
BUDGET ESTIMATES FISCAL YEAR 1989

Appropriation:
Salaries and Expenses

February 1988

U.S. Nuclear Regulatory Commission



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U. S. NUCLEAR REGULATORY COMMISSION
FISCAL YEAR 1989

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Regulation

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Regulation

Special and Independent
Reviews, Investigations,
and Enforcement

Nuclear Safety
Management and Support

Special Supporting
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SUMMARY

INTRODUCTION

A. The United States Congress has determined that the safe use of nuclear power for peaceful purposes, particularly in the production of electricity, is a legitimate and important national goal. The Congress established the U.S. Nuclear Regulatory Commission (NRC) to regulate those who commercially use or produce nuclear material so that the public health and safety, the common defense and security, and the environment are protected.

B. To meet this congressional mandate, the Commission has adopted the following broad goals as a basis for budgeting and future planning:

Ensure that licensees operate nuclear power plants safely and are adequately prepared to respond to accidents.

Ensure that nuclear power plants under construction are designed and constructed properly and are ready for safe operation.

Prepare for future reactor licensing activities.

Ensure that research provides the technical bases for timely and sound rulemaking and regulatory decisions in support of NRC licensing and inspection activities.

Ensure that current and future uses of nuclear materials are safe and have adequate safeguards.

Ensure that high-level and low-level nuclear waste and uranium mill tailings are safely managed and disposed.

Allocate NRC's human and capital resources and direct the agency's affairs so that they contribute most effectively to the mission of protecting the public health and safety.

Ensure that NRC has effective external communications and relations with outside organizations.

Continue to maintain special and independent reviews and investigations of NRC activities.

C. In furtherance of these goals, this budget for the NRC:

- Emphasizes safety first and foremost.
- Continues a program to upgrade licensees equipment maintenance practices at nuclear power plants.

- Continues the implementation of the Severe Accident Policy Statement initiated in FY 1986.
- Contains a long-term program to prepare the NRC to review licensee requests to extend nuclear power plant lifetimes beyond their current license conditions.
- Provides for review of applications for reactor operating licenses and standard plant designs.
- Provides for maintaining resident inspectors at all reactor sites.
- Provides for a stable research program essential for effective nuclear safety regulation, including continued NRC participation in major international safety research efforts.
- Develops improved guidelines and procedures for future decommissioning of licensed plants and facilities.
- Provides for the continued development of a framework for high-level waste regulation and fulfillment of NRC's responsibilities under the Nuclear Waste Policy Act of 1982, as amended in 1987.
- Provides full regulatory support for the implementation of the Low-Level Radioactive Waste Policy Act of 1982, as amended in 1985.
- Expands the regulatory oversight currently provided for nonreactor licensees.
- Expands the review, screening, and analysis of operational data.
- Maintains an effective emergency response capability for reactor, materials, and fuel facility incidents.
- Reflects significant savings in staff resources as a result of the consolidation of personnel into the new White Flint Building and other initiatives that increase productivity.
- Provides an improved qualification and training program for NRC technical staff.

SALARIES AND EXPENSES SUMMARY

Estimates of Appropriation

The budget estimates for Salaries and Expenses for FY 1989 provide for obligations of \$450,000,000¹ to be funded in total by a new appropriation. The sum appropriated shall be reduced by the amount of revenues received during fiscal year 1989 from licensing fees, inspection services, and other services and collections, excluding those moneys received for the cooperative nuclear safety research program, services rendered to foreign governments and international organizations, and the material and information access authorization programs, so as to result in a final fiscal year 1989 appropriation estimated at not more than \$247,500,000.

Estimates of Obligations and Outlays

This section provides for the summary of obligations by mission area, the summary of financing these obligations, the analysis of outlays, obligations by function, the proposed appropriation language, and an analysis of the appropriation language.

The summaries of obligations include the Reimbursable program. It should be noted that the obligations related to this program are not financed by NRC's appropriated funds, but solely through reimbursable agreements with other Federal agencies.

Revenues derived from license, inspection, and user fees and other services and collections will be used for necessary salaries and expenses. Revenues derived from enforcement actions will be deposited to Miscellaneous Receipts of the Treasury.

The Summary of Obligations by mission area indicates the total obligations for Direct and Reimbursable programs for FY 1987, FY 1988 and FY 1989. The detailed justifications for direct program activities are presented in the same order as they appear in this summary table.

¹Dollars in the text are whole dollars, dollars in the tables are in thousands; staff numbers are in full-time equivalents.

SUMMARY OF OBLIGATIONS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Direct Program:			
Reactor Safety and Safeguards			
Regulation.....	\$142,309	\$147,362	\$151,622
Nuclear Safety Research.....	122,468	111,611	137,117
Nuclear Material Safety and			
Safeguards Regulation.....	23,941	24,467	30,586
Nuclear Waste Regulation.....	21,336	20,948	22,394
Special and Independent Reviews,			
Investigations, and Enforcement.....	35,346	34,307	40,965
Nuclear Safety Management and Support.	<u>61,573</u>	<u>62,323</u>	<u>67,316</u>
Total Obligations -			
Direct Program.....	\$406,973	\$401,018	\$450,000
Reimbursable Program.....	<u>902</u>	<u>2,500</u>	<u>2,500</u>
Total Obligations.....	\$407,875	\$403,518	\$452,500
Offsetting collections from			
Federal funds.....	-460	-2,500	-2,500
Recovery of prior year			
obligations.....	-5,359	0	0
Unobligated balance, start			
of year.....	-9,274	-8,218	0
Unobligated balance, end			
of year.....	<u>8,218</u>	<u>0</u>	<u>0</u>
Budget Authority.....	\$401,000	\$392,800	\$450,000

FINANCING OF OBLIGATIONS

The financing of the estimated total obligations of \$450,000,000 proposed in the budget estimate for FY 1989 is summarized in the following table:

Summary of Financing

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Sources of Funds Available for Obligations:			
Recovery of prior year obligations.....	\$ 5,359	\$ 0	\$ 0
Unobligated balance, start of year.....	9,274	8,218	0
Appropriated to NRC.....	<u>401,000</u>	<u>392,800</u>	<u>450,000</u>
Subtotal.....	415,633	401,018	450,000
Less: Unobligated balance, end of year.....	<u>8,218</u>	<u>0</u>	<u>0</u>
Total Obligations.....	\$407,415	\$401,018	\$450,000

OUTLAYS FOR SALARIES AND EXPENSES

Outlays for FY 1989 are estimated at \$429,620,000. The following analysis identifies funds available for outlays for each of the budget periods. This amount less the unexpended balance at the end of the period equals the outlays.

Outlay Analysis

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Unexpended balance, beginning of year:			
Obligated.....	\$120,019	\$129,452	\$ 89,900
Unobligated.....	9,274	8,218	0
Appropriation to NRC.....	<u>401,000</u>	<u>392,800</u>	<u>450,000</u>
 Total Funds Available for Outlays.....	 \$530,293	 \$530,470	 \$539,900
 Unexpended balance, end of year:			
Obligated.....	-129,452	- 89,900	-110,280
Unobligated.....	<u>-8,218</u>	<u>0</u>	<u>0</u>
 Total Outlays.....	 \$392,623	 \$440,570	 \$429,620

SUMMARY OF BUDGET

OBLIGATIONS BY FUNCTION

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Direct Program:			
Salaries and Benefits.....	\$175,609	\$186,137	\$184,000
Program Support.....	150,645	139,762	180,075
Administrative Support.....	69,785	64,669	75,055
Travel.....	<u>10,934</u>	<u>10,450</u>	<u>10,870</u>
Total Obligations -			
Direct Program.....	\$406,973	\$401,018	\$450,000
Reimbursable Program.....	<u>902</u>	<u>2,500</u>	<u>2,500</u>
Total Obligations.....	\$407,875	\$403,518	\$452,500

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PROPOSED APPROPRIATION LANGUAGE - SALARIES AND EXPENSES

The proposed appropriation language is as follows:

Salaries and Expenses

For necessary expenses of the Commission in carrying out the purposes of the Energy Reorganization Act of 1974, as amended, and the Atomic Energy Act, as amended, including the employment of aliens; services authorized by section 3109 of Title 5, United States Code; publication and dissemination of atomic information; purchase, repair, and cleaning of uniforms; official representation expenses (not to exceed \$20,000); reimbursements to the General Services Administration for security guard services; hire of passenger motor vehicles and aircraft, \$450,000,000, to remain available until expended: Provided, That from this appropriation, transfers of sums may be made to other agencies of the Government for the performance of the work for which this appropriation is made, and in such cases the sums so transferred may be merged with the appropriation to which transferred: Provided further, That moneys received by the Commission for the cooperative nuclear safety research program, services rendered to foreign governments and international organizations, and the material and information access authorization programs including criminal history checks under section 149 of the Atomic Energy Act, as amended, may be retained and used for salaries and expenses associated with those activities, notwithstanding the provisions of section 3302 of Title 31, United States Code, and shall remain available until expended: Provided further, That revenues from licensing fees, inspection services, and other services and collections estimated at \$202,500,000 in fiscal year 1989 shall be retained and used for necessary salaries and expenses in this account, notwithstanding the provisions of section 3302 of Title 31, United States Code, and shall remain available until expended: Provided further, That the sum herein appropriated shall be reduced by the amount of revenues received during fiscal year 1989 from licensing fees, inspection services, and other services and collections, excluding those moneys received for the cooperative nuclear safety research program, services rendered to foreign governments and international organizations, and the material and information access authorization programs, so as to result in a final fiscal year 1989 appropriation estimated at not more than \$247,500,000.

ANALYSIS OF PROPOSED FY 1989 U.S. NUCLEAR REGULATORY
COMMISSION

APPROPRIATION LANGUAGE

1. FOR NECESSARY EXPENSES OF THE COMMISSION IN CARRYING OUT THE PURPOSES OF THE ENERGY REORGANIZATION ACT OF 1974, AS AMENDED, AND THE ATOMIC ENERGY ACT, AS AMENDED:

42 U.S.C. 5841 et. seq.

42 U.S.C. 5841 et. seq., the Energy Reorganization Act of 1974, established the Nuclear Regulatory Commission (NRC) to perform all the licensing and related regulatory functions of the Atomic Safety and Licensing Board Panel, the Atomic Safety and Licensing Appeal Panel, and the Advisory Committee on Reactor Safeguards, and to carry out the performance of other functions including research, for the purpose of confirmatory assessment related to licensing and other regulation, other activities, including research related to nuclear material safety and regulation under the provisions of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et. seq.).

2. EMPLOYMENT OF ALIENS:

42 U.S.C. 2201 (d)

42 U.S.C. 2201 (d) of the Atomic Energy Act of 1954, as amended, authorizes the Commission to employ persons and fix their compensation without regard to civil service laws.

3. SERVICES AUTHORIZED BY 5 U.S.C. 3109:

5 U.S.C. 3109 provides in part that the head of an agency may procure by contract the temporary or intermittent services of experts or consultants when authorized by an appropriation.

4. PUBLICATION AND DISSEMINATION OF ATOMIC INFORMATION:

42 U.S.C. 2161 (b)

42 U.S.C. 2161 (b) directs the Commission that they shall be guided by the principle that the dissemination of scientific and technical information related to atomic energy should be permitted and encouraged so as to provide that interchange of ideas and criticism which is essential to scientific and industrial progress and public understanding and to enlarge the fund of technical information.

5. PURCHASE, REPAIR, AND CLEANING OF UNIFORMS:

5 U.S.C. 5901

5 U.S.C. 5901 authorizes the annual appropriation of funds to each agency of the government as a uniform allowance.

6. OFFICIAL REPRESENTATION EXPENSES:

47 Comp. Gen. 657

43 Comp. Gen. 305

This language is required because of the established rule restricting an agency from charging appropriations with the cost of official representation unless the appropriations involved are specifically available therefor. Congress has appropriated funds for official representation expenses to the NRC and NRC's predecessor, the AEC, each year since fiscal year 1950.

