DEPARTMENT OF ENERGY FY 1995 CONGRESSIONAL BUDGET REQUEST ENERGY SUPPLY, RESEARCH AND DEVELOPMENT

OVERVIEW

UNIVERSITY AND SCIENCE EDUCATION

Program Mission

There is a national consensus that one of the most serious problems facing the Nation over the next several years is the declining number of young Americans, including women and minorities, indicating interest in pursuing careers in science, mathematics, engineering and technology. This problem is further compounded by the often poor and inadequate preparation received by young students interested in such careers. The crisis in education has serious implications for the Nation's continued international economic and technological competitiveness. Therefore, the Administration and U.S. Governors have designated improving science and mathematics education as one of the goals for education reform by the turn of the century. This includes the goal of making U.S. students first in the world in mathematics and science achievement by the year 2000.

Future success in meeting the Department's science, energy, and defense research and development (R&D) missions is also heavily dependent on the quality of the Department's scientific and technical workforce. The Department and its predecessor agencies have historically supported programs designed to help replenish the Nation's scientific workforce, while at the same time encouraging young students to pursue scientific and technical careers in fields of direct programmatic interest to the Department. The University and Science Education (USE) program is the primary DOE program that strengthens the Nation's science education and research infrastructure to ensure their effective contribution to the Department's long-range R&D missions. Much of this support involves the use of the unique facilities and resources at the Department's research facilities to assist in science education, from the precollege through postdoctoral levels. The USE program consists of four major subprograms and a set of interrelated program activities that focus on the following three primary objectives:

- Utilize the unique resources of the Department's laboratories (scientists, facilities and equipment) to assist in the national effort to strengthen the Nation's economic, educational and technological competitiveness by enhancing both university faculty and student research and precollege science education;

- Strengthen university capability to perform long-range R&D, including providing support for state-of-the-art research instrumentation and the refueling of university nuclear research reactors; and

- Enhance the quality and increase the numbers of young people, particularly minorities and women, interested in pursuing energy-related scientific/technical careers.

Program Overview

The first USE subprogram, Laboratory Cooperative Science Centers, includes support for pre-college student and teacher research and training; and for undergraduate, graduate, and faculty research appointments at DOE laboratories and DOE university consortia. The FY 1995 request builds on an historically strong base of involvement of the DOE laboratories in science education at both the precollege and university level and implements the Administration's commitment to improve mathematics and science education in the U.S. as described in the report "Pathways to Excellence," prepared by the Federal Coordinating Council and Science, Engineering and Technology (FCCSET) Committee on Education and Human Resources (EHR) in January 1993. Support will be provided for comprehensive programs at the national, regional and local level to be conducted at several DOE laboratories. Such activities include: 1) summer and semester-length research appointments; and 3) support for precollege students; 2) summer and academic-year appointments for university faculty and graduate students; and 3) support for precollege student and teacher research appointments including the prestigious DOE High School Science Students' Honors Research Program and the DOE Teacher Research Associates Programs. Support is requested to significantly increase participation by women and underrepresented groups in laboratories.

The second USE subprogram, University Programs, includes support for university-based efforts directed at encouraging more young people, including minorities and women, to pursue energy-related scientific and technical careers as well as support for energy-related workforce analyses and assessments. Continued cost-shared support will also be provided for the development of museum exhibitions and related classroom educational materials on DOE scientific and technical program activities. Support is requested to continue the Department's PreFreshman Enrichment Program for 7,000 middle-school students in summer workshops on mathematics, science, and engineering conducted by universities on their campuses. Funds are requested to continue nationally competitive postdoctoral research appointments in energy related scientific and technical disciplines and support is requested for enhanced support of DOE laboratory/minority university collaborative research and education partnerships, and support is requested to fund implementation plans to improve research infrastructure in Experimental Program to Stimulate Competitive Research (EPSCOR) states.

The third USE subprogram, University Reactor Fuel Assistance, provides support for refueling and related activities for university nuclear research and training reactors and continuation of the conversion of university reactors to Low Enriched Uranium (LEU) fuel.

