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STATEMENT OF
HENRY ESCHWEGE, DIRECTOR
COMMUNITY AND ECONOMIC DEVELOPMENT DIVISION



115486

BEFORE THE
SUBCOMMITTEE ON ENVIRONMENTAL POLLUTION
SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

ON
THE ENVIRONMENTAL PROTECTION AGENCY'S
WATER POLLUTION CONTROL CONSTRUCTION GRANTS PROGRAM

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE:

WE ARE HERE AT YOUR INVITATION TO PRESENT OUR OBSERVATIONS AND CONCERNS REGARDING THE ENVIRONMENTAL PROTECTION AGENCY'S MULTI-BILLION DOLLAR CONSTRUCTION GRANTS PROGRAM. OUR COMMENTS WILL BE BASED ON ISSUES PRESENTED IN A NUMBER OF OUR REPORTS ISSUED SINCE ENACTMENT OF THE CLEAN WATER ACT OF 1977. (ATTACHMENT I.)

WE BELIEVE THESE HEARINGS ARE MOST TIMELY BECAUSE OF THE GROWING CONCERN IN THE COUNTRY AND THE CONGRESS OVER THE NEED TO REDUCE GOVERNMENT SPENDING AND CONTROL INFLATION.

ANY PROGRAM WITH THE MAGNITUDE, SCOPE, AND COMPLEXITY OF THE CONSTRUCTION GRANTS PROGRAM--ONE OF THE LARGEST PUBLIC WORKS PROGRAMS IN THE HISTORY OF THE NATION--IS BOUND TO EXPERIENCE PROBLEMS. NEVERTHELESS, THE PROGRAM HAS ALSO HAD SOME SUCCESSES, PARTICULARLY WITH THE CONTROL OF INDUSTRIAL WATER POLLUTION. HEAVILY POLLUTED RIVERS, SUCH AS THE CAYAHOGA, ARE BEING CLEANED UP AND VALUABLE COMMERCIAL AND SPORT FISH SUCH AS SALMON AND TROUT ARE RETURNING TO MANY RIVERS WHERE THEY LONG AGO DISAPPEARED.

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OUR WATERS ARE UNDOUBTEDLY GETTING CLEANER, BUT WHAT CONCERNS US IS THAT MANY OF THE PROBLEM AREAS HAVE PERSISTED. SECONDARY TREATMENT IS NOT ALWAYS NEEDED. ADVANCED WASTE TREATMENT FACILITIES--THE MOST EXPENSIVE TYPE OF POLLUTION CONTROL--FREQUENTLY ARE NOT WELL JUSTIFIED AND MAY NOT SUBSTANTIALLY IMPROVE WATER QUALITY. ACCORDINGLY, THE BENEFITS DERIVED FROM THE FUNDS INVESTED IN SUCH FACILITIES ARE OFTEN SUBJECT TO SERIOUS QUESTION. COMPREHENSIVE PLANNING HAS NOT BEEN ACCOMPLISHED. NONPOINT SOURCES OF POLLUTION, SUCH AS RUNOFF FROM AGRICULTURE AND FOREST LANDS, ARE OFTEN MORE OF A PROBLEM THAN POLLUTION FROM INDUSTRIAL OR MUNICIPAL POINT SOURCES. LESS COSTLY ALTERNATIVES ARE NOT ALWAYS USED. LOW-INCOME FAMILIES IN SMALL COMMUNITIES ARE FINDING IT VERY DIFFICULT TO PAY USER CHARGES AND HOOKUP AND CONNECTION FEES BROUGHT ABOUT BY EXPENSIVE TREATMENT PLANTS. CONTINUING OPERATION AND MAINTENANCE (O&M) PROBLEMS HAVE SIGNIFICANTLY DECREASED THE EFFECTIVENESS OF COMPLETED PLANTS. EXISTING WATER QUALITY MONITORING SYSTEMS DO NOT PROVIDE THE TYPE AND QUALITY OF DATA NEEDED TO ASSESS CONDITIONS AND THE EFFECTIVENESS OF CLEAN UP EFFORTS. EACH OF THESE AREAS NEEDS THE CLOSE ATTENTION OF EPA.

WATER POLLUTION CONSTRUCTION IS EXTREMELY COSTLY

LET ME PROVIDE A LITTLE BIT OF BACKGROUND. THE PROGRAM BEGAN UNDER THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1956. AT FIRST, ONLY SMALL COMMUNITIES PARTICIPATED BECAUSE GRANTS UNDER THIS ACT WERE LIMITED TO THE LESSER OF 30 PERCENT OF THE PROJECT COST OR \$250,000. THE 1966 WATER POLLUTION AMENDMENTS OPENED THE PROGRAM TO CITIES OF ALL SIZES BY REMOVING THE DOLLAR CEILING, AND INCREASING THE FEDERAL SHARE OF PROJECT COSTS UNDER SOME CIRCUMSTANCES TO 40 OR 50 PERCENT. THE

MOST EXTENSIVE AND FAR-REACHING PROGRAM LEGISLATION WAS THE FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, (PUBLIC LAW 92-500) WHICH INCREASED THE FEDERAL SHARE TO 75 PERCENT OF PROJECT COSTS. MOST OF THE PROJECTS CURRENTLY FUNDED RECEIVE 75 PERCENT FEDERAL MONEY.

THE CLEAN WATER ACT OF 1977 OPENED THE POSSIBILITY OF A STILL LARGER FEDERAL SHARE. A PROJECT USING INNOVATIVE AND ALTERNATIVE TECHNOLOGY CAN RECEIVE UP TO 85 PERCENT FEDERAL MONEY. IF SUCH A PROJECT FAILS, 100 PERCENT GRANTS ARE AVAILABLE TO FUND MODIFICATION OR REPLACEMENT COSTS.

THE CONGRESS APPROPRIATED ALMOST \$35 BILLION BETWEEN 1972 AND 1981 AND AUTHORIZED ANOTHER \$5 BILLION FOR FISCAL YEAR 1982. BEYOND 1982, EPA'S 1980 NEEDS SURVEY SHOWS THAT \$120 BILLION IN FEDERAL FUNDS WILL BE NEEDED THROUGH THE YEAR 2000.

THESE EPA ESTIMATES ARE FOR CONTROLLING POINT SOURCES OF POLLUTION ONLY AND DO NOT ADDRESS POLLUTION FROM NON-POINT SOURCES. WE SEE NONPOINT POLLUTION AS A MULTIBILLION DOLLAR PROBLEM NOW COMING ONTO THE HORIZON. ALSO, POLLUTION COSTS WILL GO EVEN HIGHER WHEN INDUSTRIES ADD PRETREATMENT COMPONENTS TO MEET TOXIC CHEMICAL STANDARDS.

