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ENVIRONMENTAL PROTECTION AGENCY



**FISCAL YEAR 1978
BUDGET**

PART 1

OMB SUBMISSION FOR OFFICIAL USE ONLY



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Summary

Budget Authority, Contract Authority, Obligations, Outlays, End-of-Year Employment By Appropriation (dollars in thousands)

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978
<u>Abatement and Control</u>				
Budget authority.....	\$375,283	\$329,544	\$379,588	\$456,700
Obligations.....	323,177	330,519	427,000	457,000
Outlays.....	276,127	260,000	360,818	431,000
Contract authority.....	35,545	45,000	49,182	...
End-of-year employment.....	3,941	4,241	4,253	5,312
<u>Enforcement</u>				
Budget authority.....	52,263	56,561	56,331	78,100
Obligations.....	48,865	56,561	56,331	78,100
Outlays.....	51,264	56,000	57,000	76,000
End-of-year employment.....	1,560	1,595	1,609	2,271
<u>Research and Development</u>				
Budget authority.....	164,871	159,476	259,496	287,000
Obligations.....	133,872	152,155	288,000	277,000
Outlays.....	170,180	160,000	220,000	231,000
End-of-year employment.....	1,714	1,679	1,798	1,873

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>
<u>Energy Research and Development</u>				
Budget authority.....	100,550	96,973	...	...
Obligations.....	83,422	88,333	56,223	...
Outlays.....	65,687	120,000	74,000	48,000
End-of-year employment.....	143	123	...	...
<u>Agency and Regional Management</u>				
Budget authority.....	71,583	67,538	70,890	80,905
Obligations.....	60,754	67,538	70,890	80,905
Outlays.....	65,498	66,000	72,000	81,000
End-of-year employment.....	1,992	1,795	1,824	1,926
<u>Buildings and Facilities</u>				
Budget authority.....	2,969	2,100	2,100	7,100
Obligations.....	636	2,186	5,755	7,100
Outlays.....	555	2,000	2,400	3,300
<u>Construction Grants</u>				
Budget authority.....	...	...	5,900,000	5,200,000
Contract authority.....	...	...	...	...
Obligations.....	63,336	...	700,000	5,600,000
Contract authority.....	4,265,892	6,076,420	5,300,000	1,000,000
Outlays.....	662,905	400,000	620,000	200,000
Contract authority.....	1,765,664	3,370,000	3,760,000	5,000,000

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978
<u>Scientific Activities Overseas</u>				
Budget authority.....	4,000	6,000	5,000	5,000
Obligations.....	3,261	6,000	5,984	5,000
Outlays.....	3,725	5,000	4,000	4,000
<u>Operations, Research, and Facilities</u>				
Obligations.....	11,071	3,600	3,400	2,600
Outlays.....	20,803	16,000	20,000	8,000
End-of-year employment.....	20	...	...	...
<u>Revolving Fund</u>				
Obligations.....	455	500	500	500
Outlays.....	-214	-50	-50	-50
<u>Trust Funds</u>				
Obligations.....	12	...	...	...
Outlays.....	15	...	49	...
<u>Reimbursements</u>				
Obligations.....	4,625	6,000	6,800	6,800
End-of-year employment.....	111	105	116	116
<u>Advances and Allocations Accounts</u>				
End-of-year employment.....	...	12	...	...

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978
<u>Consolidated Working Fund</u>				
Obligations.....	73	...	...	...
Outlays.....	161	...	147	...
<u>Total, Environmental Protection</u>				
Agency				
Budget authority.....	771,519	718,192	6,673,405	6,114,805
Contract authority.....	...	...	...	...
Obligations.....	733,559	713,392	1,620,883	6,515,005
Contract authority.....	4,265,892	6,076,420	5,300,000	1,000,000
Outlays.....	1,316,706	1,084,950	1,430,364	1,082,250
Contract authority.....	1,801,209	3,415,000	3,809,182	5,000,000
End-of-year employment.....	9,481	9,550	9,600	11,498

NOTE: Excludes transfer of Environmental Impact Statement activities from Agency and Regional Management to Abatement and Control:

Budget authority.....	8,872
Obligations.....	3,416
Outlays.....	3,416
End-of-year employment....	123

All subsequent tables and text include this transfer.

End-of-year employment = permanent positions.

Summary of Increase or Decrease
Budget Authority and End-of-Year Employment
(dollars in thousands)

	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>	<u>Increase + Decrease -</u>
<u>Abatement and Control</u>			
Budget authority.....	\$379,588	\$456,700	+ \$77,112
End-of-year employment.....	4,253*	5,312	+ 1,059
<u>Enforcement</u>			
Budget authority.....	56,331	78,100	+ 21,769
End-of-year employment.....	1,609	2,271	+ 662
<u>Research and Development</u>			
Budget authority.....	259,496	287,000	+ 27,504
End-of-year employment.....	1,798	1,873	+ 75
<u>Agency and Regional Management</u>			
Budget Authority.....	70,890	80,905	+ 10,015
End-of-year employment.....	1,824	1,926	+ 102
<u>Buildings and Facilities</u>			
Budget authority.....	2,100	7,100	+ 5,000
<u>Scientific Activities Overseas</u>			
Budget authority.....	5,000	5,000	...
<u>Reimbursements</u>			
End-of-year employment.....	116	116	...
<u>Trust Funds</u>			
Budget authority.....	...	...	...
<u>Total, Environmental Protection Agency</u>			
Budget authority.....	773,405	914,805	+ 141,400
End-of-year employment.....	9,600	11,498	+ 1,898

*End-of-year employment = permanent positions.

Transition Quarter
 Budget Authority, Contract Authority, Obligations, Outlays
 By Appropriation
 (in thousands of dollars)

	<u>Total</u>
<u>Abatement and Control</u>	
Budget authority.....	\$92,639
Obligations.....	124,168
Outlays.....	74,000
Contract authority.....	19,000
<u>Enforcement</u>	
Budget authority.....	13,931
Obligations.....	17,375
Outlays.....	15,000
<u>Research and Development</u>	
Budget authority.....	42,923
Obligations.....	55,925
Outlays.....	40,000
<u>Energy Research and Development</u>	
Budget authority.....	21,000
Obligations.....	30,138
Outlays.....	27,000
<u>Agency and Regional Management</u>	
Budget authority.....	16,923
Obligations.....	28,110
Outlays.....	20,000
<u>Buildings and Facilities</u>	
Budget authority.....	500
Obligations.....	533
Outlays.....	600

<u>Construction Grants</u>	
Obligations.....	27,806
Contract authority.....	966,506
Outlays.....	150,000
Contract authority.....	800,000

<u>Scientific Activities Overseas</u>	
Budget authority.....	670
Obligations.....	670
Outlays.....	1,000

<u>Trust Funds</u>	
Obligations.....	76
Outlays.....	30

<u>Total, Environmental Protection Agency</u>	
Budget authority.....	188,586
Obligations.....	284,801
Contract authority.....	966,506
Outlays.....	327,630
Contract authority.....	819,000

NOTE: Excludes transfer of \$2,061 for Environmental Impact Statement activities from Agency and Regional Management to Abatement and Control;

Budget authority.....	1,920
Obligations.....	7,376
Outlays.....	6,000

Liquidation of Contract Authority
(in thousands of dollars)

	<u>Actual 1976</u>	<u>Transition Quarter</u>	<u>1977</u>	<u>1978</u>
Construction Grants.....	\$800,000	\$800,000	\$3,800,000	\$5,000,000
Abatement and Control (Areawide Waste Treatment Management Grants).....	65,000	19,000	49,182	...
Total.....	865,000	819,000	3,849,182	5,000,000

Summary of Budget Authority, Contract Authority,
Obligations, Outlays and End-of-Year Employment
By Media
(dollars in thousands)

<u>Air</u>				
Budget authority.....	\$147,882	\$142,824	\$146,882	\$201,882
End-of-year employment.....	1,670	1,763	1,776	2,077
<u>Water Quality</u>				
Budget authority.....	246,664	178,237	218,254	239,744
End-of-year employment.....	3,156	3,132	3,115	4,138
<u>Water Supply</u>				
Budget authority.....	32,327	43,754	44,507	62,907
End-of-year employment.....	245	298	296	549
<u>Solid Wastes</u>				
Budget authority.....	16,632	15,737	15,763	19,163
End-of-year employment.....	172	183	185	198
<u>Pesticides</u>				
Budget authority.....	44,175	39,807	40,045	47,645
End-of-year employment.....	962	952	954	1,080
<u>Radiation</u>				
Budget authority.....	6,067	4,901	5,545	7,805
End-of-year employment.....	229	204	214	230

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>
<u>Noise</u>				
Budget authority.....	10,203	10,285	10,283	11,783
End-of-year employment.....	383	395	396	135
<u>Interdisciplinary</u>				
Budget authority.....	18,362 ^{a/}	36,020	38,057	41,756
End-of-year employment.....	326	350	323	390
<u>Toxic Substances</u>				
Budget authority.....	8,837	7,367	7,417	7,417
End-of-year employment.....	36	52	47	47
<u>Program Management and Support</u>				
Budget authority.....	68,897	67,195	72,235	80,771
End-of-year employment.....	459	486	483	489
<u>Agency and Regional Management</u>				
Budget authority.....	65,374 ^{a/}	67,538	70,890	80,905
End-of-year employment.....	1,869	1,795	1,824	1,926
<u>Energy</u>				
Budget authority.....	100,000	96,427	96,427	100,927
End-of-year employment.....	143	123	123	123
<u>Buildings and Facilities</u>				
Budget authority.....	2,100	2,100	2,100	7,100

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>
<u>Construction Grants</u>				
Budget authority.....	...	...	...	...
<u>Scientific Activities Overseas</u>				
Budget authority.....	4,000	6,000	5,000	5,000
<u>Operations, Research and Facilities</u>				
End-of-year employment.....	20	...	...	...
<u>Reimbursements</u>				
End-of-year employment.....	111	105	116	116
<u>Advances and Allocations Accounts</u>				
End-of-year employment.....	...	12	...	...
<u>Total, Environmental Protection Agency</u>				
Budget authority.....	771,520	718,192	773,405	914,805
End-of-year employment.....	9,481	9,550	9,600	11,498

a/ Includes comparative transfer of EIS from Agency and Regional Management to Interdisciplinary:

Budget authority.....	\$8,872
End-of-year employment	123



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AIR

Program Highlights

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs. 1977</u>
Abatement & Control					
Appropriation.....	\$63,552	\$83,139	\$89,001	\$127,401	+\$38,400
Permanent Positions...	787	815	823	919	+96
Transition Quarter Est.	33,693	N/A	N/A	N/A	
Enforcement					
Appropriation.....	12,963	13,743	14,325	21,425	+\$7,100
Permanent Positions....	432	477	493	668	+175
Transition Quarter Est.	4,725	N/A	N/A	N/A	
Research & Development					
Appropriation.....	35,806	45,942	43,556	53,056	+9,500
Permanent Positions....	451	471	460	490	+30
Transition Quarter Est.	15,855	N/A	N/A	N/A	
Total - Air Program					
Appropriation.....	112,321	142,824	146,882	201,882	+55,000
Permanent Positions....	1,670	1,763	1,776	2,077	+301
Transition Quarter Est.	54,273	N/A	N/A	N/A	

Overview and Strategy

The Clean Air Act authorizes a national program of air pollution research, regulation, and enforcement activities. Under the Act primary responsibility for the prevention and control of air pollution rests with State and local governments, with the program directed at the Federal level by the Environmental Protection Agency (EPA). EPA's role is to conduct research and development programs, set national environmental goals, ensure that adequate standards and regulations are established to meet these goals, provide assistance to the States, and ensure that the standards and regulations are effectively enforced.

The environmental standards are the National Ambient Air Quality Standards (NAAQS). These standards set forth the allowable concentration in air of pollutants which affect human health and public welfare. The health and other effects of pollutants are delineated in criteria documents which are the basis for the standards. National Ambient Air Quality Standards have been set for total suspended particulates, sulfur dioxide, nitrogen dioxide, carbon monoxide, photochemical oxidants, and hydrocarbons. Two types of standards are set: primary standards to protect human health and secondary standards to protect the public welfare (prevention of damage to property, animals, vegetation, crops, visibility, etc.). Controlling emissions to meet standards is handled through two major types of activities: (1) States carry out State implementation plans (SIPs) which control pollution primarily by prescribing specific emission limitations or control actions for types of polluters and (2) EPA controls emissions from new motor vehicles and selected stationary sources.

The attainment of the primary NAAQS has been the primary objective of the air program under the Clean Air Act. The combined Federal-State-local effort at controlling air pollution has achieved a notable degree of success in reducing air pollutant emission levels and in moving ambient air quality across the nation. However, it is also clear that the standards have not been attained at many areas of the nation. (Nonattainment is defined as the NAAQS being exceeded at one or more monitoring sites in the AQCR.)

Although there are many AQCRs with ambient air quality levels exceeding standards, significant progress has been made in reducing pollutant levels and in attaining standards for the pollutants, predominantly associated with stationary sources. The concentration of particulates in the ambient air has decreased annually at an average rate of 5 percent through 1975. A review of the most recent sulfur dioxide ambient data show that concentrations in urban areas have decreased an average of 30 percent since 1970. Fewer than 10 percent of all urban monitors are exceeding the sulfur dioxide standards.

Progress has also been documented for automotive-related pollutants. Although carbon monoxide historical data are limited, available data in several States and major cities suggest a continuation in the general improvement noted in EPA trend reports. The average number of occasions in which 8-hour concentrations exceed the carbon monoxide standard has declined, typically by 50 percent, in many

of the urbanized portions of the States for which data are available. Historical data on oxidants (which are produced by the photochemical transformation in the atmosphere of hydrocarbons emitted from both stationary and mobile sources) exist for only a few urban areas. Los Angeles and San Francisco have shown notable improvements; the number of hours in excess of the oxidant standard has been reduced by as much as 50 percent since 1970 at many monitoring stations in these metropolitan areas. Nitrogen dioxide emissions have increased nationally about 10 percent since 1970. Because of recent changes in measurement methodology for monitoring nitrogen dioxide, few areas have sufficient historical data to assess trends. However, valid data indicate that only a few areas of the country have ambient nitrogen dioxide concentrations in excess of the national standard.

The program emphasis for FY1978 will continue to be on the attainment and maintenance of the National Ambient Air Quality Standards. Because the implementation of control actions is basically the responsibility of the State and local governments, it will be required that they take on increased responsibilities for air pollution control if the standards are to be attained, particularly if automotive-related pollutants are to be controlled. The State control plans incorporate controls for automotive related pollutants since reductions achieved as a result of the Federal motor vehicle control program are not sufficient to attain the standards for such pollutants in many areas. The Federal program for FY1978 places primary emphasis on increasing State and local control agencies' ability to control air pollution: Increased levels of resources are to be provided for control agency operations and for the implementation of motor vehicle inspection and maintenance (I/M) programs. The implementation of I/M programs is necessary to assure that motor vehicle emission controls remain in proper working order.

In order to attain the standards, efforts are to concentrate on the implementation of State implementation plans, their reassessment, and revision if indicated. For maintenance of the standards, many SIPs will have to be revised to include the controls required to assure that the ambient air quality standards are not violated in the future. The governors of 45 States have been formally notified by EPA Regional Administrators that the SIPs for their states must be revised in order to attain and maintain the NAAQS. Plan revisions are necessary in 31 States for particulate matter; 12 States for sulfur dioxide; 22 States for carbon monoxide; 29 States for photochemical oxidants; and 3 States for nitrogen dioxide. The revised plans, containing revised or additional emission limitations, must be submitted to EPA by July 1977. By July 1978, SIPs must incorporate all other necessary regulatory measures such as improved transportation measures. The revised SIPs are to provide for the attainment of the NAAQS as expeditiously as practicable.

The nature and magnitude of the problems associated with attainment and maintenance of the NAAQS varies with the specific pollutant involved. Federal programs will be aimed at the formulation of methodologies for developing control strategies and the development of control systems as well as to the support of State and local programs.

Particulate matter problems are related in many cases to sources that are not generally controllable by the application of commonly available particulate emission controls. Examples of such sources are "fugitive dust" and "urban particulate background," which result from activities such as farming operations, construction, the abrasion of road surfaces, and atmospheric reactions involving pollutants emitted as gases. Development of control strategies for particulate air pollutants that take into account these problems will require the definition of sources, development of appropriate analytical tools (including, in some cases, measurement technology), and the identification of control technology. The FY1978 program addresses these problems. For sulfur dioxide, the national problem is generally related to the need to minimize the impact on energy supplies of the specific control technologies that are to be applied for continued maintenance of the standards. The attainment of standards for this pollutant is relatively well in hand. Similarly, problems associated with carbon monoxide do not require extensive development work; implementation of available controls, rather than development of controls, seems to be required. The FY1978 program is aimed at such implementation.

Problems associated with photochemically formed pollutants (i.e., photochemical oxidants and nitrogen dioxide) are related to our understanding of their formation. Nevertheless, it is clear that reductions in precursor (hydrocarbons and nitrogen oxides) emissions will lead to their control. Understanding of the atmospheric transformation and the impact that resulting pollutants have on public health and welfare is essential if adequate control strategies are to be developed. Implementation plans as necessary will be reassessed as to their control requirements in view of improved understanding of the transport and transformation processes.

Maintenance of the standards in the long term will also be facilitated by Federal programs that lead to the minimization of emissions from new sources (i.e., new motor vehicle emission standards and standards of performance for new stationary sources) and the assurance of continued low emissions performance for these sources during their useful lives. Program emphasis is on the control of new

sources of pollutants that lead to photochemical pollutants formation (i.e., on sources of nitrogen oxides and hydrocarbons) and on programs designed to assure compliance of production and in-use vehicles with applicable emission standards. In addition, an expanded program for the control of emissions of synthetic organic chemical substances will result in the prevention of future problems associated with these substances as well as in the reduction of photochemical oxidants.

Development of the basic understanding of pollutant formation, transport, transformation, and ultimate fate requisite for the development of control recommendations for dealing with newly identified environmental problems will be continued. Among these fall the effects that sulfates and nitrates may have on human health and welfare, including long-term impacts on terrestrial ecology, e.g., acid rainfall. The definition of the impact on human health of many substances emitted to the atmosphere in small amounts, such as many trace metals, also requires attention. Emerging health problems may be averted if control programs are initiated in time.

Improving understanding of health and ecological effects and the transport and transportation of air pollutants is the responsibility of the research program. As a better scientific data base on the air pollutants now regulated becomes available, the research program is shifting to the identification of other airborne substances which may require regulation in the future. Areas receiving increased attention in FY1978 include sulfates, carcinogens, and potentially toxic airborne substances.

Research will also continue in FY1978 to provide a better data base for implementation of the NAAQS (such as the scheduled revision of the Criteria Documents), and for assessment of other potential problems, such as nitrates and trace metals. Research efforts will emphasize understanding of the formation of photochemical oxidants and nitrates, instrumentation development, and identification and quantification of pollutant emissions from various sources.

The stationary source enforcement program is directed toward supplementing State and local agency enforcement. The mobile source enforcement program is directed primarily toward achieving compliance with vehicle emissions standards and fuel regulations promulgated by EPA. In FY1978 the stationary source program will concentrate on bringing major (Class A)* sources in non-attainment areas into

*Industrial air pollution sources have been divided into classes. Major (Class A) sources are those individually capable of emitting 100 tons/year or more of a pollutant assuming no controls; Minor (Class B) sources are those individually capable of emitting from 25 tons/year to 100 tons/year of a pollutant assuming no controls.

compliance with State Implementation Plan requirements, and on the review of new sources. EPA assistance and guidance to States will be required to develop and implement new source review procedures including strategies to assess the impact on the air quality standards of potential new sources. EPA's new sources review policies are designed not to limit industrial growth but to ensure that industrial expansion and environmental protection are accomplished simultaneously. In FY1978 the stationary source enforcement program will also develop and implement, with States and communities, strategies to control minor (Class B) sources.

Mobile source enforcement efforts in FY1978 will be focused on the Selective Enforcement Audit Assembly line testing program which will be increased to the level of full implementation for light-duty vehicles. This program will assure that production line vehicles are in compliance with emission standards. The recall program will also be increased to the level of full implementation in FY1978 to help assure compliance of in-use vehicles with emission standards.

In summary, the EPA program is aimed at supporting States and localities in their air pollution control efforts, at providing an adequate level of Federal activity in those areas for which the Federal government has the primary responsibility (e.g., the setting of emissions standards for new sources) or where Federal action would result in a high environmental payoff (e.g., enforcement actions against major air pollution sources in cases where States do not have the resources to take action), and at the development of air pollution control related knowledge and techniques supportive of the national air pollution control effort (e.g., control technology for NOx, health effects of air pollutants).

SUMMARY OF INCREASES AND DECREASES

	<u>(in thousands of dollars)</u>
FY1977 Air Program.....	\$146,882
Abatement and Control.....	+38,400

The increase provides for the support of State and local air pollution control programs, including the support of programs for the control of in-use motor vehicle emissions; the setting of New Source Performance Standards for stationary sources of photochemically reactive substances; the assessment of the need for control of synthetic organic chemical substances; the development of control strategies (and the supportive analyses and analytical methodologies) for the control of complex air pollution problems, such as photochemical oxidants and particulates; the certification of motor vehicles for conformity with emissions standards; and improvements in air quality monitoring operations.

Enforcement..... +7,100

Of the requested increase of \$7,100 thousand, \$5,700 thousand is for the Stationary Source Enforcement Program to be used primarily to solve non-attainment problems posed by Class A and B emitters and to handle complex sets of problems associated with industrial growth and expansion. The other \$1,400 thousand will be used in the Mobile Source Enforcement Program for the full implementation of SEA, Recall, I/M and vapor recovery activities in the Regions.

Research and Development..... +9,500

The proposed increase in resources will be used to conduct retrospective and prospective epidemiological studies on carcinogens; to conduct population studies on health effects of sulfates and sulfuric acid and to accelerate development of field-usable sulfate monitoring equipment; characterize and evaluate air toxic agents and their industrial sources, and to develop sampling and analytical techniques for their measurement; expand Regional Air

Pollution Study work on long-range sulfate transport and transformation; assess transport and transformation of atmospheric organics, evaluate the potential for the creation of hazardous substances and assess the potential for inter-media transfer.

201,882

FY1978 Air Program Request.....

	AIR			
	Actual 1976	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
<u>Program Levels</u>				
Number of sources subject to NSPS.....	1,145	1,155	1,385	+230
Number of States delegated NSPS enforcement authority...	14	31	43	+12
Number of States delegated NESHAP enforcement authority.	11	28	40	+12
Number of pollutants covered by hazardous pollutant standards.....	3	4	4	---
Number of source categories covered by NSPS.....	19	25	30	+5
Number of engine families certified for conformity with emission standards.....	338	381	406	+25
Number of emission tests carried out for motor vehicle certification purposes.....	2,407	2,554	3,067	+513
Number of fuel economy tests carried out.....	800	800	1,500	+700

AIR ENFORCEMENT

	Actual 1976	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
<u>Program Levels</u>				
Identified Class A sources in U.S.....	21,954	23,000	26,000	+3,000
Identified Class B sources in U.S. having impact on nonattainment..	2,830	2,830	75,000	+72,170
Sources subject to FEA prohibition orders.....	75	75	1,075	+1,000
Assembly Line testing test orders.....	0	10	36	+26
Certification & production inspection/compliance....	85	80	80	0
Combined fuels/vapor recovery inspections.....	26,800	25,000	22,000	-3,000
Recall investigations.....	15	25	30	+5

AIR

Abatement and Control

Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977	Page
(dollars in thousands)					

Appropriation

Air Quality & Stationary Source Planning & Standards.....	\$7,159	\$8,058	\$8,001	\$9,501	+\$1,500	A-15
Mobile Source Standards and Guidelines.....	5,261	4,320	4,778	4,778	---	A-25
State Programs Resource Assistance.....	33,893	51,554	57,076	91,576	+34,500	A-30
Air Quality Strategies Implementation.....	5,387	5,676	5,487	6,387	+900	A-36
Mobile Source Certifica- tion and Testing.....	4,712	6,827	6,277	7,377	+1,100	A-43
Trends Monitoring and Progress Assessment...	7,140	6,704	7,382	7,782	+400	A-50
Total.....	63,552	83,139	89,001	127,401	+38,400	

Permanent Positions

Air Quality & Stationary Source Planning & Standards.....	193	181	181	196	+15	
Mobile Source Standards and Guidelines.....	54	60	51	51	---	
State Programs Resource Assistance.....	18	15	15	15	---	

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs 1977</u>	<u>Page</u>
Air Quality Strategies						
Implementation.....	234	250	240	288	+48	
Mobile Source Certification and Testing.....	161	158	166	181	+15	
Trends Monitoring and Progress Assessment...	127	151	170	188	+18	
Total.....	787	815	823	919	+96	

Purpose

The abatement and control appropriation encompasses air program activities related to the development of control strategies and control programs, and the implementation of such programs. This objective is accomplished in two basic ways. First, State and local actions are encouraged by the provision of assistance in all areas of technical and policy matters. Second, direct Federal action is taken in cases of State or local failure to act as required by the Clean Air Act. The activities under the three appropriations complement each other. Knowledge gained as a result of activities funded by research and development is translated into practical control program by abatement and control activities; if required, these programs are ultimately enforced by EPA.

Abatement and control activities in the air program are aimed at supporting the overall air program objectives of attaining and maintaining the NAAQS. Support of State and local programs is the highest priority objective under abatement and control, followed by the implementation of complementary Federal controls, i.e., New Source Performance Standards and motor vehicle emission controls. Lower emphasis must be placed on obtaining solutions for other important environmental problems, such as the control of pollutants with localized effects and the control of pollutants with no direct human health impact.

Supporting the primary air program objective are activities related to the revision of State Implementation Plans which are substantially inadequate for attaining and maintaining the standards, specially the plans for the control of particulate matter, carbon monoxide, and photochemical oxidants. The plans for the control of sulfur dioxide are generally adequate as attainment is, in most cases, well in hand. The plans for sulfur dioxide control may require revision, however, pursuant to State actions aimed at increasing the use of readily available higher sulfur content fuels.

The maintenance of the standards in the future (and, in many cases, their eventual attainment) will require long-range planning of controls with an ever increasing level of sophistication. The impact of air pollution control requirements on society, economic activity, and energy supplies will be minimized and air pollution control goals will be adequately considered along with other social goals only if improved planning processes are implemented. Program emphasis in FY1978 will be on the development of analytical tools, data bases, and processes that will foster the planning, development, and implementation of control programs at the State and local level in order to alleviate the need for Federal intervention.

The abatement and control activities are categorized under the following subactivities:

Air Quality and Stationary Source Planning and Standards. This subactivity is related to (1) the development of nationwide control strategies for both regulated and unregulated pollutants, the reassessment and modification of these strategies, and the translation of decisions on appropriate control requirements into regulatory actions; and (2) the development of emissions standards for stationary sources of air pollution, and the requisite supportive analyses and technology assessments. Control strategies developed under this subactivity are translated into criteria for State action, e.g., State Implementation Plans, or directly into Federal control requirements, e.g., New Source Performance Standards.

Mobile Sources and Standards and Guidelines. This subactivity involves the setting of emissions standards for mobile sources (including the associated technical analyses and technology assessments) and the development of mobile sources related technical procedures and guidelines applicable to the control of emissions from new and in-use vehicles. Under this subactivity, findings made in relation to the need for control of mobile source emissions under the research and development activities or under the air quality and stationary source planning and standards

subactivity are translated into practical control programs applicable to appropriate classes of motor vehicles or to appropriate stages of motor vehicle's life, from design to the end of their useful lives.

State Programs Resource Assistance. This subactivity involves the provision of resources to support State and local governments' activities in implementing air pollution control programs, including vehicle inspection and maintenance. The primary responsibility for controlling air pollution rests on the States and localities. If these governments are to effectively implement air pollution control programs, thereby eliminating or reducing the need for direct Federal intervention, supplementation of State and local resources is required. Resource supplementation, similar to other Federal programs (e.g., the National Highway Traffic Safety Administration's State and community highway safety grants), complements the purpose of the activities carried out under the other subactivities of the abatement and control appropriation.

Air Quality Strategies Implementation. This subactivity is related to the implementation of regulatory requirements for which the Federal government has primary responsibility, such as the consultation with, and overview of, air pollution control activities carried out by Federal facilities, the review of environmental impact statements prepared by other Federal agencies for air pollution impact, the implementation of air quality standards and control strategies in specific areas of the nation, and the interaction with State and local governments in the implementation of air pollution control activities. These activities result in the implementation of the general control strategies (developed under the standards subactivities) at specific areas of the nation, i.e., States and localities, through State and local control programs.

Mobile Source Certification and Testing. This subactivity includes the certification of prototype motor vehicles and engines for conformity with motor vehicle emissions standards developed under the mobile source standards and guidelines subactivity. This subactivity also includes laboratory and other associated support activities (including data analysis) involved in technology assessment, emissions characterization, test procedures development, and test procedure refinement for mobile sources.

Trends Monitoring and Progress Assessment. This subactivity includes the determination of ambient air quality and emission levels, determining their relationships, and assessing progress made towards the attainment of environmental goals. These data and assessments are used for judging the progress made in achieving legislative or regulatory program goals and providing guidance as to the need for reassessing, changing, or developing control strategies.

AIR

Air Quality and Stationary Source Planning and Standards

Appropriation	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
<u>Emissions Standards & Technology Assessment..</u>	\$3,222	\$4,056	\$4,030	\$5,030	+\$1,000
Energy & Pollutant Strategies Development..	1,845	1,918	1,911	1,911	...
State Programs Guide- lines & Regulations Development.....	2,092	2,084	2,060	2,560	+500
Total.....	7,159	8,058	8,001	9,501	+1,500
<u>Permanent Positions</u>					
<u>Emissions Standards & Technology Assessment..</u>	95	97	97	107	+10
Energy & Pollutant Strategies Development..	32	29	29	29	...
State Programs Guide- lines & Regulations Development.....	66	55	55	60	+5
Total.....	193	181	181	196	+15

Budget Request

An increase of \$1,000,000 and 10 positions for emissions standards and technology assessment will provide for emission testing and industry studies activities, which will increase the number of New Source Performance Standards (NSPS) which can be developed in 1978. Primary emphasis is on sources of HC and NOx, pollutants for which long-term nationwide emissions will be favorably impacted if standards are set at an early date. The emphasis on the synthetic organic chemicals industry will be continued. A two fold objective will be served by controlling emissions from this industry: New Source Performance Standards will significantly reduce emissions of photochemical precursors from this industry (contributing to the control of photochemical oxidants) and future problems related to the potentially toxic or carcinogenic nature of these substances will be prevented, avoiding the need for pollutant-specific controls in the future. In addition, an increase of \$500,000 and 5 positions in State programs guidelines and regulations development will provide for a greater emphasis on defining control technology for existing sources and on studies aimed at improving the technical basis for air quality management.

Program Description

This subactivity includes the setting of emission standards for stationary sources and all industry studies, cost studies, and other analyses which support the standard setting function. Also included is the setting of ambient air quality standards, the development and reassessment of nationwide control strategies needed to meet these standards, studies oriented toward the balancing of energy and environmental goals, the assessment of potential pollutants, the development of control strategies, analytical tools and guidelines, and the translation of all control strategies into regulatory actions.

Emissions Standards and Technology Assessments

New Source Performance Standards are set for production processes within specific designated industries, and for control of specific pollutants. An example is the standard for electric arc furnaces within the ferroalloy industry to control particulates. New Source Performance Standards provide the basis for controlling emerging industries, such as oil shale use, and coal gasification, and are a major

Long-run tool to prevent significant deterioration and to maintain air quality. The standards define best available control technology (BACT) for specific production units of the industries studied; the technical data used for determination of BACT are documented and made available with the standards. These data are useful to State agencies who are frequently engaged in dialogues with industry on the subject of control technology.

The standard setting activity for stationary sources has been largely concerned with process emissions of TSP and SO₂. A study prepared in 1975 by the Argonne National Laboratory has shown that the standard setting activity, with a limited increase in resources, can have a greater impact on long-term nationwide emissions by changing its emphasis to control of sources of substantial hydrocarbons and nitrogen oxide emissions. The use of standards of performance to control new sources of hydrocarbons is now seen as the main regulatory program for maintenance of oxidant standards. The use of standards of performance to control nitrogen oxides is similarly seen as the preferred regulatory approach rather than the widespread use of State implementation plans.

Fugitive emissions have also emerged as a priority target for standard setting for both new and existing sources. New programs have been initiated to delineate emission factors and control technology for this previously unregulated source of pollution.

Energy and Pollutant Strategies Development

National Ambient Air Quality Standards (NAAQS) have been set for six pollutants. Although most readily available control methods have been employed nationally, many regions have not attained standards and are not expected to attain them in the timeframe envisioned by the Clean Air Act. This situation requires a reassessment of control strategies. Methodologies and criteria for control strategy development for large geographical areas and for specific areas must be developed. In addition, air pollution problems related to atmospheric transformations (e.g., nitrogen dioxide and nitrates formed from nitrogen oxide emissions, photochemical oxidants from hydrocarbons and nitrogen oxides, and sulfates from sulfur dioxide) are proving to affect large-scale geographical areas, i.e., multi-State areas, far exceeding the size of Air Quality Control Regions (AQCRs). New approaches to air pollution control

for areas of this magnitude are required. In other cases (e.g., sulfur dioxide or carbon monoxide-related air quality problems), refinements and improvements in well-understood techniques may be in order for optimization of control requirements. The current situation with respect to EPA involvement in energy projects such as the Clean Fuels Policy, the oil-to-coal conversion program and other aspects of ESECA has made it apparent that the availability of energy fuels information, in a readily useable form, is necessary to conduct these activities. The gathering and interpretation of energy information, and the subsequent analysis using this information have become significant tasks in themselves.

Control strategies for noncriteria pollutants are also required by the Clean Air Act. The regulatory pathway for controlling these pollutants may be any of a series of authorities provided by the Clean Air Act, e.g., Section 111 (NSPS) or Section 112, National Emissions Standards for Hazardous Air Pollutants (NESHAP). To control a pollutant via Section 112, the Administrator must make a determination that the pollutant "may cause or contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible illness." Thus far, NESHAP have been applied to control mercury, asbestos and beryllium from specific sources. During 1976 vinyl chloride is to be added to the list of hazardous pollutants controlled under Section 112 and the standards for asbestos and mercury will be expanded to include additional sources. Section 111 also allows the agency to promulgate standards for control of noncriteria pollutants from not only new sources, but from existing sources as well. Sulfuric acid mist, fluorides and total reduced sulfur compounds are noncriteria pollutants regulated by NSPS. State plans to control existing sources will be initiated in FY1977. Now under review to identify specific environmental damages are several multi-media pollutants such as cadmium, chromium, arsenic and mercury. The health effects and environmental damage of approximately 700 high volume industrial organic substances, presumed to be prevalent in the environment, are being assessed. The need for action, if any, will be determined and the regulatory pathway will be recommended at the conclusion of each assessment.

State Programs Guidelines and Regulations Development

The currently identified need for the revision of the State Implementation Plans and the expected additional plan revisions for the maintenance of the standards require that the most effective control strategies be utilized by the States and localities for the control of air pollution. The identification of these control strategies and the development of the control plans by the States and localities

requires a sophisticated and integrated program aimed at the development and dissemination of policy, procedures, and guidelines to be utilized by States in implementation plan revision and development actions. An example of the results of the EPA work would be the State guidelines for control of non-criteria pollutants emitted from sources covered by new source performance standards for which regulation exist under Section 111(d) of the Clean Air Act. Other examples would be special studies to identify technical barriers to the achievement of the standards (e.g., fugitive emissions, urban particulate background) and the documentation (for use by States) of the findings of these studies. In addition, analytical tools will be prepared for State and local agencies to air in control strategy reassessment and development (EPA activities supportive of States in these tasks are described under the Air Quality Strategies Implementation subactivity).

1976 Accomplishments

The FY1976 resource level for this subactivity was \$8.9 million and 182 positions, allocated to emissions standards setting, industry studies, ESECA implementation, best available technology assessment, environmental impact assessment, sources inspections and testing, and development of guidance documents for various air pollution sources.

The development of emission standards and associated control technology assessments were allocated \$5.0 million and 97 positions. These resources included approximately \$3.0 million of contract support for studies of the synthetic organic chemicals manufacturing industry, source emissions testing, studies of evaporative hydrocarbon emissions control, industry studies (including industrial boilers, coal gasification, petroleum refineries, and iron ore beneficiation), and cost and economic analyses associated with emission standards. New Source Performance Standards were promulgated for primary copper, lead and zinc smelters, coal cleaning plants, phosphate fertilizer plants (5 processes), electric arc furnaces in iron and steel mills and ferroalloy plants. Guidelines for the control of existing phosphate fertilizer plants under section 111(d) were proposed. During FY1976 a shift in emphasis to the control of hydrocarbons from that of particulates and sulfur dioxide was made.

In addition work on the following standards will have been completed in 1976: guidelines for the control of existing sulfuric acid plants under section 111(d), sulfur recovery in petroleum refineries,

kraft pulp mills, lignite-fired steam generators, coke ovens, grain elevators, opacity for basic oxygen furnaces in iron and steel mills. Preliminary work began on the examination of 600-700 processes in the synthetic organic chemicals manufacturing industries; the study will take about 3 years and will involve 200-300 compounds. A review of health effects and environmental damages of 20 high volume industrial organics was completed. As a result, a closer examination of benzene is being made to assess its potential as a community air pollution problem.

The studies and analyses associated with the development of energy and pollutant strategies were allocated \$1.9 million and 29 positions. These resources included approximately \$0.9 million for contract support for pollutant screening and control strategy evaluations, and economic analysis of control strategies and control plans.

An assessment of arsenic was made indicating that arsenic is not a widespread urban air pollution problem but may pose a community exposure problem around nonferrous ore smelters. Additional health and control technology studies for arsenic are underway. If warranted, regulatory steps may be taken at the completion of these studies. Many requirements of the Energy Supply and Environmental Coordination Act (ESECA) were completed. ESECA, however, was extended by the Energy Policy and Conservation Act (EPCA), continuing the overall planning and guidance program aimed at environmentally sound conversions to coal of major fuel burning installations, both utility and industrial. A report prepared in late calendar 1975 indicated that the impact of gas curtailments and the burning of alternate fuels (especially coal) may significantly effect air quality. The use of replacement fuels would result in a increase in both SO₂ and TSP emissions, with the increase in emissions occurring in areas already impacted by high air pollution levels. The Energy Data System (EDS) was developed as a tool for assessing air quality and energy impacts of environmental legislation. The system will store nationwide summaries of air quality data relating to fuel consumption and atmospheric emissions from power plants and large industrial fuel burners. The Agency's policy on atmospheric sulfates was developed and published.

The development of state programs guidelines and regulations were allocated \$2.0 million and 56 positions. These resources included approximately \$0.3 million of contract support for the development of guidance on the control of fugitive particulate emissions, and the control of nitrogen oxides.

Guidance on the implementation of EPA's tall stacks policy and Supplemental Control Systems (SCS) was issued to the States and regional offices; guidance on the development of revised control strategies for particulates, nitrogen oxides, and photochemical oxidants was prepared; policy and guidelines for implementation of ESECA's coal conversion-related requirements were issued (i.e., on regional limitation determinations, primary standard conditions specification, and significant risk); and the policy for the review and control of new sources seeking to locate in areas exceeding the standards was developed.

1977 Program

The FY1977 resource level for this subactivity is \$8.0 million and 181 positions. These resources will be directed to the continued development of new source performance standards for sources of hydrocarbons and nitrogen oxides; the assessment of the air pollution impact of the synthetic organic chemicals industry, including toxic and carcinogenic effects of these substances, and the development of appropriate emissions standards; continued assessment of other pollutants as to the need for control; continued implementation of ESECA's requirements and assessment of energy impacts of air pollution controls; and development of guidance, for State and local use, on the more complex aspects of control strategy development.

The development of emission standards and technology assessment has been allocated \$4.0 million and 97 positions. These resources include approximately \$2.0 million in contract funds for continued studies of the synthetic organic chemicals industry, and emissions measurement and industry studies in support of emission standards setting. NSPS will be proposed for sulfur recovery in petroleum refineries; grain elevators; steam generators greater than 250 million BTU per hour; combined combustion of refuse and fossil fuels; phosphate rock preparation; chloralkali plants (mercury cells); lime plants; crushed and broken stone; stationary internal combustion engines; electric arc furnaces in gray iron foundries; steel mill sintering machines; stationary gas turbines; nonmetallic minerals industries (19 separate processes). Guidelines will be proposed for the control of existing primary aluminum plants under section 111(d). The following standards will be promulgated: gasoline marketing regulations; guidelines for the control of existing phosphate fertilizer; kraft pulp mills; lignite-fired steam generators; coke ovens (charging); basic oxygen furnace in steel mills; and guidelines for the control

of existing sulfuric acid plants under section 111(d). Test methods used to determine compliance with standards of performance will be revised to incorporate the International System of Measurements and to correct minor inadequacies. Guideline documents for the determination of reasonably available control technology for existing sources of hydrocarbons will be issued for approximately 12 source categories in the surface coating industry, including: motor vehicle and light truck assembly; coil, fabric, machinery, paper and can coating; as well as other solvent using processes in adhesives, rubber, and pharmaceutical manufacturing.

The work on energy and pollutant strategies has been allocated \$1.9 million and 29 positions. These resources include an estimated \$0.8 million in contracts funds for pollutant and control strategy evaluations, energy-related analyses, and economic assessments related to control strategy assessments. The program for a preliminary screening of some 700 organic chemicals as potential air contaminants is to be continued. Those chemicals determined to be of special concern will be further assessed to establish the need for regulatory action. A similar program is planned for inorganic materials with emphasis on toxic metals. An assessment of the need for a short-term ambient air quality standard for NO₂ is to be completed early in the fiscal year. Significant changes resulting from a review of the criteria documents will be reflected in the air quality standards and the strategies used for attainment and maintenance. Energy strategies studies are related to energy conversion, natural gas curtailment, supply and demand analyses, energy data base development and application, and studies regarding trends in energy/environmental problems. The program also includes the assessment of the environmental impact of power plant and industrial coal conversion. This involves (1) the technical feasibility, the time required for modification and the associated costs to convert or reconvert gas and/or oil fired power plants to coal and (2) the technical feasibility and the associated costs to retrofit these and other selected coal fired power plants with flue gas desulfurization systems. The results from these individual plant investigations will be used in both analysis and implementation of sulfur oxide control strategies and also to develop EPA strategies for the short and long term reconversion of power plants from natural gas and fuel oil to coal.

The development of State programs guidelines and regulations has been allocated \$2.1 million and 55 positions. These resources included an estimated \$1.2 million in contracts funds for the development of guidance on complex aspects of air pollution control. Work will concentrate on guidance for the control of particulate and hydrocarbon emissions. Guidance will be developed on the effectiveness of fugitive dust controls; techniques for the management of other particulate air pollution problems; air quality improvements achievable through energy conservation; fine particulates control; development of a State and local hydrocarbon control program; the spatial and temporal distribution of pollutants and their reaction products; and methodologies to relate emissions to air quality. In addition, abatement and control strategies will be analyzed in order to determine technical inadequacies causing nonachievement of the ambient air quality standards; pollution source categories for which knowledge of the emission characteristics is limited will be identified and emissions quantified; and improved emission inventory techniques as well as documents to guide State and local inventorying activities will be developed.

1978 Plan

The FY1978 plan for this subactivity includes \$9.5 million and 196 positions. There are no plans for purchasing ADP hardware or software. Contracts funds in FY1978 approximate \$5.0 million. The increase of \$1.0 million and 10 positions for emission standards and technology assessments will provide for accelerating the setting of national emission standards for sources of hydrocarbons and nitrogen oxides, and continued work on the synthetic organic chemicals industry, including the determination of the need for possible pollutant-specific controls for any of these substances that may be toxic or carcinogenic. The increase of \$0.5 million and 5 positions for strategies and guidelines development will provide for improvements in air quality management methods and techniques, particularly to aid control agencies in determining reasonably available control technology for Class B sources and to develop information on the techniques available to control the more complex aspects of air pollution, e.g., photochemical oxidants and fugitive dust.

Work which will be completed or initiated in this area includes promulgation of New Source Performance Standards for sulfur recovery in petroleum refineries, grain elevators, combined refuse

and fossil fuel combustion, phosphate rock preparation, and a revised opacity standard for petroleum refineries. In addition, NSPS will be proposed for carbon black plants, drycleaning, coal gasification, natural gas and oil production (sulfur recovery), guidelines for the control of existing kraft pulp mills under section 111(d), coke ovens (pushing), solvent degreasing, asphalt roofing manufacturing plants, lead acid storage battery manufacturing, revisions to the standard for steam generators greater than 250 million BTU per hour heat input, petroleum refineries (11 processes), petroleum storage (2 processes), petroleum transfer operations (3 processes), and solvent end use applications (12 processes). Guidelines for the determination of reasonably available control technology will be prepared in conjunction with State Implementation Plan revisions. National emission standards for hazardous air pollutants will be promulgated for asbestos from iron ore beneficiation plants and for volatile metals from primary copper, lead and zinc smelters.

It is anticipated that assessments will be completed for at least three potential pollutants and control strategies recommended. Work will continue on the screening of organic and inorganic chemicals. The strategy for attainment and maintenance of the suspended particulate standard will be completed with a view toward developing an Agency policy on fine particulates. Analyses will continue to be made of the impact on air quality of the various energy policies and the energy demands of air pollution regulatory actions. Other projects will be aimed at identifying barriers to the achievement of the ambient air quality standards and the studies and analyses for removing these barriers and improving the technical basis for the air quality management approach to air pollution. Such projects will include studies of long-range oxidant transport, sulfur dioxide to sulfate relationships, short-term to annual NO₂ relationships, fugitive dust and fugitive emissions, analysis to determine the reason for failures to meet TSP standards, HC reactivity evaluation and the impact of Federal auto standards on attainment of air quality standards.

AIR

Abatement and Control

Mobile Sources Standards and Guidelines

Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs 1977
(dollars in thousands)				

Appropriation

Mobile Source Stan-
dards and Guidelines..

\$5,261	\$4,321	\$4,778	\$4,778	---
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Total....

5,261	4,321	4,778	4,778	---
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Permanent Positions

Mobile Source Stan-
dards and Guidelines..

54	60	51	51	---
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Total....

54	60	51	51	---
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Budget Request

The budget request will support a continuation of the program.

Program Description

This subactivity includes the development of emission standards for mobile sources of air pollution (i.e., passenger motor vehicles, heavy-duty and light-duty trucks, motorcycles, and aircraft) and associated technical activities, such as technology assessments and emissions characterization. The control of all significant classes of motor vehicles is necessary if the National Ambient Air Quality Standards for carbon monoxide, photochemical oxidants, and nitrogen dioxide are to be attained and maintained in many areas of the nation.

The development of standards for mobile sources involves a characterization and analysis process. First, air pollutant emissions from representative individual vehicles are determined. Follow up work involves the characterization of the use of these vehicles and the characterization of emissions on the basis of vehicle samples representative of actual in-use vehicle populations. At this stage, the development of appropriate emissions sampling and testing procedures may have to be carried out. The development of an appropriate data base. After the initiation of a regulatory action, further definition of issues raised during the regulatory process may be required. After a regulatory action has been completed, the reassessment of control requirements or procedures may be indicated; such reassessments may involve a process similar to that of new regulatory actions. An essential part of the reassessment process is the continuous assessment of new or improved technologies for potential changes in the nature and magnitude of air pollutant emissions and other related factors, e.g., fuel economy.

The various categories of mobile sources are at different stages of this generalized process for development of emissions controls. Initial control actions for light-duty motor vehicles (automobiles) were taken in the past, with future actions related to this class of motor vehicles revolving around the statutory standards set by the Congress (under amendments to the Clean Air Act) and the associated administrative actions, such as the extension of the time by which the standards are to be applied or the assessment of the energy impacts of the standards set. The emissions standards for this class of vehicles may require future technology assessments to determine if changes in the standards are warranted by changing technology. The assessment of emissions of currently unregulated pollutants from automobiles may also be required due to changes in the technology used by manufacturers for meeting emissions standards

which may result in emissions of toxic substances (e.g., sulfuric acid emissions from catalysts or hydrogen cyanide emissions from a specific type of catalyst). The results of the assessments may indicate the need for changes in the standards or additional regulatory action for preventing the emissions of substances that may turn out to present a health risk.

The controls for other motor vehicles are at the initial stages of implementation or are just reaching the levels of stringency comparable to the controls required of automobiles. As the emissions standards are imposed on additional classes of motor vehicles and as the stringency of these standards increases, it is likely that the reassessments of the emissions standards as well as the control technology used by the manufacturers (in terms of its energy as well as nonregulated pollutant impacts) will be required, in a fashion similar to the process experienced with automobiles. Therefore, it is expected that work of increasing complexity, involving additional classes of motor vehicles, will have to be carried out for the foreseeable future.

1976 Accomplishments

The FY1976 resource level for this subactivity was \$3.8 million and 59 positions. These resources were allocated to the development of emissions standards for other than light-duty motor vehicles and to the assessment of the impacts on light-duty vehicles of the emissions standards already set; the assessment of the feasibility and energy impacts on the various proposals for emissions standards being considered by the Congress as amendments to the Clean Air Act; and the development of the regulations for implementation of the fuel economy testing and labeling responsibilities imposed on EPA by the Energy Policy and Conservation Act (EPCA). The level of resources included \$1.4 million in contract funds. Contract funds supported work on the effects of ambient conditions on motor vehicle emissions levels; development of emissions standards for heavy-duty vehicles; assessment of the impact on emissions of a variety of control technologies; characterization of sulfuric acid emissions; and determination of operational characteristics of vehicles that lead to the formation of carbon monoxide "hot spots".

The motor vehicle emissions control technology assessment program was a major project for FY1976. Sulfate/sulfuric acid emissions assessments constituted a significant element of this work. Work on this subject should continue through the next few years. Under this subactivity work has begun on:

characterization of sulfuric acid emissions from (1) a representative in-use vehicle population, and (2) heavy and light-duty diesel engines; assessment of the impact on sulfuric acid emissions of catalyst modifications and control of oxygen in the catalyst; and assessments of catalysts with low sulfuric acid emission characteristics. Soon to be published is a procedure for sulfuric acid emission testing, and a protocol for manufacturers to use in generating data on sulfuric acid emissions from vehicles tested during the certification process.

Standard setting activity for FY1976 included the promulgation of SST aircraft emission standards and a revised evaporative emission standard (based on a revised test) for light-duty vehicles as well as extensive work on exhaust emission standards for motorcycles, light-duty trucks, and heavy trucks. Work on the development of an emission test for implementation of the warranty provisions of section 207(b) of the Clean Air Act has reached a stage where regulation proposal should come in early 1977.

Work on fuel economy standards and labeling related matters, also a major activity required by EPCA, resulted in regulatory requirements. The 1976 fuel economy labeling and fuel economy compliance regulations were promulgated, being applicable to the 1977 and 1978 model years, respectively. Work on fuel economy compliance and fuel economy retrofit regulations was also carried out.

1977 Program

The FY1977 resource level for this subactivity is \$4.8 million and 51 positions. These resources will be directed at the setting of emissions standards and the assessment of the need for the control of additional sources or unregulated pollutants. These resources include approximately \$2.4 million in contracts related to technology assessment, emissions characterization, emissions standards and associated procedures development, and technical support for State and local in-use vehicle emissions control programs. Work will concentrate on assessing manufacturer efforts towards meeting statutory standards as a continuation of the FY1976 work. Special attention is being placed on the impact that evolving technologies have on the emissions of uncontrolled substances and the fuel economy of motor vehicles. Regulations will be promulgated for more stringent emissions controls for light-duty and for heavy duty trucks. Work will continue on characterization of emissions from diesel engines, and unregulated emissions from catalyst (other than sulfuric acid and sulfates). The special effects of ambient temperatures on emissions will

be assessed since evidence available to data indicates that normal variations in temperature result in large changes in motor vehicle emissions, a factor that is not accounted for by the current emission standards.

1978 Plan

The FY1978 plan for this subactivity includes \$4.8 million and 51 positions. There are no plans for purchasing ADP hardware or software. Contract funds in FY1978 approximate \$2.6 million for technology assessments, characterization of unregulated pollutants, development of emissions control regulations, and support of State and local in-use vehicle control programs.

Characterization of unregulated pollutants for current and, more importantly, future control technologies must be implemented if EPA is to be aware of the types and quantities of pollutants which can be expected to result from the introduction of new technologies. In the vehicle emissions control area, final emission standards will be proposed for heavy-duty trucks; a report on gaseous and particulate emissions from light-duty diesel fuels, as well as recommendations for their control, will be prepared.

Conduct of the sulfuric acid test program will continue through FY1978 including a report on sulfuric acid control system durability and a report on gaseous and particulate emissions from light-duty diesel fuels. The results of these studies may indicate the need for setting emissions standards for pollutants not currently controlled.

In addition, the various fuel economy and emissions standards are to be updated; a report on the characterization of emissions from malfunctioning catalyst equipped vehicles is to be issued; the promulgation of 1983 aircraft retrofit regulations is to be completed; and the data on emissions reductions achievable by in-use vehicle inspection and maintenance programs will be updated.

AIR

Abatement and Control

State Programs Resource Assistance

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
			(dollars in thousands)		
<u>Appropriation</u>					
Control Agency Resource	\$32,334	\$51,550	\$55,550	\$80,050	+\$24,500
Supplementation.....					
Inspection/Maintenance					
Resources	---	---	---	10,000	+10,000
Training.....	1,559	4	1,526	1,526	---
Total.....	33,893	51,554	57,076	91,576	+34,500
<u>Permanent Positions</u>					
Control Agency Resource					
Supplementation.....	---	---	---	---	---
Inspection/Maintenance					
Resources.....	---	---	---	---	---
Training.....	18	15	15	15	---
Total.....	18	15	15	15	---

Budget Request

The increase of \$24.5 million in control agency support resources will provide for the full funding of air State and local air pollution control agencies. FY1978 represents the year in which all air pollution control measures for attaining and maintaining the standards are to be in place and in process of implementation; fully staffed control agencies are a necessary condition for implementation of air pollution control programs. The increase of \$10.0 million for inspection/maintenance programs is to facilitate the implementation of these programs in areas where adopted by the States for air pollution purposes.

Program Description

This activity includes the resources and assistance provided to support State and local governments' activities in implementing air pollution control programs. Support is provided as grants to control agencies, grants for demonstrating improvements in agency operations, services of contractors, assignment of personnel to State agencies, and training and technical information services provided to personnel of State and local agencies.

A major task for control agencies in FY1977 will be the development of revised SIPs in those AQCRs and interstate portions where the current SIP has been determined to be substantially inadequate. It is currently expected that there will be some 72 revisions for TSP, 10 revisions for SO₂, 40 for CO, as many as 122 for O_x, and 1 for NO₂. This will be a major workload and will involve the agencies in special studies for specific pollutants, analysis of air quality data, increased emphasis on emission data, development of emission limitations, other regulation development, and increased source inspection frequency. States are required to adopt all revisions of emission limits involving reasonably available control technology by July 1, 1977. Other measures (e.g., control of transportation sources and land use measures) must be adopted by July 1, 1978. In addition, the State and local agencies have to place added emphasis on new source review programs if the standards are to be attained and maintained in the future.

Grants to State and local control agencies having a major role in carrying out State Implementation Plans constitute the major form of EPA assistance. These funds support the full range of activities required of a control agency including ambient air quality monitoring, control plan development (including control regulations), source surveillance, enforcement actions against violators, and technical and administrative support functions. Grants assistance is supplemented by the provision of services of contractors for specific tasks identified by the States, localities, or EPA as required for carrying out or revising the State Implementation Plan. Examples of this type of support are emission inventory development, dispersion modeling, source inspections, air quality monitoring, and control strategy development.

Funds for initiating implementation of State and local motor vehicle emissions control programs will be provided in FY1978. Projects supported under this new program would be limited to those that are envisioned by the State Implementation Plan or that are required in support of new control strategies that may be incorporated into the Plan. Support is to be provided in resolving limited areas that are identified as impeding the implementation of effective in-use motor vehicle emissions control programs, such as small-scale demonstrations of feasibility of inspection/maintenance, and facilitation of the establishment of State capabilities in the area of motor vehicle emissions control.

Resources assistance is further supplemented by the provision of training in specialized areas of air pollution control. Beginning July 1, 1976, the EPA Air Pollution Training Institute at Research Triangle Park, North Carolina, will be operated by contract with Northrop Services, Inc. The contractor will develop new courses, revise and update instructional manuals and materials and conduct all laboratory courses at Research Triangle Park as well as supply manuals and instructional materials for university field centers. A small EPA staff will monitor the contract, maintain liaison with Regional Offices and State and local agencies, assess changing training requirements, and ensure that those requirements are fulfilled. The EPA staff will also work with regional university centers to develop State and local self-sufficiency in training by offering field courses closer to the agencies. Eventually as many as six to eight centers may be used.

1976 Accomplishments

The FY1976 resource level for this subactivity was \$54.6 million and 15 positions. These resources were allocated to providing grants, contractor, and training assistance to State and local air pollution control agencies.

Control agency resource supplementation was allocated \$51.5 million. These funds included approximately \$3.0 million in contractor assistance in the areas of control strategy reassessment and revision; emission inventory improvement; air quality and source monitoring; and improvements in control agency technical procedures. A major accomplishment of State and local agencies in FY1976 was the determination of the attainment of status of all AQCRs and the determination of SIP adequacy in the non attainment AQCRs. This work was done in connection with EPA's Regional

Offices and involved detailed air quality and compliance analyses. This effort has laid the groundwork for a program to develop revised SIPs and further enforcement in nonattainment areas. These areas will all require further study and a case-by-case determination of the appropriate mix of future control actions, i.e., SIP revisions and/or further compliance work. Ongoing compliance and enforcement work by State and local agencies has led to progress in reducing emissions. These agencies, together with EPA have indentified 22,000 class A sources (sources capable of emitting over 100 tons of a pollutant each year). By December 1975 some 87 percent of these sources were in final compliance or on a firm schedule leading to final compliance. This figure was expected to rise to 90 percent by the end of FY1976.