The fourth USE subprogram. University Research Instrumentation (URI), will provide competitive support for the acquisition of state-of-the-art research instrumentation by DDE-sponsored university researchers. The URI program assists the Department's energy research and technology programs by helping universities purchase instruments which cost more than \$100,000 each, and which will be utilized by a number of faculty researchers and students. URI awards are made to universities based on both the merit and accomplishments of current DDE-sponsored university research projects and the degree to which the new equipment will enable university scientists to substantially advance understanding of energy-related phenomena.

Program Direction funding is requested for Federal staffing and associated support costs to provide overall management and program direction of the USE program.

Performance measures used for the USE program include the number of students and teachers served and the number of minority and underrepresented student participants in lab based programs.

DEPARTMENT OF ENERGY FY 1995 CONGRESSIONAL BUDGET REQUEST ENERGY SUPPLY, RESEARCH AND DEVELOPMENT (Tabular dollars in thousands, narrative in whole dollars)

LEAD TABLE

University and Science Education

	FY 1993	FY 1994	FY 1994	FY 1995
Activity	Adjusted	Appropriation	Adjustment	Request
Operating Expenses				
Laboratory Cooperative Science Centers	\$26,515	\$35,823	-\$80	\$30,846
University Programs	20,357	12,800	-23	17,377
University Reactor Fuel Assistance	3,424	3,730	0	3,730
University Research Instrumentation	5,562	5,647	-49	5,647
Program Direction	0	0	0	2,944
Subtotal, Operating Expenses	\$55,858	\$58,000	-\$152	\$60,544
Less Productivity Savings	-85 a/	0	0	0
TOTAL	\$55,773	\$58,000	-\$152	\$60,544
Less activities funded in Materials Support and				
Other Defense Programs	-52,616	0	0	0
Total, Program in Energy Supply Research				
and Development	\$3,157	\$58,000	_\$152	\$60,544
Summary				
Operating Expenses	55,773	58,000	-152	60,544
Total Program	55,773 b/	58,000	-152	60,544
Staffing (FTEs)	(Reference Adv	visory & Oversight Pro	gram Direction)	24
Authorization: P.L. 95-91, "Department of Energy Organization	on Act" (1977), Se	ction 209		

a/ Amount of general reduction for use of prior year balances assigned to this program. The total will be taken at the appropriation level.

b/ Total reflects an internal reprogramming of +\$1,000,000; a reduction of \$832,000 transferred to the Small Business Innovative Research (SBIR) program; and a general reduction for use of prior year balances of \$85,000.

DEPARTMENT OF ENERGY FY 1995 CONGRESSIONAL BUDGET REQUEST ENERGY SUPPLY, RESEARCH AND DEVELOPMENT (Tabular dollars in thousands narrative in whole dollars)

SUMMARY OF CHANGES

University and Science Education

FY	1994 Appropriation	\$	58, 00 0
-	Adjustment	<u> </u>	<u>- 152</u>
FY	1994 Adjusted	\$	57 ,848
-	Reduced support for selected precollege and other lab-based programs		-2,168
-	Reduced support for mathematics science education program		-1,200
-	Initiate support for technology education, including initiatives in school-to-work transition and apprenticeship programs		+3,000
-	Reduced support for EPSCoR implementation grants		-5,000
-	Increased support for laboratory/minority university partnerships		+1,500
-	Increased support for programs serving minority and underrepresented students		+3,620
-	Consistent with the Secretary's realignment of DOE, support for Program Direction which was previously provided under Advisory & Oversight Program Direction, Office of Energy Research, is now included here		+2,944
FY	1995 Congressional Budget Request	5	60,544

KEY ACTIVITY SUMMARY

UNIVERSITY AND SCIENCE EDUCATION

I. Preface: Laboratory Cooperative Science Centers

Support is provided for precollege science students and teachers and for university faculty, graduate, and undergraduate students to participate in summer and semester-length research and education activities at DOE laboratories. The objectives of this effort are to provide hands on research experience in cutting edge science thereby stimulating students to prepare for careers in science and technology fields and enhancing the knowledge and skills of teachers and faculty. The principal approach of this program takes full advantage of the unique resources and facilities at the DOE laboratories for research and support of related mathematics and science education. Support is also provided in this activity element for high school science student honors research, science teacher research appointments, workshops/institutes and other precollege science and mathematics education activities.

II. A. Summary Table: Laboratory Cooperative Science Centers

11. 8.