NOT ONLY ARE THE CAPITAL COSTS FOR BUILDING THE WASTE TREATMENT PLANTS HIGH BUT O&M COSTS PAID BY THE USERS ARE STAGGERING AS WELL. EPA ESTIMATED ANNUAL O&M COSTS AT \$6 BILLION IN 1980 AND THEY MAY REACH \$30 BILLION BY 1990.

SECONDARY TREATMENT IS NOT ALWAYS NEEDED

THE ACT REQUIRES MUNICIPAL WASTEWATER TREATMENT FACILITIES TO PROVIDE AT LEAST SECONDARY TREATMENT TO ANY DISCHARGES

MADE TO FRESH WATER REGARDLESS OF THE EFFECT SUCH TREATMENT WILL HAVE ON WATER QUALITY. THERE ARE SOME LOCATIONS, HOWEVER, WHERE SECONDARY TREATMENT MAY NOT BE NEEDED BECAUSE THE TREATMENT WILL ONLY MARGINALLY IMPROVE THE QUALITY OF THE RECEIVING WATER. SOME RIVERS HAVE THE CAPACITY TO ABSORB WASTEWATER DISCHARGES FROM A LOWER LEVEL OF TREATMENT. GREATER FLEXIBILITY IS NEEDED TO ALLOW LESS COSTLY ALTERNATIVES AS LONG AS THE WATER QUALITY IS NOT MATERIALLY AFFECTED.

FOR EXAMPLE, TWO MUNICIPAL WASTE TREATMENT FACILITIES IN THE ST. LOUIS, MISSOURI AREA WERE PLANNED TO BE UPGRADED FROM PRIMARY TO SECONDARY TREATMENT AT AN EXPECTED FEDERAL COST OF \$163 MILLION. WE FOUND THAT SUCH TREATMENT WOULD HAVE LITTLE EFFECT ON IMPROVING THE WATER QUALITY AND, ESPECIALLY, THE USES OF THE RECEIVING WATER-- THE MISSISSIPPI RIVER. TWO PRIMARY PURPOSES OF SECONDARY TREATMENT ARE TO ENHANCE OXYGEN LEVELS OF RECEIVING WATERS AND REDUCE SUSPENDED SOLIDS. IN THIS CASE, THERE WAS NO OXYGEN PROBLEM AND SECONDARY TREATMENT WOULD HAVE NO SIGNIFICANT IMPACT ON SUSPENDED SOLID CONCENTRATIONS.

THIS AND OTHER SITUATIONS SUGGEST THAT THE LAW COULD BE MORE FLEXIBLE SO THAT EACH PROPOSED SECONDARY TREATMENT FACILITY CAN BE EVALUATED ON ITS OWN MERITS. WE RECOMMENDED THAT THE CONGRESS AMEND THE LAW TO REMOVE THE MANDATORY REQUIREMENT FOR SECONDARY TREATMENT OF DISCHARGES TO FRESH WATER AND TO PERMIT THE EPA ADMINISTRATOR TO GRANT WAIVERS, DEFERRALS, OR MODIFICATIONS ON A CASE-BY-CASE BASIS WHEN DISCHARGERS CAN DEMONSTRATE THAT THE ENVIRONMENTAL IMPACT OF SECONDARY TREATMENT WILL BE MINIMAL OR INSIGNIFICANT.

WE ARE ALSO CONCERNED THAT MORE MUNICIPALITIES WERE NOT ABLE TO TAKE ADVANTAGE OF THE PROVISION IN THE CLEAN WATER ACT OF 1977 WHICH ALLOWS SECONDARY TREATMENT WAIVERS FOR DISCHARGES INTO MARINE WATERS. PUBLICLY OWNED TREATMENT FACILITIES COULD OBTAIN A WAIVER OF THE SECONDARY TREATMENT REQUIREMENT WHEN THEIR DISCHARGES INTO MARINE WATERS WOULD NOT CAUSE ENVIRONMENTAL DAMAGE.

IN MAY 1981 WE REPORTED THAT MANY COMMUNITIES HAVE BEEN DISCOURAGED FROM APPLYING FOR SECONDARY TREATMENT WAIVERS BECAUSE OF LEGISLATIVE CONSTRAINTS AND RESTRICTIVE EPA ADMINISTRATION OF THE WAIVER PROVISION. ALTHOUGH 230 COMMUNITIES SUBMITTED PRELIMINARY APPLICATIONS, ONLY 70 SUBMITTED FINAL WAIVER APPLICATIONS TO EPA BECAUSE:

- THE CLEAN WATER ACT PROVIDED LIMITED TIME FOR COMMUNITIES TO APPLY FOR WAIVERS AND MADE COMMUNITIES WITHOUT EXISTING MARINE OUTFALLS INELIGIBLE FOR WAIVERS;
- EPA'S RESTRICTIVE ADMINISTRATION INCLUDED COMPLEX WAIVER REGULATIONS AND EXTENSIVE INFORMATION REQUIREMENTS, WHICH WERE VERY COSTLY;
- FEDERAL FUNDING WAS NOT PROVIDED FOR WAIVER STUDIES; AND
- EPA'S DEFINITION OF WASTEWATER TREATMENT TECHNOLOGY, UNLESS CHANGED, WILL REQUIRE ALL COMMUNITIES TO HAVE SECONDARY TREATMENT BY 1983, REGARDLESS OF WHETHER THEY RECEIVE WAIVERS.

AS A RESULT, WE FOUND MISSED OPPORTUNITIES FOR SIGNIFICANT SAVINGS. FOR 34 COMMUNITIES VISITED, WE ESTIMATED THE TOTAL POTENTIAL CONSTRUCTION COSTS SAVINGS AT ABOUT \$1.3 BILLION AND THE ANNUAL OPERATION AND MAINTENANCE COST SAVINGS AT ABOUT \$49 MILLION.

WE BELIEVE THAT EPA AND THE CONGRESS COULD PROTECT THE ENVIRONMENT YET TAKE ADVANTAGE OF THIS SAVINGS POTENTIAL BY REOPENING, MODIFYING, AND CONTINUING THE WAIVER PROVISION.

ADVANCED WASTE TREATMENT FACILITIES--
ARE THEY WORTH THE COST?