7. REIMBURSEMENTS TO THE GENERAL SERVICES ADMINISTRATION FOR SECURITY GUARD SERVICES:

34 Comp Gen. 42

This language is required because, under the provisions of the Federal Property and Administrative Services Act of 1949, specific appropriation is made to GSA for carrying out the function of protecting public buildings and property, and therefore, NRC appropriations not specifically made available therefor may not be used to reimburse GSA for security guard services.

8. HIRE OF PASSENGER MOTOR VEHICLES AND AIRCRAFT:

31 U.S.C. 1343

31 U.S.C. 1343 provides in effect that unless specifically authorized by the appropriation concerned or other law, no appropriation shall be expended to purchase or hire passenger motor vehicles for any branch of the Government.

9. TO REMAIN AVAILABLE UNTIL EXPENDED:

31 U.S.C. 1301

31 U.S.C. 1301 provides in part that regular, annual appropriation shall be construed to be permanent or available continuously unless the appropriation expressly provides that it is available after the fiscal year covered by the law in which it appears.

10. THAT FROM THIS APPROPRIATION, TRANSFERS OF SUMS MAY BE MADE TO OTHER AGENCIES OF THE GOVERNMENT FOR THE PERFORMANCE OF THE WORK FOR WHICH THIS APPROPRIATION IS MADE, AND IN SUCH CASES, THE SUMS SO TRANSFERRED MAY BE MERGED WITH THE APPROPRIATION TO WHICH TRANSFERRED:

31 U.S.C 1532

31 U.S.C. 1532 permits the transfer of appropriated funds from one account to another or working fund only when authorized by law.

11. THAT MONEYS RECEIVED BY THE COMMISSION FOR THE COOPERATIVE NUCLEAR SAFETY RESEARCH PROGRAM, SERVICES RENDERED TO FOREIGN GOVERNMENTS AND INTERNATIONAL ORGANIZATIONS, AND THE MATERIAL AND INFORMATION ACCESS AUTHORIZATION PROGRAMS, INCLUDING CRIMINAL HISTORY CHECKS UNDER SECTION 149 OF THE ATOMIC ENERGY ACT, AS AMENDED, MAY BE RETAINED AND USED FOR SALARIES AND EXPENSES ASSOCIATED WITH THOSE ACTIVITIES, NOTWITHSTANDING THE PROVISIONS OF SECTION 3302 OF TITLE 31, UNITED STATES CODE, AND SHALL REMAIN AVAILABLE UNTIL EXPENDED:

26 Comp. Gen. 43

2 Comp. Gen. 775

Appropriated funds may not be augmented with funds from other sources unless specifically authorized by law. Under the cooperative nuclear safety research program, funds are received from foreign governments for their participation in NRC's reactor safety research experiments. The NRC would also be authorized to receive directly compensation from foreign governments and international organizations for providing safety assistance and other services related to promoting the public health and safety. Funds are also received in the form of fees from licensees for the cost of security investigations and related processing associated with access to formula quantities of special nuclear material. These funds will be used to pay the related NRC processing costs and the agency performing the security investigations. Pursuant to P.L. 99-399, section 606, funds will be received in the form of fees from licensees for the cost of fingerprint examinations and criminal history checks of each individual granted access to safeguards information or unescorted access to a nuclear power plant. These funds will be used to pay for processing and performing the fingerprint examinations and criminal history checks. NRC will also use the money currently collected under 10 CFR Part 25, to pay the NRC processing costs and the Office of

Personnel Management for conducting background investigations used as a basis for NRC security clearances for designated licensee representatives and other personnel requiring access to classified information.

12. THAT REVENUES FROM LICENSING FEES, INSPECTION SERVICES, AND OTHER SERVICES AND COLLECTIONS SHALL BE RETAINED AND USED FOR NECESSARY SALARIES AND EXPENSES IN THIS ACCOUNT, NOTWITHSTANDING THE PROVISIONS OF SECTION 3302 OF TITLE 31, UNITED STATES CODE, AND SHALL REMAIN AVAILABLE UNTIL EXPENDED:

31 U.S.C. 9701

The NRC is authorized under Title V of the Independent Offices Appropriation Act of 1952 to collect license fees. Pursuant to section 9701 of Title 31, United States Code, any person who receives a service or thing of value from the Commission shall pay fees to cover the NRC's cost in providing such service or thing of value.

42 U.S.C. 2213

The NRC is authorized under Title VII of the Consolidated Omnibus Budget Reconciliation Act of 1985 to impose an annual fee on each power reactor licensed to operate. Pursuant to section 2213 of Title 42, United States Code, the NRC shall assess and collect annual charges from persons licensed by the Commission.

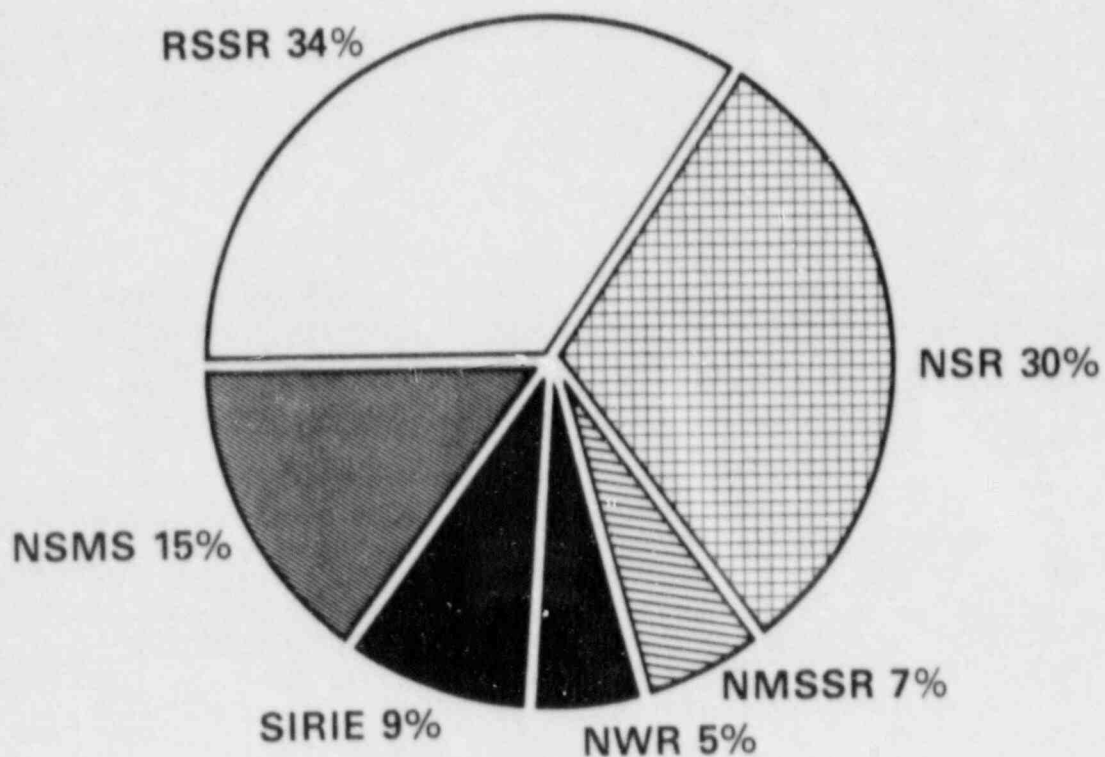
13. THAT THE SUM HEREIN APPROPRIATED SHALL BE REDUCED BY THE AMOUNT OF REVENUES RECEIVED FROM LICENSING FEES, INSPECTION SERVICES AND OTHER SERVICES AND COLLECTIONS, EXCLUDING THOSE MONIES RECEIVED FOR THE COOPERATIVE NUCLEAR SAFETY RESEARCH PROGRAM, SERVICES RENDERED TO FOREIGN GOVERNMENTS AND INTERNATIONAL ORGANIZATIONS, AND THE MATERIAL AND INFORMATION ACCESS AUTHORIZATION PROGRAMS:

42 U.S. 2213

P.L. 100-203

The total fees to be collected in fiscal year 1989 shall not be less than a total of 45 percent of the Commission's budget. Pursuant to Paragraph (b) (1) (A), section 2213 of Title 42, United States Code, and as amended by the Omnibus Budget Reconciliation Act of 1987, P. L. 100-203, the amount of the aggregate charges assessed pursuant to this paragraph in fiscal year 1989 shall not be less than an amount that, when added to other amounts collected by the Commission for such fiscal year under other provisions of law, is equal to 45 percent of the costs incurred by the Commission with respect to such fiscal year.

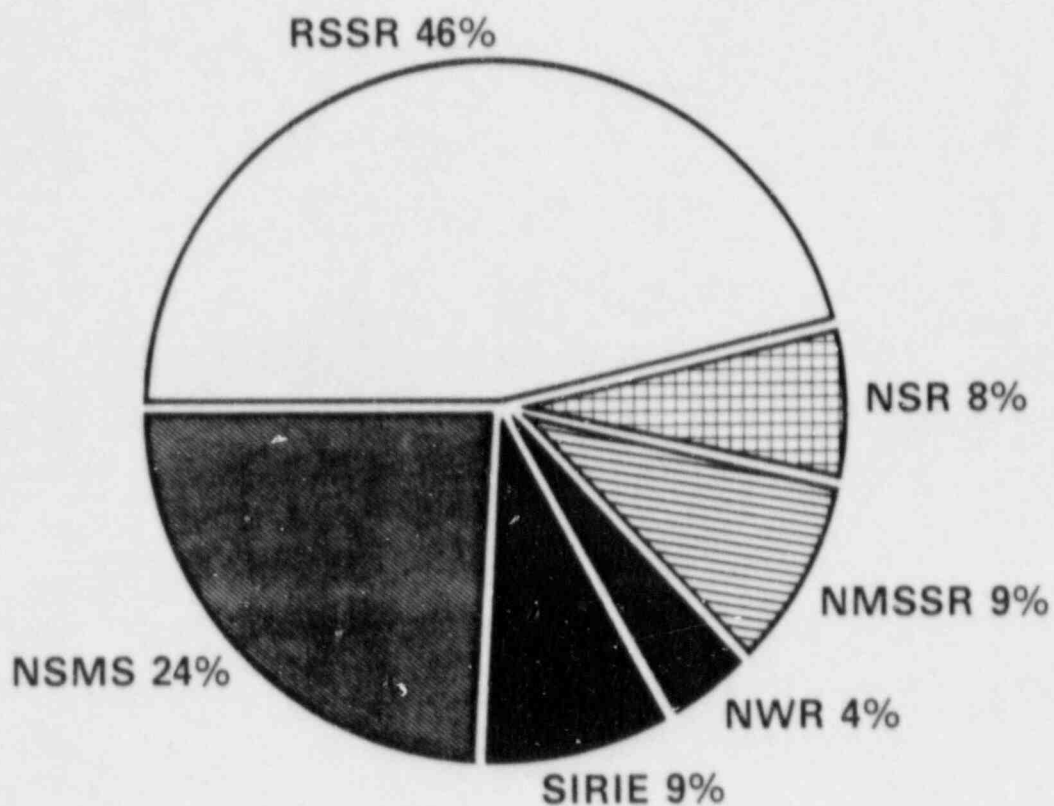
FY 1989 DOLLAR DISTRIBUTION BY MISSION AREA



LEGEND

- RSSR — REACTOR SAFETY AND SAFEGUARDS REGULATION
- NSR — NUCLEAR SAFETY RESEARCH
- NMSSR — NUCLEAR MATERIAL SAFETY AND SAFEGUARDS REGULATION
- NWR — NUCLEAR WASTE REGULATION
- SIRIE — SPECIAL AND INDEPENDENT REVIEWS, INVESTIGATIONS, AND ENFORCEMENT
- NSMS — NUCLEAR SAFETY MANAGEMENT AND SUPPORT