Program Activity		FY 1993 Enacted		FY 1994 Enacted		Y 1995 equest	% Change	
Laboratory Cooperative Science Centers	\$	26,515	\$	35,743	\$	30,846	- 14	
Total, Laboratory Cooperative Science Centers	\$	26,515	\$	35,743	\$	30,846	- 14	
Major Laboratory and Facility Funding								
AMES LAB	\$	127	\$	296	5	150	- 49	
ARGONNE NATIONAL LAB (EAST)	\$	4,523	\$	4,575	Ś	4,542	- 1	
BROOKHAVEN NATIONAL LAB	\$	1,959	\$	2,057	\$	2,394	+ 16	
FERMI NATIONAL ACCELERATOR LAB	\$	1,060	\$	1,200	\$	1.280	+ 7	
IDAHO NATIONAL ENGINEERING LAB	\$	100	\$	157	\$	100	- 36	
LAWRENCE BERKELEY LAB	\$	1,480	\$	1,629	Ś	1.754	+ 8	
LAWRENCE LIVERMORE NATIONAL LAB	\$	1,159	\$	704	Ś	1.000	+ 42	
LOS ALAMOS NATIONAL LABORATORY	\$	897	\$	1,087	Ś	858	- 21	
MOUND PLANT	\$	50	\$	187	Ś	170	- 9	
OAK RIDGE INSTITUTE FOR SCIENCE & EDUCATION	\$	1,951	\$	2,503	Ś	2.500	Ō	
OAK RIDGE NATIONAL LAB	\$	1,010	\$	1,098	Ś	1.157	+ 5	
PACIFIC NORTHWEST LAB	\$	904	Ś	1,300	Ś	1.100	- 15	
PRINCETON PLASMA PHYSICS LAB	\$	308	Ś	371	Ś	350	- 6	
SAVANNAH RIVER ECOLOGY LAB	\$	100	Ś	111	Š	100	- 10	
SAVANNAH RIVER TECHNOLOGY CENTER	\$	57	Ś	43	Ś	70	+ 63	
SANDIA NATIONAL LABORATORIES	\$	1,362	\$	650	Ś	650	0	

FY 1993

FY 1994

Laboratory Cooperative Science Centers

Program Activity

Laboratory Cooperative Science Centers	Supported precollege and university level student/teacher/faculty research appointments and related science education activities at DOE laboratories. Included summer and semester research appointments for undergraduate students, with special emphasis on underrepresented minorities including women and summer and academic year research appointments at below the FY 1992 level.	Provides for precollege and university-level student/teacher/ faculty research appointments and related science education activities at DOE labs. Includes summer and semester length research appointments for undergraduate students, with special emphasis on underrepresented minorities including women; and summer/academic year research appointments. Provides for consistency on the application of overhead rates to research support.	Provides for precollege and university-level student/teacher/ faculty research appointments and related science education activities at DOE labs. Includes summer and semester length research appointments for undergraduate students, with special emphasis on underrepresented minorities including women; and summer/academic year research appointments. Provides for consistency on the application of overhead rates to research support.
	Supported national precollege level student/teacher research appointments and related science education activities at DOE labs including the high school student honors research, precollege teacher research appointments and minority student apprenticeships at approximately 75% of the FY 1992 level.	Maintains support for national precollege-level student/teacher research appointments and related science education activities at DOE labs at the FY 1993 level. Includes high school science student honors research, precollege teacher research appointments, and minority student research apprenticeships.	Maintains support for national precollege-level student/teacher research appointments and related science education activities at DOE labs at the FY 1993 level. Includes high school science student honors research, precollege teacher research appointments, and minority student research apprenticeships.
	Supported precollege mathematics science education only for the Lawrence Livermore Supercomputing Center	Maintains support of precollege science education for the Lawrence Livermore Supercomputer Center.	Maintains support of precollege science education for the Lawrence Livermore Supercomputing Center.
	Provided support for DOE laboratory rural/urban partnerships designed to strengthen precollege math/science education on local/regional basis.	Continues support for DOE laboratory rural/urban partnerships designed to strengthen precollege math/science education on local/regional basis.	Continues support for DOE laboratory rural/urban partnerships designed to strengthen precollege math/science education on local/regional basis.
	Provided support for 10 four-week teacher training institutes (50 teachers per institute) for middle/high school science/math teachers at DOE laboratories.	Provides support for 10 four-week teacher training institutes (50 teachers per institute) for middle/high school science/math teachers at DOE laboratories.	Provides support for 10 four-week teacher training institutes (50 teachers per institute) for middle/high school science/math teachers at DOE laboratories.