WE HAVE BEEN PARTICULARLY CONCERNED WITH A TREND TOWARDS CONSTRUCTING VERY EXPENSIVE ADVANCED WASTE TREATMENT FACILITIES TO PREVENT VIOLATIONS OF WATER QUALITY STANDARDS. MANY COMMUNITIES ARE BEING REQUIRED TO PROVIDE SUCH TREATMENT EVEN THOUGH ANTICIPATED VIOLATIONS MAY BE NEITHER SIGNIFICANT OR CERTAIN AND WITHOUT REASONABLE ASSURANCES THAT THE TREATMENT WILL SIGNIFICANTLY IMPROVE WATER QUALITY. WE QUESTION WHETHER ADVANCED WASTE TREATMENT FACILITIES WHICH PROVIDE ONLY MARGINAL WATER QUALITY AND PUBLIC HEALTH IMPROVEMENTS SHOULD CONTINUE TO BE FUNDED.

SECONDARY TREATMENT PLANTS ARE GENERALLY DESIGNED TO REMOVE 85 PERCENT OF THE POLLUTANTS. REMOVAL OF THE LAST 15 PERCENT THROUGH ADVANCED WASTE TREATMENT COULD COST AT LEAST 5 TIMES AS MUCH AS THE FIRST 85 PERCENT. EPA ESTIMATES THAT \$5.6 BILLION WILL BE NEEDED THROUGH THE YEAR 2000 TO CONSTRUCT ADVANCED WASTE TREATMENT FACILITIES FOR MUNICIPAL SEWAGE.

OUR ANALYSIS SHOWED THAT EPA WAS FINANCING SOME ADVANCED WASTE TREATMENT FACILITIES WITHOUT SUFFICIENT WATER QUALITY DATA AND WITHOUT ADEQUATELY CONSIDERING THE HIGH COSTS INVOLVED. EPA AND THE STATES NEED TO OBTAIN BETTER WATER QUALITY INFORMATION AND CONSIDER ALL WATER POLLUTION CONTROL ALTERNATIVES SO THAT TREATMENT METHODS SELECTED WOULD IMPROVE WATER QUALITY AND RESULT IN MORE EFFICIENT USE OF FEDERAL FUNDS.

EPA OFFICIALS HAVE AGREED WITH OUR POSITION ON ADVANCED WASTE TREATMENT AND STATED THAT EPA AND THE STATES HAD GIVEN INSUFFICIENT ATTENTION TO JUSTIFYING THESE FACILITIES. THE AGENCY IS NOW COMMITTED TO A MORE RIGOROUS ANALYSIS AT THE PLANNING STAGE, AND TO A

MORE CAREFUL CONSIDERATION OF THE COST EFFECTIVENESS OF PARTICULAR PROJECTS AND ALTERNATIVE SOLUTIONS. WE RECOMMENDED TO THE CONGRESS IN A JULY 1980 REPORT THAT A COST/BENEFITS APPROACH TO FUNDING ADVANCED WASTE TREATMENT PROJECTS BE SERIOUSLY CONSIDERED.

COMPREHENSIVE PLANNING HAS
NOT BEEN ACCOMPLISHED

AS EARLY AS 1969, WE REPORTED TO THE CONGRESS ON THE NEED FOR COMPREHENSIVE PLANNING AND RECOMMENDED THAT SYSTEMATIC PLANNING BE DEVELOPED TO RELATE FACILITY CONSTRUCTION TO WATER QUALITY IMPROVEMENT. AREAWIDE PLANNING SHOULD PROVIDE A SOUND BASIS FOR DETERMINING THE TYPE OF FACILITIES AND THE DEGREE OF TREATMENT NEEDED TO SOLVE WATER POLLUTION PROBLEMS. ALTHOUGH THE PLANNING PROGRAM HAS ACHIEVED SOME SUCCESS, MANY PROBLEMS HAVE HINDERED THE EFFECTIVENESS. (ATTACHMENT II SHOWS AN EXAMPLE OF THE BENEFITS OF PLANNING.)

UNFORTUNATELY, EPA AND THE STATES GAVE LOW PRIORITY TO THE AREAWIDE PLANNING PROGRAM IN THE EARLY YEARS OF PUBLIC LAW 92-500. IN DECEMBER 1978 WE REPORTED MAJOR PROBLEMS WITH THE PROGRAM. THE TECHNICAL CAPABILITY TO IDENTIFY THE CAUSE AND EFFECT RELATIONSHIP AMONG NONPOINT POLLUTION SOURCES AND THE EXPECTED WATER QUALITY IMPACTS OF VARIOUS CONTROL TECHNIQUES STILL DOES NOT EXIST; PLANNING AGENCIES WILL NOT CONTINUE AREAWIDE PLANNING WITHOUT FEDERAL FUNDS; AREAWIDE PLANS IF DEVELOPED MAY NOT BE IMPLEMENTED BECAUSE OF INSTITUTIONAL PROBLEMS; AND THE GENERAL PUBLIC HAS PARTICIPATED LITTLE IN THE PLANNING PROCESS. NEVERTHELESS, THE AREAWIDE PLANNING PROGRAM IS BEING RAPIDLY PHASED OUT; IN FACT NO FUNDING HAS BEEN REQUESTED FOR FISCAL YEAR 1982.

WE BELIEVE A CONTINUED NEED EXISTS TO SUPPORT COMPREHENSIVE PLANNING EFFORTS IN SPECIFIC AREAS WHERE PRIORITY PROBLEMS PERSIST.

NONPOINT POLLUTION IS A MAJOR PROBLEM

NONPOINT POLLUTION, RUNOFFS FROM AGRICULTURE AND FOREST LANDS, MINING AND CONSTRUCTION SITES, AND URBAN AREA STORMS, ARE DIFFICULT TO MEASURE, CONTROL, AND ELIMINATE. WE DO KNOW, HOWEVER, THAT NON-POINT POLLUTION IS A MAJOR PROBLEM, ACCOUNTING FOR MORE THAN HALF THE POLLUTANTS ENTERING NATIONAL WATERS. THIS PERCENTAGE WILL INCREASE AS PROGRESS IS MADE IN ABATING POINT SOURCES OF POLLUTION. FEDERAL AND STATE OFFICIALS AGREE THAT IN MANY AREAS OF THE COUNTRY THE 1983 WATER QUALITY GOALS CANNOT BE ATTAINED BECAUSE OF NONPOINT POLLUTION.