FY 1989 STAFF DISTRIBUTION BY MISSION AREA



LEGEND

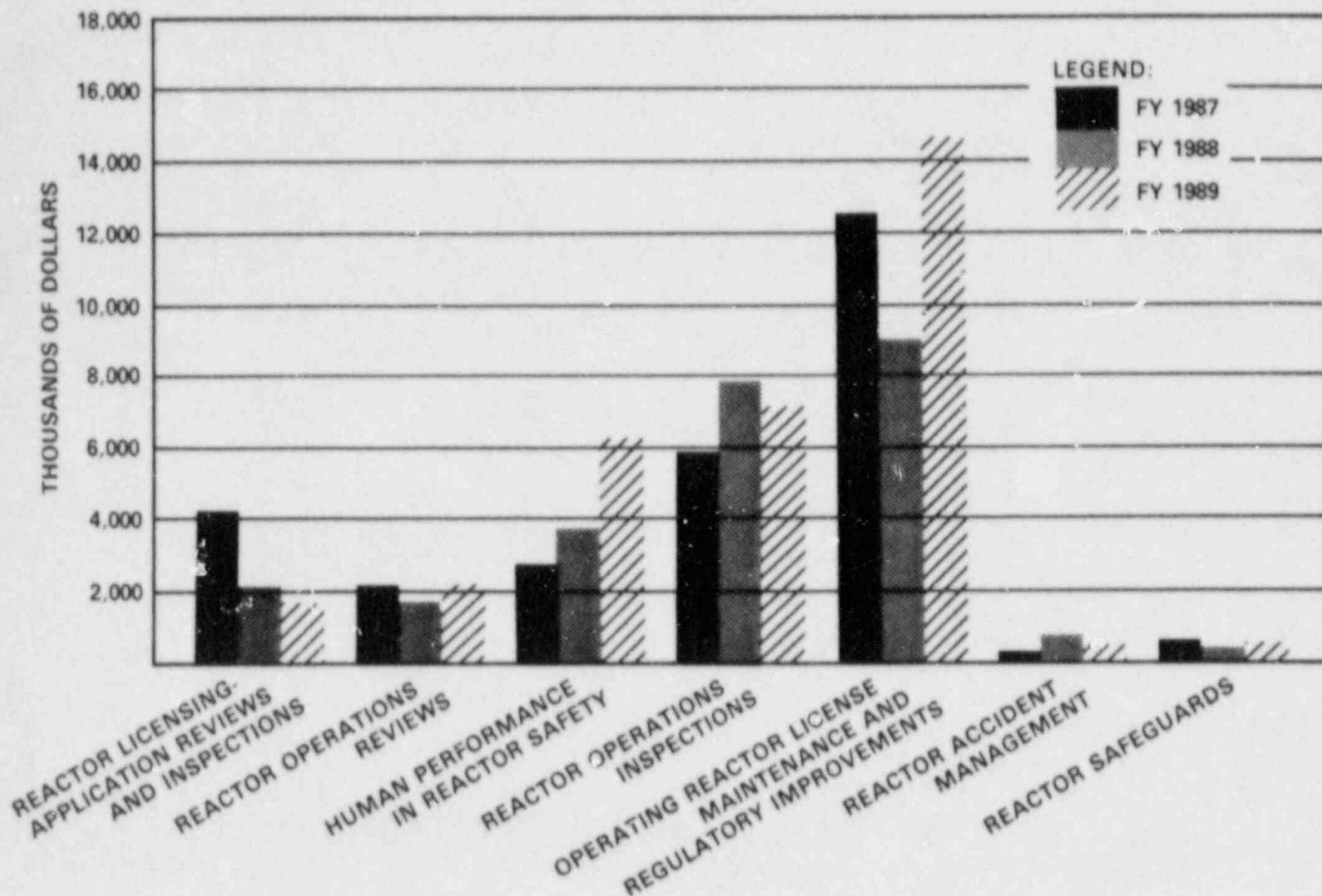
- RSSR — REACTOR SAFETY AND SAFEGUARDS REGULATION
- NSR — NUCLEAR SAFETY RESEARCH
- NMSSR — NUCLEAR MATERIAL SAFETY AND SAFEGUARDS REGULATION
- NWR — NUCLEAR WASTE REGULATION
- SIRIE — SPECIAL AND INDEPENDENT REVIEWS, INVESTIGATIONS, AND ENFORCEMENT
- NSMIS — NUCLEAR SAFETY MANAGEMENT AND SUPPORT

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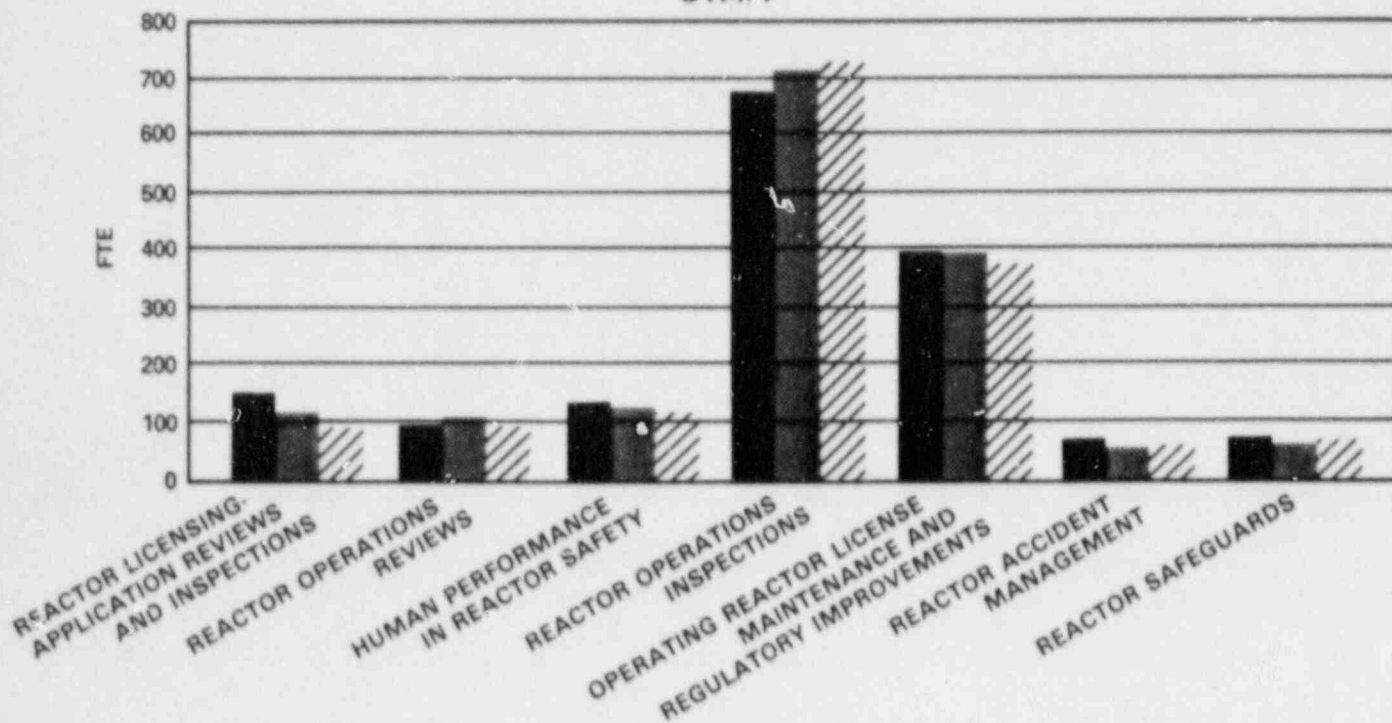
REACTOR SAFETY AND SAFEGUARDS REGULATION

REACTOR SAFETY AND SAFEGUARDS REGULATION

PROGRAM SUPPORT



STAFF



REACTOR SAFETY AND SAFEGUARDS REGULATION

(Dollars are in thousands, except in text, where whole dollars are used; staff numbers are in full-time equivalents.)

Total FY 1989 estimated obligations \$151,622

Total Funds and Staff

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Salaries and Benefits	\$ 82,321	\$ 89,486	\$ 86,217
Program Support	28,510	26,504	32,945
Administrative Support	24,855	25,003	25,817
Travel	<u>6,623</u>	<u>6,369</u>	<u>6,643</u>
Total obligations	<u>\$142,309</u>	<u>\$147,362</u>	<u>\$151,622</u>
(Staff)	(1,559)	(1,537)	(1,471)

Program Support Funds and Staff

The Reactor Safety and Safeguards Regulation staff and program support funds are allocated as shown below. The program support funds are primarily for work done by the Department of Energy laboratories and commercial contractors. The narrative that follows describes these programs and the reasons they are needed.

	<u>FY 1987</u> <u>Actual</u>		<u>FY 1988</u> <u>Estimate</u>		<u>FY 1989</u> <u>Estimate</u>	
	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>
Reactor Licensing- Application Reviews and Inspections	\$ 4,181	145	\$ 3,037	114	\$ 1,773	81
Reactor Operations Reviews	2,140	98	1,705	101	2,141	98
Human Performance in Reactor Safety	2,717	123	3,724	121	6,233	108
Reactor Operations Inspections	5,925	671	7,840	707	7,150	714
Operating Reactor License Maintenance and Regulatory Improvements	12,588	399	9,018	393	14,598	367
Reactor Accident Management	350	64	790	45	460	46
Reactor Safeguards	<u>609</u>	<u>59</u>	<u>390</u>	<u>56</u>	<u>490</u>	<u>57</u>
TOTALS	\$28,510	1,559	\$26,504	1,537	\$32,945	1,471

DESCRIPTION OF MISSION AREA

Reactor Safety and Safeguards Regulation encompasses all NRC licensing and inspection of reactor facilities and designs, as required by the Atomic Energy Act of 1954, as amended. This includes responsibility for evaluating the public health effects, safety, environmental, safeguards, and antitrust aspects of reactor facilities; and ensuring that civilian reactor facilities are designed, constructed, and operated safely and are in compliance with agency regulations. This mission area is composed of the following seven major programs.

- o Reactor Licensing-Application Reviews and Inspections
- o Reactor Operations Reviews
- o Human Performance in Reactor Safety
- o Reactor Operations Inspections
- o Operating Reactor License Maintenance and Regulatory Improvements
- o Reactor Accident Management
- o Reactor Safeguards

These seven programs ensure that licensees operate power plants safely and are adequately prepared to respond to accidents; ensure that nuclear power plants are designed and constructed properly and are ready for safe operation; and prepare for licensing future nuclear power plant designs.

REACTOR LICENSING-APPLICATION REVIEWS AND
INSPECTIONS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 4,181	\$ 3,037	\$ 1,773
(Staff)	(145)	(114)	(81)

The Reactor Licensing (Application Reviews and Inspections) program is conducted to ensure that nuclear power plants and non-power reactors are designed and constructed properly and are ready for safe operation. The program is composed of four major elements: Review of Power Reactor Applications, Inspection of Power Reactors under Construction, Review of Standardized Reactor Design Applications, and Review of Other-Than-Power Reactor Applications.

The resources decrease is attributable to the reduced number of plants in the construction pipeline as license reviews are completed and reactor operating licenses are issued. As the number of plants in the pipeline declines, resources will be shifted to activities associated with operating plants.

REVIEW OF POWER REACTOR APPLICATIONS

The NRC reviews applications for reactor construction permits and reactor operating licenses to evaluate the safety, environmental, and safeguards aspects, as well as antitrust implications. It is anticipated that in FY 1988 there will be ten operating license applications under active review, and five in FY 1989 and that five reactor operating licenses will be issued in FY 1988, and two in FY 1989. The NRC conducts these license reviews on a schedule that will not unnecessarily impact reactor startup and operation. Currently there are no construction permit applications pending NRC review. Resources are also provided to support the resolution of major problems, such as those from the Tennessee Valley Authority's Watts Bar plant and Comanche Peak 1.

INSPECTION OF POWER REACTORS UNDER CONSTRUCTION

The NRC inspects reactors under construction in order to audit licensee compliance with NRC rules, regulations, and the construction permit that was issued. These inspections are conducted by NRC resident inspectors stationed at the reactor site, NRC region-based personnel, and headquarters personnel. The NRC resident inspectors at reactors under construction ensure that equipment is installed and structures are built in accordance with

design requirements and quality assurance procedures. The work is accomplished through review of procedures, direct observation, and audits of licensee quality control programs. Resident inspectors may also participate in agency hearings, licensing meetings, and public discussions. The agency continues to assign two resident inspectors at every construction site.

