

DEPARTMENT OF ENERGY  
FY 1996 CONGRESSIONAL BUDGET REQUEST  
ENERGY SUPPLY, RESEARCH AND DEVELOPMENT

OVERVIEW

ADVANCED NEUTRON SOURCE (ANS)

The Advanced Neutron Source was planned to be an experimental facility designed to meet the Nation's need for an intense steady-state source of neutrons. The facility was to be based on a new research reactor that would have had the most intense neutron beams in the world, exceeding its closest competitor by a factor of 5 to 10. The Advanced Neutron Source would have replaced both the High Flux Beam Reactor and the High Flux Isotope Reactor, and would have provided increased research capability and increased assurance of worker and public safety.

The Advanced Neutron Source was designed to meet the programmatic needs of the Department of Energy in condensed matter physics, chemistry, biological sciences, materials science, polymer science, isotope production, and materials irradiation. In addition, it would have functioned as a national facility open to researchers from universities, national laboratories, and industry. Based on the experience in Europe, the Advanced Neutron Source would have served over 1,000 researchers per year.

Because of the high cost of ANS and increasing budget constraints, no FY 1996 funds are provided for ANS. The Department plans to propose to reprogram funds remaining in FY 1995 for conceptual design of a spallation neutron source in the Basic Energy Sciences program.

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 (Tabular dollars in thousands. Narrative in whole dollars).

LEAD TABLE

Advanced Neutron Source

Activity	FY 1994 Adjusted	FY 1995 Appropriation	FY 1995 Adjustment	FY 1995 Adjusted	FY 1996 Request
Operating Expenses.....	\$16,243	\$20,000	-\$236	\$19,764	\$0
Capital Equipment.....	0	1,000	0	1,000	0
Subtotal, Program.....	<u>\$16,243</u>	<u>\$21,000</u>	<u>-\$236</u>	<u>\$20,764</u>	<u>\$0</u>
Adjustment.....	-307 a/	-127 a/	0	-127 a/	0
Total, Program.....	<u><u>\$15,936</u></u> b/	<u><u>\$20,873</u></u>	<u><u>-\$236</u></u>	<u><u>\$20,637</u></u>	<u><u>\$0</u></u>
<b>Summary</b>					
Operating Expenses.....	15,936	19,873	-236	19,637	0
Capital Equipment.....	0	1,000	0	1,000	0
Total, Program.....	<u><u>\$15,936</u></u>	<u><u>\$20,873</u></u>	<u><u>-\$236</u></u>	<u><u>\$20,637</u></u>	<u><u>\$0</u></u>

Staffing (FTE's)..... (Included in Basic Energy Sciences Program Direction)

Authorization: Section 209, P.L. 95-91, "Department of Energy Organization Act"

a/ Share of Energy Supply, Research and Development general reduction for use of prior year balances assigned to this program. The total general reduction is applied at the appropriation level.

b/ Excludes \$243,000 which has been transferred to the SBIR program and \$8,100 which has been transferred to the STTR program.

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SUMMARY OF CHANGES

Advanced Neutron Source

FY 1995 Appropriation.....	\$ 21,000
- Adjustment.....	<u>236</u>
FY 1995 Adjusted.....	\$ 20,764
<u>Operating Expenses</u> .....	- 19,764
No activity.	
<u>Capital Equipment</u> .....	<u>1,000</u>
No activity.	
FY 1996 Congressional Budget Request.....	<u>\$ 0</u>

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 (dollars in thousands)

KEY ACTIVITY SUMMARY

ADVANCED NEUTRON SOURCE RESEARCH, DEVELOPMENT AND OPERATIONS

I. Preface: Advanced Neutron Source Research, Development and Operations

Because of the high cost of ANS and increasing budget constraints, no FY 1996 funds are provided for ANS.