YET COMPARED TO THE-CONSTRUCTION GRANTS PROGRAM UNDER THE CLEAN WATER ACT, VERY LITTLE FUNDING IS PROVIDED FOR NONPOINT SOURCES. TO DATE THE PRIMARY PROGRAM COVERING NONPOINT POLLUTION HAS RECEIVED OBLIGATIONS OF ONLY \$396 MILLION WHILE PROGRAMS COVERING POINT SOURCES HAVE RECEIVED \$35 BILLION. NONPOINT POLLUTION, THEREFORE, IS RECEIVING ONLY ABOUT ONE PERCENT OF THE TOTAL POLLUTION FUNDING.

VERY LITTLE IS KNOWN ABOUT THE CAUSE/EFFECT RELATIONSHIP OF NONPOINT POLLUTION TO WATER QUALITY, THE EXACT MAGNITUDE OF NON-POINT PROBLEMS, AND THE COSTS WHICH WILL BE INCURRED TO CORRECT THE PROBLEMS. WHAT IS DISTURBING TO US IS THAT THE FUNDS NOW BEING SPENT TO BUILD FACILITIES TO CONTROL POINT SOURCES OF POLLUTION MAY NOT HAVE AS MUCH IMPACT ON IMPROVING WATER QUALITY AS ORIGINALLY BELIEVED BECAUSE NONPOINT POLLUTION MAY BE NEGATING OR AT LEAST LESSENING THE IMPACT.

LESS COSTLY ALTERNATIVES

LESS COSTLY BUT VIABLE ALTERNATIVES ARE NOT ALWAYS USED. FOR EXAMPLE, IN NOVEMBER 1978 WE REPORTED THAT A VERY OLD TREATMENT

TECHNOLOGY--THE SEPTIC SYSTEM, WHEN PROPERLY DESIGNED, INSTALLED, AND MAINTAINED--IS AN ACCEPTABLE ALTERNATIVE TO COSTLY CENTRAL TREATMENT PROCESSES. HOWEVER, A LACK OF ENCOURAGEMENT BY FEDERAL AGENCIES IN BUILDING SEPTIC SYSTEMS TO PERMANENTLY SOLVE WASTE-WATER TREATMENT PROBLEMS, THE LACK OF FINANCIAL INCENTIVES, AND THE RELUCTANCE OF STATES AND COMMUNITIES TO DEVELOP MORE EFFECTIVE TECHNIQUES TO MANAGE AND CONTROL SEPTIC SYSTEMS ACTIVITIES, HAD CONTRIBUTED TO THE FAILURE TO USE THIS VIABLE ALTERNATIVE.

EPA HAS TAKEN STEPS TO PROMOTE GREATER USE OF SEPTIC SYSTEMS, INCLUDING THE PUBLICATION OF GUIDANCE AS TO WHEN SEPTIC SYSTEMS COULD BE USED AND A SEPTIC SYSTEM DESIGN MANUAL. WE ARE CURRENTLY REVIEWING THE ADEQUACY OF THE FACILITY PLANNING PROCESS AND ARE EVALUATING, AMONG OTHER THINGS, THE EXTENT TO WHICH SEPTIC SYSTEMS ARE BEING PROMOTED AND ENCOURAGED AS A PERMANENT METHOD OF WASTE-WATER TREATMENT.

ALSO, STEMMING POLLUTION AND FLOODING CAUSED BY COMBINED STORM SEWER AND SEWAGE SYSTEMS WILL PRESENT A CHALLENGE TO OUR INNOVATIVE ABILITIES BECAUSE OF THE ENORMOUS COSTS ASSOCIATED WITH THE TRADITIONAL LARGE CONSTRUCTION PROJECTS USED TO CONTROL SUCH POLLUTION. FOR EXAMPLE, IN JANUARY 1981 WE ESTIMATED THAT THE TOTAL COST OF CHICAGO'S TUNNEL AND RESERVOIR PROJECT, WITH ITS 131 MILES OF UNDERGROUND TUNNELS, THREE OPEN PIT STORAGE RESERVOIRS, TREATMENT PLANT UPGRADING, LOCAL SEWER UPGRADING, AND VARIOUS OTHER PROJECTS WOULD APPROACH \$12.5 BILLION, WHICH IS GREATER THAN THE ALASKA PIPELINE. THERE ARE MOVES AFOOT TO SIGNIFICANTLY SCALE DOWN THE CHICAGO PROJECT.

ALTERNATIVE TECHNIQUES TO CONTROL COMBINED SEWER PROBLEMS, INCLUDING MEASURES TO REDUCE THE FLOW OF RAIN OR POLLUTANTS INTO THE SYSTEM, DEVICES TO INCREASE THE FLOW OF SEWAGE

THROUGH THE SYSTEM, AND DEVICES TO REGULATE AND TREAT SEWAGE AT OVERFLOW POINTS, HAVE PROVEN THEIR VALUE HERE AND IN OTHER COUNTRIES AND CAN PROVIDE RELIEF AT FAR LESS FEDERAL AND LOCAL COST. YET SUCH TECHNIQUES HAVE NOT BEEN WIDELY USED BECAUSE OF INFLEXIBLE WATER QUALITY GOALS, EPA'S POSITION THAT THE CLEAN WATER ACT PROVIDES GRANT FUNDS ONLY FOR CONSTRUCTION TYPE PROJECTS, AND THE LOW PRIORITY GIVEN TO COMBINED SEWER OVERFLOW ABATEMENT, COMPARED TO TREATMENT PLANTS.

COMBINED SEWER OVERFLOWS ARE A SIGNIFICANT PROBLEM IN MANY AREAS AND CANNOT BE IGNORED. WE BELIEVE, HOWEVER, THAT THE USE OF INEXPENSIVE TECHNIQUES SHOULD BE EMPHASIZED AND COMMUNITIES BE REQUIRED TO MAKE MAXIMUM USE OF LOWER COST ALTERNATIVES BEFORE FUNDING LARGE SCALE, STRUCTURAL PROJECTS. WHILE THESE TECHNIQUES MAY NOT PROVIDE A TOTAL SOLUTION, IT IS TIME TO REALIZE THAT THE CURRENT APPROACH IS NOT WORKING AND FUNDS IN THE MAGNITUDE REQUIRED FOR STRUCTURAL APPROACHES ARE NOT AVAILABLE AND PROBABLY NEVER WILL BE.

