from the west and accounts for about 50 percent of the Mississippi River volume flowing past St. Louis. The two rivers do not mix much until about 30 to 50 miles downstream of their confluence. (See figure 1 on p. 4.) As a result, waste discharges from the Missouri side tend to stay in the west half of the river and those from the Illinois side tend to stay in the east half.

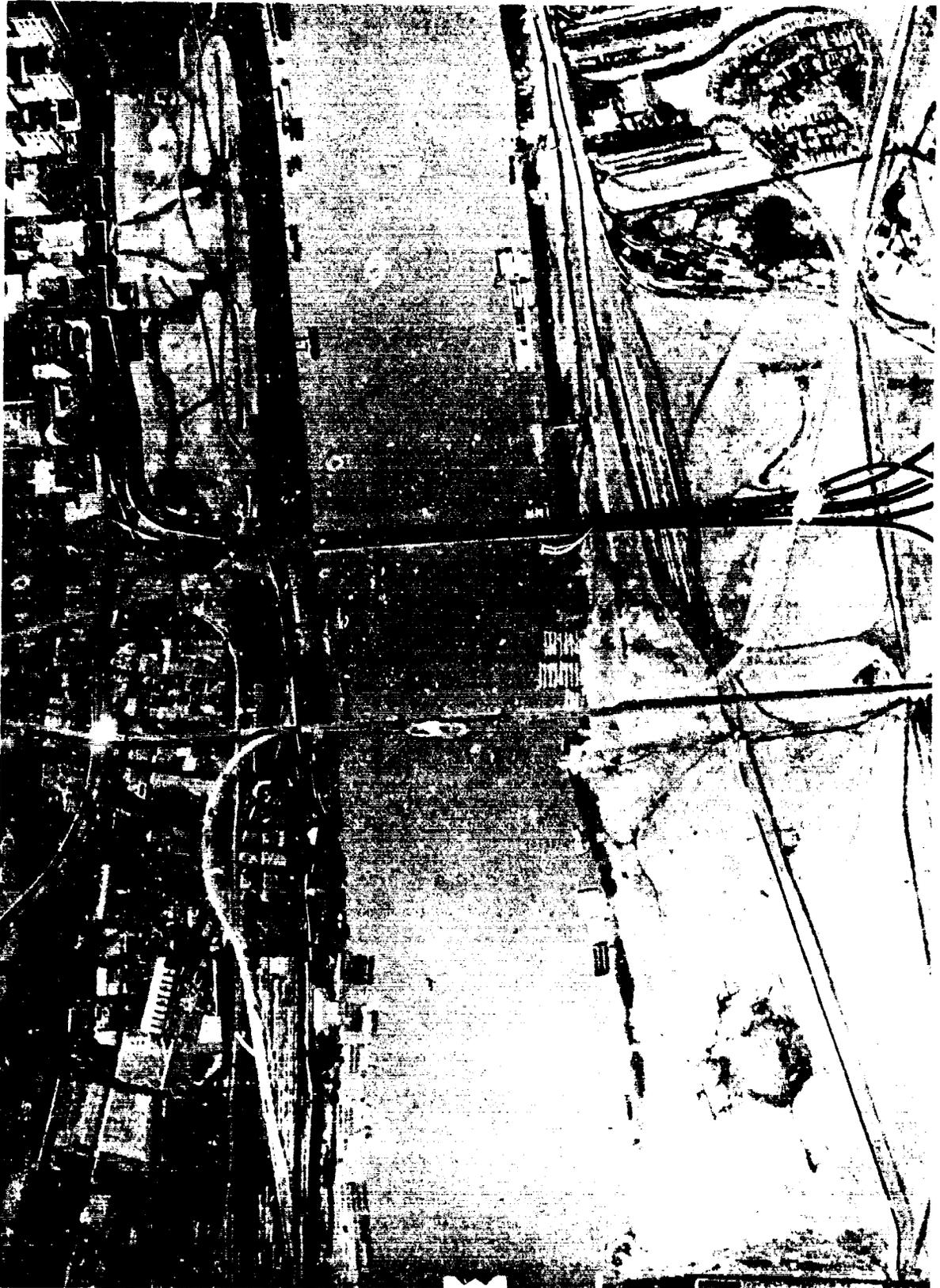
The Mississippi River in this area is used principally for barge traffic and for domestic and industrial water supply and waste disposal. (See figure 2 on p. 5.) Fishing and pleasure boating activities are very limited. The area's drinking water supply companies have three water intakes; two are located above the major municipal sewage discharge points, and the third is on the river's east side about 2 miles below the largest municipal waste discharge point, which is on the west side. According to a water company official, the largest discharge point does not appreciably contaminate the water at the third intake station because the east-west river waters do not mix laterally. But some major industrial dischargers, particularly petroleum plants in Illinois, are located upstream from the water company intakes. Water company officials stated that petroleum and phenol tastes had been detected in water supplies on both sides of the river in past years but had not been a major problem in recent years.

EPA has designated 18 municipal and industrial sources in the area as major dischargers. (See app. I.) As shown below, these sources discharge an average of about



COURTESY: ARMY CORPS OF ENGINEERS

FIGURE 1. SEGMENT OF THE MISSISSIPPI RIVER IMMEDIATELY SOUTH OF THE CONFLUENCE OF THE MISSOURI AND MISSISSIPPI RIVERS



COURTESY: ARMY CORPS OF ENGINEERS

FIGURE 2. BARGE TRAFFIC ON THE MISSISSIPPI RIVER NEAR DOWNTOWN ST. LOUIS

370 million gallons a day (MGD) which is less than one-half of 1 percent of the average daily flow of the river and approximately 1 percent of the critical summer low flow.

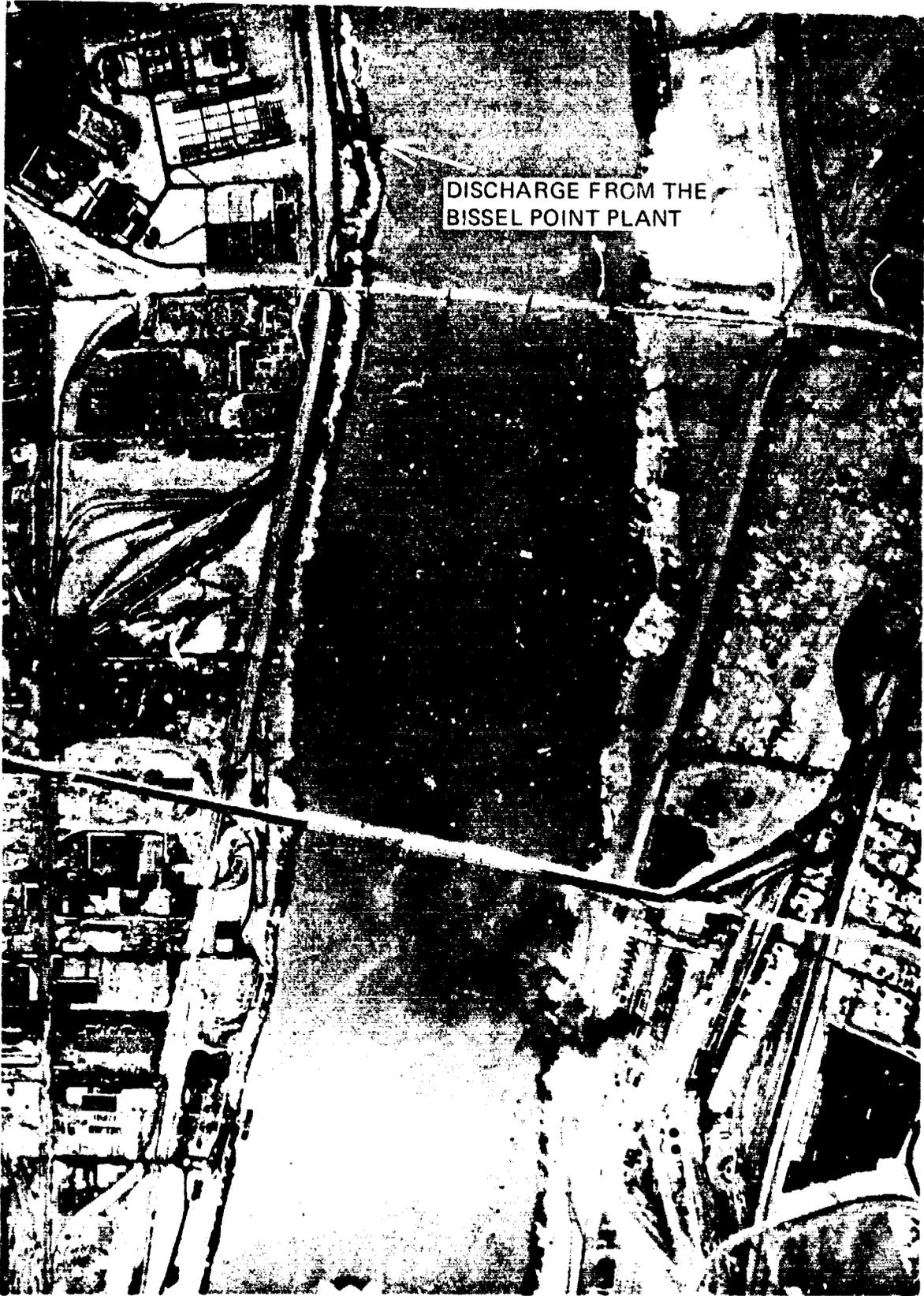
<u>Dischargers</u>	<u>Missouri</u>		<u>Illinois</u>		<u>Total</u>	
	<u>Number</u>	<u>MGD</u>	<u>Number</u>	<u>MGD</u>	<u>Number</u>	<u>MGD</u>
Municipal	2	229.2	a/6	25.5	8	254.7
Industrial	<u>3</u>	<u>57.3</u>	<u>a/7</u>	<u>60.3</u>	<u>10</u>	<u>117.6</u>
Total	<u>5</u>	<u>286.5</u>	<u>13</u>	<u>85.8</u>	<u>18</u>	<u>372.3</u>

a/One municipal facility discharging 23.5 MGD has been classified here as industrial because 99 percent of its flow is from industry.

As can be seen, nearly 70 percent of the discharge comes from the eight municipal facilities, and about 75 percent of the discharge comes from the Missouri side. In addition to the 18 municipal and industrial sources, 3 electric power plants have been designated as major dischargers. These three plants discharge an average of 740 MGD, of which 99.3 percent is cooling water. Thermal pollution studies of these plants have indicated they do not significantly affect the river's temperature due to its size. These plants were not included in our review.

The Metropolitan St. Louis Sewer District (MSD), which services all of the city of St. Louis and most of St. Louis County, operates the only two municipal facilities discharging directly to the Mississippi from the Missouri side. These two facilities, the Lemay and Bissell Point plants, account for 90 percent of the area's municipal discharges and about 60 percent of the major municipal and industrial discharges. (See figure 3 on the following page.)