The training activities were allocated \$3.0 million and 15 positions. These resources included \$2.5 million in grants and contract funds. Contract funds supported the contract for operation of the training institute and course development work. Grants supported nine graduate training grants, producing a total of 72 trainees, 70 full time equivalent fellowships and two speciality programs, i.e., the Environmental Management Institute and the Automotive Emission Control Training Program at Colorado State University. During FY1976 two workshops were conducted by Colorado State University; the purpose of these programs was to provide training

in auto emission control systems to some 40 master instructors who will return to their communities and train other instructors and practicing mechanics. The Air Pollution Training Institute conducted 66 courses, providing 1,442 students a total of 5,721 man-days of training. Fifty percent of the students were employees of State/local governments, thirty-two percent were EPA employees, and the remainder were from other Federal agencies, private industry, universities and foreign governments.

1977 Program

The FY1977 resource level for this subactivity is \$57.1 million and 15 positions. These resources will be directed at the support of State and local air pollution control programs.

Control agency resource supplementation has been allocated \$55.6 million. These funds include approximately \$3.0 million in contractor assistance in the areas of control strategy reassessment and revision and other technical air pollution control work. States will have to (in addition to carrying out monitoring and enforcement programs) develop SIP revisions; to continue priority work on programs associated with reviews of new modified sources, new source performance standards, national emissions standards for hazardous air pollution sources; and to proceed with compliance work in the non attainment AQCRs.

State and local control efforts to date have been concentrated on obtaining compliance with particulate and SO₂ regulations at an estimated 22,000 Class A sources across the country. By the end of FY1976, excellent results had been achieved--90% of Class A sources were either complying with final emission limitations or were meeting increments in compliance schedules. The 10% of Class A sources still in violation are for the most part powerful and recalcitrant industries that will continue to require extensive resources to collect evidence, negotiate agreements and/or mount effective court actions if they are to be brought into compliance. Since compliance by these large volume polluters is known to be a major factor in both attaining and maintaining the primary NAAQS, States and localities will have to continue to concentrate on Class A violators. In addition, the control agencies will have to place more emphasis on compliance by Class B sources, particularly those in non attainment areas. It is estimated that more than 100,000 Class B sources exist in non attainment areas.

Training activities are allocated \$1.5 million and 15 positions. These resources include an estimated \$1.0 million in contract funds for the operation of the air pollution training institute.

1978 Plan

The FY1978 plan for this subactivity includes \$91.6 million and 15 positions. There are no plans for purchasing ADP hardware or software although a proportion of the funds allocated to State and local support may support State and local ADP-related activities, including the acquisition and/or development of ADP hardware and software. Extramural funds account for virtually all of the funds in this subactivity.

Control agency resource supplementation will support the continued development of SIP revisions by State and local agencies; whereas in FY1977 emphasis is on developing emission limitations, in FY1978 the emphasis will be on other measures, such as control of transportation sources and land use measures. This will present the agencies with problems of developing increasingly complex plans constrained by energy tradeoffs, extensive social and economic impacts, long-range transport of air pollutants, and other similarly complex issues. This will also involve the development of control strategies for non traditional sources, such as industrial fugitive emissions and reentrainment of dust in urban environments. The compliance and enforcement priorities of the control agencies will continue to include compliance by the problem Class A sources and by Class B sources. A new factor will be added in FY1978 as the agencies begin to seek compliance with the emission limitations developed in FY1977 as part of the SIP revision process.

State and local in-use vehicle emissions control programs will be supported with an increased allocation of \$10.0 million, to be used to provide appropriate support through grants and contracts. It is expected that the provision of limited resources, targeted to the solution of specific problems, will result in overcoming obstacles currently in the way of implementation of State and local motor vehicle emissions inspection and maintenance programs. Given the lack of in-use vehicles' compliance with emissions standards, and their larger than expected emissions, it is necessary that States and localities start implementing in-use motor vehicle emission control programs if ambient air quality standards are to be attained.

Training support will continue to be funded at a level of \$1.5 million.

AIR

Abatement and Control

Air Quality Strategies Implementation

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs 1977</u>
<u>Appropriation</u>					
Federal Activities/ EIS Review.....	\$733	\$677	\$727	\$727	---
Air Quality Management Implementation.....	4,654	4,999	4,760	5,560	+\$900
Total..	5,387	5,676	5,487	6,387	+900
<u>Permanent Positions</u>					
Federal Activities/ EIS Reviews.....	40	38	34	34	---
Air Quality Management Implementation.....	194	212	206	254	+48
Total..	234	250	240	288	+48

Budget Request

The increase of 48 positions and \$0.9 million provides for additional work, at EPA regional offices, related to SIP revisions, delegations to States, and new source reviews.

Program Description

This subactivity includes the development of control strategies for areas of the country where States do not carry out their responsibilities; the incorporation of these control strategies into appropriate regulatory actions; the interaction with State and local governments in implementing air pollution control programs; evaluation of State and local control agencies and consultation with State and local control agencies on specific air pollution control problems; and management of the State/local support resources and their allocation. It also involves EPA responsibilities in monitoring Federal facilities' air pollution control activities, in providing advice to other Federal agencies in their air pollution control activities, and reviewing the Environmental Impact Statements (EIS) prepared by other Federal agencies insofar as air pollution impacts are concerned.

Air Quality Management Implementation

High levels of activity are foreseen in the area of State implementation plan (SIP) reassessments, development, and execution. Many of these plans have proven to be inadequate for the attainment and maintenance of the NAAQS thus requiring redevelopment and additional implementation. During FY1976 all State implementation plans were evaluated relative to their ability to attain and maintain the NAAQS. As a result of these evaluations, plan revisions have been requested in 45 States. EPA personnel will have to participate in the development of such plans and, in some cases, do the planning and execution of the plans.

Implementation plans requiring emission limitations representative of achievable control technology (as needed) must be developed by July 1, 1977, with subsequent implementation of those plans beginning in FY1978. Implementation plans requiring other measures (generally referring to the control of transportation sources and land use measures) necessary for attainment must be developed during FY1977 and FY1978 with implementation beginning in FY1979. Implementation of additional controls, e.g., NESHAPS, will require increased EPA activity.

Very complex control strategies will have to be developed and implemented for the control of particulates and those pollutants that are produced in atmospheric reactions, such as photochemical oxidants, and nitrogen dioxide. These pollutants are characterized by originating from many sources spread over wide geographical areas and by the transport, over large distances, of the air pollutant precursors, e.g., hydrocarbons and nitrogen oxides. In order to progress toward attainment of the suspended particulate standards, control plans will be developed and implemented that control fugitive emissions from various processes and control fugitive dust generated by man's activities, such as unpaved roads and construction. Such controls were not emphasized during earlier control efforts. In order to progress toward the attainment of the oxidant standards, control plans will be developed and implemented that require stationary source hydrocarbon controls over entire megalopolises of the east coast, midwest, and far west. Additional transportation control measures will also be required. The particulate and hydrocarbon controls to be implemented will require greater emphasis on public participation in their development. General public support will be required to make the control programs effective.

A particularly critical program will be that of reviewing new sources of pollution to assure that they will not cause air quality to deteriorate in areas already attaining the NAAQS or that they will not delay attainment (or aggravate current problems) in areas that have not yet attained the NAAQS. This will, in some cases, necessitate the use of best available emission control technology, selective source siting, and emission trade-offs. Such sophisticated siting and review analysis of new sources will require increased EPA and State activity.

Federal Activities/EIS Review

The subactivity also includes EPA activities related to the process of assuring Federal agency compliance with pollution control requirements and the review of environmental impact statements (EIS). All Federal agencies are, under Executive Order 11752, to ensure that their facilities comply with Federal, State, interstate, and local substantive standards and limitations for the prevention and control of environmental pollution. EPA activities in relation to other Federal agencies include providing technical advice and assistance in air pollution control, monitoring their programs for achieving air quality standards, and reviewing compliance strategies. Activities also include the

review, for air quality impact, of EIS's prepared by the other Federal agencies pursuant to the National Environmental Policy Act (NEPA). Equivalent reviews are carried out pursuant to Section 309 of the Clean Air Act.

1976 Accomplishments

The FY1976 resource level for this subactivity was \$5.7 million and 242 positions. These resources were allocated to the review of environmental impact statements, other Federal activities and the implementation of air quality management strategies.

The implementation of air quality management strategies was allocated \$4.9 million and 204 positions. These resources included essentially no contracts funds. The main accomplishments during FY1976 were the issuance of calls for SIP revisions, resulting from a finding that the plan was substantially inadequate to attain the standards. At the conclusion of a year-long evaluation, the governors of 45 States were notified that SIP revisions were necessary in order to attain and/or maintain the NAAQS. Revisions are required for particulate matter in 31 States, sulfur dioxide in 12 States, carbon dioxide in 22 States, photochemical oxidants in 29 States, and nitrogen dioxide in 3 States.

In addition, in order to implement the prevention of significant deterioration of air quality policy, continuing reviews were made by EPA of potential new sources of pollution; a complex control strategy for the attainment and maintenance of the sulfur dioxide standards in the State of Ohio was promulgated; the Agency began implementing its policy concerning the use of supplementary control systems and tall stacks and on the issuance of variances (policies which may require SIP revisions); the impact of FEA-issued prohibition orders (issued under the provisions of ESECA) on air quality were assessed; air pollution control agencies receiving grants assistance were evaluated as to their ability to carry out air pollution control tasks, in areas such as monitoring, laboratory and engineering services, and enforcement, with commitments for the performance of high-priority program outputs obtained from these agencies; and significant progress was made in obtaining State commitments to the enforcement of New Source Performance Standards (14 States) and National Emission Standards for Hazardous Air Pollutants (11 States), with an additional 17 States in various stages of the delegation process by the end of the year.

Federal activities and environmental impact statements review were allocated \$0.7 million and 38 positions. No contracts funds were included in this allocation. Environmental impact statements were reviewed for the air pollution impact of the actions covered and assistance was provided to Federal facilities for assuring their compliance with air pollution control requirements. At years end, 249 of approximately 411 Federal point sources were in compliance with the SIPs with an additional 31 sources on a consent declaration to come into compliance.

1977 Program

The FY1977 plan for this subactivity is \$5.5 million and 240 positions. These resources are allocated to the review of environmental impact statements, other Federal agency assistance activities, and the implementation of air quality management strategies.

The implementation of air quality management strategies is allocated \$4.8 million and 206 positions. These resources include essentially no contracts funds. Work during FY1977 will concentrate on the development of State Implementation Plan revisions for the areas that were issued calls for plan revisions; the assessment of the plans for other areas where the attainment of the standards is in doubt or the adequacy of the State Implementation Plan is questionable; and the continued work related to the delegation of responsibilities to States and new source reviews where this responsibility resides with EPA.

The SIP revisions will require complex analyses and technical judgements to be made by the State, local, and EPA personnel, the coordination of many sources of expertise, meetings with the affected industries to determine the extent of the control capabilities and impacts (both economic and technical) of the contemplated control requirements, and public hearings on the proposed revisions to the SIPs. In addition, implementation actions and defense of EPA's requirements will have to continue for those controls that require implementation during FY1977, e.g., the promulgated controls for sulfur dioxide in Ohio.

The requirements of ESECA (as extended by the Energy Policy and Conservation Act, EPCA) will continue to require EPA review of the air quality impact of the prohibition orders issued by FEA. It is expected that approximately 170 utility units and an additional 560 major fuel burning installations

will be affected by such orders during FY1977. All of these potential conversions to the use of coal require EPA review and determinations, based on the constraints established by ESECA, prior to the prohibition orders becoming effective.

Work related to the evaluation of control agencies will continue; commitments from States to the performance of air pollution control tasks will be obtained. Delegations of the enforcement of the New Source Performance Standards and the National Emissions Standards for Hazardous Air Pollutants are expected to be made for an additional 17 States, bringing the total number of States to which enforcement of these standards has been delegated to 31 and 28, respectively.

Federal activities and environmental impact statements review is allocated \$0.7 million and 34 positions under the FY1977 program. Environmental impact statements prepared by other Federal agencies are reviewed for air quality impact of the proposed actions and Federal agencies will be provided assistance for assuring their compliance with air pollution control requirement.

1978 Plan

The FY1978 plan for this subactivity includes \$6.4 million and 288 positions. The increase of \$0.9 million and 48 positions will support the development of complex air pollution control plans, and the assessment of the economic, social, and energy impacts of the controls to be developed under the State Implementation Plans. The program will continue to be aimed at the development of adequate air pollution control programs and the delegation of responsibilities for air pollution control to the States and localities, and the carrying out of EPA's air pollution control responsibilities, such as selected new source reviews, promulgation of SIPs where necessary, and the review of environmental impact statement and assistance to Federal facilities for air pollution control.

The FY1978 plan includes \$5.7 million and 254 positions for the implementation of air quality management strategies. This level of resources includes essentially no funds for contracts and does not include the acquisition of ADP software or hardware. It is expected that the work during FY1978 will represent a continuation of the development and adoption, by States, of the air pollution control plans required for attainment of the standards in the areas that have deficient State Implementation

Plans. Current plans envision the adoption of all control measures requisite for the attainment of standards by the end of FY1978, with implementation of these measures during the 1979 to 1981 period. The FY1978 program would concentrate on the finalization of the State control plans and the initiation of the process for adoption, by the sources, of the requisite controls. It is expected that significant workloads will be presented to the States, localities, and EPA in the development of the source-specific control requirements that will have to be developed pursuant to the adoption of control plans by the States.

Although it is expected that the States will make substantial progress in the adoption of control measures for the attainment of standards, it is clear that all reasonable control measures will not lead to the attainment of the standards in many areas of the nation. Far-reaching controls will have to be developed for these areas. It is expected that the development of these additional, complex, control plans and requirements will have been initiated during FY1978. EPA regional offices will have to participate in the development of these plans, providing assistance to the States and localities, identifying areas that require the development of additional analytical procedures, and implementing the provisions of the expected amendments to the Clean Air Act, specially those amendments that relate to the extension of the dates by which standards are to be attained. All of these actions will have to be accompanied by complex analyses of control requirements, control capabilities, and the reasonableness of the application of specific control requirements under the unique circumstances applicable to various sources and localities.

In addition, the activities related to the evaluation of State and local control programs will continue; commitments from States to the performance of air pollution control tasks will be obtained. Delegations of the enforcement of the New Source Performance Standards and the National Emissions Standards for Hazardous Air Pollutants are expected to be made for a total of 43 and 40 States, respectively.

Federal activities and environmental impact statements review is allocated \$0.7 million and 34 positions in the FY1978 plan. Environmental impact statements prepared by other Federal agencies will be reviewed for the air quality impact of the proposed actions and Federal agencies will be provided assistance for assuring their compliance with air pollution control requirements.

AIR
Abatement and Control
Mobile Source Certification and Testing

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs 1977</u>
				(dollars in thousands)	
<u>Appropriation</u>					
<u>Certification</u>					
Review.....	\$1,243	\$1,842	\$1,650	\$1,950	+\$300
Laboratory and Data Analysis	3,469	4,985	4,627	5,427	+800
Support.....					
Total..	4,712	6,827	6,277	7,377	+1,100
<u>Permanent Positions</u>					
<u>Certification</u>					
Review.....	56	55	59	69	+10
Laboratory and Data Analysis					
Support.....	105	103	107	112	+5
Total..	161	158	166	181	+15

Budget Request

The increase of 15 positions and \$1.1 million includes resources to conduct the fuel economy labeling, compliance, and retrofit testing programs; and finance the installation of the second phase of the real time system computer.

Program Description

Two distinct areas of activity are covered by this subactivity: (1) Activities related to the engineering review of the data used to certify motor vehicles for compliance with emission standards and associated technical support, and (2) the operation of the Ann Arbor motor vehicle emissions testing laboratory, including data processing and analysis support, for both certification of motor vehicles and engines and the development of standards and guidelines. The certification process involves the submission to EPA of applications for certification; the development of emissions performance information by manufacturers and EPA on the basis of prototype vehicle testing; and the review of these data by EPA for the purpose of determining compliance with standards and approval/disapproval of certificates of conformity.

Manufacturers apply for certification by submitting an application for certification to EPA (Part I application) which describes the vehicles and engines the manufacturer plans to offer for sale. EPA reviews the manufacturer's application and determines what actions the manufacturer is to take to demonstrate compliance with emission standards. EPA reviews the application for acceptability of proposed procedures for mileage accumulation and emission testing, and the proposed maintenance procedures for the vehicles and engines.

EPA selects durability vehicles and engines (i.e., tested to determine emission control system durability to 50,000 miles for purposes of deriving deterioration factors) and emission data vehicles and engines (i.e., tested to determine typical engine class emissions) based on information supplied in the application for certification. During the testing of vehicles, EPA personnel carry out surveillance of manufacturer's testing. During site visits to manufacturer's facilities, EPA personnel also inspect the procedures and controls used by the manufacturers in their own test facilities to insure that these facilities and certification procedures comply with Federal requirements and that data submitted to EPA are obtained using valid procedures.

After completion of the testing program (including confirmatory testing at the EPA laboratory), manufacturers submit a Part II application, which summarizes the certification test results. Review of this application involves the final review of test data, the review of manufacturer's engineering reports, the calculation of the deterioration factors to ensure that emission levels do not exceed the applicable standards, and the final decision to certify an engine family. Certification review also involves the review of manufacturers' maintenance instructions to the ultimate purchaser, manufacturers' warranties, and manufacturers' service and technical bulletins.

After the issuance of the certificate of conformity, manufacturers are allowed to submit requests for "running changes" to their certified products to reflect technological changes and changes in product lines. Review of "running changes" may involve, at EPA's discretion, additional testing at the manufacturer's facility or at the EPA facility. Since running changes are approved after the certificate of conformity has been issued and vehicles may be in production, their impact on changing emissions is monitored closely by EPA. It should be noted that each fiscal year motor vehicle manufacturers' full line of vehicles and engines undergoes the certification process. In general, each fiscal year covers the premanufacture certification of each model year, e.g., FY1978 covers the certification of 1979 model year, with production changes, i.e., "running changes", processed in the following year, e.g., FY1979.

Additional activity is required in the constant reevaluation of certification procedures. The automotive industry is characterized by constant engineering changes resulting from technological changes or the constraints imposed by the marketplace. All changes in vehicle and engine configurations which may affect emissions are reviewed and analyzed by EPA. Manufacturers, in order to evaluate the impact on emissions of proposed changes they wish to make, request interpretation from EPA of the Federal regulatory advisory circulars (used to document EPA approved procedures and policy that do not require regulatory action), and general policy. These activities are expected to increase in the future.

The changing nature of the emissions standards for light-duty motor vehicles (with Congressional action expected to provide a phased scheduling of standards to the statutory levels for a manufacturer's full vehicle line by model year 1982), coupled with industry's certain attempts to meet the standards with a changing technology aimed at lowering costs and improving fuel economy, necessitates the continuation of the design verification (by actual emissions testing) function represented by the

certification program. For FY1978, workloads associated with the certification program are expected to increase due to the need to certify additional classes of motor vehicles that will be covered by emissions standards, such as an expanded class of light-duty trucks, and a revised heavy-duty engine standard. The workloads are summarized in the tables.

Table 1
Summary of Certification Tests Carried
Out at EPA by Model Years and Fiscal
Years -- Light-Duty Vehicles*

<u>Model Year</u>	<u>Total Number of Emission Tests</u>	<u>Tests by Fiscal Year</u>		
		<u>FY 1976</u>	<u>TQ</u>	<u>FY1977</u> <u>FY1978</u>
1976	1903	1372		
1977	2893	1035	985	873
1978	2566			1681
1979	3120			885
				2182
				3067
		<u>Total</u>	<u>985</u>	<u>2554</u>

*Assumes continuation of 1977 model year emission standards for the 1978 model year.

Table 2
Summary of Certification Tests Carried
Out by EPA - Heavy-Duty Engines

<u>Number of Tests</u>	<u>Fiscal Years</u>	
	<u>FY1976</u>	<u>FY1977</u> <u>FY1978</u>
	8	10
		54

Table 3
Summary of Number of Engine Families Certified
and Number of Certificates of Conformity
(in parentheses) Issued*

	FY1976	FY1977	FY1978
Light-duty vehicles	346 (205)	272 (230)	299 (271)
Heavy-duty engines	131 (131)	131 (131)	131 (131)
Light-duty trucks	57 (36)	52 (45)	80 (77)

*Assumes continuation of 1977 model year emission standards for the 1978 model year.

Table 4
Summary of Running Changes

	FY1976	FY1977	FY1978
Light-duty vehicles and trucks	1500	1800	1800
Heavy-duty engines	300	364	364

1976 Accomplishments

The FY1976 level of resources for this subactivity was \$5.7 million and 165 positions. These resources included approximately \$1.5 million in contract funds, primarily related to technical and data support to emissions testing.

The testing workloads and motor vehicle certification accomplishments were summarized in the tables presented above. Significant impacts on the certification and testing activities will result from the Energy Policy and Conservation Act (EPCA) passed in December, 1975. EPCA has two separate impacts on EPA's mobile source certification testing program: testing for labeling and testing for calculation of manufacturer annual average fuel economy.

Regulations were promulgated to implement the labeling provisions of EPCA. The regulations proposed to continue essentially the same level of testing as is currently used in the voluntary labeling program. The testing impact of the current program is the conduct of a highway test on all emission data vehicles (approximately 600 in FY1976, all tested at EPA), a highway test on all running change vehicles tested before the mileage guide data cutoff data of September 15 (approximately 100 in FY1976, with 30 tested at EPA), and a city and highway test on additional vehicles needed to plug data loopholes in the mileage guide (approximately 100 in FY1976, with 50 tested at EPA).

1977 Program

The FY1977 level of resources is \$6.3 million and 166 positions. These resources include approximately \$2.3 million in contracts funds which provide support to emissions testing and data processing activities.

The projected testing and certification workloads were summarized in the tables presented above. The Energy Policy and Conservation Act (EPCA) will continue to impact the certification and testing program. Regulations, applicable to the 1978 model year, have been promulgated for the testing of vehicles for, and calculation of, compliance with fuel economy standards. The regulation requires the testing of small numbers of vehicles needed to cover all base levels (individual vehicle groupings) and the testing of running changes which would not normally be tested for demonstration of emission standard compliance but which can be expected to have an impact on average fuel economy. For the FY1978 model year, the number of extra vehicles to require testing is about 700. EPA currently plans to test about one-fourth of these in its own laboratory. Test vehicles will be chosen on the basis of checks to determine if manufacturer submitted data appear reasonable, and some random spot checking to ensure the integrity of manufacturer submitted data. The 25 percent level was chosen because it represents a minimum level of confirmatory testing while still providing a capability to check suspect data. It should also be noted that the Sealed Housing for Evaporative Determination (SHED) tests will begin during FY1977 on the 1978 model year vehicles. The SHED method is being instituted because it is estimated that over two-thirds of evaporative emissions go undetected with current procedures.

1978 Plan

The FY1978 plan for this subactivity includes \$7.4 million and 181 positions; this level of resources includes an increase of \$1.1 million and 15 positions, which are related to the implementation of EPCA's fuel economy-related requirements, to the implementation of motorcycle and light-duty vehicle emission standards, and to the continued acquisition of the real time computer system for the testing facility. The funds include approximately \$2.8 million in contracts for the support of emissions testing and data activities. It is expected that the computer system will be fully operational during FY1978, permitting emissions testing to be carried out with increased accuracy, reliability, and speed. The computer system's acquisition, including both hardware and software, was initiated in 1975. The real-time computer system will handle much of the data collection and processing function in the testing laboratory.

The projected testing and certification workloads were summarized in the tables presented above.

AIR

Abatement and Control

Trends Monitoring and Progress Assessment

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
			(dollars in thousands)		
<u>Appropriation</u>					
Ambient Air Quality					
Monitoring.....	\$1,010	\$977	\$1,126	\$1,526	+\$400
Mobile Source					
Monitoring.....	2,140	1,384	1,349	1,349	...
Air Quality & Emissions					
Data Analysis & Progress					
Assessments.....	3,990	4,343	4,907	4,907	...
Total.....	7,140	6,704	7,382	7,782	+400
<u>Permanent Positions</u>					
Ambient Air Quality					
Monitoring.....	44	50	51	69	+18
Mobile Source					
Monitoring.....	8	8	8	8	...
Air Quality & Emissions					
Data Analysis & Progress					
Assessments.....	75	93	111	111	...
Total.....	127	151	170	188	+18

Budget Request

The increase of \$0.4 million and 18 positions will provide for expanding ambient air quality standards attainment-related field work and analyses.

Program Description

This subactivity covers the work related to determining ambient air quality levels and air pollution source emission levels, determining and analyzing their relationships, and assessing the progress made toward the attainment of environmental goals.

Ambient Air Quality Monitoring

Activity in this program includes EPA's ambient air monitoring operations carried out by regional offices, the requisite associated laboratory support, and special field monitoring studies. Most ambient air quality and source monitoring is carried out by State and local agencies who provide these data to EPA. The regional offices oversee State monitoring efforts, develop and carry out quality control programs to assure the quality and consistency of State data, and process and evaluate data submitted to EPA by the States. Determination of attainment or nonattainment of the ambient air quality standards are made on the basis of these data. It is expected that monitoring activities and data analyses will increase due to the need for continuously reassessing the SIPs in nonattainment areas as to their adequacy for attaining standards, and the need to develop revised control plans. In addition to SIPs (i.e., criteria pollutants and related monitoring), a limited program to acquire available State data on currently unregulated pollutants is also being carried out. These data aid in understanding relationships between sources and receptors of currently unregulated pollutants, and are used for making long- and short-term trends analyses supportive of decisions on the need for control.

This subactivity also includes efforts directed at improving State and local monitoring programs. Continuing efforts include the technical guidelines on monitoring developed by EPA headquarters for the use of regional offices and State and local agencies, such as guidance on the siting of ambient air quality monitors and on the appropriate size for monitoring networks. Adherence to these criteria should promote uniformity of siting, and ensure that the several objectives of the State and local networks are met.

Mobile Source Monitoring

Also included are activities aimed at determining mobile sources' emissions performance. These data are used to assess the effectiveness of control programs, to assess the need for additional or new controls, and to develop the basis for regulatory actions. In this program, vehicles in consumer use are tested, in the condition in which they are received (i.e., without any consideration as to state of maintenance), in order to determine their emissions. The data are used to determine the average emissions that are to be expected from average in-use vehicle populations. Samples tested are generally defined by model year and are representative of diverse geographical areas. The data so obtained are used to calculate emission reductions to be required by control strategies developed for attainment and maintenance of NAAQS. The model year and type of vehicles to be tested each year varies. In general, a sample of about 180 vehicles, selected to be representative of the in-use vehicle population mix, are tested in six locations in the country. The areas covered to date have been Chicago, Denver, Detroit, Houston, Los Angeles, Newark, Phoenix, St. Louis, and Washington. Results are available from programs initiated in FY1971-74. Approximately 900 vehicles were tested by the FY1971 and FY1972 programs, covering 1957 through 1972 model year vehicles. The FY1973 testing program covered 1,080 1967 through 1974 model year vehicles. The FY1974 testing program included 1,704 1965 through 1975 model year vehicles in six cities.

Air Quality and Emissions Data Analysis and Progress Assessments

Also included are the preparation of the annual and special reports on air quality and emission trends, special analyses on the status of attainment of the NAAQS, development and dissemination of new or improved techniques for data analysis, collection and analysis of emission data, and development and publication of emission factors. Diffusion models are validated, refined and applied to predict air quality levels around point sources and in urbanized (multi-source) areas. Technical guidance and direct assistance in the application of diffusion models is provided by Headquarters to the regional offices and State and local control agencies. Also included are the development, updating, and maintenance of systems for storage and retrieval of air quality and emissions data gathered by monitoring activities. The data systems are composed mainly of an inventory of point sources and their emissions, and a storage field for ambient air quality data. To assist the States in efficient and timely submission of data to EPA, continuing support is provided to the 30 State and local agencies using the Comprehensive Data Handling System.

1976 Accomplishments

The FY1976 resource level for this subactivity was \$6.1 million and 141 positions. These resources were allocated to the development and analysis of data on ambient air quality, air pollutant source emissions, establishing the source-receptor relationship for air pollutants, and determining the progress made in air pollution control programs.

The development of ambient air quality data was collected \$0.9 million and 40 positions. Essentially no contract funds were part of this allocation. State and local monitoring activities were evaluated; field visits were carried out to determine the degree to which monitoring operations met EPA's criteria and are generating valid data; and State and local agency data on ambient air quality were processed. At the end of the year, 2,300 monitoring stations were reporting data for sulfur dioxide; 3,800 for total suspended particulates; 400 for carbon monoxide; 350 for photochemical oxidants; and 1,350 for nitrogen dioxide.

The monitoring of emissions from motor vehicles was allocated \$0.5 million and 8 positions. These resources included approximately \$0.3 million in contracts for testing in-use vehicle populations in order to determine their actual emission levels. Analyses of the data obtained from the FY1972 and FY1973 In-Use Compliance Testing Program were completed. These data identified classes of light-duty motor vehicles which had emission levels in excess of the applicable standards. Due to technical documentation problems, the Agency has not found it possible to use these data to support a recall of high-emitting vehicle classes. The FY1974 emission test program, covering 1,704 1975 through 1975 model year vehicles, was completed; results will be used to update emission factors used to calculate motor vehicle emissions. In addition, an emission test program covering 2,200 1970 through 1976 model year vehicles was initiated.

The assessment of environmental trends and progress of control programs was allocated \$4.7 million and 93 positions. These resources included approximately \$2.0 million in contract support for studies to validate and refine diffusion models and other simulation techniques used in assessing source-receptor relationships; assessments of national and regional air pollution control strategies for air quality standard attainment and maintenance; development of revised criteria and guidelines for the siting of air quality monitors; development of methods for determining and displaying populations exposed to air

quality levels above the NAAQS; development of analytical techniques used in preparing EPA's annual Monitoring and Air Quality Trends Report and other special reports; and the provision of installation, training and troubleshooting services to State and local users of the Comprehensive Data Handling System (CDHS).

The Monitoring and Air Quality Trends Report, 1974 was completed and published. Analyses were performed on the status of attainment of the standards. In-depth studies of 14 metropolitan areas not currently meeting the standards for total suspended particulates were completed. Reports of these studies (and other studies concerned with resuspended particulates) will be released early in FY1977. Preliminary efforts were made in developing systems for analyzing and quantifying the change in exposure that selected populations have experienced over time. These analyses show clearly that, although certain localities are still exposed to ambient levels above the NAAQS, the vast majority of people living in the large metropolitan areas are exposed to far less pollution than they were in 1970. In addition, a study of oxidant levels in rural areas indicated that hydrocarbons and other precursors transported from population centers contribute to the formation of elevated oxidant levels observed in areas well away from the population centers. A standardized air quality index was also developed. This index provides a mechanism for relating daily air quality values to standard descriptions of air quality that can be easily understood by the public.

Analyses of emission data from a number of source categories lead to the issuance of Supplement No. 6 to publication AP-42, the compilation used for estimating current and projected air pollutant emissions as part of air pollution control strategies development. New or revised emission factors were presented for fuel oil combustion sources, open burning, natural gas processing sources, wood-working sources and a number of agricultural process sources.

1977 Program

The FY1977 resource level for this subactivity is \$7.4 million and 170 positions. These resources are allocated to the development and analysis of data on ambient air quality, air pollutant source emissions, establishing the source-receptor relationships for air pollutants, and determining the progress made in air pollution control programs.

The development of ambient air quality data and field monitoring operations is allocated \$1.1 million and 51 positions. Essentially no contract funds are included in this allocation. Technical guidance and direction is to be provided to State and local agencies to ensure that State and local monitoring sites are operating properly and generating valid data. Data generated by States and localities will be edited and verified.

The monitoring of emissions from motor vehicles is allocated \$1.3 million and 8 positions. These resources include approximately \$1.1 million in contracts for testing in-use vehicle populations in order to determine their actual emission levels. The results of the FY1974 emission test program will be used for updating EPA's official publication on emissions factors (AP-42), for the first time including data on emissions from in-use production vehicles that were equipped with catalysts. These data will permit an assessment to be made of in-use catalyst deterioration and the impact that such deterioration may have on new and in-use control strategies as well as stationary source control. This program will also provide improved data on heavy-duty vehicle emissions on the basis of actual measurements over a road route, and additional data on in-use catalyst equipped vehicles with more mileage than those covered by the FY1976 revisions to AP-42. A report presenting updated emission factors for 1967 through 1976 model year light-duty trucks will also be provided. The format in which these emission factors are presented will be revised in order to facilitate the use of the data by State and local personnel responsible for planning transportation systems.

The assessment of environmental trends and progress of control programs is allocated \$4.9 million and 111 positions. This level of resources includes approximately \$2.1 million in contracts for identification and documentation of air quality monitoring sites to be used for long-term national trends; development and issuance of guidelines setting forth techniques and priorities for monitoring; development of additional analytical techniques for use in preparation of EPA's annual Monitoring and Air Quality Trends Report and special reports; evaluation of selected State ambient monitoring networks, primarily in nonattainment areas, to determine network adequacy and conformity with published siting guidance; development of emission factors for the more significant categories of natural emissions, particularly for hydrocarbons and other oxidant precursors; validation and refinement of recently developed diffusion models and other simulation techniques; and assessments of national and regional air pollution control strategies for air quality standard attainment and maintenance.

The Monitoring and Air Quality Trends Report, 1975 will be published. During FY1977, EPA will encourage State and local agencies and regional councils to use the standardized air quality index developed in FY1976. An evaluation of the index using data from 20 cities is planned. A Federal-State program for collection and analyses of ambient data for nonregulated pollutants will be continued. Nationally, much of these data are collected by State and local agencies, but at this time these data are not available for national assessments of the need for control and to determine trends for these pollutants. Related to these types of assessments, the development of a rapid capability for obtaining air quality information for special studies is planned. During the year, the need for assessing the impacts of unregulated substances (past examples are lead, sulfates, vinyl chloride, hexachlorobenzene) can be expected to arise. The installation of automated air quality data handling systems (CDHS) in an additional 3-5 State and local control agencies will be completed. Criteria for the siting of ambient air quality monitors, presented in a regulatory guideline, will be proposed.

1978 Plan

The FY1978 for this subactivity includes \$7.8 million and 188 positions. The increase of \$0.4 million and 18 positions is related to additional analyses of ambient air quality and emissions data in support of State Implementation Plan revisions. The plans include approximately \$0.1 million for improvements in EPA's computerized systems for storage and retrieval of air quality and emissions data. The planned resources will be allocated to the development and analysis of data on ambient air quality, air pollutant source emissions, establishing the source-receptor relationships for air pollutants, and determining the progress made in air pollution control programs.

The development of ambient air quality data and field monitoring operations is allocated \$1.5 million and 69 positions. Essentially no contract funds are part of the planned resources. Technical guidance and direction is to be provided to State and local agencies' field monitoring and laboratory operations to ensure that State and local monitoring networks generate valid air quality data. It is expected that improvements in monitoring network design and operation, resulting from a reassessment of monitoring objectives and requirements, will be implemented.

The monitoring of emissions from motor vehicles that are in actual use is allocated \$1.3 million and 8 positions in the plan for FY1978. These resources include approximately \$1.1 million in contracts for the testing of in-use vehicle populations in order to determine their actual emission levels. Motor vehicle surveillance data will provide additional data on in-use catalyst-equipped vehicles. Additional data on emissions for heavy-duty and light-duty trucks will also be available. FY1978 motor vehicle surveillance data will, for the first time, report on heavy-duty truck emissions using a revised-test procedure. An updated report will also be issued on the emissions from 1967-1977 model year light-duty vehicles.

The assessment of environmental trends and progress of control programs is allocated \$4.9 million and 111 positions in the plan for FY1978. The level of resources includes approximately \$2.0 million in contracts for continued development and issuance of new or revised guidelines setting forth techniques and priorities for monitoring; evaluation of selected State ambient monitoring networks to determine network adequacy and conformity with the monitoring siting regulatory guideline; development of emission factors for additional categories of natural emissions, particularly for hydrocarbons and other oxidant precursors; validation and refinement of diffusion models and other simulation techniques; and assessments of national and regional air pollution control strategies for air quality standard attainment and maintenance.

Activities of the same nature as those described for FY1976 and FY1977 will be carried out. During FY1978, the EPA regional offices will have to assess the adequacy of State Implementation Plans for attaining and maintaining the ambient air quality standards for the pollutants that require complex control strategies, such as photochemical oxidants and particulates. The Monitoring and Air Quality Trends Report, 1976 will be published. Criteria for the siting of ambient air quality monitors will be promulgated. A program to develop emission factors for natural sources, particularly for hydrocarbons and other oxidant precursors, was initiated at the end of FY1976. Emission factors for the more significant natural sources will be developed during FY1977. Factors on additional natural sources will be produced in FY1978. A complementary expansion in the overall emissions data base for nitrogen oxides

is also contemplated in support of the need to reassess control strategies for these pollutants. Similarly, an expected expanded availability of air quality data will permit more precise assessments of control strategy potentials for attaining standards and will provide guidance to control strategy redevelopment activities. It is expected that the revisions of State Implementation Plans will require a high level of effort in the areas of diffusion modeling and other control strategy development related work.

AIR ENFORCEMENT

	<u>ACTUAL 1976</u>	<u>BUDGET ESTIMATE 1977</u>	<u>CURRENT ESTIMATE 1977</u> (dollars in thousands)	<u>ESTIMATE 1978</u>	<u>INCREASE+ DECREASE- 1978 vs 1977</u>	<u>Page</u>
<u>APPROPRIATION</u>						
Stationary Source Enforcement.....	\$9,661	\$9,841	\$10,504	\$16,204	+\$5,700	A-62
Mobile Source Enforcement.....	<u>3,302</u>	<u>3,902</u>	<u>3,822</u>	<u>5,222</u>	<u>+1,400</u>	A-69
TOTAL	12,963	13,743	14,326	21,426	+7,100	
<u>PERMANENT POSITIONS</u>						
Stationary Source Enforcement.....	327	357	372	507	+135	
Mobile Source Enforcement.....	<u>105</u>	<u>120</u>	<u>121</u>	<u>161</u>	<u>+40</u>	
TOTAL	432	477	493	668	+175	

PURPOSE

The air enforcement program is directed toward achieving compliance with the standards and regulations established for stationary and mobile sources of air pollution under the provisions of the Clean Air Act. The stationary source enforcement program is undertaken to bolster and stimulate State enforcement of State Implementation Plans, New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPS). The mobile source enforcement program is primarily a Federal effort directed toward achieving compliance with fuel and motor vehicle emission standards and regulations.

The Clean Air Act places the primary responsibility for development and enforcement of regulations limiting emission of air pollutants upon the States. EPA's primary objective regarding the stationary source enforcement program is to assist and to stimulate State enforcement programs. Activities under State Implementation Plans (SIP's) thus far have focused on enforcing applicable emission limitations on existing Class A sources of air pollution and on identifying the problems causing non-attainment of the primary health-related standards in many areas of the country. This includes source identification, ascertaining compliance status, developing enforceable compliance schedules for sources not in final compliance, and assuring compliance with final emission limitations or increments of progress contained in compliance schedules.

In 1978, the same level of resources will be placed into enforcement against the remaining recalcitrant Class A violators, and an increased level will be channeled into enforcement of standards for an estimated 75,000 Class B sources impacting non-attainment. Increased resources will also be applied toward dealing with about 1,000 additional combustion sources prohibited by FEA from burning oil. In addition, a large proportion of the increase will be used to develop and implement, with States and local governments, a comprehensive program to ensure that new industrial growth is balanced with environmental concerns. This will be achieved by implementing far-reaching programs for new source reviews, prevention of significant deterioration, and enforcement of new source performance standards. Efforts will also be directed toward maintaining compliance by those sources now on schedules or complying with final emission limits in order to ensure that advances made toward clean air goals are not lost.

The Mobile Source Enforcement program is directed primarily toward achieving compliance with motor vehicle and fuel emission standards and regulations. In FY 1978, efforts in the program will be focused on programs aimed at reducing the failure of vehicles to meet emission standards. In FY 1978, the program will achieve full implementation of the Selective Enforcement Audit assembly line testing program for light duty vehicles and the Recall program. A confirmatory test capability in support of SEA and recall will also be established. In addition, efforts will be placed on assuring the successful implementation of Stage II Vapor Recovery requirements for vehicle refueling, enforcing lead phase-down requirements, and supporting the implementation of State Inspection/Maintenance programs in additional areas.

AIR ENFORCEMENT
STATIONARY SOURCE ENFORCEMENT

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase+ Decrease- 1978 vs 1977</u>
<u>Appropriation</u>					
Stationary Source					
Enforcement.....	\$9,661	\$9,841	\$10,504	\$16,204	+\$5,700
<u>Permanent Positions</u>					
Stationary Source Enf..	327	357	372	507	+135

Budget Request

An appropriation of \$16,203,500 is requested for FY 1978. This represents an increase of \$5,700,000 over FY 1977. A total of 507 positions is requested for FY 1978, which is an increase of 135 positions over FY 1977. These positions will be used primarily to solve non-attainment problems posed by Class A and B emitters and to handle the complex sets of problems presented by industrial growth and expansion and to develop and implement with States and communities strategies for minor source control.

Program Description

The stationary source air enforcement program is designed to effectively utilize the enforcement authorities provided by the Clean Air Act and EPCA to ensure nationwide compliance with State Implementation Plans (SIPs), New Source Performance Standards (NSPS),

and National Emission Standards for Hazardous Air Pollutants (NESHAPS). EPA's stationary source enforcement program consists of ensuring compliance by all Class A sources, working with State and local agencies to deal with Class B sources having an impact on attainment problems, encouraging States to request enforcement authority for NSPS and NESHAPS, and enforcing SIP, NSPS and NESHAPS requirements to support and stimulate State efforts.

The responsibility for enforcing State-developed, EPA-approved emission limitations is shared by EPA and the States. The Clean Air Act directs that States have primary responsibility for achieving clean air within their jurisdiction. When States do not enforce air pollution standards, however, the Act requires EPA to take action.

In accordance with the intent of the Act, the EPA air enforcement program is designed to ensure that all sources achieve compliance with applicable standards. EPA bolsters State air enforcement efforts by supporting State control agencies through control agency grants, providing specialized skill and expertise or special contractual efforts, and by taking enforcement actions against selected sources when the States cannot or will not enforce.

EPA has primary responsibility for the enforcement of the Federal emission standards it promulgates. However, both Section 111 (New Source Performance) and Section 112 (National Emission Standards for Hazardous Air Pollutants) provide for State enforcement of all or a portion of these standards. In accordance with the intent of Congress, EPA is placing a high priority on delegating enforcement authority for NSPS and NESHAPS to the States. After delegation, EPA will actively monitor the enforcement of these standards.

FY 1976 Accomplishments

During FY 1976, the following were accomplished:

-Completed update of inventory of Class A sources resulting in an increase of number of sources from 19,360 to 21,954.

- Achieved compliance with standards or compliance schedules by about 90% of the Class A sources subject to SIP's--up from 84% at the end of 1975, despite large increase in inventory;
- Increased the number of field surveillance actions undertaken (about 8,000 actions in 1976) by 36% over the 1975 level making possible the reduction in sources of unknown status;
- Reduced percentage of unknown sources by about 50%, from 1,227 to 638;
- Maintained high level of NSPS and NESHAPS compliance at 90% and 91%, respectively.

In FY 76 58% of the positions assigned to stationary source enforcement were applied to achieving compliance at Class A sources. An additional 12% was directed toward NSPS compliance. The remainder of these positions were allocated to cover other SIP programs and NESHAPS and new source review programs. Contract expenditures for FY 1976 totaled \$1,885,000 including \$1,465,000 for attainment of primary standards; \$320,000 for maintenance of primary standards; and \$100,000 for NESHAPS enforcement. \$75,000 of the above amounts were for ongoing operation and maintenance of the Compliance Data System and \$125,000 for regional data support.

FY 1977 Program

Major accomplishments during FY 1977 will be to:

- Continue to update Class A source inventory. This process is expected to add an additional 1,000 sources.
- Increase level of compliance to about 95% in final compliance or on schedules;
- Complete non-attainment AQCR analyses in conjunction with positions assigned to Regions under abatement and control appropriation, and assist States in developing strategies and appropriate source inventories to alleviate non-attainment problems;
- Delegate major portions of NSPS and NESHAPS to nearly all States and ensure compliance levels of at least 95%;
- Begin audits of State new source review programs, including evaluations of permits issued and make recommendations for changes.

In FY 1977, the position level will be 372 positions, with 58% again applied toward Class A source compliance, about 13% being applied to New Source Review, New Source Performance Standards, Prevention of Significant Deterioration, and the remaining 29% being allocated to Class B source compliance, non-attainment strategies, NESHAPS, EPCA, SIP revisions, and §111 (d) programs. FY 1977 Operating Plans contract expenditures totaling \$1,831,600 contain \$1,324,700 for attainment of primary standards; \$477,900 for maintenance of primary standards; \$17,400 for NESHAPS enforcement; and \$11,600 for §111 (d) source enforcement. Included in these totals is \$60,000 for operation and maintenance of the Compliance Data System, and \$140,000 for regional data support.

FY 1978 Plan

In FY 78, about 42% of 507 positions required will be allocated to compliance by Class A sources, about 25% to NSPS, NSR, and PSD programs, about 10% to Class B source strategies, with the remainder applied to other SIP efforts, NESHAPS and §111 (d) efforts. The bulk of the increase in positions is being placed into solving NSR, PSD, and NSPS problems, with a somewhat smaller portion being used to assist states in developing and implementing enforcement strategies for Class B sources.

The FY 1976 and 77 programs emphasize the need to assess the attainment status of AQCRs and to develop and begin implementing plans to remedy deficiencies in areas that are not attaining the primary NAAQs for one or more of the criteria pollutants. The governors of 45 States have been notified by EPA that the SIPs for their states must be revised in order to attain and maintain the ambient air quality standards. Plan revisions are necessary in 31 states for particulates, in 12 states for sulfur dioxide, in 22 states for carbon monoxide, in 29 states for photochemical oxidants, and in 3 states for nitrogen dioxide. Additional calls for plan revisions are expected in the coming months. At the present time, the best information available indicates that out of the total 247 AQCRs in the U.S., 117 AQCRs are non-attainment for particulate; 35 are non-attainment for SO₂; 56 are non-attainment for CO; 101 are non-attainment for O₃; and 5 are non-attainment for NO_x-- indicating the potential need for many more SIP revisions. The revised plans containing emission limitations achievable with reasonably available control technology must be submitted to EPA by July, 1977, and by July, 1978 state plans must incorporate all other necessary regulatory measures, such as improved transportation and land use controls. SIP revisions will require extensive input

from enforcement personnel to ensure that ongoing enforcement activities are not disrupted or delayed by pending revisions, that any new provisions are achievable and enforceable, and that proper balances are worked into strategies such that industrial/economic growth can occur in large, medium-sized, and small industries.

In addition, EPA personnel will work with states and local agencies to develop and begin implementing enforcement strategies based upon these completed analyses in FY 1977. Following revision of plans, another round of enforcement will be required at all sources for which new or revised emission limitations have been promulgated. By the beginning of FY 1978, full scale enforcement programs will be underway to correct existing attainment problems and to ensure that the many areas projected to be close to the allowable ambient levels remain below the health-protective cut-offs.

Enforcement efforts to date have been concentrated on obtaining compliance with particulate and SO₂ regulations at an estimated 22,000 Class A sources across the country. By the end of FY 1976, excellent results had been achieved-- 81% of the Class A sources were complying with final emission limitations and 6% were meeting increments in compliance schedules. However, those Class A sources still on schedules will require close surveillance during FY 1978 to ensure that they comply with scheduled increments. The 10% of Class A sources still in violation are for the most part powerful, recalcitrant industries that will continue to require extensive enforcement resources to collect evidence, negotiate agreements and/or mount effective court actions if they are to be brought into compliance. Since compliance by these large-volume polluters is known to be a major factor in both attaining and maintaining the primary NAAQA, enforcement will continue through FY 1978 to concentrate on Class A violators.

In many non-attainment areas of the country, the collective contribution to pollution levels of Class B sources will be identified as a major contributor to non-attainment problems. An estimated 75,000 of the 130,000 Class B sources located in non-attainment AQCRs will be identified as having the potential to impact the NAAQS. Control of these sources will be especially important because compliance by Class B polluters will most likely take the pressure off imposing even tighter restrictions on existing Class A sources that are now in effect. Although EPA anticipates dealing with these polluters in groups and categories rather than individually as with Class A sources, and primarily through State and local agencies, development of strategies and assistance to state and local agencies

in conducting effective enforcement programs to deal with this anticipated large number of Class B sources will necessitate an increase in Federal enforcement resources.

Implementing energy conservation programs is also closely bound with solving and preventing air quality problems. The Federal Energy Administration plans to issue orders prohibiting the burning of petroleum products to some 1,000 major fuel-burning installations during the second half of FY 1977. Therefore, during FY 1978, EPA enforcement will have to renegotiate compliance methods and timetables with each of these sources as they convert to coal and will have to certify to FEA the date upon which these large sources can convert and still meet environmental safeguards. Close attention must be given to this program because a very real potential exists for these sources to cause non-attainment problems where none now exist or to exacerbate current air quality levels such that clean-up already achieved may be lost.

The concept of preventing back-sliding from achievements already reached applies to all stationary source enforcement programs. Failure to support an effective NAAQS maintenance program by ensuring the continued compliance of sources with either emission limitations or compliance schedule increments would negate the efforts expended to date in bringing sources into compliance. EPA's enforcement program must maintain an effective "presence" through strong field surveillance efforts to assure continued compliance.

The most important issue facing stationary source enforcement in FY 1978 will be permitting new construction or expansion of industrial sources so that they neither prevent attainment, cause non-attainment, or cause significant deterioration of current air quality.

Many states do not yet have adequate new source review programs laid out and some of those that do are not able to implement them to the extent needed to ensure both attainment and maintenance of ambient standards. Federal assistance and guidance to states will be required to develop and implement NSR procedures, including strategies to assess the impact on the NAAQS of potential new sources. Uncontrolled industrial growth in areas barely attaining standards would seriously jeopardize air quality gains made to date, and create difficult, if not impossible, re-attainment problems. EPA's policy in this regard is not to limit growth but to act as a catalyst in ensuring that the goals of industrial expansion and environmental protection are accomplished together. Inherent in the review

program for new construction will be the State's and EPA's ability to assist industry in locating environmentally sound alternative construction sites. Control of HC emissions from stationary sources in order to attain the NAAQS for oxidants is an excellent example of the problems facing the stationary enforcement program. Postponement of automobile standards designed to reduce photochemical oxidant levels make control of stationary sources, both new and existing, imperative. In many non-attainment areas for oxidants, such as Los Angeles and Houston-Galveston, the States and EPA will be faced with managing large involved emission trade-off programs in order to permit new construction. Additional enforcement resources will be necessary to assure compliance with construction permits issued under NSR and to monitor state enforcement as appropriate to assure adequate state NSR programs.

Part of the long-term program to attain and maintain standards and allow for growth involves ensuring the compliance of new industrial sources with NSPS. Twenty-four categories of sources are currently regulated under NSPS and 15 additional categories of new sources will be subject to NSPS by the start of FY 1978. This will result in a substantial increase in the number of sources subject to NSPS and will require additional enforcement resources above current levels.

Enforcing emission limitations for hydrocarbons, carbon monoxide, and nitrogen oxides at Class A sources and some Class B sources will be a cross-cutting priority for all enforcement efforts in FY 1977 and FY 1978. Little progress has been made to date in reducing these emissions from stationary sources. A heightened enforcement effort is imperative with respect to HC sources since they are major contributors to photochemical oxidant problems.

Contract funds requested for FY 1978 totaling \$4 million will support enforcement case development--\$1,400,000; compliance monitoring and field surveillance-- \$1,050,000; regional industrial technical and economic studies-- \$800,000; and national profiles and enforcement strategy studies-- \$300,000. Funds required for operation and maintenance of the Compliance Data System, modifications for direct state access and expansion for Class B sources, and regional data support are \$450,000.

AIR ENFORCEMENT
MOBILE SOURCE ENFORCEMENT

<u>Actual</u> 1976	<u>Budget</u> Estimate 1977	<u>Current</u> Estimate 1977 (dollars in thousands)	<u>Estimate</u> 1978	<u>Increase+</u> <u>Decrease-</u> 1978 vs 1977
<u>Appropriation</u>				
Mobile Source Enf. \$3,302	\$3,902	\$3,822	\$5,222	+\$1,400
<u>Permanent Positions</u>				
Mobile Source Enf.. 105	120	121	161	+40
<u>Budget Request</u>				

The increase requested for the Mobile Source Enforcement Program in FY 1978 of 40 positions and \$1.4 million reflects the Agency's emphasis on programs aimed at reducing the failure of vehicles to meet emission standards. The increase will enable full implementation of the Selective Enforcement Audit assembly line testing program for light duty vehicles and a pilot SEA program for motorcycles, the effective implementation of a recall enforcement testing program, an increased level of recall investing activity as a result of an expanded recall surveillance program, enforcement field testing in support of SEA and recall, and assistance to regions and states for implementation of additional state inspection/maintenance programs.

Program Description

The Mobile Source Enforcement Program is directed primarily toward achieving compliance with vehicle emission standards and fuel regulations promulgated by EPA under provisions of the Clear Air

Act. The activities of the program include preventing introduction of uncertified new domestic and imported vehicles into commerce; auditing certification procedures of domestic and foreign automobile manufacturers; enforcing vehicle assembly line emission test activity and the recall, warranty and tampering provisions of the Act; developing and enforcing Federal regulations on the availability of unleaded fuels; ensuring implementation and compliance with stage I and stage II vapor recovery requirements, inspection/maintenance requirements, and other VMT requirements of Transportation Control Plans.

FY 1976 Accomplishments

The resource level for the Mobile Source Enforcement Program in FY 1976 was \$3,302 thousand and 105 positions. Approximately \$939 thousand were contract funds utilized in support of establishing a home base for METFac, performing confirmatory recall testing, providing assistance to states for fuels sampling, providing assistance to states for inspection/maintenance, and conducting anti-tampering support activities. Of the \$939,000 for the contract funds, \$45,000 was used for development and operation of computer data bases for fuels, imports, and assembly line and in-use emissions data. During FY 1976, the Mobile Source Enforcement Program promulgated final Selective Enforcement Audit Regulations to assure compliance of vehicles on the production line with emission standards, began construction of the Mobile Enforcement Test Facility in support of SEA and recall activities, and conducted 85 inspections and 11 investigations of foreign and domestic automobile manufacturer certification and production compliance activities. Activities of the recall program during FY 1976 included conducting 15 recall investigations of suspect classes of vehicles, auditing recalls, establishing a public reporting system, developing defect reporting regulations, and initiating the development of a confirmatory testing capability. With respect to the warranty and aftermarket parts programs, efforts continued to develop regulations on the 207(a) and 207(b) warranty provisions of the Clean Air Act; and to develop aftermarket parts guidelines. In FY 1976, mobile source enforcement continued its efforts to implement State inspection/maintenance programs, assured compliance with VMT measures, conducted 122 stage I vapor recovery inspections, and assured compliance with fuel additive regulations by conducting 26,800 inspections of gasoline retail service stations. In FY 1976, mobile

source enforcement also promulgated the enforcement provisions of the Stage II vapor recovery regulations and revised lead phase-down schedule, and initiated enforcement of the lead phase-down regulations. In addition, approximately 15 tampering investigations and 30 imports investigations were conducted to assure compliance with anti-tampering and imports provisions of the Clean Air Act.

FY 1977 Program

In FY 1977, the Mobile Source Enforcement Program will continue to carry out its responsibilities under Title I and Title II of the Clean Air Act and will emphasize programs aimed at reducing the failure of vehicles to meet emission standards. The FY 1977 Mobile Source Enforcement resource level is \$3,822 thousand and 121 positions. Approximately \$1,300,000 are contract funds to be used in support of recall emission testing, METFac and home base, statistical program support, anti-tampering publicity, survey, and vehicle testing; assistance to states and regions for implementation of inspection/maintenance programs; assistance to states for unleaded gasoline sampling, stage II vapor recovery, and imports publicity. Out of \$1.3 million dollars contract funds, it is anticipated that \$95,000 will be used for the operation of computer data bases for fuels, imports, emissions, and vapor recovery. In FY 1977, the Mobile Source Enforcement Program will conduct a pilot Selective Enforcement Audit Program for light duty vehicles through issuing an estimated 10 test orders to manufacturers to test vehicles on the assembly line. This represents the first time that EPA will exercise its authority under the Clean Air Act to test production vehicles on the assembly line. Emphasis will also be placed on identifying suspect classes of vehicles exceeding applicable emission standards by conducting a recall emission testing program, conducting approximately 25 recall investigations, ordering an estimated 2 recalls, enforcing the defect reporting regulations, and conducting audits of ongoing recalls. In FY 1977, an enforcement field test capability will be developed through the completion of METFac (Mobile Enforcement Test Facility) and completing preparations for a permanent station for METFac (Home Base) at Sandusky, Ohio. In FY 1977, mobile source enforcement will also enforce manufacturer certification and production compliance procedures through conducting 80 inspections and 15 investigations, will promulgate the 207(a) and 207(b) warranty provisions of the Clean Air Act, and will promulgate final guidelines for the aftermarket parts voluntary self-certification program. With respect to regional programs, mobile source enforcement will place high

priority on supporting implementation of inspection/maintenance programs, on integrating stage I vapor recovery inspections into the ongoing fuels inspection activity (20,000 unleaded and 5,000 stage I vapor recovery inspections), on monitoring lead phase-down requirements, and on conducting an estimated 40 imports investigations.

FY 1978 Plan

The proposed FY 1978 Mobile Source Enforcement Program budget is 161 positions and \$5,222 thousand. Approximately \$1,924 thousand of these resources will be contract funds to be utilized in support of expanded recall, field testing tampering, inspection/maintenance, vapor recovery, and fuels activities. As part of the \$1,924,000 contract funds, \$95,000 will be utilized for continued usage of the fuels, imports, emissions, and vapor recovery computer data bases. In FY 1978, the Mobile Source Enforcement Program will continue to place primary emphasis on programs aimed at reducing the failure of vehicles to meet emission standards.

The Selective Enforcement Audit assembly line testing program will be increased to the level of full implementation for light duty vehicles. This program will assure that new vehicles on the production line are in compliance with emission standards before being introduced into commerce.

The recall program will also be increased to the level of full implementation to assure compliance of in-use vehicles with emission standards. A recall enforcement testing program will be conducted on suspect classes of vehicles and will result in more effective determination of whether recall is appropriate. Recall investigation activity will increase as a result of an increase in the recall surveillance program. The promulgation of the Selective Enforcement Audit regulations, the defect reporting regulations, and public reporting of investigations will all serve to identify a greater number of vehicle classes suspected of exceeding exhaust emission standards in-use.

In FY 1978, the Mobile Source Enforcement Program will also place major emphasis on certain regional activities aimed at enforcing hydrocarbon control strategies to meet emission standards.