II. A. Summary Table: Advanced Neutron Source Research, Development and Operations

Program Activity	FY 1994 Adjusted	FY 1995 Adjusted	FY 1996 Request	\$ Change
Advanced Neutron Source Research, Development and Operations.....	\$ 16,243	\$ 19,764	\$ 0	\$ -19,764
Total, Advanced Neutron Source Research, Development and Operations	<u>\$ 16,243</u>	<u>\$ 19,764</u>	<u>\$ 0</u>	<u>\$ -19,764</u>

II. B. Laboratory and Facility Funding Table: Advanced Neutron Source Research, Development and Operations

Oak Ridge National Lab .....	\$ 15,536	\$ 19,000	\$ 0	\$ -19,000
Argonne National Lab (East) .....	200	0	0	0
Brookhaven National Lab .....	175	0	0	0
All Other .....	332	764	0	-764
Total, Advanced Neutron Source Research, Development and Operations	<u>\$ 16,243</u>	<u>\$ 19,764</u>	<u>\$ 0</u>	<u>\$ -19,764</u>

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

Program Activity	FY 1994	FY 1995	FY 1996
Advanced Neutron Source Research, Development and Operations	<p>The FY 1994 research and development (R&amp;D) program was a continuation of designs, tests, and modelling of ANS components to provide further results prior to ANS construction. Activities in FY 1994 included fuel element R&amp;D such as the irradiation of the second miniplate in the reflector region of the High Flux Isotope Reactor facility. Upper and lower fuel elements without uranium in fuel plates were fabricated for use in core flow tests. Dynamic tests of some reactor core elements, the control rods, and the reflector shutdown rods were carried out. A study was undertaken to examine the impact on the ANS performance goals if low or medium-enriched fuel is used rather than the highly enriched fuel used for the design. The study will build on existing information using currently developed fuels and focus on low (20%) and medium (35%) enriched fuel. Continued work on the Environmental Impact Statement.</p>	<p>Because of the high cost of ANS and increasing budget constraints, no FY 1996 funds are provided for ANS. The Department plans to propose to reprogram funds remaining in FY 1995 for conceptual design of a spallation neutron source in the Basic Energy Sciences program.</p>	<p>The Administration proposes not to continue the Advanced Neutron Source (ANS) reactor project in FY 1996. Although the Department of Energy will complete certain research and development and engineering design activities described in the FY 1995 Energy and Water Development Appropriations Act conference report, no additional financial commitments will be made on behalf of the project after the submission of the FY 1996 budget request to Congress. Concern about the high cost of building the ANS reactor was the primary factor in the Administration's decision to propose terminating the project. There was also a non-proliferation policy concern about the 93-percent enriched fuel that the ANS reactor was designed to use. The development of a technically acceptable lower enriched fuel would have required further research and development.</p> <p>The Administration will propose to reprogram remaining funds from the FY 1995 appropriation for the ANS project to support research and development and engineering design activities leading to the conceptual design of a spallation neutron source to meet the Nation's need for a next-generation neutron scattering source. An additional \$8 million for this purpose is also requested in FY 1996 in the Basic Energy Sciences program. The preferred alternative site for a spallation neutron source would be Oak Ridge National Laboratory, in order to maximize the use of neutron source design expertise already developed through the preparation of the ANS conceptual design, and to take advantage of the laboratory's</p>

III. Advanced Neutron Source Research, Development and Operations (Cont'd):

Program Activity	FY 1994	FY 1995	FY 1996
Advanced Neutron Source Research, Development and Operations (Cont'd)			<p>experience in operating particle accelerators and conducting neutron scattering research. The spallation source research and development effort will make use of the best capabilities in the DOE laboratories, including the Defense Programs' Accelerator Production of Tritium (APT) project at Los Alamos National Laboratory.</p> <p>Without a major new neutron source or upgraded operation of an existing research reactor, the United States will forego significant scientific, technical, and economic benefits that derive from neutron scattering and materials irradiation research and the production of medical isotopes. A spallation neutron source should enable the Nation to carry out major research activities in areas such as biology, materials science, superconductivity, pharmaceuticals, electronic materials, and many other technological areas that are critical for future U.S. economic competitiveness and national security.</p>
	<p><b>EPACT:</b></p> <p>EPACT Section 2203(a)(2)(d) "Supporting Research and Technical Analysis":</p> <p>Provided funds to further develop the design and provide the technical foundation for the Advanced Neutron Source.</p> <p>Funding in the amount of \$243,000 and \$8,100 has been transferred to the SBIR program and the STTR program, respectively.</p>	<p>Funding in the amount of \$392,750 and \$19,637 has been budgeted for the SBIR program and the STTR program, respectively.</p>	