Inasmuch as the Mississippi River is a boundary between the States of Illinois and Missouri, it is under the jurisdiction of two EPA regional offices--region VII in Kansas City, Missouri, which covers Missouri, and region V in Chicago, Illinois, which services Illinois. State environmental agency counterparts are the Missouri Department of Natural Resources and the Illinois Environmental Protection Agency.



DISCHARGE FROM THE
BISSEL POINT PLANT

COURTESY: ARMY CORPS OF ENGINEERS
FIGURE 3. DISCHARGE FROM THE BISSEL POINT PLANT INTO THE MISSISSIPPI RIVER

SCOPE OF REVIEW

In reviewing water pollution control activities in the St. Louis metropolitan area, we specifically examined the water quality improvements expected from upgrading the Bissell Point and Lemay plants to secondary treatment. We limited our study to an approximate 34-mile stretch of the Mississippi River running from the Alton Dam north of St. Louis (river mile 202.9) to a point just south of St. Louis at the Jefferson Barracks Bridge (river mile 168.7).

We interviewed officials at EPA headquarters in Washington, D.C., and at EPA regional offices in Missouri and Illinois. We also held discussions with officials of the Missouri and Illinois State environmental agencies and of the various sewer and water companies in the St. Louis area and immediately downstream. We examined documents, records, and literature at these locations, giving particular emphasis to past, present, and future water quality data, studies, and projections.

During the review, we were assisted by Dr. Donald T. Lauria, Associate Professor of Water Resources Engineering at the University of North Carolina. From 1965 to the present, Dr. Lauria has been on the faculty of the Department of Environmental Sciences and Engineering at the University. Dr. Lauria, a member of various professional and honorary societies, is a registered professional engineer in North Carolina and New York.

CHAPTER 2

EFFECTS AND BENEFITS

EXPECTED FROM SECONDARY TREATMENT

No significant change in Mississippi River water quality is expected to result from the planned investment of about \$216 million (including \$163 million in Federal funds) in secondary treatment facilities in St. Louis. Although EPA and other officials have mentioned possible long-range reductions in potentially cancer-causing materials, these benefits have not been validated or quantified.

MISSISSIPPI RIVER WATER QUALITY

A number of water quality studies were summarized in a 1972 MSD report which stated that suspended solids, phenols, and fecal coliform are the most noticeable pollutants in the Mississippi River. In 1976 the State of Missouri reported that water quality problems in the Mississippi below its junction with the Missouri were essentially caused by the sediment load from agricultural runoffs and stream channelization.

The Mississippi River in the St. Louis area has been designated by the State of Missouri as a class B stream; that is, its waters are not suitable for primary contact recreation, such as swimming, but are of sufficient quality for secondary contact recreation, such as boating, fishing, and wading. 1/ Class B waters are to be maintained at a quality necessary for the propagation of fish, for use as raw water for public drinking water supply, and for agricultural and industrial uses.

Various water quality parameters are used to measure pollution and to determine the suitability of water for use. Not all water quality parameters apply to all uses. For example, dissolved oxygen is not a part of the standard for drinking water supplies but is a part of the standard for fish and aquatic life.

1/Class A streams are those suitable for whole body water contact, such as swimming, wherein raw water may be accidentally swallowed.

As it enters the St. Louis area, Mississippi River water has poor quality with respect to some parameters, such as suspended solids and phenols. With respect to others, such as dissolved oxygen and fecal coliform, the quality appears adequate for its designated uses.

According to the U.S. Geological Survey, the minimum 7-day consecutive low flow expected to occur once every 10 years is about 30 billion gallons a day. Geological Survey officials advised us that this low flow is most likely to occur in cold winter months. They also said that low flows during the summer, when water temperatures are high, are more critical to treatment plant design requirements than the lower flows which occur in winter. Without a statistically calculated critical low flow, the consultant who assisted us in this review analyzed flow data for June through September of 1968 through 1974 and estimated the critical 7-day low flow to be about 40 billion gallons a day during critical months. A 1958 U.S. Public Health Service report on pollution in the Mississippi used a comparable critical low flow based on flow records in July and August.

Dissolved oxygen

Dissolved oxygen is essential to the natural purification processes of waters and to the maintenance and propagation of fish and other aquatic life. The Missouri State water quality standard for fish and aquatic life specifies that dissolved oxygen be at least 5 milligrams per liter (mg/l).

According to our consultant, low dissolved-oxygen conditions generally occur when river flows are low and water temperatures are high (typically July and August). During July and August 1974, however, water temperatures above and below St. Louis averaged 79 degrees to 82 degrees F, while dissolved oxygen averaged 8.3 to 9.8 mg/l--well above the 5 mg/l standard.

In addition, of 390 samples taken by MSD above St. Louis in the Missouri and Mississippi Rivers during a 7-year period from October 1967 through September 1974, only 6 fell below the 5 mg/l standard. All of these exceptions occurred in the Mississippi near Alton, Illinois, before entering the St. Louis area. Below St. Louis only 3 of 208 samples did not meet the 5 mg/l standard.

From the above data, it is obvious that an oxygen problem does not exist in the Mississippi River near St. Louis, and, therefore, aquatic life is not threatened.

Suspended solids

Suspended solids are undissolved materials in the water. Our analysis of MSD samples of the Missouri and Mississippi headwater areas indicated a daily average of 252 mg/l of suspended solids entering the area. At an average daily flow of 114 billion gallons, we estimate that the river passing St. Louis transports about 120,000 tons of suspended solids daily.

MSD estimated that wastes from all St. Louis metropolitan area sources would add about one-half of 1 percent to the average suspended materials already in the river. Under critical summer low-flow conditions, this amount is about 1.5 percent. MSD noted in a 1972 report that suspended solids are primarily the result of agricultural and natural runoffs. Thus, data indicates that the river already has a high level of suspended solids and that additions to suspended solids from wastes in the St. Louis area are minimal.

Fecal coliform

The presence of fecal coliform in water indicates the potential existence of pathogenic bacterial contamination. Missouri standards for water used for limited contact, such as fishing and boating, and for drinking water supplies call for fecal coliform counts not to exceed 2000 per 100 milliliters.

In water-years 1968-74, 274, or 89 percent, of the 308 samples taken by MSD below St. Louis at river miles 162 and 168 exceeded this standard. In the same time, 132, or 38 percent, of 347 samples taken near Missouri River mile 7 and 18 percent of 338 samples taken near Mississippi River mile 202.5 (both locations are above the waste discharges from St. Louis) exceeded the standard. The average fecal coliform in these samples is shown in the following schedule.

Water-year (note a)	Average fecal coliform per 100 milliliters		
	Missouri	Mississippi	
	Mile 7	Mile 202.5	Miles 162 and 168 (note b)
1968	615	214	11,129
1969	3,055	966	4,425
1971	3,158	630	95,285
1972	2,761	150	24,730
1973	856	145	36,994
1974	608	115	23,689

a/No data available for 1970.

b/Monitoring stations below St. Louis.

The above data leaves little doubt that large quantities of fecal coliform are added to the river in the St. Louis area.

Phenols

Wastes containing phenols, commonly known as carbolic acid, cause taste and odor problems in fish flesh and municipal drinking water supplies. Missouri water quality standards published in June 1973 do not specify phenol levels but state that taste- and odor-producing substances should be limited so as not to interfere with legitimate uses of water or impart unpalatable flavor to fish. Prior to that time, Missouri had published a water quality objective of no more than 5 micrograms of phenols per liter (ug/l) at any time and a monthly average of no more than 2 ug/l.

Our analysis of MSD water quality data for water-years 1968 through 1974 is summarized below.

Water-year	Average annual phenols (ug/l)		
	Missouri	Mississippi	
	Mile 7	Mile 202.5	Miles 162 and 168 (note a)
1968	1.8	2.1	5.6
1969	6.7	6.7	13.2
1970	41.9	28.1	61.8
1971	5.2	8.8	9.7
1972	30.3	21.7	36.2
1973	44.3	54.3	39.2
1974	9.7	13.9	13.3

a/Monitoring stations below St. Louis.

During this period, the number of samples exceeding the 5 ug/l criterion were 48 percent, 51 percent, and 75 percent for the three sampling sites. Similarly, the number of monthly averages exceeding the 2 ug/l criterion near the same locations were 74, 84, and 100 percent.

The above data indicates significant quantities of phenols in the waters entering and leaving the St. Louis area. Also, the phenol concentrations are somewhat higher below St. Louis than above it.

CURRENT TREATMENT PROVIDED

The Bissell Point and Lemay plants, which account for 90 percent of the municipal discharges in the St. Louis area, currently provide only primary treatment. Primary treatment involves removing floating and settleable solids and associated biochemical oxygen demand (BOD)^{1/} by skimming and settling. Bissell Point began operations in 1970 and Lemay in 1968.

The following schedule shows the success of primary treatment in reducing two common pollutants: 5-day biochemical oxygen demand (BOD5) and suspended solids. The schedule is based on data reported to EPA under Public Law 92-500 requirements for the period January 1975 through March 1976.

	<u>Treatment facility</u>		
	<u>Bissell Point</u>	<u>Lemay</u>	<u>Total</u>
BOD⁵			
Average daily tons removed	34	18	52
Percent removed	20	38	24
Suspended solids:			
Average daily tons removed	65	40	105
Percent removed	48	59	54

MSD officials estimated, however, that about 1,750 pounds of phenols are discharged daily--nearly all from the Bissell Point plant--and that they account for about one-sixth of the average phenols in the river below St. Louis.

Data on fecal coliform input to both waste treatment plants was not available. MSD and State officials advised

^{1/}See glossary.

us that the principal method of reducing fecal coliforms at primary treatment facilities involves disinfection with chlorine. MSD noted that Lemay and Bissell Point do not disinfect their waste water before discharging it into the Mississippi because previous disinfection efforts were ineffective due to very little contact time in the chlorine contact chambers.

SECONDARY TREATMENT--EXPECTED IMPACT
ON WATER QUALITY

EPA has generally defined "secondary treatment" as treatment providing a 30-day average removal of at least 85 percent of BOD5 and suspended solids from waste water entering treatment plants and a maximum average discharge not to exceed 30 mg/l of either.

As of August 1976, construction of secondary treatment facilities at the Lemay and Bissell Point plants was estimated to cost \$216 million, with a Federal share of \$163 million. The Lemay plant, estimated to cost \$90 million, was scheduled to commence operations about 1980. Upgrading the Bissell Point plant for an estimated \$126 million has been postponed to the mid-1980s to allow earlier completion of the Lemay plant by using funds previously designated for Bissell Point. MSD officials told us that about 7 percent of the construction of Lemay's trash- and grit-handling facilities had been completed as of June 1977. These facilities, which are estimated to cost about \$9 million, or 10 percent of the total Lemay secondary treatment cost, are usable and desirable regardless of whether any further secondary treatment construction follows, according to the officials.