The majority of NRC inspections at reactors under construction are in-depth, specialized technical inspections carried out by region-based specialists in the areas of civil, mechanical, and electrical engineering; instrumentation; welding; nondestructive examination; quality assurance; fire protection; training; radiation protection; emergency planning; and environmental protection. Region-based specialists are responsible for evaluating the corrective measures taken by the utilities to resolve certain types of identified problems as well as routine inspection efforts. The agency will continue to expend an average effort of about 5 staff years of inspection per reactor at plants in the construction and preoperational testing phases.

To augment these inspections by region-based specialists, NRC will assess the operational readiness of the applicant through the use of team inspections as an additional audit to ensure that it is ready for and capable of safe power operation before a license is granted.

REVIEW OF STANDARDIZED REACTOR DESIGN APPLICATIONS

The standardization of nuclear power plant designs is an important Commission initiative that can significantly enhance the safety and reliability of nuclear power plants. In support of the Commission's goals pertaining to future standardization of reactor designs, the agency will continue its phased review of the Electric Power Research Institute's advanced light-water reactor requirements document. This review will be completed in FY 1991. NRC will also conduct design certification reviews, including technical specifications, for the General Electric advanced boiling-water reactor design (FY 1988-1991) and the Combustion Engineering advanced pressurized-water reactor design (FY 1987-1991). Additionally, NRC expects to complete its review and issue a preliminary design approval for the Westinghouse advanced pressurized-water reactor in early FY 1989.

REVIEW OF OTHER-THAN-POWER REACTOR APPLICATIONS

The NRC reviews new and renewal license applications and license amendments for nonpower reactors to evaluate their safety, environmental, and safeguards aspects. The agency plans on having 30 renewal applications and other license amendments for nonpower reactor licenses under review both in FY 1988 and FY 1989.

Reactor Safety and Safeguards Regulation

To limit the use of high-enriched uranium fuel in domestic non-power reactors, the NRC may require licensees to convert to a low-enriched uranium fuel in accordance with 10 CFR Part 50.64. Of the 25 reactors affected, it is expected that approximately 20 will convert to low-enriched uranium fuel over the next four or five years.

Additionally, the NRC will continue to review and comment on proposed Department of Defense and Department of Energy reactor projects and facilities, as requested.

REACTOR OPERATIONS REVIEWS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds (Staff)	\$ 2,140 (98)	\$ 1,705 (101)	\$ 2,141 (98)

The Reactor Operations Reviews program is designed to evaluate reactor and licensee performance with its principal focus on operational safety. The program is composed of three major elements: Reactor Performance Evaluation, Reactor Maintenance and Surveillance, and Licensee Performance Evaluation.

REACTOR PERFORMANCE EVALUATION

Experience has shown that safety issues will continue to arise from events at operating reactors across the country. The Reactor Performance Evaluation program element includes the means to effectively respond to unanticipated events as they occur and to identify anticipatory actions that would assist in precluding significant events. The work conducted in this program element supports NRC's accident prevention goal of having an effective regulatory program for achieving a low frequency of safety system challenges, a high availability of equipment, and the timely sharing of operating experience.

Events Analysis

The NRC conducts initial technical assessments of reactor event reports to determine the immediate safety implications for the facility, the applicability to other operating reactors, and to determine the immediate regulatory actions that must be taken.

The NRC assesses and screens approximately 3,500 such event reports annually. These reports include telephone notifications of significant events at licensed reactor facilities and additional event and follow-up reports submitted through the NRC's five regions. Approximately 1,000 of these event reports require follow-up effort by the NRC to ensure that affected facilities take appropriate corrective action. Approximately 200 of these event reports are usually sufficiently significant to require guidance for immediate corrective actions, such as orders and confirmatory action letters, and the issuance of temporary instructions for the regions to verify licensee implementation of corrective actions.

Reactor Safety and Safeguards Regulation

Additionally, NRC prepares and issues about 100 bulletins and information notices each year to inform licensees, vendors, and the agency staff of potential safety problems and to recommend or require corrective actions.

Engineering/Safety Assessments

The NRC will continue to perform engineering and systems reviews and issue safety evaluations (including amendments) to facility licenses necessitated by safety improvements or operating experience. The Office of Nuclear Reactor Regulation also will continue to support and expand the Incident Investigation program element by providing resources for approximately ten augmented inspection teams and approximately three incident investigation teams annually in response to significant operational events.

Approximately 50 potential generic safety questions are submitted annually from regional offices for engineering/safety assessment by headquarters personnel. These questions are reviewed and the results of these reviews will be considered for broad dissemination via generic communication (e.g., information notices, bulletins, generic letters).

In addition to the review and assessments described above, approximately 400 Reports of Defects and Noncompliances (Part 21) and approximately 700 Construction Deficiency Reports (50.55(e)) submitted by licensees and permit holders will be analyzed each year through FY 1989.

REACTOR MAINTENANCE AND SURVEILLANCE

The objective of this program is to upgrade maintenance practices at nuclear power plants. In furtherance of this objective, the NRC will describe the status of maintenance in the industry, assess the effectiveness of existing maintenance practices and proposed industry initiatives, and develop the course of future NRC actions concerning maintenance of equipment in nuclear power plants. Earlier in this program, the staff concluded that inadequate maintenance at some plants is a significant contributor to plant reliability problems and, thus, is of safety concern. A policy statement, presently under Commission review, underscores the Commission's belief that significant improvements can and must be achieved in maintenance throughout the industry. In FY 1989, NRC will continue implementation of the NRC Maintenance and Surveillance Program Plan. NRC will also continue to evaluate the effectiveness of industry programs.

LICENSEE PERFORMANCE EVALUATION

The NRC carries out this program to clearly identify early-on those plants that need increased management attention by licensees. In order to accomplish this, a performance evaluation

effort has been undertaken that: (1) evaluates the effectiveness of licensee performance by integrating information from programs and activities such as Systematic Assessment of Licensee Performance (SALP), enforcement, performance indicators, analyses of operational data trends, event evaluation, reactor operator examinations, and licensing and inspection results; (2) identifies the need for and recommends special inspection for validation of conclusions reached in performance evaluations; (3) monitors the implementation of the SALP program and recommends revisions as needed; (4) reviews and evaluates issues related to licensee organizational structure and staffing; (5) evaluates the effectiveness of industry initiatives that support improved operations (e.g., maintenance); (6) evaluates the effectiveness of operating plant maintenance and surveillance; (7) reviews and evaluates the human factors aspects of maintenance and surveillance and of proposed solutions for operating problems; and (8) reviews and evaluates licensee design and procedure change process. Plants identified as requiring increased attention will be reviewed by senior management and appropriate action taken.

Systematic Assessment of Licensee Performance

The SALP program is designed to improve both NRC regulatory efforts and licensee performance in the construction and operation of nuclear power plants. This involves collecting information on a periodic basis regarding the overall performance of a licensee. Emphasis is placed on understanding the reasons for licensee performance, sharing the understanding with the licensee, and then focusing agency inspection accordingly. The NRC SALP program will be modified to make the program more efficient and to place more emphasis on licensee performance in the areas of operations, maintenance, and management. The NRC will conduct SALP reviews for approximately 70 to 75 operating and construction sites each year in FY 1988 and FY 1989 at approximately 12- to 18- month intervals.

Plant Procedures

The NRC is continuing to implement its long-term program for upgrading emergency operating procedures (EOPs) which was initiated shortly after the accident at Three Mile Island. The objectives of the program are to improve the technical content of EOPs and to enhance their useability by applying human factors principles in their design and implementation. The staff is continuing with its review of generic technical guidelines, submitted by owners groups representing the four nuclear power plant vendors, as well as evaluating the industry's efforts to upgrade EOPs by reviewing procedures generations packages from operating reactors and license applicants. The staff is also examining the need to modify and improve existing guidance to the industry in the area of EOPs and is researching the need for initiating appropriate regulatory action for other types of plant procedures.

Quality Assurance

The quality assurance verification activities include developing and implementing a comprehensive program for assuring quality and reliability of operating reactor facilities. The primary activity is a series of inspections by joint NRC headquarters/regional inspection teams. The purpose of these inspections is to assess the effectiveness of licensees' quality assurance/quality control efforts in identifying, reporting, and correcting safety-significant problems. Also, the teams are responsible for ensuring appropriate corrective actions where flaws are identified. In FY 1988-1989 NRC will conduct 35 technical reviews per year of new and revised licensee quality assurance programs and topical reports. Four technical reviews of quality assurance programs for standard plant reviews will be conducted in FY 1988.

HUMAN PERFORMANCE IN REACTOR SAFETY

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds (Staff)	\$ 2,717 (123)	\$ 3,724 (121)	\$ 6,233 (108)

The Human Performance in Reactor Safety program is designed to ensure that trained and qualified operating personnel interact in an environment such that their ability to prevent or cope with accidents is not compromised. The program is composed of two major elements: Human Performance Evaluation and License and Examine Reactor Operators. Total resources in this program will increase in FY 1989 despite a reduction in staff, due to the resumption of reactor operator requalification examinations in late FY 1988 and the full implementation of the new NRC requirement to test reactor operators at least once during the six-year term of their license.

HUMAN PERFORMANCE EVALUATION

The Human Performance Evaluation program element is conducted to evaluate whether: (1) nuclear power plant personnel are able to meet job performance requirements; (2) an effective mechanism exists to assess and, where necessary, improve the quality and effectiveness of licensee training programs, and (3) nuclear power plant control rooms and local control stations are designed to facilitate reliable personnel performance.

The NRC's policy statement on training and qualifications of nuclear power plant personnel provides regulatory guidance for the training and qualifications of civilian nuclear power plant operating personnel, called for by Section 306 of the Nuclear Waste Policy Act of 1982 (P.L. 97-425). In recognition of industry initiatives underway to upgrade training programs, the policy statement endorsed the Institute of Nuclear Power Operations (INPO) Training Accreditation Program and directed the staff to monitor and evaluate the effectiveness of the INPO program through a variety of methods. These methods include accreditation team visit observations, post-accreditation reviews, and observations of the National Nuclear Accrediting Board. To conduct the evaluations and determine adherence to the policy statement, the NRC will participate in INPO training accreditation team audits at eight sites (approximately 15% of INPO audits) in each fiscal year, and will complete six (approximately 10% of INPO accredited sites) post-accreditation reviews annually.

The NRC conducts reviews of reactor control room designs and safety parameter display systems to resolve man-machine interface issues identified in control rooms. The detailed control room design reviews (DCRDR) identify human factors engineering problems in control rooms. These problems are then corrected by the licensee. The Safety Parameter Display System (SPDS) provides control room operators with a concise display of critical plant variables that aids them in determining the safety status of the plant. The NRC reviews SPDS designs to identify deficiencies that are to be corrected by licensees. Audits performed on operating SPDS have identified deficiencies on more than half of the systems. The NRC will complete technical reviews of ten SPDSs in FY 1988 and 12 in FY 1989, and will conduct ten DCRDRs in FY 1988 and 12 in FY 1989.

LICENSE AND EXAMINE REACTOR OPERATORS

All licensee personnel authorized to operate a reactor must be licensed by the NRC. The NRC administers initial, replacement, and requalification examinations to evaluate an applicant's understanding of the facility design and familiarity with the controls and operating procedures of the facility. These examinations consist of both written and operating tests. The initial examinations are conducted to ensure that each new power reactor is staffed with qualified operators before issuance of its operating license. Replacement examinations are administered to new operators at existing facilities to ensure that operating plants are adequately staffed with qualified operators. The requalification examinations are designed to verify the continued proficiency of licensed operators. There are currently about 5,400 licensed reactor operators. In accordance with recent changes to NRC regulations, all licensed reactor operators are now required to have at least one NRC-administered requalification exam during the six-year term of their license. The NRC plans to conduct about 1,600 reactor operator examinations in FY 1988 and 2,300 in FY 1989.