III. Laboratory Cooperative Science Centers (Cont'd):

FY 1993	FY 1994	FY 1995
No activity.	No activity.	Initiates support for technology education, including initiatives in school-to-work transitions and apprenticeship programs.
No activity.	Funding in the amount of \$536 has been budgeted for the SBIR program.	Funding in the amount of \$617 has been budgeted for the SBIR program. This amount will be reduced upon allocation of the productivity savings reflected in the lead table.
\$ 26,515	\$ 35,743	\$ 30,846
\$ 26,515	\$ 35,743	\$ 30,846
	FY 1993 No activity. No activity. \$ 26,515 \$ 26,515	FY 1993 FY 1994 No activity. No activity. No activity. Funding in the amount of \$536 has been budgeted for the SBIR program. \$ 26,515 \$ 35,743 \$ 26,515 \$ 35,743

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KEY ACTIVITY SUMMARY

UNIVERSITY AND SCIENCE EDUCATION

I. Preface: University Programs

Support is provided for science education and research-related efforts in areas of direct relevance to DOE where universities, colleges and other non-DOE facilities are the principal performers. Support is included for scientific and technical manpower development efforts, the collection and analysis of data on the supply and demand of scientists and engineers for current and future energy R&D programs, and summer institutes in science/math on college campuses for women and minority middle school students. Support is also provided for the development and preparation of museum-based exhibits and related educational material on energy-related science technology. Funds are requested to support a number of competitive postdoctoral research appointments in energy-related scientific and technical disciplines and for DOE laboratory/minority university collaborative research and education programs.

II. A. Summary Table: University Programs

11. 8.

Program Activity	F	Y 1993 nacted	F E	Y 1994 nacted	F	Y 1995 equest	% Change	
University Programs	\$	20,357	\$	12,777	\$	17,377	+ 36	
Total, University Programs	\$ 20,357		\$ 12,777		\$ 17,377		+ 36	
Major Laboratory and Facility Funding								
LAWRENCE BERKELEY LAB	\$	905	\$	833	\$	800	- 4	
LOS ALAMOS NATIONAL LABORATORY	\$	329	\$	291	\$	350	+ 20	
OAK RIDGE INSTITUTE FOR SCIENCE & EDUCATION	5	3,178	\$	3,001	\$	3,000	0	
OAK RIDGE NATIONAL LAB	5	229	\$	291	\$	350	+ 20	
SANDIA NATIONAL LABORATORIES	5	1.633	2	1.516	Ż	1.500	- 1	

III. Activity Descriptions: (New BA in thousands of dollars)

Program Activity	FY 1993	FY 1994	FY 1995
University Programs			
University Programs	Initiated postdoctoral fellowship program which supports ten postdoctoral research appointments in energy related scientific and technical disciplines at DOE laboratories. The fellowship program will be nationally competitive.	Continues postdoctoral fellowship program which will support ten postdoctoral research appointments in energy related scientific and technical disciplines at DOE laboratories. The fellowship program will be nationally competitive.	Continues postdoctoral fellowship program which will support postdoctoral research appointments in energy related scientific and technical disciplines at DOE laboratories. The fellowship program will be nationally competitive.
	Continued nuclear engineering research program at FY 1992 level.	No activity.	No activity.
	Continued manpower analysis efforts at FY 1992 level.	Supports manpower analysis efforts. Support includes funding for the collection and analysis of data on the supply and demand of scientists and engineers for current and future energy R&D programs.	Supports manpower analysis efforts. Support includes funding for the collection and analysis of data on the supply and demand of scientists and engineers for current and future energy R&D programs.
	Reduced support for Prefreshmen Enrichment Program (PREP) below the FY 1992 level.	Reduces support for PREP below FY 1993 level.	Increases support for PREP.
	Delayed awards in the museum-based science education program until FY 1994.	Provides continued funding for museum-based science education program at FY 1992 level.	Provides continued funding for museum-based science education program at FY 1994 level.
	Maintained support for DOE laboratory/minority university alliances which included precollege science education activities with emphasis on underrepresented minorities and women at the FY 1992 level.	Continues support for DOE laboratory/minority university alliances which include precollege science education activities with emphasis on underrepresented minorities at FY 1993 level.	Continues support for DOE laboratory/minority university alliances which include precollege science education activities with emphasis on underrepresented populations.
	Provided support for 10 pilot grants to retain women/minority students in math/science pipeline who are prepared to teach at precollege level.	Provides support for 10 pilot grants to retain women/minority students in math/science pipeline who are prepared to teach at precollege level.	Maintains support for grants to retain women/minority students in math/science pipeline who are prepared to teach at precollege level.
	EPACT:	EPACT :	EPACT:
	EPACT Section 2203(b) "Supporting Research and Technical Analysis":	EPACT Section 2203(b) "Supporting Research and Technical Analysis":	EPACT Section 2203(b) "Supporting Research and Technical Analysis":