The following schedule shows our estimate of the average amounts of BOD5 and suspended solids expected to be removed from the combined Lemay-Bissell Point waste waters by secondary treatment.

	<u>Tons per day</u>	
	<u>BOD5</u>	<u>Suspended Solids</u>
Raw waste loads entering the plants	214	197
Wastes removed by primary treatment	52 (24%)	105 (54%)
Additional amounts expected to be removed by secondary treatment (note a)	139 (65%)	65 (33%)
Total amounts removed by primary and secondary treatment	191 (89%)	170 (87%)
Amounts discharged into the river:		
After primary treatment	162	91
Expected after secondary treatment	23	26
Estimated average amounts in the river above the plants	1,800	120,000

a/Based on EPA's definition of secondary treatment.

MSD, State, and EPA region VII officials do not anticipate any increase in flow at the two plants.

As can be seen in the above schedule, Lemay and Bissell Point currently add about one-tenth of 1 percent (91 tons) to the suspended solids already in the Mississippi River on an average basis. Similarly, they add about 9 percent (162 tons) to the BOD5 entering the area. Upgrading the two plants from primary to secondary treatment would remove an additional 139 tons of BOD5 and 65 tons of suspended solids per day and would substantially reduce fecal coliform and virtually eliminate phenols in the discharges. Such pollution reductions appear impressive on a weight basis, but a more appropriate question is: How much will secondary treatment improve the Mississippi's environmental quality? (See fig. 3, p. 7.)

Dissolved oxygen

According to our consultant, the main purpose of secondary treatment is to protect the dissolved oxygen of the receiving stream. Primary treatment removes only a small fraction of the oxygen-demanding material (i.e., BOD) from waste water, whereas secondary treatment removes about 90 percent of it. It is generally assumed that an oxygen concentration of about 5 mg/l is the minimum allowable value for protection of aquatic life in lakes and

ivers; below this, some fish species and other organisms may suffer. Secondary treatment is considered to be especially needed when BOD in the discharge from primary treatment plants causes the oxygen in the receiving waters to fall below the 5 mg/l standard under critical conditions. But as stated on page 10, it is clear that the Mississippi River does not have an oxygen problem in the vicinity of St. Louis.

Even though secondary treatment, in some instances, may raise oxygen concentrations above 5 mg/l, such treatment will improve only slightly the oxygen resources of the Mississippi River below St. Louis. A 1975 report prepared by a consulting firm for the Army Corps of Engineers projected the impact of eliminating all waste discharges in the St. Louis area on dissolved oxygen in the Mississippi. The report indicated that no more than a 0.2 mg/l increase would occur. Although the report was based on data for August, when temperatures were high and the river's oxygen-carrying capacity was low, the flow was about 103,000 MGD--much more than the critical low flow of about 40,000 MGD.

To determine the effect of secondary treatment on water quality during critical low-flow conditions, our consultant made simulations using the Corps of Engineers' rate constants $1/$ and the 40,000 MGD minimum 7-day flow occurring once in 10 years. He was conservative in his calculations, choosing values that would show the greatest improvement from secondary treatment. Assuming an oxygen concentration of 6 mg/l above Bissell Point, a BOD₅ of 2.5 mg/l, and a temperature of 80 degrees F, the minimum dissolved oxygen below St. Louis based on primary treatment at Bissell Point was calculated to be 5.9 mg/l. Upgrading the plant to secondary treatment raised the minimum dissolved oxygen to 6 mg/l. The calculations were repeated using a BOD₅ above Bissell Point of 3.5 mg/l instead of 2.5 mg/l. The minimum dissolved-oxygen concentrations with primary and secondary treatment were 57. and 59. mg/l, respectively. Thus, it appears that secondary treatment will raise the oxygen level only about 0.1 or 0.2 mg/l during low flows.

The consultant made additional calculations for a flow of about half the minimum (20,000 MGD); he felt this was necessary because the Bissell Point discharge

$1/A$ BOD removal rate of 0.2 per day and a reaeration rate of 0.4 per day.

does not mix well with Mississippi River water and because not all of the river flow is available for dilution (although probably more than 20,000 MGD is available). Assuming upstream oxygen and BOD5 concentrations of 6 and 2.5 mg/l, respectively, the minimum downstream dissolved oxygen with primary and secondary treatment was calculated to be 5.8 and 6 mg/l, respectively. Additional simulations for alternative upstream conditions are included in the following table which shows that, even with half the minimum flow, secondary treatment will raise the downstream oxygen only 0.1 to 0.5 mg/l.

Expected Minimum Oxygen Concentrations in mg/l
at Low Flow and 80 degrees F

Flow (MGD)	<u>Above Bissell Point</u>		<u>Below Bissell Point</u>	
	<u>Dissolved oxygen</u>	<u>BOD5</u>	<u>Minimum dissolved oxygen with primary</u>	<u>Minimum dissolved oxygen with secondary</u>
20,000	5.0	2.5	5.0	5.0
	5.0	3.5	4.9	5.0
	5.5	2.5	5.4	5.5
	5.5	3.5	5.2	5.5
	6.0	2.5	5.8	6.0
	6.0	3.5	5.4	5.9
40,000	5.0	2.5	5.0	5.0
	5.0	3.5	5.0	5.0
	5.5	2.5	5.5	5.5
	5.5	3.5	5.4	5.5
	6.0	2.5	5.9	6.0
	6.0	3.5	5.7	5.9

Suspended solids

The suspended-solids concentrations discharged by the two plants into the Mississippi River are, on an average, less than those already in the river. As noted on page 11, the average concentration entering the area is 252 mg/l. The average discharged by Bissell Point with primary treatment is 130 mg/l and by Lemay is 57 mg/l. With secondary treatment, Bissell Point should discharge 30 mg/l and Lemay 22 mg/l. Our consultant estimated that secondary treatment at the Bissell Point plant would lower the suspended-solids concentration in the Mississippi River less than 0.5 mg/l under low-flow conditions.

Phenols

According to MSD, State, and EPA region VII officials and our consultant, secondary treatment in St. Louis would probably eliminate the phenols being discharged by the two plants. An MSD official estimated this would reduce the average concentration of phenols in the river by about 2.2 ug/l. Our consultant and MSD and State officials, however, believe it is unlikely that this is the least costly method of eliminating phenols, because many of them originate from industrial sources and because the cost for such treatment should be borne by the polluters rather than by the community at large. They believe that secondary treatment should not be used for phenol removal until other alternatives, including pretreatment, are thoroughly investigated.

Fecal coliform

Because of the lack of data on current treatment plant fecal coliform intake, we did not attempt to estimate the extent that secondary treatment would reduce fecal coliform in the river water. Also, no measure of the primary treatment efficiency was found.

MSD officials advised us that secondary treatment without postchlorination should result in a reduction of from 75 to 85 percent of the fecal coliform discharged. With postchlorination, the reduction of fecal coliform discharges would average 98 to 99 percent. MSD and Missouri officials said that postchlorination is not likely to be used at the Bissell Point and Lemay plants because recent indications are that such treatment produces chlorinated hydrocarbons which can do more harm than good.

Data presented on page 12 leaves little doubt that large quantities of fecal coliform are added to the Mississippi in the St. Louis area. It is highly probable that much of that increase is from MSD's discharges, which are not disinfected. It can also be reasoned that secondary treatment at the two plants would noticeably reduce fecal coliform, even without postchlorination. Our consultant notes, however, that if disinfection were used, coliform could be measurably reduced by chlorinating the primary treatment discharges. In addition, our report issued on August 30, 1977, entitled "Unnecessary and Harmful Levels of Domestic Sewage Chlorination Should Be Stopped" pointed out that sewage disinfection in many instances is not needed and the value of widespread sewage chlorination appears to be questionable.

SECONDARY TREATMENT--EXPECTED IMPACT ON RIVER USES

A fundamental purpose of improving water quality through secondary treatment is to maintain or upgrade the uses of the receiving water. We questioned Federal, State, and local officials about anticipated changes in water uses, or other benefits, to be derived from providing secondary treatment at the Bissell Point and Lemay plants.

MSD officials stated that, because of the Mississippi's large assimilative capacity, they anticipate no noticeable or measurable changes in the river's water quality or uses from secondary treatment. They stated that, in addition to the millions of dollars of Federal funds to be spent on secondary treatment, there will be increased costs to the public for operation, maintenance, and capital investment. Operating costs, they noted, are estimated to increase from a current \$6 million to over \$13 million a year as a result of secondary treatment. The secondary treatment plants will also use much more energy and will increase the amount of sludge--the disposal of which is expected to be a problem. There is no requirement that secondary treatment be justified on the basis of improving water quality, according to MSD officials; the only justification for secondary treatment is that the law requires it.

A Public Health Service report on pollution in the Mississippi River, issued in 1958, concluded that taste and odor problems in fish were caused by phenols and that this had been a major factor in the decline of commercial fishing in the area. Data presented earlier in this chapter indicates that phenols in the river will not be eliminated by secondary treatment but will be reduced about one-sixth.

The Missouri Department of Conservation, in an article published in 1971, noted that the number of commercial fishermen had declined in Missouri from 1,274 in 1945 to 762 in 1969. The same article noted that, in the five counties immediately below St. Louis, only 35 people had purchased commercial fishing permits. Five years later, in March 1976, 82 commercial permits were issued in four of the five counties immediately below St. Louis. The conservation official who provided this data noted that the earlier decline in fishing was attributable, at least in part, to bad publicity regarding channel dredging and industrial pollution. Another conservation official stated

secondary treatment would not remove compounds which do the most damage to aquatic life. Water supply officials in Chester, Illinois (about 67 miles downstream from St. Louis), who were residents of that area for many years, said that commercial fishing in their area was increasing and that fish tastes had improved in recent years.

Missouri Department of Natural Resources officials concluded there would be no measurable benefits from secondary treatment in the St. Louis area. They based their opinions on the fact that the Mississippi River has large assimilative capacity. One of the officials, involved with the drinking water supply program, stated that many of the substances which secondary treatment would reduce had not proved harmful to public health and would be dissipated naturally in a stream as large as the Mississippi in a relatively short stretch. Further, he said, most of the substances that are harmful to public health, such as heavy metals, certain viruses, and toxic organics, would not be removed by secondary treatment. His opinion was that secondary treatment was not necessary because public health downstream from St. Louis would not be measurably affected. Water supply officials in Chester, Illinois, also could foresee no change in their operations resulting from secondary treatment in St. Louis.