Operators of nonpower reactors also are examined to ensure their qualifications. About 90 examinations for nonpower reactor operators will be conducted by NRC each fiscal year.

In addition to administering examinations, this program element also focuses on resolving generic operator licensing problems, maintaining an examination question bank, reviewing appeals for license denials, and improving the proficiency of examiners through training.

REACTOR OPERATIONS INSPECTIONS

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds (Staff)	\$ 5,925 (671)	\$ 7,840 (707)	\$ 7,150 (714)

The Reactor Operations Inspections program is designed to audit licensees' safe operation of nuclear power plants in accordance with NRC regulations. The program is composed of three major elements: Resident Inspections, Region-Based Inspections and Specialized Inspections. The primary focus of this program is on plant operations and maintenance. The program is performed by resident, region-based, and headquarters inspectors. The resident inspectors serve as NRC representatives in a variety of inspection functions. Their primary job is to observe, evaluate, and report on the adequacy of licensee nuclear safety activities on a day-to-day basis. Region-based inspectors supplement the basic activities carried out by resident inspectors through a variety of program and technical inspections that afford an in-depth look at licensee operations. Headquarters inspections supplement the regional inspections in selected technical areas, provide additional national perspective of licensee performance, serve as a testing ground for new inspection approaches, and provide a mechanism for evaluating the effectiveness of regional inspections. Program support decreases result from reduced reliance on contractor assistance for conducting specialized inspections. The increase in staff for FY 1989 reflects the increase in the number of operating reactors.

RESIDENT INSPECTIONS

Resident inspectors for operating sites are generalists who concentrate on day-to-day licensee operations, events follow up, licensee management, and staff performance. In addition, they coordinate onsite activities of the various agency offices and participate in emergency exercises. Two residents are assigned to all multi-unit operating sites. In FY 1988, the assignment of a second resident inspector to all single-unit operating sites will be completed. Most plants in preoperational testing have four resident inspectors. This added onsite inspection coverage is provided during the critical period when utility construction and associated quality assurance and quality control inspections are being completed, preoperational testing is in progress, hearings are being conducted, and when last-minute allegations may be introduced.

REGION-BASED INSPECTIONS

The majority of inspections are indepth, specialized technical inspections carried out by region-based specialists in the areas of instrumentation, quality assurance, plant operations, systems surveillance, maintenance, modifications, inservice inspection, fire protection, training, refueling, radiation protection, environmental protection, and management systems. In addition, region-based specialists and headquarters staff assist in responding to allegations of safety and safeguards violations at nuclear facilities and provide technical support to investigations. Region-based specialists are responsible for conducting routine reactor inspections and evaluating the corrective measures taken by the utilities to resolve identified problems. To augment these region-based inspectors, NRC contracts for highly specialized technical assistance that includes expertise in areas such as electrical and mechanical engineering; metallurgy and instrumentation for inspection of power reactors; aerial radiological surveys; environmental monitoring at reactor sites; and other independent confirmatory measurements. NRC will also utilize the Plant Risk Status Information Management System as a probabilistic risk assessment tool to help focus the inspection program on safety significant areas. Efforts will continue to develop probabilistic risk assessment inspection procedures to assist NRC inspectors in focusing attention on specific components, equipment, or systems.

NRC will conduct operations inspections at an estimated 107 operating reactors in FY 1988 and 117 in FY 1989 and will inspect approximately 50 nonpower reactors each year in FY 1988 and FY 1989. The NRC will continue to utilize fixed and mobile laboratories (e.g., the nondestructive examination van) in conducting these inspections.

SPECIALIZED INSPECTIONS

In addition to the inspections conducted by NRC residents and region-based specialists and headquarters staff, NRC conducts several types of specialized inspections. These include safety system functional inspections, safety systems outage modifications inspections, operational safety team inspections, and vendor inspections.

As the result of the Davis-Besse and other significant operational events, it became evident that there was a need to address the functionality of reactor systems and components. A safety system functional inspection is an in-depth engineering review of the design, configuration, maintenance, testing, and operation of reactor systems, their components, and their supporting systems. A safety system outage modification inspection is also an in-depth engineering examination of system functionality, but it is oriented towards the safety impact of modifications which are made to safety systems during the course of a reactor outage. This

inspection focuses on how the modification has altered the original design considerations and safety margins, the quality of the modified as-installed systems, and the adequacy of full functional testing of the modified systems. Safety systems functional inspections and safety systems outage modifications inspections will be conducted to provide information on the effectiveness of industry-sponsored evaluation programs and regional inspections. These inspections are conducted by a team of specialists that include operations, design and installation-oriented personnel.

The NRC will conduct approximately six safety system functional inspections/safety systems outage modifications inspections in FY 1988 and eight in FY 1989.

An operational safety team inspection is an in-depth review of plant operational programs including maintenance, operations, surveillance testing, corrective action, management oversight, and safety review. These inspections provide senior NRC management with a national perspective on plant performance in cases where regional inspections have indicated the need to further examine overall operational safety. The NRC will conduct seven to nine multidisciplinary operational safety team inspections in FY 1988 and 10 to 12 in FY 1989 in which significant safety issues have been identified as a result of the licensee performance evaluation process.

Vendor inspections are conducted to ensure that suppliers of materials, components, and services used in nuclear power plants provide a quality product that maintains the safety standards to which the plant was originally designed. These inspections are intended to improve reactor safety by focusing on operational reactor safety issues, assessing the potential generic implications of vendor deficiencies, and emphasizing licensee responsibilities for their vendor suppliers. The NRC will conduct approximately 100 vendor/contractor inspections annually. This will include about 70 inspections of suppliers of nuclear components, materials, and services, and about 30 reactor inspections in the areas of equipment qualification, vendor interface programs, procurement, and component integrity.

OPERATING REACTOR LICENSE MAINTENANCE AND
REGULATORY IMPROVEMENTS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$12,588	\$ 9,018	\$ 14,698
(Staff)	(399)	(393)	(367)

The Operating Reactor License Maintenance and Regulatory Improvements program is designed to ensure that operating facilities maintain adequate levels of protection of public health and safety by completing the regulatory actions necessary to correct inadequacies in plant design and operation that are identified from: evaluating operating experience and unanticipated events, resolving safety issues, inspection findings, and NRC-sponsored safety research. This program is composed of four major elements: Integrated Safety Assessment, Project Management, Safety Evaluations of Licensing Actions, and Regulatory Improvements. The resource reduction in FY 1988 is expected to increase the backlog of licensing actions. Increases in program support funding in FY 1989 are planned to offset staffing decreases and to reduce the growth of the licensing action backlog.

INTEGRATED SAFETY ASSESSMENT

As a follow-on to the completed two-plant pilot Integrated Safety Assessment Program (ISAP) the NRC is proceeding with a proposed ISAP II, a program derived from the original with certain programmatic differences.

The proposed ISAP II program will address regulatory issues through the development of integrated priority-based plant implementation schedules. These integrated schedules will be established through the use of two analytical tools: a probabilistic risk assessment and an operating experience review. The use of an integrated schedule will provide a predictable safety basis for the staff and licensee to manage work loads and estimate resource requirements. ISAP II is currently being offered to all power reactor licensees.

PROJECT MANAGEMENT

NRC project managers provide the overall management/review of safety and environmental modifications to operating plants. These modifications include actions that are directed by NRC as a result of safety, environmental and safeguards assessments, and

actions that are initiated by the utilities. It is through these modifications that NRC ensures that operating facilities achieve and maintain adequate levels of public health and safety. The development of priority-based plant implementation schedules for licensing actions will be continued with the goal of participation by half of all operating reactors by FY 1991.

The project manager is the focal point of contact with the licensee, other NRC staff, and the public on safety matters concerning a specific plant. They assign priorities for plant specific safety issues, manage the review and issuance of license amendments, including Sholly notices, fee determination, safety evaluations, and environmental assessments. The project manager consults with State and local officials and prepares correspondence replying to public and congressional inquiries. Additionally, project managers will conduct certain technical reviews, evaluate the licensee's overall performance, and assist the regions in developing an inspection plan.

SAFETY EVALUATION OF LICENSING ACTIONS

Many safety significant licensing actions require detailed technical review to ensure that the safety of the plant is not compromised, particularly, as they relate to operational safety such as the Babcock and Wilcox design reassessment, plant restarts, and response to problem plant issues. Both plant-specific actions and actions affecting several operating reactors will be addressed and resolved. Approximately 2,600 actions will be completed in FY 1988 and 2,800 in FY 1989. The review of issues will be conducted to ensure that guidance provided to the technical staff includes a uniform priority ranking scheme, scheduling criteria and work assignment procedures in order to apply resources most effectively. The evaluation scheme used to establish priorities will be based primarily on the safety significance of the issues. Approximately 25 topical report applications will be reviewed per year.

REGULATORY IMPROVEMENTS

Operating experience and implementation of NRC policies on technical specifications, severe accidents, and safety goals necessitate improvements in regulatory requirements.

The technical specifications for an operating reactor are an integral part of the operating license. These technical specifications have become cumbersome over the years and in many instances address matters not related to safety. To correct this problem, the NRC initiated a technical specification improvement program to improve operational safety by reducing the size and complexity of the technical specifications, thereby making them more understandable to operations personnel. The program will

also more clearly define the relationship between technical requirements and their safety significance. The Commission's policy statement on technical specification improvements for nuclear power reactors and the technical specification improvement program also call for the continuing investigation of methods to make better use of risk and reliability considerations in defining technical specifications. Technical guidance will be developed to focus on those operational specifications that are significant to safety. Industry submittals of streamlined technical specifications will be reviewed and approved to ensure that plant safety requirements are met.

The severe accident policy statement calls for a systematic examination of all operating reactors to identify and remedy risk outliers; that is, plant-specific features that are high-risk contributors. During FY 1988, a generic letter will be finalized that will implement this policy. Technical guidance for the individual plant examination program will be developed in support of the NRC severe accident implementation program. In FY 1988 and beyond, the individual plant examinations submittals will be received. These will be reviewed and assessed, and appropriate licensing and inspection actions will be taken.

The Commission's safety goal policy provides overall guidance on acceptable levels of risk from nuclear power plants. In FY 1988 and beyond, guidance will be developed on the use of probabilistic risk assessment to implement the safety goal.

REACTOR ACCIDENT MANAGEMENT

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds (Staff)	\$ 350 (64)	\$ 790 (45)	\$ 460 (46)

The Reactor Accident Management program is designed to ensure that adequate protective measures can and will be taken in the event of a radiological emergency, and that licensee personnel can adequately manage reactor accidents. The program is composed of two major elements: Emergency Preparedness Licensing and Assessment, and Licensee Reactor Accident Management Evaluation.

EMERGENCY PREPAREDNESS LICENSING AND ASSESSMENT

The NRC requires nuclear power plant applicants and licensees to develop and implement onsite and offsite plans for taking protective actions in the event of reactor accidents. The plans for a given reactor site generally involve those prepared by the utility for application to onsite areas and those prepared by State and local government authorities for areas beyond the plant boundary. The NRC will continue to conduct emergency preparedness licensing reviews for those plants still in the licensing pipeline; and continue to maintain close coordination with the Federal Emergency Management Agency, State, and local governments to ensure adequate offsite emergency preparedness. In addition, NRC will review and evaluate licensee requests for changes to their emergency preparedness plan and will observe and evaluate each licensee's emergency response capabilities during full-scale exercises of emergency preparedness plans, which are held for each licensee every two years.

LICENSEE REACTOR ACCIDENT MANAGEMENT EVALUATION

NRC has taken an active role in reviewing the procedures that utilities maintain for coping with accident conditions (emergency operating procedures) and for offsite protective measures (off-site emergency plans). However, there is still a need for information for the utilities on what actions should be taken to prevent core melt and mitigate offsite releases for accidents which proceed beyond the emergency operating procedures and then for assurance that utilities implement appropriate measures. The accident management evaluation program will develop and issue information on conducting reactor operations in a severe accident. It

will include information on the structure of accident management organizations, procedures to be followed, and the training and qualification of personnel. In FY 1988 through FY 1989, information will be developed based on existing severe accident information.