III. Advanced Neutron Source Research, Development and Operations (Cont'd):

Program Activity	FY 1994	FY 1995	FY 1996
Advanced Neutron Source Research, Development and Operations (Cont'd)	\$ 16,243	\$ 19,764	\$ 0
Advanced Neutron Source Research, Development and Operations	\$ 16,243	\$ 19,764	\$ 0

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KEY ACTIVITY SUMMARY

CAPITAL EQUIPMENT

I. Preface: Capital Equipment

Because of the high cost of ANS and increasing budget constraints, no FY 1996 funds are provided for ANS.

II. A. Summary Table: Capital Equipment

Program Activity	FY 1994 Adjusted	FY 1995 Adjusted	FY 1996 Request	\$ Change
Capital Equipment	\$ 0	\$ 1,000	\$ 0	\$ -1,000
Total, Capital Equipment	\$ 0	\$ 1,000	\$ 0	\$ -1,000

II. B. Laboratory and Facility Funding Table: Capital Equipment

Oak Ridge National Lab	\$ 0	\$ 1,000	\$ 0	\$ -1,000
Total, Capital Equipment	\$ 0	\$ 1,000	\$ 0	\$ -1,000



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

Program Activity	FY 1994	FY 1995	FY 1996
Capital Equipment	No activity.	Because of the high cost of AMS and increasing budget constraints, no FY 1996 funds are provided for AMS. The Department plans to propose to reprogram funds remaining in FY 1995 for conceptual design of a spallation neutron source in the Basic Energy Sciences program.	No activity.
	\$ 0	\$ 1,000	\$ 0
Capital Equipment	\$ 0	\$ 1,000	\$ 0

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ENERGY RESEARCH ANALYSES

The Office of Program Analysis (OPA) manages the Energy Research Analyses (ERA) Program to fulfill one of the major responsibilities of the Director of the Office of Energy Research. The Department of Energy Organization Act (Public Law 95-91) states "...it shall be the duty and responsibility of the Director [of the Office of Energy Research] (1) to advise the Secretary with respect to the physical research program...[and] (2) to monitor the Department's energy research and development programs in order to advise the Secretary with respect to any undesirable duplication or gaps in such programs...." Accordingly, the Office of Program Analysis arranges for and participates in the assessments of research projects and programs in order to evaluate the quality and impact of these efforts and to identify undesirable duplications and gaps.

There are two principal types of independent research assessments performed by OPA on programs throughout the Department. First, OPA staff organize comprehensive project by project evaluations of major research programs using outside experts from industry, academia and laboratories. These peer reviews of ongoing projects provide the basis for judgments on the quality of the research and its impact. Without these reviews less technically competitive projects might be continued. Second, technical assessments provide independent views of the directions that future R&D in specific areas of interest across the Department should take to be more productive and relevant to DOE missions. Research assessments are performed by outside experts and OPA staff drawing on the world's leading experts in the specific fields being addressed. State-of-the-science assessments by the Foreign Applied Sciences Assessment Center (FASAC), Japanese Technology Evaluation Center (JTEC) and JASON's are also performed.

The Office of Program Analysis project-by-project peer reviews of research in progress across the Department support the Department's core values dealing with excellence and quality. The reviews help program managers improve or replace projects that have significant shortcomings, and capitalize on the strengths of stronger projects.

The performance measure for the ERA program is the number of project reviews or assessments performed. One research needs assessment and approximately 300 project reviews can be performed at the requested level.