In a June 1976 report entitled "Water Quality Management Basin Plan," the Missouri Department of Natural Resources noted that secondary treatment for many discharges is unnecessarily stringent and has little or no relevance to water quality improvement. Further, the report stated, most available studies and many knowledgeable persons support the contention that organic pollution of the Missouri and Mississippi Rivers from primary treatment sources, including the Bissell Point plant, is negligible and that secondary treatment is unnecessary due to the enormous assimilative capacity of the receiving stream. The report said the across-the-board application of the secondary treatment requirement is likely to result in vast expenditures of limited resources without any measurable benefits.

Illinois Environmental Protection Agency officials stated that the impact of secondary treatment on Mississippi River water quality, as it relates to public health and water uses, would not be measurable. However, these officials were of the opinion that, while such benefits could not be quantified, they were nonetheless very real. They referred to the potential reduction of cancer from removing some carcinogenic materials through municipal secondary treatment.

EPA officials in regions V and VII also believed that, although changes in water quality in the St. Louis would probably not be measurable, there should be long-range benefits from reducing suspected carcinogens and other pollutants. The officials pointed out that secondary treatment would remove large quantities of suspended solids which contain a variety of pollutants--some harmful and some not.

CONCLUSIONS

Serious questions have been raised about the benefits to be derived from providing secondary treatment at the St. Louis municipal waste treatment plants, particularly in view of the estimated \$216 million cost. The benefits are not readily quantifiable, and the harmful substances removed may be negligible. The quality of the river water will be only nominally improved, and the extent to which water uses will be enhanced appears negligible.

The elimination of 162 tons of BOD5 each day will slightly increase the dissolved oxygen in the river below St. Louis. Since the existing dissolved oxygen is considered to be adequate and since the river's natural assimilative capacity eliminates any effects of BOD5, the expenditure of funds to combat this pollutant appears questionable.

Secondary treatment will also preclude the discharge of about 91 tons of suspended solids each day, or less than one-tenth of 1 percent of the suspended solids normally present in the river. The removal of this small amount will not increase the uses of the Mississippi at or below St. Louis.

Secondary treatment would slightly reduce average phenols in the river. Even without secondary treatment, however, there are encouraging signs that commercial fishing is increasing below St. Louis. Further, it seems far more reasonable to eliminate phenols at the industrial sources than at secondary treatment plants.

Although fecal coliform, which is substantially added in the St. Louis area, would probably be greatly reduced, there does not seem to be any evidence that this will result in measurable or noticeable public health benefits. The one potential health benefit from secondary treatment may be a reduction of suspected carcinogenic materials, as indicated by State and Federal officials. However, much uncertainty exists about the ability of secondary treatment to remove these substances.

The Congress and EPA have opted to clean up the Nation's waterways by imposing uniform technology-based waste water treatment standards on polluters and by requiring compliance by a given date. The advantages of such an approach are that compliance in meeting the standards and moving toward a national goal is measurable and enforceable, equal treatment is provided to all municipal polluters, and program administration is eased. The main disadvantage is that this approach is rigid and focuses on meeting technology-based standards rather than on improving water quality and increasing water uses. We believe that mandatory secondary treatment, without the flexibility to consider alternatives or the characteristics and uses of the receiving waterways, commits scarce resources to projects, such as those in St. Louis, which will have a minimal effect on the quality or use of receiving waters.

In considering amendments to the Water Pollution Control Act in March 1977, the House Committee on Public Works and Transportation recognized the immediate need to extend the July 1, 1977, deadline for meeting secondary treatment requirements for two reasons. 1/ First, less than half of the municipal treatment plants throughout the Nation would be in compliance as of that date. Second, municipalities had questioned the need for secondary treatment at publicly owned works which discharge into ocean or coastal waters. In proposing extensions, the Committee expected EPA to grant funds for environmental assessments of the need for secondary treatment in these instances and to accelerate research and development to better identify the pollutants for which some level of control is necessary.

On December 27, 1977, the Clean Water Act of 1977 amended Public Law 92-500 by allowing waivers of secondary treatment for publicly owned treatment works discharging into marine waters if water quality standards can be met and maintained. Such action suggests that the Congress, though resolute in its commitment to pollution control, is amenable to further study of the benefits of secondary treatment. We find the rationale for reassessing the need for secondary treatment for ocean outfalls to be equally valid for treatment works discharging into streams which have large assimilative capacities.

1/House Report 95-139 dated March 29, 1977.

RECOMMENDATIONS TO THE CONGRESS

We recommend that the Congress amend the law to eliminate the mandatory requirement for secondary treatment of discharges to fresh water and to permit the Administrator of EPA to grant waivers, deferrals, or modifications on a case-by-case basis to this requirement when dischargers can demonstrate that the environmental impact of secondary treatment will be minimal or insignificant.

STATE, LOCAL, AND AGENCY COMMENTS AND OUR EVALUATION

According to MSD, our report presents important information which must be considered before requiring secondary treatment for the St. Louis area. Although MSD did not fully agree with some of the statements made by other agencies' representatives, it believed the information in the report was essentially correct.

In general, neither EPA nor the States of Illinois and Missouri agreed with our recommendation that the Congress amend the law to eliminate the mandatory requirement for secondary treatment and to allow EPA to grant waivers, deferrals, or modifications to the requirement where the impacts of discharges can be shown to be minimal. According to EPA, the recommendation would lead to abandonment of national technology-based effluent limitations and a return to least-cost alternatives based on the maintenance of minimum levels of water quality. EPA stated that the approach had not worked in the past because of inequities in treatment requirements which allowed dischargers located on larger receiving waters to provide minimal treatment compared with other dischargers. EPA also believed that the recommendation would create a serious equity problem between municipalities and industries which discharge the same pollutants.

EPA contended that our review of secondary treatment in a single area was not sufficient to support the recommendations on a national basis. Although our review was limited to one specific area of the Nation, we believe that similar situations are also occurring in other areas. For instance, officials of the Illinois Environmental Protection Agency pointed out that since 1949 the State has required a minimum of secondary treatment for all municipal waste treatment plants except those situated on major bodies of water, such as the Mississippi, Ohio, and Illinois Rivers, that have large assimilative

capacities. However, each secondary treatment plant has to be evaluated on its own merits since the cost-benefit ratio varies greatly depending on the facility's circumstances.

The State of Missouri stated that our recommendation was inappropriate because it would enable every discharger in the State to apply for a waiver or deferral. According to the State, the clean water program could be adversely affected because it would be necessary to review each request and demonstrate why a waiver or deferral could or could not be granted.

The State of Illinois believed the recommendation attempted to accomplish in piecemeal fashion all that section 208 of the law intended to accomplish. According to the State, the cumulative impact of all pollutant discharges must be considered; therefore, a case-by-case analysis is not advisable.

There are basically two approaches to water cleanup: (1) to require polluters to maintain a certain level of waste treatment (such as secondary treatment), regardless of the effect such treatment will have on water quality, and (2) to vary the level of waste treatment required after analyzing the quality of water desired and the costs involved. We believe there are advantages and disadvantages to both approaches and that no one approach best suits all cases.

We realize there will be increased administrative costs for reviewing and evaluating grantee requests for waivers, modifications, or deferrals. And we do not advocate setting up a system in which administrative costs are higher than the savings from waiving, modifying, or deferring secondary treatment projects. Undoubtedly the costs and benefits of many proposed secondary treatment projects will not vary much. Our concern is not so much with projects that are marginally questionable as with projects whose costs far exceed the benefits to be realized. Accordingly, not all requests would have to be reviewed in detail, so the savings from waiving, modifying, or deferring projects that are not very cost beneficial would far outweigh the additional administrative costs.

Impact of secondary treatment

In commenting on our report, Missouri Department of Natural Resources officials concluded there would be no

measurable benefits from secondary treatment. The State of Illinois, however, contended that secondary treatment at the Lemay and Bissell Point plants would have a greater impact on improving water quality than that which we cited because the general level of dissolved oxygen in the Mississippi River at St. Louis is low. Although we agree that secondary treatment has a greater impact on improving water quality when the dissolved-oxygen level is low, we believe the water quality in the St. Louis area is not as bad as Illinois suggests. As pointed out on page 10, only 6 of 390 samples taken by MSD above St. Louis and only 3 out of 208 samples taken by MSD below St. Louis were considered low.

Illinois also stated in its comments that dissolved-oxygen levels of less than 3 mg/l existed for a considerable duration in the summer and fall of 1975. However, the data attached to Illinois' comments showed that in only 2 of 30 samplings was the dissolved-oxygen level below 3 mg/l. The data showed that, in the fall of 1975, none of the samples had concentrations less than 3 mg/l. In fact, the lowest value for this period was 6.2 mg/l. In the summer of 1975, two of the values were below 3 mg/l, but both occurred on the same day, August 12. Accordingly, Illinois' data does not demonstrate to us that dissolved-oxygen levels were low for a "considerable duration." More important, however, was a comparison of Illinois' data with data obtained by MSD at approximately the same sampling location. Eleven samples by MSD in August 1975 showed a dissolved-oxygen range of 4 to 8.9 mg/l (average was 6.7), compared with Illinois' single result of 2.2 mg/l.

After we received Illinois' written comments, we discussed with Illinois Environmental Protection Agency officials the water quality data supporting Illinois' position that secondary treatment would significantly improve water quality. We found that Illinois' support was based on a very limited sample of water quality data. The acting director of the Illinois agency agreed with us that the impact of secondary treatment on dissolved oxygen would be minimal and that other methods could control some of the more damaging pollutants, such as phenols. In addition, he advised us that Illinois was in the process of eliminating the water quality standard for fecal coliform.

Cumulative impact of pollution

EPA stated that water pollution control has been costly and that, because of the need to limit the total

quantity of pollutants discharged, all contributors must do their part. According to EPA, the impact of a single polluter on water quality might be relatively small, but its effect would no longer be small when hundreds of individual polluters are considered collectively. Although this comment, at first glance, appears to be logical, it fails to recognize the assimilative capacity of a large flowing body of water, such as the Mississippi River. Even though the river receives heavy pollution loads from upstream, the oxygen and POD quality of the Mississippi just above St. Louis is quite good. The upstream BOD load is not cumulative, but decreases as it moves downstream due to self-purification. Hence, river quality at St. Louis is not very dependent on the level of treatment provided by hundreds of individual upstream dischargers.

It should be mentioned that, although the oxygen and BOD effects of secondary treatment at St. Louis may not depend significantly on upstream polluters, the effect on complex organic chemicals, metals, refractory compounds, and other substances may indeed depend on whether treatment is provided upstream. The river has less self-purification capacity for these materials than for BOD, and their build-up tends to be more cumulative. Unfortunately, much uncertainty exists about the ability of secondary treatment to remove these substances.