REACTOR SAFEGUARDS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds (Staff)	\$ 609 (59)	\$ 390 (56)	\$ 490 (57)

The Reactor Safeguards program is designed to ensure that licensees adequately deter, detect, and protect against threats, radiological sabotage, and theft or diversion of special nuclear materials at reactors. Safeguards requirements for reactors include detailed plans, procedures, and operational systems for maintaining accountability of material, deterring and responding to acts of radiological sabotage, or illegal seizures of facilities. Licensees use sophisticated detection and alarm systems, barriers, and safeguards organizations staffed with trained and competent personnel to comply with safeguards requirements. Special care must be exercised to assure that licensee-implemented safeguards programs provide adequate protection without compromising safe operations. The NRC carries out this program by conducting reactor safeguards inspections and regulatory effectiveness reviews and by evaluating proposed changes to licensee safeguards plans.

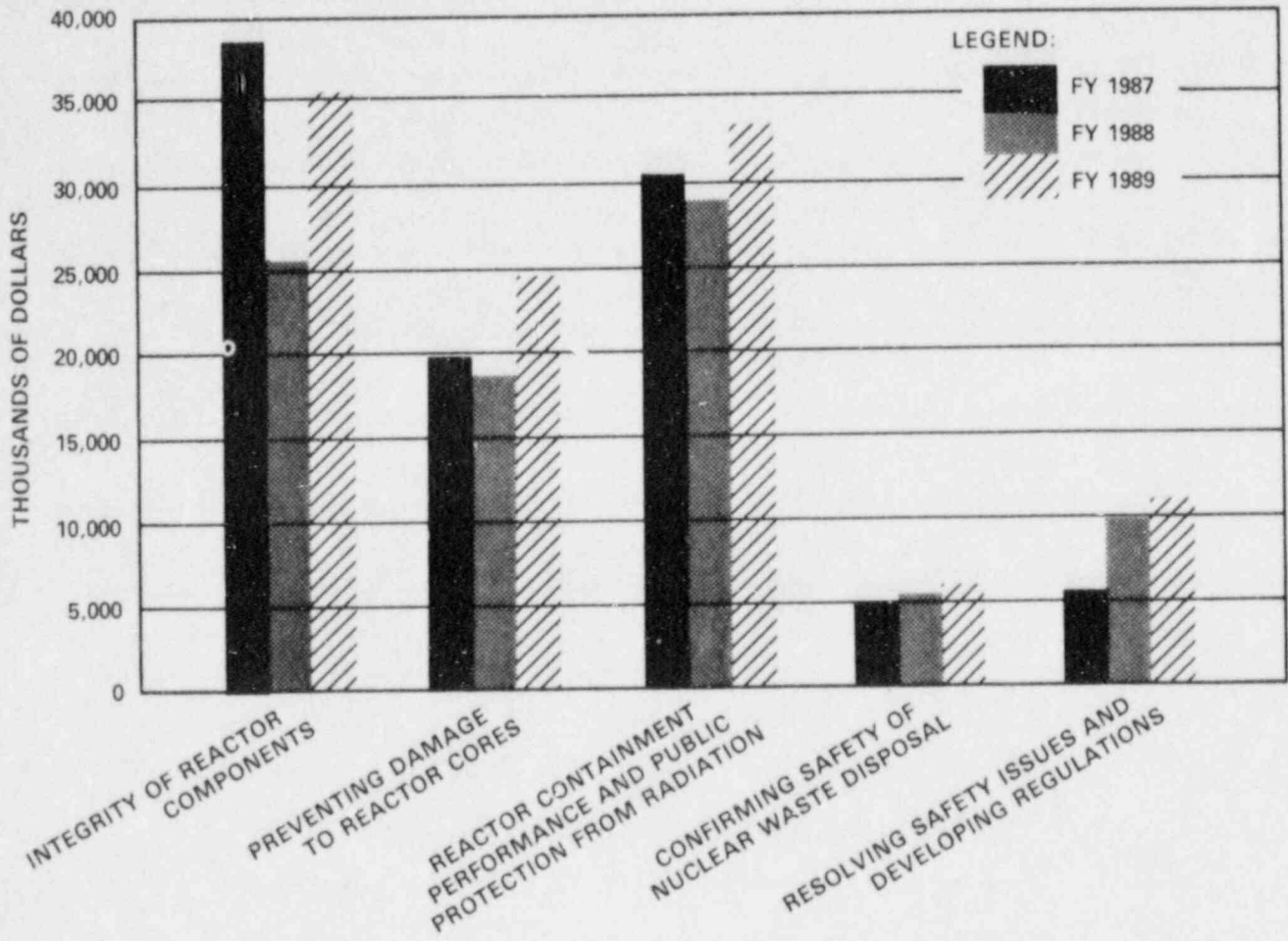
The NRC uses region-based specialists to conduct safeguards inspections at reactor sites. Over the next several years, safeguards inspections will place increased emphasis on the reviews of licensee programs related to personnel reliability. Approximately 300 safeguards inspections will be conducted each year at operating reactors.

The NRC's safeguards regulatory effectiveness reviews are conducted to assure that the safeguards required by the regulations and implemented by licensees provide adequate protection without compromising safe reactor operations. The NRC will conduct 14 safeguards regulatory effectiveness reviews each year in FY 1988 and FY 1989. Reviews for all reactor sites are expected to be completed by FY 1991. These reviews provide valuable insights into the adequacy of NRC safeguards regulations. The NRC will complete approximately 225 reviews per year of new and amended safeguards plans for reactors in FY 1988 and FY 1989. In FY 1989, NRC will initiate a program of licensee performance indicators to provide a methodology for evaluating licensee performance.

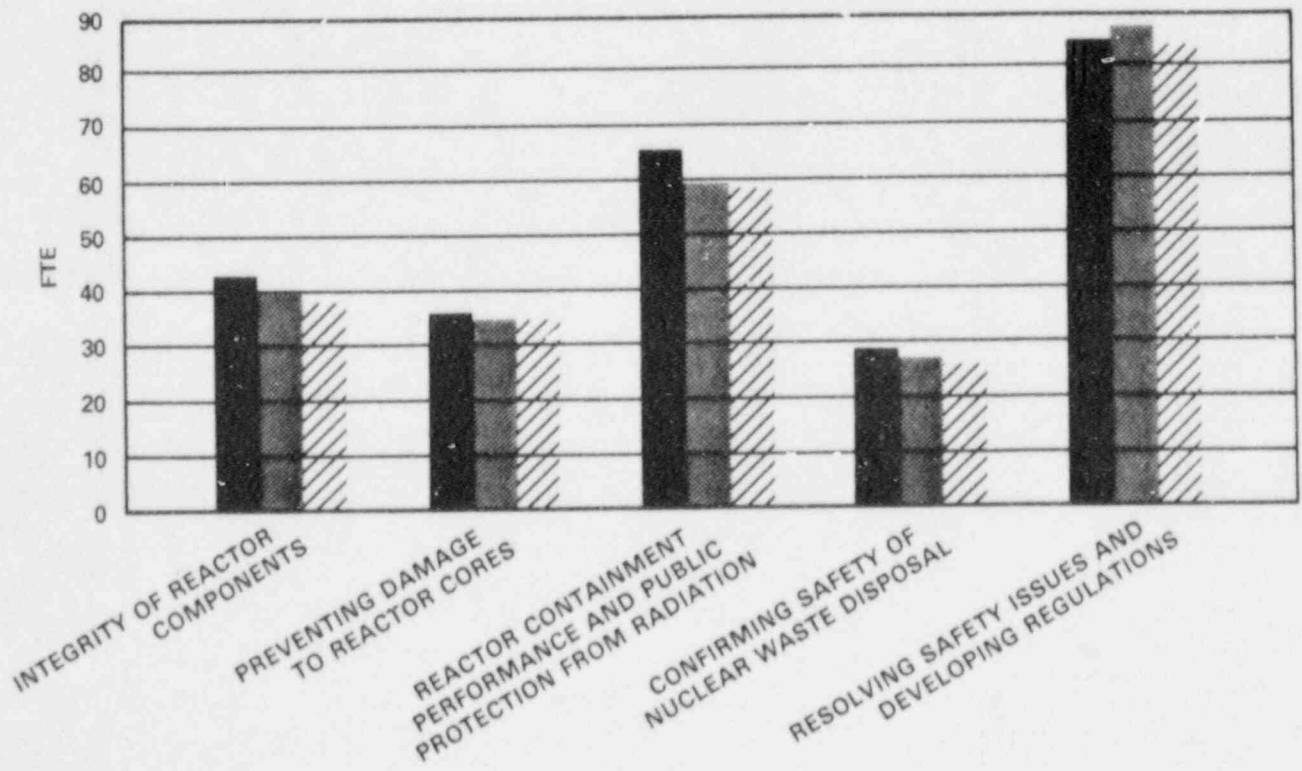
NUCLEAR SAFETY RESEARCH

NUCLEAR SAFETY RESEARCH

PROGRAM SUPPORT



STAFF



NUCLEAR SAFETY RESEARCH

(Dollars are in thousands, except in text, where whole dollars are used; staff numbers are in full-time equivalents.)

Total FY 1989 estimated obligations \$ 137,117

Total Funds and Staff

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Salaries and Benefits	\$ 15,167	\$ 16,044	\$ 15,768
Program Support	99,814	88,910	113,235
Administrative Support	6,868	6,081	7,504
Travel	<u>619</u>	<u>576</u>	<u>610</u>
Total Obligations	<u>\$122,468</u>	<u>\$111,611</u>	<u>\$137,117</u>
(Staff)	(255)	(246)	(239)

Program Support Funds and Staff

The Nuclear Safety Research program support funds and staff are allocated as shown below. The program support funds are primarily for work done by the Department of Energy laboratories, commercial contractors, nonprofit organizations (universities, foundations, etc.) and grantees. The narrative that follows describes the programs and the reasons they are needed.

	<u>FY 1987 Actual</u>		<u>FY 1988 Estimate</u>		<u>FY 1989 Estimate</u>	
	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>
Integrity of Reactor Components	\$ 38,527	42	\$ 25,930	39	\$ 35,220	37
Preventing Damage to Reactor Cores	19,764	35	18,520	34	24,865	34
Reactor Containment Performance and Public Protection from Radiation	30,415	65	28,800	59	34,270	58
Confirming Safety of Nuclear Waste Disposal	5,005	28	5,770	27	6,900	26
Resolving Safety Issues and Developing Regulations	<u>\$ 6,103</u>	<u>85</u>	<u>\$ 9,890</u>	<u>87</u>	<u>\$ 11,980</u>	<u>84</u>
TOTALS	\$ 99,814	255	\$ 88,910	246	\$113,235	239

DESCRIPTION OF MISSION AREA

The NRC is responsible for ensuring safety in the design, construction, and operation of nuclear facilities and the other activities it regulates. The technologies employed are relatively new and complex. It is often necessary to make regulatory judgments on matters related to safety that are beyond normal experience-based engineering practice. In order to achieve the high degree of confidence required to help ensure safety, it is essential to carry out a research program and to develop knowledge that confirms the engineering judgments made and that provides the technical basis for establishing safety regulations. Furthermore, unforeseen safety problems continue to arise from operating experience. The NRC must have ready access to sources of expertise in order to promptly solve those problems. The best way to maintain such sources of expertise is to implement an ongoing research program that requires experts in pertinent areas of technology in the NRC and contractor organizations.

Nuclear Safety Research has two main purposes. The first is to provide independent expertise and information for making timely regulatory judgments. The information should be independent in the sense that it is not derived solely from information provided by licensees and that it has received or is capable of verification by scientific peer review by experts who did not perform the research. Research required for this purpose is mostly oriented to problems that are foreseeable in the near term. The second purpose of research is to identify or characterize problems of potential safety significance for which new or expanded knowledge can assist the NRC in pursuing its mission. The expansion of knowledge also can help to recognize unforeseen situations and to prepare for dealing with them. Research for this purpose is generally considered long term, requiring effort over a period of five years or more.