In FY 1978, substantial efforts will be devoted to assuring the successful implementation of stage II vapor recovery requirements for vehicle refueling. This activity will be integrated into the ongoing fuels sampling and stage I vapor recovery efforts.

High priority will continue to be placed on supporting implementation of inspection/maintenance programs in additional areas and in conducting audits and spot checks of existing programs. I/M programs will not only serve to remedy emissions from noncomplying vehicles in-use, but data from these programs will be used by recall and tampering programs to identify classes of vehicles exceeding standards.

During FY 1978, the major activities for the Mobile Source Enforcement Program will be:

Implement SEA for light duty vehicles

- Issue 36 test orders

Conduct 80 inspections and 15 investigations of auto manufacturers activities

Implement 207(a) and (b) warranty regulations

Implement aftermarket parts guidelines

Fully implement recall program

- Conduct 30 recall investigations

- Expand recall auditing, defect reporting and public reporting follow-up

- Conduct recall enforcement testing program through contractor, home base, and METFac testing (30 contractor tests)

Conduct 25 tampering investigations

Provide support to ongoing I/M programs and assist in development of new I/M programs

Perform 5 audits of existing inspection/maintenance programs

Conduct 7 calibration spot checks of existing I/M facilities

Support I/M implementation in 4 additional areas (total of 14)

Conduct METFac and home base emission tests

Review enforceability of AQMP's and of TCP's for additional new cities

Enforce unleaded gas and stage I and II vapor recovery requirements

- Conduct 22,000 combined fuels inspection tests

- 1000 stage II vapor recovery tests

- 21,000 unleaded and stage I tests

Enforce lead phase-down requirements

- Conduct 5 lead phase-down investigations

Conduct 40 imports investigations

AIR

Research and Development

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase+ Decrease- 1978 vs. 1977	Page
(dollars in thousands)						
Appropriation						
Health and Ecological Effects...	\$23,425	\$30,705	\$30,113	\$37,913	\$ +7,800	A-77
Industrial Processes	5,224	5,065	5,000	6,000	+1,000	A-114
Monitoring and Technical Support.....	7,157	10,172	8,443	9,143	+700	A-123
Total.....	35,806	45,942	43,556	53,056	+9,500	
Permanent Positions						
Health and Ecological Effects...	270	303	280	305	+25	
Industrial Processes.....	34	49	40	45	+5	
Monitoring and Technical Support.....	147	119	140	140	...	
Total.....	451	471	460	490	+30	

Purpose

The air research and development program is designed to furnish EPA with the knowledge to establish prudent environmental controls based upon known or potentially adverse health and ecological effects; to define, develop, and demonstrate systems for controlling stationary sources; and to evolve strategies for minimizing the emission of pollutants.

To achieve these ends, the program is structured to quantify the effects of air pollutants on man, animals, plants, and the general environment; develop predictive models for pollutant emission, transport, transformation, and removal, and verify these models by actual measurements; develop and standardize techniques for the monitoring of pollutants; and develop new and improved technology for preventing and controlling air pollution and demonstrate the cost effectiveness of such technologies.

AIR

Research and Development

Health and Ecological Effects

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase+ Decrease- 1978 vs. 1977
				(dollars in thousands)	
<u>Appropriation</u>					
Health Effects.....	\$13,163	\$19,237	\$18,311	\$25,211	+\$6,900
Ecological Processes and Effects.....	1,680	1,164	1,910	1,910	...
Transport and Fate of Pollutants.....	8,582	10,304	9,892	10,792	+900
Total.....	23,425	30,705	30,113	37,913	+7,800
<u>Permanent Positions</u>					
Health Effects.....	192	187	205	230	+25
Ecological Processes and Effects.....	38	57	34	34	...
Transport and Fate of Pollutants.....	40	59	41	41	...
Total.....	270	303	280	305	+25

Budget Request

An increase of \$7,800,000 and 25 positions is requested, part of which will provide new starts for a) retrospective and prospective epidemiological studies on carcinogens, b) population studies of specific sulfates, and c) the initial evaluation and application of candidate screening tests for hazardous substances. A portion of the increase will be utilized to conduct research on the transport and transformation of atmospheric sulfates and synthetic organics. Finally, the balance will provide for acceleration of sulfuric acid clinical studies research and for expansion of the environmental carcinogens program. Specifically, the resources will be utilized as follows:

- \$5,000,000 and 14 positions have been identified to expand the environmental carcinogens program, including initiation of epidemiological studies. Four of these positions are needed for the Cancer Assessment Group.
- \$1,800,000 and 6 positions will be used: 1) to conduct epidemiological and controlled clinical exposure studies on the health effects of sulfuric acid and other sulfates, and 2) to conduct studies on the contributions of natural sources to ambient sulfate levels, effects of sulfates on visibility reduction, and data analysis and modeling of ambient sulfates in relation to precursor emissions.
- \$1,000,000 and 5 positions are requested: 1) to expand research to assess air contaminant screening tests, and initiate the application of candidate tests; and 2) to conduct preliminary assessment of the transport and transformation of synthetic organic compounds in the atmosphere, potential intermedia transfer, and potential toxics formation.

Program Description

Research on air health and ecological effects provides a sound scientific basis upon which to establish and continually evaluate both primary and secondary ambient air quality

standards. This is done in a number of program areas including health effects, ecological processes and effects, and transport and fate.

The health effects research program uses toxicological investigations, controlled human exposure studies and epidemiological studies of targeted populations to address health research questions. Investigations focus on those air pollutants that may or do adversely affect the public health. Research in this program concentrates on developing scientific data needed for a possible short-term NO_2 standard; clarifying the health data base for oxidants; reviewing new data to determine the adequacy of existing pollutant standards; compiling a data base to evaluate the health effects of sulfates, nitrates and other particulates; assessing exposure-effect relationships of chronic, low-level exposure to trace metals and other non-pesticide substances; and collecting and analyzing information on the effects on public health of emissions from automobiles. In addition, an assessment of the contribution of environmental carcinogens to the incidence of cancer in the general population is continuing.

The ecological effects research focuses upon the effects of air pollutants on the structure and functions of ecosystems, especially on their economically useful components, such as forests and crops. Projects involving laboratory and/or field studies, and mathematical and/or theoretical simulations are conducted to support the establishment and the scheduled re-evaluation of air pollutant criteria documents, as well as to provide policy makers with guidelines to assess the environmental impact of municipal, industrial, and agricultural emission sources as well as energy resource development.

Studies on air transport and fate are conducted to qualitatively and quantitatively determine the sources and sinks, kinetics of formation and removal, and chemical/physical interactions of airborne gaseous and particulate matter. This area of research includes: (1) the development, evaluation and validation of air quality simulation models for predicting and describing air quality impacts anticipated from various control abatement strategies, (2) determination of atmospheric chemical and

physical processes for describing the formation and removal of gaseous and particulate air pollutants is also part of this work.

FY 1976 Accomplishments

In FY 1976, the total health and ecological effects resources (exclusive of transport and fate) were \$14,843,100 and 230 positions. Those resources included approximately \$6,514,500 for contracts, \$1,284,200 for grants and \$500,000 for interagency agreements. The following research results were achieved in FY 1976:

A monograph, "Health Consequences of Particulate Air Pollution," has been prepared. The document gives data collected in 1971 and 1972 from the southeastern U.S. and the New York City area on the relationships between particulate air pollution exposures and the prevalence of chronic respiratory illness; the incidence of acute respiratory illness; and the aggravation of symptoms in susceptible subpopulations. Results from the studies support the current standard for total suspended particulates and provide data that can be useful to future Agency actions relative to respirable particulates and suspended sulfates.

Decrements in certain lung function parameters following four-hour exposure to 0.4 parts per million (ppm) ozone and two-hour exposure to 0.6 ppm ozone were observed in human subjects. This work will be used in continuing evaluations of the National Primary Ambient Air Quality Standards and Recommended Federal Episode Criteria for oxidant (as measured by ozone). It may be noted that in the latter case, a one-hour average concentration of 0.4 ppm is the "warning" level and a one-hour average concentration of 0.6 ppm is the "emergency" level for oxidant. The above findings, together with other parameters yet to be examined, are especially relevant to

assessing the adequacy of the existing safety margin in the present ambient standard and the Episode Criteria.

An animal model, developed as part of the air health program, was used to assess the immune response or defense mechanism of the lung. It was shown that ozone and nitrogen dioxide in 0.1 ppm and 3.5 ppm concentrations significantly enhance mortality and reduce mean survival time in mice challenged with streptococcus bacteria. Such findings will contribute to the body of information on the effects of these pollutants on the ability to resist infectious disease, providing a firmer basis for regulatory decisions in the future.

To simulate natural air pollution conditions, animals were exposed to fluctuating concentrations of NO₂ over time, the fluctuations representing peak intermittent exposures. On such a regimen, followed by challenge with streptococcus bacteria, an enhancement of mortality over controls was observed. These findings will contribute to an improved understanding of the relationship between concentration and duration of exposure in evaluating not only the concentration established by the air standards, but the averaging times employed as well.

Chromosomal aberrations were examined in college freshmen, half of whom had resided in Los Angeles, a high oxidant area, and half of whom had entered college from residences elsewhere in the U.S. No evidence was observed of a seasonal effect of oxidant air pollution on the frequency of aberrations. A constant excess of aberrations observed in the Los Angeles Basin residents is being examined. This work can expand our knowledge of the risks associated with high oxidant levels and will help to elucidate previous suggestions of radiation-like effects of oxidant (measured as ozone) on chromosomes.

A major effort has been directed toward developing and utilizing in vitro screening techniques for predicting the toxicity, mutagenicity, and carcinogenicity of numerous environmental pollutants. The screening systems developed so far are expected to be valuable in assessing the myriad of potentially hazardous substances presently found in the environment.

An improved monitoring methodology system that is capable of measuring the exposure of selected populations to short-term, high levels of various air pollutants, such as SO_x and NO_x, was deployed. This system permits the health researchers to study firsthand the relationships between the acute adverse health effects they observe and the short-term, high pollutant levels they measure. The combination of these data is used to assess the degree of protection provided to the public by currently short-term exposure averaging times and to develop the data base for establishing new short-term standards.

Construction of the clinical health facility at Research Triangle Park Health Effects Laboratory is nearing completion. These facilities will provide the capability to assess the effects on human health of specific pollutants by means of human exposure studies carried out under controlled laboratory conditions. In addition, work has been in progress to develop and apply non-invasive physiological techniques for human subjects. Two such techniques for sensitive measurements of cardiac parameters have resulted in an entirely new approach, for which EPA has applied for a patent.

Among the scientific summaries prepared were those on nitrosamines, vinyl chloride, arsenic, nitrogen oxides, vanadium, lead, and nickel. Draft reports were prepared on fuel and fuel additive toxicology, platinum and palladium. In addition, as part of EPA's

international cooperation on air pollution control, assistance was provided to the World Health Organization in the form of reviews of their Criteria Reports.

A long-term study of animal exposure to mobile source pollutants was completed and analyzed. All exposed groups develop altered pulmonary function and structural pathologic changes. Pulmonary emphysema was present in several experimental groups. The important results of the study will be relevant to the continuing evaluation of the present mobile source emission standards.

Sample collection and analysis were completed in a pilot study conducted cooperatively with the Center for Disease Control. The study was designed to preliminarily assess trace metal body burden in residents of primary non-ferrous smelter communities. When analysis of results are complete, the information will be used as part of the basis for selecting smelter communities for a more in-depth trace metals health effects study.

Data from a study on the effects of sea-salt aerosol on agricultural crops were used to establish exposure time tables for injury to vegetation. In this study, plants were exposed to aerosol concentrations simulating those from saltwater mechanical cooling devices at a power plant complex. Information of this nature is important for relating exposure averaging times to observed effects.

A study to measure uptake of cadmium from phosphate fertilizers by peas, radishes and lettuce showed that significant amounts are retained in leaf and root tissue. Cadmium also comes from such sources as non-ferrous smelters, tire residues and coal-fired power plants. Work of this nature is applicable to Agency activities to protect human welfare, in that it contributes to an understanding of effects of pollution on crops of significant economic value.

Field testing of the Zonal Air Pollution system was completed at Colstrip, Montana, where a long-term project is being conducted to assess the environmental impact of pollution on wildlife, vegetation, and soils. The system is designed to deliver controlled concentrations of sulfur dioxide to test plots at the site. The methodology has proved successful and will be recommended for use at other air pollution research sites throughout the United States.

The FY 1976 resources level for air transport and fate research was \$8,581,700 and 40 positions. Those resources included approximately \$3,029,124 in contracts, \$1,675,491 in grants and \$2,084,907 in interagency agreements. Since airborne sulfates may cause adverse health effects, a major study was conducted of the transport of SO₂ in polluted air masses. The transformation of SO₂ to sulfates in power plant plumes takes place at a relatively low rate (3-5 percent per hour) over long distances. Power plant plumes were tracked for 60-100 km and urban plumes for 250 km. The results support the theories of long-range transport of sulfates from large point sources and urban areas.

EPA investigators participated in a field study (conducted at the General Motors test track facility in Milford, Michigan) to assess sulfuric acid and sulfate exposures produced by catalyst-equipped cars. Results showed that sulfate emitted by the cars was in the form of very small (0.02 um) particles of sulfuric acid and remained in the acid form at least 20 meters downwind from the roadway. These results indicate the importance of measuring sulfuric acid concentrations attributable to mobile sources directly on roadways.

A numerical model was developed for studying the ammoniation of sulfuric acid emissions from cars. It had been thought that sulfuric acid concentrations and

associated exposures were highly dependent upon background ammonia concentrations. Under worst-case conditions the ammoniation process was found to be controlled by diffusion; maximum sulfuric acid concentrations were only dependent on variations in background ammonia. The degree of ammoniation on the road, under worst-case meteorological situations, appeared to be relatively insensitive to background ammonia concentrations.

Two major field studies were conducted to assess the long-range transport of oxidants and their precursors. Results show that oxidants and their precursors can be transported over long distances. No evidence was found that natural sources by themselves produce oxidant levels above the national standard, as some have claimed.

A report on the problem of the possible depletion effects of halogenated air pollutants on stratospheric ozone was written and submitted to the House Subcommittee on Public Health and Environment. The report discusses the potential problem of ozone depletion in the stratosphere and subsequent increases in amounts of ultra violet radiation from the sun reaching the earth's surface.

A major study was conducted in the EPA wind tunnel to assess the effects of buildings on the dispersion of effluents from nearby stacks. The angle of the wind to a rectangular building was found to have a significant effect on the dispersion of pollutants released from building rooftops. The results of this study can be used to refine ground-level concentration estimates generated by the conventional plume theory.

FY 1977 Program

The FY 1977 resources level for air health and ecological effects research (exclusive of transport and fate) is \$20,221,000 and 239 positions. These resources include approximately \$8,608,000 in contracts, \$1,300,000 in grants and \$300,000 in interagency agreements.

The principal FY 1977 research objectives for the air health and ecological effects program include: the establishment of an exposure monitoring system for the assessment of the levels of carcinogens in specific study areas; the evaluation of the effects of specific air pollutants on man (i.e., sulfates, ozone/oxidants, trace metals and carcinogens); the expansion and refinement of data relating to health hazards associated with automobile emissions; and the determination of the effects of air pollutants, singly and in combination, in various concentrations upon individual flora and faunal ecosystem components and upon intact ecosystems.

The FY 1977 air health effects research program includes: (1) Assessing the acute health effects from short-term peak exposure to nitrogen oxides; (2) Completing the clinical studies on ozone/oxidants to ascertain pulmonary dysfunction alteration of immune response, and possible effects on human chromosomal structure; (3) Developing, through toxicologic studies, dose-response data on sulfuric acid, ammonium sulfate, and ammonium bisulfate; (4) Evaluating data on such trace metals as lead, cadmium, mercury and others; (5) Establishing a monitoring program to assess levels of carcinogens in specific study areas selected partly on the basis of cancer incidence rates; (6) Expanding toxicology studies on carcinogens to fill identified research gaps; (7) Refining and expanding knowledge on possible health hazards of emissions from motor vehicles, especially those equipped with emission control devices; (8) Continuing assessment of health risks associated with fuel additives; (9) Examining the relationship between observed health effects and various pollutant particle sizes, especially these in the respirable range.

The FY 1977 air ecological effects program includes: (1) Developing and strengthening the scientific basis for air quality control strategies and for establishing secondary air quality standards for major air pollutants with emphasis on SO₂, O₃, NO and for non-criteria pollutant (e.g., heavy metals, halogen compounds, etc.) upon agronomic, horticultural and forest ecosystems; (2) measuring of acute and chronic effects of airborne photochemical oxidants upon selected forest and agricultural ecosystems; (3) determining acute and chronic ecological effects of major air pollutants, singly and in combination, upon agronomic, horticultural, forest, and grassland ecosystems; (4) determining ecological effects of air pollutants within selected systems as a result of their transport, transformation, accumulation, and dispersal through biological, physical and chemical means; (5) developing population-dynamics models dealing with air pollutants and terrestrial plant and animal communities; (6) developing and applying models describing transport pathways of airborne hazardous substances (e.g., particulates, heavy metals, etc.) to selected terrestrial plants and animals; and (7) determining the effects of mercury as an air pollutant on agronomic and horticultural plants.

The FY 1977 resources level for air transport and fate research was \$9,892,000 and 41 positions. Those resources included approximately \$3,450,000 in contracts, \$2,076,000 in grants and \$2,405,000 in interagency agreements.

The FY 1977 program reflects increasing emphasis on the following high-priority subject areas: (1) Atmospheric sulfates: Uncertainty continues to exist concerning the extent of atmospheric sulfate associated with human activity--its composition, distribution and probable sources. The program on atmospheric modeling and the chemistry and physics of atmospheric sulfates is designed to eliminate these uncertainties, particularly with respect to the following:

- The role of photochemistry in the formation of sulfates;

- The relative contribution of high vs. low-level sulfur dioxide sources in producing concentrations of sulfates at ground level; and
- The amount of visibility reduction associated with anthropogenic sources of atmospheric sulfur.

(2) Halocarbons: Investigations will be made of man-made and naturally occurring halocarbon impacts on stratospheric ozone with emphasis on tropospheric sources, dispersion, and reactions and stratospheric sinks, (3) Air Quality Simulation Model Development (AQSM): Model development will shift from the urban scale to the development and evaluation of smaller scale highway models and larger scale (500-1000 km) models. Both of these models are needed to evaluate adequately the sulfates problem, while the larger scale models are required to evaluate in general the problem of long-range transport and transformation of pollutants, (4) Photochemical Oxidants: Emphasis will be placed on determining the sources, distribution and atmospheric chemistry of photochemical oxidants. Special studies will be conducted to determine: the role of natural vs. man-made sources; the impact of long-range transport and the inter-relationships of NO_x , HC/Oxidants; and specific hydrocarbon reactivities associated with precursors of oxidants.

Air

Health and Ecological Effects

Significant Extramural Project - 1977 Program

Title: Operation and Maintenance of CHAMP

Amount: \$1,395,000

Discussion:

Assessing the human health effects of exposure to community air pollution requires the collection of accurate ambient air quality and meteorological data. The CHAMP (Community Health Air Monitoring Program) system consists of a network of remote stations which incorporate technological developments in air monitoring and meteorological sensors. Data collection for the system is used to quantitate short-term human exposure levels to various air pollutants within selected communities.

The system consists of 23 remote monitoring stations presently located in five communities, and five mobile units which can be easily deployed to most areas. Each remote station detects sensor operating parameters or "system checks" such as valve position, flow rates, critical temperatures, range selection, calibration settings, and other parameters which are vital to obtain valid and accurate air quality data. The remote stations are linked by dial telephone to a central system controller where all systems data are received and evaluated by computer control. Rapid retrieval of these "system checks" permit immediate reaction to system malfunctions and provides means to evaluate critical operating tolerances in order to insure the accuracy of the data.

The CHAMP system provides pollutant data for nitric oxide, nitrogen dioxide, ozone, sulfur dioxide, methane and non-methane hydrocarbons, carbon monoxide, PAN (peroxyacetylnitrate), and suspended particulates. Total particulate matter is aerodynamically separated to provide samples of all respirable particulates and suspended particulate matter. Meteorological sensors provide

wind speed, wind direction, temperature, humidity, and barometric pressure information. Complete system flexibility has been incorporated to allow for the addition of other pollutant sensors or a change of sensors to meet the latest technology.

Title: Operation and Maintenance of CLEANS

Amount: \$500,000

Discussion:

This program provides for the study of selected human volunteer subjects exposed to carefully controlled laboratory environments simulating those in urban areas. Exposure schedules are chosen to correspond to levels of air pollution actually occurring as a result of industrial or automotive emissions. Changes in physiologic status, alterations in metabolism or interference with immune mechanisms of the exposed individuals are used to help formulate the basis for environmental standards. Each of the two controlled environmental laboratories provide living accommodations for three persons. In addition, each laboratory is fully equipped with the most sophisticated instrumentation available for assessing the health status of the subjects. Especially important are instruments for measuring heart and lung function before, during, and after exercise. Because of the complexity of this instrumentation as well as the large amount of data acquired, most of the testing is under computer control. Medical technicians and research physicians monitor and direct the studies by interacting with the computer.

The controlled environmental laboratories are capable of operating over a wide range of temperature and humidity conditions and in either very clean status or one programmed to simulate the desired pollution profile. Both laboratories can provide carefully controlled levels of carbon monoxide, sulfur dioxide, nitrogen dioxide, and ozone either singly or in any combination. One of the laboratories can also provide fine particulate aerosols of nitrate and sulfate compounds. These environmental conditions are also under computer control, providing great flexibility and reliability.

The CLEANS program in the U. S. Environmental Protection Agency is a unique national resource for the study of man's interaction with certain aspects of this environment. Operated under the direction of EPA scientists, it is available for the participation of qualified researchers throughout the country.

Title: Impact of Ambient Oxidant Pollutants on the Mixed Conifer Forest Ecosystem Amount: \$180,000

Discussion:

Objective of the effort is to intensively evaluate the effect of ambient photochemical oxidant air pollution on a complex mixed conifer forest ecosystem. Descriptive systems models shall be developed to assist in predicting the future condition of the study forest ecosystem under variable oxidant stressor levels. The predicted consequences of photochemical oxidants on the forest ecosystem shall be evaluated in terms of human welfare effects. The adaptability of the systems models developed to other pollutant types and forest types shall be evaluated.

In addition to gaining basic scientific knowledge regarding the direct impact of photochemical oxidants on major components of a forest ecosystem, interactive effects shall be assessed through systems analysis. Knowledge of the complex relationship between variable oxidant stress and resulting ecosystem condition and associated impact to human welfare should provide great assistance in assessing air pollution control strategy and establishing suitable secondary air quality standards.

Title: Battelle Massive Air Sampler (Contract)

Amount: \$100,000

Discussion:

During FY 1976 Battelle developed, produced, and field evaluated two massive air volume samplers. Based on the success of these evaluations, it is anticipated that ten samplers will be required for special field studies by the laboratory in the area of particulate sampling.

Title: Catalyst Program Extension (Grant)

Amount: \$50,000

Discussion:

This grant will continue to analyze the impact of catalysts on automotive-generated pollutants.

Air

Health and Ecological Effects

Significant Extramural Projects - FY 1977 Program

Title: Targeted Epidemiology Studies

Amount: \$1,500,000

Discussion:

The epidemiology research involves targeted population studies designed to test hypotheses developed in part from earlier Community Health Effects Surveillance Studies (CHESS) results. These studies will also complement data obtained through toxicological and controlled clinical investigations. Implementation and adjustment of ambient air quality standards will be influenced by these data. Further, the exposure response relationships to non-criteria pollutants will be more firmly established.

In FY 1977 the epidemiologic program will conduct field studies in the Los Angeles Basin to study the effects of oxidants on persons with and without chronic lung disease. Another study is designed to replicate the observed cytogenetic effects of oxidants in college freshmen. A significant effort will be undertaken to develop methodology to improve the characterization of human exposure to air pollution in health study areas including indoor/outdoor pollutant relationships and mobility of specific study groups. A joint study with the Center for Disease Control (CDC) on characterizing the impact of proximal living to lead, copper, and zinc smelters on trace metal burdens as a function of age will continue. An effort will begin on assessing the health benefits associated with improvement in a major urban area's air quality. Considerable activity will center on analyses and reports preparation of data collected from earlier epidemiology programs.

Air

Health and Ecological Effects

Significant Extramural Projects - FY 1977 Program

Title: Studies on the Relationship between Carcinogen Metabolism in the Alveolar Macrophage and the Induction of Lung Cancer Amount: \$350,000

Discussion:

The objective of this task is to study the relationship between carcinogen metabolism in the alveolar macrophage and the induction of lung cancer. Using in vitro methods the course of metabolic activation/detoxification of procarcinogens will be investigated in alveolar macrophages obtained from rats and hamsters. Biochemical methods will be used in monitoring induction or metabolic activation/detoxification systems. Microbial mutagenesis will be used to monitor the extent of metabolic activation/detoxification by macrophages. Once the conditions for maximal activation/detoxification of carcinogens have been established using in vitro methods, whole animal studies will be initiated employing intratracheal instillation techniques to administer particulates and appropriate procarcinogens. The metabolic activation of procarcinogens will be monitored as described above using macrophages obtained by saline lavage of carcinogen-exposed animals. When optimal conditions have been established, experiments will be performed to demonstrate the relationship between elicitation of macrophage influx, metabolic activation/detoxification of carcinogens and the induction of lung tumors in animals. This is a long-range project that will be approached sequentially with continuation from year to year being dependent upon demonstrated success of initial studies.

Air

Health and Ecological Effects

Significant Extramural Projects - FY 1977 Program

Title: Determination of the Influence of Environmental Materials
as Co-Factors with Carcinogenic Influence from Energy Sources Amount: \$150,000

Discussion:

The cytotoxic effect of amphibole will be compared with silica and chrysotile asbestos using rabbit alveolar macrophages and red blood cells. The potential for cellular neoplastic transformation will be studied in the presence and absence of known carcinogens using the BALB/C 3T3 and/or hamster embryo systems.

The carcinogenic effect of amphibole will be compared with polycyclic hydrocarbon compounds that result from the use of alternate energy source. These polycyclic hydrocarbons include but are not limited to naphthylamines, aminobiphenyls, chrysene, dibenzanthracene. The co-carcinogenic effect of amphibole along with these hydrocarbons will be compared with that of asbestos such as amosite. The animal of choice will be rat and/or hamster.

Air

Health and Ecological Effects

Significant Extramural Projects - FY 1977 Program

Title: Effects of Etiologically Defined Respiratory Infections
on Lung Function and its growth in an Area of Low Pollution Amount: \$200,000

Discussion:

This study provides baseline pulmonary function data on children living in an area of low environmental pollution. Children will be studied longitudinally to characterize pulmonary function changes associated with physical growth and documented upper respiratory infections. Children will be cultured for pathogene at two week intervals regardless of systematology and measurements made will assess the impact of these infectious agents on pulmonary function. This information will enable the design of better studies to assess the growth of lung function and impact of respiratory infections on young children living in areas of high air pollution.

Air

Health and Ecological Effects

Transport and Fate of Pollutants

Significant Extramural Projects - FY 1977 Program

Title: Regional Air Pollution Study (RAPS) Prime Contractor Support
(Contract)

Amount: \$2,000,000

Discussion: Provides for the operation of the 25-station aerometric network, together with the operation of a routine meteorological sounding network for the RAPS in St. Louis. Provides supplementary studies and measurements for special experiments carried out in the St. Louis area. The RAPS, initiated in FY 1973, is designed to provide a suitable amount of high quality meteorological, air quality, and emissions data on an urban scale, for the development, evaluation, and validation of air quality simulation models. The data gathering phases of RAPS are scheduled to terminate in September 1977. Data analysis will be continued into FY 1978 and beyond.

Title: NOAA-EPA Interagency Agreement (IAG)

Amount: \$2,040,000

Discussion: Supports 56 NOAA personnel assigned to the ORD, administered by the Meteorology and Assessment Division, ESRL. NOAA personnel conduct research in air quality simulation modeling, geophysical research, and applied modeling activities in ESRL. NOAA personnel are assigned to other EPA components and provide technical assistance in air pollution meteorology.

FY 1978 Plan

In FY 1978, the total health and ecological resources level (exclusive of transport and fate) will be \$27,121,000 and 264 positions. These resources will include approximately \$13,624,000 for contracts, \$2,272,600 for grants and \$466,200 for interagency agreements.

In FY 1978 the air health effects research emphasis will continue to shift from the criteria pollutants to the non-criteria pollutants as ongoing criteria pollutant research is completed. Sulfates, and to a somewhat lesser degree nitrates and respirable particulates, will receive special attention. Efforts will continue to develop health effects data on non-pesticide organic and inorganic substances.

In the criteria pollutant area, work will be completed on collecting and analyzing field and laboratory data on the health effects of short-term exposure to nitrogen oxides. These data will be available as part of the criteria for short-term nitrogen oxides exposures. Evaluations of the effects of CO on the thickening of the innermost structures of arteries will be completed to determine whether the CO ambient standard is sufficiently protective of the public health. The field studies on oxidants should be nearing completion to permit data evaluation on the need to change the oxidant emergency episode level value. A significant research program will continue on evaluating the acute and chronic health effects from exposure to combinations of criteria pollutants in order to determine the extent of additive or synergistic effects. Reviews will continue on assessing the adequacy of existing safety margins, on developing better health indicators of adverse pollutant effects, and on developing more accurate biological screening systems to rapidly screen for the potential toxicity of selected environmental pollutants.

The research program in the non-criteria area will emphasize sulfates, with efforts on nitrates and other respirable particulates. The sulfate research will concentrate on analyzing the toxicologic and clinical results obtained in 1977 on sulfuric acid, ammonium sulfate, and ammonium

bisulfate. While these results will be suggestive as to possible regulatory actions, their principal value will be to direct the design of definitive epidemiologic studies on sulfates. Further, toxicologic and clinical studies will be performed to identify the cation-anion-pH interactions that are believed to be the cause of biological activity in sulfates. In FY 1978, additional monies for sulfates will permit the acceleration of controlled human exposure studies and will allow a multi-site epidemiologic program on sulfates to start in 1978 instead of being phased in over a two year period. The planned program, including the research discussed under the transport and fate and measurement techniques and equipment development categories, is designed to produce the necessary data to permit the Agency to make a decision in 1980-81 on whether these specific sulfates require regulatory action.

Efforts in the non-pesticide inorganics and organics area will emphasize collecting health effects data on such metals as cadmium and arsenic. Field studies will continue, for example, on characterizing human body burdens from persons living in the vicinity of smelters. This information will be available for incorporation into actions to control smelter emissions.

Although many agencies in the federal sector are involved in research on cancer and carcinogenic agents, only limited information is available both on the distribution and levels of potential environmental carcinogens and on the extent to which the public health may be at risk from such agents. In FY 1976, EPA initiated a carcinogens program whose objective is to develop a systematic program which can provide an assessment of the contribution of environmental carcinogens to the incidence of cancer in the general population. Through this program, EPA can make a major contribution to national research efforts on cancer through its unique capability to monitor and characterize environmental exposures. As an integral component, the program will consolidate and coordinate the many data bases which currently exist in other agencies.

Initially, the principal thrust of this program is to identify the significance of environmental carcinogens to human cancer incidence via an assessment of media transport, inter- and intra-media transformation, measurement methodology, exposure levels, dose assessment, and retrospective estimation of exposure, all conducted under a rigorous quality assurance program, for both man-made and natural carcinogens which may affect the general population.

In FY 1978, the environmental carcinogens program will continue to build on the developing data base by compiling information on critical pathways of selected carcinogens, from source to target human tissue, and by developing exposure-response models. These and other accumulated results, including data gathered in retrospective epidemiological studies, will be applied to the design of a cost-effective, pollutant-oriented system to assess the contribution of environmental carcinogens to cancer incidence and mortality. The system, which will have a quality assurance program as an integral component, will be tested with newly selected, cancer types and incidence areas. When completed, the system envisaged will permit an assessment of the contribution--whether major, minor, or insignificant--of environmental agents to the cancer incidence and mortality of the general population; that is, under what conditions of concentration, form, and location, when applied to susceptible populations, are environmental carcinogens a significant factor in public health. In addition, the requested increased funding level will also be used to expand toxicological studies, particularly for those chemicals or candidate carcinogens which have not yet been fully tested for toxicity and to initiate prospective epidemiological studies on cohorts with exposure to known or suspected carcinogens at greater than environmental levels.

Based on emerging results from exposing subjects to ultrafine sulfuric acid mist and the field monitoring program to determine ambient concentrations of sulfuric acid around heavily travelled freeways, resources will be deployed to address additional research needed on automotive-emitted sulfuric acid or will concentrate more on assessing the health effects from various trace metals emitted from auto using new fuel additives or improved control systems.

Increased resources related to air toxics will be utilized to undertake state-of-the-art assessment of air screening tests, and to initiate preliminary evaluation and application of candidate screening tests.

In the ecological effects program, criteria pollutants will receive continuing effort by use of field, greenhouse, and laboratory studies on the effects of SO_2 , O_3 , and NO_2 on economically important crop and tree species. FY 1978 will see increased emphasis on use of the scientific data to support economic evaluation of pollutant impacts. Long-term photochemical oxidant effects studies on forest ecosystems will emphasize component interactions and systems analyses at the San Bernadino forest study site.

Non-criteria pollutant work will continue with studies on the effects of acid aerosols on pine, bioaccumulation of florides, further development of measurements for plant uptake and accumulation of cadmium, and subsequent effects on the critical process of nitrogen fixation.

Mathematical models describing transport pathways of airborne pollutants to terrestrial plants and animals will concentrate upon predictive models which deal with the hazardous trace metals such as cadmium, lead and arsenic.

Of the requested \$6,900,000 increase in the air health effects program area, a total of \$570,000 is expected to be used for ADP purposes. Approximately \$500,000 will be used for increased time sharing and software to support retrospective and prospective carcinogen epidemiology. Resources of \$70,000 will be used to support epidemiological studies on the health effects of sulfates and sulfuric acid.

The FY 1978 resources level for air transport and fate will be \$10,792,000 and 41 positions. These resources include approximately \$3,950,000 in contracts, \$2,476,000 in grants and \$2,405,000 in interagency agreements.

The FY 1978 plan is a continuation of the FY 1977 plan with the following changes:

The FY 1978 program will continue to support research on determining the transport, transformation and removal processes of regulated and important non-regulated pollutants with the major effort focused on oxidants, sulfates, halocarbons and toxic organics. The FY 1978 program will expand current research on the chemistry and physics of atmospheric sulfates and toxic organic compounds. Specifically, the Sulfate Transport and Transformation in the Environment (STATE) program, representing a series of field experiments to ascertain the nature and extent of long-range transport and transformation of sulfates, oxidants, and nitrates, will be initiated. The STATE program is a necessary follow-on to the Regional Air Pollution Study (RAPS) program in St. Louis which was heavily supportive of research on air pollution on the urban scale. The RAPS program will be completed in FY 1977 in accordance with the original RAPS plan.

Of the requested \$900,000 increase in the transport and fate program area, a total of \$175,000 will be used for the procurement of ADP items. \$125,000 will be used for the purchase of a mini-computer and additional terminals and \$50,000 will procure software to support increased chemical and meteorological simulation modeling.

Air

Health and Ecological Effects

Significant Extramural Project - 1978 Plan

Title: Operation and Maintenance of CHAMP

Amount: \$2,900,000

Discussion:

Assessing the human health effects of exposure to community air pollution requires the collection of accurate ambient air quality and meteorological data. The CHAMP (Community Health Air Monitoring Program) system consists of a network of remote stations which incorporate technological developments in air monitoring and meteorological sensors. Data collection for the system is used to quantitate short-term human exposure levels to various air pollutants within selected communities.

The system consists of 23 remote stations presently located in five communities, and five mobile units which can be easily deployed to most areas. Each remote station detects sensor operating parameters or "system checks" such as valve position, flow rates, critical temperatures, range selection, calibration settings, and other parameters which are vital to obtain valid and accurate air quality data. The remote stations are linked by dial telephone to a central system controller where all systems data are received and evaluated by computer control. Rapid retrieval of these "system checks" permit immediate reaction to system malfunction and provides means to evaluate critical operating tolerances in order to insure the accuracy of the data.

The CHAMP system provides pollutant data for nitric oxide, nitrogen dioxide, ozone, sulfur dioxide, methane and non-methane hydrocarbons, carbon monoxide, PAN (peroxyacetylnitrate), and suspended particulates. Total particulate matter is aerodynamically separated to provide samples of all respirable particulates and suspended particulate matter. Meteorological sensors provide

wind speed, wind direction, temperature, humidity, and barometric pressure information. Complete system flexibility has been incorporated to allow for the addition of other pollutant sensors for a change of sensors to meet the latest technology.

Title: Operation and Maintenance of CLEANS

Amount: \$1,200,000

Discussion:

This program provides for the study of selected human volunteer subjects exposed to carefully controlled laboratory environments simulating those in urban areas. Exposure schedules are chosen to correspond to levels of air pollution actually occurring as a result of industrial or automotive emissions. Changes in physiologic status, alterations in metabolism or interference with immune mechanisms of the exposed individuals are used to help formulate the basis for environmental standards. Each of the two controlled Environmental Laboratories provide living accommodations for three persons. In addition, each laboratory is fully equipped with the most sophisticated instrumentation available for assessing the health status of the subjects. Especially important are instruments for measuring heart and lung function before, during, and after exercise. Because of the complexity of this instrumentation as well as the large amount of data acquired, most of the testing is under computer control. Medical technicians and research physicians monitor and direct the studies by interacting with the computer.

The Controlled Environmental Laboratories are capable of operating over a wide range of temperature and humidity conditions and in either very clean status or one programmed to simulate the desired pollution profile. Both laboratories can provide carefully controlled levels of carbon monoxide, sulfur dioxide, nitrogen dioxide, and ozone either singly or in any combination. One of the laboratories can also provide fine particulate aerosols of nitrate and sulfate compounds. These environmental conditions are also under computer control, providing great flexibility and reliability.

The CLEANS program in the U.S. Environmental Protection Agency is a unique national resource for the study of man's interaction with certain aspects of this environment. Operated under the direction of EPA scientists, it is available for the participation of qualified researchers throughout the country.

Title: Evaluation of Health Effects of Atmospheric Pollution in Urban Areas of Special Interest Using CLEVER Van Technology/CHAMP Monitoring

Discussion:

Studies of the health status of populations have provided much of the information available relating environmental factors to human health. Changes in community disease patterns associated with industrialization of society serve as a convincing indicator of the health risks of technological progress. Documenting those changes in causes of death and illness is thus an essential aspect of managing innovation and economic growth. These studies, however, are fraught with difficulties in quantitating exposure and in determining subtle alterations in health status. The traditional tools of epidemiology have successfully delineated many environmental hazards, but are frequently not sensitive enough to detect more subtle effects. It has been either logistically impossible or prohibitively expensive to use the more sophisticated modern medical diagnostic techniques in studying the epidemiology of illness caused by environmental factors. With the evolution of better non-invasive diagnostic techniques linked to computer control of the large amount of data acquired, it is now possible to greatly improve the specificity and sensitivity of population studies. A mobile laboratory equipped with the necessary instruments and computer has been designed and built. Initially two such laboratories will be deployed in communities chosen to represent special environmental conditions. Information gained from these community studies will not only give us a much better basis for environmental control, but add greatly to our basic knowledge of the epidemiology of chronic heart and lung disease -- the two biggest causes of illness and death in our country.

Title: Impact of Ambient Oxidant Pollutants on the Mixed Conifer
Forest Ecosystem

Amount: \$420,000

Discussion: Objective of the effort is to intensively evaluate the effect of ambient photochemical oxidant air pollution on a complex mixed conifer forest ecosystem. Descriptive systems models shall be developed to assist in predicting the future condition of the study forest ecosystem under variable oxidant stressor levels. The predicted consequences of photochemical oxidants on the forest ecosystem shall be evaluated in terms of human welfare effects. The adaptability of the systems models developed to other pollutant types and forest types shall be evaluated.

In addition to gaining basic scientific knowledge regarding the direct impact of photochemical oxidants on major components of a forest ecosystem, interactive effects shall be assessed through systems analysis. Knowledge of the complex relationship between variable oxidant stress and resulting ecosystem condition and associated impact to human welfare should provide great assistance in assessing air pollution control strategy and establishing suitable secondary air quality standards. This is the second year of a two year project.

Air

Health and Ecological Effects

Significant Extramural Projects - FY 1978 Plan

Title: Studies on the Relationship between Carcinogen Metabolism in the Alveolar Macrophage and the Induction of Lung Cancer Amount: \$350,000

Discussion:

The objective of this task is to study the relationship between carcinogen metabolism in the alveolar macrophage and the induction of lung cancer. Using in vitro methods the course of metabolic activation/detoxification of procarcinogens will be investigated in alveolar macrophages obtained from rats and hamsters. Biochemical methods will be used in monitoring induction or metabolic activation/detoxification systems. Microbial mutagenesis will be used to monitor the extent of metabolic activation/detoxification by macrophages. Once the conditions for maximal activation/detoxification of carcinogens have been established using in vitro methods, whole animal studies will be initiated employing intratracheal instillation techniques to administer particulates and appropriate procarcinogens. The metabolic activation of procarcinogens will be monitored as described above using macrophages obtained by saline lavage of carcinogen-exposed animals. When optimal conditions have been established, experiments will be performed to demonstrate the relationship between elicitation of macrophage influx, metabolic activation/detoxification of carcinogens and the induction of lung tumors in animals. This is a long-range project that will be approached sequentially with continuation from year to year being dependent upon demonstrated success of initial studies.

Air

Health and Ecological Effects

Significant Extramural Projects - FY 1978 Plan

Title: Determination of the Influence of Environmental Materials
as Co-Factors with Carcinogenic Influence from Energy Sources Amount: \$500,000

Discussion:

The cytotoxic effect of amphibole will be compared with silica and chrysotile asbestos using rabbit alveolar macrophages and red blood cells. The potential for cellular neoplastic transformation will be studied in the presence and absence of known carcinogens using the BALB/C 3T3 and/or hamster embryo systems.

The carcinogenic effect of amphibole will be compared with polycyclic hydrocarbon compounds that result from the use of alternate energy source. These polycyclic hydrocarbons include but are not limited to naphthylamines, aminobiphenyls, chrysene, dibenzanthracene. The co-carcinogenic effect of amphibole along with these hydrocarbons will be compared with that of asbestos such as amosite. The animal of choice will be rat and/or hamster.

Air

Health and Ecological Effects

Significant Extramural Projects - FY 1978 Plan

Title: Effects of Etiologically Defined Respiratory Infections
on Lung Function and its growth in an Area of Low Pollution Amount: \$350,000

Discussion:

This study provides baseline pulmonary function data on children living in an area of low environmental pollution. Children will be studied longitudinally to characterize pulmonary function changes associated with physical growth and documented upper respiratory infections. Children will be cultured for pathogene at two week intervals regardless of symptomatology and measurements made will assess the impact of these infectious agents on pulmonary function. This information will enable the design of better studies to assess the growth of lung function and impact of respiratory infections on young children living in areas of high air pollution.

Air

Health and Ecological Effects

Significant Extramural Projects - FY 1978 Plan

Title: Targeted Epidemiology Studies

Amount: \$2,100,000

Discussion:

In FY 1978, the epidemiology program will continue as described in FY 1977. If the funding increase for sulfates is obtained, field studies in five geographically different regions of the U.S. will begin. These studies will attempt to characterize the health impact from populations exposed to the various toxic components in the sulfate particulate mix.

Air

Health and Ecological Effects

Transport and Fate of Pollutants

Significant Extramural Projects - FY 1978 Plan

Title: Sulfur Transport and Transformations in the Environment
(Contract)

Amount: \$3,500,000

Discussion: A large-scale program of discrete, intensive experimental field study periods during the years FY 1978 - FY 1980, to acquire the necessary data base for additional research on the chemistry, physics, and meteorology of the transport and transformation of sulfur (and nitrogen) air pollutants, as well as research and development of measuring techniques for the precursors, intermediate, and end products of the transformation processes. Plume scale studies will be made over distances to 500 km from the sources; regional scale investigations will extend to distances of 1000 km. STATE will be conducted in the region approximately bounded by the Mississippi River, Great Lakes, Appalachian Mountains, and the southern Tennessee border. STATE will be designed to acquire the data base necessary for the development of control strategies for the reduction of ambient concentrations of sulfur and nitrogen transformation products.

Title: Regional Air Pollution Study (RAPS) Prime Contractor
Support (Contract)

Amount: \$ 700,000

Discussion: Provides for the operation of the 25-station aerometric network, together with the operation of a routine meteorological sounding network for the RAPS in St. Louis. Provides supplementary studies and measurements for special experiments carried out in the St. Louis area. The RAPS, initiated in FY 1973, is designed to provide a suitable amount of high quality meteorological, air quality, and emissions data on an urban scale, for the development, evaluation, and validation of air quality simulation models. The data gathering phases of RAPS are scheduled to terminate in September 1977. Data analysis will be continued into FY 1978 and beyond.

Title: NOAA-EPA Interagency Agreement (IAG)

Amount: \$2,150,000

Discussion: Supports 56 NOAA personnel assigned to the ORD, administered by the Meteorology and Assessment Division, ESRL. NOAA personnel conduct research in air quality simulation modeling, geophysical research, and applied modeling activities in ESRL. NOAA personnel are assigned to other EPA components and provide technical assistance in air pollution meteorology.

AIR

Research and Development
Industrial Processes

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs. 1977</u>
<u>Appropriation</u>					
Mineral, Processing and Manufacturing Industries	\$5,224	\$5,065	\$5,000	\$6,000	+\$1,000
<u>Permanent Positions</u>					
Mineral, Processing and Manufacturing Industries	34	49	40	45	+5

Budget Request

An appropriation of \$6,000,000 and 45 positions is requested for FY 1978. This represents a \$1,000,000 and 5 position increase from the FY 1977 level. This increase will be utilized to accelerate the assessment of hazardous emissions from critical industries and to develop an integrated approach to the generation and analysis of data on toxic emissions from industrial sources. The program will provide characterization data on approximately 25 industries and indepth environmental assessments on about 10 processes of ongoing chemical industry.

Program Description

The industrial processes program concentrates on point sources of air pollution arising from the industrial sector of the economy and is focused on those mining, manufacturing, service, and trade industries which are involved in the extraction, production and processing of materials into consumer products. This research activity supports the technology requirements of the Clean Air Act through the development and demonstration of new or improved cost-effective technology having industry-wide applicability, short-term achievability and long-term viability. In addition, emphasis is being placed on the assessment of various industrial processes to determine possible sources of toxic emissions.

FY 1976 Accomplishments

The FY 1976 resource level for this subactivity was \$5,223,700. These resources included approximately \$4,000,000 in contract support and \$400,000 in grants.

In FY 1976, the air industrial processes program:

- Accelerated the hazardous materials source assessment program in order to provide a data base for New Source Performance Standards.
- Completed study on technological options and economic consequences of requiring 80-90 percent control of SO_x emissions in the petroleum refining industry.
- Completed protocol document for ocean incineration of hazardous organochlorine waste residues.
- Completed source assessments for specific inorganic chemicals, organic chemicals and non-ferrous metals industry emissions.

FY 1977 Program

The FY 1977 program focuses on assessing the nature and quantity of toxic and other hazardous pollutants emitted from industrial sources. This information, together with data on the ability to control these pollutants, will provide the basis for regulatory actions. In addition, several development and demonstration projects on criteria pollutant control will continue as will efforts to transfer technology for particulate control from the power industry to other industrial sectors.

The FY 1977 resource level for this subactivity is \$5,000,000. These resources include approximately \$3,600,000 in contract support and \$500,000 in grants.

Major outputs to be achieved in FY 1977 include:

- Source assessments for hydrocarbon emissions from the synthetic organic chemicals industry.
- Demonstration of technology to control emissions of NO_x from nitric acid plants.
- Demonstration of techniques for control of asbestos emissions.
- Complete manual for electrostatic precipitator design criteria for collection of metallic fumes in secondary smelters.

AIR

Industrial Processes

Mineral, Processing and Manufacturing Industries

Significant Extramural Projects - FY 1977 Program

Title: Evaluation of Fabric Filter Applications for Non-Ferrous Metals Industry (Contract) Amount: \$500,000

Discussion:

The purpose of this project is to evaluate the operation of the fabric filter for non-ferrous metals operations. The scope of the project will include the sampling and analysis of emissions from installations equipped with this control equipment. This information, together with data on uncontrolled emissions, will allow for an evaluation of the effectiveness of these devices.

Title: Petroleum Refinery - Air Emissions Assessment (Contract) Amount: \$425,000

Discussion:

An environmental assessment of the petroleum refining industry to define areas for which control technology programs should be developed within the industry. The contractor will identify and quantify air emissions from refineries using data from the available literature, contractor expertise, and engineering calculations. Information will also be acquired through a sampling program. Emissions from refineries will be compared to environmental risk factors. The requirements of the petroleum refining industry will be defined in sufficient detail to set priorities and goals for decision-making regarding the development of control technology.

Title: Environmental Assessment of Iron and Steel Industry Sources Amount: \$200,000
(Contract)

Discussion:

The results of this project will point out significant environmental problems in the iron and steel industry. Where technology exists for solving these environmental problems, applicability to this industry will be shown. If solutions are not available, R&D needs will be identified.

FY 1978 Plan

In FY 1978, activities will further focus on the problem of hazardous emissions control. The increase in the budget will be utilized to accelerate the assessment of hazardous emissions from critical industries. This additional extramural initiative will provide screening data for approximately 25 industries as well as an indepth environmental assessment of about 10 processes having major emission problems. As source assessments are completed, the available control technology, together with economic implications will be identified. This information will continue to serve as a basis for issuing and updating regulations for control of pollution from these sources.

The requested FY 1978 resource level for this subactivity is \$6,000,000. These resources include approximately \$3,700,000 in contract support and \$500,000 in grants.

Major outputs to be achieved in FY 1978 include:

- Complete source assessments for hazardous emissions with emphasis on the petroleum refining, ferrous, and nonferrous, as well as the organic chemicals industries.
- Preliminary assessment of applicability of known control technology to remove these pollutants.
- Development of assessment methodology to determine of airborne emissions.

AIR

Industrial Processes

Mineral, Processing and Manufacturing Industries

Significant Extramural Projects - FY 1978 Program

Title: Development of Control Technology for Fugitive Emission Sources in the Iron and Steel Industry (Contract) Amount: \$300,000

Discussion:

After control of ducted air polluted emissions is achieved for the processes of the iron and steel industry, fugitive emissions are the remaining major contribution to atmospheric emissions. This project will evaluate and develop control options for fugitive emissions. Major emphasis will be given to potentially hazardous emissions.

Title: Single Site Demonstration of Zero Water Discharge and Minimum Air Pollutant Discharge (Contract) Amount: \$300,000

Discussion:

The iron and steel industry is a major source of pollutants (including toxics) discharged into waterways. This project will attempt to demonstrate that zero discharge of pollutants can be achieved in a cost effective manner at an integrated iron and steel plant. This project will cost 40-50 million dollars including industry participation over a five year period. It will not be initiated unless commitments can be obtained from industry.

Title: Environmental Assessment of Iron and Steel Industry Sources Amount: \$200,000
(Contract)

Discussion:

The results of this project will point out significant environmental problems in the iron and steel industry. Where technology exists for solving these environmental problems applicability to the industry will be shown. If solutions are not available R&D needs will be identified. At present level of funding, complete assessment will take five years (including FY 1977). Highest priority segments of iron and steel industry will be studied first.

AIR

Research and Development

Monitoring and Technical Support

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase+ Decrease- 1978 vs. 1977
		(dollars in thousands)			
<u>Appropriation</u>					
Measurement, Techniques and Equipment					
Development.....	\$4,463	\$ 6,770	\$5,960	\$6,660	\$+700
Technical Support.....	2,694	3,402	2,483	2,483	...
Total.....	7,157	10,172	8,443	9,143	+700
<u>Permanent Positions</u>					
Measurement, Techniques and Equipment					
Development.....	62	53	63	63	...
Technical Support.....	85	66	77	77	...
Total.....	147	119	140	140	...

Budget Request

Resources of \$9,143,000 are requested, an increase of \$700,000 over FY 1977.

The incremental funds in the air measurement techniques and equipment development area will be used to: 1) initiate the development of new and/or improved instrumentation and methodology to characterize and measure priority organic compounds from sources (mobile and stationary) and in ambient air (limited field studies will be conducted to test developed methodology and determine the presence and prevalence of organic compounds); and 2) to accelerate instrumentation development in the area of sulfates sampling and analysis.

Program Description

The output of this program is new and/or improved methodology and instrumentation technology which will be utilized for stationary source, mobile source and ambient air quality goals.

This area consists of the following major research categories.

- (a) Sampling and analysis techniques for identification and measurement of pollutants from stationary sources:

Work in this area focuses on the development of sampling procedures and associated instrument requirements for impending stationary source performance standards and improvement of techniques for existing performance standards, e.g., the development of improved sampling procedures for

continuous in-stack monitoring of particulate matter. Additional work is carried out in the identification of stationary source pollutants and in the support of stationary source compliance activities.

- (b) Another major program activity is the development of sampling and analysis techniques for identification and measurement of pollutants from mobile sources:

Integral to this development work are characterization studies which describe gaseous and particulate emissions from advanced power systems for light-duty vehicles and the evaluation of selected fuel additives on control system performance. Characterization studies are also carried out to determine the composition of aircraft particulate emissions and the effects of emission control systems on the quantity, size distribution and composition of particulate emissions.

- (c) Sampling and analysis techniques for identification, characterization and measurement of pollutants in ambient air:

New and improved analytic techniques for the criteria and non-criteria pollutants in the ambient air are developed. This area of research also includes studies on the identification and characterization of urban and rural atmospheres for a variety of important gaseous and particulate pollutants including, for example, ammonia, formaldehyde, polynuclear aromatics, nitrates, and organic acids.

A program will continue to support the registration of designated fuel and fuel additives in order to provide an independently derived information base on the constituents and amounts present in fuels and fuel additives and to recommend, as warranted, candidates for registration and regulation.

A state-of-the-art assessment of remote sensing techniques for field measurement of priority hazardous pollutants or combinations of pollutants in air will be initiated in FY 1978.

The technical support program is responsible for assuring that the knowledge and technology gained from developing current state-of-the-art are made available to Agency operating programs in response to specific requests for support. This activity plans for and provides resources and staff to respond to such requests on a continuing and immediate-response basis.

FY 1976 Accomplishments

The FY 1976 resource level for air monitoring and technical support was \$7,157,100 and 147 positions.

Those resources included approximately \$1,625,000 in contracts \$572,000 in grants and \$123,500 in interagency agreements.

The following efforts were completed during FY 1976:

- A sulfuric acid monitor was developed and successfully evaluated. This monitor is an integral part of the system being developed to determine the presence of sulfuric acid emissions from mobile and stationary sources.
- An automated dichotomous sampler, which collects and segregates suspended particulate matter into two size ranges was improved. This instrument will be useful for determining the physical and chemical characteristics of particulates as they impact on health and control studies.
- The rapid x-ray fluorescence technique for analyzing total sulfur in particulate matter was successfully applied and found to be in good agreement with wet chemistry methods and far more rapid.

- A gas chromatographic/mass spectrometric/computer (GS/MS/COMP) system has been successfully used during pilot-studies of polluted environments, to identify and quantify volatile nitrosamines and a variety of polynuclear aromatic hydrocarbons. Because of its specificity, sensitivity, and versatility, this technique is superior to all others for measuring organic vapors.
- A significantly improved analytical technique, ion chromatography, has been developed to measure water soluble sulfates. The technique also has promise for measuring other ionic species.
- New analytical methods were developed to measure such gaseous pollutants in motor vehicle exhaust as hydrogen cyanide, nitrosamines, nitrous oxide, ammonia, hydrogen sulfide, sulfur dioxide, and carbonyl sulfide.
- The exhaust emissions of numerous present day and prototype cars were characterized over a wide range of operating conditions. Included among the cars tested were leanburn, stratified charge, dual and three-way catalyst-equipped, and diesel models.
- Gaseous and particulate emissions, especially sulfur compounds, were characterized from oil-fired power plants. The results indicate that sulfuric acid emissions in the plume are several times higher than those indicated by currently used emission factors.
- A simultaneous multi-wavelength x-ray fluorescence spectrometer was adapted and modified to analyze automatically for many elements in particulate samples. The instrument is now being used routinely to analyze particulate samples collected from both stationary and mobile sources.
- Prototype continuous monitoring systems were developed to measure chlorinated hydrocarbon emissions from dry cleaning and solvent degreasing industries. The monitoring systems are necessary to support contemplated emission standards.

- The Fuel and Fuel Additives Registration program actually started registration of fuel additives in FY 1976 after publication of revised regulations on November 7, 1975. This phase is nearly completed.
- The technical support program implemented a unified planning and management system which has improved the responsiveness of the research and development program to the scientific and technical needs of the Agency. Accomplishments included an investigation of long distance transport of oxidant and oxidant precursors in the New England and Gulf Coast areas; short-term emergency sampling and analysis projects involving Kepone, vinyl chloride, and polychlorinated biphenyls; and completion of special studies on ozone transport and on nitrogen dioxide levels in critical areas. Continuing activities include trace element analyses of National Air Sampling Network samples for non-metal inorganics, metals and benzene soluble organic compounds as well as analyses of the Fuels Surveillance Network samples for trace metals, sulfur, lead and phosphorus.

FY 1977 Program

The FY 1977 resource level for air monitoring and technical support was \$8,443,000 million and 140 positions. Those resources included approximately \$2,829,000 in contracts, \$570,000 in grants and \$201,000 in interagency agreements.

The FY 1977 measurement techniques and equipment program will continue development and assessment of air pollutant measurement methodologies, techniques, and instrumentation. It will concentrate on condensable emissions from mobile sources, nonregulated pollutant characterization in urban-rural areas, characterization of toxic trace metals and organic emissions from stationary sources, and methods for the sampling, identification and measurement of carcinogens in emissions and ambient air.

The stationary source activity will focus on the Agency research needs associated with the increasing NSPS activity; specifically NO_x , HC, and fine or suspended toxic pollutants.

Work on instruments and methods for characterizing the species of sulfate in the ambient air will be emphasized. Characterization of urban/rural atmospheres will necessitate increased activity in multi-pollutant techniques development with consideration for remote, high sensitivity equipment.