III. University Programs (Cont'd):

Program Activity	FY 1993	FY 1994	FY 1995		
University Programs (Cont'd)	Supported implementation of State plans to improve research infrastructure in EPSCoR states and for planning grants.	Maintains the number of implementation grants awarded and supports traineeships.	Reduces number of implementation grants.		
	Provided support for continuation of reactor instrumentation upgrade program.	No activity.	No activity.		
	Funding in the amount of \$393 was transferred to the SBIR program.	Funding in the amount of \$192 has been budgeted for the SBIR program.	Funding in the amount of \$348 has been budgeted for the SBIR program. This amount will be reduced upon allocation of the productivity savings reflected in the lead table.		
	\$ 20.357	\$ 12.777	\$ 17.377		
University Programs	\$ 20,357	\$ 12,777	\$ 17.377		

KEY ACTIVITY SUMMARY

UNIVERSITY AND SCIENCE EDUCATION

I. Preface: University Reactor Fuel Assistance

II. B.

Provides support associated with the fabrication and shipping of nuclear fuel for university-based research/training reactors. The university-based nuclear research and manpower development effort is highly dependent on these specialized facilities, not only for nuclear related training, but also for research in the basic sciences. Support is provided through this program for the continued conversion of university reactors to low enriched uranium (LEU) fuel as mandated by the Nuclear Regulatory Commission. This subprogram also includes support on a competitive basis for university reactor sharing grants which provide research and training opportunities for faculty/students from nearby universities and colleges without direct access to research reactors.

II. A. Summary Table: University Reactor Fuel Assistance

Program Activity	F) Ei	r 1993 nacted	F) El	r 1994 nacted	F	r 1995 equest	X Change
University Reactor Fuel Assistance	\$	3,424	\$	3,730	\$	3,730	0
Total. University Reactor Fuel Assistance	\$	3,424	\$	3,730	\$	3,730	0
Major Laboratory and Facility Funding							
ARGONNE NATIONAL LAB (EAST)	\$ \$	150 2,095	\$ \$	150 1,744	\$ \$	200 2.300	+ 33 + 32

III. Activity Descriptions: (New BA in thousands of dollars)									
Program Activity	FY 1993	FY 1994	F¥ 1995						
University Reactor Fuel Assistance									
University Reactor Fuel Assistance	Provided support for university reactor refueling and funding for LEU conversion, including completion of safety analysis reviews for conversion of four TRIGA reactors to LEU fuel.	Provides support for university reactor refueling and funding for LEU conversion, including initial fabrication of one TRIGA reactor core.	Provides support for university reactor refueling and funding for LEU conversion, including partial fabrication of one TRIGA reactor core.						
	Funding in the amount of \$306 was transferred to for the SBIR program.	Funding in the amount of \$56 has been budgeted for the SBIR program.	Funding in the amount of \$75 has been budgeted for the SBIR program. This amount will be reduced upon allocation of the productivity savings reflected in the lead table.						
	\$ 3,424	\$ 3,730	\$ 3.730						
University Reactor Fuel Assistance	\$ 3,424	\$ 3,730	\$ 3.730						

KEY ACTIVITY SUMMARY

UNIVERSITY AND SCIENCE EDUCATION

I. Preface: University Research Instrumentation

Support is provided on a competitive merit basis to universities for the purchase of state-of-the-art scientific research equipment costing more than \$100,000. The principal objective of the program is to strengthen the ability of university scientists to conduct long-range research related to the high priority DOE fundamental science and energy technology research. An ancillary objective of the URI program is to provide graduate students with hands-on experience in the use of sophisticated research instrumentation.