The NRC's research program provides an essential contribution to the agency's mission and is vital for implementing a large number of the agency's programs. The goal of the Office of Nuclear Regulatory Research is to ensure that research provides the bases for timely rulemaking and related decisions in support of NRC licensing and inspection activities. The need for information arises within a regulatory process that is based on NRC's long-standing philosophy of defense in depth. This context provides a clear and logical structure for the Nuclear Safety Research mission area. This area consists of five major programs: Integrity of Reactor Components; Preventing Damage to Reactor Cores; Reactor Containment Performance and Public Protection from Radiation; Confirming Safety of Nuclear Waste Disposal; and Resolving Safety Issues and Developing Regulations.

The Commission has endorsed most of the recommendations made in the National Academy of Sciences' report "Revitalizing Nuclear Safety Research." These recommendations are being implemented in

FY 1988-1989 by a series of actions that include: creation of a Nuclear Safety Research Review Committee to review the overall management of the Research program; adoption of a cogent statement of the philosophy of the Commission's safety research program which emphasizes the need for excellence and adequate funding; impose a contractual requirement for publication of peer-reviewed research results; organization of Senior Program Steering Groups to coordinate the planning of research and the application of its results; Commission commitment to a strong leadership role in planning and advocating the safety research program; increased interaction with the universities; and increased cooperation with other organizations.

INTEGRITY OF REACTOR COMPONENTS

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds	\$38,527	\$ 25,930	\$ 35,220
(Staff)	(42)	(39)	(37)

The Integrity of Reactor Components program examines reactor plant systems and related components to see if they perform as designed and that their functional integrity and operability can be maintained over the life of the plant. Reactor safety depends on maintaining the integrity of the reactor system pressure boundary, i.e., maintaining it free from damage and ensuring it is leak tight. Failure to maintain pressure boundary integrity could compromise the ability to cool the reactor core and could lead to a loss-of-coolant accident accompanied by release of hazardous fission products.

This program is composed of four major program elements: Reactor Vessel and Piping Integrity, Aging of Reactor Components, Reactor Equipment Qualification, and Seismic and Fire Protection. The increase in funding in FY 1989 is for pressure vessel safety irradiation tests and studies associated with pipe cracking, non-destructive examination methods to measure mechanical properties for predictions of materials aging, developing requirements for reinspection of nuclear power plants as a basis for license renewals, and increased work in plant-aging research.

REACTOR VESSEL AND PIPING INTEGRITY

This program element is directed toward improving NRC's understanding of the basic metallurgical processes that contribute to failures (cracking, embrittlement, erosion) of the reactor pressure vessel and related piping. These effects result from corrosion, aging, and irradiation. The information developed will be used to establish guidance or requirements for augmented procedures for test and maintenance of the reactor vessel and primary system piping, to formulate or evaluate remedial actions needed to respond to problems arising in the course of operating nuclear power plants, and to evaluate licensees' requests to extend their reactor operating licenses beyond current expiration. An integral part of this effort is to develop and/or validate nondestructive examination methods to detect, before failure, cracks and flaws in critical plant piping and vessels.

Pressure Vessel Safety

Brittle failure of the reactor pressure vessel, which could result in a core-melt accident, must be prevented by ensuring adequate

safety margins. Experimental research on the effects of temperature, stress, irradiation, and flaws on the reactor's primary system pressure boundary, is necessary to confirm the NRC's current regulatory position that pressure vessels will not fail by brittle fracture during service or in the event of an accident.

One issue of major interest is that of a potential accident called pressurized thermal shock (PTS). Here, sudden cooling and depressurization of the reactor vessel under certain conditions brought on by an anomalous transient followed by inadvertent repressurization of the reactor could lead to failure of the vessel. In FY 1988-1989, NRC will prepare for its third Pressurized Thermal Shock Test. The actual test will be conducted in FY 1990. This test will determine the effect of the reactor vessel's cladding on mitigating the extension of a crack started by a PTS incident and will contribute to quantifying the fracture analyses safety margins used in formulating the Pressurized Thermal Shock Rule (10 CFR 50.61).

Neutron radiation on reactor vessels has continued to be very important because the vessel can become brittle and could fail in an accident such as PTS. In FY 1989, work will be completed on the establishment of benchmarks for improved predictions of radiation doses to materials and validation of the flux reduction fix set forth in the Pressurized Thermal Shock Rule to reduce such doses. The benchmarks will improve accuracy of these predictions and will help ensure that no more than the corresponding reduction in the originally predicted embrittlement claimed by licensees is accurate. Embrittlement is monitored through material surveillance programs, the results of which are evaluated using a reference fracture toughness curve in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Because radiation will adversely alter the material properties, it is necessary to ensure that the code reference curve accurately represents behavior of the materials. Irradiation tests will be completed in FY 1989 of low upper-shelf materials to ensure that the code curves represent behavior of the materials in service. Other irradiations, which are the basis for the funding increase in FY 1989, are of 4-inch thick specimens to be annealed to ensure that small-scale laboratory annealing tests correctly exhibit characteristics of recovery of initial mechanical properties for continued safe reactor service. Initiate tests in FY 1989 to provide data for updating the ASME code, section III, for the prediction of fatigue life. The present curves are based on smooth specimen, room temperature air tests. The revised codes will consider the effects of as-fabricated surfaces, operating temperature, and water environment. Under such conditions, component fatigue life could be different than currently estimated. Also in FY 1989 the needed revisions to 10 CFR 71 (Packaging and Transportation of Radioactive Material) for acceptable materials for spent-fuel shipping containers will be completed.

Metallurgical analysis of the TMI-2 lower vessel head will be initiated in FY 1989. These analyses will seek to define a realistic temperature experienced by the lower head steel of the TMI-2

vessel during the core melt accident, determine the post-accident microstructure, and verify the change in mechanical properties of the steel as a result of this temperature excursion through metallurgical tests of the material. Various locations on the lower vessel head will also be studied to determine the extent of interaction between the molten core material and the vessel.

Piping Integrity

There have been numerous instances of cracked piping in nuclear power plants. Piping in most operating nuclear plants is designed on the basis that a double-ended guillotine break is the major accident against which the plant must be protected. This conclusion led to the installation of numerous pipe whip restraints and jet impingement barriers, and affected the plant design in many other areas. Past and ongoing research efforts have shown that, for many piping systems, the double-ended guillotine break is a low probability event and further, that the steps taken to implement the requirement to postulate this break can actually reduce, rather than enhance, safety. In FY 1988, research will begin on the definition of a replacement to the double-ended guillotine break as the major accident against which the plant must be protected, and further will define when the leak-before-break principle can be applied.

In FY 1989, the long-term validation tests of proposed replacement materials for boiling-water reactors (BWR) will be completed. At the same time the International Piping Integrity Research Group tests will be conducted of large carbon and stainless steel pipe at elevated temperature and pressure using seismic loads. The tests will assess the margin of safety for fracture of piping subjected to realistic seismic loadings which will contribute to the final validation of the leak-before-break principle. The study of degradation of cast stainless steel and its implications to the leak-before-break principle will also be completed in FY 1989. The above research will contribute to confirming the technology basis of the leak-before-break principle and to defining a replacement for the double-ended guillotine break as the design basis for many aspects of nuclear power plants.

Funding increases in this area for FY 1989 are required for study of irradiation-assisted stress corrosion cracking of core internals and for the study of the effect of water chemistry parameters on the long-term crack resistance of steels for replacement piping in BWRs.

Inspection Procedures and Techniques

Methods currently in use for detecting and characterizing flaws are not always consistent, reproducible, or interpretable. Nevertheless, preservice and inservice inspections are relied on to reveal and characterize flaws in reactor pressure boundary components such as vessels, pipes, and steam generator tubes. For safety evaluations, such as for PTS, it is very important to know if the

very small flaws capable of crack initiation under PTS accident conditions are present. Pressure boundary piping must be reliably inspected to determine if a leak-before-break condition exists. Excessive degradation in steam generator tubing must be properly detected and characterized so that tubes can be plugged to avoid unacceptable releases of radiation or loss of coolant. Thus, methods currently in use must be quantified with respect to their reliability.

In FY 1988, round robin tests on stainless steel will be initiated. They will compare the current ASME code method, the advanced nondestructive examination ultrasonic testing methods, and the International Program for Inspection of Steel Components method. These tests are needed to meet the criteria for adoption into the ASME code and will be completed in FY 1989. Also in FY 1989, recommendations will be developed for performance demonstration requirements and updated test procedures.

Locations exist in plants where conventional inspection techniques are inadequate for proper examinations for flaws. Thus, alternative techniques are very useful. One such technique is acoustic emission. This technique has the advantage that components can be monitored online so that their integrity can be assessed on a continuous basis rather than periodically, on a limited sample, as is the case with current inservice inspections which generally use ultrasonic testing techniques. Growing cracks produce acoustic signals that can be monitored to allow the detection, location, and evaluation of flaw severity for active cracks growing during reactor operation. Leaks also produce acoustic signals that allow for the location and sizing of leak sources and for discrimination between leakage through cracks and leaks from other sources such as valve packings. The acoustic emission information can, therefore, be used for enhancing the reliability and safety of operating reactors on a continuous basis. Although such methods are desirable, the monitoring procedures, techniques, and crack evaluation criteria are not yet fully validated by inservice monitoring. In FY 1988, research will begin to capitalize on the opportunity for in-field validation through acoustic emission testing. This validation will continue in FY 1989. The results of the validation will be provided to ASME for possible application in the ASME code in FY 1989. In FY 1989, work will begin on the development of requirements for reinspections of nuclear power plant components as a basis for license renewals.

AGING OF REACTOR COMPONENTS

As the operating life of nuclear power plants increases, there is a growing need to ensure that critical plant components and safety systems continue to provide an adequate level of reliability. Aging could result in degradation of physical barriers or redundant components making them vulnerable to simultaneous

failure in the event of a transient or accident. This program element is designed to systematically evaluate the degradation mechanisms whereby electrical and mechanical components can and have failed in use. The results of this research will provide the basis for establishing timely and effective maintenance, test, and replacement requirements to mitigate the effects of aging or to validate continued operation of plants without repair or replacement.

Research will determine the age-related deterioration of such equipment as pressure vessels, piping, cables, circuit breakers, valves, pumps, and motors in their operating environment. Some samples and components taken from the Shippingport Nuclear Power Plant at Shippingport, Pennsylvania, will be examined in FY 1989 and others will be stored for later examination. The availability of the Shippingport materials and equipment provides a unique opportunity to check predicted deterioration of both materials and equipment against actual deterioration.

In FY 1988, Phase I Aging-System Interaction studies will be completed on six safety and support systems. These studies will result in preliminary identification of the significant causes of aging degradation and an evaluation of current inspection, surveillance, and monitoring methods used to evaluate such degradation. Phase II studies on the six systems which generally involve in situ assessment, post service examinations and tests, and cost benefit analyses will be initiated in FY 1989 and completed in FY 1990-1991. In FY 1989, research will be continued to determine residual lifetime and quantification of aging of major components and structures for life extension/license renewal; criteria will be developed for inspection, maintenance, and replacement of some critical valves, auxiliary feedwater pumps, motors, batteries, and chargers/inverters, with the remainder to be completed in the period FY 1990-1991; the Shippingport reactor vessel will be tested to establish the amount of embrittlement that has occurred during its operating life; and the documentation of the Ice Condenser Decontamination Factor Tests and the development of analytical methods for evaluating the effectiveness of ice condensers and suppression pools as engineered safety features for severe accidents will be completed.

REACTOR EQUIPMENT QUALIFICATION

The establishment of design specifications and performance requirements for nuclear plant components is an essential part of the regulatory process. Qualification tests that show that certain equipment will operate under normal conditions may be insufficient by themselves to ensure safety. Some valves must close against high flows in the event of a pipe break outside the containment building. Valve malfunction can cause other emergency equipment needed in the control of the reactor to malfunction (e.g., flooding). Work conducted in this program element is focused on validating the adequacy of existing national standards for equipment

qualification and on developing proposed modifications or additions to these standards based on the results of research, new analytic techniques, or operating experience.