It must be borne in mind, however, that the primary purpose of secondary treatment is to remove BOD. Therefore, it does not seem reasonable at this time to justify expensive treatment processes to remove metals, persistent organics, and other pollutants when the effect on BOD appears to be minimal and when the health benefits from such removal are unknown or highly questionable. And if metals or other substances did need to be removed, it would seem preferable to use a process specifically intended for this purpose or perhaps to remove them by alternatives other than end-of-pipe treatment, such as pretreatment of industrial wastes, in-plant industrial process changes, or enforcement of strict sewer ordinances. Because these substances originate in industrial wastes, municipalities should not be penalized by having to remove them in domestic waste treatment facilities.

Ocean discharges exempted from secondary treatment

The Clean Water Act of 1977 provides that secondary treatment requirements can be waived for municipal discharges into marine waters if water quality standards

can be met and maintained. Thus, the waiver for ocean outfalls focuses primarily on efficiency (minimum costs) rather than equity (uniform treatment). We believe the same approach can be applied to fresh water when water quality standards can be met and maintained or when the costs of secondary treatment are prohibitively high in relation to the benefits.

In our report, we observed that the requirement for secondary treatment should be waived, under certain circumstances, for such waters as the Mississippi River which provide a high degree of dilution. EPA, however, stated that our analogy is invalid. EPA agreed that exceptions for BOD may be technically valid but said there is great concern for other pollutants, such as metals and persistent organics.

The exemption of ocean dischargers from secondary treatment also casts doubt on EPA's argument for equity among industrial polluters. EPA said that it is a mistake to relax treatment requirements for dischargers fortuitously located on larger receiving waters, yet that is exactly what is being done for ocean dischargers. Accordingly, we believe similar consideration should be given to municipalities which discharge into receiving waters with large dilution factors.

Costs versus benefits of secondary treatment

In our judgment, there is a point at which secondary treatment for municipal discharges may not be justified. For example, even if we were able to value the benefits of upgrading a plant from primary to secondary treatment at \$1 million and the costs at \$50 million, the law would require the plant to still be upgraded anyway.

We agree with EPA that all polluters should do their part, but only if there is some degree of rationality between costs and water quality improvements. The Congress has, to some extent, recognized the disparity between improvements in environmental quality and the costs of treatment. In the latest amendments to Public Law 92-500, the Congress waived the best available technology requirement for industrial dischargers of other than toxic pollutants when it can be shown that the reduction in pollution that can be expected from new equipment does not bear a reasonable relationship to the equipment cost. As we pointed out in our report, no more than a 0.2 mg/l increase in dissolved oxygen

would occur if all municipal and industrial waste discharges were discontinued in the St. Louis area. Because the Lemay and Bissell Point treatment plants account for about 60 percent of the waste discharges, we believe the marginal benefits to be realized do not justify the expenditure of at least \$216 million to construct secondary treatment facilities.

Secondary treatment not waived
by section 208

The State of Illinois implied in its comments that our recommendation is what section 208 of Public Law 92-500 intends to accomplish through a systematic and thorough analysis of all water quality factors. The State added that section 208 was intended to serve the purpose of determining when more or less treatment was needed. We do not agree that section 208 allows the Administrator of EPA to waive or defer the construction of secondary treatment facilities. The act and its amendments are explicit in that municipal treatment plants have to provide at least secondary treatment.

CHAPTER 3

POTENTIAL FOR GREATER WATER QUALITY BENEFITS FROM ALTERNATIVE TREATMENT WORKS PROJECTS

Although alternative publicly owned treatment works projects may, in some instances, offer greater water quality benefits than secondary treatment projects, EPA's policy practically precludes alternative projects from being considered. Because of this policy, some secondary treatment projects may be built which are not the most beneficial to improving water quality.

AGENCY GUIDANCE FOR SETTING CONSTRUCTION PRIORITIES TOO RESTRICTIVE

A State's priority system is supposed to be designed to improve water quality as much as possible, consistent with the act's goals and requirements. Missouri's water quality, however, may not be optimum because its priority system is influenced by Federal considerations which, in some instances, may not result in the most effective use of Federal funds.

EPA's policy for funding projects to correct existing combined sewer overflow problems and to treat and control storm water discharges is summarized in EPA Program Guidance Memorandum-61, dated December 16, 1975. Although the purpose of the memorandum is to insure that such projects are funded only when careful planning has demonstrated they are cost effective, the memorandum contains the following, somewhat contradictory statement.

"Treatment or control of pollution from wet-weather overflows and bypasses may be given priority for construction grant funds only after provision has been made for secondary treatment of dry-weather flows in the area."

The effect of this provision is that, regardless of how cost effective combined sewers and storm water projects might be or how much they might improve water quality, these projects could not have been funded until provisions had been made for secondary treatment of dry-weather flows.

EPA has not thus far included all combined sewer overflow and storm water sewer projects in its definition of "publicly owned treatment works" that must provide secondary treatment by July 1, 1977. A March 1976 report by the National Commission on Water Quality, however, stated that

these types of projects should provide secondary treatment by July 1, 1977. According to the Commission's report, the act's definition of "treatment works" is extremely broad and means:

"* * * any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature * * *, or necessary to recycle or reuse water of the works, including intercepting sewers, outfall sewers, sewage collection systems, pumping, power, and other equipment, and their appurtenances; extensions, improvements, remodeling, additions, and alterations thereof; elements essential to provide a reliable recycled supply such as standby treatment units and clear well facilities; and any works, including site acquisition of the land that will be an integral part of the treatment process or is used for ultimate disposal of residues resulting from such treatment. [Sec. 212(2)(A)]

"In addition * * *, 'treatment works' means any other method or system for preventing, abating, reducing, storing, treating, separating, or disposing of municipal waste, including storm water runoff, or industrial waste, including waste in combined storm water and sanitary sewer systems." [Sec. 212(2)(B)]

Subsequent to our review, however, Public Law 92-500 was amended by the Clean Water Act of 1977 whereby the Congress stated that treatment works for control of pollutant discharges from separate storm sewer systems are excluded from being grant eligible.

We believe that broadening EPA's interpretation of publicly owned treatment works eligible for grants to include correction of existing combined sewer overflow problems would allow States more latitude in selecting projects to be undertaken. If more beneficial projects were identified and approved within current funding limitations, water quality could be better improved.

This approach would be consistent with the change the Congress has made to the 1972 amendments regarding States' determination of project priorities. The Congress has now given the States sole authority to

determine the priority of each category of projects under the Clean Water Act. EPA, after opportunity for public hearings, determines that certain projects will not contribute to the act's enforceable requirements. In addition, the Congress has stated that not less than 25 percent of the funds allocated to a State in any fiscal year shall apply to such projects as (1) major sewer system rehabilitation, (2) new collector sewers and appurtenances, (3) new interceptors and appurtenances, and (4) correction of combined sewer overflows. Therefore, not all of the funds allocated to a State in a fiscal year will have to be spent on secondary or higher levels of treatment.

DETERMINATION OF PROJECT PRIORITIES

EPA regulations require each State to prepare a list of its municipal dischargers and to rank them in order of their priority for receiving construction grants. Although the individual States assign the priorities, they are to follow four EPA criteria: (1) severity of pollution problems, (2) population affected, (3) need for preservation of high-quality waters, and (4) national priorities set forth in annual EPA guidance.

The State of Missouri prepared its fiscal year 1977 priority list using a facility planning area factor and a project factor. The facility planning area factor, which considered the first three EPA criteria, was noted by EPA region VII as a scientific and objective method of comparing needs on the basis of excess BOD to be abated. The State's project factor considered only one criterion--the national priorities determined by EPA. Even though the project factor considered only one criterion, it was weighted more heavily and, as a result, was the controlling factor in establishing priorities in all but a few situations.

The President's Council on Environmental Quality, in considering the limited Federal aid available, stated in its 1976 annual report that a "fundamental question is how the money should be allocated to achieve the most improvement in water quality." A panel assembled under the auspices of the National Academy of Sciences and the National Academy of Engineering, in discussing secondary treatment priorities in February 1975, suggested that first priority be given to construction of municipal facilities where discharges have significant adverse effects on beneficial uses of receiving waters.

The National Commission on Water Quality believes that construction of secondary treatment works, in general, is the top category eligible for Federal support and that waste water collector systems are next in priority. It also believes Federal assistance should be available to correct severe combined sewer and storm sewer systems where cost effective. In final analysis, however, the commission advocates that the States themselves set priorities on the basis of cost effectiveness and the projects' ability to contribute toward water quality objectives.

Officials of the Missouri Department of Natural Resources believed that EPA regulations and the law do not leave the State sufficient latitude in determining which projects will provide the greatest improvement in water quality and usage. Missouri State officials also expressed support for delegating more authority to manage construction grants to the States because the States are more directly familiar with their water quality problems.

EPA officials in region VII concurred that Missouri's system of ranking projects is designed, for the most part, to insure continued funding of secondary treatment projects throughout the State, even though nonsecondary treatment projects may have a greater impact on water quality.

ALTERNATIVES TO SECONDARY TREATMENT PROJECTS

During our review, several State and local officials informed us that, in their judgment, the funds for secondary treatment at the Bissell Point and Lemay plants could be more effectively spent on other projects. EPA officials in regions V and VII, while agreeing that other projects could be more beneficial to water quality, pointed out that the law requires secondary treatment.

According to Missouri State officials, the Bissell Point and Lemay plants have a very low priority from a water quality and use standpoint. They believe the funds for these projects could be better spent by accelerating completion of such major projects as the Little Blue Valley Sewer District and the Meramec Regional Treatment System and by authorizing and accelerating completion of interceptor sewers in the Springfield, Missouri, area and sewage treatment plants and collector sewer systems in such small communities as Benton City, Missouri.

State officials pointed out that numerous small communities are currently on septic systems in the Springfield area, some of which already have collector sewers installed

but no interceptors to connect them to the Springfield treatment plants. Benton City is a small town where people are on individual septic systems. In both Benton City and the Springfield area, we were advised of sewage water above ground and ground water contamination.

The Benton City situation, which--according to State officials--is not uncommon, was discussed at an August 1976 Missouri Clean Water Commission meeting. At that time, concern was expressed that wastes from individual septic tank systems had discharged through street ditches into a local creek and had contaminated local water supplies. Benton City, because it has no collector system or municipal treatment facility, is lower in priority in Missouri than a community with a treatment facility which needs upgrading. State officials were able to obtain EPA approval of an exception to the priority listing in this case in order to fund construction of the sewage treatment plant.

EPA will fund construction of this plant if the initial planning study demonstrates a sewer system is feasible and if necessary funding of the collector system and the local share of treatment plant costs have been arranged. The Farmers Home Administration, the Department of Housing and Urban Development, and the Economic Development Agency, as well as the State of Missouri, have limited funds available for collector systems. The municipality also must bear the cost of the initial planning. It should be noted that the exception granted was to give higher priority to construction of the treatment facility, not to fund a collector system.