Characterization studies of the exhaust from light-duty vehicles will focus on the identification and measurement of non-regulated pollutants in emissions from advanced engines and control systems during malfunction of either the engine, the control system or both. Current research indicates that the greatest variety and abundance of potentially harmful pollutants appear to occur during these phases of operation.

The FY 1977 objectives for the Fuel and Fuel Additives Registration Program are to register all gasolines by Fall 1976 and all diesel fuels by January 1977. In addition, usage data of registered products will be documented, and routine reports of registered additives, gasolines, and diesel fuels will be issued. Also, a fuel and fuel additives screening committee will recommend compounds for control, tests to determine potential health effects, and advise resolution of non-compliance issues.

The FY 1977 technical support program provides for international monitoring activities; guidance and assistance in the design, implementation and operation of field and laboratory systems to collect and/or measure valid environmental samples; and evaluation of instruments and methods, assessment and analysis of the data and issuance of reports. Emphasis will be given to pollutants of proven or potential adverse effects to human health and welfare including polycyclic organic trace chemicals.

Air

Monitoring and Technical Support

Significant Extramural Projects - FY 1977 Plan

Title: Analytical Services Contract : Amount: \$250,000

Discussion: This is to provide contractual analytical services on an as needed basis to better enable the laboratory to carry out its technical services support to the Office of Research and Development and other Agency program offices.

Title: Glass Fiber Filter Procurement Contract Amount: \$150,000

Discussion: This contract provides for the purchase of multi-quantity glass fiber filters for the purpose of providing these filters to all Federal, State and local air pollution agencies. Such a distribution of filters will ensure a common collection mechanism nationwide.

Title: On-Site Technical Services (Northrop Extension) Amount: \$150,000

Discussion: This will continue the on-site Northrop Technical Services contract which furnishes the ORD laboratories with routine analysis and research investigations.

Title: Cryogenic Air Sampler Contract

Amount: \$100,000

Discussion: The intent of this contract will be to build and evaluate under specified test conditions five (5) cryogenic air samplers based on a design developed by the U. S. Air Force. This type sampler is expected to fill a gap in ambient air sampling of volatile materials or unstable chemical materials that presently exists. With increasing interest in organic pollutants (e.g., carcinogens) an efficient air sampler is desperately needed in this area. The U.S. Air Force sampler offers an approach in relieving this deficiency.

Title: Pollutant State-of-the-Art Contract

Amount: \$100,000

Discussion: This contract will provide a means to obtain a quick response documentary review of available literature for sampling, analytical, and quality control methodology for various pollutants of interest. The quick response will be to informational demands of Agency program offices (e.g., OTS) and also to in-house analysts enabling a quick response to requests for analysis of new specific pollutants.

Title: Environmental Monitoring BOA Extension

Amount: \$75,000

Discussion: This contract is to provide a group of contractors to assist the Office of Research and Development in any environmental monitoring projects of crises or short-term duration such as Kepone, PCB's, etc.

Title: N.C.S.U. Grant Renewal for Neutron Activation Analysis

Amount: \$55,000

Discussion: This is to extend an existing grant with North Carolina State University to provide a needed neutron activation analysis support capability.

FY 1978 Program

The FY 1978 resources level request for air monitoring and technical support is \$9,143,000 and 140 positions. Those resources include approximately \$3,329,000 in contracts and \$670,000 in grants and \$301,000 in interagency agreements.

The FY 1978 program will be a continuation of the FY 1977 work at an increased effort of approximately \$700,000.

The program will continue to emphasize research on developing measurement methods and the characterizations of regulated and important non-regulated air pollutants emitted from stationary and mobile sources and in the ambient air. The requested increase in the FY 1978 program will expand current research efforts to develop new and improved analytical methods for measuring and characterizing sulfates and organics emissions from mobile and stationary sources and in the ambient air and will focus on measurement of the particulate size range and presence of acid sulfates. This will also include accelerated development of field-useable sulfate monitoring equipment as well as sampling and analytical techniques for measuring priority airborne organics. Such methodology is essential for planned epidemiological, toxicological, clinical and atmospheric formation studies as well as for routine monitoring applications.

The Fuel and Fuel Additives Registration Program is a continuing program for regulation of motor vehicle hydrocarbons. The FY 1978 program will largely be a continuation of previous years work involving registration of fuels and additives and activities of the Screening Committee to ascertain and resolve health effect problems and noncompliance issues.

A new program in FY 1978 will examine lidar and microwave techniques for monitoring atmospheric pollutants (benzidine, vinyl chloride, ethylene dibromide benzene, etc.). The object will be to determine system accuracy, sensitivity, reliability, versatility, and cost-effectiveness as opposed to existing techniques for monitoring atmospheric contaminants. A state-of-the-art assessment of remote sensing techniques for field measurement of priority pollutants, or combinations of pollutants also will be initiated.

Of the \$700,000 requested increase, \$125,000 will be used to purchase one mini-computer and to upgrade an existing mini-computer in order to provide increased support in characterization studies using mass spectrometers and other analytical techniques.

The FY 1978 air technical support activity will continue to apply the latest methods, equipment and techniques for the measurement and quantification of ambient air contaminants to the solution of Agency problems. It will concentrate on monitoring emissions from mobile/non-mobile sources, non-regulated pollutant characterization, measurement of trace metals and organic emissions from stationary sources and methods for identification of carcinogens and mutagens.

Air
Monitoring and Technical Support

Significant Extramural Projects - FY 1978 Plan

Title: Analytical Services Contract Amount: \$250,000

Discussion: This is to provide contractual analytical services on an as needed basis to better enable the laboratory to carry out its technical services support to the Office of Research and Development and other Agency program offices.

Title: Glass Fiber Filter Procurement Contract Amount: \$150,000

Discussion: This contract provides for the purchase of multi-quantity glass fiber filters for the purpose of providing these filters to all Federal, State and local air pollution agencies. Such a distribution of filters will ensure a common collection mechanism nationwide.

Title: On-Site Technical Services (Northrop Extension) Amount: \$150,000

Discussion: This will continue the on-site Northrop Technical Services contract which furnishes the ORD laboratories with routine analysis and research investigations.

Title: Pollutant State-of-the-Art Contract

Amount: \$100,000

Discussion: This contract will provide a means to obtain a quick response documentary review of available literature for sampling, analytical, and quality control methodology for various pollutants of interest. The quick response will be to informational demands of Agency program offices and also to in-house analysts enabling a quick response to requests for analysis of new specific pollutants.

Title: Environmental Monitoring BOA Extension

Amount: \$75,000

Discussion: This contract is to provide a group of contractors to assist Office of Research and Development in any environmental monitoring projects of crises or short-term duration.

Title: North Carolina State University Grant Renewal for Neutron Activation Analysis

Amount: \$75,000

Discussion: This is to extend an existing grant with North Carolina State University to provide a needed neutron activation analysis support capability.

Title: Technical Services for Collecting, Processing and Analysis of Environmental
Data and Samples Amount: \$796,000

Discussion: This is a contract for technical services to support specific functions for a laboratory's monitoring operations programs. The contractor is intimately involved in calibration, instrument maintenance, data acquisition and aircraft maintenance. This contract is a technical support effort, the funding of which will include more than one media.



WATER QUALITY

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (Dollars in Thousands)	<u>Estimate 1978</u>	<u>Increase+ Decrease- 1978 vs 1977</u>
Abatement & Control					
Appropriation.....	\$162,359	\$115,173	\$152,679	\$157,869	\$ +5,190
Permanent Positions.....	1,788	1,816	1,815	2,423	+ 608
Transition Quarter Est..	49,939	N/A	N/A	N/A	N/A
Enforcement					
Appropriation.....	19,685	21,242	21,358	30,358	+9,000
Permanent Positions.....	786	764	754	1,149	+ 395
Transition Quarter Est..	7,098	N/A	N/A	N/A	N/A
Research & Development					
Appropriation.....	35,259	41,823	44,218	51,518	+7,300
Permanent Positions.....	587	552	546	566	+ 20
Transition Quarter Est..	14,813	N/A	N/A	N/A	N/A
TOTAL - Water Program					
Appropriation.....	217,303	178,238	218,255	239,745	+21,490
Permanent Positions.....	3,161	3,132	3,115	4,138	+ 1,023
Transition Quarter Est..	71,850	N/A	N/A	N/A	N/A

NOTE: The program highlights and description of the Construction Grants activity will be found in the Construction Grants section of this submission.

OVERVIEW AND STRATEGY

The Federal Water Pollution Control Act Amendments of 1972 represent the most comprehensive legislation ever enacted to clean up the Nation's waters. The Act expanded the Federal role in water pollution control, dramatically increased the funding for construction of publicly-owned waste treatment works, elevated planning to a new level of significance, opened new avenues for public participation and created a regulatory mechanism featuring uniform technology-based effluent standards, together with a national permit system for all dischargers as the means of enforcement.

The objectives of the Act are to "restore and maintain the chemical, physical and biological integrity of the Nation's water." The Act provides for achieving these objectives in distinct phases. The FY 1973 to FY 1977 period is generally referred to as Phase I, and FY 1978 to FY 1983 as Phase II. During Phase I the Act requires industry to install best practicable control technology currently available (BPT) and publicly-owned wastewater treatment works to achieve secondary treatment by July 1, 1977. Phase I emphasizes the development of effluent limitations guidelines and pretreatment standards for industrial dischargers, secondary treatment limitations for publicly-owned waste treatment works, issuance of permits and the award of construction grants.

Phase II requirements are intended to be achieved by July 1, 1983. Industries are to install best available technology economically achievable (BATEA) which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants. Publicly owned treatment works are to achieve best practicable waste treatment technology, including reclaiming and recycling of water and confined disposal of pollutants. During this phase, increased attention will be given to control of nonpoint sources and the more difficult point sources of pollution.

As the Agency enters FY 1978, it will be at the end of a transition period between Phases I and II in implementing the requirements of the Act. During this time, its plans and expected efforts tend to fall within several broad areas of concern: industrial point source control, point source control for publicly owned treatment facilities, nonpoint source control and the improvement of State and local institutions for carrying out the requirements of the Act.

By the end of FY 1977, the first major effort of developing and promulgating effluent limitations standards and guidelines for 52 major industrial categories will be complete, with the exception of final pretreatment standards for existing industrial sources. However, in compliance with court ordered deadlines, continuing activities are required to complete standards for industrial categories which have been published as interim final and develop final pretreatment standards. In addition, considerable effort will be required to defend and support industrial standards as they come under judicial review and to re-develop those standards that are remanded by the courts. Technical support also must be given to application of the standards in the writing and enforcement of permits. As the Agency has become involved in these followup and support activities for those standards promulgated early in the Phase I period, it has become evident that such activities will require almost as much effort as for the initial development of those standards. This effort will continue throughout FY 1978 in order to deal with those standards promulgated late in the Phase I period.

The second phase of the industrial point source control program beginning in FY 1977 requires the revision and updating of the BATEA and new source standards as well as pretreatment standards for both new and existing sources. Recent court settlements have escalated these requirements into a high level program, requiring significant resources with very stringent deadlines for initiation of contract studies as well as eventual promulgation of standards. The inclusion of health and environmental effects considerations into the standard setting process substantially increases the complexity of carrying out the Phase II standard setting requirements of the Act. It is expected that toxic pollutant control will be the major thrust of these efforts, with relatively minor emphasis on achieving additional control over the more traditional nontoxic pollutants which were the focus of many of the standards developed during Phase I.

Concomitant with the requirement to develop BATEA standards for industry to control toxic pollutants is the requirement under a recent court settlement to develop and promulgate water quality criteria for a list of 65 specific toxic pollutants. This work will require a continuation and expansion of ongoing efforts to develop water quality criteria for use by States in the development of water quality standards.

Municipal point source control is effectuated through the Municipal Wastewater Treatment Construction Grant Program, initially funded at \$18 billion by PL 92-500 to achieve secondary treatment by the end of FY 1977. This program has a key role in enabling publicly owned treatment works to apply best practicable waste treatment technology by July 1, 1983. The obligation of the \$18 billion by the end of FY 1977 will enable about 50 percent of the 18,000 municipalities to achieve secondary or higher level treatment as required. However, less than 40 percent of the FY 1977 population will be served by the required levels of treatment, principally because larger cities will not have had time to complete construction.

In order to achieve substantial progress toward the 1983 goals, additional effort must be placed on increasing the rate of obligation of construction grant funds, on ensuring that grant obligations quickly result in construction, and on ensuring that Federally funded publicly owned treatment works operate efficiently and reliably. The FY 1978 workload in processing new awards is projected to increase by 65 percent over the current (end of FY 1976) level of 3,980 new projects, and the workload in managing active projects will rise by 35 percent from 8,370. This level of municipal construction activity envisions a 6 to 10 year program of \$5 billion per year of which \$5 billion has been authorized by Congress for FY 1977 and \$5 billion is requested for FY 1978. The \$5 billion per year level is based on the Agency's judgement regarding the optimum continuing construction program both feasible under federal budgetary constraints and the levels of resources which can be realistically anticipated to maintain the current level and quality of management.

The water quality management program under Section 208 of PL 92-500 seeks to establish effective environmental decision making at the State and local government level. It is anticipated that nationally based programs for pollution control will become increasingly difficult to apply. While such programs establish uniform thresholds of abatement, they are not always appropriate for

individual pollution situations on a localized basis after national standards and guidelines are set. Since abatement alternatives are apt to be severe in their consequences, there is a necessity that local citizen expectations and opinion be a major element in any abatement decisions. The most effective political process to respond to this source of opinion and for solving these pollution programs is local and State Government.

The water quality management process is viewed as the framework by which all basic water quality decisions and determinations will be made. Operating under the provisions of the FWPCA for nearly four years, top priority has been given to development of effluent limitations and issuance of waste discharge permits to point sources; funding of publicly owned waste treatment works; and compliance monitoring, technical assistance and enforcement necessary to assure that permit conditions are met. With these programs well under way, priority is now shifting to development of necessary toxic pollutant controls and emphasis on the 208 water quality management process. Area-wide and State-wide planning efforts will peak in FY 1978 such that by November 1978 they will have completed much of the initial planning. Also, identification and designation of management agencies to implement formulated plans will be initiated.

With the release of \$137 million of previously authorized contract authority, EPA's current investment in 208 planning programs will amount to over \$300 million. With this investment, it is imperative that the water quality management program be managed adequately insofar as program design and outputs are concerned. During this period it is extremely important that sufficient resources are available for EPA to guide, provide technical assistance and otherwise husband effective planning efforts between State and local 208 agencies. To properly achieve the program objectives, it is essential that program management efforts be directed to assist State and local officials in perceiving critical pollution problems and cost effective solutions; building effective public-political constituencies; and achieving the necessary institutional framework for implementing and managing the planned pollution abatement and control programs. In the end, it will be essential that EPA receive approvable 208 plans, not only from the standpoint that the construction grant program and NPDES permit program will be tied to approved plans, but also from the standpoint that 208 is the principal device under PL 92-500 for dealing with de minimis source and nonpoint source pollution problems.

With increasing levels of control being applied to the abatement of industrial and municipal point sources, the relative contribution of nonpoint sources (NPS) to total pollution loads becomes more and more significant. As this occurs, increasing attention will be focused toward the control of nonpoint sources. These nonpoint sources include agriculture, silviculture, construction activities, mining, and runoff from urban areas.

The control of nonpoint sources is not directed by a specific section of the Act, but is to be addressed in the development of the 208 water quality management plans. Thus, the 208 process becomes the basic vehicle for dealing with these problems. It is not likely that Statewide and Areawide 208 efforts will identify all nonpoint sources or develop abatement and control programs for all nonpoint sources in the initial plans formulated. For the future, it is clear that more planning and program emphasis must be placed on nonpoint source controls, since it is primarily these problems which will prevent all the Nation's waters from meeting the 1983 goals.

In FY 1978 water enforcement activity will increase in response to substantial new demands. Those new demands result from three primary stimuli: (1) increased numbers of violations of NPDES permits resulting from permittees failing to meet the July 1, 1977, deadline for compliance with BPT and permittees violating final effluent limitations; (2) new and more complex permit requirements such as BAT, Section 208 areawide requirements, Section 303(d) maximum daily loads, Section 301(c) variances, Section 302 water quality related effluent limitations, toxic pollutant standards and limitations; (3) new and important programs requiring considerable development and implementation as well as enforcement effort. These include the implementation and enforcement of pretreatment standards pursuant to Sections 307(b), (c), and (d); implementation of the Section 404 dredge and fill wetlands program; implementation of the Section 311 hazardous substances program; increased emphasis on EPA's NPDES role as overseer of approved State programs; and the need to reissue expiring permits.

In order to meet the goals of the FWPCA, water enforcement will pursue two primary goals in FY 1977. The first is to promote increasing State participation in the NPDES program. The second is to assure the completion of treatment facilities by major industrial facilities to achieve BPTCA and by funded major municipal dischargers to achieve secondary treatment. Included in this goal is the resolution of all major adjudicatory hearing requests in order to assure that all priority dischargers have an enforceable NPDES permit.

Major municipal facilities will be placed on construction schedules which are realistic and consistent with construction grant funding schedules. The municipal permit program will focus on becoming a more effective driving force in support of the Agency effort to grant funds for municipal sewage treatment construction projects. Major industrial permit reissuance and modification will also continue to receive high priority in FY 1978 as will the issuance of major and energy-related new source permits. Non-NPDES enforcement will continue to focus on oil spill and spill prevention enforcement as well as on the enforcement of the Ocean Dumping Act. Compliance monitoring activities will be supported by a strong enforcement program. Formal enforcement mechanisms will primarily consist of Notices of Violations to the States, Administrative Orders, and Section 309 Referrals to U.S. Attorneys, or comparable State action.

Because of the long-term phased nature of the Act, many research and development activities are proceeding in a sequenced fashion. Top priority has been given to efforts concentrating on the technological and informational needs related to the 1983 objective. Research emphasis in fiscal year 1978 will be given to preliminary prioritization of known toxic pollutants and the development of methods for screening complex effluents to quickly identify, quantify, and characterize other toxics warranting attention. Assistance is being provided in formulating effluent standards for industrial discharges. Research and development projects will also examine more effective and economical technologies in an effort to reduce the total cost. They are also concerned with the development of safe and effective methods for the disposal of increasing volumes of sludges being produced through higher levels of treatment of municipal sewage. Increased resources will be devoted to the sludge disposal problem in FY 1978, with emphasis on pyrolysis techniques. Emphasis will also be placed on determining treatability of toxic waste streams from critical industries. Existing effluent guidelines will be reviewed and revised so that they can be successfully utilized in the second round of permit issuance. Research studies have pointed the way directly into revised criteria by providing more complete data and better values. Accordingly, guidance was prepared by the States to follow in revising their water quality standards.

Reflecting the likely judicial changes in emphasis, initial studies and efforts to develop the framework for managing nonpoint source pollution are being carried out. Research in this area in fiscal year 1978 will focus on development of water quality criteria applicable to the time variant nature of nonpoint source pollution and on characterization of the effectiveness of preventive and control measures applicable to nonpoint sources.

SUMMARY OF INCREASES AND DECREASES

(in thousands of dollars)

FY 1977 Water Quality Program..... \$218,255

Abatement and Control..... +5,190

The net increase is made up of increases in construction grants program management (\$13.4 million); 208 program management; effluent standards and guidelines support; ocean disposal, hazardous substances spill and Section 404 permit review programs; the Great Lakes program. Water control agency grants are increased by \$10 million, while Section 208 grants (-\$15 million), training grants, and the clean lakes program (-\$15 million) all will be decreased.

Enforcement..... +9,000

The increase is for personnel and contract support for 395 additional positions to meet the substantial increased demands on the water enforcement and permit programs.

Research and Development..... +7,300

The increase includes expanded research efforts in health and ecological effects research, including Great Lakes research; in industrial research; and in the public sector activities for development of disposal of sewer sludge.

FY 1978 Water Quality Program..... 239,745

WATER QUALITY

	Actual* 1976	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs 1977
<u>Program Levels:</u>				
Section 208 Management Agency Designations.....	0	100	200	+ 100
Section 208 State Planning Agency Designations.....	50	1	0	- 1
Section 208 Regional Planning Agency Designations.....	27	50	0	- 50
Review of Environmental Impact Statement Drafts.....	500	500	700	+ 200
Clean Lakes Projects.....	19	39	48	+ 9
Ocean Dumping Permits.....	60	60	60	
Construction Grants Awards.....	3,976	5,750	6,500	+ 750
Step I Awards.....	(2,341)	(2,500)	(2,500)	
Step II Awards.....	(724)	(2,000)	(2,600)	(+ 600)
Step III Awards.....	(911)	(1,250)	(1,400)	(+ 150)
State Program Approvals (NPDES).....	28	33	45	+ 12
Enforcement Program Actions (Referrals and Administrative Orders).....	1,029	867	1,152	+ 285
Adjudicatory Hearings:				
Prehearing Conferences.....	77	70	70	
Settled.....	260	300	575	+ 275
Permits Issued by EPA: Municipal--				
Major.....	716	1,255	688	- 567
Minor.....	3,120	950	0	- 950
Nonmunicipal--				
Major.....	701	124	688	+ 564
Minor.....	7,086	2,705	0	-2,705
Sampling and Reconnaissance Inspections Conducted.....	2,645	2,403	3,680	+1,277

*Does not include Transition Quarter.



WATER QUALITY
Abatement and Control

<u>Appropriation</u>	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs 1977</u>	<u>Page</u>
			(Dollars in thousands)			
Water Quality Planning and Standards.....	\$21,475	\$14,927	\$31,581	\$24,081	\$- 7,500	WQ-14
Effluent Standards and Guidelines.....	4,670	7,141	18,342	19,742	+ 1,400	WQ-27
Grants Assistance Programs.....	103,017	55,000	66,160	60,450	- 5,710	WQ-34
Water Quality Strategies Implementation.....	6,731	7,534	7,740	10,540	+ 2,800	WQ-41
Water Quality Monitoring & Analysis.....	5,236	4,515	4,842	5,642	+ 800	WQ-48
Municipal Source Control.....	21,230	26,055	24,014	37,414	+13,400	WQ-54
Total.....	162,359	115,172	152,679	157,869	\$+5,190	
<u>Permanent Positions</u>						
Water Quality Planning and Standards.....	438	403	413	508	+ 95	
Effluent Standards and Guidelines.....	58	54	51	85	+ 34	
Grants Assistance Programs.....	...	...	...	...		
Water Quality Strategies Implementation.....	213	241	237	266	+ 29	
Water Quality Monitoring & Analysis.....	190	176	181	181		
Municipal Source Control.....	889	942	933	1,383	+ 450	
Total.....	1,788	1,816	1,815	2,423	+ 608	



Purpose

The objective of the water quality abatement and control program is primarily to assist State and local agencies in controlling water pollution by providing management, technical, and resource assistance and through disseminating guidelines and standards. These guidelines set methods and procedures and levels of control for sources of pollution. Water quality criteria and standards are applied to the receiving waters and are subsequently reflected in the level of control placed on the source. Management assistance is provided in the preconstruction and construction of wastewater treatment facilities and their operation. One-half of the water program manpower is used to manage and monitor this multibillion dollar program. Additional management assistance is provided in developing State and areawide section 208 water quality management planning agencies, improving municipal waste control management, and in monitoring and reporting on ambient water quality and changes in quality. Technical assistance includes general assistance on controlling persistent and complex pollution problems as well as specific response assistance for spills or other pollution emergencies.

Because a primary responsibility for the control of pollution lies with the States, most of EPA's abatement and control efforts are oriented toward support of State and local efforts. States are responsible for detailed planning, monitoring, and enforcement efforts, as well as for establishing the priorities for commitment of Federal funds for the construction of sewage treatment plants. Local governments are responsible for detailed planning, for operation and maintenance of sewage treatment plants, and for participating financially in the construction of treatment plants.

Grants support development and operation of State water pollution control agencies, which include the functions of construction grants review, permits, monitoring, and other implementation measures. States are encouraged to undertake the issuance of industrial and municipal permits and conduct the enforcement program to ensure compliance with permits.

EPA monitoring and analysis activities are coordinated with State and other Federal efforts and include ambient water quality monitoring, collection, and dissemination of information and water quality data. Current programs include the establishment of basic national water monitoring programs and the analysis of monitoring data to assist in development and implementation of standards and regulations. Increasing emphasis is being placed on monitoring of toxic materials, nonpoint sources, and biological impact.

Technical assistance and information is provided to assist in applying technology, developing standards, and instituting effective programs and source management. Research assistance is requested to develop new control techniques as problems are anticipated through the "208" planning process. A major program thrust involves the development and establishment of industrial effluent (point source) guidelines on best practicable and available technologies, effluent and pretreatment standards, and regulations for all industrial categories. These guidelines are used by the enforcement program in issuing permits. Research and development assistance is provided on new treatment technologies applicable to development of particular guidelines. Limited assistance and technical development efforts will continue on nonpoint sources to support Phase II (1977-1983) planning. A spill prevention and control program focuses on implementing spill prevention plans at non-transportation related onshore and offshore facilities, and responding to major spill events to mitigate the effects of polluting spills on the environment.

EPA provides or supports training to improve the skills of State and local water pollution control personnel as well as to increase the availability of water pollution control manpower. Skills which are addressed range from sewage treatment plant operation to plant design and management. Also under this program, EPA assists other Federal agencies to bring their facilities into conformance with prevailing pollution standards and helps to ensure that the programs, projects, and other activities of Federal agencies produce a minimum water pollution impact.

The Marine Protection, Research and Sanctuaries Act of 1972, as amended, authorizes the Administrator of the Environmental Protection Agency to regulate the disposition of materials into the ocean, excepting dredged material. Under this authority, a permit program for ocean disposal of waste has been underway since FY 1973.

Primary objectives for fiscal year 1978 include:

- Approximately 6,500 new awards obligating \$6.4 billion for the planning, design, and construction of waste treatment facilities;
- Continuing technical and fiscal integrity review of municipal construction activities, including project site reviews, reviews of completed facilities plans, and an increased number of financial audits;
- Development of water quality criteria for 65 toxic environmental substances;
- Implementation of toxic substances control strategy analyses of alternative approaches per substance, and reproposing regulations for 10 of the 21 industrial effluent guidelines, addressing 65 substances as identified in the Settlement Agreement;
- Funding of selected areawide planning agencies to develop water quality management plans for completing priority tasks that did not receive funding from the initial planning grant;
- Review and approval of State, areawide and local section 208 Agency plans;
- Implementation of water quality management program regulations (40 CFR, Parts 130 and 131) by State and designated areawide planning and management agencies;
- Development of ocean dumping guidelines and alternatives;
- Continuation of an expanded and intensified national municipal operations program;
- State implementation of the national Basic Water Monitoring Program developed in FY 1977;
- Implementation of final EPA dredged or fill material guidelines; and
- Participation in the implementation of Corps of Engineers regulations.

WATER QUALITY

Abatement and Control Water Quality Planning and Standards

<u>Appropriation</u>	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs 1977</u>
Water Resources Council.....	\$ 49	\$ 207	\$ 192	\$ 37	-\$155
State Programs Regulations and Guidelines.....	14,190	10,561	10,105	15,160	+5,055
Great Lakes Program.....	3,917	4,159	4,158	6,758	+2,600
Clean Lakes Program.....	3,243	...	15,026	26	-15,000
Chesapeake Bay Program.....	76	...	2,100	2,100	...
Total.....	21,475	14,927	31,581	24,081	-7,500

Permanent Positions

Water Resources Council.....	3	3	2	2	...
State Programs Regulations Guidelines.....	407	375	343	438	+95
Great Lakes Program.....	20	25	27	27	...
Clean Lakes Program.....	...	...	1	1	...
Chesapeake Bay Program.....	8	...	40	40	...
Total.....	438	403	413	508	+95

Budget Request

An appropriation of \$24,081,000 is requested for FY 1978, which represents a decrease of \$7,500,000 from FY 1977. This includes a \$15,000,000 reduction for Clean Lakes to allow time for evaluating the accomplishments and benefits of prior year grant expenditures during FY 1978, before assessing the need for additional appropriations. Also included is an increase of \$2,600,000 for additional monitoring, demonstration grant projects, and completion of an IJC study for the Great Lakes program. An additional \$5,055,000 and 95 positions are requested to assist in and accelerate the development of acceptable Section 208 plans.

To adequately manage the design, output and physical integrity of this program and to provide guidance, technical assistance and coordinate planning efforts between State and local 208 agencies will require 217 regional and 52 headquarters manyears in FY 1978. In FY 1977, the Agency has 136 regional and 38 headquarters manyears assigned to this program. If \$137 million of previously authorized contract authority is released, EPA's current investment in Section 208 planning programs will amount to over \$300 million. Also, the Agency is under a court mandate to have approved and acceptable 208 plans by November 1978. This is the basis for the requested increase.

Program Description

The water quality planning and standards subactivity includes five program elements. The State programs regulations and guidelines element covers a broad range of activities including providing technical guidance, assistance, and information to States, other Federal agencies, and local agencies to assist with the development of water pollution control programs. These activities include assisting States and State-designated areawide agencies in the preparation and implementation of their water quality management programs for the prevention, reduction, and elimination of water pollution from both point and nonpoint sources; providing guidance on the setting of standards; disseminating technical information concerning scientific and engineering advances; and providing technical consultation.

The second program element covered by this subactivity is the Great Lakes program which includes both funding for the Great Lakes initiative program as well as demonstration grants authorized by section 108(a) of the FWPCA. The Great Lakes initiative program was established in FY 1973 to provide the principal source of funding for United States activities in direct support of the Canadian-United States Agreement including the Upper Lakes Study, the Pollution from Land Use Study, Great Lakes water quality surveillance, International Joint Commission support activities, special studies of water quality problem areas, and demonstration grants authorized by section 108(a).

The third program element covered by this subactivity is the Clean Lakes program. Under this program, the Agency provides financial assistance to the States to carry out methods and procedures to restore the quality of publicly owned freshwater lakes. Nineteen million dollars has been appropriated by Congress for fiscal years 1975 and 1976 to carry out the requirements under Section 314. Ninety-six applications for lake restoration have been received.

The fourth program element covered by this subactivity is support provided the Water Resources Council. This program has three principal activities: (1) Headquarters participation in Water Resources Council meetings as a member agency; (2) participation by both headquarters and regions in the National Assessment through furnishing data on water supplies and water quality, along with appropriate analysis of the total assessment data and findings; and (3) regional participation in comprehensive water and related land resource planning studies and in the activities of River Basin Commission, established under Title II of PL 89-80.

The fifth program element covered by this subactivity is the Chesapeake Bay program which is charged with developing a management system to maintain and improve the overall water quality of Chesapeake Bay. This will be accomplished through an inventory of point sources, review and revision of NPDES permits, and increased priority for construction grants to municipalities. In addition, existing and potential water quality problems will be investigated and reinforced as they relate to possible regulatory action. The program will emphasize coordination of existing programs of Federal, State and local planning and regulatory agencies.

1976 Accomplishments

Water Resources Council

In FY 1976, four comprehensive planning studies will be completed for Hawaii, Maumee, Minneapolis - St. Paul, and the Monogahela.

State Program Regulations and Guidelines

In FY 1976, \$3.0 million was spent on contractual studies to assist Section 208 program management development; for State demonstration projects on how the planning process can be used to solve potential problems; for development of nonpoint source best management practices; for technology transfer; for a benefit analysis on in-place toxic removal; for in-place toxic pollutants and to perform technology assessments to develop waste water criteria; and to foster public involvement in local Section 208 programs. Training grants were also used for public information activities (\$0.2 million). Principal accomplishments in FY 1976 include:

- Published EPA's Quality Criteria for Water, 1976;
- Initiated development of expanded second generation water quality criteria document;
- Finalized revision and approval of 56 State water quality standards and promulgated Federal water quality standards for two States;
- Developed and published regulations on water quality standards and anti-degradation policy;
- Completed a report to identify and prioritize the locations for removal of in-place toxic pollutants;
- Promulgated standards of performance for Marine Sanitation Devices;
- Acted on six petitions from States requesting that discharge of sewage from vessels, whether treated or not, be prohibited in specific waters -- published determinations in the Federal Register;

- Developed a proposed regulation for permitting discharges to aquaculture projects in navigable waters -- now awaiting promulgation;
- Presented a summary report to Congress on the national estuarine pollution control program;
- Completed a documentary movie on estuaries, for public dissemination;
- Developed final regulations for integrated State and areawide Water Quality Management Planning;
- Developed silviculture pesticides BMP report;
- Used Section 106 grant resources to support priority program areas including permits, municipal facilities management, compliance monitoring, and planning;
- Completed a project to aid State water pollution control agencies in upgrading and reclassifying key environmental control positions;
- Completed the issuance of Best Management Practices for nonpoint source categories; and
- Secured formal agreements with 10 other Federal agencies and Departments on participation in the Section 208 program.

Great Lakes Program

A final report on the Upper Lakes Reference Studies was submitted to the IJC in July, 1976. The other study, that of pollution from land use activities in the entire Great Lakes basin, reached midpoint in FY 1976 and will continue toward its scheduled completion in FY 1979. The latter effort required \$0.5 million in contractual work.

Because of the size and uniqueness of the Great Lakes, EPA supplements its normal monitoring programs and that of the States, and cooperates with Canada through the IJC in a scheduled nine-year cyclical program. Monitoring of Lake Michigan was begun in FY 1976. Total monitoring contractual or grant costs was \$0.8 million.

The Special Demonstration Grants program (\$1.6 million) authorized for the Great Lakes by Section 108(a) of PL 92-500 continued during FY 1976, with completion of one project and publication of the related report.

The Office of Research and Development continued to do studies on the Great Lakes under EPA's Large Lakes Research program. Work has been directed to the most polluted lakes first to obtain the most timely information for pollution control programs. The mathematical model of Lake Ontario was completed in FY 1976, and preliminary base line information was collected for Lake Michigan.

Clean Lakes Program

- Seventeen lake restoration grants to eight States were awarded for \$3,243,000;
- Fourteen lake restoration grants were technically approved and will be formally awarded;
- \$1.4 million has been designated for evaluation of implemented lake restoration projects.
- The entire \$4 million FY 1975 appropriation has been obligated; and
- Seven lake restoration proposals have been rejected.

Chesapeake Bay Program

- Completed studies on the concentration of PCB's in Striped Bass eggs and on the relationship between herbicides and the disappearance of rooted aquatic vegetation.
- Initiation of studies on the Chesapeake Bay to evaluate nonpoint source effects, ecological significance of underwater vegetation and wetlands, fate of kepone in sediments, geochemistry of surface sediments, and to develop a zoning scheme for the Bay.

1977 Program

Water Resources Council

In FY 1977, the Ohio Main Stem, Yellowstone Pacific Northwest and Hudson studies will be completed. Six comprehensive water resources studies will be initiated. These are: Allegheny, Delaware, Fox-Wolf, Lake Champlain, Southcentral Alaska and Upper Mississippi. A national assessment study will also be completed.

State Programs Regulations and Guidelines

In FY 1977, program emphasis will be placed on the successful undertaking of Section 208 planning by State and local governments. This will include nonpoint sources. In the past, EPA and the States concentrated virtually all of their resources on abating point source of pollution. The States have begun to develop strategies which include nonpoint source abatement in accordance with regulations and guidance issued by EPA. Section 208 is being used by the Agency to address those water quality problems not readily soluble by other sections of the Act.

This will require States to fill present vacancies with the well qualified staff necessary to meet increasing responsibilities. The development of a Continuing Planning Process Handbook and a State Strategy Handbook are planned to assist the States in developing well integrated planning and decision making processes.

Plans for the SBA Loan Program include a substantial increase in the number of loans approved and the delegation of this program to several States.

In FY 1977, \$0.8 million in contracts is being committed on continued development of public involvement in the Section 208 program, on the basis for using broader designations for water quality criteria, and for technology assessments to develop water quality criteria.

Under the State Programs Regulations and Guidelines program, EPA will also:

- Publish a report on the integrity of water;
- Complete review and revision of State water quality standards;
- Continue to investigate harbors and waterways of critical importance which require additional studies and provide the basis for a decision on removal of in-place toxic pollutants;
- Investigate and approve/disapprove State petitions requesting the prohibition of vessel sewage, whether treated or not, as required;
- Assist in the review of permit applications for approval/disapproval;
- Continue reevaluation of the status of the Nation's estuaries in preparation for the updated FY 1978 report to Congress;
- Continue nonpoint source demonstration projects dealing with sediment control and mining; and
- Make initial attempts to identify controls for pollution from urban stormwater, grazing and other nonpoint pollution sources and to disseminate this technology.

Great Lakes Program

The Pollution from Land Use Activities Reference Group (PLUARG) studies will continue in FY 1977, and a public information program on the findings of the land use studies will be initiated to inform and obtain input from the public and other government agencies in connection with the final report preparation scheduled for FY 1978. Contractual cost for this effort is programmed at \$0.5 million.

Systematic monitoring of near-shore waters will be initiated and intensive surveillance of Lake Michigan will be continued into the second year, based upon the IJC approved Federal-State-Canadian cooperative program, and will include continuation of the open-lakes survey. Data for both water quality monitoring and research will result from the Lake Michigan program. Contractual or grant costs for this effort are programmed at \$0.8 million.

Continuing staff support will be provided for the Water Quality Board including Special Studies, and for the direct activities of the government under the Great Lakes Water Quality Agreement, particularly those in connection with the special fifth-year review of the Agreement.

Work on four 108(a) Demonstration Grant projects will continue in FY 1977 at the \$1.6 million level expected to be completed, bringing to a total seven completions of the original nine projects authorized.

The Office of Research and Development will continue in connection with the mathematical modelling efforts, including calibration of lake-wide models for Lakes Erie and Huron, and preliminary examination of models to describe the fate and transport of hazardous pollutants in selected areas.

Clean Lakes Program

- Continue to receive and review lake restoration proposals from the States;
- Hold Regional meetings to discuss and evaluate grants for funding;
- Evaluate 75 to 100 lake restoration proposals submitted by States for Federal funding on their technical merits and make grants for appropriate proposals for about \$15,000,000;

- Coordinate program with pertinent activities of other Federal agencies; and
- Evaluate restoration projects underway.

Chesapeake Bay Program

Major contractual investigations will be launched into the cause and effect relationships of pollutant inputs to the Bay and regarding available and appropriate regulatory mechanisms to control Bay pollution (contracts cost: \$1,100,000). The pollutant studies will concentrate on the input of toxic materials such as Kepone and PCB's, the effect of nonpoint source pollution on the disappearance of rooted aquatic vegetation, and the effect of dredging on the environment. Major outputs during FY 1977 include:

- An assessment of the water quality and related resource problems of the Bay;
- Determination of the relationship between water quality management and existing regulatory agencies, research programs, permits and mandates and review of the specific institutional/regulatory issues they raise;
- A comprehensive zoning scheme of the Chesapeake Bay; and
- A definition and prioritization of estuarine physical transport processes.

1978 Plan

Water Resources Council

Due to establishment of a centralized budget in the Water Resources Council, funds for participation in river basin studies will no longer be provided by EPA but by the Water Resources Council. Continuing Agency staff support will be provided through cooperation and participation in river basin commissions.

State Programs Regulations and Guidelines

Implementation of the Section 208 water quality management plan will occur in FY 1978. Federal funding for statewide Section 208 plans in nondesignated areas is provided to assist State and local governments in complying with the U.S. District Court for the District of Columbia ruling that Section 208 must be developed by November 1978 for the entire Nation.

Continued decentralization of functions and responsibilities will be a major section 106 program emphasis. The development of policies and guidance to ensure State emphasis on and commitment to national priorities will continue.

In FY 1978, \$3.0 million is planned for contracts to provide problem resolution support to assist Section 208 agencies in the implementation of approved plans; to provide increased assistance for implementation of nonpoint source control plans; and to provide evaluation of local Section 208 management effectiveness. None of this increase is for procurement of ADP hardware or software.

Other activities to be undertaken in FY 1978 are:

- Review and approval of State, areawide and local 208 agency plans;
- Begin incorporating criteria constituent parameters into State water quality standards;
- Continue investigation of harbors and waterways of critical importance which require additional studies and provide the basis for a decision on removal of in-place toxic pollutants;
- Take action on State petitions requesting the prohibition of vessel sewage, whether treated or not, as required;
- Assist in developing a data base to permit determinations on prohibiting vessel sewage discharges;
- Publish an updated report to Congress on the Nation's estuaries;
- Continued provision of technical support rationale for toxic pollutants, effluent guidelines, ocean dumping, hazardous spills, and dredged or fill materials; and

- Continuation of nonpoint source planning projects (mining and new legal institutional arrangements for nonpoint source control).

Great Lakes Program

The final report of the four-year Pollution from Land Use Activities Reference Group (PLUARG) studies will be submitted to the IJC, and collection of field data will continue to verify mathematical modelling predictions and to supplement the water quality monitoring program. An additional \$1.0 million is required to permit a more thorough and complete response on this report and to ensure timely completion, as required by the Treaty. This brings the total cost of this effort to \$1.5 million.

The FY 1978 program represents an increase in activities, particularly those related to surveillance and monitoring, based on the IJC recommended Federal-State monitoring program in cooperation with Canada. Monitoring of near-shore waters will continue, and the intensive lake-wide survey program will be shifted to Lake Erie. Continuing staff support will be provided for the Water Quality Board. An additional \$1.0 million will be required for increased surveillance activities, bringing the total surveillance and monitoring costs to \$1.8 million and will be secured through contracts with States and other contractors.

Two 108(a) Demonstration Grant projects will be completed including the final reports. Work will continue on the last two of the original nine authorized 108(a) projects, and three new starts are planned for storm and combined sewer overflow control demonstrations at a cost of \$0.4 million, bringing to \$2.0 million the total for 108(a) projects.

Research will continue to be highlighted by issuance of reports dealing with nutrients and ecological effects of dredge spoils disposal, and by completion of the mathematical models of Lake Michigan and the generalized Great Lakes hazardous pollutant model.

None of the preceding is for procurement of ADP hardware or software.

Clean Lakes Program

Continue the FY 1977 program until all appropriated funds are committed:

- Evaluate, approve and fund lake restoration proposals; and
- Conduct site visits to awarded projects to monitor and evaluate restoration progress.

Chesapeake Bay Program

In FY 1978 the study programs will concentrate on pollution control methodology as it effects the Bay's ecosystem. Monitoring programs will be developed to utilize sophisticated sensing systems. Regulations and intergovernmental mechanisms will be developed to provide a uniform regulatory system for the Chesapeake Bay as an entity. Contractual cost is estimated to be \$1,100,000.

Program analysis would concentrate on priority management issues identified, examining available alternative solutions, expected benefits, implementation feasibility and costs, and needed implementation actions.

WATER QUALITY

Abatement and Control Effluent Standards and Guidelines

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs. 1977</u>
			(dollars in thousands)		
<u>Appropriation</u>					
Effluent Standards and Guidelines.....	\$4,670	\$7,141	\$18,342	\$19,742	+\$1,400
<u>Permanent Positions</u>					
Effluent Standards and Guidelines.....	58	54	51	85	+34

Budget Request

An appropriation of \$19,742,000 is requested for FY 1978. This represents an increase of \$1,400,000 and 34 positions over FY 1977 for carcinogenic health effects studies, general studies of toxic pollutants (including environmental mass balances and risk analyses), economic aspects of BAT revisions, and to meet litigation responses and court demands.

Program Description

The Federal Water Pollution Control Act Amendments of 1972 require the Environmental Protection Agency to establish effluent limitations which must be achieved by point sources of discharges into the navigable waters of the United States. Section 301 of the Act requires the achievement by July 1, 1977, of effluent limitations which require the application of the "best practicable control technology currently available" (BPT), and the achievement by July 1, 1983, of effluent limitations which require the application of the "best available technology economically achievable" (BAT). Section 306 of the Act requires the establishment of new source standards and 307(B) and (C) requires pretreatment standards for industry.

The first major effort of developing and promulgating effluent limitations, standards, and guidelines for 52 major industrial categories has largely been completed, with the exception of final pretreatment standards for existing industry sources. In compliance with court ordered deadlines, continuing activities will be devoted to completing standards for industrial subcategories which have been published as interim final or deferred, development of pretreatment standards for industries for which effluent limitations have been developed, the promulgation of standards of performance for new sources, and the review and revision of all standards within five years of promulgation. A continuing major activity involves Agency response to court challenges and demands of standards already promulgated, often requiring additional technical information.

A major new program emphasis is being directed toward implementing a toxic control strategy to identify the most cost-effective and cost-beneficial regulatory approach to controlling toxic pollutant discharges to the Nation's waters. During FY 1976, a prioritized list of the 65 most dangerous toxic materials was developed, together with a list of 21 industries known or suspected of discharging these materials. In FY 1977 and 1978, EPA will analyze in detail the technological, economic, health, and general environmental factors in order to develop specific regulations, including revision of BAT limitations and guidelines. The schedule for completion of studies and promulgation of regulations is outlined in a Settlement Agreement between EPA and the Natural Resources Defense Council along with other environmental groups which establishes specific point source categories, pollutants to be evaluated, priority of review, and specific promulgation dates.

Substantial and potentially costly impact to the Nation's industries is possible. To fulfill the Agency's obligations in this area will require careful analyses, evaluation and integration of health, technology and economic studies to identify the best regulatory approach among alternatives.

Of special concern is the role of some of these toxic substances as health hazards and as carcinogenic agents. Beginning in FY 1977 and continuing through 1978, emphasis will be directed toward investigating the toxicity and biological effects on man and other life forms, including those entering the food chain, and the fate, transport and effects of toxic agents in the environment.

Economic, statistical and inflationary impact analyses are conducted on a regular basis to support the development of water quality standards, regulations and programs and to support adjudicatory hearings. The primary emphasis continues to be direct support to the development of effluent limitations and guidelines.

1976 Accomplishments

In FY 1976, \$1.9 million was obligated and \$2.2 million committed on contractual work to identify advancements made in treatment technologies since promulgation of Group I categories, to provide additional technical information necessary for adjudicatory hearings, to collect data on effluent processes and on potentially hazardous materials, and to provide more accurate data and technical information for developing additional regulations. An additional \$0.6 million was obligated and \$0.4 million committed on contractual work for revision, modification and amendments to existing contracts. Principal accomplishments include:

- Published interim final or final regulations for existing sources for 17 of Group I, Phase II industries;
- Published interim final or final regulations for 11 of the Group II industries;
- Developed regulations for specific categories not covered under Group I and II;

- Developed and analyzed data and background information to be used in the annual review of established limitations. The effluent limitations must be revised every five years;
- Provided technical support and assistance to the States, regions and Office of Enforcement on enforcement proceedings involving industrial discharges, industrial waste water treatment technology and control;
- Developed technical information necessitated by legal reconsiderations and remands as a result of court challenges to Phase I and Phase II of Group I;
- Evaluated the effect of effluent limitations and guidelines on energy, solid wastes, air, and radiation impact and to identify alternative technologies to reduce such impacts;
- Provided scientific and engineering technology to assist in controlling the discharge of industrial pollutants affecting the quality of drinking water;
- Evaluated alternative methodology for developing and establishing effluent limitations and guidelines as recommended by the Effluent Standard and Water Quality Information Advisory Committee (ESWQIAC), and other interested organizations;
- Quantitatively evaluated the environmental effects of the regulations applicable to industrial point sources under Section 301(b), 304(b) and (c), 306 and 307 (B) and (C) as BPT, BAT, NSPS, and pretreatment regulations are implemented;
- Provided profiles of discrete industrial sources for use in preparing new source environmental impact assessments; and
- Provided technical assistance to the regions and States on the applicability of the guidelines and standards to the NPDES permit program.

1977 Program

In FY 1977, \$11.3 million will be allocated to initiate contract studies in support of the toxics strategy, including technical studies, economic impact analyses, determination of health effects, and analyses of environmental distribution and overall exposure risk. In addition, \$5.0 million will be committed for contractual work to promulgate the remaining regulations now under court order, to respond to litigations, to collect additional data to strengthen and repromulgate Group I regulations which are remanded as a result of lawsuits, and to collect and analyze data necessary to promulgate pretreatment regulations. Projected principal accomplishments for the program include:

- Collect and analyze technical data necessary to revise BAT Regulations for industries required by the Settlement Agreement; requiring about \$3.1 million of contractual work to revise BAT regulations;
- Perform economic analyses on the impact of best available technology (BAT) for 21 industries, primarily through contractual studies for \$3,100,000;
- Develop criteria for 65 toxic pollutants which will address human health and environmental effects, utilizing \$2.5 million for contractual work;
- Initiate inhouse and contractual studies of \$2.6 million to determine overall environmental exposure and risk, and recommend control strategies for each of the 65 toxic pollutants;
- Develop and analyze data and background information to be used in the annual review of Section 306 New Source Performance Standards (NSPS). Information must be gathered on growth patterns in all industrial categories in order to establish priorities for the revision of NSPS;
- As appropriate, develop, propose, and promulgate pretreatment standards based on mass limitations. This is an extension of pretreatment standards originally promulgated on the basis of concentration;

- Develop, propose, and promulgate effluent limitations and standards for subcategories omitted by coverage by the Group I and Group II industries;
- Develop and propose regulations for the remaining Group II industries such as Machinery and Mechanical products and Miscellaneous Foods and Beverages;
- Publish final regulations for 7 of the Group I, Phase II industries which have been published as interim final such as Raw Cane Sugar; Electroplating; Inorganic Chemicals; Iron and Steel; Nonferrous Metals; Pulp and Paper; and Ferroalloy Manufacturing;
- Publish final regulations for 8 of the Group II industries such as Ore Mining; Coal Mining; Oil & Gas Extraction; Mineral Mining; Explosives; Gum and Wood; Carbon Black; and Hospitals;
- Issue draft guidance Development Documents for industries such as Fish Hatcheries; Water Supply; Steam Supply, Transportation; Concrete Products; Clay and Gypsum Products; and Petroleum Bulk Storage Facilities;
- Develop technical information required by the judicial review, technical reconsiderations, and remands of the Group I and II industries and those subcategories finalized in the above items.

1978 Plan

At least \$12.0 million will be required in FY 1978 to complete contractual support to the toxic strategy, including \$5.0 million for health effects and environmental risk studies, \$3.0 million for economic aspects of effluent guidelines BAT revisions, and \$4.0 million for litigation responses and court remands. An additional \$5.0 million is planned for contractual work to promulgate the remaining regulations omitted for Group I and II coverage, to collect additional data to repromulgate Group II regulations remanded as a result of lawsuits, and to collect additional data to make proposed regulations more defensible. None of this increase is for procurement of ADP hardware or software. The planned outputs for this program are:

- Revise BAT Regulations to control identified problem pollutants and promulgate pretreatment standards for 21 industries as required by the Settlement Agreement (\$5 million);
- Perform economic impact analyses of 19 industries for best available technology (BAT); to be performed principally through contractual evaluations (\$3 million);
- Initiate contractual studies (\$5 million) to provide for appropriate risk assessments and concentrations for each water constituent of concern, which is associated with discernable health or environmental effects of aquatic and human organisms;
- Develop technical information necessary to respond to lawsuits filed on regulations (\$4 million);
- Publish a criteria document for 65 toxic substances, and revise criteria for those substances contained in the initial EPA criteria document;
- Prepare and publish two reports (1) the Agency's plans, programs, and priorities and (2) the section 516 (a) report on the Agency's previous year's water related programs;
- Certification by regional personnel of approximately 100 loans to small business for water pollution control facilities.

WATER QUALITY
Abatement and Control
Grants Assistance Programs

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs 1977</u>
		(dollars in thousands)			
<u>Appropriation</u>					
<u>Control Agency Resource</u>					
Supplementation	\$46,277	\$40,000	\$50,000	\$60,000	\$+10,000
 Areawide Waste Treatment Management Resources..					
	52,993	15,000	15,000	...	-15,000
 Training Grants	<u>3,747</u>	<u>...</u>	<u>1,160</u>	<u>450</u>	<u>-710</u>
TOTAL	103,017	55,000	66,160	60,450	-5,710
 <u>Permanent Positions</u> ...	...	...	...	...	...

Budget Request

An appropriation of \$60,450,000 is requested for FY 1978. This represents a decrease of \$5,710,000 from the FY 1977 level and reflects a decision not to fund additional new Section 208 agencies and to maintain control agency grants at the FY 1977 level (\$+10,000,000). The latter increase is necessary to provide additional management support to meet an increase in the number (reissuance) and complexity of permit enforcement applications. This will be complicated by appeals under the Section 301(c) variance provisions, which allow operators to meet modified requirements for best available technology based partly on their economic capabilities. The States will have to be able to make and verify these determinations. This increase is a minimal one and maintains the constant level of State support provided over the past two years, with no allowance for inflation.

Program Description

The water quality grants assistance programs include three grant assistance activities: (1) control agency resource supplementation grants, (2) Section 208 planning grants, and (3) training grants.

1. The water control agency resource supplementation program provides Federal support to State and interstate water pollution control agencies. In virtually every program activity (e.g., permitting, monitoring, planning, enforcement, and municipal facilities management), EPA and the States each perform functions which must be coordinated if they are to be effective. EPA develops the strategy for coordination of effort between EPA and the States as well as the sequencing of this effort from year to year. These broad guidelines are translated into operational program terms in the annual program plan prepared by each State and approved by the EPA regional office.

Upon approval of the program, EPA funds each State agency to enable it to conduct its program activity. The EPA regions also monitor State performance to ensure that the outputs specified in the programs are accomplished.

In FY 1975, the last year for which figures are available, the role of the State is clearly shown as State man-years of effort totaled approximately 5,500, compared to EPA regional man-years totaling about 2,200. Thus, the States are providing about 71 percent of the manpower resources in the water program. To help fund the State efforts in FY 1976, EPA provided \$46 million for State grants, or 37 percent of the total State spending of \$125 million for FY 1976.

2. The act provides for the establishment of water quality management and planning agencies under Section 208. Through Section 208, State and areawide planning agencies are provided a unique opportunity to plan and manage a comprehensive program based on integrated planning and control over such activities as municipal and industrial waste water, storm and combined sewer runoff, nonpoint source pollutants, and land use as it relates to water quality. From a pollution control standpoint, Section 208 provides the unique opportunity to examine all sources of pollution in an area and develop the most beneficial cost effective trade-offs between sources to reach the desired ambient water quality level.

A management system will be developed to carry out the objectives and requirements of the plans. This comprehensive management system is expected to be the cornerstone of efforts for attaining the 1983 goals of the Act, as it incorporates all the principal functions of water pollution control planning, construction, and regulation.

3. Academic training grants are awarded to institutions of higher education to meet a variety of professional manpower needs. Efforts in this area are divided into four primary categories: the professional training grant program, the graduate fellowship program, professional training curriculum activities, and undergraduate training grants.

1976 Accomplishments

Control Agency Resource Supplementation

In FY 1976, obligations of \$46,277,000 were used for the following accomplishments:

- Support of priority program areas including permits, municipal facilities management, compliance monitoring and planning;

- State issuance of 1,100 major permits and 9,900 minor permits;
- Increased capacity of State compliance monitoring to strengthen the enforcement of more than 38,000 issued permits; and
- Increased capacity of State agencies to manage the construction of municipal facilities, and expedite the award of more than \$3.6 billion of construction grants.

Section 208 Planning Grants

During the past fiscal year, the areawide designated agency portion of the Section 208 areawide waste treatment management planning program became fully operational. This involved not only management of the 149 areawide agencies funded by June 1975, but included \$52,993,000 for the initiation of planning activities by the States and 27 newly designated area-wide agencies. This brought 126 areawide waste treatment management plans under development throughout the Nation. Additionally 50 States and Territories began their work under the Section 208 process. This effort was in response to a court order requiring a State to conduct water quality management planning for all areas of a State where this planning is not being performed by local government. In five States, the entire planning is being done by local governments.

Training Grants

The professional training grant program provides for training graduate level students in water-related engineering and environmental sciences. In FY 1976, 540 graduate trainees were supported at 34 institutions. Under the graduate fellowship program 98 employees from 53 State and territorial water pollution control agencies were selected from these agencies to spend one year in a water-related graduate or undergraduate program. Upon completion of this training, the employees returned to their respective agencies. Professional training activities for FY 1976 included continuation of curriculum development in the Ohio Model Monitoring Program, development of operation and maintenance technical assistance courses and courses for waste water collection systems operators. In addition,

demonstration grants were developed for professional training in the 208 Program and in certification of senior operators in the local water pollution control facilities. Undergraduate training grants were provided for 10 institutions in water-related engineering and environmental disciplines to support approximately 100 students. The total obligation for these training grants were \$3,747,000.

1977 Program

Control Agency Resource Supplementation

Compliance monitoring and enforcement will receive increased emphasis while permitting activities will decline. The point source control phase of planning was completed in most areas in FY 1976, and FY 1977 will see additional emphasis on nonpoint source planning. Additional State personnel must be provided to properly manage the multibillion dollar construction grants program. The total of FY 1977 grant resources available for these purposes is \$50 million, including a \$10 million congressional increase. The Agency is depending on increasing program delegations to the State in such areas as plans and specifications review, operation and maintenance manual review, bid tabulation, etc.

EPA manpower resources will be inadequate to undertake all required increased activities in areas of program emphasis. Thus, States must be encouraged to respond by shifting and adding personnel to carry out priority activities. Resources will be moved from permitting to compliance monitoring and enforcement. Manpower will be shifted from point source planning to nonpoint source planning. However, additional Agency staffing must be provided to encourage the States to increase their capacity to manage the construction grant program, and simultaneously to carry out the other requirements of the Act.

Section 208 Planning Grants

Approximately 60 additional high priority areawide agencies are likely to be designated from funds made available under District Court Order No. 75-1706. A total of \$15,000,000 will also be provided to State agencies to assist in their development of incorporating the requirements of Section 208. The last remaining territory is expected to be designated in FY 1977.

Training Grants

In FY 1977, \$1,160,000 is provided to support a three phase National Environmental energy workforce study that will provide supply and demand data essential to the eventual assimilation of academic training programs into established State education and training delivery systems. In addition, grants to post-secondary educational institutions and also direct financial assistance for water pollution trainee fellowships will continue. These professional and sub-professional training grant programs will support curriculum development, operations and maintenance training, technical assistance and demonstration project activities.

1978 Plan

Control Agency Resource Supplementation

The major means of achieving the Act's goals are the issuance and enforcement of permits and the construction of large numbers of municipal treatment plants. Additional program emphasis will be placed on compliance monitoring and permit reissuance; the reorientation of management agencies to implement Section 208 planning outputs; and the planning and managing of programs addressing nonpoint source pollution. In the past, EPA and the States have concentrated virtually all of their resources on abating point sources of pollution. The area of concentration will now be reoriented to place greater emphasis on nonpoint sources. Control strategies will begin to be developed in FY 1977 by the States, based on "best management practices." Beginning in FY 1978, specific controls and regulatory programs are to be developed by the States to cover their nonpoint source problems for selected categories.