TREATMENT PLANTS OFTEN DON'T PERFORM AS PLANNED

DESPITE A FEDERAL EXPENDITURE OF \$25 BILLION, PLUS SEVERAL BILLION MORE IN STATE AND LOCAL FUNDS TO CONSTRUCT NEW WASTEWATER TREATMENT PLANTS OR TO MODIFY AND EXPAND EXISTING PLANTS, MANY ARE NOT TREATING WASTEWATER AT THE EFFICIENCY LEVELS THEY WERE DESIGNED TO ACHIEVE. EPA REPORTED OVER THE PAST SEVERAL YEARS THAT AT ANY GIVEN POINT IN TIME 50 TO 75 PERCENT OF THE PLANTS ARE IN VIOLATION OF THEIR PERMITS. OUR NOVEMBER 1980 REPORT PORTRAYED AN EVEN MORE ALARMING PICTURE. OF 242 PLANTS SAMPLED IN 10 STATES, 87 PERCENT WERE IN VIOLATION OF THEIR PERMIT AND 31 PERCENT WERE, IN OUR OPINION, IN SERIOUS VIOLATION.

THIS CONTINUING PROBLEM HAS BEEN CAUSED BY A COMBINATION OF FACTORS, INCLUDING DESIGN AND EQUIPMENT DEFICIENCIES, INFILTRATION/INFLOW OVERLOADS, INDUSTRIAL WASTE OVERLOADS, AND OPERATION AND MAINTENANCE DEFICIENCIES. BUT MORE IMPORTANTLY, VIRTUALLY NO ONE WILL ACCEPT ACCOUNTABILITY OR RESPONSIBILITY FOR THE FAILURE OF TREATMENT PLANTS TO MEET PERMIT CONDITIONS.

THE QUESTION OF ACCOUNTABILITY AND/OR RESPONSIBILITY FOR TREATMENT PLANTS INVOLVES A TANGLED WEB OF CHARGES, COUNTERCHARGES, INNUENDOS, AND FINGER POINTING BY THE VARIOUS PARTIES INVOLVED IN PLANT CONSTRUCTION. THESE PARTIES INCLUDE EPA, STATE, AND LOCAL OFFICIALS; DESIGN ENGINEERS; EQUIPMENT MANUFACTURERS; AND CONSTRUCTION CONTRACTORS AND SUBCONTRACTORS. EVEN WHEN THE POTENTIAL EXISTS TO LEGALLY RESOLVE THE ACCOUNTABILITY/RESPONSIBILITY ISSUE, EPA HAS NOT ENCOURAGED GRANTEES TO TAKE ACTION OR BECOME LEGALLY INVOLVED. AS A RESULT FEDERAL, STATE, AND LOCAL GOVERNMENTS SPEND MILLIONS TO FIX THE SAME TREATMENT PLANTS FOR WHICH THEY ORIGINALLY, OFTEN RECENTLY, SPENT MILLIONS TO CONSTRUCT.

WE SEE NO SIMPLE SOLUTION TO THIS MULTIBILLION DOLLAR PROBLEM. WE HAVE SUGGESTED VARIOUS ALTERNATIVES, SUCH AS THE TURNKEY CONCEPT, OR THAT EPA AND THE STATES BECOME A PARTY TO THE VARIOUS CONTRACTS NEGOTIATED FOR THE PLANNING, DESIGN, AND CONSTRUCTION PHASES. CLEAR LINES OF ACCOUNTABILITY MUST BE ESTABLISHED IN CONTRACTS AND CHANGES AND MODIFICATION TO SYSTEMS DURING ANY OF THE PHASES MUST BE CLEARLY DOCUMENTED. STATE AND EPA TECHNICAL ASSISTANCE PROGRAMS MAY NEED TO BE REINSTITUTED

OR STRENGTHENED TO HELP GRANTEES TO IDENTIFY, EVALUATE AND SOLVE TREATMENT PLANT OPERATIONAL PROBLEMS.

IN RESPONSE TO OUR REPORT EPA STATED THAT IT IS CURRENTLY CONDUCTING A SERIES OF STUDIES TO IDENTIFY PROBLEMS, DEFINE ALTERNATIVE SOLUTIONS, AND RECOMMEND POLICIES AND DIRECTIONS TO IMPROVE PROGRAMS WHICH AFFECT PUBLICLY OWNED TREATMENT PLANTS.

ECONOMIC AND SOCIAL
IMPACTS ON SMALL COMMUNITIES

LOCAL COMMUNITIES HAVE A SIGNIFICANT RESPONSIBILITY FOR ADMINISTERING ENVIRONMENTAL PROGRAMS. IN THE WATER QUALITY PROGRAM, THE LOCAL COMMUNITIES ARE GENERALLY RESPONSIBLE FOR UP TO 25 PERCENT OF THE ELIGIBLE COSTS OF CONSTRUCTING THE TREATMENT PLANTS, ALL OF THE DEBT SERVICE TO FINANCE THE LOCAL SHARE, AND ALL OF THE OPERATIONS AND MAINTENANCE COSTS. OVER THE LIFETIME OF A TREATMENT PLANT, THE COSTS BORNE BY THE LOCAL COMMUNITIES CAN EASILY BE GREATER THAN THE 75 PERCENT SHARE OF THE CONSTRUCTION COSTS PROVIDED BY THE FEDERAL GOVERNMENT.

ALTHOUGH ALL COMMUNITIES ARE AFFECTED TO SOME EXTENT BY POLLUTION CONTROL COSTS, WE REPORTED IN MAY 1980 THAT THE COST TO SMALL COMMUNITIES--THOSE UNDER 10,000 POPULATION--EXACTS A MUCH HIGHER ECONOMIC AND SOCIAL PRICE BECAUSE THE COSTS MUST BE SHARED BY FEWER TAXPAYERS, SOMETIMES PLACING SEVERE BURDENS ON LOW-INCOME RESIDENTS.

WE BELIEVE EPA NEEDS TO EXPERIMENT WITH COMPREHENSIVE APPROACHES TO POLLUTION CONTROL FOR SMALL COMMUNITIES, SUCH AS:

--SPECIAL TECHNICAL ASSISTANCE TO HELP A COMMUNITY DETERMINE THE MOST COST EFFECTIVE WAY OF MEETING ENVIRONMENTAL REQUIREMENTS.

--PHASED IMPLEMENTATION OF FEDERAL REQUIREMENTS WHEN CONCURRENT IMPLEMENTATION WOULD BE TOO COSTLY.

--SUSPENSION OR WAIVER OF INDIVIDUAL REQUIREMENTS WHEN THE COSTS ARE HIGH AND THE POTENTIAL ENVIRONMENTAL BENEFITS ARE MINIMAL OR THE PROJECT MAY BE ENVIRONMENTALLY HARMFUL.