In addition, Missouri and MSD officials said that combined sewer problems should be corrected and that such projects would be more cost effective than some secondary treatment installations. In June 1976, MSD requested a grant to study and develop systems to prevent all dry-weather sewage overflows to the Mississippi River and to selectively monitor and regulate combined sewage flows and overflows. The application noted that, during dry weather, an average of over 80 million gallons a day of raw sewage is discharged directly to the river from the Bissell Point treatment plant whenever a river stage of 20 feet is reached. This stage was reached an average of 1 out of every 5 days in calendar years 1970-75. The Lemay plant area experiences similar problems resulting in dry-weather overflows. MSD officials did not have a firm estimate of the cost to correct these problems but believed that about \$30 million would be needed for automation of sewer control stations, gates, and pumps.

Two members of the University of Missouri civil engineering staff expressed the opinion that worthwhile waste water treatment projects are those which improve water quality and thereby increase water uses. Both believed that secondary treatment in St. Louis would not greatly improve water quality or uses and that any improvements would be offset by substantial capital investment requirements, tremendous operating cost increases, high energy demands, and large increases in sludge disposal problems.

As potential alternatives not limited to the St. Louis area, the university engineers suggested modifications to existing lagoon systems, elimination of unsewered (septic) communities, and better control of inorganic waste sources to municipal facilities such as toxic metals. They also concurred with the acceleration of the Little Blue Valley Sewer District projects, the Meramec regionalization project, and the Springfield area interceptors.

Control of inorganic waste sources to municipal treatment facilities was also mentioned as an alternative by State officials. This source control aspect is not considered a construction-type project under the grant program. However, as pointed out by one of the university faculty, this aspect deals with controlling the more damaging pollutants which are not eliminated by secondary treatment or by the natural assimilative capacity of the Mississippi River.

Another alternative would be to divert funds to non-point source pollution 1/ control efforts. The June 1976 Missouri report noted earlier suggested phasing in secondary treatment with the recovery of the Mississippi from non-point pollution control efforts. Missouri's 1976 Water Quality Inventory Report estimated that \$2.3 billion would be needed to construct publicly owned waste water treatment facilities in Missouri to meet the 1983 goals which, projected at then-present funding levels, would take over 20 years. At the same time, the report estimated it would cost about \$500 million 2/ to control soil erosion in Missouri--a major source of nonpoint source pollution which is considered responsible for polluting the headwaters in the St. Louis area. The report also estimated that, at then-current expenditure rates, this would take 65 to 70 years. According to one of the University of

1/See glossary.

2/1970 Department of Agriculture estimate.

Missouri faculty members, urban, agricultural, and silviculture runoffs into the Missouri and Mississippi Rivers will continue to be the rivers' main pollution problem.

Officials of the Illinois Environmental Protection Agency stated that, while they could foresee no measurable change in the quality or uses of the water in the Mississippi, they were supportive of the universal requirement for secondary treatment from the standpoint of equitable treatment of all communities whether discharging to a large or small stream. They also indicated that there may be more beneficial water quality projects in their State for which funds designated for secondary treatment on the Mississippi could be used, such as correcting low dissolved oxygen in the Illinois River resulting from Chicago wastes.

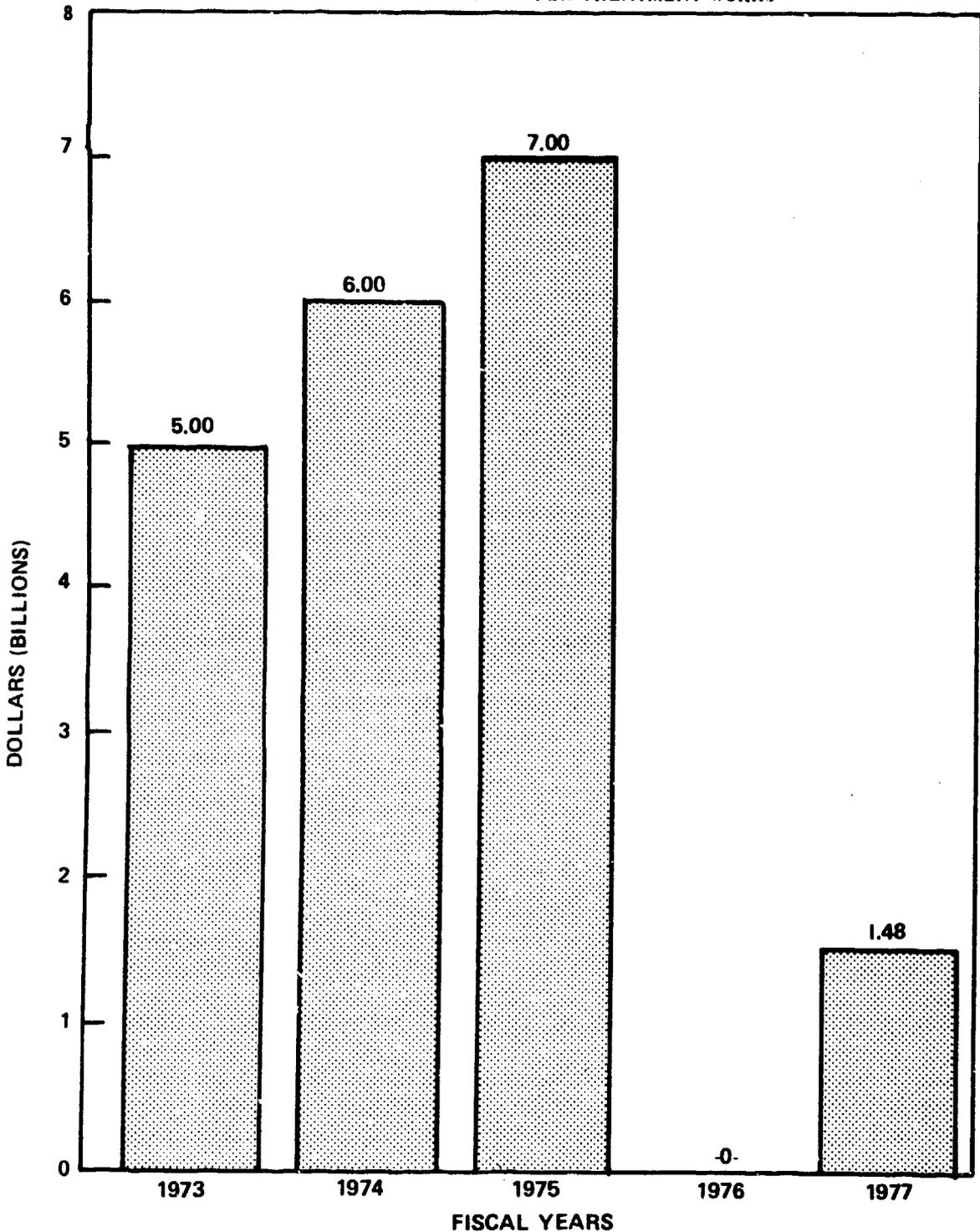
LIMITED FINANCIAL RESOURCES FOR PUBLICLY OWNED TREATMENT WORKS

To assist grantees in meeting the requirements of the 1972 amendments, the Congress provided, under Public Law 92-500, \$18 billion for constructing waste treatment facilities. On October 1, 1976, the Congress increased funding for the program by appropriating \$480 million to be available until expended. Another \$1 billion was appropriated on May 4, 1977, to be available for fiscal years 1978-80. In addition, under the Clean Water Act of 1977, the Congress authorized an additional \$24.5 billion for fiscal years 1978-82. As of October 31, 1977, EPA had obligated about \$18.1 billion of the \$19.5 billion provided since Public Law 92-500 was passed. (See graph on p. 36.)

As shown below, EPA's latest estimate of the cost to construct all needed publicly owned treatment works to meet the 1983 goal is an additional \$150 billion--well above that which has been made available to date.

<u>Category</u>	<u>January 1976 cost estimate</u>
	(000,000,000 omitted)
Secondary treatment	\$13
More stringent treatment	21
Infiltration/inflow	3
Replacement and/or rehabilitation	6
New collector sewers	17
New interceptor sewers	18
Combined sewer overflows	18
Control of storm water	<u>54</u>
 Total	 <u>\$150</u>

**APPROPRIATIONS OR CONTRACTING AUTHORITY¹
FOR CONSTRUCTION GRANTS UNDER P.L. 92-500
MUNICIPAL WASTE WATER TREATMENT WORKS**



FUNDS ILLEGALLY IMPOUNDED IN FY 1973-1976 WERE RELEASED FOR USE IN FY 1978 BUT WERE ACTUALLY AUTHORIZED IN PREVIOUS YEARS. FUNDING METHOD FOR FISCAL YEAR 1977 CHANGED FROM CONTRACT AUTHORITY TO APPROPRIATIONS

Even though EPA considers all six categories listed above as subject to the 1983 "best practicable waste treatment technology" requirement of the act, it does not generally consider new collector sewers, combined sewer overflows, and control of storm water projects as required to meet the July 1, 1977, deadline for secondary treatment. These three categories of construction projects constitute a large portion of the estimated funding needs. Since not all projects can be constructed with the limited available funding, we believe projects should be funded on a case-by-case basis where the improvements to water quality are greatest.

CONCLUSIONS

EPA's policy concerning construction grants discourages States and municipalities from considering projects that are outside the scope of what EPA considers as eligible publicly owned treatment works required to provide secondary or higher levels of treatment. There is potential for improving water quality and uses more rapidly in some cases if EPA were to emphasize more the construction of projects such as combined sewer overflows and collector systems.

The financial resources which would enable EPA to carry out Public Law 92-500 and the Clean Water Act of 1977 are limited. Within the limited funding available, assigning priorities strictly by categories can result in less than optimum improvements.

RECOMMENDATION

We recommend that the Administrator of EPA reevaluate its policy of subordinating combined sewer overflow and collector sewer projects to municipal plant projects in view of the Clean Water Act of 1977, which allows States more flexibility in determining construction grant priorities.

STATE AND AGENCY COMMENTS AND OUR EVALUATION

EPA stated that, in its opinion, the States have adequate flexibility in establishing funding priorities if they follow the priority system. According to EPA, its Program Requirements Memorandum on this subject is not totally inflexible concerning funding of combined sewer overflow projects, as indicated by our report. The Agency informed us that requests for deviations from its memorandum would be considered on a case-by-case basis when the positive effects of combined sewer overflow projects can be demonstrated.

The State of Missouri said that the States should be granted the flexibility, in establishing priorities, to defer funding of the major secondary treatment facilities discharging to the Missouri and Mississippi Rivers until other high-priority needs are satisfied, such as construction of secondary treatment on other streams, advanced waste treatment where needed, correction of by-passes, and construction of necessary interceptor sewers. Missouri added that, if changes in Public Law 92-500 are needed to allow EPA enforcement flexibility and to modify guidelines for funding priority lists to permit deferral

of these projects, the law should be so amended. The State of Illinois did not respond specifically to our recommendation.