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LEAD TABLE

Energy Research Analyses

<u>Activity</u>	<u>FY 1994 Adjusted</u>	<u>FY 1995 Appropriation</u>	<u>FY 1995 Adjustment</u>	<u>FY 1995 Adjusted</u>	<u>FY 1996 Request</u>
Operating Expenses.....	\$3,649	\$3,531	-\$124	\$3,407	\$3,463
Subtotal, Program.....	3,649	3,531	-124	3,407	3,463
Adjustment.....	-142 a/	-101 a/	0	-101 a/	0
Total, Program.....	<u>\$3,507 b/</u>	<u>\$3,430</u>	<u>-\$124</u>	<u>\$3,306</u>	<u>\$3,463</u>
 Summary					
Operating Expenses.....	\$3,507	\$3,430	-\$124	\$3,306	\$3,463
Total Program.....	<u>\$3,507</u>	<u>\$3,430</u>	<u>-\$124</u>	<u>\$3,306</u>	<u>\$3,463</u>

Authorization: Section 209, P.L. 95-91.

a/ Share of Energy Supply, Research and Development general reduction for use of prior year balances assigned to this program. The total general reduction is applied at the appropriation level.

b/ Excludes \$55,000 which has been transferred to the SBIR program and \$1,820 which has been transferred to the STTR program.

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SUMMARY OF CHANGES

Energy Research Analyses

FY 1995 Appropriation.....	\$ 3,531
- Adjustment.....	<u>- 124</u>
FY 1995 Adjusted.....	\$ 3,407
- Increase support for peer reviews.....	<u>+ 56</u>
FY 1996 Congressional Budget Request.....	<u>\$ 3,463</u>

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KEY ACTIVITY SUMMARY  
 ENERGY RESEARCH ANALYSES

I. Preface: Energy Research Analyses

The Energy Research Analyses (ERA) program assesses research projects and programs in order to judge the significance of these efforts and to identify undesirable duplications and gaps. Peer reviews of individual research projects using outside experts are performed. Technical assessments to determine the direction of future research and state-of-the-science reviews are also performed.

II. A. Summary Table: Energy Research Analyses

Program Activity	FY 1994 Adjusted	FY 1995 Adjusted	FY 1996 Request	\$ Change
Energy Research Analyses.....	\$ 3,649	\$ 3,407	\$ 3,463	\$ 56
<b>Total, Energy Research Analyses</b>	<b>\$ 3,649</b>	<b>\$ 3,407</b>	<b>\$ 3,463</b>	<b>\$ 56</b>

II. B. Laboratory and Facility Funding Table: Energy Research Analyses

Oak Ridge National Lab .....	\$ 741	\$ 344	\$ 600	\$ 256
Argonne National Lab (East) .....	997	300	400	100
All Other .....	1,911	2,763	2,463	-300
<b>Total, Energy Research Analyses</b>	<b>\$ 3,649</b>	<b>\$ 3,407</b>	<b>\$ 3,463</b>	<b>\$ 56</b>

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

Program Activity	FY 1994	FY 1995	FY 1996
Energy Research Analyses			
Energy Research Analyses	Continued to perform peer reviews of hundreds of projects in ER, FE and EE. Performed one technical assessment of research needs in FE, CE, or ER (e.g., catalysis). Supported external R&D review through groups outside OPA, e.g., JASON, FASAC, JTEC. Provided DOE's share of support for management and technical staff for NAPAP acid precipitation assessments.	Continue to perform peer reviews of hundreds of projects in ER, FE and EE. Perform one technical assessment of research needs in FE, CE, or ER (e.g., nanostructured materials). Support external R&D review through groups outside OPA, e.g., JASON, FASAC, JTEC. Provide DOE's share of support for management and technical staff for NAPAP acid precipitation assessments.	Continue to perform peer reviews of approximately 300 projects in ER, FE and EE. Perform one technical assessment of research needs in FE, CE, or ER (e.g., advanced composite materials). Support external R&D review through groups outside OPA, e.g., JASON, FASAC, JTEC.
	Funding in the amount of \$55,000 and \$1,820 has been transferred to the SBIR program and the STTR program, respectively.	Funding in the amount of \$66,000 and \$3,306 has been budgeted for the SBIR program and the STTR program, respectively.	Funding in the amount of \$69,260 and \$5,195 has been budgeted for the SBIR program and the STTR program, respectively.
	\$ 3,649	\$ 3,407	\$ 3,463
Energy Research Analyses	\$ 3,649	\$ 3,407	\$ 3,463