II. A. Summary Table: University Research Instrumentation

FY 1993 Enacted		FY 1994 Enacted		FY 1995 Request		% Change	
\$	5,562	\$	5,562	\$	5,647	+ ;	2
\$	5,562	\$	5,562	\$	5,647	+ ;	2
	\$ \$	FY 1993 Enacted \$ 5.562 \$ 5.562	FY 1993 FT Enacted Er \$ 5,562 \$ \$ 5,562 \$	FY 1993 FY 1994 Enacted Enacted \$ 5,562 \$ 5,562 \$ 5,562 \$ 5,562	FY 1993 FY 1994 FY Enacted Enacted Re \$ 5,562 \$ 5,562 \$ \$ 5,562 \$ 5,562 \$	FY 1993 FY 1994 FY 1995 Enacted Enacted Request \$ 5,562 \$ 5,562 \$ 5,647 \$ 5,562 \$ 5,562 \$ 5,647	FY 1993 FY 1994 FY 1995 Enacted Enacted Request X Ch \$ 5,562 \$ 5,562 \$ 5,647 + 2 \$ 5,562 \$ 5,562 \$ 5,647 + 2

III. Activity Descriptions: (New BA in thousands of dollars)									
Program Activity	FY 1993	FY 1994	FY 1995						
University Research Instrumentation									
University Research Instrumentation	Provided support for 22-24 instrumentation awards.	Provides support for 22-24 instrumentation awards.	Provides support for 22-24 instrumentation awards.						
	Funding in the amount of \$85 was transferred to the SBIR program.	Funding in the amount of \$83 has been budgeted for the SBIR program.	Funding in the amount of \$113 has been budgeted for the SBIR program. This amount will be reduced upon allocation of the productivity savings reflected in the lead table.						
	\$ 5,562	\$ 5,562	\$ 5,647						
University Research Instrumentation	\$ 5,562	\$ 5,562	\$ 5,647						

KEY ACTIVITY SUMMARY

UNIVERSITY AND SCIENCE EDUCATION

1. Preface: Program Direction

This subprogram provides the Federal staffing and associated funding resources required to provide overall management, program direction, and support of the Department's science education and technical information programs and to carry out the Department's responsibilities for science and mathematics education in the recently established Office of Science Education and Technical Information.

11. A. Summary Table: Program Direction

Program Activity	FY 1993 Enacted		FY 1994 Enact e d		FY 1995 Request		% Change
Program Direction	\$	0	\$	0	\$	2.944	>999
Total, Program Direction	\$	0	\$	0	\$	2,944	>999
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Program Direction No Ov	o activity. See Advisory and versight Program Direction.	No activity. See Advisory and Oversight Program Direction.	TRANSFER: Provide funds for salaries, benefits, and travel for 24 full-time equivalents (FTEs) in the Office of Science Education and Technical Information. Provide for overall
			menagement, program Direction, and support of the science education and technical information programs. Support the Department's math, science, engineering, and technology education activities. Support activities at the seven designated Science Education Centers and other DOE facilities in support of the National Education Goals. Support efforts in public science literacy as well as other precollege and undergraduate programmatic areas. Support public/private efforts to increase participation of minorities and women in a variety of activities supported by the Department. Interact with outside organizations to develop model state plans for education reform and improvements. Support the EPSCoR effort and activities related to the on-line program information system for university and other researchers. Coordinates refueling and conversion of university research reactors and associated instrumentation and equipment. Support undergraduate education and evaluation efforts. (\$2,055)
Ni Oʻ	o activity. See Advisory and versight Program Direction.	No activity. See Advisory and Oversight Program Direction.	Provide program support such as printing, timesharing on various information systems and communications networks, and contractual support. Provide for Automated Office Support Systems (AOSS) workstations. (\$889)
	\$ 0	\$ 0	\$ 2,944

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III. Program Direction (Cont'd):

Program Activity	FY 1993	FY 1994	FY 1995
Program Direction	\$ 0	\$ 0	\$ 2 944
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