After Missouri gave us its comments, Public Law 92-500 was amended to provide that construction priorities be exclusively controlled by the States, with certain exceptions. (See p. 31.) The amendments also require that at least 25 percent of a State's allotment be set aside for

- major sewer rehabilitation,
- new collector sewers,
- new interceptors, and
- correction of combined sewer overflows.

We believe these changes are consistent with our recommendation that EPA consider revising its policy of not funding combined sewer overflow projects until secondary treatment of dry-weather flows has been provided. Although EPA contends that the States already have such flexibility, our review showed that Illinois and Missouri do not perceive themselves as having this flexibility. Accordingly, we agree with Missouri that EPA should allow States to defer major secondary treatment projects discharging to the Missouri and Mississippi Rivers. In this way, by the time funding would be available for the projects, detailed studies could be made to more accurately determine if the benefits of secondary treatment would justify the expenditure.

MAJOR DISCHARGERS TO THE MISSISSIPPI RIVER
IN THE ST. LOUIS AREA

River segment	Type	Dischargers				Percent of average flow Segment
		Missouri		Illinois		
		No.	Amount (MGD)	No.	Amount (MGD)	
202 to 195 (Alton)	Industrial	-	-	6	36.7	0.03
	Municipal	-	-	2	4.7	.01
Total		-	-	8	41.4	.04
	Power	-	-	1	502.6	.44
195 to 186 (note a)	None	-	-	-	-	-
186 to 180 (note a)	Industrial	-	-	-	-	-
	Municipal	1	121.5	2	7.7	.11
Total		1	121.5	2	7.7	.11
	Power	-	-	1	110.9	.10
180 to 175	Industrial	1	2.6	1	23.5	.02
	Municipal	-	-	1	10.3	.01
Total		1	2.6	2	33.8	.03
	Power	-	-	1	126.3	.11
175 to 170	Industrial	2	54.7	-	-	.05
	Municipal	1	107.8	1	2.9	.10
Total		3	162.5	1	2.9	.15
	Power	-	-	-	-	-
170 to 162 (Jefferson Barracks Bridge)	None	-	-	-	-	-
		-	-	-	-	-
Total		5	286.6	16	825.6	.98

a/Water supply intakes at river miles 192, 190.4, and 181.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JAN 28 1978

OFFICE OF
PLANNING AND MANAGEMENT

Mr. Henry Eschwege
Director
Community and Economic
Development Division
United States General Accounting Office
Washington, DC 20548

Dear Mr. Eschwege:

The Environmental Protection Agency in consultation with the States of Illinois and Missouri has completed a review of your draft report entitled "Secondary Treatment of Municipal Wastewater in the St. Louis Area-Nominal Impact Expected." We are concerned both with the overall approach taken in generating the report and much of the detailed information presented to support the conclusions and recommendations.

There is general agreement among the reviewers that the issue of secondary treatment in a single area such as St. Louis is of insufficient scope to support the report's conclusions and recommendations on a national basis. The need for a uniformly applied, technology-based secondary treatment standard on a national basis is grounded in the principles of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500). EPA is convinced that the secondary level of treatment should be a minimum base level because it is a necessary, reasonable, and appropriate standard for municipal wastewater treatment. All water resource users, whether public or private, have the common responsibility of treating wastewater to meet such a practicable standard. Inherent within this responsibility is the principle of equity and the premise that waste dilution and transport are not valid uses of the nation's waterways. Furthermore, this single case cannot be extrapolated into national policy change without a complete discussion of the issues that address the purposes of the Act.

P.L. 92-500 and the Clean Water Act of 1977 both emphasize the recycling and reuse of effluents, the beneficial use of nutrients, and the containment of harmful pollutants in wastewater and sludges. Their intent is to minimize the use of surface waters as a means of conveying or diluting wastewater pollutants and to utilize these waters and pollutants to the maximum extent possible. The use of recycling and reuse alternatively to secondary treatment will have to be carefully considered. Investment in facilities which cost considerably more than primary treatment therefore will remain the basic requirement of the Federal Water Pollution Control Act.

Implementing GAO's recommendation to eliminate the mandatory requirement for secondary treatment in all cases and substitute a case-by-case waiver/deferral policy administered by the EPA would lead to an abandonment of the national technology-based effluent limitations and EPA's enforcement efforts. This would lead to a return to least-cost alternatives based on the maintenance of minimum levels of water quality. The result would be a greater reliance on "water quality standards." No consideration is given in the report to improving the "water quality standards" approach. This approach did not work in the past because of inequities in treatment requirements which allowed dischargers fortuitously located on larger receiving waters to provide minimal treatment compared to other dischargers that were required to provide the most advanced treatment. This recommendation also creates a serious inequity because industries would be required to meet technology-based limitations while municipalities would only be required to meet water quality related limitations.

It should also be recognized that we are now in a new era of water pollution control dealing with complex organic chemicals. This will mean that more sophisticated treatment schemes will be necessary for both industries and publicly owned treatment works. To abandon the concept of requiring a minimum level of treatment that is practicable for publicly owned treatment facilities may destroy the results of many years of progress toward achieving the Act's goals. The assessment of the need for secondary treatment is far more complex and cannot be limited to the consideration of short term impact using parameters such as BOD and suspended solids. In the Mississippi and other large waterways the primary pollutants of concern are toxic substances, dissolved organics, bacteria, and viruses. It is well documented that secondary treatment does achieve the removal of some toxics, bacteria, viruses, and dissolved organics. The additional benefits obtainable through secondary treatment cannot be ignored in evaluating the need for maintaining this minimum standard of treatment.

Substituting a case-by-case determination of effluent limitations for municipal facilities would further delay the goals of Public Law 92-500. Such a program would result in the commitment of more EPA personnel and resources. State resource levels would also be impacted. As GAO well knows, increases in resources for these Federal and State environmental programs will probably not be obtained.

EPA has addressed the issue of the States' flexibility in setting construction priorities through its water quality strategy and its regulations on "State determination of project priority list" (40 CFR 35.915). EPA considers that sufficient flexibility already exists. In developing a priority system the States must consider the severity of pollution problems, the existing population affected, the need for preservation of high quality waters, national priorities, and additional factors identified by the State in its priority system. Adherence to these general criteria should, if applied properly, result in funding those facilities first which will produce the greatest improvements in water quality. It should be noted that the Clean Water Act of 1977 sets aside 25 percent of each State's yearly allotment for interceptors, collectors, and projects for abatement of combined sewer overflows. The Act also gives the States even more flexibility in establishing construction priorities.

The following specific comments are provided on the GAO Report: The basic conclusion of the report is that secondary treatment at St. Louis will have minimal impact on the Mississippi River. This conclusion is apparently based on the relatively small percentage of the total suspended solids and oxygen demanding materials in the St. Louis wastewater compared to the total in the Mississippi River. (The GAO report acknowledges that the effects of secondary treatment at St. Louis are not minimal with respect to both fecal coliform bacteria and phenols). It is agreed that the impact in terms of reduced suspended solids loading would not be great because of the large volume of silt and sediment carried by the Mississippi River. However, based on the comments from the Illinois EPA, there is some question about the actual dissolved oxygen levels in the river. The conclusions, with respect to the minimal impact as a result of reduced BOD loadings, should be re-evaluated by GAO in view of these comments from the State of Illinois. Furthermore, on the basis of fecal coliform bacteria and phenols alone, we would not conclude that the impact of secondary treatment at St. Louis would be inconsequential.

When a single source is examined it might be concluded that the impact from that source for a specific pollutant is relatively small. However, as is the case in the Mississippi River, when all of the discharges with their various pollutants are considered collectively, the impact is no longer small. Another way of stating this view is that there would be no progress in the clean-up of our Nation's water if the presence of existing pollution were considered a valid excuse to do nothing.

The basis for the GAO conclusion that secondary treatment at St. Louis will have minimal impact on the Mississippi River is that the assimilative capacity of a large river such as the Mississippi allows it to accept a large discharge of wastewater without a major impact. To accept this reasoning would permit the extension of this argument to smaller discharges on smaller rivers provided that the dilution factor was sufficiently great. The net result of such an approach would be counter to the basic thrust of P.L. 92-500 in that it would not be possible to "draw the line" on waivers. Furthermore, the case-by-case approach which would result was shown to be unworkable in the program prior to the enactment of P.L. 92-500.

In making the recommendation to waive secondary treatment, GAO draws an analogy to the case set forth to exempt ocean outfalls from secondary treatment. We believe that this analogy is invalid. The case for waiving secondary treatment for ocean outfalls is based on the impact (or lack thereof) of BOD on the ocean. The position of the Agency is that the impact of BOD on the ocean is minimal only in the case of ocean outfalls where there are high dispersion rates associated with depth or tidal movements.

EPA questions whether the impact of BOD in the Mississippi River is in fact negligible as represented in the GAO analogy. Furthermore, the recommendations of the Agency to waive the secondary treatment requirements for certain ocean outfalls do not stop with consideration of BOD. While exceptions for BOD may be technically valid, there is great concern for other pollutants such as metals, persistent organics, bacteria, and viruses. Primary treatment alone even with chlorination does not sufficiently reduce these pollutants.

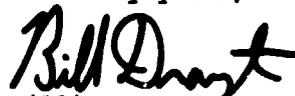
The term "secondary" has little meaning for combined sewer overflows or flows which bypass the treatment facilities. This term has been used historically to apply to certain treatment processes and pollutant removal levels associated with municipal plants constructed largely for the purpose of treating domestic-type wastewater. Overflows and bypasses have occurred when the conveyance system or treatment plants have been operated poorly or hydraulically overloaded. The approaches that best control pollutant discharges from combined sewer systems are normally different from the processes associated with secondary treatment, though they may overlap in some circumstances. An attempt, as implied by GAO, to apply "secondary" technologies to combined sewer overflows and bypasses would require the construction of gigantic and enormously expensive treatment facilities.

The GAO report argues that funding policies for combined sewer overflow (CSO) control is unnecessarily restrictive because provisions for the funding of secondary treatment facilities must be made before the funding of CSO projects can proceed. The Agency will consider requests for deviation from the requirements of Program Requirements Memorandum, PRM 75-34, where it can be demonstrated that the CSO project will result in greater water quality improvements than providing secondary treatment for dry weather flows.

Enclosed for your information is your 1970 report "Evaluation of Policy Requiring Waste Treatment Installations Which Result in Uneconomical Use of Federal, State and Local Resources". This report bears an extremely close relationship to your current report. We recommend you review the 1970 report and the Agency's response prior to preparation of your final document as we feel our comments are still applicable.

We appreciate the opportunity to comment on this report prior to its submission to Congress.