State agency grants under Section 106 of the Act will be increased to the \$60,000,000 level. This level of funding will provide continued support to high priority State program activities.

Section 208 Planning Grants

No new designations of regional planning agencies are expected to be made during FY 1978. However additional funds will be made available to agencies that successfully completed their initial plans during FY 1978, for the purposes of continuing the planning process and extending it to complete priority tasks that did not receive funding from the initial planning grant.

Section 208 planning grants decrease by \$15 million for FY 1978. Funds made available by the court order and by the Congress during FY 1976 and FY 1977 are believed sufficient to fund these continuations and extensions in FY 1978.

Training Grants

Training grants will be terminated after FY 1977 unless additional legislation such as P.L. 94-378 enables further continuation as has occurred for FY 1977. The gradual phase out of this activity over the past several years is leading to the eventual assimilation of these programs into established State education and training delivery systems. In FY 1978, \$450,000 is provided for continuation of the National Environmental Energy workforce study.

WATER QUALITY

Abatement and Control Water Quality Strategies Implementation

<u>Appropriation</u>	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs 1977</u>
Spill Prevention and Response.....	\$3,249	\$4,042	\$4,140	\$4,440	+\$300
Ocean Disposal Permits.....	1,490	1,319	1,406	3,706	+2,300
Federal Activities/ EIS.....	1,639	1,769	1,758	1,758	...
Dredge & Fill Regulations.....	352	404	435	635	+200
Total.....	6,730	7,534	7,739	10,539	+2,800
<u>Permanent Positions</u>					
Spill Prevention and Response.....	107	117	119	135	+16
Ocean Disposal Permits.....	24	24	24	27	+3
Federal Activities/ EIS.....	66	81	75	75	...
Dredge & Fill Regulations.....	16	19	19	29	+10
Total.....	213	241	237	266	+29

Budget Request

An appropriation of \$10.5 million and 266 positions is requested for FY 1978. This represents an increase of \$2.8 million and 29 positions over FY 1977. The additional resources will be used to accelerate the final designation of ocean disposal sites, implement the hazardous substances spill program and expand the dredge and fill permit review program to all waters of the U.S.

Program Description

The Water Quality Strategies Implementation subactivity covers the program areas of Federal activities and EIS reviews, ocean disposal permits, dredge and fill regulations, and spill prevention and response.

The Federal activities and EIS review activity includes the evaluation of projects and programs of other Federal agencies in light of the requirements and goals of the National Environmental Policy Act (NEPA) and the Federal Water Pollution Control Act, as amended, (FWPCA).

The ocean disposal permit program is authorized by the Marine Protection, Research, and Sanctuaries Act of 1972. Under Title I of this Act, the Administrator of EPA is authorized to strictly regulate the disposition of all materials except dredged material which is regulated by the Corps of Engineers. It further prohibits the transportation for the purpose of dumping and the dumping in ocean waters of chemical, biological, and radiological warfare agents and high level radioactive materials. Under this authority, a permit program for ocean disposal of wastes was implemented in 1973, and has been operational since then.

The purpose of the dredged and fill material program is to protect the Nation's wetlands and navigable waters from the discharge of dredged or fill material that will result in significant environmental impact. The EPA is responsible for the promulgation of guidelines in conjunction with and for use by the Corps of Engineers in specifying disposal sites for the discharge of dredged or fill material and for the technical review of applications for disposal permits received by the Corps. A significant action in developing final site-selection guidelines is the preparation of a procedures and testing manual for the environmental acceptability of dredged or fill material disposal in water.

The primary objective of EPA's spill prevention and response program is to protect water quality through the prevention of spills and minimizing the impact of spills on the environment. Section 311 of the Federal Water Pollution Control Act specifies a three-fold approach to the control of spills which consists of response, prevention, and enforcement. Essential to the implementation of Section 311 is the promulgation of key regulations (including the designation of hazardous materials), development of the National Contingency Plan, establishment of spill response programs, and development of an aggressive spill prevention program. The Spill Response Program is shared with the U.S. Coast Guard and jurisdictional lines between the agencies are drawn geographically between inland and coastal (including the Great Lakes) waters. It is EPA's position, supported by Section 311, that the discharger should take actions to remove the spill material; however, if the violator fails to do so, clean-up will be undertaken by EPA and the discharger charged for the cost of removal. To provide efficient and coordinated response actions, national and regional contingency plans are required which delineate procedures, techniques (chemical uses) and responsibilities of the various Federal, State and local authorities.

1976 Accomplishments

In FY 76, \$6.7 million and 213 positions were allocated for this subactivity. This covers the program areas of Federal activities and EIS reviews, ocean disposal permits, dredge and fill guidelines, and spill prevention and response.

The Federal Activities/EIS Reviews function utilized \$1.6 million and 66 positions. About 1,600 EIS's were reviewed and evaluated. The program also developed methods to expedite NEPA compliance; prepared EIS's and water related actions; and provided liaison and coordination with other Federal agencies on water quality related problems and water pollution abatement measures at Federal installations. None of the funds were used for contracts.

The ocean disposal permits program utilized \$1.5 million and 24 positions in FY 1976. Approximately 60 permits were issued under the permit program, revisions were proposed for regulations and criteria, and a specialized air and water monitoring program was conducted for the first ocean incineration of waste disposal to be performed in the United States. The program also conducted surveys on three dump sites through \$0.5 million in contracts and \$0.2 million in interagency agreements with NOAA, and published final environmental impact statements on two ocean

dump sites. Violations of the Act were reported with civil enforcement actions taken and fines levied. An annual report was also prepared as required by statute.

The spill prevention and response program utilized \$3.3 million and 107 positions in FY 1976. Contract funding of \$0.3 million was used to support the Regions through multi-disciplinary technical field support under emergency spill operations and to support further implementation of the total program. An additional \$0.2 million was utilized to fund two grants involving hazardous materials spill response training and hazardous materials prevention regulations.

The spill prevention and response program proposed hazardous pollutant rules for designation, removability, harmful quantities, and rates of penalty; conducted a regulations workshop at the 1976 National Hazardous Substances Meeting; conducted through a contract (\$0.1 million) a study on the cost of spill prevention; worked with the Canadian Government on spill prevention related annexes of the Great Lakes Water Quality Agreement; finalized a grant to recommend the technical approach for the development of the Hazardous Substances Spill Prevention Program; finalized a technical draft of the Oil Removal Regulations; completed contract studies in support of the development of regulations for Non-Harmful Discharges of Oil Regulation; and finalized the training program for hazardous substances response personnel in the field.

The dredge and fill materials program utilized \$0.4 million and 16 positions in FY 76. None of the above funding was utilized for contracts or grants. EPA's involvement was to assist the U.S. Army Corps of Engineers in the promulgation of interim final regulations. EPA developed and published interim final guidelines for use by the Corps in disposal site selection, initiated the development of a testing procedures manual for use in conjunction with the EPA guidelines by the Corps, and through cooperation with EPA laboratories and other Federal agencies initiated the collection of information to define the boundaries of wetlands. EPA personnel contributed to setting precedents through denial of permits that would have unacceptably degraded wetlands.

FY 1977 Program

In FY 77, \$7.7 million and 237 positions are the planned resource levels for this subactivity. This covers the program areas of Federal activities and EIS reviews, ocean disposal permits, dredge and fill guidelines, and spill prevention and response.

The FY 77 program consists of the continued review of about 1,600 EIS's prepared by EPA and other Federal agencies with added focus on pre-EIS liaison to insure early environmental consideration and the subsequent implementation of measures to mitigate any adverse effects. Guidelines, techniques and regulations developed during FY 75 and FY 76 will be revised and refined to further improve the quality and expedite the EIS and negative declaration process. It is anticipated that the review process for EIS's and other Federal agency facilities will be especially critical and time consuming during FY 77, because of the Section 301 secondary treatment requirements which come due in FY 77-78. Increased emphasis will also be placed on assisting and reviewing non-Federal environmental assessments submitted to EPA and other Federal agencies. A total of \$1.8 million and 75 positions are allocated for this program effort. None of the funds will be used for contracts.

The ocean disposal permits program resources are \$1.4 million and 24 positions for FY 77. Approximately 60 permits will be issued under the permit program, the revised regulations and criteria will be out for comments. The program will also begin conducting baseline surveys on approximately 3 dump sites to be funded by \$0.5 million in contracts and \$0.2 million in interagency agreements with NOAA. Environmental impact statements will be started on two ocean dump sites. Violations of the Act will continue to be reported with civil enforcement actions taken and fines levied. An annual report will also be prepared.

The spill prevention and response program resource levels are \$4.1 million and 119 positions for FY 77. Contract funding of approximately \$0.3 million will be used to support the Regions through multi-disciplinary technical field support under emergency spill operations and to support further implementation of the total program. An additional \$0.2 million is to be used to fund contractual functions pertaining to the implementation of the hazardous materials program, to expand the management information system, and to continue the oil pollution prevention program.

The spill prevention and response program plans to develop the technical approach for the hazardous substances spill prevention regulation; amend the oil pollution prevention regulation; continue oil prevention aerial monitoring; finalize the technical approach for the development of the removal and mitigating action hazardous substances regulations; implement the oil removal regulation; provide special equipment and technical assistance to regions for hazardous

substances spill removal operations; revise the National Contingency Plan; implement the training program for the hazardous substances response program; and provide technical expertise to headquarters and regional enforcement personnel (also Coast Guard).

The dredge and fill materials program is allocated \$0.4 million and 19 positions in FY 77. None of the above funding is to be utilized for contracts or grants. EPA will continue in FY 77 to: assist the Corps in promulgation of final regulations; prepare and promulgate final EPA guidelines and develop and publish interim final testing procedures manual. The emphasis in FY 77 will be on expansion of permit review and develop general permits from the traditionally navigable waters to certain of the remaining waters of the U.S. Also emphasis will include a major role in protecting water quality by demonstrating an unacceptable adverse impact for a small number of important controversial permit applications (Sec. 404(c)).

FY 1978 Plan

A budget of \$10.5 million and 266 positions is allocated for FY 78. This request covers the same program areas as FY 77 and includes an increase of \$2.8 million and 29 positions. No part of this increase is associated with the procurement of ADP hardware or software items.

The Federal Activities/EIS review function has requested \$1.8 million and 75 positions with which they will review and evaluate almost 1,600 other agency EIS's for compliance; prepare EIS's and water related actions; and provide liaison and coordination with other Federal agencies on water quality related problems and water pollution abatement measures at Federal installations. None of the funds will be used for contracts.

The ocean disposal permits program has requested \$3.7 million and 27 positions for FY 78. This represents an increase of \$2.3 million and 3 positions to be used for interagency coordination, baseline survey and EIS contracts and development of alternatives to ocean disposal.

Eleven baseline dump site surveys and 8 EIS's will be continuing at various stages toward completion in FY 79 utilizing \$1.5 million in contract funds and \$0.5 million in NOAA inter-agency agreements. Special projects utilizing contracts, interagency agreements and/or in-house support involving the monitoring of sites will cost approximately \$0.5 million.

In addition to the above, program guidance in the preparation and revision of regulations and criteria, guidelines, and operating manuals, including studies of new technology will be provided; the annual report will be prepared; and attention and response will be given to oversight hearings, public hearings, adjudicatory hearings, lawsuits and Congressional inquiries.

The spill prevention and response program has requested \$4.4 million and 135 positions for FY 78. This represents an increase of \$0.3 million and 16 positions. Two additional positions at EPA Headquarters would permit defense of the Hazardous Substances regulation and therefore insure continuation of the hazardous substances program. A third position would allow for technical and investigative assistance by EPA Headquarters to Regional offices on a case-by-case basis. An additional allocation of the remaining 13 positions to the Regions would allow response to approximately 500-600 hazardous substances spills per year, and support enforcement activities through harmful quantity determinations.

The overview for the FY 78 spill prevention and response program is as follows:

- (1) initiate the hazardous substances spill prevention program; (2) complete the expansion of management information control system to incorporate hazardous substances prevention; (3) develop hazardous substances removal and mitigation regulations; (4) revise the National Contingency Plan; (5) implement hazardous substances aerial monitoring techniques; (6) continue oil prevention aerial monitoring; (7) expand special equipment and technical assistance to regions in hazardous substances spill response operations; and (8) continue to implement the oil prevention and response program.

The dredge and fill materials program requests \$0.6 million and 29 positions, an increase of \$0.2 million and 10 positions over FY 77. In FY 78, COE regulation, EPA guidelines and test manual will be reviewed and revised on the basis of the accumulation of new information from research and program management. Additional resources are required to expand the permit review and development of general permits to all waters of the United States and to implement the veto responsibility of the Administrator under Sec. 404(c) of P.L. 92-500.

WATER QUALITY

Abatement and Control Water Quality Monitoring and Analysis

<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (Dollars in Thousands)	<u>Estimate 1978</u>	<u>Increase+ Decrease- 1978 vs 1977</u>
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Appropriation

Water Quality Monitoring and Analysis:.....	\$5,236	\$4,515	\$4,842	\$5,641	\$+800
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Permanent Positions

Water Quality Monitoring and Analysis:.....	190	176	181	181	...
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Budget Request

An appropriation of \$5,641,600 is requested for FY 1978. This represents an increase of \$800,000 over FY 1977 for continued operation of the National Water Quality Surveillance System which has previously been funded by reprogramming from prior year balances. None of this increase is for procurement of ADP hardware or software.

Program Description

This program includes (1) the operation of EPA and State monitoring stations and surveys, including survey design, field sampling and data collection, laboratory analyses, and quality control operations; (2) data interpretation, reporting, and evaluation; (3) water quality and effluent progress measurement, reporting, and analysis; and (4) maintenance, operation and improvement of a national water quality data system. This program also includes analyses to support the development of water quality standards and regulations.

The Federal Water Pollution Control Act Amendments of 1972 require the Environmental Protection Agency, in partnership with the States, to perform a wide variety of water quality monitoring activities. These include establishing, equipping, and maintaining a water quality surveillance system for the purpose of monitoring quality of the navigable waters and ground waters of the United States, and providing an annual water quality inventory report to Congress describing the quality of all navigable waters during the preceeding year. To implement these programs, EPA has established a national network of 188 monitoring stations upstream and downstream from a variety of drainage areas. This network is providing information concerning the impact of municipal and rural areas on water quality and is providing valuable insight into the effectiveness of control programs, especially municipal and industrial point sources. Future analyses will focus on the impact of nonpoint sources. These results, together with the results of State monitoring programs and analyses, have been forwarded to Congress and the public in the calendar year 1974, 1975, and 1976 Water Quality Inventory Reports to Congress.

The Act requires that no grant under Section 106 (grants for pollution control programs) shall be made to any state or interstate agency which has not provided or is not carrying out an appropriate water quality monitoring program. In FY 1976 EPA issued specific regulations outlining the State monitoring programs required. The primary focus of these regulations is to require each State, in conjunction with EPA, to develop a systematic water quality monitoring strategy, and update it as required; to establish adequate quality control procedures on all monitoring activities; and to provide necessary data to EPA in a format compatible with the national water quality data system.

To insure that the monitoring programs during the FY 1978-1983 period provide the information necessary to implement water pollution control programs and measure their impact, a Standing Work Group on Water Monitoring has been established to define comprehensive National programs needed. During FY 1977 national programs will be developed in the area of ambient water monitoring, effluent monitoring, toxics monitoring, and biological monitoring. The major emphasis in FY 1978 will be on implementing these comprehensive programs.

A major initiative in FY 1977-1978 is water monitoring support to the implementation of the comprehensive toxics control program in water. Major studies will be undertaken in house and with contractor assistance to (1) establish and document the existence, concentrations, and geographic location of 65 identified toxic pollutants in the United States; (2) analyze the sources, uses, and leakages to the environment of these pollutants; (3) evaluate the risks which these pollutants pose, based on their presence in the environment; and (4) make recommendations concerning the most appropriate control strategies for each pollutant. These studies will make full use of toxics information developed by State, EPA, and other Federal agencies as part of their monitoring programs.

To provide a national water quality data system, EPA operates the STORET Water Quality File as a service to Federal agencies, States and other governmental agencies to insure their ability to store, retrieve, and analyze water quality data. During FY 1976 major changes were made in the operation and management of the system to improve cost accountability, data quality, and overall management controls. With these changes, emphasis is now being placed on improving the support which STORET provides to top managers.

1976 Accomplishments

Important accomplishments during FY 1976 were the initiation of a quality control program with the States, analysis of initial data from the NWQSS, and adoption of a plan to improve the operation of STORET. Principal accomplishments include:

- Promulgation of Section 106 grant regulations concerning State water quality monitoring programs, with requirements for quality control, strategy development, and data handling;
- Evaluation of quality assurance procedures in over 60 State water quality monitoring Laboratories;
- Submission to Congress of the first set of State Water Quality Inventory Reports, together with a national overview by EPA;
- Analysis of the first year's data from the National Water Quality Surveillance System, focusing on municipal and industrial point source effects;
- Analyses and publication of documented case studies of water pollution clean-up successes in five geographic areas;
- Agencywide adoption of a policy for the operation of STORET as a national utility data system for water quality information, and a comprehensive action plan to assure adequate fiscal and management controls; and
- Interagency agreement with the U. S. Geological Survey to provide sampling and laboratory analyses of data from automated river/stream sampling stations operated by USGS (\$0.6 million).

1977 Program

Important programs being undertaken during FY 1977 are the adoption and initiation of a uniform national Basic Water Monitoring Program for States, negotiations with States to implement the program, and data collection and analyses to support the Agency's Toxic Strategy. Projected accomplishments for the program include:

- Development, adoption, and publication of uniform national Basic Water Monitoring Programs for State collection of ambient, effluent, toxics, and biological data;
- Negotiation of agreements with States concerning content and implementation of each State's monitoring programs to support the Basic Water Monitoring Program and comply with Section 106 regulations;

- Follow-up activities on State quality assurance evaluations, including re-evaluation of selected laboratories, and implementation of routine performance checks on laboratory results;
- Analyses of 65 pollutants designated in the Toxics Strategy, based on analyses of data developed by a \$2.6 million effluent standards and guidelines contract, and on STORET data and a selected sample of permit program effluent data; provision of technical support to toxics monitoring by States;
- Operation and evaluation of data from the National Water Quality Surveillance System, focusing on non-point sources and selected toxic pollutants;
- Submission to Congress of Second Annual State Water Quality Inventory Reports;
- Publication of additional case studies of water pollution clean-up successes;
- Performance of feasibility study on the need for a national utility data system for effluent data;
- Continued implementation of STORET action plan, including thorough revision of documentation, improved quality control procedures and improved support to top managers; and
- Using prior year balances, conclude an interagency agreement with the U. S. Geological Survey to provide sampling and laboratory analyses of data from automated river/stream sampling stations operated by USGS.

1978 Plan

Major accomplishments planned for FY 1978 are the State implementation of the Basic Water Monitoring Program, recommendations for control strategies for the 65 toxic pollutants, and the establishment of a biological monitoring program to support the toxics program. The planned outputs for this program are:

- State implementation of the comprehensive Basic Water Monitoring Program developed during FY 1977, including greater reliance on intensive surveys, more uniform sampling protocol, reduced numbers of fixed ambient stations, and initiation of biological and toxics monitoring;
- Development of control strategies for each of the 65 toxic pollutants, based on the studies performed during FY 1977; controls may include: revised best available technology regulations, pretreatment and new source performance standards, water quality standards, Section 307(a) toxic standards, or regulation through solid waste, air, or other regulatory programs;
- Establishment of a biological monitoring program to support the Toxics Strategy, including analyses of fish and shellfish tissues and maintenance of a tissue bank; program will involve participation by States, U.S. Fish & Wildlife Service, Food and Drug Administration, and other on-going programs;
- Operation of National Water Quality Surveillance System, and production of annual report, including an interagency agreement of \$700,000 for U.S. Geological Survey to provide sampling and laboratory analysis and \$100,000 to restore Region II to this network (none of this increase is for procurement of ADP hardware or software);
- Submission and analyses of State Water Quality Inventory reports;
- Continue to provide STORET support to top managers;
- Establishment of a quality assurance program for dischargers, including validation of industrial self-monitoring reports, and inspection of municipal laboratories; and
- Continued technical support and back-up for toxics controls, water quality management plans, and the permit program.

Water Quality
Abatement and Control
Municipal Source Control

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
				(Dollars in Thousands)	
<u>Appropriation</u>					
<u>Municipal Facility</u>					
Construction	\$16,825	\$21,409	\$19,404	\$32,804	+\$13,400
Waste Treatment Operations & Maintenance	1,757	4,647	1,751	1,751	...
Manpower Planning & Training	2,648	...	2,859	2,859	...
Total	21,230	26,056	24,014	37,414	+13,400
<u>Permanent Positions</u>					
<u>Municipal Facility</u>					
Construction	766	826	819	1,269	+450
Waste Treatment Operations & Maintenance	59	116	63	63	...
Manpower Planning & Training	64	...	51	51	...
Total	889	942	933	1,383	+450

Budget Request

Administration of the municipal source control subactivity in FY 1978 is expected to require an additional \$13.4 million over the currently estimated FY 1977 level. This increase is due to three major factors -- (1) the expected increase in total staff by 450 over the current FY 1977 level to accommodate the increased project workload (\$9.0 million); (2) the new contract requirements for needs survey development (\$1.0 million) and general grant and contract support (\$2.4 million); and (3) an increase in funding for the interagency agreement with the Corps of Engineers and GSA to perform increased numbers of construction inspections (\$1.0 million).

The increased funding of \$9.0 million for support of the new construction grants staff will include salaries and benefits, travel, and other administrative support for the 450 new positions being added to the program. The 450 positions will supplement the existing staff to allow over 5,500 new awards totalling \$6.4 billion to be processed, approximately \$5 billion in payment requests to be evaluated and over 11,000 existing projects to be managed. This level of activity will represent a substantial acceleration from the actual FY 1976 and expected FY 1977 program performance in all workload indicators. In addition, the new positions are expected to allow increased efforts in program and fiscal review to assure that funds available are awarded to the highest priority projects and that construction is technically and fiscally optimum.

The \$3.4 million for contract support will provide \$1 million to fund the basic contracts required for the biennial needs estimate required under Sections 516(b)2 and 205(a) of the FWPCA. The output from these contracts will be the 1978 Needs Survey to be submitted to Congress in February, 1979. The remaining \$2.4 million will be utilized to cover general contract and grant support, including improvement in management information systems, special studies and training seminars, and manpower development, demonstration, and State Agency grants. No part of the \$2.4 million increase is associated with the procurement of ADP hardware or software items.

The \$1.0 million increase to \$3.5 million to fund the work performed under agreements with GSA and the Corps of Engineers will cover increased levels of construction inspections during FY 1978. The increased funding levels reflect the increasing numbers of construction projects underway for which inspections must be performed. Approximately 50% of the total interim inspections performed by EPA are included in these subagreements.

Program Description

The Municipal Source Control subactivity is composed of two sections. The first, the municipal wastewater treatment facility construction program, derives its legislative authority from Title II of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500). The second, the municipal operations and manpower planning and training program, derives its principle authority from Title I, Sections 104 and 109 through 112, and portions of Title II and Title IV. The primary goals of these programs are (1) to achieve the most cost-effective and timely abatement of municipally treated wastewater pollution control through proper planning, design, construction, and operations and maintenance of treatment works; and (2) to assure an adequate supply of qualified water pollution control manpower at all government levels. Workload for the program is primarily measured by two factors: The number of new awards to be processed and the number of on-going projects to be managed. The funding provided under this subactivity covers the cost of both operating the construction grants program and the municipal operations and manpower planning and training program. Omitted from this subactivity are those operating costs related to construction grants environmental impact statements, which are provided separately, and the municipal construction grant funds, which are included in a separate appropriation account (Construction Grants).

This subactivity is predominantly located in the EPA Regional Offices, where all the grant activity and associated administration of the grants program and post-construction activities take place. The direct training and operational technology activities of the municipal operations and training programs are located at the National Training and Operational Technology Center in Cincinnati. The remainder of the subactivity (i.e., program policy, administrative oversight, needs estimates) resides in headquarters, primarily in the Municipal Construction Division and the Municipal Operations and Training Division of the Office of Water Program Operations. The subactivity is divided into two major program areas, comprising three program elements, reflecting the functional division between the construction and facility operations portions.

The first program area -- the administration and operation of the construction grants program -- includes the following activities: (1) technical and administrative review of grant applications, amendments, and supporting materials; (2) the review of facilities plans, construction plans and specifications, and bidding documents; (3) an assessment of environmental impact; (4) an analysis of infiltration or inflow into the waste treatment system; and (5) the review of user charge and industrial cost recovery

systems. It also includes various post-award management activities related to monitoring on-going construction projects: (1) the periodic review of vouchers and subsequent payment to grantees; (2) the conducting of interim and final construction inspections of treatment facilities; (3) the analysis and processing of change orders and grant amendments; and (4) the review of contracts to ensure compliance with civil rights and labor laws and regulations. Many of the States have accepted delegation of certain parts of these activities, particularly the review of construction drawings and specifications and the review of the bidding documents. The funding requirements reflect actual and planned delegation through FY 1978.

The second area -- the municipal operations and manpower planning and training program -- includes the following interrelated activities:

- (1) Development and maintenance of State and local municipal operations programs. This involves continuous assessment of plant operational efficiencies nationwide through a vigorous plant O & M inspection program. Inspection results are reported annually to Congress per Section 210 of the Act. The program supports State and local efforts to improve plant operation and maintenance through the development of guidance materials and manuals, identification of research and training needs, conduct of technical assistance demonstration programs, and public awareness activities.
- (2) Development of trained water pollution control personnel to implement programs authorized by P.L. 92-500. These include (a) training and certification of municipal wastewater treatment facility operators and related personnel to improve treatment efficiencies at existing plants and assure efficient and reliable operation of new federal funded plants; (b) development of manpower planning capabilities to assess State agency manpower and training needs relative to supply; (c) training of professional and sub-professional waste pollution control manpower; (d) training of State agency personnel in the technology of abatement and control of water pollution through short-term training courses, packaged training courses, development of audiovisual training aids and delivery of training resources to State agencies for its purpose of developing State agency training self-sufficiency.

1976 Accomplishments

The FY 1976 resource level for this subactivity was \$21.2 million and 889 positions, of which \$16.8 million and 766 were involved in the administration of the grants program and \$4.4 million and 123 in municipal operations, manpower planning and training activities. Approximately \$1.1 million of this total was for contracts, \$1.2 million for interagency agreements, and \$3.9 million for grants. The major contracts and grants included the Corps/GSA interagency agreement for interim construction inspections (\$1.2 million) and the operator training grants for \$1.1 million. The remainder of the grants and contracts were for less than \$200 thousand each.

During FY 1976, the Agency processed 3,977 new awards and 2,020 change orders totalling \$4,141.0 million for the planning, design and construction of treatment facilities. The number of on-going projects for all steps on June 30, 1976 totalled 8,367, with a grant award total of \$14,439.6 million. Payments totalling \$2,429.0 million were processed for work completed during FY 1976. A total of 1,119 Step 3 or Section 8 construction projects were completed over the year and 3,438 projects were either under construction or awaiting construction initiation. In comparison to FY 1975, the activity in FY 1976 represented a substantial acceleration, both in terms of new awards (i.e., 4,000 awards vs. 2,600), in payments (\$2,429 vs. \$1,938 million), and in active projects (i.e., 8,367 vs. 6,052). The following table summarizes the grant program during FY 1976.

Item	FY 1976 Nos.	Amount (\$ M)
Awards Processed:		
Step 1 Awards	2,341	\$ 158.9
Step 2 Awards	724	166.4
Step 3 Awards	911	3,815.7
Active Projects:		
Step 1	4,020	294.3
Step 2	909	396.4
Step 3	2,160	9,736.8
Section 8 (PL 84-660)	1,278	4,012.1
Project Completions	1,662	(n.a.)
Total Outlays	(n.a.)	\$2,429.0

A number of steps were taken during FY 1976 to improve management of the program and expand public knowledge of the laws and regulations. These included (a) the release of a construction grants handbook explaining in detail all parts of the program (and a companion summary pamphlet for municipal officials); (b) a series of training sessions for EPA and State personnel, grantees, and the public on various facets of Title II; (c) the publication of expanded guidance on multiyear planning and priority list procedures, revenue procedures, facility plan development, and value engineering requirements; (d) the reorganization of several offices to allow closer coordination between the different functional groupings within the construction program; and (e) the development of improved payments guidelines to allow monthly payment processing and better payments management.

Other program activities in FY 1976 should also be noted:

(1) Municipal Construction.

- a) The development of an improved grants management information system to facilitate EPA and State management was initiated during FY 1976. A feasibility study and requirements analysis were completed under contract and implementation of the new system was begun in the EPA Regional Offices. Full implementation is expected in mid-FY 1977.
- b) The emphasis on delegation of program activities to the States remained a high agency objective throughout FY 1976. An agreement was signed with the State of California to pursue delegation of most Federal tasks to the State under a fee arrangement that returns part of the allotment funds to the State for administration of the program. Twenty-six functional subagreements involving all parts of the program are now complete or under negotiation. Delegations to States other than California were increased during FY 1976 for those program areas allowable under current regulations. Approximately 35 States had been certified to review plans and specifications and the O & M manuals by June 30, 1976. Other areas of delegation included change order review, interm inspections, and construction bid review.
- c) A cross reference index file was developed during FY 1976 that linked together NPDES permits, construction grants projects, and facilities required from the 1974 Needs Survey. The intent of the file is to facilitate coordination of grant program schedules with permit compliance schedules to improve project tracking and management.

d) A FY 1976 Needs Survey, required under Sections 516(b)(2) and 205(a) of FWPCA (P.L. 92-500), was initiated to (1) update the 1974 Needs cost estimates for treatment plants and conveyance systems for individual facilities, (2) provide detailed inventory of data on all aspects of existing and needed municipal facilities, and (3) estimate the costs by State for correction of combined sewer overflows and treatment and control of stormwater. The survey involves EPA personnel, outside contractors, and State personnel. It is scheduled to be completed and submitted to Congress by February, 1977.

(2) Municipal Operations and Manpower Planning and Training.

a) The Manpower Planning and Training activities conducted in FY 1976 included (1) an operator training program (\$1.1 million in grant awards) to increase treatment plant operator capability and State operator certification and testing capability by providing States and Municipalities with instructional capability, specialized new methods and skills required under NPDES, new technology and innovative training projects; (2) an academic training program funded under the Grants Assistance Subactivity (\$2.9 million in grant awards supporting 552 professionals and 150 sub-professionals), which provided professional graduate training, undergraduate training and State Agency Fellowships; and (3) a direct training program (\$0.5 million) which conducted 21 short term courses for 500 students, developed and distributed nationally a variety of training resources, made available extensive audiovisual training aides and fostered State Agency Training self-sufficiency through training workshops and EPA/State consultation.

b) The Municipal Operations and Maintenance program completed several tasks during the year:

- A plan for a National Municipal Operations Program was recommended by a State/Federal Water Programs Advisory Committee and is currently awaiting Agency approval.
- An O & M data system supporting the entire inspection process, data needs and form review was implemented and further development of applications programming was begun. Further study and review of requirements is now underway.
- A series of conferences for Regional, State, and consulting personnel was held, covering design for operability, flexibility, and maintainability.

. A new program format was adopted for process control assistance demonstrations. The new format is designed to gain broad spectrum training benefits for State and consulting personnel in addition to demonstrating the effectiveness of technical assistance at a plant site.

. Manuals designed to assist personnel at municipal wastewater treatment facilities in dealing with operational controls, troubleshooting and maintenance of anaerobic sludge digestion, aerobic biological treatment processes and lagoons were initiated. A course in troubleshooting and evaluating wastewater treatment facilities was completed and given on a pilot test basis.

. A municipal operations public information strategy was adopted that includes projects to inform the engineering community, public administrators and decision makers, public interest groups and the general public about the importance of a continuing interest and investment in good plant operation and maintenance.

. In cooperation with the Construction Grants Program, eligibility requirements for plant start-up activities and guidance for a plan of operation were prepared.

1977 Program

In FY 1977, it is estimated that approximately 5,750 new awards, totalling almost \$5.7 billion, will be made for the planning, design and construction of treatment facilities and that almost 10,000 projects will be in various stages of pre-construction or construction activity. In addition, approximately \$300 million is expected to be obligated to reimburse the 4,500 projects eligible under Section 206(a) of P.L. 92-500. These program activities are predicated on a number of legislative actions now under consideration in Congress: 1) An appropriation of \$700 million for the construction grants program under the Talmadge/Nunn proposals, 2) enactment of an amendment allowing funds to remain available two years from the date of the authorization, and 3) an additional \$5 billion budget authority for construction grants over the funds currently available. It should be noted, however, that \$5.3 billion of the expected obligations will be related to the balance remaining in the original \$18 billion contract authority funds. The following table summarizes the program planned for FY 1977:

<u>Item</u>	<u>FY 1977</u>	<u>Amount</u>
	<u>No. of Projects</u>	<u>(\$ M)</u>
Step 1 Awards	2,500	\$ 225
Step 2 Awards	2,000	700
Step 3 Awards	1,250	4,775
Active Projects	9,930	16,000
Project Completions	4,300	(n.a.)
Total Outlays	(n.a.)	3,700

To support this level of activity, the FY 1977 resources assigned to this subactivity will be \$24.0 million and 933 positions. Of this \$24.0 million, approximately \$2.0 million will be for contracts, \$2.3 million for grants, and \$2.5 million for interagency agreements. The major contracts and grants will include the Corps/GSA interagency agreement for \$2.5 million (an increase of \$1.3 million from FY 1976), the Needs Survey Contract for \$2.0 million (an increase of \$1.8 million), and the Operator Training grant program for \$1.1 million (the same level as FY 1976).

Because this position level is approximately 300 below what has been computed to be an adequate manpower level for a program this size, the Agency has taken steps to compensate for the shortfall. These steps include an increase in the outside contracting or delegation of selected tasks, the acceleration of the delegation of construction inspections to the Corps of Engineers and GSA, and the beginning of attempts to automate certain project reporting tasks to best utilize the available personnel. Despite these steps, the workload for existing personnel will still increase because of the increased new award processing and project monitoring. Therefore, because of the tight resource constraints, it is expected that initiation of several planned new activities to optimize program management and ensure fiscal integrity will be deferred or minimized until additional positions are made available.

A number of activities in support of the program, however, are expected to continue or be initiated during FY 1977.

1) Municipal Construction.

- a) EPA has begun a major new effort within the current resources ceiling to ensure the technical and fiscal integrity of the construction grants program. This will involve the Regional Offices, Headquarters personnel and the EPA Office of Audit in several different activities intended to monitor and evaluate various components of the program. A series of approximately 20 construction operations review inspections will be conducted on selected projects as one major component of this effort. These inspections will be conducted by teams of EPA engineers and auditors who will thoroughly review the fiscal and construction aspects of on-going construction projects, including on-site inspections, grantee interviews, State meetings, and EPA Regional visits. In addition, detailed quality reviews of completed facilities plans will be performed to give feedback to the Regional, State, and local officials on facility planning procedures. Finally, EPA will perform increased numbers of financial audits at various stages of the construction process to ensure proper accounting and program procedures are being followed.
- b) The revised management information system will be fully implemented into the EPA Regions to facilitate improved milestone tracking of projects, to expand multiyear project management, to provide timely and accurate management access to information, and to improve payments processing and management. This, coupled with increased on-site review and inspection, and increased EPA staff review activities, will assure that EPA funds are being utilized as intended and that construction is timely and cost-effective.
- c) The impact of expanded delegation responsibilities through enactment of the Cleveland/Wright legislation will be evaluated for each State and implementation planning begun for those States with sufficient staff and expertise to accept immediate delegation. The experience with EPA delegation to California indicated the need for extensive planning and training before full delegation could be attempted. During this implementation period, increased demands on existing resources to perform these functions will be required.

d) A third round of reimbursement to projects eligible under Section 206(a) will be accomplished during FY 1977 utilizing additional funds made available for this year. A total of \$300 million is expected to be obligated. With this new round, a total of \$2.1 billion will have been awarded under this section, bringing the percentage reimbursed from 68.7% to between 75% and 85% of the total potential reimbursable amount.

e) The FY 1976 Needs Survey will be completed and transmitted to Congress in February 1977. Within EPA, the results on needs by category will be intergrated into construction grants priority list development, facilities planning, and Section 208 areawide planning to assure close coordination of the programs related to grants management. The technical needs data will also provide assistance in legislative planning and analysis for future years.

(2) Municipal Operations and Manpower Planning and Training.

a) The FY 1977 Manpower Planning and Training Program will include:

- Expanded operator training programs to develop operator training self-sufficiency at the State and local levels. These programs will include (1) comprehensive training on NPDES Effluent Monitoring Procedures; (2) support of the Associated Board of Certification (ABC) to develop and improve operator certification programs, (3) development of facility operator training in advance treatment operation; (4) wastewater facility management; and (5) State and local agency operator instructor development.

- Manpower planning programs to provide technical assistance to State and local water pollution control agencies. This will include assistance to 15 agencies through Manpower Planning courses, research, development of guidance to systematize State Manpower Planning activities and a manpower needs assessment methodology for water pollution control facilities.

- A redesigned academic training program to assist State and local water pollution control and water supply agencies in recruiting additional personnel. Approximately 1,500 students will be supported at 30 to 40 universities. The State Agency Fellowship Program (\$0.7 million funded from the Grants Assistance Subactivity) will provide training to approximately 150 State agency employees to upgrade pollution abatement skills and knowledge. Undergraduate training will provide training for 200 students at the two year Associate of Arts and four year Bachelor of Environmental Technology levels.

: Direct training support programs to facilitate State training self-sufficiency. The activities will include (1) preparation of student reference texts, instructor guides and development of four new courses for State agencies; (2) presentations to 144 State agency instructors in municipal waste treatment operations and treatment technology; (3) two workshops for selected Regional/State/National training personnel; (4) fifteen short courses at the National Training Center for 360 students; (5) instruction and material support for an expected 28 courses in the EPA Regions for an estimated 570 students; (6) audiovisual training aids lending and information services reaching from 35,000 - 50,000 viewers.

b) The FY 1977 Municipal Operations program will emphasize:

- Guidance development for implementation and monitoring of accomplishments under the National Municipal Operations Strategy;
- Coordination with the Office of Public Affairs in development of a public information strategy. Effort in this first year will concentrate on reaching local administrators, decision makers and public interest groups.
- Technical assistance activities for facility operations and maintenance. Projects will be selected to insure either training benefits or demonstrations of new process control approaches.
- On-site training of State and local personnel in Treatment plant process controls.

FY 1978 Plan

The FY 1978 program for this subactivity is expected to require \$37.4 million and 1383 positions, an increase of \$13.4 million and 450 positions over the FY 1977 level. These positions will support 6,500 new awards totaling \$6.4 billion, over 11,000 on-going projects in pre-construction or construction stages, and payments processed of approximately \$5.2 billion. In addition, obligations totaling \$200 million will be awarded under Section 206(a) to raise total reimbursement to approximately 85% of total eligible cost. This level of activity is contingent on enactment of proposals now before Congress that would provide additional appropriations of \$5 billion per year for FY 1977 and FY 1978 to the construction grants program and \$200 million to the Section 206(a) reimbursement program. (See separate section on construction grants account).

Of the \$37.4 million, approximately \$3.5 million will be for contracts, \$1.6 million for grants, and \$3.5 million for interagency agreements. The major components of this increase of \$1.7 million from FY 1977 will be the Corps/GSA interagency agreement and the Needs Survey contract.

The following table compares the planned FY 1978 program with FY 1976 and FY 1977 activities:

<u>Item</u>	<u>FY 1976</u>	<u>FY 1977</u>	<u>FY 1978</u>
	<u>Actual</u>	<u>Planned</u>	<u>Requested</u>
Total obligations (\$ Millions)	\$4,140.0	\$6,000.0	\$6,600.0
New Step 1 Awards	2,341	2,500	2,500
New Step 2 Awards	724	2,000	2,600
New Step 3 Awards	911	1,250	1,400
Active Projects	8,367	9,930	11,350
Project Completions	1,662	4,300	5,080
Total Outlays (\$ Millions)	\$2,429.0	\$3,700.0	\$5,200.0

The additional resources over the current level are made necessary by both the increased project workload and the additional tasks required to ensure that new and on-going projects maintain their fiscal and technical integrity. As indicated above, EPA will be required to process and monitor more projects in FY 1978 than ever before. In addition, greater proportions of these projects are now under construction and will require increased manpower resources for review, inspection, and audit functions not necessary in the planning and design stages. Although agreements with the Corps of Engineers and GSA for interim construction inspections will reduce total in-house personnel requirements, steps to ensure project integrity for the 11,000 active projects and all new projects require close review and contact by EPA staff on all phases of the construction project. New positions added to the program will provide full support to the increased new project workload and allow full implementation of the new initiatives now planned to ensure fiscal and technical integrity.

The enactment of the Cleveland/Wright legislation is expected to have minimal overall impact in FY 1978 toward reducing EPA workload and will probably not begin to reduce EPA needs until late FY 1979 or FY 1980. The increased workload in delegation planning, training of State personnel, and monitoring

of delegation performance will more than offset overall benefits of delegation until the program becomes fully operational. Assuming a level funding program no more than \$5 billion per year, the increased resources level is expected after FY 1980 to become self-reducing as States become fully proficient in program operation.

The higher resource levels requested for FY 1978 will allow a number of planned improvements to program management and fiscal control to be fully implemented. The increased project levels and Cleveland/Wright implementation activities will be supplemented by the following management efforts:

(1) Municipal Construction.

a) Several activities now underway in development of automated MIS capability will be operational during FY 1978. Multiyear program planning through the State continuous planning process will be fully integrated into construction grants management through the vehicle of the State Project Priority List. Through this, EPA and the States will be able to plan and manage existing projects with full awareness of the impact of current actions on future funding constraints. Linkage of the construction grants activities from priority list through monitoring of completed facilities will be available to facilitate "cradle to grave" project management. An interface across the construction grants program to NPDES permits, needs, and O & M will provide coordination of legislative objectives to optimize available resources.

b) A program of technical and fiscal inspections will be fully operational by FY 1978 and will begin to reap benefits in regard to improved guidance, regulations, and general program management. Construction Operations review inspections, facilities planning quality reviews, value engineering reviews, and financial audits will continue to be performed to ensure compliance with existing program guidance and regulations. Feedback of such inspections to States, municipalities, and Regional Offices should provide improvements at all levels of the construction process.

c) The 1978 Needs Survey will be conducted during FY 1978, with completion expected by February, 1979. Unlike past surveys, the 1978 effort will canvas 100% of all the facilities in the country to compile a complete inventory of current and future facilities. This data will provide the basis for detailed planning, management, and evaluation of the grants program.

d) Procedures to improve outlay forecasts and aid payments management will be implemented in the Regional Offices during FY 1978. Such guidance will result in management benefits at both the National level in regard to government fiscal policy and at the local level in regard to expeditious and cost-effective construction management.

e) Steps will be taken to integrate EPA construction grants management information capabilities with State management systems to improve the accuracy, consistency, and timeliness of management data available for decision making and program management. The capability of States to input results of their activities directly into the unified data base and to be able to access reports and status information as management needs arise will improve State/EPA communications and trust. With many federal requirements delegated to the States under the Cleveland/Wright proposals, an information system that facilitates easy review by EPA of program progress becomes essential under EPA's new roll.

(2) Municipal Operations and Manpower Planning and Training.

a) The FY 1978 program for Manpower Planning and Training will maintain the same resources level as FY 1977. Training activities will include operator training assistance, operator certification program assistance, State agency assistance, direct training assistance, enforcement and permit compliance oriented training, development of performance evaluation, troubleshooting and safe hazardous materials operating procedure for municipal wastewater treatment facilities personnel, development of State and areawide water quality management programs, assessment of manpower requirements for P. L. 92-500 Construction Grants process and determination of State agency facility workload. These training efforts will produce:

- Draft Guidance for manpower training self-sufficiency.
- Guidance for State agency and facility waste treatment plants and wastewater collection systems.
- Operator (facility) training materials and resources.
- Facility operator certification program development and implementation.

- State and local agency training materials and resources including (a) fellowships and professional training grants for State or local water pollution control personnel; (b) training courses on water pollution control program planning and management; and (c) EPA direct technical training courses for State and local personnel.
- Grant financial assistance (other than academic training) and training technical assistance to State and local governments to support the development of operator training and certification and State P. L. 92-500 program self-sufficiencies.
- b) For FY 1978, the Municipal Operations and Maintenance activities will concentrate on those activities associated with implementation of the National Municipal Operations Strategy. These activities will include:
 - Continuation of technical assistance demonstrations in operations and maintenance technology and on-site training in treatment plant process controls.
 - Preparation of special reports on plant efficiency (legislatively mandated), associated problems and their causes.
 - Development of new applications of O & M Data Systems materials including Regionalizing access to the files.
 - Preparation of printed materials and further distribution of existing materials in support of the Public Information Strategy.



Water Enforcement				
	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978
<u>Appropriation</u>				Increase+ Decrease- 1978 vs 1977
Permit Issuance.....	\$7,789	\$8,151	\$7,097	+\$1,480
Water Quality Enforcement.....	11,896	13,091	14,261	+7,520
Total.....	19,685	21,242	21,358	+9,000
<u>Permanent Positions</u>				
Permit Issuance.....	361	269	210	+124
Water Quality Enforcement.....	425	495	544	+271
Total.....	786	764	754	+395

Budget Request

An appropriation of \$30,357,700 is requested for FY 1978. This represents an increase of \$9,000,000 over FY 1977. A total of 1149 positions is requested for FY 1978, which is an increase of 395 positions over FY 1977.

Purpose

The water quality enforcement program emphasizes the compliance monitoring, enforcement, and continuing issuance of National Pollutant Discharge Elimination System (NPDES) wastewater discharge permits. Other activities include the enforcement actions necessary to achieve compliance with regulations on oil and hazardous material discharge, pretreatment, ocean dumping, and related requirements of the Act. Most water quality enforcement activities are conducted cooperatively with the States and maximum State assumption of these responsibilities is a primary goal.

The NPDES permit program is part of the comprehensive effort initiated by the 1972 Amendments to reduce or eliminate point source pollution from industrial, municipal, commercial, and agricultural facilities. The Act prohibits discharge of pollutants to virtually all waters of the United States unless a permit is issued by EPA or an EPA-approved State program. The permit is the focal point of the tight regulatory system with precise and detailed abatement requirements, streamlined enforcement procedures, and heavy penalties for permit violation.

The permit is the mechanism for imposing on point source dischargers the uniform national effluent limitations and national performance standards which EPA is required to promulgate. These standards, set by the abatement and control function, establish the maximum amounts of various pollutants which can legally be discharged by a permittee. If, at a given facility, the established national effluent limits will not reduce pollution enough to meet the ambient water quality standards set by the State or EPA, the permit will impose stricter effluent limitations as necessary to meet the water quality standards. These more stringent effluent limits are set by the permit program in coordination with pollution load allocation activities covered under the abatement and control function. Permits are issued on condition that their pollutant reductions be accomplished according to given time schedules.

EPA's NPDES compliance monitoring program covers all aspects of EPA activity utilized in determining compliance with permit conditions and actions initiated in instances of noncompliance. It includes Compliance Review and Compliance Inspections. Compliance Review is the review of all Schedule Reports, Discharge Monitoring Reports, Compliance Inspection Reports, etc. Compliance inspection refers to all field related activities conducted to determine the status of compliance with permit requirements, including compliance evaluation (non-sampling) inspections, sampling inspections, and production facility inspections.

As one of the highest priorities of the enforcement program, the basic thrust of the compliance monitoring activities is to insure the completion of treatment facilities by major industrial and municipal facilities to meet the requirements of the FWPCA.

The FWPCA also provides for various enforcement mechanisms to assure compliance with the requirements of the NPDES program. These primarily consist of the issuance of Section 309(a)(1) Notices of Violations (NOVs) to dischargers with NPDES permits issued by approved States; issuance of Section 309(a)(3) orders to dischargers with EPA-issued permits and to dischargers with State-issued permits who fail to comply with NOVs; and referrals to U.S. Attorneys for civil or criminal relief to remedy violations of NPDES permits and the FWPCA. The law provides for \$10,000 civil penalties and \$25,000 criminal fines per day of violation.

The non-NPDES enforcement program is responsible for providing technical and legal support to achieve compliance with Section 311 (oil and hazardous material spill prevention and control) and Section 404 (discharges of dredged or fill materials; wetlands protection) of the FWPCA, the Refuse Act, and the Marine Protection, Research and Sanctuaries Act.

1976 Accomplishments

FY 1976 resource level for Water Quality Enforcement was \$19,685,200 and 835 positions. These resources were allocated in two main areas: Permit Issuance and Water Enforcement.

Permit Issuance activities utilized \$7,789,500 and 361 positions. They primarily consisted of the issuance and reissuance of NPDES permits. By the end of FY 1976, approximately 50,000 NPDES permits were issued, reissued, or modified by EPA and the 28 NPDES-approved States, 12,000 of which were written in 1976 alone. Nearly all of the major dischargers now hold valid NPDES permits. For the most part, the majors yet to be permitted have been involved in legal proceedings.

The Municipal Permit Program was transferred to the Office of Water Enforcement during 1976. Existing municipal permit policies were streamlined and new policies were created to institute coordination between the Office of Water Enforcement and the Office of Water Planning and Standards regarding area wide planning in accordance with Section 208 of the Act. Policies and procedures were also established regarding the 1977 statutory deadline for municipal dischargers and the issuance of Enforcement Compliance Schedule Letters, among other issues.

Other areas of accomplishment for the Permit Program in 1976 included the signing of a Memorandum of Understanding between EPA and the Nuclear Regulatory Commission on the licensing of nuclear power plants to eliminate duplications of effort in the preparation of EIS's and the issuing of permits and licenses; national strategy to control PCB's and national conferences on steam electric power generating facilities and new source NPDES permit regulations; the issuance of regulations regarding agriculture and silviculture activities; and substantial technical support to the preparation of adjudicatory hearings for the steam-electric power, iron and steel, and chemical industries.

Water enforcement activities utilized \$11,895,700 and 425 positions. FY 1976 was a transition year in which compliance monitoring and enforcement activities were emphasized in support of the large number of discharge permits previously issued. Water enforcement resources that had been previously dedicated to the enormous task of getting out the initial round of discharge permits were, to a great extent, focused on permit compliance and enforcement.

All major discharger self-monitoring reports, facility compliance schedules, and discharge monitoring reports were reviewed for compliance. EPA conducted 1696 reconnaissance inspections and 949 sampling inspections in FY 1976. These inspections were conducted to verify permittee self-monitoring information, review violations identified in permittee self-monitoring reports and to identify and define permit violations not indicated in the reports.

Identification of violations was followed by letters, telephone calls, conferences, administrative orders and referrals to Justice as appropriate. In FY 76 the Regions issued 900 Administrative Orders, 137 Notices of Violation to the States, and 129 Referrals to the U.S. Attorneys.

The Water Enforcement Program also pursued full implementation of approved State NPDES programs for issuance and compliance assurance and pursued additional State NPDES approvals. To date twenty-eight States have received program approval.

The resolution of adjudicatory hearings was also a high priority program in FY 1976. A

total of 260 cases were settled by the end of Fiscal Year 76. A backlog of 1277 requests remains.

Oil Spill Prevention requirements were also monitored and enforced. The Regions referred 1077 oil spill cases to the Coast Guard, 20 spill cases to the U.S. Attorneys, and conducted 1175 SPCC violation proceedings.

The Corps of Engineers and EPA, in conjunction with Justice, have been developing a procedure for administrative and judicial enforcement arising from a discharger's failure to comply with Section 404. The procedure makes the Corps primarily responsible for administrative enforcement and civil and criminal referrals to the Department of Justice, but specifies that EPA may act independently of the Corps of Engineers where appropriate (e.g. emergencies).

Approximately \$411,000 was allocated for contracts by OWE. Of this amount, \$189,399 was used for several individual contracts supporting the ADP system. This involved Regional support, Permit Compliance System maintenance and operation, and other ADP modifications and improvements. OWE spent \$190,086 on consulting services in support of adjudicatory hearings and enforcement cases in the form of technical assistance and testimony to support imposition of permit effluent limitations. Miscellaneous training and smaller contracts comprised \$14,143 of the fiscal year allocation. New source file (Dodge) contracts involved \$18,000.

FY 1977 Program

The primary emphasis for FY 1977 is the assurance of the achievement of Best Practicable Technology Currently Available (BPTCA) and water quality requirements of the Federal Water Pollution Control Act (FWPCA). FY 1977 resource levels for the Water Enforcement Program will be \$21.4 million and 754 positions.

Of these resources, \$14.3 million and 544 positions have been allotted for enforcement activities. One of the most important goals is to promote increasing State participation in the NPDES program. To further this end the Regions will continue to make every attempt to grant NPDES program approval to those States which are willing and capable of taking on the program responsibilities. States that have already received program approval will be given help in developing their capabilities in a manner consistent with the requirements of the FWPCA. States that have not received program approval will be encouraged to participate with the Regions in as many areas of the NPDES program as possible within the boundaries of the Act.

Our other major goal for FY 1977 is to assure the completion of treatment facilities by major industrial facilities to meet BPTCA and water quality requirements in accordance with the requirements of the FWPCA. Major industrial dischargers on permits will be reaching final effluent limits in FY 1977. Additional vigilance in compliance monitoring will be necessary during FY 1977 to ensure that final effluent limitations will have in fact been achieved and are being maintained. This involves an increase in follow-up actions to self-monitoring reports, and increase in the number of facility and sampling inspections conducted by EPA and the States, and an increase in the number of enforcement actions taken. An increase in the number of referrals to U.S. Attorneys for civil and criminal enforcement action under sections 309(b),(c), and (d) is also expected. Cases brought in FY 1977 will be more resource intensive since it will be more difficult to establish a violation of a final effluent limitation than a schedule date.

Also an important priority in FY 1977 is the resolution of adjudicatory hearing requests. The Agency has in FY 1976 received requests for adjudicatory hearings in excess of the number originally estimated. Furthermore, a greater portion of the FY 1977 cases will involve recalcitrant dischargers intent upon employing every delay and appeal device available under the regulations.

The FY 77 resource level for Permit Issuance will be \$7.1 million and 210 positions. These resources will be primarily devoted to putting enforceable permits into effect and to upgrading the enforceability of permits in force.

The number of permits to be issued, reissued or modified by EPA and the States will increase from about 12,000 in FY 1976 to 22,000 in FY 1977. It is estimated that most of the 20,000 municipal permits will have to be reissued or modified in FY 1977. Many municipal permits were issued for a short term and will expire in FY 1977, requiring reissuance. In addition, EPA objectives to prepare and issue permits which are tied to available construction grant funding and which have reasonable schedules for planning, design, and construction are expected to result in the need in FY 1977 to modify most, if not all, of the long-term permits that would have extended beyond FY 1977. The modification of the secondary treatment technology information, fecal coliform limits, issuance of the best practicable waste treatment technology information, and emerging pretreatment requirements may all be expected to contribute to the need to modify municipal permits. Virtually all municipal permits will need to be reexamined and either reissued or modified. These resource intensive efforts, which are not amenable to "batching," will result in enforceable permits that are effective in assuring the optimum utilization of readily available construction grant funds and continued progress toward meeting the national goals for pollution abatement.

Major industrial permit reissuance and modification will also receive high priority status during FY 1977, as will the special handling of thermal variance requests wherein exemption claims are allowed based on environmental impact studies in accordance with section 316 of the Act.

Also of importance for FY 1977, will be the issuance of major and energy-related new source permits, especially with regard to coal and oil exploration, and uranium mining.

Non-NPDES enforcement will continue to focus on oil spill and spill prevention enforcement as well as the enforcement of the Ocean Dumping Act.

Approximately \$1.35 million has been allocated for OWE contract support. Of this amount, \$514,000 will be used for technical and legal adjudicatory hearing support functions. Total ADP commitments will be \$350,000 -- \$150,000 for the Permit Compliance and Water Enforcement Information Systems and \$200,000 for Regional System support. Enforcement case support will involve \$412,000 for technical, economic, and engineering efforts in the prosecution and resolution of permit violations. Seventy-four thousand dollars will be committed to a continuing contract study for the development of municipal permit limitations achievable through good O&M practices and to develop limitations for special classes of permits, such as agriculture activities and coal mines.

FY 1978 Plan

FY 1978 resource levels for the Water Quality Enforcement program will be 30.4 million and 1149 positions. Of this, 334 positions are planned for Permit Issuance, and 815 positions for Water Enforcement.

FY 1978 will pose substantial new and increased demands upon the Water Enforcement program. These new demands will result from four primary stimuli. One, increased numbers of violations of NPDES permits resulting from permittees failing to meet the July 1, 1977 deadline for compliance with BPT and permittees violating final effluent limitations. Two, new and more complex permit requirements, such as BAT requirements, section 208 area wide requirements, section 303(d) maximum daily loads, section 302 water quality related effluent limitations, and toxic pollutant standards and limitations. Also post-1977 permits will be the subject of section 301(c) variance requests to consider whether BAT standards may be relaxed for economic reasons. Many permit conditions based on these new requirements will be challenged by permittees in adjudicatory hearings. Resolution of these requests is therefore a high priority program for FY 1978 involving considerable additional resources. Since the authority to grant section 301(c) variances is not vested in States with approved programs, the burden of acting on section 301(c) variance requests and defending the denial of such requests will fall on EPA for all permits, whether issued by EPA or NPDES States.

Three, new and important programs requiring considerable development and implementation effort as well as enforcement effort. These include the application and enforcement of pretreatment standards pursuant to section 307(b)(c) and (d), and implementation of the section 404 dredge and fill wetlands program. Four, increased emphasis on EPA's NPDES role as overseer of approved State programs.

In FY 1978 there will be increased sampling and non-sampling inspection activity to assure enforcement of permit effluent limitations and compliance schedule requirements - sampling inspections are projected to require increased resources because of the NRDC litigation settlement regarding inclusion of toxic substance limitations for 21 industry categories. One sampling and one non-sampling compliance monitoring inspection will be conducted during the expected term of each major discharger's permit. Enforcement actions will be taken against violations by major dischargers when appropriate.

The costs to monitor toxic substances, including the costs to develop the standard techniques, may run from 3 to 5 times as much as monitoring the traditional parameters. The positions requested would allow the establishment of five toxics laboratories, running 300-400 samples per year per laboratory.

FY 1978 projections also account for Compliance Review of all EPA major permits (4640). This includes review of major compliance schedule reports and of Discharge Monitoring Reports. No minor permits will be reviewed.