EPA STATED THAT IT INTENDS TO EXPERIMENT WITH COMPREHENSIVE POLLUTION CONTROL APPROACHES TAILORED TO ADDRESS THE ENVIRONMENTAL AND SOCIAL NEEDS FOR SMALL COMMUNITIES. IT FURTHER STATED THAT IT PLANNED TO UNDERTAKE A MAJOR PROGRAM INITIATIVE DIRECTED AT SMALL COMMUNITIES, INCLUDING AN EXTENSIVE OPERATION TRAINING PROGRAM AND A RESEARCH AND DEVELOPMENT PROGRAM AIMED AT SMALL SYSTEMS TECHNOLOGY.

ASSESSING THE EFFECTIVENESS
OF POLLUTION CONTROL EFFORTS

SOUND ASSESSMENTS OF WATER QUALITY ARE ESSENTIAL TO THE NATION'S WATER POLLUTION CONTROL AND CLEANUP PROGRAMS. YET TOO OFTEN, VITAL HEALTH AND ECONOMIC DECISIONS ARE BASED ON RESEARCH THAT IS NOT CONCLUSIVE AND DATA THAT IS OBTAINED FROM INADEQUATE ENVIRONMENTAL MONITORING SYSTEMS. IN A 1980 REPORT ON WATER QUALITY STANDARD VIOLATIONS WE REPORTED THAT THE OPINIONS OF COMPETENT SCIENTISTS CONFLICT ON THE DEGREE TO WHICH VARIOUS POLLUTANTS AFFECT AQUATIC LIFE; TEST RESULTS VARY WIDELY FOR THE SAME FISH SPECIES, SIMILAR CONDITIONS, AND THE SAME TOXIC MATERIAL. EVEN RELATIVELY COMMON WATER QUALITY CHARACTERISTICS, SUCH AS DISSOLVED OXYGEN AND AMMONIA, LACK FIRM SCIENTIFIC BASES AND ARE OFTEN SHROUDED IN CONTROVERSY.

SIMILARLY, WE REPORTED IN APRIL 1981 THAT THE WATER QUALITY SAMPLING NETWORKS OF EPA AND THE GEOLOGICAL SURVEY WHICH ARE

USED TO ANALYZE WHETHER RIVERS ARE BECOMING CLEANER, STAYING THE SAME, OR GETTING MORE POLLUTED, CANNOT PROVIDE SUFFICIENTLY SOUND DATA FOR SUCH ASSESSMENTS. NETWORK SAMPLES ARE TAKEN TOO INFREQUENTLY AND STATIONS ARE PLACED TOO SPARSELY TO DEAL WITH THE COMPLEX NATURE OF WATER QUALITY AND INCONSISTENCY AND ERRORS IN FIELD AND LABORATORY PERFORMANCE MAKE NETWORK WATER QUALITY DATA EVEN LESS RELIABLE. AS A RESULT, STATISTICAL COMPARISONS AND WATER QUALITY ASSESSMENTS BASED ON NETWORK DATA ARE HIGHLY QUESTIONABLE.

WE RECOMMENDED THAT THE NETWORKS BE DISCONTINUED AND THEIR RESOURCES BE SHIFTED TO A PROGRAM OF SPECIAL STUDIES OF WATER QUALITY.

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THIS COMPLETES MY PREPARED STATEMENT. WE SHALL BE GLAD TO RESPOND TO YOUR QUESTIONS.

LIST OF GAO'S REPORTS ON
THE CONSTRUCTION GRANTS PROGRAM
1978-1981

"Environmental Protection Agency's Construction Grant Program--
Stronger Financial Controls Needed," CED-78-24, April 3, 1978

"Review of the Implementation of Industry Cost Recovery and User
Charge Systems," CED-78-102, April 11, 1978

"Secondary Treatment of Municipal Wastewater in the St. Louis
Area--Minimal Impact Expected," CED-78-76, May 12, 1978

"Questions Continue As To Prices In Contracting For Architec-
tural-Engineering Services Under The Environment," CED-78-94,
June 6, 1978

"More Effective Action By The Environmental Protection Agency
Needed To Enforce Industrial Compliance With Water Pollution
Control Discharge Permits," CED-78-182, October 17, 1978

"Community-Managed Septic Systems--A Viable Alternative To
Sewage Treatment Plants," CED-78-168, November 3, 1978

"Reuse of Municipal Wastewater and Development of New Technology--
Emphasis and Direction Needed," CED-78-177, November 13, 1978

"Water Quality Management Planning Is Not Comprehensive and May
Not Be Effective For Many Years," CED-78-167, December 11, 1978

"Wastewater Treatment: What Does It Cost The Homeowner?"
CED-79-35, February 13, 1979

"Combined Sewer Flooding And Pollution--A National Problem. The
Search For Solutions In Chicago," CED-79-77, May 15, 1979

"Large Construction Projects To Correct Combined Sewer Overflows
Are Too Costly," CED-80-40, December 28, 1979

"EPA Should Help small Communities Cope With Federal Pollution
Control Requirements," CED-80-92, May 30, 1980

"Many Water Quality Standard Violations May Not Be Significant
Enough To Justify Costly Preventive Actions," CED-80-86,
July 2, 1980

"Costly Wastewater Treatment Plants Fail To Perform As Expected,"
CED-81-9, November 14, 1980

"Chicago's Tunnel and Reservoir Plan--Costs Continue to Rise And
Completion of Phase I Is Unlikely," CED-81-51, January 21, 1981

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"Better Monitoring Techniques Are Needed To Assess the Quality Of Rivers and Streams," CED-81-30, April 30, 1981

"Millions of Dollars Could Be Saved By Implementing GAO Recommendations on Environmental Protection Agency Programs," CED-81-92, May 5, 1981

"Billions Could Be Saved Through Waivers For Coastal Wastewater Treatment Plants," CED-81-68, May 22, 1981

THE WILLAMETTE STUDY--AN EXAMPLE OF

THE BENEFITS OF USING GOOD DATA FOR PLANNING *

Several experts we contacted in the field of water quality analysis stated that much of the national effort to attain desirable water quality is based on inadequate data. Methods of obtaining the needed water quality information are available and are starting to be implemented by some of the States. At the same time, however, even these methods are being continuously improved. In addition to EPA obtaining water quality information, other Federal agencies are assisting in developing methods for obtaining and interpreting water quality data.

After collecting cause and effect data based on a pilot study of the Willamette River in Oregon, a U.S. Geological Survey (USGS) team identified alternatives for achieving water quality standards. These alternatives may save several million dollars in Federal and State construction funds. Several members of the Department of the Interior's Advisory Committee on Water Data for Public Use--which includes national authorities on pollution control--said that the Willamette study was excellent and should be used as an example of how water quality studies should be done. Oregon Department of Environmental Quality officials also stated that the USGS study was well done and that the State is using the results of the study to clean up its water.