Sincerely yours,



William Drayton, Jr.
Assistant Administrator
for Planning and Management

Enclosure

METROPOLITAN ST. LOUIS SEWER DISTRICT



September 16, 1977

Mr. Henry Eschwege, Director
Community Economic Development Division
Room 6146
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Eschwege:

We would like to thank you for giving us the opportunity to review the draft of the proposed report "Secondary Treatment of Municipal Wastewater in the St. Louis Area--Nominal Impact Expected". We believe this report presents some important facts which must be considered in making an evaluation of the cost effectiveness of secondary treatment for the St. Louis area.

While we may not fully agree with some of the statements made by representatives of other agencies, we do believe the information in this report is essentially correct.

[See GAO note.]

Thank you once again for permitting us to comment and if we can be of any further assistance please feel free to call upon us.

Sincerely,

Peter F. Mattei
Executive Director

PFM/lcr

GAO note: Material no longer related to this report has been deleted.



Illinois Environmental Protection Agency

217/782-1654

Mississippi River Water Quality Report

September 20, 1977

**Mr. Henry Eschwege, Director
United States General Accounting Office
Washington, D.C. 20548**

Dear Mr. Eschwege:

We appreciate the opportunity to comment on your August 19, 1977 letter and attached report, entitled "Secondary Treatment of Municipal Wastewater in the St. Louis Area - Nominal Impact Expected". As discussed herein, this Agency does not concur with the conclusion of the report.

It appears that the purpose of your letter and report is intended to give the basis for not requiring the City of St. Louis (or Metropolitan St. Louis Sewer District) to install secondary waste treatment facilities at the LeMay and Bissell Point Treatment Works.

The apparent position of the General Accounting Office is that the additional St. Louis treatment facilities would produce little improvement in Mississippi River water quality and the monetary costs would greatly exceed the benefits.

The primary issues are in the areas of: Impact on Mississippi River Water Quality; Costs of providing additional waste treatment; Recommendations to the Congress relative to flexibility for secondary treatment; and Alternative Policies.

Impact on Mississippi River Water Quality

The Illinois Environmental Protection Agency Phase I Water Quality Management Plan (Section 303(e)) for the section of the Mississippi River in question concluded that even after all point sources in Illinois have secondary treatment or better, violations of the applicable standards will occur for fecal coliform, copper, manganese, iron, mercury and dissolved oxygen downstream of the St. Louis area.

It should be pointed out that the water quality problems detected by this Agency's monitoring network in 1975 and identified by the Section 303(e) report were not minor excursions from the regulations.

Values were obtained for fecal coliform, total iron, mercury and copper as high as 45,000 per 100 ml, 9.0 mg/l, 13 micrograms/l, and 0.5 mg/l, respectively. Also values for dissolved oxygen were as low as 2.2 mg/l. The minimum dissolved oxygen occurred on August 12, 1975 when the Mississippi River flow was 63,437 MGD. As a point for comparison with the report attached to your letter, the following flow figures are presented:

1. August 11, 1975 - flow - 59,497 MGD
2. August 12, 1975 - flow - 63,437 MGD
3. Minimum 7 day 10 year low flow - 29,761 MGD
4. Minimum flow of record - 11,628 MGD
5. Maximum flow of record - 658,274 MGD

These flow figures were provided by the United States Geological Survey and the Illinois State Water Survey.

Additional water quality data for the Mississippi River including information for years 1974 through 1977, are included for your review. Also indicated in the enclosure is an identification of the points of collection. You will note that the points for sample collection start well upstream of St. Louis and extend to the Ohio River.

Since the objective of both the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500), and the Illinois Environmental Protection Act is to restore and maintain the chemical, physical and biological integrity of the Nation's (Illinois) Waters, it does not seem particularly wise to allow such an important national resource to continue in a degraded condition.

Furthermore, St. Louis could be the first of many pollutant dischargers along the Mississippi which attempt the same argument - secondary treatment is not necessary because of a "nominal impact" on the Mississippi River. Where would this stop? What would be the "last straw" to begin requiring secondary treatment at each site?

In the first place the impact is not nominal. Contrary to the analysis presented in the report, which showed secondary treatment as increasing the dissolved oxygen (DO) by 0.1 mg/l, Illinois Environmental Protection Agency sampling showed DO levels less than 3 for a considerable duration in the summer and fall of 1975. Perhaps, if the oxygen demand of ammonia-nitrogen and benthos had been considered in your consultant's analysis, as well as an accurate 7 day, 10 year low flow and a more reasonable and narrower width of stream, the analysis would have shown the problem revealed by our data.

Similarly, other areas of the technical support for the position of GAO do not appear to be well founded.

Project Costs

No one ever said that water pollution control was inexpensive. On the contrary, water pollution control has proven quite costly. Municipalities and industries up and down the River are not particularly eager to endorse the expenditure of large amounts of money for water pollution control. Yet, because of the need to limit the total quantity of pollutants discharged, all contributors must do their part. If the GAO recommendation were to prevail, who would notify the communities and industries along the Mississippi River and major tributaries that they too are having "nominal impact" on the river and do not need to provide secondary treatment?

Later when the existing problems get even more severe, who tells them they need to expend two to three times today's figures for the same degree of treatment.

Recommendation To The Congress

The recommendation of the report attempts to perform in piecemeal (case-by-case) fashion all that Section 208 of PL 92-500 is intended to accomplish through a systematic and thorough analysis of all water quality factors.

Since the cumulative impact of all pollutant dischargers must be considered, a case-by-case analysis as recommended is not advisable. As indicated above, the Section 208 Water Quality Management Planning Process was intended to serve the purpose of determining when more or less treatment was needed.

If any modification in PL 92-500 occurs, which would grant waivers from secondary treatment, it should provide for the suggested flexibility at the smallest installations, not the largest.

Alternative Policies

There are numerous statements in the Alternative Policies Section of the report which cannot be supported. An item-by-item discussion of the alternates in question is not possible within the constraints of this letter.

Summary

In summary, the rationale for not requiring secondary treatment at the two St. Louis treatment works is not provided in the report attached to your letter. We strongly believe that secondary treatment for St. Louis is necessary and should be implemented .

Very truly yours,



Michael P. Mauzy
Acting Director

MTW:bls/790/sp/1-4

Enclosure

cc: Alan Hais, USEPA, Washington D.C.
W. H. Busch, IEPA
R. S. Schleuger, IEPA

[See GAO note.]

GAO note: Material no longer related to this report has been deleted.

JOSEPH P. TEASDALE
GOVERNOR



CAROLYN ASHFORD
DIRECTOR

missouri department of natural resources

2010 Missouri Blvd.
P.O. Box 1388 Jefferson City, Missouri 65101 314-751 3241

10.600

October 13, 1977

Director, Community and Economic Development
U. S. General Accounting Office
Room 6146
441 G Street, N. W.
Washington, D. C. 20548

Dear Sir:

Attached is a copy of a letter we wrote to Mr. Alan Hais,
U. S. Environmental Protection Agency, Washington, D. C.
outlining our comments on the draft GAO Report entitled "Secondary
Treatment of Municipal Wastewater in the St. Louis Area - Nominal
Impact Expected".

If you have any questions, please advise.

Yours truly,


Charles A. Stieffermann, P. E.
Director of Municipal Waste Section
Water Quality Program

CAS/lb

enc.

Division of Environmental Quality

10.600

September 28, 1977

Mr. Alan Hais
Municipal Construction Division
Municipal Technology Branch
OWPO, WH-547
U. S. Environmental Protection Agency
Washington, D. C. 20460

Dear Mr. Hais:

We have reviewed the draft CAO Report on "Secondary Treatment of Municipal Wastewater in the St. Louis Area - Nominal Impact Expected", and offer the following comments.

The recommendation on page 25B to amend Public Law 92-500 to eliminate the mandatory requirement for secondary treatment is ambiguous as it is not clear whether it applies to all discharges in the state or only to discharges to the Mississippi River in the St. Louis area. If the recommendation applies to all discharges, we feel that it is inappropriate, as it would qualify every discharger in the state to apply for a waiver or deferral. This could adversely affect the clean water program because it would be necessary to review each request and demonstrate why a waiver or deferral could or could not be granted. If the recommendation applies to only those discharges going into the Mississippi River in the St. Louis area, which should necessarily be expanded to include all discharges to the Missouri River and Mississippi River below St. Louis, we still feel it is inappropriate at this time. We would recommend instead that the state be granted the flexibility in establishment of priorities to defer funding of the major secondary treatment facilities discharging to the Missouri and Mississippi Rivers until other high priority needs are satisfied, such as construction of secondary treatment on other streams, advanced waste treatment where needed, correction of bypasses, and construction of necessary interceptor sewers. If amendments to Public Law 92-500 are needed to allow EPA the flexibility on enforcement and to modify guidelines for establishment of funding priority lists to permit deferral of these projects, we recommend that this be done. In this way, by the time funding would be available for these major facilities, detailed analysis and modeling

Mr. Alan Hais

September 28, 1977

studies could be made to more accurately determine if the beneficial effects of secondary treatment would be adequate to justify the expenditure. If it is justified, the construction could proceed and if it is not, the mandatory secondary treatment requirement could then be changed at that time, to permit case by case waivers where justified.

If you have any questions regarding the above comments, please advise. We appreciate the opportunity to review and comment on this report.

Yours truly,



James P. Odendahl, P. E.
Director
Division of Environmental Quality

JPO/CAS/la

PRINCIPAL ENVIRONMENTAL PROTECTION AGENCY OFFICIALSRESPONSIBLE FOR ACTIVITIESDISCUSSED IN THIS REPORT

	<u>Tenure of office</u>	
	<u>From</u>	<u>To</u>
ADMINISTRATOR, EPA:		
Douglas M. Costle	Mar. 1977	Present
John R. Quarles, Jr. (acting)	Jan. 1977	Mar. 1977
Russell E. Train	Sept. 1973	Jan. 1977
John R. Quarles, Jr. (acting)	Aug. 1973	Sept. 1973
Robert W. Fri (acting)	Apr. 1973	Aug. 1973
William D. Ruckelshaus	Dec. 1970	Apr. 1973
ASSISTANT ADMINISTRATOR FOR WATER AND HAZARDOUS MATERIALS (note a):		
Thomas C. Jorling	June 1977	Present
Andrew Breidenbach	Sept. 1975	June 1977
James L. Agee	Apr. 1974	Sept. 1975
Roger Strelow (acting)	Feb. 1974	Apr. 1974
Robert L. Sansom	Apr. 1972	Feb. 1974
DEPUTY ASSISTANT ADMINISTRATOR FOR WATER PROGRAM OPERATIONS:		
John R. Rhett	Mar. 1973	Present
Louis De Camp (acting)	Sept. 1972	Mar. 1973
Eugene T. Jensen	June 1971	Sept. 1972

a/Before April 22, 1974, the title of this position was Assistant Administrator for Air and Water Programs.

(08741)