Continued development and expansion of ADP systems, such as the Permit Compliance System (PCS) and the Adjudicatory Hearing System (ADHS), will take place. EPA is required to report to Congress and the public on the status of NPDES. PCS and ADHS provide direct information for the reports and are also necessary for the management of the Permit compliance program.

Resources have also been requested for the implementation and enforcement of section 404 permits for the discharge of dredged or fill material. This will involve oversight and review of the Corps of Engineers program, veto procedure preparation and proceedings, guidelines drafting, and enforcement.

The pretreatment program will also require additional resources in FY 1978. The intension is to review programs and take a very limited number of enforcement actions where necessary.

The activities associated with permit issuance, including section 316 considerations, adversary proceedings support, agriculture and silviculture activities, section 208 area wide planning pre-treatment, and NPDES audits, among others, account for most of the increase of positions over 1977. All expiring major permits will be reissued during FY 1978 so that no major permit will be allowed to lapse. Some major permits will be revoked before they are due to expire in FY 1979 and some major permits will be issued for less than 5 years in an effort to level out extreme workload variations.

During 1978, technical guidance will be issued on the use of toxic BAT limitations in the absence of guidelines, on the use of concentration limitations, and other subjects. Procedures and regulations will be issued to assure the processing of variance requests in a uniform, effective and efficient manner. National policies and procedures will be established for implementing sections 208, 301(b)(2), 301(c), 302, 303, 307, 306, and 511(c). NPDES reviews of State and Regional programs will be performed to assure quality control, render technical and policy support, and assure uniform application of policy. During 1978, personnel will also be serving on Effluent Guidelines working groups and reviewing contractors' documents on the development of effluent limitations based on BATEA. Activity in handling section 316(a) exemption requests and 316(b) studies will continue in FY 1978.

Approximately \$3.2 million is planned for contract support. Of this amount, \$700,000 will be used to develop, operate and maintain ADP systems -- \$240,000 for Permit Compliance System operation and enhancement of capabilities, \$300,000 for Regional system support, \$150,000 for development and operation of the Permit Information System, and \$10,000 for the adjudicatory hearing system. Adjudicatory, 301(c) economics, and 316(a) and (b) hearings support involves total contract expenditures of \$1.39 million. Enforcement case support expenditures will total approximately \$480,000 for prosecution and resolution of permit effluent violations. Approximately \$413,000 will be spent to equip and operate five Regional toxic laboratories. Discharge monitoring and permit quality control programs will require \$210,500 in contractual support for effective operation. Program studies in municipal permit limitations, 404, and special permit categories will require \$60,000. Continuing operation and enhancement of the new source file system will require \$40,000.

Water Quality

Research and Development

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u> (dollars in thousands)	<u>Increase + Decrease - 1978 vs. 1977</u>	<u>Page</u>
<u>Appropriation</u>						
Health and Ecological	\$14,470	\$18,940	\$21,777	\$25,777	+\$4,000	WQ-81
Effects.....	5,779	8,285	7,400	8,400	+1,000	WQ-112
Industrial Processes.						
Public Sector						
Activities.....	10,298	10,014	10,392	11,792	+1,400	WQ-124
Monitoring and						
Technical Support..	4,712	4,584	4,649	5,549	+900	WQ-145
Total.....	35,259	41,823	44,218	51,518	+7,300	

<u>Permanent Positions</u>						
Health and Ecological						
Effects.....	319	276	286	306	+20	
Industrial Processes.	51	49	38	38	...	
Public Sector						
Activities.....	115	118	113	113	...	

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs. 1977</u>
<u>Permanent Positions</u>					
<u>Monitoring and</u>					
Technical Support...	102	109	109	109	...
Total.....	587	552	546	566	+20

Purpose

The role of research and development in EPA's water quality program is to provide the scientific information needed to support its standard setting and enforcement activities. To do this, a multifaceted research program has been established. The goals of this program include the development of efficient and cost-effective waste water treatment technology for both municipalities and industries; the determination of useful and defensible monitoring methods; definition of criteria for water use in various aquatic environments; and the establishment of strategies for control of pollution from spills of hazardous materials. An overall goal is to provide the scientific basis for economical and socially viable environmental management.

Water Quality

Research and Development

Health and Ecological Effects

	Actual 1976	Budget Estimate 1977	Current Estimate 1977 (dollars in thousands)	Estimate 1978	Increase + Decrease - 1978 vs. 1977
<u>Appropriation</u>					
Health Effects.....	\$967	\$2,723	\$2,410	\$3,810	+\$1,400
Ecological Processes & Effects.....	12,260	13,625	16,567	18,167	+1,600
Transport & Fate of Pollutants.....	1,243	2,592	2,800	3,800	+1,000
Total.....	14,470	18,940	21,777	25,777	+4,000
<u>Permanent Positions</u>					
Health Effects.....	15	17	24	34	+10
Ecological Processes & Effects.....	272	236	234	237	+3
Transport & Fate of Pollutants.....	32	23	28	35	+7
Total.....	319	276	286	306	+20

Budget Request

A total increase of \$4,000,000 and 20 positions is requested in FY 1978. Of this increase, \$1,400,000 and 10 positions are required in the health effects program to develop methods and approaches to identify and characterize classes of pollutants; to develop tests for the assessment of biological impact of suspect substances on living organisms; and to apply these tests to complex effluents. The positions will cover skill gaps in health and biological sciences.

In the ecological processes and effects program, an increase of \$1,600,000 and three positions is requested. A \$600,000 increase, with no additional positions, is needed to expand the ecology Great Lakes ecological research program. This expansion will allow for earlier completion of Great Lakes research already in progress. Most significantly, it will result in the development of a predictive mathematical model, culminating in a combined model for all five Great Lakes by calendar year 1981. Additionally, \$1,000,000 (and three positions) will provide for limited efforts to develop water quality criteria for non-steady state flows and for pollutants (such as sediments) which are important parameters not now identified in present water quality criteria. The principal question to be answered is whether water quality control can be less stringent in rivers dominated by non-point sources, wherein organisms are subjected to varying pollutant stresses. The position increase provides for critical technical skills.

In the transport and fate program area, an increase of \$1 million and seven positions is requested to initiate the development of hierarchical testing methodologies for quickly predicting the fate of hazardous materials introduced into fresh water ecosystems. The five positions would serve to cover skill voids in the physical and biological sciences areas critical to the proper technical management of this research. These testing methods will be designed to provide the Agency with a capability to quickly and inexpensively characterize the thousands of

compounds (and their degradation products) contained in wastewaters; to identify what compounds are present and whether they accumulate in aquatic life, or transform into potentially hazardous degradation products.

Program Description

This program includes three specific areas of research: (1) the development of criteria for the safe treatment and disposal of wastewaters and sludges, and health-related criteria for fresh and marine recreational waters; (2) research on the toxicological effects of water pollutants on aquatic organisms; and (3) research on the movement, transformation, degradation, accumulation and fate of water pollutants.

The water quality health effects program includes the determination of the health effects associated with land application of wastewater and sludge and the development of the criteria for safe implementation of such practices; the development of necessary health effects information to assure the public safety from pollutants emitted during operations of wastewater treatment plants; and the investigation and quantification of health effects associated with the disposal or runoff of wastewater and sludge into the aquatic environment.

The construction grant program calls for alternative waste treatment management techniques and systems to implement Section 201 of the Federal Water Pollution Control Act (FWPCA), as amended. One such technique is land disposal. However, many State agencies are reluctant to use land for the treatment and disposal of wastewater and sludge because of a lack of precise information on the health hazards associated with this practice. Specific areas of health effects research include: the determination of safe practices for utilization of wastewater and sludge and safe operation of waste treatment facilities; the transport of heavy metals and viruses through the soil; the survivability of viruses; and the uptake and effects of pollutants in plants, animals, and man.

Health effects data associated with municipal wastewater management have become important due to the rapid movement of secondary and advanced waste treatment of sewage required by P.L. 92-500, and the resulting increase in the number of treatment plants. Aerosols emitted from the aeration basins of activated sludge plants, from trickling filters, and from aerated lagoons pose a potential health hazard to persons living or working nearby. These aerosols contain pathogenic organisms, which may cause disease, and chemical contaminants, which may lower resistance to disease or produce adverse health effects. Epidemiologic studies are performed to document the incidence and risk of disease associated with wastewater aerosols. To complete the link between epidemiological results and the wastewater treatment plant discharges, the wastewaters themselves and the aerosols produced are characterized physically, chemically and micro-biologically.

The water quality health effects research program also supports the national goal that water be suitable for recreation by calendar year 1983. The data base available for recreational water quality standards remains deficient. It is possible that current standards are too stringent, resulting in unnecessary closing of beaches, excessive chlorination costs, and discharge of chlorinated effluents which are known to be ecologically harmful. Furthermore, the development of valid health-related recreational water quality criteria will contribute to the Agency's water pollution regulatory program by providing the scientific basis for effluent standards and ocean dumping regulations.

The water quality ecological effects program is designed to determine the fate and effects of pollutants in aquatic ecosystems, both fresh water and marine. This research aids the Agency in the development of water quality criteria and provides information for use in developing effective pollution control programs. This is accomplished by conducting research that will provide a sound scientific basis for setting effective, legally defensible standards and will assist in determining effective treatment and control strategies.

The ecological effects research program includes research on the effects of specific pollutants and pollutant combinations on representative or key sensitive organisms in aquatic ecosystems, and on critical ecosystem parameters and processes. Also under investigation are the physical, chemical, and biochemical transformation products of pollutants introduced to or passing through aquatic ecosystems. Additional research includes the characterization of natural and stressed aquatic ecosystems; development of mathematical ecosystem simulations and laboratory models which aid in the prediction of pollutant stress effects on aquatic biota and ecosystems; and methods to measure the relative health of aquatic ecosystems. Inherent in these efforts is the consideration of intermedia pollutant transport and effects, wherever applicable.

The water quality transport and fate program includes: (1) research on the movement, transformation, degradation, accumulation and fate of pollutants in fresh surface waters and ground waters; (2) development of protocols (including mathematical models) for predicting point and nonpoint source pollution contributions and their impacts on fresh surface and ground waters; and (3) development of methods for evaluating the effectiveness of alternative point and nonpoint source management strategies with considerations of water quality, energy, and socioeconomic impacts.

The outputs from this research are needed to translate ambient water quality goals into pollution control requirements at the source. This requires information on how quickly pollutants will be transformed into harmless materials, under what circumstances specific pollutants are transformed into substances of greater toxicity, the movement, persistence, and bioaccumulation potential of hazardous substances within various substrates of the aquatic ecosystem, and the expression of much of this information in quantitative or mathematical terms. The results are used in: (1) developing water quality criteria for bioaccumulative pollutants; (2) determining effluent limitations necessary on the part of pollution discharge permit applicants to meet water quality standards; (3) evaluating the extent of environmental contamination and resultant hazards

that would occur from the registration and use or disposal of a given pesticide or other hazardous substance in a specified manner; and (4) developing water quality management plans (as required under Sections 201, 208, and 303 of P.L. 92-500) for achieving and maintaining desired water quality levels.

This research provides the sound and legally defensible methods necessary for determining levels of point and nonpoint source controls required to meet water quality goals. The need for accurate and reliable assessment methods is becoming more critical as the rate of expenditure on pollution control systems increases. It is currently estimated that \$180 billion will be spent over the next 10 years on point source control systems alone. At this level of investment, it becomes imperative that valid methods be made available and used to accurately determine the specific levels of pollution control required and identify the most cost-effective mix of point and nonpoint controls that can achieve water quality goals. Existing methods, of unknown validity, address only a portion of the water quality parameters of interest and are totally inadequate for assessing the impacts of nonpoint sources of water pollution.

1976 Accomplishments

The FY 1976 resource level for the Water Quality Health and Ecological Processes and Effects program area was \$14,470,800 and 319 positions. Those resources included approximately \$1,128,100 in contracts, \$3,237,900 in grants, and \$340,800 in interagency agreements. Of the \$967,000 and 15 positions devoted to the health effects research area, \$189,721 was expended in contracts, \$183,246 in grants, and \$15,000 in interagency agreements. The major accomplishments in this area included:

- The third phase of the marine recreational water quality criteria project at the New York City beaches was completed. The objective of this project concerned the possible relationship of gastrointestinal symptomatology to indicator bacteria densities. The findings confirmed a relationship between the densities of certain indicator organisms, such as *E. coli*, and

gastrointestinal symptoms associated with swimming. This finding led to the development of a rapid membrane filter technique for enumerating this indicator bacterium which, when compared to other methods, is more precise. The information obtained is expected to be germane to the development of recreational water quality criteria.

- A state-of-the-art review was prepared on the effects of wastewater treatment and disposal methods on the occurrence, persistence, and movement of pathogens and heavy metals. This document summarizes current knowledge relative to problems associated with the disposal of wastewater and sludges. It is expected to assist in determining most proven directions for research programs and specifies investigators and institutions presently involved in research relative to these problems.

- The successful isolation was reported of the causative agent of primary amoebic meningoencephalitis, a disease associated with swimming.

- To further aid in the identification of other causative agents in waterborne disease, a portable unit, dispatchable to any body of water, was developed. Over one hundred enteric viruses can be identified from water samples collected.

The FY 1976 resources level for ecological effects research was \$12,260,300 and 272 positions. Those resources included \$722,439 in contracts, \$2,739,028 in grants; and \$296,312 in interagency agreements.

Accomplishments included:

- Field and laboratory phases of the National Eutrophication Survey were completed. Samples were obtained and analyzed from all forty-eight adjacent States and included samples from lakes and reservoirs, tributaries and outlets, and waste treatment plant effluents. Data generated

by the survey will be used throughout the country to determine feasibility of restoring polluted lakes and streams via construction of municipal waste treatment facilities to reduce nutrient inflow. In addition, a part of the study relates land use and other drainage area characteristics to phosphorus and nitrogen levels in streams. Results for the eastern third of the United States were completed and reported in EPA's Ecological Research Series.

- A four-year study was completed on causes and effects of air-supersaturation of water, a form of pollution that causes tissue damage, and often death, for migrating Pacific salmon. Supersaturation is a serious problem in the Snake and Columbia Rivers of the Pacific northwest, where water becomes supersaturated as it spills over dams. Supersaturation is also found at dams in Montana and Colorado and below thermal power plants in eastern States. As a result of the studies indicated, one hundred and ten percent saturation has been proposed by ORD to the Agency as a safe level for salmonids in shallow water.

- Data were obtained from a small lake indicating that the addition of fly ash to the water is a promising phosphorus control technique. Algal growth was reduced considerably with no apparent detrimental effects.

- Studies were completed on the effects of sewage outfalls on aquatic life, including incidence of fish disease in Southern California. It was concluded that about 3 percent of the Southern California coastal shelf is affected by sewage discharges to a depth of two hundred meters. The incidence of fin erosion in bottom-dwelling fish increased in the vicinity of outfalls. It was estimated that biological recovery from the effects of the discharges would probably require six to 12 months in shallow water and many years in deeper water (sixty meters or deeper).

- A major study on the Tanana River near Fairbanks, Alaska showed that indicator and pathogenic bacteria and enteric viruses survive in far greater numbers for longer periods at zero degrees centigrade than previously was believed. This information, along with data on the relationship between indicator bacteria and pathogens, can contribute to the basis for establishing disinfection criteria and water quality standards in cold climates.

- A mobile bioassay unit has been developed to conduct on-site analyses of complex effluents, those industrial and municipal discharges that vary over time in composition and concentration of the component chemicals. By the time they are discharged, many of these effluents have received some degree of waste treatment, reducing their lethality to aquatic life. To evaluate the sublethal effects of these discharges that can still harm aquatic life exposed for long periods, a variety of short-term biological testing procedures have been developed and evaluated. These methods can be readily incorporated into effluent testing requirements, permit conditions, and hazardous substance evaluations.

- Methods development was completed for phytoplankton and zooplankton bioassays. The methods were incorporated into the EPA Manual for Bioassay Procedures for the Ocean Disposal Permit Program and also are being modified for use by EPA Region II for controlling waste disposal in the New York Blight.

- The ability to quantitatively evaluate the degree of similarity between laboratory model microcosms and the West Passage of Narragansett Bay has been achieved. This is an important step toward replication of natural conditions in a controlled laboratory system.

- A procedure was developed to enable the use of filtration (feeding) rates of mussels and scallops as a sub-lethal measure of the impact of a toxicant on those species. This work will contribute to the assessment of pollutant impacts on important marine organisms, especially at low level exposures.

- A significant effort was devoted to hearings on the City of Philadelphia's permit renewal request to dispose of sewage sludge at sea. Research efforts from the Ocean Disposal program were applied to the preparation of testimony, and as a result of these efforts, further disposal of Philadelphia wastes at sea was prevented.

The FY 1976 resource level for the transport and fate subactivity was \$1,243,500 and 32 positions. Of these resources, \$800,000 was devoted to grant and contract efforts. These resources were concentrated in three areas: (1) characterization of the physical, chemical and biological processes that determine a pollutant's fate; (2) characterization of the transport and fate of pollutants in ground water; and (3) development of mathematical models for estimating nonpoint source pollution loadings and linking these models to existing models for predicting water quality.

Major accomplishments in the work on transport and fate processes included:

- The development of a preliminary evaluative model for predicting the distribution, residence time, and fate of pesticides in various substrates of a fresh water ecosystem and calibration of the model for malathion;
- Development of a conceptual model for predicting the distribution, residence time, and fate of mercury among substrates of a fresh water ecosystem;
- Completion of a report containing laboratory data and an evaluative model for the fate of vinyl chloride (a carcinogen) upon release to the environment;

- Work on the characterization of the four major environmental processes (microbial degradation, oxidation, volatilization, and sorption) that control the aquatic transport and fate of pollutants.

This information is essential to the development of models for predicting pollutant exposure levels and persistence.

Efforts dealing with the transport and fate of pollutants in ground waters are being directed at characterization of the fate of organic and microbiological pollutants released from septic tank systems and other sources and identification of conditions under which these pollutants do not degrade ground water aquifers. Accomplishments in FY 1976 included the development of methodologies for microbiological sampling of saturated and unsaturated subsurface zones.

Accomplishments in the area of water quality predictive models included: (1) the development of a preliminary computerized model for estimating nonpoint source loadings of BOD, suspended solids, total dissolved solids and heat to a riverine system and the development of a simplified (manual) methodology for use primarily by 208 agencies in estimating the nature and extent of nonpoint source pollution contributions from non-irrigated agricultural and silvicultural activities; and (2) continued work on the development of nonpoint source loading models capable of addressing a broader range of the pollutants of interest and the interfacing of these models with existing water quality predictive models.

1977 Program

The FY 1977 resource level for the Water Quality Health and Ecological Effects program area was \$21,777,000 and 286 positions. These resources included approximately \$1,220,700 in contracts, \$5,171,000 in grants, and \$1,068,000 in interagency agreements.

In the area of health effects research, the total resources are \$2,410,000 and 24 positions. Those resources included approximately \$265,700 in contracts, \$876,000 in grants, and \$443,000 in interagency agreements. In FY 1977 the water quality health effects program will be directed toward:

- Identification of possible health effects associated with treatment, disposal and use of wastewater and sludge land;
- Epidemiological studies of populations living near either land application sites for wastewaters and sludges or near activated sludge treatment plants;
- Characterization of aerosols from land application sites and activated sludge treatment plants;
- Evaluation of workers at wastewater treatment plants to determine evidence of infections before and after exposure to aerosols;
- Determination of human health criteria for pathogen concentrations in marine and fresh recreational water, including assessment of the etiology of amoebic meningoencephalitis;
- Assessment of pathogen survival and movement at sites using land application of wastewater and sludge, including uptake through the food chain;
- Studies of bioavailability of cadmium, lead and other metals contained in food grown on soil which receives wastewater and sludge.

The FY 1977 resource level for ecological effects research was \$16,567,000 and 234 positions. Those resources included approximately \$405,000 in contracts, \$3,070,000 in grants and \$593,000 in interagency agreements. Also, \$2,900,000 of these funds will be used to support work in the Agency's Chesapeake Bay Study program, for which Region III is the designated program manager. A description of this effort is located in the water planning and standards section of this medium. The FY 1977 ecological effects water quality research program will include:

- Determination of the fate and ecological effects of oil and derived hydrocarbons in marine and freshwater ecosystems;
- Determination of the fate, transport, and effects of non-pesticide organic and inorganic pollutants, singly and in combination, on aquatic species, ecosystems, and on community structures and populations;
- Determination of the ecological effects in aquatic environments of disinfected wastes which contain by-products resulting from the disinfection process;
- Characterization of pollution problems of the Great Lakes, determination of the dynamic processes affecting pollution of large lakes, and development of management-oriented models for describing the fate and effects of pollutants in the Great Lakes;
- Determination of the estimated "safe concentration" for fresh water life of complex industrial effluents receiving best practicable treatment and development of procedures for sampling and conducting bioassays of complex wastes in marine and fresh water ecosystems;
- Determination of the effect on fresh water ecosystems of pollutants and transformation of pollutants to other toxic or non-toxic forms, and assessment of the bioaccumulation of water-borne materials, including rates of accumulation, ultimate organism or tissue sites, and persistence;
- Determination of the fate, transport, and effects of municipal wastes, industrial wastes, and dredge materials disposed into marine and estuarine ecosystems and development of procedures and guidelines for assessing these effects;

- Determination of the ecological impact of variation of environmental parameters; such as temperature and salinity, and environmental requirements of aquatic organisms;
- Assessment of nutrient loading, nutrient sources, rate-limiting nutrients and trophic conditions for selected lakes; assessment of the contribution of nutrients and other pollutants from non-point sources and their impact on surface water ecology; and determination of nutrient recycling from sediments and the relative importance of nutrient cycling by fresh water biological communities compared to physical-chemical cycling from sediments;
- Development of simulated ecosystems to assess ecological alterations; assessment of the dynamics of physical, chemical and biological processes, and testing of biostatistical methods to quantitatively sample ecosystem components; development and validation of predictive models which describe pollutant distribution and interactions including sediment transport, ocean outfall plumes, barge dumping, flushing rates, and retention time and chemical fluxes; development of transport models to predict the magnitude and distribution of settled and suspended materials resulting from dredge material disposal; development and application of bioassays (single species and multi-species) (static and flow-thru) to problems such as ocean disposal, temperature, metals, oil, mixed wastes and dredge materials.
- Description and evaluation of the dynamics of aquatic ecosystems under pollution stress and determination of the long-term response of a lake to phosphorus reduction.
- Development and evaluation of the ecological significance of measures of aquatic community structure, such as diversity indices, as indicators of the "health" of marine and fresh water ecosystems.

The FY 1977 resource level for the transport and fate subactivity is \$2,800,000 and 28 positions. In FY 1977, emphasis will continue in the same three areas pursued in FY 1976, with \$2,050,000 being devoted to grant and contract efforts.

The transport and fate process characterization work will include:

- Mathematical characterization of microbial degradation processes of importance in transforming organic pollutants;
- The development of quantitative transport and fate process and rate data for PCB's, dichlorobenzidene, and several other representative pollutants of national concern;
- Completion of an evaluative model for mercury for use by water pollution control agencies and the private sector; and
- Expansion of the pesticide (malathion) evaluative model to address other pesticides.

Ground water transport and fate research will be directed toward:

- Completion of a study aimed at determining allowable septic tank densities for discharging to sandy, loam, and clay soils (i.e., densities that will not result in degradation of the ground water aquifer); and
- Completion of a method for organic pollutant sampling of saturated and unsaturated subsurface zones and completion of a report on the utility of the use of stable isotope ratios in ground water investigations to identify the source and dynamics of subsurface pollution.

In the predictive model research area emphasis will be on:

- Evaluation of the applications and limitations of existing water quality predictive models in allocating allowable point source loadings among discharge permit applicants;
- Development of basinwide and 208 areawide analysis procedures for conducting gross or broad assessments of point and nonpoint source pollution contributions and their water quality impacts; and
- Initiation of the development of an analysis procedure for conducting detailed assessments in a given stream reach of point and nonpoint source pollution contributions and predicting water quality impacts and improvements that would result under alternative pollution control schemes.

Water Quality

Health and Ecological Effects

Significant Extramural Projects - FY 1977 Program

Title: Pollutants Posing a Health Risk Related to
Water Quality Directly or Indirectly

Amount: \$695,000

Discussion: Extramural projects constitute a substantial portion of research efforts on health effects related to water quality, however, extramural funds are divided between numerous small, interrelated projects which are exemplified by the following studies. An epidemiological study of populations living near activated sludge plants is being conducted to characterize aerosols as to drift and presence of pathogenic organisms and to define a possible relationship between these pathogens and illness in neighboring communities. This project is a grant and is funded at a level of \$567,000. A project, which is funded as a grant at a level of \$128,000 is underway and will define and evaluate the variables affecting adsorption, transport, and infectivity of viruses in a soil-water systems. The data obtained will be used to develop criteria for predicting virus movement through soils.

Title: Great Lakes Research Program

Amount: \$3,385,860

Discussion: The Great Lakes Research Program conducted by the Large Lakes Research Station of the Duluth Environmental Research Laboratory consists of grants involving each of the Great Lakes. The specific program includes:

Lake Michigan

Whole lake biological and chemical studies have been undertaken in cooperation with the Great Lakes Surveillance Branch of Region V. The studies will be used to evaluate the effect of nutrient loadings on the trophic states of Lake Michigan.

Lake Huron

The studies on Lake Huron are being incorporated into eutrophication models designed to provide nutrient loading limits and simulate the results of waste reductions.

Lake Erie

Work on Lake Erie consists principally of a nutrient bio-assessment program, the results of which are being incorporated into modeling efforts to allow the understanding of nutrient inputs and the resulting eutrophication.

Lake Ontario

These studies consist of verifying the calibrated mathematical model for Lake Ontario to assure its broader applicability and monitoring of other significant problems.

More Than One Lake Studies

Individual problems that are associated with more than one lake are often combined into single studies. These studies include the impact

of dredging, algal nutrient growth studies, and atmospheric inputs of metals and nutrients.

Title: Mathematical Models of Fates of Pollutants in Estuaries (Grant) Amount: \$130,681

Discussion: The objective of this research is to develop a generalized mathematical model of an estuarine ecosystem which has application to many situations. To accomplish these objectives the work will proceed through developing transport characteristics for conservative and non-conservative substances, producing an ecosystem simulation and, finally, beginning to track the transport and effects of toxic materials in the estuarine system. Using the model system concepts that have been developed by the College for the large lakes, a nutrient phytoplankton - upper trophic level model will be applied to estuarine hydrodynamics. A series of meetings between the laboratory and the principal investigator will review the progress and develop the verification data set for a particular set of estuaries.

Title: A Facility for the Experimental Analysis of Coastal Marine Ecosystems (Grant) Amount: \$940,000

Discussion: The last funding period for a three-year grant of which the primary objective is to design, develop, and operate a facility for the experimental analysis of coastal marine ecosystems. The mission of the facility would be to carry out basic research on the structural and functional responses of coastal marine ecosystems to a number of environmental stresses related to national energy policy development and implementation.

Title: Responses of a Tropical Estuary to Relaxation of Sewage Stress Amount: \$173,000
(Grant)

Discussion: Second-year funding. The objectives of this project are to document the responses of a tropical estuary ecosystem (Kaneohe Bay, Hawaii) to the removal of sewage stress and then to arrive at adequate theoretical bases to predict those responses.

Water Quality

Health and Ecological Effects

Transport and Fate of Pollutants

Significant Extramural Projects - FY 1977 Program

Title: Development of Executive Program (Contract) Amount: \$400,000

Discussion: An executive computer program will be developed to automatically link watershed, river, reservoir, and estuarine submodels into a comprehensive basin analysis model. Selection of submodels will be done in an interactive mode and will be based upon available data, level of detail required and level of user understanding.

Title: Radius of Influence of Subsurface Injection Wells (Grant) Amount: \$ 66,000

Discussion: Literature and data review on existing approaches to determine radius of influence of injection wells case histories of failures or pollution problems.

Title: Modeling Transport and Behavior of Pesticides and Other
Toxic Organic Materials in Aquatic Environments (Grant)

Amount: \$115,000

Discussion: A generalized model representing the functional characteristics of toxic organic materials in natural aquatic environments will be formulated, implemented, and tested. It will be compatible with the ecosystem model CLEANER and will have potential application for studying environmental impacts of pesticides in diverse aquatic ecosystems.

Title: Behavior of DDT and Kepone in Sediment-Water Systems Under
Different Oxidation Reduction and pH Conditions (Grant)

Amount: \$ 85,300

Discussion: The results of this study should provide information on: (1) conditions affecting the movement of these pesticides into estuaries and quiet water areas, (2) conditions governing migration of the pesticides into the sediment after reaching a quiet water area, and probably most important, (3) the effect of the physicochemical conditions likely to be encountered in nature on the degradation of these two biologically active pesticides.

FY 1978 Plan

The FY 1978 program includes a total of \$25,777,000 and 306 positions. The health effects subactivity will receive \$3,810,000 and 34 positions; ecological processes and effects, \$15,267,000 and 237 positions; and transport and fate, \$3,800,000 and 35 positions. Also, \$2,900,000 of these funds will be used to support work in the Agency's Chesapeake Bay Study program, for which Region III is the designated program manager. A description of this effort is located in the water planning and standards section of this medium.

The health effects research program will expend approximately \$457,200 in contracts, \$2,240,300 in grants and \$262,900 in interagency agreements.

The increase in health effects resources in FY 1978 will be used to develop approaches to characterizing classes of waterborne hazardous substances, to accelerate the development of a standardized sequence of tests for determining pollutant effects and to apply these tests to complex effluents. Chemical protocols for improved toxicity testing of suspect substances and criteria for safety factors will be developed and validated.

Work, recently started, will continue on the determination of the dispersion of pathogens, especially viruses, in aerosols formed by spray irrigation of sludges and wastewaters; determination of the persistence and transport of contaminants through the soil of land application sites and on to the food chain; assessment of the health of populations residing in areas where land disposal of wastewater and sludges is conducted. In addition to research associated with land applications, studies will continue on the disposal of these wastes in water. The Federal Water Pollution Control Act of 1972 has placed stringent conditions on wastewater discharges into rivers and lakes. As a result, many communities are considering disposal of treated effluent on land. Hence, the potential health hazardous of the use of wastewater discharges in the irrigation of food or forage crops will be investigated.

In addition to the above, several interrelated research efforts will develop valid microbiological criteria for shellfish-growing waters to evaluate the health effects associated with the consumption of shellfish.

The FY 1978 resources for the ecological effects research program will consist of approximately \$515,500 in contracts, \$6,316,300 in grants and \$515,500 in interagency agreements.

In FY 1978 that portion of the ecological effects research program involving ocean disposal, disinfection and the Great Lakes which was initiated under a Congressional add-on in FY 1976 will be completed.

Ecological effects information is needed to develop water quality criteria applicable to the highly variable ambient conditions produced by non-point source (NPS) discharges. Already available are first generation water quality criteria relating to fishes and phytoplankton. These, however, are directed primarily at steady-state conditions. For application to the determination of required levels of NPS controls, effects data for all NPS pollutants must be keyed to the random, varying exposure that is common to NPS pollution. Only in this way can reasonable "wet weather" water quality criteria be developed.

Perhaps the least NPS information exists on the ecological effects of sediment, the most prevalent pollutant from non-point sources. Also, there is little information on the upper level of sediment control that would begin to produce adverse effects (viz., increased steamed scour and possible increased dissolved toxics concentrations because of reduced sediment sorption capacity). The level of sediment control required from an environmental pollution standpoint cannot be articulated until these upper and lower bounds are quantified. There is a somewhat similar problem with the identification of appropriate levels of nutrient control, particularly in streams. Additional resources will allow limited expansion of efforts to develop water quality criteria for non-steady-state flows and to study pollutants such as suspended sediments, in water.

The Great Lakes research program will be expanded to increase efforts in selected areas. The expanded effort will permit the earlier completion of Great Lakes Research already in progress. The areas to which increased attention would be given include: nutrient control effectiveness in

Lakes Michigan and Ontario; atmospheric pollutant input to Lakes Michigan, Huron and Superior; and a hazardous materials model for the Great Lakes. This work will allow development of predictive methods one to two years earlier with cost savings in monitoring, planning and construction of pollution control works.

In FY 1978 expanded efforts will be directed to the problem of complex effluents. Substantial research efforts have attempted to refine acute and chronic bioassay and chemical assay tests to study the effects and the levels of concentrations of specific pollutants under controlled conditions in the laboratory. These methods are not adequate for rapid evaluation of the ecological impact of complex wastes. Alternative and supplementary methods must be developed and tested to rapidly evaluate complex effluents. Rapid methods to classify pollutants will be developed and correlated with more sophisticated ecological studies to fully define and quantify the impact of complex wastes on aquatic environments. The scope of the planned research will include development of rapid assay techniques in the laboratory; adapting the methods to mobile testing units so screening can be accomplished "on-site"; and comparing the biological effects and bioaccumulation of a family of effluents. The feasibility of developing a predictive effects model for effluents from a particular industry will be investigated.

The FY 1978 program for the transport and fate subactivity includes \$3,800,000 and 35 positions, an increase of \$1 million and seven positions over FY 1977. Of this amount, approximately \$2,350,000 will be used for grant and contract support. These resources will be allocated among the same three main areas being addressed in FY 1977 plus one additional area (development of hierarchical testing methods for fate of hazardous substances). This new effort is projected to result in the development of an interim set of hierarchical testing methods during FY 1981 and a refined set by the end of FY 1982.

The effort placed on non-point source and water quality modeling research in FY 1978 is projected to result in the availability of the desired outputs in FY 1981. Upon completion of these models, emphasis will then be placed on verification of their accuracy and validity over the range of conditions expected to be encountered in the field.

The FY 1978 program will also: characterize the major environmental processes controlling aquatic transport and fate of pollutants (with emphasis on sensitized photolysis and oxidative processes); develop quantitative transport and fate process and rate data for specific hazardous pollutants of national concern (e.g., kepone and arsenic compounds); develop quantitative information on natural loading rates of sediments and nutrients to watercourses (as necessary to distinguish between man-induced and natural pollution contributions); expand the pesticides evaluative model to address additional specific pesticides; adapt the mercury evaluative model to address cadmium and other inorganics; and initiate studies to verify the accuracy and validity of mathematical models being used as the basis for setting effluent limitations in discharge permits, as necessary to successfully defend legal challenges of the results obtained through their use.

Of the requested \$4,000,000 increase, approximately \$230,000 will be used to procure ADP items. \$200,000 will be used for the completion of the Great Lakes data base. In order to maintain continuous updating of the Great Lakes data base, the remainder of the existing Great Lakes information must be added to this base. Items to be added in order to complete this inventory include past Agency biological information, information from the Canadian Center for Inland Waters, Ministry of Environment (Canada) findings and data from academic institutions. An additional \$30,000 will be used to expand presently planned fish physiological monitoring systems (cough-frequency response test) through the purchase of a cassette reader and a portable A/D recorder unit for on-site monitoring.

Water Quality

Health and Ecological Effects

Significant Extramural Projects - FY 1978 Plan

Title: Pollutants Posing a Health Risk Related to
Water Quality Directly or Indirectly

Amount: \$695,000

Discussion: Extramural projects constitute a substantial portion of research efforts on health effects related to water quality, however, extramural funds are divided between numerous small, interrelated projects which are exemplified by the following studies. An epidemiological study of populations living near activated sludge plants is being conducted to characterize aerosols as a drift and presence of pathogenic organisms and to define a possible relationship between these pathogens and illness in neighboring communities. This project is a grant and will be funded at a level of \$567,000. A project, which will be funded as a grant at a level of \$128,000 is underway and will define and evaluate the variables affecting adsorption, transport, and infectivity of viruses in a soil-water system. The data obtained will be used to develop criteria for predicting virus movement through soils.

Title: Great Lakes Research Program

Amount: \$2,315,000

Discussion: The Great Lakes Research Program conducted by the Large Lakes Research Station of the Duluth Environmental Research Laboratory consists of grants involving each of the Great Lakes. The specific program includes:

Lake Michigan

Whole lake biological and chemical studies will continue from FY 1977.

Lake Huron

The Huron studies will continue to be incorporated into eutrophication models designed to provide nutrient loading limits and simulate the results of waste reductions.

Lake Erie

The nutrient assessment program will continue to provide an understanding of nutrient inputs to Lake Erie and the resultant eutrophication.

Lake Ontario

The study will continue to verify the calibrated mathematical model for Lake Ontario to assure its broad applicability. Other significant water quality problems will be monitored.

Lake Superior

Lake Superior is of relatively higher water quality than the other Great Lakes. It is planned to initiate a study of atmospheric inputs of hazardous substances.

More Than One Lake Studies

Individual problems that are associated with more than one lake are often combined into single studies. These studies will continue to determine the impact of dredging, algal nutrient growth studies, and atmospheric inputs of metals and nutrients. Technology Transfer, mathematical modeling and studies of the accumulation of hazardous substances in sediments will be initiated in FY 1978.

Title: Responses of a Tropical Estuary to Relaxation of Sewage Stress Amount: \$180,000

Discussion: Third-year funding. The objectives of this project are to document the responses of a tropical estuary ecosystem (Kaneohe Bay, Hawaii) to the removal of sewage stress and then to arrive at adequate theoretical bases to predict those responses.

Title: Mathematical Models of Fates of Pollutants in Estuaries (Grant) Amount: \$130,681

Discussion: The objective of this research is to develop a generalized mathematical model of an estuarine ecosystem which has application to many situations. To accomplish these objectives the work will proceed through developing transport characteristics for conservative and non-conservative substances, producing an ecosystem simulation and, finally, beginning to track the transport and effects of toxic materials in the estuarine system. Using the model system concepts that have been developed by the College for the large lakes, a nutrient phytoplankton - upper trophic level model will be applied to estuarine hydrodynamics. A series of meetings between the laboratory and the principal investigator will review the progress and develop the verification data set for a particular set of estuaries. This extramural project is a continuation of the first year funding.

Title: Study of Large Scale Ecosystem Simulation (Grant) Amount: \$1,000,000

Discussion: An existing grant will be continued to determine the effect of oil, sewage, and complex wastes on the structure and resiliency of marine ecosystems. Funds will be sought to carry out large scale microcosm research and to determine complex response parameters and to determine what response parameters of an ecosystem are precursors to that system's ultimate collapse. These experiments will tie together laboratory bioassays, and sophisticated response parameters with large-scale ecosystem responses.

Water Quality

Health and Ecological Effects

Transport and Fate of Pollutants

Significant Extramural Projects - FY 1978 Plan

Title: Soil Treatment Facilities and the Subsurface
Environment (Grant)

Amount: \$144,000

Discussion: Determine design and operation criteria to assure
the protection of ground water associated with soil
treatment facilities.

Title: Modeling Transport and Behavior and Pesticides and Other
Toxic Organic Materials in Aquatic Environments (Grant)

Amount: \$125,000

Discussion: A generalized model representing the functional
characteristics of toxic organic materials in natural
aquatic environments will be formulated, implemented,
and tested. It will be compatible with the ecosystem
model CLEANER and will have potential application for
studying environmental impacts of pesticides in diverse
aquatic ecosystems.

Water Quality

Research and Development

Industrial Processes

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs. 1977</u>
<u>Appropriation</u>					
Mineral, Processing and Manufacturing Industries...	\$5,779	\$8,285	\$7,400	\$8,400	+\$1,000
<u>Permanent Positions</u>					
Mineral, Processing and Manufacturing Industries...	51	49	38	38	...

Budget Request

An appropriation of \$8,400,000 is requested for FY 1978. This is a \$1,000,000 increase over the FY 1977 level. The requested increase will be utilized to develop data on the treatability of waste streams from critical industries. This will provide assessment methodologies which can be used to determine the hazards of these streams. A small portion of the increase will allow preparation of an assessment of control procedures for non-energy mining activities.

The water industrial processes program concentrates on point sources of water pollution resulting from the industrial sector of the economy in those mining, manufacturing, service, and trade industries which must meet "best available technology" (BAT) standards of the Federal Water Pollution Control Act (FWPCA). This program is also the realization of the national policy, established in P.L. 92-500, that a major research and demonstration effort be made to develop technology necessary to help eliminate the discharge of pollutants to the Nation's waters.

The program develops and demonstrates new or improved cost-effective technology having industry-wide applicability, short-term achievability and long-term viability, principally through cost-sharing extramural grants. It provides the primary data for the establishment of economically and technically feasible effluent guidelines and treatment parameters for industrial liquid waste discharge permits. As a result of the recent court decree program, emphasis is being shifted towards the development of the data required to regulate the discharge of hazardous pollutants. The new program direction focuses on developing complete waste stream assessments including chemical and bioassay data and the applicability of treatment alternatives to a broad range of pollutant materials in industrial waste effluents. In addition, this program addresses technology for prevention and control of accidental spills of hazardous materials in support of Section 311 of P.L. 92-500.

1976 Accomplishments

The FY 1976 resource level for this subactivity was approximately \$8,000,000. Approximately \$2,800,000 will be used for contracts and \$2,800,000 for cost-sharing research and demonstration grants. Industrial contributions accounted for 50% of the total demonstration costs (i.e., in excess of \$3,000,000).

In FY 1976, the water industrial processes program:

- Completed an engineering design and economics feasibility report on the conversion of chlorinated organic residues into marketable products. This information will be used in designing new industrial facilities;
- Initiated an engineering design study for complete pollution control in an integrated steel mill. The results of this study will be used in designing waste treatment facilities at several iron and steel facilities and by EPA's regulatory activities in revising effluent guidelines. The project was partially supported by the iron and steel industry;
- Completed source assessments for specific inorganic and organic chemical processes and for non-ferrous metals production. The results of these studies will be used in evaluating the relative importance of various types of pollutants to the overall environmental impact of these industries;
- Prepared manual on available practices for hazardous spills prevention. The manual has been widely distributed to users by EPA and has been published in professional literature; and
- Demonstration of a system for the containment of hazardous materials spilled on land.

1977 Program

The FY 1977 program focuses on assessing the nature and quantity of hazardous pollutants discharged from industrial sources. This information, together with information on the controllability and treatability of these pollutants will supplement the data base which will be utilized for future regulations. In selected industries, demonstration of more viable control technologies or in-plant modifications will be undertaken. These industries will be selected on the basis of the preliminary assessments now underway and the probability of being able to control the pollutants having the most serious health and ecological effects. Research will continue to demonstrate the economic and technical viability of combined municipal/industrial wastewater management with special emphasis on providing a technical base for pretreatment standards.

The hazardous incident program will continue efforts to control and minimize hazardous material spills and damages, and will initiate research to implement the new EPA spill regulations.

The FY 1977 resource level for this subactivity is \$7,400,000. Approximately \$3,100,000 will be used for contracts and \$2,300,000 for grants. Industrial cost-sharing is expected to decline to approximately 35% due to the increased emphasis on assessments. Industry is expected to contribute \$1,200,000 to the projects.

Major outputs to be achieved in FY 1977 include:

- Preliminary assessment of the occurrence of the 65 pollutants in the 21 industries specified in the court decree;
- Preliminary assessment of the applicability of currently available control technology to remove hazardous and toxic pollutants;

- Complete engineering design study for overall pollution control in an integrated steel mill;
- Demonstration of control technology for selected pesticide manufacturing wastes;
- Demonstrate technology for treatment of ammonia plant condensates;
- Development of screening tests for evaluation of toxicity of treated industrial effluent; and
- Development of advanced technologies for removal of fluoride from inorganic chemical industry process waters.

WATER QUALITY

Industrial Processes

Mineral, Processing and Manufacturing Industries

Significant Extramural Projects - FY 1977 Program

Title: Toxic Materials Control Assessment - Textiles (Grant) Amount: \$250,000

Discussion:

This study will determine the hazardous substances discharged by the textile industry and the extent to which they can be controlled. This project will require biological as well as chemical testing.

Title: Toxic Materials Control Assessment - Pesticides Amount: \$250,000

Discussion:

This study will determine hazardous substances discharged by pesticides manufacturers. The extent to which these toxic discharges can be controlled will be evaluated. This work will require toxicity testing since not all of the potential toxicants being emitted can be identified chemically.

Title: Toxic Materials Control Assessment - Fertilizer

Amount: \$150,000

Discussion:

This study will determine toxic substances discharged by fertilizer manufacturers. The extent to which these toxic discharges can be controlled will be evaluated. This work will require toxicity testing because not all of the potential toxicants being emitted can be chemically characterized.

Title: Toxic Materials Control Assessment - Organics

Amount: \$200,000

Discussion:

This study will determine toxic substances discharged by organic chemical manufacturers. The extent to which these toxic substances can be controlled will also be evaluated. This work will require toxicity testing because not all of the potential toxicants being emitted can be chemically characterized.

Title: Develop Improved Technique for Removing Toxic Pollutants from
Coking and Blast Furnace Waters (Contract)

Amount: \$250,000

Discussion:

This project will develop methods for treating the water effluents from coke ovens. The control of toxic pollutants will be the major focus of the development of technology for this segment of the iron and steel industry.

Title: Technical and Economic Evaluation of BATEA Guidelines -
Textiles (Grant)

Amount: \$300,000

Discussion:

This project will evaluate the treatment efficiency, economic achieveability, and environmental impact of those processes identified as BATEA for the textile industry. Mobile units will be used on effluents from actual textile mills. This is a first of a kind cooperative study between EPA and industry to field test control equipment. The results will be used to set effluent regulations.

Title: Advanced Iron and Steel Wastewater Control (Contract)

Amount: \$250,000

Discussion:

This study will develop improved wastewater discharge control requiring less space and energy. The project will attempt to achieve the national goal of zero discharge. Stringent levels of control falling short of discharge elimination will also be evaluated.

1978 Plan

In FY 1978, activities will be focused on the problem of hazardous discharges. As source assessments are completed, the available control technology, together with economic implications will be identified. This information will serve as a basis for updating effluent guidelines and for regulating the use and disposal of hazardous chemicals.

Complete source assessments will establish detailed chemical characterizations of industrial waste streams. These assessments will relate effluent composition to production variables including alternative processes, types of raw material, operating conditions and waste treatment alternatives. Completed assessments will provide comprehensive information not only on the chemical and bioassay characteristics of waste streams, but also will provide data on the costs of alternatives for reducing adverse environmental impacts.

The requested increase will be used to accelerate the detailed assessment of hazardous pollutant discharges in the following industries---organic chemicals manufacturing, petroleum refining, iron and steel production, and non-ferrous metals production. The detailed assessments will include sampling and chemical analysis of typical effluent streams and, if feasible, preliminary bioassay screening to establish the relative toxicity of the streams. Further on-site pilot scale studies to determine the treatability of the hazardous materials in these effluents and the associated costs will be undertaken.

The requested FY 1978 resource level for this subactivity is \$8,400,000. These resources include approximately \$3,600,000 for contract support and \$2,800,000 for grants. Industry is expected to contribute \$1,000,000 to these projects.

Major outputs to be achieved in FY 1978 include:

- Complete assessment of the occurrence of a range of pollutant parameters including the 65 pollutants of the Consent Decree in six selected industries;

Water Quality

Industrial Processes

Mineral, Processing and Manufacturing Industries

Significant Extramural Projects - FY 1978 Program

Title: Toxic Materials Control Assessment - Pesticides Amount: \$250,000

Discussion:

This study will determine toxic substances discharged by pesticides manufacturers. The extent to which these toxic discharges can be controlled will be evaluated. This work will require toxicity testing since not all of the potential toxicants being emitted can be identified chemically. This is a follow-on to work funded in FY 1977.

Title: Toxic Materials Control Assessment - Fertilizer Amount: \$150,000

Discussion:

This study will determine toxic substances discharged by fertilizer manufacturers. The extent to which these toxic discharges can be controlled will be evaluated. This work will require toxicity testing because not all of the potential toxicants being emitted can be chemically characterized. This is a follow-on to work funded in FY 1977.



- Complete assessment of the applicability of currently available control technology in being able to remove hazardous pollutants;
- Complete assessment of state-of-the-art of control procedures for non-energy mining activities;
- Demonstration of field detection and identification kit for spilled hazardous materials; and
- Demonstration of on-site detoxification system for non-recoverable hazardous materials.

None of the requested FY 1978 increase will be used for procurement of ADP items.

Title: Toxic Materials Control Assessment - Organics

Amount: \$200,000

Discussion:

This study will determine toxic substances discharged by organic chemical manufacturers. The extent to which these toxic discharges can be controlled will also be evaluated. This work will require toxicity testing because not all of the potential toxicants being emitted can be chemically characterized. This is a follow-on to work funded in FY 1977.

Title: Develop Improved Technique for Removing Toxic Pollutants from
Coking and Blast Furnace Waters (Contract)

Amount: \$250,000

Discussion:

This project will develop methods for treating the water effluents from coke ovens. The control of toxic pollutants will be the major focus of the development of technology for this segment of the iron and steel industry.

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Textiles (Grant)

Amount: \$250,000

Discussion:

This project will evaluate the treatment efficiency, economic achieveability, and environmental impact of those processes identified as BATEA for the textile industry.

Mobile units will be used on effluents from actual textile mills. This is a first of a kind cooperative study between EPA and industry to field test control equipment. The results will be used to set effluent regulations. This is a follow-on to work funded in FY 1977.

Water Quality

Research and Development

Public Sector Activities

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs. 1977</u>
<u>Appropriation</u>					
Wastewater Management....	\$10,298	\$10,014	\$10,392	\$11,792	+\$1,400
<u>Permanent Positions</u>					
Wastewater Management....	115	118	113	113	...

Budget Request

An appropriation of \$11,792,000 is requested for FY 1978. This represents an increase of \$1,400,000 from the FY 1977 level. The increase reflects needed research and development in two important program areas. Of the total, \$400,000 will provide the resources to begin development of nonpoint source control techniques for urban runoff through non-structural methods. The remaining \$1,000,000 will be applied to increase efforts in the development of environmentally safe and cost-effective methods of sewage sludge disposal and utilization. Emphasis will be placed in the areas of pyrolysis and land application.

Program Description

Public sector water quality research efforts address primarily the prevention, control, treatment and management of water pollution which is the result of public service and community non-industrial activities. The program functional areas are defined in such a way as to incorporate the major groupings of municipal responsibilities with the corresponding Federal (EPA) programs which support or regulate them.

A principal program area is the municipal and domestic wastewater treatment and control systems technology development activity. This element directly supports the needs of the Construction Grants Program and requires that the research program develop new technologies to meet effluent requirements along with the generation of a data base to support Agency regulatory activities, guidelines and policy. There are a number of major gaps in the data base relating to economics, performance, reliability, efficiency, water quality, wastewater renovation and reuse, and disposal of residuals which require investigation. A generalized summary of the research areas to meet municipal and Federal needs are:

- a. Sludge management and residual disposal.
- b. Performance reliability and efficiency of existing POTW's.
- c. Development of economical and feasible technological alternatives for specific water quality requirements.
- d. Disposition of hazardous compounds and metals.
- e. Reliability and efficiency of individual home and rural treatment systems.



The objective of this portion of the program is the mitigation of the problems within the constraints of resources, time, and technological capabilities. Of the roughly seven million dollars allocated annually in FY 1976 and FY 1977 for this activity, approximately five million per year has been expended in extramural efforts. The majority of both the extramural and inhouse resources were directed to municipal sludge management and treatment process development for NPDES requirements.

A subdivision in the wastewater treatment technology area is described as small wastewater flows. The objective of this activity is the development of practical handbooks or manuals which will provide regulatory agencies, planning agencies, consulting engineers and the general public with specific details on the design, operation, applicability, capital and operating costs and environmental implications of alternatives available for the treatment and disposal of wastewaters generated from individual homes, rural communities and recreational vehicles. An annual total of about \$800,000 has been budgeted for this research with more than seventy-five percent of this in extramural efforts.

The other public sector research resources are about equally divided between the program areas of urban runoff pollution control and soil treatment systems.

In the urban runoff section, emphasis is being placed on urban non-point pollution control utilizing non-structural methods as opposed to the combined sewer treatment hardware development of the past. The products of this research are guidelines, manuals, methods and management tools with supportive data to aid planners, designers and policy makers in carrying out assessments and formulating solutions to urban sewered and unsewered wet weather pollution.

The goals in this program area are influenced by a broad range of activities inside and outside of EPA. The recommendations of the Section 208 planning program will be affected by the urban runoff research findings and developments. These recommendations will in turn feed back

and affect specific research tasks. Similarly, the U.S. Army Corps of Engineers flood plain management programs, the Soil Conservation Service rural land development erosion and sediment control programs and the Department of Transportation road construction and maintenance programs all impact directly on the urban runoff research activities.

The reorientation of goals will allow the resources to be directed toward the urgently needed "users" type of documents.

In summary, urban runoff research spans the categories of: problem definition, user's assistance tools, developing land management techniques for prevention, collection system flow control, storage, treatment and disposal of wet weather flows and sludges, preventive or BMP practices, integrated systems and technical assistance for the three runoff subdivisions of combined sewer overflow, urban stormwater discharges and hydrologic modification effects. Of the total annual 1.1 million dollar budget almost 80 percent is expended in extramural efforts.

The activities of the soil treatment systems research program are interwoven with wastewater treatment research activities and with the research activities of other agencies such as the U.S. Army Corps of Engineers and the Department of Agriculture. The research is oriented toward field evaluation and development of design manuals for three major methods or processes which can be utilized to achieve "best practical treatment" or "non polluting discharge" for municipal sewage treatment systems.

Presently, the method of spray irrigation of crops achieves "non polluting discharge" through direct and beneficial reuse of municipal effluents. Infiltration-percolation provides a water suitable for irrigation, recreational impoundments, groundwater recharge, etc. The overland flow method approaches "best practical treatment" of raw sewage with a direct discharge to surface waters. When fully developed these three systems will be considered as viable alternative methods for achieving "best practicable treatment" technology.

Of the approximately one million dollars annual total for this program more than sixty percent is in extramural efforts.

1976 Accomplishments

During FY 1976 budget expenditures were divided as follows: grants, \$2,272,400; contracts, \$3,557,000; and interagency agreements, \$54,200. In FY 1976 the wastewater management research program in the public sector accomplished the following:

- Demonstrated at field scale a method of meeting or exceeding the U.S. EPA secondary effluent standards for BOD₅, suspended solids and fecal coliform with lagoon effluents utilizing intermittent slow sand filters in year-round operation at the Logan, Utah wastewater treatment works. The results of this study have been disseminated by a joint EPA-Utah State University symposium, at scientific and engineering society meetings and with EPA Technology Transfer seminars. Over a dozen full-scale processes of this type are presently either in operation, being constructed, or have construction approval. This system development offers a proved method for the more than 4,000 lagoon systems in the United States to meet secondary effluent standards with a process that is reliable, reasonably inexpensive, and requires minimal operation and little maintenance.
- Completed a comparative study on the bacteriological effectiveness of alternative wastewater disinfectants and determination of residual toxicity associated with wastewater disinfection. One of the principal findings was that the threshold value for toxic effects to selected fish is 0.03 mg/l of available chlorine.
- A three-sludge system for removal of organic and nitrogenous material was developed in-house and is now an accepted state-of-the-art.

- Completed and distributed an audiovisual training program for erosion and sediment control. The training material is directed to the implementation level of sediment pollution prevention, i.e., excavation contractors, foremen, local government inspectors and developers. The training materials were developed through the joint efforts of the U.S. EPA, Department of Agriculture Soil Conservation Service, and the Department of Transportation's Federal Highway Administration. The need for this type of user's tool is urgent. As state and local agencies move toward accelerated control of non-point source pollution, training of a large number of people is essential.

- Developed an updated and refined version of the User's Manual for the Storm Water Management Model (SWMM). Additionally, several simplified mathematical models were developed for preliminary storm water management planning. These may be used by planners or officials as the level of detail, resources or data reliability dictate.

- Completed a two year effort on the effects of climate on soil treatment and developed two computer programs to aid in design and operation of such systems.

- Completed and published the research findings on a pilot overland flow treatment of raw domestic wastewater which emphasized enhanced phosphorous removal.

1977 Program

During FY 1977 the following division of expenditures are planned: grants, \$3,252,000; contracts, \$2,745,000; and interagency agreements, \$591,000. The public sector program in FY 1977 will advance development of sludge treatment and utilization, disinfection, and urban runoff control. Lime treatment and thermophilic anaerobic and aerobic digestion processes will be evaluated for cost effectiveness. Also research to minimize energy consumption in sewage sludge disposal will continue. Major efforts in sludge pyrolysis in cooperation with the U.S. Bureau of Mines, the City of South Charleston, West Virginia and Union Carbide will be executed.

Development and demonstration of new methods, processes and management techniques to provide improved operation and maintenance of municipal wastewater treatment plants will continue. This effort will be in "mid-stream" during FY 1977 and indications gained from the early results show that this will be a worthwhile product when incorporated into every day operation.

The evaluation of the "orbal" or oxidation ditch-type of secondary treatment facility was completed in FY 1976. Results show that this type of plant is capable of a high degree of treatment. In FY 1977, the economic advantages and capital costs under varying conditions will be examined. This will allow publication of cost, performance and design guides for this method of treatment.

In the small flows area it is expected that the work on the characterization and handling of septic tank pump out (septage) will be completed. These results will contribute to future planning manuals.

The study of economic and environmental impacts of combined sewer overflow sludges and the initial generalized analysis of receiving water impacts from all urban wet weather sources will be completed.

An evaluation of the cost effectiveness and influence on local planning of existing urban wet weather pollution and hydraulic control facilities will be conducted. Several existing projects dealing with treatment hardware and instrument evaluation will be continued.

A manual of practice for collection system infiltration/inflow analysis and prevention and control which is being done in cooperation with the Office of Water Program Operation Construction Grant Program will be completed. In the soil treatment area, the initial land treatment planning and design manual will be completed. This manual is urgently needed and widely anticipated. It has been compiled with close support of the Office of Water Planning, the U.S. Army Corps of Engineers and Technology Transfer. Technical reports will also be prepared on various design models for phosphorous removal and climatological considerations in soil treatment systems.

Water Quality

Public Sector Activities

Waste Management

Significant Extramural Projects - FY 1977 Program

Title: Report of Long-Term Effects of Soil Treatment Systems
(Contract) Amount: \$100,000

Discussion: Evaluation and collection of results of studies of ten existing soil treatment systems for the purpose of condensing the information into a form which is more useable for the user community.

Title: Demonstrate Improved Performance at Selected Biological Treatment Plants (Contract) Amount: \$371,000

Discussion: This contract will be a keystone to improving the efficiency, reliability and cost-effectiveness of present wastewater systems.