CLEANING UP THE WILLAMETTE RIVER

The Willamette River Basin is located in northwestern Oregon. Within the basin are three of the State's largest cities, Portland, Salem, and Eugene and about 70 percent of the State's population. The basin supports an important timber, agricultural, industrial, and recreational economy and also extensive fish and wildlife areas.

The Willamette River has been carefully studied in the past and, on the basis of this information, extensive cleanup has been made in Oregon by various industries, the State, and the Federal Government. The goal of this cleanup was to provide a water quality that satisfied the recreational and aesthetic requirements of people and an adequate environment for fish. One of the most important measures of water quality is dissolved oxygen. The State has set requirements for minimum levels of dissolved oxygen necessary for fish and other aquatic organisms and for the prevention of offensive odors.

*Source: "Better Data Collection and Planning is needed to Justify Advanced Waste Treatment Construction," CED-77-12, December 21, 1976, pp. 37-43.

Through several years of extensive cleanup, all the industrial and municipal dischargers on the river finally achieved secondary treatment of their wastes in 1972. The Willamette River is now the largest river in the United States on which all known point sources of wastewaters receive secondary treatment. As a result, the water quality of the river has markedly improved, reaching the State standards for dissolved oxygen in all but extremely low-flow years.

Because of strong State interest in environmental matters, the State Department of Environmental Quality planned to take additional actions to make sure that the Willamette water quality met or exceeded State standards at all times. The State planned to require advanced wastewater treatment for all municipal and industrial polluters to remove additional amounts of BOD and suspended solids. This advanced treatment requirement would have affected a large number of municipal polluters and could have cost tens of millions of Federal and State dollars.

The results of the U.S. Geological Survey study of the Willamette, begun in January 1973 and done in cooperation with the Oregon Department of Environmental Quality, indicated that effective and efficient management alternatives were available which could achieve the desired water quality standard, yet save millions of dollars.

A DESCRIPTION OF THE WILLAMETTE STUDY

The purpose of the Willamette River pilot study was to (1) develop and test new methods for river quality analysis and (2) use the information obtained to determine the impact of various alternatives on water quality. As noted by the study team:

"Achievement of desirable river quality at acceptable cost requires that management decisions be based on sound impact assessments, not on arbitrary assumptions. Thus, the vital link between resource-development plans and management decisions is scientific assessment to predict the probable impacts of each planning alternative."

To understand the cause and effect water quality relationships in the Willamette Basin, the study team looked at the basin's hydrology, chemistry, and biology. The team stated that river basin studies have to be developed on a case-by-case basis because each basin has different characteristics that need to be considered.

A large amount of river quality data had been collected in previous studies, and much of this data was useful for background purposes of the USGS study. Information on pollutant loadings, flow, and water quality had not been collected at the same time. Consequently, cause and effect relationships could not be determined. Additionally, in order for monitoring and surveying information to be useful, the sampling has to be aimed at the specific needs of the program managers. Water quality experts cannot simply collect general data and try to use it later for a variety of specific purposes.

The study team prepared a mathematical model of dissolved oxygen to test alternatives concerned with variable water flow and pollutant loadings. The study team defined specific data needs and modified certain standard tests to meet the changing conditions of the water. For instance, most of the BOD tests in previous river quality studies were given a 5-day analysis which is a standard test. However, the basinwide implementation of secondary treatment had removed a substantial percentage of the rapidly decaying wastes from the water. The remaining wastes in the river tended to degrade much more slowly. The study team thus used a 20-day test of BOD which was more meaningful.

Because river quality planning and management decisions in the Willamette Basin have been dictated primarily by poor water quality conditions that occur during the summer when low flows and high temperatures exist, the study team aimed the tests and modeling at this critical period. The study team believed that collecting extensive dissolved oxygen data during the remainder of the year for assessing management alternatives would waste both time and money. Because only a short period of the year needed to be studied, fieldwork could be very intensive to provide a high degree of data reliability.

The study emphasized the importance of timeliness in gathering information for water quality planning and management needs. Even with this emphasis, however, the study took 2-1/2 years to complete. In commenting on the extended time frame, the study team stated that few, if any, rivers have existing data that is valid and adequate enough to permit sound river quality planning. Therefore, for complex river systems, 2 to 3 years of intensive data collection, verification, and analysis during critical periods is generally needed. The data can be collected during a short, low-flow period during the summer, but it takes 2 or more years to analyze and verify the conclusions developed from the data.

The study cost an estimated \$500,000 to complete. A large part of the money, however, was used to experiment with new approaches, testing techniques, and methods of analysis. The director of the study team estimated that a similar study, using the newly developed approaches and methods, would cost about \$150,000 to \$200,000 and would require 2 years to complete.

The study did require a great deal of money, but it is only a fraction of the tens of millions of dollars it would have cost to install advanced waste treatment facilities to remove more BOD and suspended solids basinwide.

RESULTS OF THE WILLAMETTE STUDY

The study team found that the generally high quality of the Willamette River during most of the year was the result of two factors--basinwide implementation of secondary treatment and low-flow augmentation. The naturally occurring low summer flows have been augmented by a number of Corps of Engineers reservoirs which were built for irrigation and navigation and not for water quality enhancement. The Corps maintains a minimum flow of 6,000 cubic feet per second during the critical summer months. In comparison, the naturally occurring low flow for the unusually dry summer of 1973 would have been 3,260 cubic feet per second.

The study team stated that, without flow augmentation, State dissolved oxygen standards would have been violated for a large segment of the river during the 1973 natural flow. They also found that, even though secondary treatment had a profound effect on the river, increasing BOD and suspended solids removal by implementing advanced waste treatment would not have appreciably increased the dissolved oxygen levels further. One reason for this is because, of the total remaining BOD in the river, almost one-half represents natural sources of pollution. Thus only one-half of the BOD is potentially amenable to removal by higher levels of treatment at point sources.

According to the study team, the major factor affecting dissolved oxygen levels in the only segment of the river that did not meet State standards in the summer of 1973 was the discharge of ammonia by industrial dischargers. About 68 percent of the ammonia came from one industrial discharger. When this ammonia is discharged to the Willamette, it reacts with bacteria in the river to change its chemical form. This reaction consumes dissolved oxygen.

The study results indicated that advanced waste treatment construction for all municipal and industrial dischargers

to remove additional amounts of BOD and suspended solids over secondary treatment levels would not appreciably increase the dissolved oxygen levels in the river. Instead, the study results showed that the continued augmenting of the flow of the river from reservoirs and controlling just the one industrial firm's large ammonia discharge would greatly reduce the impact of nitrogen and achieve desirable dissolved oxygen levels throughout the Willamette River.