Title: Impact of Combined Sewer Overflow on Various Receiving Waters (Grant)

Amount: \$100,000

Discussion: Analyze impact of combined sewer overflow on various receiving waters and establish criteria guidelines for future impact studies. This area is basic to the development of combined sewer pollution control techniques. This is a follow-on to work funded in FY 1977.

Title: Demonstrate Land Disposal of Treated Wet-Weather Solids (Contract)

Amount: \$250,000

Discussion: Because of the large costs involved, land disposal may be attractive economically if it meets all other criteria.

Title: Feasibility of Renovating Impoverished Land With Sewage Sludge (Grant)

Amount: \$100,000

Discussion: Demonstrate feasibility of renovating impoverished land with sewage sludge, and collect data for use in developing a guidance document on sludge use for recommendation purposes. This is a follow-on to work funded in FY 1977.

Title: Sludge Utilization in the Forest (Grant)

Amount: \$250,000

Discussion: Demonstrate utilization of sludge in the forest in an eastern environment. This demonstration has the potential to open vast areas of land for sludge utilization.

Title: Impact of Storm Remedial Systems on Local Planning (Contract) Amount: \$100,000

Discussion: Assess the cost effectiveness and impact on local planning (including flood and erosion control and re-sultant receiving water quality improvement) of completed and operating storm remedial systems. We need an assessment for charting future directions. This is a follow-on to work funded in FY 1977.

Title: Environmental Impact of Urban Stormwater Runoff (Grant) Amount: \$182,000

Discussion: Assess the national environmental impact of urban stormwater runoff by resolving key technical questions (i.e. design storm or critical period criteria, pollutants to be controlled and remedial requirements to change a receiving water condition). This requires ranking receiving waters as to sensitivity to runoff and assessing different regions to establish guidelines for meeting Water Quality Standards. This is a follow-on to work funded in FY 1977.

Title: Detrimental Impacts of Highway Roadway Construction (Grant) Amount: \$100,000

Discussion: Assess detrimental impacts of highway roadway construction and design to reduce such impacts (to be coordinated with the Department of Transportation and other concerned highway departments).

Title: Upgrading of An Anaerobic Digester for Greater Gas
Production (Grant)

Amount: \$100,000

Discussion: Demonstrate the upgrading of an anaerobic digester for greater gas production by returning solids, adding activated carbon, and/or operating in thermophilic mode. Anaerobic digestion upgrading will contribute to better municipal sludge management. This is a follow-on to work funded in FY 1977.

Title: Technique for Treatment of Heat Treatment Liquor (Grant)

Amount: \$202,000

Discussion: Demonstrate the most promising technique for treatment of heat treatment liquor. This sludge problem must be solved, and a demonstrated method will be necessary to solve it.

Title: Using Irradiation Processes to Reduce Pathogen Content (Grant)

Amount: \$290,000

Discussion: Demonstrate the best means of reducing pathogen content by irradiation processes. The health implications of pathogen content reduction are obvious.

Title: Effect of High Temperature Acid Extraction on Dewatering and
Metal Content of Sludge (Grant)

Amount: \$290,000

Discussion: Demonstrate effect of high temperature acid extraction on dewatering and metal content of sludge. Sludge dewatering is a significant cost in the municipal sludge management area.

Title: Operation of Pilot Plant (Contract)

Amount: \$268,000

Discussion: Operation of pilot plant to provide effluent for ecological research studies. Effluent provided will be used to judge what level of organics and metals are permissible for ocean discharge.

Title: Innovative High-Rate Suspended Growth Systems (Contract)

Amount: \$125,000

Discussion: Evaluation of innovative high-rate suspended growth systems with potential savings in energy, volume, and/or space requirements.

Title: Onsite Alternative Wastewater Systems Demonstration Study
(Grant)

Amount: \$200,000

Discussion: This study will, through local or State Governmental auspices, attempt to demonstrate the validity of the new techniques developed by engineering each onsite system and comparing with older approaches.

Title: Evaluation of High-Rate Infiltration-Percolation Beds
to Improve Water Quality (Grant)

Amount: \$ 35,000

Discussion: High-rate soil filtration for advanced waste treatment
to achieve complete BOD and SS removal, nitrification,
and fecal coliform removal.

Title: Evaluation of Soil Treatment Irrigation System in the Mid-
Atlantic Region (Grant)

Amount: \$300,000

Discussion: Evaluate current design information in relation to
climatic influences of the mid-Atlantic coastal region.

1978 Plan

Poor operation and maintenance of treatment plants compromises the impact of construction grants expenditures in achieving the Nation's water quality goals and thus gives priority to development and use of improved O&M practices. Research to evaluate instrumentation and control strategies in order to improve O&M practices of POTW's will be done.

Research will accelerate on disinfection to overcome the problems of induced fish toxicity and the formation of chlorinated organics. Full-scale testing of ozonation and ultraviolet radiation will be advanced while the associated reuse problem will receive increased attention. About one million dollars will be allocated for the two associated efforts.

Efforts will be increased to research, develop, and evaluate in the field reliable and cost effective processes which will render municipal sludges environmentally suitable for disposal to the land which will eliminate secondary environmental pollution (e.g., air pollution from incinerators), and ultimately provide communities with an array of cost effective and environmentally acceptable alternatives to solve their sludge disposal problems. Two of these alternatives are pyrolysis and land application. With the additional funding, approximately 3.3 million dollars will be devoted to this program area. All wastewater treatment research activities will stress energy conservation and disposal techniques with beneficial uses of residues. Guidelines will be developed on using sludge for timber production, reclamation of marginal land, and crop production. Processes or methods to mitigate the effects of metals and hazardous substances on crops will be investigated.

Development of more efficient, more reliable, and more cost effective technology for POTW's is planned. Approximately one million dollars will be used for this effort.

Research will be carried out to develop alternative forms of treatment that are less costly than secondary treatment for ocean discharges and plant upgrading.

The planned objective of the small flows subarea in FY 1978 is to develop new and improved methods and upgrade existing technology for collection, storage and treatment of individual home and rural wastewater treatment and disposal systems. Development of alternative technologies to the traditional septic tank-soil absorption system will be continued.

Emphasis will be placed on completion of the on-site treatment alternatives state-of-the-art study and the evaluation of the pressure and vacuum collection systems. Approximately 0.8 million dollars is scheduled for these developments.

Urban runoff research will concentrate on the development, collection and analysis of data, tools and solution methodologies which will provide policy and decision making information on the source, cause, impacts, remedial benefits and secondary pollution problems of wet weather flow and abatement. The ultimate objective is to provide a manageability index and a reliable data base for remedial actions on wet weather pollution. This entails a quantitative problem assessment, with receiving water sensitivity and pollutant ranking, on a national basis; cost estimates for various levels of abatement; monitoring tools; and methods of solution and planning. It is planned in FY 1978 to expand this nationwide characterization and impact research to help resolve key technical questions in data reliability, prediction techniques, secondary impacts, storm design criteria, receiving water requirements and pollutants to be controlled.

In the area of solution methodology and user's guidelines for runoff control in developing areas, urban land management and wet-weather flow instrumentation studies are planned.

The additional budget request will allow development of cost, design, and performance criteria to aid in implementation of non-structural control methods for urban runoff abatement. With the additional funding, a total of one and one-half million dollars will be devoted to urban runoff research.

The FY 1978 program includes a total of \$11,792,000. The resources are expected to be divided as follows: grants, \$4,252,000; contracts, \$3,145,000; and interagency agreements, \$595,000.

None of the requested FY 1978 increase will be used for procurement of ADP items.

Water Quality

Public Sector Activities

Waste Management

Significant Extramural Projects - FY 1978 Plan

Title: Demonstrate Improved Performance at Selected Biological Treatment Plants (Contract)

Amount: \$ 80,000

Discussion: This contract will be a keystone to improving the efficiency, reliability and cost-effectiveness of present wastewater systems.

Title: Development of the Overland Flow Soil Treatment Process in the Southwest (Grant)

Amount: \$300,000

Discussion: Parallel comparison of overland flow units as (1) a complete treatment unit and (2) a treatment unit to upgrade lagoon systems.

Title: Impact of Combined Sewer Overflow on Various Receiving Waters (Grant)	Amount: \$172,000
Discussion: Analyze impact of combined sewer overflow on various receiving waters and establish criteria guidelines for future impact studies. This area is basic to the development of combined sewer pollution control techniques.	
Title: Feasibility of Renovating Impoverished Land With Sewage Sludge (Grant)	Amount: \$100,000
Discussion: Demonstrate feasibility of renovating impoverished land with sewage sludge, and collect data for use in developing a guidance document on sludge use for recommendation purposes.	
Title: Impact of Storm Remedial Systems on Local Planning (Contract)	Amount: \$100,000
Discussion: Assess the cost effectiveness and impact on local planning (including flood and erosion control and resultant receiving water quality improvement) of completed and operating storm remedial systems. We need an assessment for charting future directions.	
Title: Environmental Impact of Urban Stormwater Runoff (Grant)	Amount: \$150,000
Discussion: Assess the national environmental impact of urban stormwater runoff by resolving key technical questions (i.e. design	

storm or critical period criteria, pollutants to be controlled and remedial requirements to change a receiving water condition). This requires ranking receiving waters as to sensitivity to runoff and assessing different regions to establish guidelines for meeting Water Quality Standards

Title: Upgrading an Anaerobic Digester for Greater Gas Production
(Grant)

Amount: \$121,000

Discussion: Demonstrate the upgrading of an anaerobic digester for greater gas production by returning solids, adding activated carbon, and/or operating in thermophilic mode. Anaerobic digestion upgrading will contribute to better municipal sludge management.

Title: Desk Top Review of Process Combinations (Contract)

Amount: \$250,000

Discussion: Desk top review of process combinations resulting in a recommendation of treatment system suitable for ocean discharge. Design and construct least costly system. Operate pilot plant to provide effluent for OHEE for marine ecological research.

Title: Innovative High-Rate Suspended Growth Systems (Contract)

Amount: \$75,000

Discussion: Evaluation of innovative high-rate suspended growth systems with potential savings in energy, volume, and/or space requirement.

Title: Evaluation of Aquaculture Systems as a Waste Treatment
Process (Grant)

Amount: \$ 50,000

Discussion: Study various aquatic organisms such as fish, shellfish,
and various combinations for nutrient management and
solids removal from primary and/or secondary conven-
tional treatment processes.

Water Quality

Research and Development

Monitoring and Technical Support

Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
(dollars in thousands)				

Appropriation
Measurement Techniques
and Equipment
Development.....
Technical Support.....

\$3,294	\$3,413	\$3,366	\$4,266	+\$900
1,418	1,171	1,283	1,283	...

Total.....

4,712	4,584	4,649	5,549	+900
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Permanent Positions
Measurement Techniques
and Equipment
Development.....
Technical Support.....

78	97	77	77	...
24	12	32	32	...

Total.....

102	109	109	109	...
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Budget Request

An increase of \$900,000 is requested to provide for the development of new measurement techniques and systems for measuring the extent and magnitude of water pollutants. Of this increase, \$700,000 would be used to develop new measurement methods to comply with the 1976 Settlement Agreement of the Consent Decree requiring EPA to develop effluent standards for 65 compounds and families of compounds. These new methods will be applicable to measuring the presence of these compounds in waste streams from both municipal and industrial sources. Current methodology for measuring the compounds and families of compounds covered by the Consent Decree are either presently unavailable or are of unknown applicability to measure these pollutants in the waste streams of interest. Under the terms of the Consent Decree, the effluent guidelines, and therefore the methods to measure the presence of pollutants in these effluents, must be available by calendar year 1983. The remaining \$200,000 is for the development of sample collection and preparation techniques for trace organics in water and analytical procedures for non-volatile organic constituents in water. Current sample collection and preparation techniques do not provide results that are representative of the actual levels of volatile and non-volatile organic substances in water. In addition, only the volatile organic substances, which make up 10 percent to 15 percent by weight of the total organic content of water, can readily be identified and measured. The remaining 80 percent to 90 percent are non-volatile and may include several carcinogenic and otherwise hazardous substances. Because these organic compounds have a wide variety of physical and chemical properties, a substantial development effort will be required if suitable analytical methods are to be available for problem identification and assessment by calendar year 1983. This effort is crucial in view of the increasing evidence that a substantial fraction of the cancer incidence is due to environmental pollutants. The additional funds will be used to increase extramural projects on these problems.

Program Description

The monitoring and technical support program relating to water quality supports two activities: (1) the development and adaptation of equipment and techniques to measure pollutants contained in surface and ground waters, sludges and soils, and the effluents from municipal, industrial, and nonpoint sources; and (2) the provisions of technical support by which the results of research and development programs and the expertise of researchers are made available for Agencywide use in response to specific requests for support. This technical support activity is planned for and provides resources to respond to both continuing and emergency requests for laboratory and monitoring support.

1976 Accomplishments

The FY 1976 resource level for this subactivity was \$4.7 million and 102 positions. These resources were allocated in three main areas: (1) the development of measurement methods for problem identification and assessment; (2) evaluation and adaptation of measurement methods for use in the NPDES and other enforcement activities and in Federal and State water quality monitoring programs; and (3) providing technical support to other EPA programs.

Resources of \$2.3 million and 42 positions were allocated to the development of methods for problem identification and assessment. These resources included \$.4 million in contracts and \$.2 million in grants. These efforts will result in new or improved methods applicable to classes of substances including trace elements, organics and viruses. An interim reference method for water borne asbestos was proposed and the development of a method specifically for methyl mercury was completed. Also, the characterization of organic constituents in typical municipal wastewaters was completed.

The development, adaptation and evaluation of measurement methods for use in Federal and State monitoring and enforcement programs was supported by \$1.0 million and 48 positions, used intramurally.

Work proceeded on the evaluation and improvement of candidate and reference methods required for compliance and other monitoring activities, particularly the NPDES and ocean dumping activities. The methods include procedures for the biological monitoring of effluents and ambient waters and for the identification of significant microbiological organisms. The approved test procedures for the NPDES program, as published in the Federal Register, October 1973, were updated and methods for the determination of radioactive substances in water supplies has been prepared and methods have been developed for measuring volatile halogenated organics in raw and potable waters. In the biological area a computerized system was developed for the storage, retrieval and analysis of biological data collected in monitoring programs and will provide an important service to Federal and State monitoring programs.

In the technical support area, the resource level was \$1.4 million and 24 positions. The funds were expended through the research laboratories to conduct a number of short-term studies for other Agency programs. Of this amount, approximately \$.7 million was used for contracted support.

During calendar year 1976, the technical support program implemented a unified planning and management system which has improved the responsiveness of the research and development program to the scientific and technical needs of the Agency. Accomplishments included aerial river surveys to detect industrial and municipal waste outfalls; a water quality study of a major river basin to evaluate potential environmental impact of development; provision of expert testimony on analytical methods for pesticides and herbicides in support of Section 307(a) standards, and on viruses in sludge in support of ocean dumping regulations; and the identification of organic pollutants in ground water, drinking water and industrial wastes for four regions. Chemical analyses for heavy metals and radiological contaminants were also conducted for enforcement activities, and quality control and specialized analyses were provided to support the Water Supply Surveys.

1977 Program

The FY 1977 resource level in this subactivity is \$4.6 million and 109 positions. These resources are allocated in the same three program areas as in FY 1976.

Resources of \$2.2 million and 41 positions are allocated to the development of measurement methods for problem identification and assessment. Of these resources, \$.3 million are in contracts and \$.2 million are in grants. Among the projects to be completed this fiscal year are efforts to improve the procedures for identifying and measuring volatile organic substances. A prototype automatic sampler for these organics will be completed along with more efficient procedures for their identification whether they have been previously detected in waters or not. Both of these developments should lower the cost of analysis for the volatile organics which include several suspected carcinogens. A similar effort is aimed at improving the techniques for sampling and analysis for trace elements to provide accurate results rapidly and at low cost. Also, the characterization of wastewaters from organophosphate manufacturing plants will be completed.

Resources of \$1.1 million and 36 positions are allocated to the development or adaptation of measurement methods for use in various monitoring programs and as reference methods in connection with NPDES and other regulatory activities. Of these total resources, approximately \$.3 million will be allocated to grants. Work is directed toward improving the reliability and accuracy of laboratory analytical procedures and to lower the cost of these procedures through automation. New reference methods for selected hazardous pollutants of major environmental concern will be developed. Kepone, benzidine, endrin, arsenic and others from a list of 65 which the Agency is under court order to review for possible regulation will be the early candidates for reference methods. Other activities include the adaptation of a bacterial mutagen test to allow routine monitoring of water for carcinogenic substances and bioassay procedures to be used in the monitoring activities of the NPDES program.

In FY 1977, the technical support program will provide resources of \$1.3 million and 32 positions for analytical services in support of: the water supply program; monitoring for viruses in wastewater treatment; collection and analysis of sludges, lake, river, and ocean samples; preparation and distribution of quality control and performance evaluation samples; and special performance evaluation studies for certification of water supply laboratories. Of these total resources, approximately \$.2 million will be used for contracts.

Water Quality

Monitoring and Technical Support

Measurement, Techniques, and Equipment Development

Significant Extramural Projects - FY 1977 Program

Title: Rapid Screening for Asbestos (Contract)

Amount: \$ 75,000

Discussion: The objective of this contract is to develop a method for rapidly analyzing water samples for asbestos content through new and unique and simple approaches that do not depend upon electron microscopy.

1978 Plan

The FY 1978 program for this subactivity includes resources of \$5.5 million and 109 positions. This is an increase of \$.9 million. Of these resources, approximately \$.7 million will be allocated to grants, \$1.2 million to contracts, and \$.1 million to interagency agreements.

The development of problem assessment methods will be allocated \$2.4 million and 41 positions, an increase of \$.2 million. This increase will be used to develop an accurate and reproducible technique for the collection, preconcentration, and separation of volatile and non-volatile trace organics in water; and to develop analytical measurement methods for non-volatile organic substances known to be in water but which cannot now be individually identified. Work will continue on the characterization of wastewaters and on methods for special trace element species such as organic complexes of heavy metals. Methods for the detection of viruses in water and sludges are not suitable for use outside of the research laboratory and work will continue on improvements in this area.

A maximum effort program utilizing \$.7 million will be initiated to develop the measurement methods and systems which are a critical portion of the Agency's implementation of the Consent Decree requiring EPA to develop effluent standards for 65 compounds and class of compounds. The criticality of this program results from the Consent Decree issued by the U. S. District Court in Washington, D. C. where the Court found that the hazardous properties of the 65 compounds and families of compounds and their suspected presence in industrial and municipal effluents required immediate attention. The Agency must insure that proven methodology is available to measure the regulated concentration of these materials in the waste streams. Moreover, these methods must be inexpensive to operate and generally useable by the dischargers to demonstrate their compliance with the effluent guidelines.

In another program activity, the development of monitoring and reference methods will be allocated \$1.1 million and 36 positions. The program will continue to develop, adapt and update

analytical methods as required to meet the Agency's needs in the enforcement and monitoring areas. Emphasis will be on the extension of NPDES test procedures to sludge and ocean disposed wastes. Other activities in this area will focus on in-plant biomonitoring techniques and the preparation of an updated microbiological methods manual for use in Federal and State monitoring programs.

In FY 1978 the resources allocated to water quality technical support will be \$1.3 million and 32 positions. This activity will continue to provide technical expertise and consultation, laboratory support services, and quality assurance techniques for Agency operating programs on matters related to the analyses of water, wastes and sediments.

None of the requested FY 1978 increase will be used for procurement of ADP items.



Construction Grants
(Dollars in Thousands)

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
Authority	...	...	\$5,900,000	\$5,200,000	-\$700,000
Appropriation	...	...	(5,900,000)	(5,200,000)	(-700,000)
Contract Authority	...	...	...	...	...
Funds Available	\$7,394,312	\$68,070	\$6,300,000	\$4,900,000	-\$1,400,000
Appropriation, at end of year	(127,806)	(68,070)	(5,300,000)	(4,900,000)	(-400,000)
Contract Authority at end of year	(7,266,506)	...	(1,000,000)	...	(-1,000,000)
Obligations	4,329,228	\$6,076,420	\$6,000,000	\$6,600,000	\$ 600,000
Appropriation	(63,336)	...	(700,000)	(5,600,000)	(4,900,000)
Contract Authority	(4,265,892)	(6,076,420)	(5,300,000)	(1,000,000)	(-4,300,000)
Outlays	2,428,569	\$3,770,000	4,380,000	5,200,000	+820,000
Appropriation	(662,905)	(400,000)	(620,000)	(200,000)	(-420,000)
Contract Authority	(1,765,664)	(3,370,000)	(3,760,000)	(5,000,000)	(+1,240,000)
Liquidation of Contract Authority	800,000	\$4,100,000	3,800,000	5,000,000	+1,200,000

Budget Request

In FY 1978, new budget authority of \$5.2 billion is being requested for the construction grants program, of which \$5.0 billion will be used to supplement existing authority in the award of new construction grants and \$200 million will provide increased reimbursement to those projects eligible under Section 206(a) of P.L. 92-500. The following table reconciles this new request with expected obligation levels in FY 1977 and FY 1978.



	(Dollars in Millions)			
	Balance of Authority Oct. 1, 1976	FY 1977 Obligations	FY 1978 Obligations	Balance to Carryover Into FY 1979
<u>New Budget Authority:</u>				
Construction Grants (Title II):				
P.L. 92-500 (\$18 B)	\$ 6,300	5,300	1,000	---
Talmadge/Nunn (\$700 M)	---	200	400	100
FY 1977 New Authority (\$5 B)	---	200	3,000	1,800
FY 1978 Request (\$5 B)	---	---	2,000	3,000
SUBTOTAL	6,300	5,700	6,400	4,900
Reimbursable Grants (Section 206(a)):				
P.L. 93-207 (\$1.9B)	100	100	---	---
P.L. 94-378 (\$200 M)	---	200	---	---
FY 1978 Request (\$200 M)	---	---	200	---
SUBTOTAL	100	300	200	---
TOTAL:	6,400	6,000	6,600	4,900

The \$5 billion requested for new construction grant activity will supplement carryover funds to provide obligations of \$5.7 billion in FY 1977 and \$6.4 billion in FY 1978. The \$3 billion carryover balance of the \$5 billion new authority will be fully obligated by FY 1980, in accordance with an amendment submitted to Congress by EPA to allow two years from the date of the appropriation to fully obligate available funds.

The request for \$5 billion in both FY 1977 and FY 1978 links directly to the EPA long term strategy of providing level funding over a period of years (beginning in FY 1977) to meet the most critical treatment needs as soon as practicable. The \$5 billion level is based on a judgement regarding the optimum continuing construction program both feasible under Federal budgetary constraints and commensurate with principles of good construction planning and management. EPA has submitted several amendments to P.L. 92-500 in conjunction with requests for additional funding to revise or eliminate certain treatment category eligibilities and lower the federal share on others. Enactment of these amendments and a commitment to a \$5 billion per year level funding appropriation by Congress will result in meeting all of the critical needs categories (treatment plants, infiltration/inflow, interceptors, and combined sewers) by 1987.

Providing these additional funds beginning in FY 1977 allows the program to continue with on-going activities without serious disruption to planned construction schedules. Individual State allotments from the \$18 billion under P.L. 92-500 will be totally obligated in many States by FY 1977 and in all but a few States by FY 1978. Providing no new funding under these circumstances would seriously impact the Federal pollution control objectives through delay or cancellation of construction on projects that had been fully planned and designed under previous federal grants.

The \$200 million requested for reimbursement of eligible Section 206(a) projects would bring the total funds appropriated to \$2.3 billion. This new increment would supplement the \$200 million appropriated by Congress in FY 1977 and the \$1.9 billion previously provided. A new round of obligations for those projects determined eligible under Section 206(a) will be made to raise the reimbursement level to between 80% - 90% of the total potential eligible reimbursement amount.

Program Description

This program provides grants to municipal, intermunicipal, State, and interstate agencies to assist in financing the planning, design, and construction of municipal waste water treatment facilities. Amounts made available for obligation are allotted to each State on the basis of formulas set forth in the Federal Water Pollution Control Act Amendments of 1972 and subsequent legislation. Within these allotments, grants are awarded on a priority basis for individual projects. Each project is eligible for 75 percent in Federal assistance, although amendments submitted by EPA would adjust the federal percentage for certain treatment categories.

The Federal Water Pollution Control Act Amendments of 1972 substantially altered methods of funding the construction grants program and the methods of providing assistance to individual projects. Under the amendments, both the percentages of Federal grants and the annual amount of monies authorized and appropriated were increased over levels previously available. Subsequent legislation is expected to increase funding further and enact several amendments to change portions of the Act, but is not expected to substantially alter the scope nor intent of the current FWPCA.

Under the existing legislation, a three step approach to funding projects has been adopted. The first step is development of the facilities plan, which includes a preliminary description of the project, a cost effectiveness analysis of several alternatives, an environmental assessment, an infiltration/inflow analysis, and identification of effluent discharge limitations. The second step is the development of design plans and specifications. The third and final step is to fund the actual construction of the treatment works. Grants are made for each of these steps, with funding of subsequent steps contingent on funding availabilities and successful completion of prior Steps. Payments against these obligations will be made to the applicant as all or portions of each of these elements are completed.

Funding for the program includes both contract authority and budget authority. For obligations incurred under contract authority, payments cannot be made until funds are provided through appropriation of funds to liquidate contract authority. The initial \$18 billion authorized under P.L. 92-500 was contract authority. The reimbursable funds and all future construction funds will be provided through new budget authority legislation.

FY 1976 Accomplishments

During FY 1976, EPA awarded 3,977 new grants totaling \$4.1 billion. Total outlays for this program reached \$2.4 billion. This level exceeded the FY 1974 outlay level by almost \$500 million, and was the highest level of payments in a single fiscal year since the program began.

At the end of FY 1976, the number of on-going projects from this year and all prior years awards totalled 8,367, representing \$14.4 billion in obligations. During FY 1976 1,662 awards were completed.

FY 1977 Program

A total of \$6.0 billion in obligations are expected to be made during FY 1977. This will include over 5,750 new awards totalling \$5.7 billion for the planning, design and construction of treatment facilities. By the end of the year, approximately 9,930 projects will be in various stages of pre-construction or construction activity. Total outlays for FY 1977 for all portions of the program are estimated to increase to \$4.380 billion, a jump of \$1.951 billion from FY 1976. Approximately \$300 million will be obligated to reimburse eligible projects under Section 206(a) during FY 1977.

This level of activity assumes legislative action a) to increase the amount available under Section 206(a) by \$200 million; b) to provide \$700 million for selected States under the Talmadge/Nunn proposals; c) to appropriate an additional \$5 billion in FY 1977 for construction grants; and d) to amend the FWPCA to allow funds to remain available two years after the year of appropriation.

FY 1978 Program

In FY 1978, obligations totalling \$6.6 billion and outlays of approximately \$5.2 billion are being planned. The construction grants program anticipates obligations of \$6.4 billion, comprising approximately 6,500 new awards. Total projects in various stages of completion at the end of FY 1978 will number over 11,000. Additional budget authority of \$5 billion for this purpose is being requested. Carryover authority into FY 1979 for current and past appropriations will be \$4.9 billion.

Approximately \$200 million is expected to be obligated under Section 206 during FY 1978. New funding totalling \$200 million to supplement unobligated balances is being requested for this purpose.

The following table summarizes the FY 1978 program and compares the activity levels to the previous two years:

<u>Item</u>	<u>FY 1976 Actual</u>	<u>FY 1977 Planned</u>	<u>FY 1978 Requested</u>
Total Obligations (\$ M)	\$ 4,141.0	\$ 6,000.0	\$ 6,600.0
New Step 1 Awards	2,341	2,500	2,500
New Step 2 Awards	724	2,000	2,600
New Step 3 Awards	911	1,250	1,400
Active Projects	8,367	9,930	11,350
Project Completions	1,662	4,300	5,080
Total Outlays (\$ M)	\$ 2,429	\$4,380	\$5,200



Water Supply

Program Highlights

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase+ Decrease- 1978 vs 1977
(Dollars in Thousands)					
Abatement and Control					
Appropriation	\$17,042	\$30,419	\$31,126	\$46,126	+\$15,000
Permanent Positions	152	209	203	405	+202
Transition Quarter Est....	7,907	N/A	N/A	N/A	
Enforcement					
Appropriation	81	81	154	1,054	+900
Permanent Positions	4	4	7	43	+36
Transition Quarter Est....	21	N/A	N/A	N/A	
Research and Development					
Appropriation	8,492	13,254	13,227	15,727	+2,500
Permanent Positions	89	85	86	101	+15
Transition Quarter Est....	3,710	N/A	N/A	N/A	
Total - Water Supply Program					
Appropriation	25,615	43,754	44,507	62,907	+18,400
Permanent Positions	245	298	296	549	+253
Transition Quarter Est....	11,638	N/A	N/A	N/A	

OVERVIEW AND STRATEGY

The safety of the Nation's drinking water supplies generally has been taken for granted by the American public. However, analyses of tap water samples indicated one or more bacteriological or chemical constituents exceeded the limits in the 1962 Public Health Service Standards. The 1969 community water supply study conducted by the Department of Health, Education and Welfare covering 969 systems indicated the following types of problems. Many systems evidenced physical deficiencies including inadequate disinfection and clarification capacity and insufficient system pressure. In addition, plant operators were found to be poorly trained in fundamental microbiology; also many systems were not inspected regularly by State or local authorities. Furthermore, not only may the safety of the Nation's drinking water supplies be questionable, but the ground water sources of drinking water may be endangered through increased contamination. The Federal Water Pollution Control Act (FWPCA), as amended, does not provide a Federal control system that adequately protects underground drinking water sources due to its restricted coverage. The FWPCA does not extend coverage to the regulation of deep well waste injections not carried out in conjunction with a discharge into navigable waters.

The misplaced confidence in the safety of the Nation's drinking water is attributable to a number of factors. One of these is the lack of public awareness concerning the potential health risks resulting from exposure to contaminated drinking water. Many towns and cities are not applying reasonably available treatment technology and techniques. In some cases adequate treatment technology has not been developed or is economically unfeasible. In addition, economic, industrial and environmental practices introducing new compounds into the environment have resulted in increasing concentrations of potentially harmful chemicals entering the Nation's drinking water. Environmental requirements limiting atmospheric and surface disposal of wastes have made underground disposal more attractive economically.

Safety of the drinking waters is primarily the concern of State and local governments. However, the Congress has determined that the Federal Government shares in this responsibility for the causes

and effects of unhealthy drinking water are not confined within the borders of State or local jurisdictions. The solution to the problem is to be found in a cooperative effort in which the Federal Government assists, reinforces and sets standards for State and local efforts.

Federal involvement in water supply as legislated in the Public Health Service Act and the Interstate Quarantine Regulations was very limited. The program authority applied to approximately 700 water supply systems serving interstate carriers and was limited to the control of communicable diseases. In 1974, the Safe Drinking Water Act, an amendment to the Public Health Service Act, greatly expanded the Federal authority. The Act provides coverage of all public water systems and protects the Nation's ground water sources of drinking water from contamination through underground injection and regulates the chemical, radiological and bacteriological constituents of drinking water.

The provision and assurance of safe drinking water to all Americans will take several years. There are approximately 60,000 community water supplies, 200,000 non-community supplies, and 200,000 underground injection facilities covered by the Safe Drinking Water Act. The statute is very specific on regulatory requirements to protect the public health and to protect ground water sources of drinking water. To date, the Federal water supply activities have focused on the development of Interim Primary Drinking Water Regulations based on the 1962 Public Health Service Standards. These regulations are designed to protect the public from adverse health affects. These national drinking water regulations which specify the maximum permissible bacteriological, radiological and chemical constituent levels required to protect the public health have been established and will be enforceable after June 1977. Regulations prescribing the requirements for a minimum State program for the assumption of primary enforcement responsibility for public water systems supervision and for a minimum State program to control the underground injection of contaminants which may endanger ground water sources of drinking water have also been developed. The enforcement of regulations is the primary responsibility of the States with technical and financial support from the Federal

Government. The States, however, must satisfy requirements for a minimum State program prior to approval for primary enforcement responsibility (primacy). Should a State be unwilling to or incapable of satisfying these minimum requirements, the Federal Government is required by statute to establish and enforce a program within that State.

Interim Primary Drinking Water Regulations were promulgated on December 24, 1975, and will become effective in June 1977. The drinking water implementation regulations specifying the requirements for minimum State programs and State program grant regulations have been available since January 1976. Based upon these requirements, 53 States and territories have expressed their intent to work toward the assumption of primacy by June 1977. In many instances, this will require approval within the respective State legislatures. The State primacy applications for FY 1977 are expected very shortly. The underground injection control regulations were proposed in August 1976. A list of those States requiring an underground injection control program will be published in the Federal Register and these States will have one-year to assume primary enforcement responsibility.

The program policy and strategy recognize that all problems cannot be resolved immediately. As such, the regulations rely on a phased approach to implementation providing adequate time for a State to satisfy the monitoring, surveillance, public notification, reporting, and recordkeeping requirements. In addition, to permit the States to assume the primary role for assuring the safety of drinking water, participation by State representatives and responsible interest groups and citizens has been incorporated into the regulatory development process. Special attention was given to protection of public health, economic impact and building on existing State institutions.

The major program emphases for the coming budget year are three-fold: (1) establish standards for organics and develop feasible treatment technology, (2) provide sufficient financial assistance to the States to encourage the maximum number to seek primary enforcement responsibility for public water systems supervision and underground injection control programs, and (3) implement a Federal program in those States that definitely refuse to seek primacy or are unable to assume primacy. The goal is to have the States and local governments assume the principal role in assuring safe drinking water with the Federal Government providing technical and financial support.

The Safe Drinking Water Act clearly defines the role and responsibilities of the Federal and State governments. The Federal Government is responsible for (1) the establishment of regulations which protect the public health, (2) technical and financial assistance, and (3) program implementation in States without primacy. The Congressional intent was that the States would primarily be responsible for the day-to-day operations to assure the safety of drinking water for its citizens through public notification and citizen suits. The citizen's role was included on the basis that an informed public is the best guardian of its own health and safety.

Water supply abatement and control is developing a coordinated program in which the research and development efforts will play a significant part in the development of regulations and the setting of standards. Research priorities will be implemented by the Office of Research and Development in consideration of needs and priorities of abatement and control activities. Research will continue to study the causes, diagnosis, treatment, control, and prevention of diseases and other impairment of man resulting directly or indirectly from contaminants in water. The objectives are to develop criteria for drinking water constituent limits with particular emphasis on organic, inorganic, and microbiological contaminants.

The products of these activities include: (a) improved methods to identify and measure the existence of contaminants; (b) improved methods to identify and measure the health effects of contaminants in drinking water; (c) new or improved methods of treating raw water to prepare it for drinking, so as to improve the efficiency of water treatment and remove contaminants from water; and (d) improved methods of protecting underground water sources of public water systems from contamination.

During FY 1978, research will concentrate on organics and nitrogen chemistry and the analytical and disinfection methods and treatment technology to address this problem. Research will be conducted to develop and implement quality assurance procedures and protocols for water supply laboratories to assure that data is accurate and legally defensible. Resources for this effort are included under the interdisciplinary activity as part of a comprehensive quality assurance program for all environmental media.

Enforcement will be exercised only when there is a clear need for Federal action. Enforcement activities will include investigation and initiation of civil or criminal actions for violations of Interim Primary Drinking Water Regulations in States without primary enforcement responsibility, monitoring of enforcement actions of States with primacy and initiation of Federal action when States have failed to act, and response to emergency situations. Enforcement in States without primacy will be pursued as required. Generally, Federal oversight in those States with primacy should require a lower level of effort. Since the program is entering its first year of implementation in FY 1977, enforcement efforts will evolve as experience with the states in the implementation of the public water systems supervision and underground injection control programs progress.

Summary of Increases and Decreases (dollars in thousands)

FY 1977 Water Supply Program..... \$44,507

Abatement and Control..... +15,000

The increase of \$10.0 million is for State grants for the public water systems supervision and underground injection control programs. Five million will be used for contracts relating to organics, for educational activities and for salaries of additional personnel for criteria, standards, and guidelines development, EPA public water systems supervision implementation, and underground injection control program initiation.

Enforcement..... +900

The increase of \$900,000 is to establish regional public water systems supervision enforcement capability.

Research and Development..... +2,500

The increase of \$2.5 million will be used to determine occurrence and effects of potential carcinogens in drinking water, to develop monitoring and analytical methods, and to determine applicability of bench level existing carcinogen removal techniques. Epidemiological studies of the relationship of water hardness to heart disease and other problems will be conducted. Cost effective advanced treatment techniques will be demonstrated at pilot plant level and large-scale system technology for inorganics removal will be adapted to small community water supply systems.

FY 1978 Water Supply Program Request..... 62,907

Water Supply

	Actual 1976	Current Estimate 1977	Estimate 1978	Increase+ Decrease- 1978 vs 1977
<u>Program Levels</u>				
State applications for public water systems supervision	53	54	47 ¹	-7
States with primary enforcement responsibility for public water systems supervision programs		47	54	+7
State applications for underground injection control grants		31 ²	35 ³	+4
States with primary enforcement responsibility for underground injection control programs		25	32	+7

- ¹ To be eligible for FY 1978 grants, a State must have been approved for primacy in FY 1977.
- ² Based on the assumption that 31 States (all oil and gas producing States) are designated by the Administrator as requiring underground injection control programs. However, a State may petition the Administrator to be designated.
- ³ Although the State program regulations require designated States to assume primacy within 270 days after the date of promulgation, the grant provisions extend grant eligibility of designated States to 2-years upon a formal declaration of intent to assume primacy. After the two-year period, a designated State without primacy will not be eligible for grants.

WATER SUPPLY ENFORCEMENT

Program Levels

	<u>Actual 1976</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>	<u>Increase+ Decrease- 1978 vs 1977</u>
<u>Public Water Supply Systems</u>				
Program Review and Evaluation		54	7	-47
Program Approvals		47	7	-40
Primary Enforcement Actions			25	+25
Overview Enforcement Actions			75	+75



Water Supply

Abatement and Control

Appropriation Criteria, Standards, and Guidelines	Actual 1976	Budget	Current	Estimate	Increase+	Page
		Estimate 1977	Estimate 1977	Estimate 1978	Decrease- 1978 vs 1977	
State Program Resource	\$3,884	\$4,973	\$6,798	\$9,398	+\$2,600	WS-13
Assistance	10,907	20,000	21,000	30,000	+9,000	WS-18
Strategy Implementation ..	2,251	5,446	3,328	6,728	+3,400	WS-22
Total	17,042	30,419	31,126	46,126	+15,000	

Permanent Positions Criteria, Standards, and Guidelines	57	48	65	95	+30	
State Program Resource Assistance	...	...	...	...	...	
Strategy Implementation ..	95	161	138	310	+172	
Total	152	209	203	405	+202	



Purpose

The water supply abatement and control appropriation encompasses activities relating to the development of regulations and establishment of standards necessary to protect the public health and welfare, the development of control strategies and programs and the implementation of such programs as mandated by the Safe Drinking Water Act of 1974. These activities include the promulgation of primary and secondary drinking water regulations which include maximum contaminant levels, the establishment of minimum requirements for State public water systems supervision and underground injection control programs and the Federal implementation of these programs if necessary.

EPA's water supply abatement and control activities are directed toward the goal of providing safe drinking water to all Americans through the attainment and maintenance of the primary drinking water regulations. The first program priority is to develop primary drinking water standards to protect the public from drinking water constituents which have an adverse health affect. This includes the establishment of standards relating to recent findings on organics, the economic analyses on public water systems supervision, and the development of feasible treatment technology. The second program priority is to assist the States in assuming the primary role in implementation of the public water systems supervision and the underground injection control programs. The Act requires the establishment of a program on Indian reservations and the operation of a program covering interstate carrier conveyances. In addition, Federal implementation of programs will be necessary in States without primacy.

Research and development activities are designed to support the development of primary drinking water regulations through research findings on health effects and the development of treatment techniques. The enforcement activities, on the other hand, are designed to insure compliance with regulations. Where States have primary responsibility for program implementation, EPA's enforcement activities will be directed to responding to emergency situations and providing back-up assistance in implementing and enforcing the regulations.

The abatement and control activities are categorized under the following subactivities.

Criteria, Standards and Guidelines. This subactivity is related to the development of drinking water standards and regulations and to the development of State program guidelines and regulations. This activity includes development of information from fundamental studies on health effects, control technology and monitoring to determine the concentration of hazardous substances in the environment. This includes microbiological (bacteria and virus) and toxic chemicals from natural and synthetic sources. Economic analyses associated with these activities will also be included. Under this subactivity, the primary and secondary drinking water regulations are established and the minimum requirements for State programs for the public water systems supervision and underground injection control programs are established. In addition, guidance to the Regions for program implementation is provided.

State Program Resource Assistance. This subactivity involves the provision of resources to support State activities in implementing the public water systems supervision and underground injection control programs as well as to provide training in the water supply field. The primary responsibility for assuring the safety of the drinking water rests with the States. If the States are to effectively implement this responsibility and thereby eliminate or reduce the need for direct Federal involvement, Federal resource assistance is required.

Strategy Implementation. This subactivity is related to the implementation of regulatory requirements for which the Federal Government is responsible. This includes program oversight in States with primacy as well as program implementation in States without primary enforcement responsibility, on Indian reservations and the interstate carrier conveyances programs. Other activities include technical assistance to States in the implementation of public water systems supervision programs and in the establishment of underground injection control programs; technical evaluations of petitions for designation of sole source aquifers; coordination with 208 programs to ensure proper consideration of water supply activities; and technical and policy guidance relating to underground injection.

Water Supply
Abatement and Control
Criteria, Standards, and Guidelines

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase+ Decrease- 1978 vs 1977
(Dollars in Thousands)					
<u>Appropriation</u>					
<u>Drinking Water Standards and</u>					
Regulations Development	\$2,143	\$3,194	\$2,298	\$3,598	+\$1,300
State Program Guidelines and					
Regulations Development	1,741	1,779	4,500	5,800	+1,300
Total	3,884	4,973	6,798	9,398	+2,600
<u>Permanent Positions</u>					
<u>Drinking Water Standards and</u>					
Regulations Development	57	32	43	58	+15
State Program Guidelines and					
Regulations Development	...	16	22	37	+15
Total	57	48	65	95	+30

Budget Request

An appropriation of \$9,398,000 and 95 positions is requested for FY 1978. This represents an increase of \$2,600,000 over the FY 1977 appropriation. The funds will be used for contracts in determining exposure and health risks of some contaminants and in conducting technological and economic feasibility of controlling these contaminants. The additional personnel will develop standards and program guidance documents necessary for implementation of the public water systems supervision and underground injection control programs.

Program Description

The Safe Drinking Water Act of 1974 requires EPA to assure the safety of the drinking water through the establishment and enforcement of national drinking water regulations specifying maximum permissible bacteriological, chemical and radiological constituent levels required to protect the public health and welfare. Maximum contaminant levels for organics and the appropriate treatment techniques to control these contaminants are being developed. EPA was responsible for the establishment of the requirements for a minimum State program for public water systems supervision that would meet the Interim Primary Drinking Water Regulations which become effective on June 24, 1977, and for underground injection control which would protect ground water sources of drinking water. This includes the development of program guidance documents and strategies for program implementation for which the responsibility is with the regions or State governments.

1976 Accomplishments

The FY 1976 resources were allocated between drinking water standards and regulations development and State program guidelines and regulations development. Development of drinking water standards and regulations included approximately \$2.0 million in contract support obligations and commitments, primarily for the National Academy of Sciences study, the conduct of economic analyses on the proposed regulations and studies on health assessments of various contaminants in drinking water such as asbestos, viruses, hydrocarbons, etc. In addition, a major contract relating to home water treatment

devices was funded. These activities are expected, where necessary, to result in the establishment of maximum contaminant levels for these constituents and the promulgation of revised primary drinking water regulations in the forthcoming fiscal year. Interim primary drinking water regulations were promulgated in December 1975 and will become effective on June 24, 1977. As a result of the discovery of organics in drinking water which may be harmful to man, EPA published in the Federal Register an Advance Notice of Proposed Rulemaking requesting data. As data becomes available on human health effects, revised standards and regulations will be issued.

The development of State program guidelines and regulations included \$1.5 million in contract/grant obligations and commitments. Development grants totalling \$251,000 were awarded to the States early in the fiscal year to enable the initiation of activities relating to the assessment of current legislative and statutory authorities, assessment of ongoing activities, etc., leading to the assumption of primary enforcement responsibility by the States. Grants were awarded for the conduct of certain portions of the rural water survey, for the development of technical materials to be used by small water systems and for disseminating information to the public. An interagency agreement with the Office of Education was negotiated for the purpose of designing an educational program to upgrade the training of present utility operators and to encourage the pursuit of an occupation in the water supply field. All of these activities have been initiated to encourage and assist the States to assume their full responsibility for assuring the safety of the drinking water. These activities were initiated in support of the drinking water implementation regulations which specify minimum requirements for State programs for public water systems supervision and underground injection control. These regulations were promulgated and will become effective in FY 1977 and FY 1978 respectively.

FY 1977 Program

The FY 1977 resource level for this subactivity is \$6,798,000 and 65 positions allocated between drinking water standards and regulations development and State program guidelines development.

The standards and regulations development activity is allocated \$2,298,000 and 43 positions. Approximately \$1,000,000 will be used for contract support in evaluating health affects on specific contaminants in drinking water, and in providing the capability to perform special studies on problem areas. The findings from projects funded in the prior fiscal year will be used to establish regulations and to set standards and will also identify requirements for further investigations. The major outputs planned include the promulgation of revised primary drinking water regulations, the development of procedures relating to quality assurance and laboratory certification and a revised economic analysis for the regulations. Activities relating to the assessment of health risks, economic impact and treatment techniques will continue.

The State programs guidelines and regulations development activity is allocated \$4,500,000 and 22 positions. Approximately \$3,700,000 is allocated for grants/contracts. A substantial amount of the funds will be used for completion of the rural water survey and the development of a data processing system associated with data collection and record keeping on the underground injection control program. Contracts relating to the costs of implementing the regulations will be initiated. In addition, projects relating to economic studies on implementing the underground injection control regulations, training, and public information will be funded.

FY 1978 Plan

The FY 1978 plan for this subactivity includes \$9,398,000 and 95 positions, an increase of \$2,600,000 and 30 positions over FY 1977. These additional resources will be allocated equally between the same two activities as FY 1977. No portion of the FY 1978 increase will be used for procurement of ADP hardware or software. The increase is primarily to provide additional

contract funds totalling \$1,000,000 for the development of standards and regulations, particularly in completing the basic assessment of exposure and health risk of at least a few of the 100 environmental health hazard contaminants expected to be identified. Studies of the technological and economic feasibility of controlling these selected contaminants will be examined and developed as may be necessary. Furthermore, a groundwork for launching a major initiative to develop new approaches to water treatment technology will be developed. The results of these efforts will form the data base for establishing standards for a few of the 157 contaminants presently being examined by the National Academy of Sciences. The additional positions will be used to develop standards for some of the contaminants posing a health hazard.

Control strategies and programs will be developed for implementation in areas where the Federal Government will have primary enforcement responsibilities. Guidance documents to assist States in implementation of underground injection control programs will be prepared. Contract funds will be used to obtain information on ground water. Furthermore, as the primary drinking water regulations are revised, it may become necessary to amend/modify the implementation regulations to reflect revised program requirements for public water systems supervision and underground injection control programs. An education effort totalling \$1.0 million will be initiated to inform the public, State officials and injection operators/utility operators of program requirements and changing regulations.

Water Supply
Abatement and Control
State Program Resource Assistance

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase- Decrease- 1978 vs 1977
		(Dollars in Thousands)			
Appropriation					
Public Water Systems Supervision					
Program Grants	\$6,907	\$15,000	\$15,000	\$20,000	+\$5,000
Underground Injection Control					
Grants	...	5,000	5,000	10,000	+5,000
Water Supply Training Grants	...	...	1,000	...	-1,000
Special Studies and Demonstrations .	4,000	...	...	...	...
Total	10,907	20,000	21,000	30,000	+9,000

Permanent Positions

...

Budget Request

An appropriation of \$30,000,000 is requested for FY 1978. This represents an increase of \$9,000,000 from the FY 1977 level. The public water systems supervision and underground injection control grants each will increase \$5,000,000; this is offset by a \$1,000,000 decrease in water supply training grant.

Program Description

Under the Safe Drinking Water Act, the States are intended to have the primary responsibility for implementation of the public water systems supervision and the underground injection control programs. The Congress, however, recognized that the States would require financial assistance to develop and maintain State programs that would satisfy the minimum requirements of the regulations designed to protect the public health and to protect ground water sources of drinking water. Financial assistance is available to the States for implementation of the public water systems supervision program and the underground injection control program. However, the Act provides that States applying for grant funds after one-year in the case of public water systems and two-years for underground injection control must have assumed primary enforcement responsibility for the respective programs.

These assistance programs are a means to strengthen the cooperative relationship between the Federal and State governments. It is the intent that through this partnership and assistance, the States will be able to assume primary responsibility for assuring the safety of drinking water.

1976 Accomplishments

The FY 1976 resource allocation for this subactivity was \$10,000,000. There were no grants for public water systems supervision and underground injection control prior to this. A \$4 million supplemental was appropriated in FY 1975 and obligated in FY 1976 for a demonstration project in Duluth, Minnesota.

The public water systems supervision grants allocation totalled \$7.5 million, with obligations of \$6.9 million. Fifty-three States applied for these grants and expressed their intention to assume primacy in one-year. The uncommitted funds of \$438,200 were reallocated to the 53 States on June 1, 1976.

The underground injection control grants allocation totalled \$2,500,000. These funds were not obligated due to the delay in proposing and promulgating the applicable State program regulations.

1977 Program

The FY 1977 resource level for this subactivity is \$21,000,000; an increase of \$11,000,000 over FY 1976 level.

A total of \$15,000,000 is available for the public water systems supervision grants. The grant applications for FY 1977 must be submitted by October 1, 1976. It is anticipated that 54 States will submit their applications.

A total of \$5,000,000 is available for the underground injection control grants. The State program and grant regulations are expected to be promulgated in January 1977. All designated States must submit applications by January 1, 1977; all other States petitioning the Administrator to amend the designations to include them are to submit their applications by April 1, 1977. In FY 1977, 31 States are expected to be designated by the Administrator as requiring underground injection control programs.

A total of \$1,000,000 is available for water supply training grants. The grants will be used for State fellowship programs designed to upgrade the professional capability of State personnel, for academic institutions for undergraduate/graduate training which is an extension of on-going activities and for interagency agreements, e.g., Office of Education for vocational education or higher education relating to the delivery of operator training and other short courses.

1978 Plan

The FY 1978 resource level requested for this subactivity is \$30,000,000; an increase of \$9,000,000 over the FY 1977 level.

The grant funds requested for public water systems supervision is \$20,000,000. It is anticipated that 47 States will have primary enforcement responsibility and thus will be eligible for the grants. The grant funds requested for the underground injection control program is \$10,000,000. It is anticipated that the remaining 25 States will be designated during the fiscal year thus making all 56 States eligible for grants. Grants for water supply training have not been requested.

Water Supply
Abatement and Control
Strategy Implementation

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase+ Decrease- 1978 vs 1977
(Dollars in Thousands)					
<u>Appropriation</u>					
Public Water Systems Supervision Program					
Implementation	\$2,140	\$5,279	\$2,730	\$5,430	+\$2,700
Underground Injection Control Program					
Implementation	111	167	598	1,298	+700
Total.....	2,251	5,446	3,328	6,728	+3,400

<u>Permanent Positions</u>					
Public Water Systems Supervision Program					
Implementation	95	153	117	252	+135
Underground Injection Control Program					
Implementation	...	8	21	58	+37
Total.....	95	161	138	310	+172

Budget Request

An appropriation of \$6,720,000 and 310 positions is requested for FY 1978. This represents an increase of \$3,400,000 and 172 positions over the FY 1977 level. The resources will be used to administer public water systems supervision programs in States without primary enforcement responsibility and to provide a regional technical assistance capability for the underground injection control program.

Program Description

The Congressional intent of the Safe Drinking Water Act is that the States would primarily be responsible for assuring the safety of the drinking water. However, the Federal Government is to provide technical assistance to the States in the development of State programs satisfying the requirements for primary enforcement responsibility for the public water systems supervision and the underground injection control programs. These activities include the participation of EPA personnel in the preparation of program plans and grant applications, reviewing existing State programs, and assessing the adequacy of legislative and regulatory authorities. In the event that States are unable or unwilling to assume these responsibilities, EPA will develop control strategies and programs that will be administered by the Federal Government. This would require monitoring and surveillance activities, recordkeeping, enforcement procedures, interaction with the States and utility operators/injection facility operators. In addition, EPA is required to establish and implement program activities similar to those in States without primary enforcement responsibility on Indian reservations and interstate carrier conveyances.

FY 1976 Accomplishments

The FY 1976 resources were allocated between public water systems supervision and underground injection control. Approximately \$500,000 in grant and contract funds were used by the regions to support these programs.

Public water systems supervision strategy implementation resources are primarily located in the regions to provide the States with the necessary technical assistance to ensure that the maximum number of States will assume primary enforcement responsibility for public water systems supervision by April 1977. The activities provided included assistance in the preparation of State program plans and grant applications, review of current programs and the legislative and statutory authority and the review and approval of plans and applications. These efforts contributed to the submission of program plans and grant applications from 53 States. These States also expressed their intent to assume primary enforcement responsibility for public water systems supervision within one-year.

Underground injection control strategy implementation resources were used to review data submitted in conjunction with requests for sole source designations. Since the underground injection control regulations were not proposed during the fiscal year, technical assistance activities were not initiated.

FY 1977 Program

The FY 1977 resource level for this program was \$3,328,000 and 138 positions allocated between the public water systems supervision and underground injection control strategy implementation programs. Minimal use of contract/grant funds is expected to be made by headquarters or the regions to support these activities.

The public water systems supervision strategy implementation program is allocated \$2,730,000 and 117 positions. These resources will provide technical assistance to all States to ensure that the maximum number of States will assume primacy. Assistance will continue to those States that are not approved for primacy in April 1977 to enable them to qualify for primary enforcement responsibility during the fiscal year. During this year, EPA will establish programs on Indian reservations, continue the interstate carrier program, and implement public water systems supervision programs in States without primary enforcement responsibility.

The underground injection control strategy implementation program is allocated \$598,000 and 21 positions. These resources will be used to assist States in the review of legislative and regulatory authorities, to assess current State programs, to participate, where necessary, in the preparation of State program plans and grant applications and to review the submissions for primacy. It is anticipated that 25 of the designated States will submit their program plans for primary enforcement responsibility within the 270 days required by the statute.

FY 1978 Plan

The FY 1978 program for this subactivity is \$6,728,000 and 310 positions, an increase of \$3,400,000 and 172 positions. No portion of the FY 1978 increase will be used for procurement of ADP hardware or software. Contract/grant funds are again expected to be at a minimal level.

The public water systems supervision implementation program resources will increase the base program and will be used for the establishment and administration of the program in States without primacy. In States without primacy, EPA will perform inventory and data management activities; implement a laboratory certification program; conduct sanitary surveys to determine compliance, problem areas and variances and exemptions; review planned constructions and respond to emergencies and imminent hazards situations.

It is anticipated that the remaining 25 States will be designated by the Administrator as requiring underground injection control programs. Technical assistance will be provided to the States in assessing existing statutory authorities and programs and in developing programs which satisfy the requirements for primacy. Assistance will be provided as necessary to those States initiating implementation activities.

As the need for Federal implementation and administration in States without primacy becomes apparent, EPA may require additional resources to begin establishment of adequate State programs.



WATER SUPPLY ENFORCEMENT

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase- Decrease- 1978 vs 1977</u>
<u>Appropriation</u>					
Water Supply Enforcement..	\$81	\$81	\$154	\$1,054	+\$900
<u>Permanent Positions</u>					
Water Supply Enforcement..	4	4	7	43	+36
<u>Budget Request</u>					

An appropriation of \$1,054,100 is requested for FY 1978. This represents an increase of \$900,000 over FY 1977. A total of 43 positions is requested for FY 1978 which is an increase of 36 positions over FY 1977. These resources will establish an enforcement capability in the regions.

Purpose

The Safe Drinking Water Act provides for assurances for the safety of the drinking water through the establishment and enforcement of national drinking water regulations, specifying the maximum permissible constituent levels required to protect the public health and welfare. The Water Supply enforcement appropriation encompasses activities relating to the investigation and initiation of civil or criminal actions for violations of the Interim Primary Drinking Water Regulations in

States without primary enforcement responsibility, to the monitoring of enforcement actions of States with primacy, and to the initiation of Federal action where States have failed to act. In addition, the enforcement activity will be responsible to provide the capability to respond to the Administrator's discretionary authority for emergency powers.

1976 Accomplishments

The Office of Water Enforcement was allocated four positions and \$80,000 in support of water supply enforcement activities. These resources provided assistance in the development of the drinking water implementation regulations and the preparation of an enforcement strategy relating to the implementation of the drinking water program. The allocated positions were also available to respond to emergency situations under the authorities granted in section 1431 of the Safe Drinking Water Act.

1977 Program

In FY 1977 Water Supply Enforcement was again allocated four positions and \$80,000 to support the Water Supply Program. Furthermore Region III allocated 3 positions and \$74,100 to the program. These resources will (1) respond to emergency situations under the authorities granted in section 1431 of the Safe Drinking Water Act, (2) provide assistance to abatement and control in the development of regional guidance documents, (3) develop enforcement policies and provide assistance as requested in the implementation of regional programs and (4) participate in review of the adequacy of compliance aspects of State program applications.

1978 Plan

In FY 1978 water supply enforcement requests an allocation of 43 positions and \$1,054,100 to support the water supply program. These positions will be located in the Regions to establish a

regional enforcement capability in the water supply program. The enforcement program will (1) investigate violations of the National Interim Primary Drinking Water Regulations and initiate civil or criminal actions in States without primary enforcement responsibility; (2) monitor enforcement actions in States with primacy as a part of the annual review of State primacy and (3) initiate Federal actions where States fail to act.

Finally, the Emergency Power section of the Safe Drinking Water Act can be used at any time that the Administrator receives information that a contaminant that is present, or is likely to be present in public water supplies, presents an imminent and substantial endangerment to the health of persons, and appropriate State and local authorities have not acted. Both the regional and headquarters enforcement offices will maintain a capability to implement the emergency powers of the Administrator. Although enforcement activities will be minimal in the first year of implementation of the public water systems and underground injection control programs, it may be necessary to reinforce the capabilities should there be a significant amount of violations.



Water Supply

Research and Development

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u>	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs. 1977</u>
(dollars in thousands)					
<u>Appropriation</u>					
Public Sector					
Activities.....	\$8,492	\$13,254	\$13,227	\$15,727	+\$2,500
<u>Permanent Positions</u>					
Public Sector					
Activities.....	89	85	86	101	+15

Purpose

The research, development, and demonstration in this program area is directed toward implementation of P.L. 92-523, the Safe Drinking Water Act. Research, studies, and demonstration are conducted relating to: (1) the causes, diagnosis, treatment, control and prevention of physical and mental diseases and other impairments of man resulting directly or indirectly from contaminants in waters; and (2) the provision of dependable safe supplies of water (Sec. 1442; P.L. 92-523).

The products of these activities include: (a) improved methods to identify and measure the existence of contaminants in drinking water and to identify the source of such contaminants; (b) improved methods to identify and measure the health effects of contaminants in drinking water; (c) new or improved methods of treating raw water to prepare it for drinking, so as to improve the efficiency of water treatment and remove contaminants from water; and (d) improved methods of protecting underground water sources of water from contamination.

Research is also conducted to develop and implement quality assurance procedures and protocols for water supply laboratories to assure that data is accurate and legally defensible. Resources for this program activity are included under the interdisciplinary subactivity, monitoring and technical support, as part of a comprehensive quality assurance program for all environmental media.

Budget Request

The discovery of numerous specific organic constituents in most of the finished drinking water supplies, and inorganic constituents of concern in some, along with their associated health implications, necessitates evaluation of the health effects of these materials, control measures to remove or reduce them and determination of the costs of such removal.

The increase of \$2.5 million and 15 positions will be used to accelerate determination of the occurrence and carcinogenic potential of organic and inorganic concentrates from tap water through in vivo and epidemiological studies; determine the relationship of cardiovascular disease (particularly hypertension) and drinking water quality; provide full-scale evaluation of treatment processes to avoid formation of or remove contaminants and scale up carcinogen removal techniques from bench to full-scale; and describe costs of control methods and investigate new technology for and reduction of costs to small systems.

Research, development and field evaluation efforts needed to meet the requirements of the Act will lag unless additional positions are provided. The requested increase of 15 positions will be used to meet the extramural project workload and accelerate the reporting of research information.

Program Description

The Water Supply Program activities include research, development, and field evaluations designed to provide a dependable and safe supply of drinking water. The program investigates the health effects resulting directly or indirectly from contaminants in drinking water and thereby supports the development of valid criteria for establishing standards for organic, inorganic and microbiological contaminants of drinking water. The primary purpose of the water supply control technology program is to evaluate, improve, and develop the control technology necessary for economic attainment of drinking water standards. This involves both the adaptation of large-scale technology to small water supply systems and the development of new or special technologies. In addition, analytic methods are developed to assess the quality of drinking water and the effectiveness of water treatment processes to remove and reduce contaminants in water supplies.

1976 Accomplishments

In FY 1976 approximately \$4.5 million were devoted to grants; \$1.2 million to contracts; and \$.32 million to interagency agreements.

Results from this research program included:

- An interim treatment guide to control chloroform;
- Completion, with the National Cancer Institutes, of a study showing chloroform to be a carcinogen in two mammalian species;
- Technical information on which to base the EPA Advance Notice for Proposed Rulemaking on organics;
- An analysis of methods for determining fibrous asbestoforms in water;
- Completion of a report on best treatment processes for the removal of the inorganic contaminants in the primary drinking water standards;
- Completion of a study on the factors which influence the cost of water supply;
- Completion of a study on the availability, use and contamination problems of ground water in Mississippi, Alabama, Georgia, Florida, North and South Carolina, and Virginia;
- Development of drilling techniques and sampling apparatus for the collection of aerobic and anaerobic bacteria and trace organics.

1977 Program

In FY 1977 it is planned to allocate approximately \$7 million to grants; \$2.1 million to contracts; and \$.5 million to interagency agreements. Work will continue in the health effects area to determine tolerances to a variety of drinking water contaminants. A substantial effort will be expended to determine the nature and concentration of organic compounds present in a variety of water supplies, and to determine the long- and short-term health effects of these organic compounds, both individually and in combination. Information obtained from this research will be used to derive operational and scientifically valid criteria for organics in drinking water. In addition, a major effort will be expended to determine the toxicity of the by-products of the leading disinfectants, chlorine and ozone.

Efforts in the control technology area are designed to provide methods for measuring low level concentrations of pollutants, and the development of cost-effective techniques for the control of drinking water contaminants during storage, treatment, and distribution. In this area, the main problem is to reduce the concentration of organic compounds present in drinking water to a safe level. Methods that will be thoroughly investigated include removal of organics by adsorption (e.g., activated carbon) or by oxidation (e.g., ozone). Disinfection process modifications to minimize or eliminate the formation of halogenated organics will also be researched, such as the removal of the organic precursors, substitution of another disinfectant for chlorine, removal of the halogenated organics after their formation, control of water treatment parameters (e.g., pH, free residual chlorine) that are found to influence the rate of formation of these halogenated organic compounds. Field studies will be emphasized. In addition, treatment techniques applicable to small water supplies will be studied, such as the use of ultraviolet radiation and perhaps ozone as promising substitutes for chlorine in the disinfection of small systems. Economical and effective treatment technology will be developed for the removal of natural and man-made radioactive contaminants of water supplies.

Water Supply

Public Sector Activities

Significant Extramural Projects - FY 1977 Program

Title: Use of Stable Isotopes in Groundwater Studies (Contract) Amount: \$120,000

Discussion: Test the use of stable isotope ratios in groundwater investigations to identify the source and dynamics of subsurface pollution.

Title: Develop Spectroscopy/Liquid Chromatography System for Organic Pollutant Identification (Contract) Amount: \$182,000

Discussion: High-boiling and highly polar organic pollutants cannot be identified in water samples by conventional means. This work will combine the separation capabilities of liquid chromatography with highly sensitive, coherent anti-stokes spectroscopy to provide a system that can rapidly identify such pollutants in environmental waters.

Title: Comprehensive Assessment of Organics in Drinking Water
(Contract)

Amount: \$100,000

Discussion: The bulk of organic material in drinking water and source water is not amenable to analysis by gas or liquid chromatography for specific organic constituents. This material will be extracted and concentrate and separated designed not to alter chemical structure and separated into major fractions. These fractions will then be characterized by molecular weight, functional groups, etc. Specific non-volatile compounds will be identified whenever possible.

Title: Treatment of Water for Removal of Asbestos and Organics
(Grant)

Amount: \$172,000

Discussion: This is a pilot scale grant planned for the city of Philadelphia. Asbestos and other potential carcinogen producers will be removed.

Title: Fixed Granular Activated Carbon Bed Treatment for Organic
Removal (Grant)

Amount: \$300,000

Discussion: Organic chemicals in drinking water will be removed through fixed granular activated carbon bed treatment.

Title:	Chloridine Dioxide and Granular Activated Carbon for Organic Removal (Grant)	Amount:	\$192,000
Discussion:	Variations on the basic granular carbon concept need to be examined and tested for maximum removal at minimum cost.		
Title:	Regeneration of Granular Activated Carbon Beds and Treatment to Remove Organics (Grant)	Amount:	\$300,000
Discussion:	An efficient method of carbon regeneration must be demonstrated in order to make granular carbon economically attractive.		
Title:	Treatment of Small Water Supplies for Reverse Osmosis (Grant)	Amount:	\$85,000
Discussion:	Reverse osmosis will be evaluated as a treatment technology for small communities for the removal of specific inorganic contaminants from water.		
Title:	Humic Acid as Trihalomethane Precursors (Grant)	Amount:	\$112,000
Discussion:	In order to understand the reasons for the chlorine-carcinogen relationship, it will be necessary to define the chemical nature of the reaction between aquatic humic substances in chlorine which produce chloroform and related halomethanes.		

Title: Study of Unit Processes for Water Treatment Technology (Contract)	Amount: \$145,000
Discussion: This will answer a critical aspect of the impact of the Safe Drinking Water Act, the cost of the unit processes which will be required due to implementation.	
Title: Economical Support for Field-Scale Organic Treatment Program (Contract)	Amount: \$145,000
Discussion: This will be a series of field investigations to demonstrate the new technologies that are emerging in the water supply field.	
Title: Powdered Activated Carbon Treatment for Organic Removal (Grant)	Amount: \$236,000
Discussion: We are looking at many kinds of treatment to overcome the carcinogen-production problems; this grant will be with one of the key cities - New Orleans.	
Title: Modification of Water Treatment to Reduce Trihalomethane Formation (Grant)	Amount: \$100,000
Discussion: This grant will use Ohio River water supplies to reduce the formation of trihalomethanes.	

Title: Disinfection Resistant of Virus Aggregates (Grant) Amount: \$106,000

Discussion: This research will determine factors which influence virus aggregation and effects of large aggregates on disinfection, efficiencies, important from both health and economic standpoints.

Title: Alternative Disinfection Field Study (Grant) Amount: \$225,000

Discussion: This research will determine the capability of alternative disinfectants and other water treatment processes to inactivate or remove naturally occurring viruses from drinking water.

Title: Occurrence and Effects of Organic Contaminants in Drinking Water Amount: \$1,655,000

Discussion: The purpose of the Water Supply Health Effects Research program is to determine the nature and concentrations of organic contaminants in drinking water and supplies by conducting literature searches and toxicological and epidemiological studies. Evaluation of the health effects of organic contaminants is necessary to develop the scientific basis for establishing and defending drinking water standards. The aggregated extramural projects constitute a substantial portion of this program and the specific funding levels for contracts and grants are \$429,000 and \$1,226,000, respectively.

1978 Plan

In FY 1978 it is planned to allocate approximately \$7.7 million to grants; \$3 million to contracts; and \$1.0 million to interagency agreements.

The States, having primary enforcement responsibility, will be addressing questions on variances and exemptions from the primary drinking water regulations. Factors which will be considered in granting or denying requests for variances and exemptions include health effects, control methods and cost. The research program will be directed toward establishing a scientific and technical base for implementing the Act with particular attention to the information needed by the States to carry out their responsibilities under the primacy provisions of the Act.

Defensible health effects data for organic, inorganic and microbiological contaminants of drinking water will be developed through short and long term toxicological studies and comparative epidemiological studies. Work will be concentrated on the substances in the revised primary drinking water standards, the four trihalomethanes that have been shown to occur widely; and inorganics such as asbestos, barium, cadmium, calcium, magnesium, lithium, iron, arsenic, lead, selenium, zinc, and copper.

Health effects data are likely to provide information which will vary from establishing MCL's to general guides on levels of contaminants of concern. It will be necessary to develop control and treatment methods in parallel with the extension of health effects information in order to provide technical advice to the States and local water utilities. The areas of concentration in control and treatment methods will be similar to those addressed in health effects. Guides for removal or prevention of hazardous materials will be published. Technology applicable to small water systems will be developed with particular attention to costs.

The National Academy of Sciences report due December, 1976 may identify additional future research needs in the area of health effects of drinking water contamination. The report will require consideration by EPA of the economic and technological feasibility of implementing the recommendations. The report, however, is not available now and the impact of the report on research requirements cannot be evaluated accurately at this time.

Of the requested \$2.5 million, approximately \$10,000 will be expended on the procurement of ADP items. This amount is necessary to provide economic cost models, develop baseline data, and estimate the demand for water and the cost of different treatments.

Water Supply

Public Sector Activities

Significant Extramural Projects - FY 1978 Plan

Title: Identify Organics in Various Industrial Wastewaters
(Contract)

Amount: \$150,000

Discussion: A survey will be made of the organic compounds being discharged in wastewaters of a wide variety of industrial manufacturing plants. Because of the high concern over nitrosamines of industrial origin, a special effort will be made to determine if nitrosamines are in water supplies.

Title: Comprehensive Assessment of Organics in Drinking Water
(Contract)

Amount: \$100,000

Discussion: The bulk of organic material in drinking water and source water is not amenable to analysis by gas or liquid chromatography for specific organic constituents. This material will be extracted and concentrated by techniques designed not to alter chemical structure

and separated into major fractions. These fractions will then be characterized by molecular weight, functional groups, etc. Specific non-volatile compounds will be identified whenever possible. This is a follow-on to work funded in FY 1977.

Title: Bio-Organic Indicators of Groundwater Pollution (Grant) Amount: \$150,000

Discussion: Conduct studies on bio-organic indicators of groundwater pollution.

Title: Treatment of Water for Removal of Asbestos and Organics (Grant) Amount: \$250,000

Discussion: Asbestos and other potential carcinogen-producers will be removed. This is a follow-on to work funded in FY 1977.

Title: Fixed Granular Activated Carbon Bed Treatment for Organic Removal (Grant) Amount: \$200,000

Discussion: Organic chemicals in drinking water will be removed through fixed granular activated carbon bed treatment. This is a follow-on to work funded in FY 1977.

Title: Chlorine Dioxide and Granular Activated Carbon for Organic Removal (Grant)	Amount: \$200,000
Discussion: Variations on the basic granular carbon concept need to be examined and tested for maximum removal at minimum cost. This is a follow-on to work funded in FY 1977.	
Title: Regeneration of Granular Activated Carbon Beds and Treatment to Remove Organics (Grant)	Amount: \$250,000
Discussion: An efficient method of carbon regeneration must be demonstrated in order to make granular carbon economically attractive. This is a follow-on to work funded in FY 1977.	
Title: Treatment of Small Water Supplies for Reverse Osmosis (Grant)	Amount: \$85,000
Discussion: Reverse osmosis will be evaluated as a treatment technology for small communities for the removal of specific inorganic contaminants from water. This is a follow-on to work funded in FY 1977.	
Title: Humic Acid as Trihalomethane Precursors (Grant)	Amount: \$118,000
Discussion: In order to understand the reasons for the chlorine-carcinogen relationship, it will be necessary to define	

the chemical nature of the reaction between aquatic humic substances in chlorine which produce chloroform and related halomethanes. This is a follow-on to work funded in FY 1977.

Title: Study of Unit Processes for Water Treatment Technology
(Contract) Amount: \$200,000

Discussion: This will answer a critical aspect of the impact of the Safe Drinking Water Act, the cost of the unit processes which will be required due to implementation. This is a follow-on to work funded in FY 1977.

Title: Economic Support for Field-Scale Organic Treatment Program (Contract) Amount: \$200,000

Discussion: This will be a series of field investigations to demonstrate the new technologies that are emerging in the water supply field. This is a follow-on to work funded in FY 1977.

Title: Powdered Activated Carbon Treatment for Organic Removal (Grant) Amount: \$100,000

Discussion: We are looking at many kinds of treatment to overcome the carcinogen-production problems; this grant will be with one of the key cities - New Orleans. This is a follow-on to work funded in FY 1977.



Title: Modification of Water Treatment to Reduce Trihalomethane Formation (Grant) Amount: \$100,000

Discussion: This grant will use Ohio River water supplies to reduce the formation of trihalomethanes. This is a follow-on to work funded in FY 1977.

Title: Disinfection Resistant of Virus Aggregates (Grant) Amount: \$120,000

Discussion: This research will determine factors which influence virus aggregation and effects of large aggregates on disinfection and efficiencies, important from both health and economic standpoints.

Title: Occurrence and Effects of Organic Contaminants in Drinking Water Amount: \$1,655,000

Discussion: The purpose of the Water Supply Health Effects Research program is to determine the nature and concentrations of organic contaminants in drinking water supplies by conducting literature searches and toxicological and epidemiological studies. Evaluation of the health effects of organic contaminants is necessary to develop the scientific basis for establishing and defending drinking water standards. The aggregated extramural projects constitute a substantial portion of the program; however, no specific proportionment of extramural funds has yet been planned.







SOLID WASTE

Program Highlights

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
(dollars in thousands)					
Abatement and Control					
Appropriation.....	\$12,613	\$11,670	\$11,665	\$15,065	+\$3,400
Permanent Positions....	144	161	163	176	+13
Transition Quarter Est.	5,281	N/A	N/A	N/A	
Research and Development					
Appropriation.....	2,811	4,066	4,098	4,098	---
Permanent Positions....	28	22	22	22	---
Transition Quarter Est.	1,617	N/A	N/A	N/A	
Total - Solid Waste Program					
Appropriation.....	15,424	15,736	15,763	19,163	+3,400
Permanent Positions....	172	183	185	198	+13
Transition Quarter Est.	6,898	N/A	N/A	N/A	

Overview and Strategy

Solid waste management, nationwide, presents a spectrum of problems from health and environmental hazards to inefficient and costly management practices. The basic solid waste management problem is improper land disposal practices. These practices cause adverse environmental and economic impacts such as ground and surface water pollution, air pollution, problems associated with uncontrolled dumping, decreased land values, and resource wastage. Aesthetic damages (e.g., litter) which have varying impacts on human health or animal life, are easily visualized and usually are the focus of public concern. However, problems associated with improper land disposal practices are not always visible and therefore, not easily understood. For example, groundwater contamination (which is not visible)

from poorly sited or poorly operated land disposal sites does occur. Although good engineering practices for siting, constructing, and operating a land disposal site are understood, they unfortunately are not applied by most regulatory and operating agencies.

Environmental problems exist for a number of interrelated reasons. The potential for groundwater contamination from land disposal practices by leachates or effluents is not well quantified or understood. Some States do not regulate disposal effectively and most do not enforce regulations vigorously due to lack of resources. Municipalities do not always devote required resources to ensure environmentally sound disposal and efficient management. There are no clearly understood social and environmental costs for not following good solid waste management practices. Since litter and ugliness are typically the most obvious targets for popular displeasure, often municipalities manage disposal "cosmetically" (i.e., no blowing paper, no odor, but allow leachate to seep into the groundwater) but not environmentally. Especially acute is the absence of a program to properly manage the hazardous wastes from the industrial sector. Although potentially hazardous wastes are small in comparison to the total waste volume (10 million tons vs. 2,865 million tons) their potential impact on public health and safety and the environment may represent the greatest threat.

The lack of regulation in hazardous waste management (i.e., environmental standards strictly enforced) is due to the fact that recognition of the special nature of potentially hazardous wastes is recent. Further the complexity of the hazardous waste management cycle from the original generation to ultimate disposal requires far more complex institutional approaches than are now available. Costs for proper disposal are higher than for unregulated dumping. In addition, public resistance to the siting of a new disposal site often-times forces the use of an unacceptable site. All of these factors contribute to perpetuating the status quo by preventing the application of sound waste management principles, and thwarting enforcement of regulations when they are in force. In the case of hazardous wastes, the absence of a range of proven treatment and disposal methods are additional contributing factors. For example, although it is known that 60 percent of the hazardous wastes are organic and can be burned, it is not known how effective the burning of these wastes will be in disposing of them or reducing the hazards associated with them. It is difficult to broadly mandate

the disposal of hazardous waste in proper disposal sites until a number of such sites exist. Establishing such sites requires engineering and testing programs to identify appropriate designs and to ascertain their viability and a concerted effort to cut off the existing cheap option-the unacceptable land disposal site.

Acceptable and safe waste management of all wastes destined for land disposal results in the elimination of most site-related land and ground water pollution, litter and blight, improves land values around disposal sites and offers the opportunity to reclaim and restore the land. Imposing higher costs on disposal operators also creates incentives for fiscal efficiency and environmentally acceptable practices. Resource conservation is indirectly aided by the application of good solid waste management practices. As disposal costs are raised, the economic incentives to recover energy and materials from solid waste increase.

Conservation through resource recovery and other means is a new activity and is not yet a self evident waste management option. It is indirectly supported by environmental, health, and safety-related upgrading of waste management. Institution of resource recovery systems (or other measures) requires new types of fiscal, marketing, management, legal and technical approaches which municipalities are not familiar with and, therefore, are reluctant to undertake.

Municipal solid waste (MSW) is a source of energy which can provide environmental benefits. Technology is being demonstrated, and some systems are sufficiently advanced to be developed to commercial application. Energy can be produced at prices which are competitive in the current energy market. Interest has been expressed by many industries and communities in building such systems. Furthermore, recovery of paper, glass, aluminum and ferrous materials from MSW produces additional energy savings by providing resources for recycled products. (Energy costs associated with the production of products from secondary materials are less than those produced with virgin resources.) Achievement of the highest feasible recovery (estimated to be the equivalent of 100,000 barrels of oil per day by 1985 with a maximum of 400,000 per day) contributes to the national goal of energy self sufficiency.

EPA's strategy for dealing with solid waste management problem focuses on (1) achieving acceptable and safe waste management practices to protect public health and welfare and the environment, and (2) conserving natural resources through institution of resource recovery or other waste reduction measures.

EPA considers the achievement of effective solid waste management to be a joint Federal, State and local effort. EPA focuses on developing answers to those waste management problems having a significant impact in terms of National implications (e.g., land disposal practices, hazardous waste management, disposal of sludges resulting from air and water pollution control, and demonstration of resource recovery technology). State efforts are directed towards establishing State regulatory control over all waste management (i.e., regulations for the treatment and disposal of all waste and for the generation storage, and transport of hazardous waste and advancing resource recovery systems). Local governments adopt and operate those systems which will best meet the State requirements while serving their citizenry. The research and development efforts in this area are directed to supporting the technology needs of the operating programs.

The basic legislative authority for the solid waste program is the Solid Waste Disposal Act, as amended. The primary tools the solid waste program employs are (1) stimulation of regulatory action at the State and local level through the use of guidelines and recommended procedures, and planning grant support; (2) research, development, and demonstrations aimed at developing a greater understanding of the problems of solid waste management, development of improved disposal and recovery methods, and demonstrations of advanced technology; and (3) technical assistance (both direct and through the written word) to Federal, State and local agencies to assist them in solving their solid waste management problems.

EPA is focusing its hazardous and solid waste management activities on developing information about the effects of hazardous wastes, identifying the wastes generated and on assessing the technology available for treatment and disposal. Information is also being gathered on the environmental consequences of land disposal of wastes in general, including sludges resulting from the treatment of municipal waste water. EPA is examining alternative means to collect and treat leachate. In the area of resource conservation, most resources are devoted to the development of information to be used by local decision makers, namely evaluations of alternative systems and means to overcome the financial, marketing and contracting constraints of implementing a system. EPA also works to implement guidelines addressing resource conservation, and provides assistance to communities to improve the efficiency of collection systems.

SUMMARY OF INCREASES AND DECREASES

(in thousands
of dollars)

FY1977 Solid Waste Management Program.....

\$15,763

Abatement and Control

+3,400

The increase provides for additional
personnel in the regional offices and
grant support for State solid waste
management planning and demonstrations.

FY1978 Solid Waste Management Program Request.....

19,163



SOLID WASTE

Abatement and Control

	<u>Actual 1976</u>	<u>Budget Estimate 1977</u>	<u>Current Estimate 1977</u> (dollars in thousands)	<u>Estimate 1978</u>	<u>Increase + Decrease - 1978 vs. 1977</u>	<u>Page</u>
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Appropriation

Waste Management Practices, Procedures & Guidelines.....	\$4,720	\$4,442	\$4,076	\$4,076	---	SW-8
Waste Management Strategies Implementation.....	5,827	4,946	5,815	9,215	+\$3,400	SW-13
Resource Conservation.....	2,066	2,282	1,774	1,774	---	SW-18
Total.....	12,613	11,670	11,665	15,065	+\$3,400	

Permanent Positions

Waste Management Practices, Procedures & Guidelines.....	40	47	52	52	---	
Waste Management Strategies Implementation.....	80	85	78	91	+13	
Resource Conservation.....	24	29	33	33	---	
Total.....	144	161	163	176	+13	

Purpose

The abatement and control appropriation encompasses the activities of the solid waste program devoted to the development of waste management strategies; the translation of these strategies into guidelines and management tools; interaction with Federal, State, and local agencies; and the

demonstration of energy and materials recovery systems. The activities included differ from those covered under the research appropriation in that they are related to the implementation of solid waste management practices for specific problems at the operating system level rather than the development of knowledge on environmental problems or on the development of control technologies.

In FY1978 the hazardous waste management program will begin to shift emphasis. Projects which have been underway since FY1974 to identify hazardous waste materials and their sources, and technology alternatives for handling these wastes will be completed or nearing completion. Development of guidance documents or guidelines which will include information on the incineration, landfill, treatment, transportation, and recycling of hazardous waste materials will be initiated in FY1978 with publication planned for FY1979.

The program activities associated with land disposal of waste materials and management of most residuals, including municipal solid waste and sewage sludge, focus on the demonstration of environmentally acceptable waste management practices. Information in this area is inadequate, particularly in relation to the availability of proven technology for collecting and treating leachate in landfills and the methodologies for handling sewage treatment sludges in landfills. Evaluations of landfill practices and demonstrations of landfill technologies are being conducted to provide the basis for guidance to Federal, State and local agencies. Specific emphasis in FY1978 is being directed towards the development of information on the effects of leachate generated from municipal disposal sites and residual sludge disposal and the requisite guidance documents for State and local government to improve their programs.

The approach to resource conservation is through recovery of resources from wastes and waste reduction. The primary barriers to resource recovery implementation are institutional constraints. The program concentrates on Federal evaluation of resource recovery alternatives; the provision of technical assistance; the dissemination of information about existing systems to reduce perceived risk; and provision of front-end planning funds to communities to facilitate implementation of resource recovery systems. In FY1978 specific emphasis will be on our evaluation of emerging resource recovery technologies and the development of guidance documents on improved resource recovery practices.

SOLID WASTE

Abatement and Control

Waste Management Practices, Procedures & Guidelines

Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
(dollars in thousands)				

Appropriation

Hazardous Waste Management Guidelines Development...	\$3,299	\$2,857	\$2,994	\$2,994	---
Other Wastes Management Guidelines Development...	1,421	1,585	1,082	1,082	---
Total.....	4,720	4,442	4,076	4,076	---

Permanent Positions

Hazardous Waste Management Guidelines Development...	21	28	23	23	---
Other Wastes Management Guidelines Development...	19	19	29	29	---
Total.....	40	47	52	52	---

Budget Request

The resources requested reflect a continuation of activities at the FY1977 program level.

Program Description

Activities and outputs are related to the development of strategies (or modification of strategies) for dealing with solid waste management problems and the translation of strategies into appropriate guidance documents (non regulatory publications) or guidelines (regulatory publications binding on Federal agencies). A guidance document represents the best technical counsel with regard to those residuals destined for incineration, treatment, and land disposal. These guidance documents provide information which aid State, local and Federal governments as well as private industry in addressing various problems of solid waste management. A guideline is a standard or principle by which to make a judgement, or determine a policy or course of action. The Federal solid waste management guidelines development program incorporates state-of-the-art studies and analyses to determine the extent and impact of the solid waste problem being addressed and assessment of alternative collection, treatment and disposal technologies, as well as the actual guidelines preparation.

The hazardous waste thrust of this program over the next two years will focus on completing studies initiated in FY1974-76 and analyzing the data on hazardous wastes obtained from these studies to determine the course of action for ensuring the proper management of these wastes. In 1978, the program expects to begin development of guidance documents and guidelines which will articulate findings and recommendations based on information collected over the past three years. Guidance documents on hazardous waste management, issued in the FY1976-1977 time frame, will be revised as necessary. While several projects, such as the chemical landfill demonstration and additional assessments of some treatment technologies will not be completed until 1979 and beyond, adequate information to address specific hazardous waste management problems will be available.

The other principle program thrust focuses on problems primarily related to the solid waste disposal practices of municipalities. In FY1975-78, emphasis is being placed on finding solutions to problems associated with leachate from landfills and with the disposal problems associated with landfilling of sewage treatment sludges. Included in the leachate program are demonstrations of technology for the collection and treatment of leachate and evaluations of existing landfill sites to determine the site criteria and engineering practices required to design landfills that will minimize the flow of leachate from the fill and maximize natural soil attenuation of leachate.

Sewage sludge is the chief residual of sewage treatment activities; it is currently produced at the rate of about seven million tons per year (dry weight). Sludges are disposed of in a variety of ways--by incineration, land spreading, in sludge-only landfills, and in combination with municipal solid wastes in sanitary landfills and dumps. The principal tasks leading to guidance documents or guidelines for sludge disposal are assessment of current practices, assessment of the heavy metals problem associated with sludges (which dictates type of control on land or underground), and assessment of the adequacy of current methods of disposal. Evaluations of methodologies for handling sewage sludges in a landfill and alternatives to land filling (e.g., utilizing sewage sludge for fertilizers) are also being addressed.

1976 Accomplishments

The FY1976 resource level for this subactivity was \$4.1 million and 42 positions. These resources were allocated to two major activities: the development of data to provide information for guidance documents and guidelines to Federal, State and local governments on (1) hazardous waste management, and (2) the management of municipal solid wastes and residual sludges on land.

The development of data to provide information on hazardous wastes management was allocated \$2.5 million and 23 positions. These resources included approximately \$1.9 million of grant and contract support for the demonstration of treatment and disposal alternatives, and the development of standard analytical methods for determining attenuation rates and leaching potential of chemical wastes in landfills. Data from these projects is expected to be available in late FY1978 and early 1979. These data will be incorporated into guidance documents or guidelines on hazardous waste management. In addition to the new efforts initiated in FY1976, the industry study contracts (initiated in 1974 and 1975) were completed. Data defining potentially hazardous wastes in 15 industries is now available; evaluations and assessments of 15 existing hazardous waste facilities were issued; and damage incidents and detailed damage reports from improper hazardous waste management were published. Specific guidance on the disposal of wastes containing PCB's and aerosol cans containing vinyl chloride was issued.

The development of data to provide information on land application and disposal of municipal solid wastes and residual sludges was allocated \$1.6 million and 19 positions. These resources included approximately \$1.0 million of extramural funds which were directed at providing information on leachate control and residuals management. Included are contracts for determining the nature and extent of the leachate problem, evaluation of treatment alternatives for controlling leachate from landfills and development of analytical and regulatory procedures for States and municipalities to utilize in managing land disposal of solid waste. In residual sludge management extramural resources are directed primarily at evaluating disposal alternatives, surveying current sludge disposal and utilization practices, and analyzing the economics associated with various utilization and disposal alternatives. These studies are expected to culminate in guidance documents or revised guidelines in FY1978-79 time frame. In addition to the developmental activities, guidelines on solid waste management were issued (Collection, Federal Procurement, Source Separation, Beverage Containers, and Resource Recovery Facilities).

1977 Program

The FY1977 resource level for this sub-activity is \$4.1 million and 52 positions. These resources will be directed at completing projects associated with development of information for guidance documents or guidelines for hazardous wastes, leachates control, sludge management, and municipal management problems.

The development of hazardous waste management guidance documents or guidelines has been allocated \$2.9 and 23 positions. These resources include an estimated \$2.0 million in extramural funds which are primarily for the chemical landfill demonstration, assessment of the economic impact of hazardous waste regulations on the petroleum refining, inorganic chemicals and organic chemicals industries and development of a standard leaching test. These activities are expected to be incorporated into guidance documents and guidelines for the management of hazardous wastes in FY1979-80. Several studies and projects initiated in prior years will be completed in FY1977 and information from these projects will be available for review and analyses. These include definitions of potentially hazardous wastes generated by an additional two industries; an industrial waste data analysis system; damage assessment reports; and assessments of six additional existing hazardous waste treatment facilities. An assessment of chemical treatment alternatives for 40 pesticides will be completed as well as studies of specific treatment alternatives for the petroleum refining and the organic chemical industry, and a study on different types of incineration for various potentially hazardous wastes.

The activities associated with municipal waste management problems is allocated \$1.1 million and 29 positions. These resources include an estimated \$0.3 million for extramural funds for projects related to the assessment of land disposal sites and continuation of the assessments of the landfill leachate surface treatment techniques. Information obtained from these projects is expected to result in guidance documents or revised land disposal guidelines in 1978 incorporating leachate control techniques.

Assessments of sludge utilization practices to determine crop uptake of pollutants and leachate and groundwater quality from sludge and land disposal will be completed.

1978 Plan

The FY1978 Plan for this subactivity includes \$4.1 million and 52 positions. There are no plans for purchasing ADP hardware or software. Extramural funds in FY1978 approximate \$2.8 million. Work which will be completed or initiated in this area includes the final funding of the chemical landfill demonstration project; soil attenuation systems studies; damage incident data collection; economic studies on selected waste management subsystems; and sludge utilization demonstrations. While resources will be allocated to the same areas as FY1977, the FY1978 program will reflect a continuing shift in emphasis. Activities related to the gathering of data on hazardous waste generation and technology will taper off with activities related to the assessment of impacts from improper land disposal practices continuing at about the same level. Activities related to the assessment of the data and guidelines and guidance development are expected to increase.

An analysis of the hazardous waste problems at Federal facilities will be completed. The chemical landfill will be constructed by the grantee. The development of new and revised guidance documents or guidelines for municipal solid waste management practices including the revision of the existing land disposal guidelines will be continued. Guidance documents for increasing and emerging implementation programs at the regional/State level will be initiated. Information on leachate collection and treatment for spray irrigation of leachate, for treatment with anaerobic filters, and for a more sophisticated biological/chemical treatment plant will be completed and disseminated.

SOLID WASTE

Abatement and Control

Waste Management Strategies Implementation

	Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1976
(dollars in thousands)					
State Program Resource					
Supplementation.....	\$2,429	\$1,800	\$2,925	\$5,925	+\$3,000
Federal Agency Guidelines					
Implementation.....	207	226	245	245	---
Waste Management Imple- mentation.....	3,191	2,920	2,645	3,045	+400
Total.....	5,827	4,946	5,815	9,215	+3,400

Positions

State Program Resource					
Supplementation.....	---	---	---	---	---
Federal Agency Guidelines					
Implementation.....	6	5	9	9	---
Waste Management Imple- mentation.....	74	80	69	82	+13
Total.....	80	85	78	91	+13

Budget Request

The increased resources provide for additional personnel in the regional offices and grant support for State solid waste planning and demonstrations.

Program Description

An integral element of a viable national solid waste management program is strong and effective State programs. The Agency's solid waste management strategy envisions that the primary role of State government in solid waste management is the control of all land disposal sites where any type of waste is disposed. Ancillary to disposal site control are programs to properly manage hazardous wastes throughout their life cycle. The third State program priority is the effort to bring about increased resource recovery and to initiate waste reduction programs.

Under this approach, EPA's emphasis has been on assisting State governments to take a stronger role in the solid waste management field. The primary measure of progress in this area is the increased employment and activity at the State level. In 1974, there were about 650 people employed by State government solid waste management programs; there are now over 850. Forty-five States now require a permit or license for land disposal; 20 States have special regulations for at least some hazardous wastes; nine States have grant or loan programs for resource recovery; and more than a dozen States project operating energy recovery systems at the local level by 1980.

Activities and outputs related to the implementation of requirements for which the Federal government has primary responsibility (i.e., the management of solid waste at Federal facilities in accordance with published guidelines), are the review of environmental impact statements for their solid waste impact, and the development of State program capability to implement solid waste management activities. Included are the development and delivery of management tools for use by State and local governments, the review and evaluation of State programs, consultation with State and local governments on specific waste management problems, and financial assistance for State solid waste management programs.

1976 Accomplishments

The FY1976 resource level for this subactivity was \$5.3 million and 89 positions. These resources were allocated primarily to development of State programs through financial assistance and provision of special technical, scientific or economic tools in the form of information and direct assistance. The objective of these efforts is to develop State programs capable of implementing State control over all land disposal sites; initiating hazardous waste control programs; stimulating the recovery of energy and materials from solid waste; reducing solid waste generation; and utilizing land use planning procedures to aid in the acquisition and siting of solid waste management facilities. In addition to the development of State programs, activities related to the implementation of the Land Disposal Guideline and Source Separation Guideline were initiated. The resources devoted to the development of State programs includes \$2.9 million of extramural funds of which \$1.8 million was allocated for grants to States. The remaining \$1.1 million was utilized to fund the solid waste information and retrieval system, (SWIRS) an injury reporting information system for municipal workers, the Waste Resources Allocation Program, and grants to public interest groups.

A revised Decision Makers Guide incorporating new chapters on balefills, landfill liners, and other subjects was issued. A model State hazardous waste law was completed. An Injury Reporting Information System (IRIS) was implemented in 100 cities (This system allows managers to determine the underlying causes of injuries so that they can take remedial action.); and SWIRS continued to provide assistance to various receptor groups. In addition, assessments of State solid waste management programs were conducted and grants were awarded to State solid waste management programs.

1977 Program

In FY1977 resources allocated for the subactivity are \$5.8 million and 78 positions. The shift in positions reflect the recognition to move resources to develop increased guidances for State and local government. As in FY1976, these resources will be devoted to activities associated with the development of State programs, and limited implementation of the Source Separation, Land Disposal, Resource Recovery Facility and Beverage Container Guidelines. The resources for development of State programs includes

\$3.6 million of extramural funds of which \$3.0 has been allocated for States. The remaining funds will be used for sludge technical assistance, grants to interest groups and for the solid waste information and retrieval system.

A decision makers guide on sludge utilization practices and management options will be published. Documents will be published describing hazardous waste management policy positions: transportation management, management of facilities, and a model hazardous waste amangement statute. A State Decision Makers Guide for Hazardous Waste Management with data and recommendations on major issues of effective hazardous waste management will be published. Public meetings will be held on hazardous waste management site selection and site acceptance for industrial waste land disposal. EPA will issue a guide for evaluating State hazardous waste management programs. EPA will work with other Federal agencies to implement the guidelines including prototype buildings practicing separation of office waste for recovery and selected facilities for demonstration of beverage container guidelines implementation.

1978 Plan

The FY 1978 program for this subactivity includes \$9.2 million and 91 positions, an increase of \$0.4 million and 13 positions for strengthening regional office capabilities to work with States and for \$3.0 million additional grant funding (\$5.9 total) for State solid waste management planning activities. The remaining funds will be allocated for the provision of assistance to receptor groups through grants and contracts. There are no plans to purchase ADP hardware or software.

An integral element of a viable national solid waste management program is strong and effective State programs. The States, for the most part, have been focusing on bringing the total solid waste problem under control and have not been able to fully address the critical areas of land disposal of wastes and the comprehensive management of specific hazardous waste streams. The additional resources for the States will permit them to increase their efforts in these important areas by allowing them to assess the magnitude of these problems and develop strategies for their solution. In addition, resources would be used to address the residuals management problems associated with implementation of and water pollution control measures. As air and water pollution control measures are implemented, management of residuals

must be addressed as part of these control measures. The regional personnel increase is complementary to an increase in State resources. Also, increased regional office resources would provide for additional personnel to deal more directly with the implementation of resource recovery and to assist the Federal establishment in complying with the guidelines.

Three hazardous waste policy positions will be issued: standard sampling methods, methods for evaluation of chemically fixed wastes, and criteria to define hazardous wastes. EPA will revise and reissue the State Decision Makers Guide for Hazardous Waste Management.

SOLID WASTE

Abatement and Control

Resource Conservation

Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978 (dollars in thousands)	Increase + Decrease - 1978 vs. 1977
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Appropriation

Resource Recovery

Systems Evaluation,
Demonstration &
Implementation.....

Resource Recovery &
Waste Reduction Analysis. 385

\$1,681

\$1,730

\$1,553

Total..... 2,066

2,282

1,774

1,774

Permanent Positions

Resource Recovery

Systems Evaluation,
Demonstration &
Implementation.....

Resource Recovery &
Waste Reduction Analysis. 4

20

21

26

26

Total..... 24

29

33

33

Budget Request

The budget request reflects a continuation of the FY1977 program level.

Program Description

The fundamental barriers to implementation of waste recovery are: (1) institutional constraints arising from the need to form novel institutional arrangements to practice recovery and (2) the high economic risk associated with full scale demonstration of new technology which prevents demonstration of such technology with private or State and local funds. The ability of the consulting community to provide technical aid and consultation is severely limited--largely by the fact that new systems are either proprietary or the basic information is being developed by EPA through its demonstrations. This program provides technical assistance to communities and States and aims at improving the ability of the consulting community to provide services. This is accomplished through EPA funded demonstrations of new technologies and systems approaches, the evaluation and dissemination of information on technologies and systems developed without Federal funds, working with communities to help them implement resource recovery measures, and conducting studies which focus on the economics and environmental benefits of various waste reduction and resource recovery measures.

EPA has funded demonstrations of resource recovery technology in Franklin, Ohio (processing of municipal solid waste to obtain metals, color-sorted glass, and paper fiber in a recyclable form), Baltimore (pyrolysis of solid waste, producing a gaseous fuel for steam generation), St. Louis (prepared solid waste as a fuel supplementing coal), and San Diego (pyrolysis of solid waste to an oil-like liquid fuel usable in utility boilers). EPA is also demonstrating separate collection as a system for materials recovery in Somerville and Marblehead, Massachusetts. EPA is evaluating (through contracts) new technology developed in the private sector, and conducting evaluations of markets for the recovered materials. The information gathered is used to develop guidance for State and local governments for their use in planning and implementing resource recovery systems.

Complementary assessments of costs and benefits are an essential part of the program. In essence, measures to reduce the generation of waste represents changes in products and distribution systems. The benefits of reduced waste generation are reduced pollution, conservation of raw materials, and avoidance or minimization of the disposal function. Because the benefits of reduced consumption (achieved through less materials-intensive or longer-lived products or through substitution of reusable for one-time-use products) are often significant, assessment of such conservation options is a key part of the EPA program.

1976 Accomplishments

The FY1976 resource level for this subactivity was \$2.3 million and 33 positions. These resources provided for evaluations and studies of resource recovery technology options, the waste-to-energy technical assistance program (including \$350,000 for grants to communities to demonstrate resource recovery implementation strategies) and policy studies related to waste reduction measures.

The development of information on resource recovery technology options was allocated \$0.8 million and 13 positions. These resources include approximately \$0.4 million in contract support primarily for technology evaluation, economic analyses and management of existing demonstrations. These activities will result in information documents which provide the State and local communities with information on technology, managerial problems, and economics associated with resource recovery facilities and source separation techniques. EPA completed the demonstration of refuse-derived fuel in St. Louis. The construction of the San Diego (liquid pyrolysis) and Baltimore (gas pyrolysis) projects were completed. EPA completed the evaluation of the Franklin, Ohio demonstration plant (wet pulping and recovery).

In 1976, the Agency expanded its efforts in providing technical assistance in resource recovery to communities. These efforts include working with the communities on a one-to-one basis, the provision of grant funds to 10 communities and development of a series of guides which provide information on the marketing, technology and implementation aspects of resource recovery. Resources allocated to technical assistance includes \$1.1 million and 13 positions, of which \$0.7 million was allocated for extramural support. EPA provided technical consultation to communities desiring to implement a resource recovery

system: Dade County, Florida; Detroit, Michigan; Lane County, Oregon; Lexington, Kentucky; Memphis, Tennessee; Montgomery County, Ohio; and Washington, D.C. EPA initiated two demonstration projects at Marblehead and Somerville, Massachusetts to test the potential of resource recovery through a multi-material source separation system of a residential waste stream. Eight resource recovery implementation guides were completed to assist communities in planning and implementing systems to recover materials and energy from solid waste.

Resources of \$0.4 million and 7 positions were also allocated for studies and analyses of projects which are directed at the reduction of waste being generated. The contractual efforts (\$0.2 million) in this area primarily focused on the beverage container aspect of waste reduction and on the analysis of product charges to reflect the costs of solid waste management in product prices. Several analytical support efforts were initiated such as the disposable versus reusable milk container contractual effort, and the development of data on various waste reduction options. EPA completed an analysis on the national returnable beverage container legislation, provided technical information on beverage container issues and testified at State and local hearings. In addition, technical assistance was provided to Federal agencies to determine the suitability of their facilities for implementing the Beverage Container Guidelines.

1977 Program

The FY 1977 resource level for this subactivity is \$1.8 million and 33 positions. These resources are allocated to the same areas as indicated for FY1976 (i.e., evaluations of existing technologies, technical assistance to communities implementing resource recovery, and waste reduction analyses). The area of technology demonstration and evaluation is allocated \$0.6 million and 12 positions. These resources include the extramural funds (\$0.2) evaluations of a waterwall incinerator and evaluation of the Somerville/Marblehead demonstration. These are expected to result in documents which describe the waterwall incinerator technology and the mechanism for developing and implementing a source separation and separate collection system to recover resources.

EPA will publish results of a comprehensive study of the costs of producing refuse-derived fuel. Further testing of bacterial and virus emissions at the St. Louis demonstration plant will be conducted. Initial operation of Baltimore and San Diego projects will be finished. EPA will publish findings on the glass and aluminum recovery subsystem implemented at the Franklin, Ohio demonstration. EPA will hold project conferences and publish a monthly technology status report.

In the areas of technical assistance we expect to continue direct assistance to communities and to provide additional grants. Approximately \$450,000 of grant and contract funds are associated with the activities in assisting State and local communities to implement resource recovery systems. These funds will be used to award grants to approximately four communities and to provide increased technical assistance through consultant services (contracted) to States and local government and to the Federal establishment to assist in the implementation of the Resource Recovery Facility Guideline. EPA will provide direct technical assistance to communities and States desiring to implement a resource recovery system. Efforts will include assistance in the development of requests for proposals, reviews of various proposals, and financing schemes and market analyses for planned systems.

The area of waste reduction has been allocated 9 positions and \$0.45 million. These resources, of which \$0.2 million are for contracts and grants, will focus on analyses and evaluations necessary to develop the annual Report to Congress and voluntary waste reduction approaches. EPA will submit the Fourth Annual Report to Congress on Resource Recovery and Waste Reduction and will complete analysis of a national product charge to reflect the costs of solid waste management in product prices.

1978 Plan

FY1978 program for this subactivity includes \$1.8 million and 33 positions, a level program. These resources will be allocated to the same areas as FY1977. There are no plans to use funds for the purchase of ADP hardware or software.

The evaluation of resource recovery technology will be allocated \$0.6 million and 12 positions.

This level of resources will permit a continuation of activities in FY1978 and will allow for one additional evaluation to be initiated. At the present time, seven systems are approaching the stage where evaluations can be initiated. The evaluation will provide both an economic and environmental assessment of the system. Three prime candidates for system evaluation are Milwaukee, Wisconsin; Chicago, Illinois; and Saugus, Massachusetts.

The resource recovery technical assistance program will be allocated \$0.7 million and 12 positions. Again, this represents the same level of effort as in FY1976 and 1977. Approximately \$0.2 million are being allocated for extramural projects to provide backup expertise from outside consultants. Through

this minimum investment of resources., some 20 communities will have underway some efforts to adopt resource recovery systems. An evaluation of the effectiveness of the 15 grants awarded that focus on the implementation of resource recovery systems will be published.

The waste reduction and policy analysis program activities will be allocated \$0.5 million and 9 positions. This represents a continuation of FY1977 efforts. Approximately \$0.2 million are allocated for extramural projects. Extramural activities will continue on the concepts of voluntary waste reduction in industry. Several pilot programs with selected "disposable" industry processes will be initiated and initial studies on the composition of environmentally acceptable packaging will begin. Past work on waste reduction approaches and concepts will be factored into this program effort in order to optimize the results.

Solid Waste

Research and Development

Actual 1976	Budget Estimate 1977	Current Estimate 1977	Estimate 1978	Increase + Decrease - 1978 vs. 1977
(dollars in thousands)				

Appropriation				
Public Sector				
Activities.....	\$2,811	\$4,066	\$4,098	...
Permanent Positions				
Public Sector				
Activities.....	28	22	22	...

Purpose

EPA's research and development efforts in the solid waste program are directed toward the development of improved solid waste management, disposal technology, and resource recovery technology. These technological advances will enable local agencies to handle their solid waste problems in a cost effective and environmentally acceptable manner. In addition, the program is developing the scientific base for the possible establishment of standards for hazardous wastes disposal. In particular, information on the fate and processes of such materials flowing through soils and ground water systems is being developed.

Budget Request

Research efforts will be continued at a level commensurate with FY 1977 efforts. Research is described in Program Description below.



Program Description

Research and development efforts in the solid waste program are directed towards the development of technologies necessary to achieve environmentally acceptable cost effective solid and hazardous waste management in which conservation and recovery of resources are among the prime considerations. Included in this objective of the program are the following:

1. Development of methodology and/or equipment to eliminate effects due to the release into the environment of materials present in solid and hazardous waste which would be adverse to public health and welfare.
2. To evaluate and develop new or improved management techniques, and new or improved methods of collection, storage, transportation and disposal.
3. To evaluate and develop new or improved methods for the reduction, separation, processing and recovery of resources.
4. To establish a technical basis to support the Agency's efforts in developing guidelines for solid and hazardous waste management.

1976 Accomplishments

The amount of funds obligated in FY 1976 amounted to \$2,810,600. This included \$951,700 for contracts, \$866,500 for grants, and \$182,000 for interagency agreements. Specific accomplishments follow.

- Analytical methods have been developed and compiled for characterizing the composition of municipal solid waste and leachates. A predictive model was developed to more accurately and easily assess the dangers of migrating landfill gases. The model can be used through charts and tables designed to allow convenient insertion of site specific conditions; it will also be distributed in computer coded form with a user manual.
- Laboratory based work has led to recommendations for modifications of the traditional sanitary landfill method by recirculating leachate through municipal solid waste to accelerate decomposition. Benefits to be derived are intensified methane gas production for efficient recovery, predictable and short periods of strong leachate production, in situ leachate treatments, and more rapid return of landfill to alternative productive uses.
- Symposia were held to disseminate latest research results on the disposal of municipal and hazardous wastes including: (a) the processing of wastes prior to disposal; (b) site modification and management; (c) identification of pollution potential of certain municipal and industrial wastes; and (d) special disposal problems.
- In the area of pollutant movement in soils, research results identified the significant properties of those soils which most strongly retard movement of pollutants and have classified the mobility of many pollutants found in leachates from disposal sites receiving mixed municipal and hazardous wastes.
- The monitoring of the pollutants arsenic, beryllium, cadmium, chromium, copper, iron, mercury, lead, nickel, selenium, vanadium, zinc, cyanide, fluoride, and organics have indicated that pollutants from hazardous wastes are much more soluble in leachates than in water. Therefore, these pollutants will be much more available for movement into underlying or adjacent potable water supplies than would be assumed on the basis of water solubility data.

- Various pesticides and organic wastes were successfully detoxified in a low-temperature microwave plasma apparatus. The system comprises a liter reactor tube through which hazardous material to be decomposed is passed. A plasma is induced in the tube using a 2,450 MHz microwave power supply and applicator. As an example phenyl mercuric acetate is instantly converted into mercury metal, which is recovered, plus water and gaseous oxides of carbon. Multipound per hour quantities have been detoxified in the unit and it is envisioned that a scaled up system capable of up to 100 lbs. per hour throughput is feasible with current technology. No special gases or chemicals are used. Other toxic wastes which have been detoxified are difficult-to-treat compounds like PCB's and the pesticides malathion and methyl bromide.

- Research results indicated that building materials for houses can be made out of waste products such as rice hulls, peanut shells and woodchips. Building materials produced are 2-3 times stronger than existing standards, 30-50 percent cheaper, and less flammable with less hazardous smoke properties. These materials are being used on a test basis in structures.

- An investigation of acid hydrolysis of solid waste to produce glucose has resulted in a significant advance in the state-of-the-technology. The work, conducted at New York University, has shown that a combination of ultraviolet and electron beam radiation pretreatment has resulted in a 67 percent increase in yield, halving of the residence time, and a cellulose throughput increase of as much as 20 percent. This conversion process is of interest because glucose is an intermediate input in the production of ethyl alcohol which is an important chemical intermediate and a pollution free and easily stored liquid fuel.

1977 Program

The amount of funds allocated to this program for FY 1977 is \$4,098,000. Of this amount, it is estimated that \$1,400,000 will be expended through contract efforts, \$1,300,000 for grants and \$600,000 for interagency agreements. Included in the program are the following.

- Research to establish data on the decomposition of landfilled municipal wastes under differing moisture regimes and the development of techniques for collecting and treating leachates. The research will lead to the development of criteria for design and operation of landfills to effect rapid stabilization and settlement so that landfills can be put to use for other constructive purposes in a relatively short time after closure.
- Completion of an assessment of deep well injection of hazardous wastes and the continuation of studies to assess alternative methods of waste disposal to land other than conventional "landfilling."
- Initiation of research directed towards establishing practical technologies for closing off and taking remedial actions on environmentally unacceptable land disposal sites.
- Technical and environmental assessment of methods for processing and treating hazardous materials; e.g., kepone, DDT, mirex, lindane, chlordane, PCB's, methyl bromide, parathion, malathion, atrazine, and 2-4-D.
- An assessment of the status of resource recovery.

Solid Waste

Public Sector Activities

Significant Extramural Projects - FY 1977 Program

Title: Detoxification of Hazardous Materials by Low Temperature Microwave Plasma (Contract)	Amount: \$165,000
Discussion: The complete destruction of toxic and hazardous materials may be possible by employing microwave plasma.	
Title: Monitoring of Selective Test Cells to Provide Long-Term Results for Recommendations Regarding the Environmental Impact of MSW Disposal (Contract)	Amount: \$75,000
Discussion: Gas and leachate production is a critical factor with the disposal of solid wastes, and this type of monitoring is necessary to determine their production and impacts.	
Title: Laboratory and Field Evaluation of Chemically Stabilized Sludges (IAG)	Amount: \$100,000

Discussion: This study will contribute significantly to landfill operation, and we will enter into a cooperative effort with the U.S. Army Corps of Engineers

Title: Assessment and Evaluation of Hazardous Waste Storing,
Sampling Analysis, and Compatibility (Grant) Amount: \$71,000

Discussion: The California Department of Health will provide us with valuable information regarding the disposition of hazardous wastes.

Title: Field Verification of Land Cultivation-Refuse Farming (Contract) Amount: \$150,000

Discussion: The agricultural utilization of solid wastes as an economically-attractive alternative to land disposal offers promise, and will be investigated with this contract.

Title: Identify the Best Practical Technology for Remedying Water
and Gas Pollution from Waste Disposal Sites (Contract) Amount: \$125,000

Discussion: The problems with inoperative landfills must be solved in the immediate future.

Title: Assessment of Biodegradation Processes for Treatment
of Selected Hazardous Wastes (Contract) Amount: \$50,000

Discussion: It is important that we identify chemicals that can
be treated by biodegradation to remove their hazardous
properties.

Title: Develop-Evaluate the Pesticide Pit Disposal Techniques (Grant) Amount: \$150,000

Discussion: The excess pesticide problem is particularly
dangerous because of the impact of undesirable
disposal on both plant and animal life.

Title: Compilation, Development, and Testing of Interim Standard
MSW Production Analysis Procedures (Contract) Amount: \$200,000

Discussion: This will produce sought-after procedures necessary
for waste material recovery and reuse.

Title: Assessment of Resource Recovery and the Need for a Federally
Supported R&D Resource Recovery Program (Contract) Amount: \$155,000

Discussion: There is a critical need for a review of the Federal
role in R&D resource recovery, its need and recommended
R&D program alternatives.

1978 Plan

The amount of funds planned for this program in FY 1978 is \$4,098,000. Of this amount, it is estimated that \$1,400,000 will be expended in contracts, \$1,400,000 in grants and \$400,000 in interagency agreements.

Specific items of research will include:

- Monitoring of established landfill test cells to provide long-term data on environmental impact of municipal solid waste disposal in processed form (shredded, baled, shredded and baled).
- Determining the effect of controlled moisture regime on long-term gas and leachate production.
- Field verification of gas migration predictive methods and design criteria for gas control.
- Publication of updated "state-of-the-knowledge" report on contaminant movement in soils.
- Laboratory and field evaluation of chemically stabilized hazardous sludges.
- Field verification of technologies for closing off and remediating environmentally unacceptable land disposal sites will be initiated.
- Preparation of reports on updated "state-of-the-knowledge" on pesticide disposal and hazardous waste encapsulation.
- Continuation of efforts on the assessment of biodegradation processes for the treatment of selected hazardous wastes.

- Continuation of efforts in resource recovery research directed towards improved resource recovery through: (1) improved preprocessing systems and development; (2) development of alternative product applications; and (3) the development of product specifications, quality control procedures, and measurement techniques.

Solid Waste

Public Sector Activities

Significant Extramural Projects - FY 1978 Plan

Title:	Detoxification of Hazardous Materials by Low Temperature Microwave Plasma (Contract)	Amount:	\$200,000
Discussion:	The complete destruction of toxic and hazardous materials may be possible by employing microwave plasma. This is a follow-on to work funded in FY 1977.		
Title:	Monitoring of Selective Test Cells to Provide Long-Term Results for Recommendations Regarding the Environmental Impact of MSW Disposal (Contract)	Amount:	\$75,000
Discussion:	Gas and leachate production is a critical factor with the disposal of solid wastes, and this type of monitoring is necessary to determine their production and impacts. This is a follow-on to work funded in FY 1977.		
Title:	Field Verification of Gas Migration Predictive Methods and Design Criteria for Gas Controls (Contract)	Amount:	\$150,000

Discussion: This study is necessary to achieve the goals of site selection, design and operation of landfills.

Title: Laboratory and Field Evaluation of Chemically Stabilized Sludges (IAG) Amount: \$75,000

Discussion: This study will contribute significantly to landfill operation, and we will enter into a cooperative effort with the U.S. Army Corps of Engineers. This is a follow-on to work funded in FY 1977.

Title: Assessment and Evaluation of Hazardous Waste Storing, Sampling Analysis, and Compatibility (Grant) Amount: \$100,000

Discussion: This will provide us with valuable information regarding the disposition of hazardous wastes. This is a follow-on to work funded in FY 1977.

Title: Field Verification of Land Cultivation-Reuse Farming (Contract) Amount: \$100,000

Discussion: The agricultural utilization of solid wastes as an economically-attractive alternative to land disposal offers promise, and will be investigated with this contract. This is a follow-on to work funded in FY 1977.

Title: Identify the Best Practical Technology for Remedying Water and Gas Pollution from Waste Disposal Sites (Contract) Amount: \$200,000

Discussion: The problems with inoperative landfills must be solved in the immediate future. This is a follow-on to work funded in FY 1977.

Title: Encapsulation - To Develop and Evaluate Bulk Encapsulation Techniques for Control of Hazardous Materials (Grant) Amount: \$200,000

Discussion: If hazardous wastes are to be disposed of safely, the problem of container deterioration must be solved.

Title: Assessment of Biodegradation Processes for Treatment of Selected Hazardous Wastes (Contract) Amount: \$150,000

Discussion: It is important that we identify chemicals that can be treated by biodegradation to remove their hazardous properties. This is a follow-on to work funded in FY 1977.

Title: Develop-Evaluate the Pesticide Pit Disposal Techniques (Cont.) Amount: \$100,000

Discussion: The excess pesticide problem is particularly dangerous because of the impact of undesirable disposal on both plant and animal life. This is a follow-on to work funded in FY 1977.

DATE DUE

1964