The effect of the dissolved oxygen level of the various alternatives examined by the study team is shown on page 22. The dotted line represents the State standards for dissolved oxygen levels in the Willamette. Line B shows the actual dissolved oxygen levels in the Willamette during the summer of 1973, when the flow was augmented to 6,000 cubic feet per second. Line C shows what the dissolved oxygen levels would have been in the summer of 1973 if the Willamette's flow had not been augmented. As can be readily seen, if the flow had not been augmented, the dissolved oxygen levels would have violated the State standards for a large segment of the river.

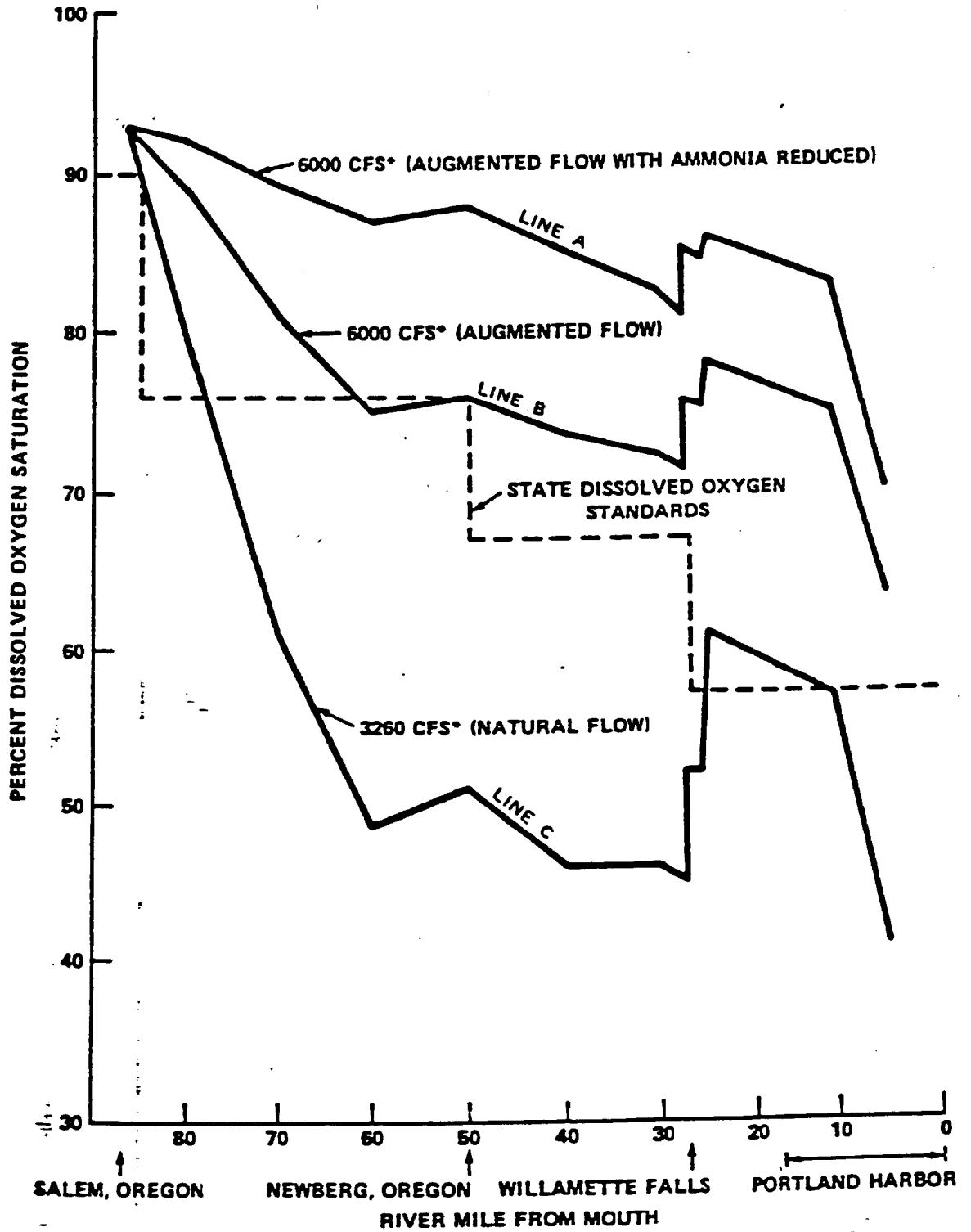
Line A represents the dissolved oxygen levels attainable through the continued use of low-flow augmentation and the reduction of ammonia from present dischargers. Under this alternative, the State standards would be exceeded at all times.

If all municipal and industrial dischargers were required to go to advanced waste treatment to remove additional amounts of BOD and suspended solids as originally planned by the State, the study showed that the existing dissolved oxygen levels, as shown by line B, would not change substantially.

The USGS analysis of the Willamette was completed in August 1975. An official of the Oregon Department of Environmental Quality stated that, because of the new information, the State has revised its water cleanup on the Willamette. Efforts are now being made to reduce the ammonia loadings from both industrial and municipal point sources.

Concerning the need for maintaining adequate flow levels in the river, an official of the Oregon Department of Environmental Quality explained that the State has no control over the water flow levels on the Willamette. Even with the high levels of treatment at the point sources on the Willamette, the present good quality waters would fall below the State standard if the Corps of Engineers decreased the flow levels because of changes in irrigation or navigation.

IMPACT OF FLOW AND AMMONIA LOADING
ON WILLAMETTE RIVER DISSOLVED OXYGEN LEVELS, JULY-AUGUST 1973



*CUBIC FEET PER SECOND - REPRESENTS THE AVERAGE FLOW AT SALEM, OREGON.

An April 1975 State water quality report noted that, of the various factors affecting water quality, the loss of streamflow would be the most detrimental to water quality. The report emphasized the need for increased attention to streamflow as follows:

"The value of a flowing stream needs public recognition and support equal to that given to the protection of water quality through the control of waste discharges."

CONCLUSION

Because USGS used better data to develop cause and effect relationships in evaluating the various water pollution control alternatives, more effective, efficient, and economical means of achieving desirable water quality were discovered.

We believe this case study illustrates the potential benefits that can be obtained if additional emphasis is placed on collecting scientifically sound water quality data and using it to carefully analyze management alternatives for water pollution control. In complex river basins, such studies will take a considerable amount of time and money but the Willamette example illustrates the great potential benefits that can result if this additional time and money is spent.