Work will begin in FY 1988 and continue in FY 1989 to evaluate the effectiveness of current ASME Inservice Inspection Programs. The purpose of this effort is to determine the need for revising inservice inspection rules specified in ASME code, section XI, to ensure the early detection of cracking in reactor coolant pressure boundary piping and vessels.

SEISMIC AND FIRE PROTECTION RESEARCH

Probabilistic risk studies currently estimate that earthquakes are potentially significant causes of risk to the public for some U.S. nuclear power plants. However, uncertainties in the data base associated with these studies contribute to difficulties in assessing whether the present seismic safety margins continue to provide adequate protection of the public health and safety. As such, the primary objective of this research is to better determine the likelihood and magnitude of severe earthquakes for nuclear power plant sites (especially for the Central and Eastern United States) and to predict the response of the site and the plant to earthquakes within the range of magnitudes appropriate to the site. This research will be used to reevaluate the ground accelerations used in establishing plant safety margins and to revise Appendix A (Seismic and Geological Siting Criteria of Nuclear Power Plants) to 10 CFR Part 100.

To accomplish this, the NRC has been funding the operation of seismographic networks in the Central and Eastern United States and related geological and geophysical research in the seismically active locations. The NRC has signed an interagency agreement with the U.S. Geological Survey (USGS) to replace the NRC-supported networks in the Central and Eastern United States. The NRC will fund the purchase of the needed permanent equipment for a six-year period and the USGS will provide personnel support and assume responsibility for the new network. In FY 1988 installation of the permanent stations of the National Seismographic Network will be initiated. Additional stations will be added in FY 1989.

Because of recent research data on earthquakes, new procedures for estimating the capacity of nuclear power plants to withstand earthquakes larger than their original design basis are being developed. These procedures will provide the basis for sound regulatory decisions without unnecessary modifications being required. These procedures must be validated by improved data bases from experience and experiments before they can be used with confidence. Large-scale, complex, experimental facilities at overseas locations in Germany, Taiwan, and Japan are being used or pursued as part of international cooperative programs to

validate these procedures. NRC pays only a small part of the total cost of these overseas experimental programs. In FY 1989, the validation of important soil-structure interaction aspects will begin using extensive seismic ground motion and structural response data collected over a period of years from the Taiwan Test Site at Lotung. In FY 1989 work will be completed to determine the ability of analytical methods to predict piping response and the onset of component damage under very large earthquake motions. This work will use the Heissdampfreaktor (HDR) facility in the Federal Republic of Germany and the Tadotsu Engineering Laboratory in Japan to compare predictions of elastic and inelastic response with actual measurement data.

Additionally, NRC research is being conducted to determine the failure level of concrete structures and such critical components as electrical equipment and piping to supplement the existing data base that is being gathered in cooperation with the Electric Power Research Institute. In FY 1988-1989, the major testing phase on large, concrete, shear-wall structures (e.g., control room, auxiliary buildings) will be continued. Results from these tests will be used to explain the rationale for the large analytical-experimental differences in building response observed in previous testing. Finally in FY 1989, component fragilities will be established for seven components with high seismic capacity (e.g., large vertical pumps, motor-driven pumps and compressors, and small motor-operated valves).

Funding has not been provided for the resumption of fire protection research pending results of an ongoing risk study scheduled for completion later in FY 1988. Following review of those results, a decision will be made on the need to undertake further fire protection research.

PREVENTING DAMAGE TO REACTOR CORES

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$19,764	\$ 18,520	\$ 24,865
(Staff)	(35)	(34)	(34)

Preventing Damage to Reactor Cores is the second major program of the Nuclear Safety Research mission area. It encompasses the operations of the reactor as a system, including control of power level, maintaining water in the reactor system, core cooling and heat removal, and maintaining proper coolant temperatures and pressures. It also includes consideration of operator actions as an integral part of the system. It addresses both normal and abnormal conditions, such as a pipe break and loss-of-coolant accident (LOCA), in which emergency systems are called upon to provide cooling water. A complete knowledge of the reactor operating as a system makes it possible to define the conditions of operation that prevent core damage, and hence maintain safety.

Continued occurrence of complex transients at operating reactors leads to the concern that there may be likely combinations of equipment malfunctions, operator errors, and system response that would preclude the safe shutdown for some future event. The emphasis of this program is on severe accident prevention through understanding of both plant and human behavior during accidents and transients. This information is used to ensure that plant equipment, operational procedures, and training are adequate to deal with operating events and to prevent serious accidents. There are a number of identified thermal-hydraulic phenomena that need to be modeled to confirm adequate capability of plant safety systems and of operator recovery actions to mitigate postulated accidents such as loss-of-coolant accidents. Research is being done to characterize human errors that have occurred at nuclear power plants, and evaluations are being made to improve diagnostic tools and operating aids in order to enhance the effectiveness of plant operators in responding to transients. To provide regulatory tools to ensure a high degree of reliability in safety systems and related components, research is being conducted to quantify plant and system risk and reliability and to establish a set of performance indicators on which NRC can objectively monitor licensee performance. A systematic examination of plants will be conducted to identify plant-specific vulnerabilities to severe accidents, thereby providing a better basis for developing accident management procedures.

This program is composed of four major program elements: Plant Performance, Human Performance, Reliability of Reactor Systems,

and Accident Management. An increase in funding is proposed in each of the program elements in FY 1989. Notable individual activities contributing to the increase are experiments using the Multi-Loop Integral System Test facility, studies to develop experimental data for improving and assessing scientific models, reduction of uncertainty in computer codes, an increased effort in human factors research and human error studies, and the support of individual plant examinations.

PLANT PERFORMANCE

This program element is designed to provide information on the thermal-hydraulic response of the reactor coolant system when the plant is subjected to transients caused by loss of offsite power, pipe breaks, etc. Such information is essential to the development and validation of analytical models for needed standards on equipment performance and for confirming the effectiveness of operating procedures in effect at each plant to prevent core damage.

Diversity in plant design and operation and the diversity and complexity of possible accidents and transients make direct experimental testing of all important events impractical. One must depend on verified analytical models (i.e., computer codes) to evaluate events of interest. Assessment of computer codes is complicated by scaling questions, complexity of systems and thermal-hydraulic processes, and the periodic identification of new phenomena that need to be simulated. The computer codes are developed and verified using data from experiments conducted in integral and separate effects test facilities. The regulatory staff uses verified computer codes to independently evaluate reactor designs to ensure that they are capable of safely responding to a wide range of possible accidents and transients. This is done to ensure that analyses performed by reactor vendors or utilities for licensing submittals are accurate and will result in operating procedures that will prevent serious accidents.

B&W System Test Facilities

Regulatory issues frequently arise that relate to the plant geometry of a specific major reactor vendor (Westinghouse, Combustion Engineering, General Electric, and Babcock & Wilcox). The thermal-hydraulic-related design issues involving Westinghouse, Combustion Engineering, and General Electric reactors, have been resolved with the use of test data from the Semiscale, Loss-of-Fluid Test, and Full Integral Simulation Test facilities. All these facilities have been recently closed. The Babcock and Wilcox (B&W) nuclear plant design incorporates features that affect its safety performance in ways that are significantly different from other pressurized water reactors. As such, separate experiments must be conducted. Additionally, operational events

concerning the B&W-designed reactors have placed more emphasis on the resolution of regulatory issues involving B&W reactors. These issues include: adequacy of B&W plant small-break loss-of-coolant accident models based on concerns raised from the TMI-2 accident; evaluation of recent accidents and transients at the Davis-Besse and Rancho Seco plants; and technical reviews of the B&W Owners Group recommendations as a result of the safety re-assessment of their plants.

To address some of these issues, NRC is conducting a joint program with the nuclear industry to study small-break, loss-of-coolant accidents, feedwater-line and steam-line breaks, and overcooling and undercooling transients for B&W-designed reactor plants. The joint experimental program with industry is being performed using the Multi-Loop Integral System Test (MIST) facility in Ohio and will be completed in FY 1989. These experiments were delayed from FY 1988 to FY 1989, requiring a funding increase in FY 1989. The data will be used to verify best estimate computer codes used to evaluate accidents and transients in B&W-designed reactors. In FY 1989, testing will continue in the University of Maryland 2x4 loop model. The purpose of this testing is to evaluate the scaling of the MIST facility and to aid in extending those results to a full-scale B&W-designed reactor. Post-test analyses of the MIST and the Maryland 2x4 loop, as well as plant calculations using TRAC and RELAP computer codes, will be continued in FY 1989.

The regulatory staff has requested additional safety information on accidents (e.g., those mentioned above) not being covered by the testing in MIST to help resolve these and other operational problems being experienced at B&W-designed reactors. In order to formulate the testing needs for this program, a Test Advisory Group (TAG) was established, made up of industry and NRC experts. The TAG report, expected at the end of FY 1988, will define a testing program for FY 1989 and 1990 that will be funded cooperatively with industry. The TAG is considering fabrication of a large-scale sector of a B&W steam generator that would permit gathering of data on the performance of B&W safety systems under a wider range of accidents. This facility would test the behavior of the unique auxiliary feedwater spray system and the influence of this system on B&W plant performance during accidents and transients. The TAG will most likely recommend full-power testing of the B&W steam generator. In FY 1989, the Once-Through Steam Generator Full-Power Operation Facility construction and testing will be completed as part of an industry cooperative program. This facility will provide experimental data simulating transients in B&W reactors for which full-power initial conditions are important. These transients include steam-line break, feed-water line break, and steam generator overfill, all of which relate to pressurized thermal shock challenges.

Other Experimental Test Facilities

The Upper Plenum Test Facility (UPTF) in Germany and the Sub Core Test Facility (SCTF) in Japan provide data to help resolve thermal-hydraulic regulatory issues such as: the effectiveness of upper plenum injection in Westinghouse two-loop plants; resolution, in full scale, of the concern that the emergency coolant will bypass the core and go out the break; and full-scale data on mixing that occurs in the downcomer under pressurized thermal shock conditions. Analysis and reporting of full-scale thermal mixing data from the German UPTF will be completed in FY 1989 and will be used to evaluate the potential for pressurized thermal shock during overcooling transients. Testing is scheduled to be completed in FY 1989 on the effect of vent valves (unique to B&W plants) on emergency core cooling system (ECCS) performance by running counterpart tests in both UPTF and SCTF. Summary analyses of these and other 2D/3D tests will be completed in FY 1990.

The Rig-of-Safety-Assessment IV (ROSA-IV) program in Japan is studying small-break loss-of-coolant accidents, feedwater-line and steamline breaks, and overcooling and undercooling transients at a very large scale with the ability to confirm the large volume of safety test data from the smaller semiscale facility. In FY 1989, counterpart tests will be conducted in the ROSA-IV facility. This testing will investigate the ability of the computer codes to calculate the effects of facility scale size and ultimately will verify the ability of the codes to extend the results of experiments in scaled facilities to a full-scale plant. This will help to quantify the uncertainty in analyses used to resolve technical issues, meet regulatory requirements, and assess operator guidelines.

NRC's support is a small percentage of the total cost of these programs, allowing us access to data from unique large-scale test programs costing over \$350 million. The resulting test data will be used by NRC to assess the capability of its own computer codes as well as those of industry, to simulate a wide range of transients and accidents.

Basic Studies

In FY 1988 and FY 1989, basic experimental data on phenomena of current interest will be generated. The data will be used to develop, improve, and assess specific models in the computer codes that are necessary to calculate accidents and transients in nuclear power plants.

Development and Assessment of Codes

Analytical models (i.e., computer codes) are the regulatory tools used to evaluate full-scale plant behavior during accident conditions. The major regulatory issue surrounding the use of such

computer codes relates to the codes' applicability, scalability, and uncertainty when applied to plant analyses. To resolve this regulatory issue, experimental data most relevant to the geometry and scenario being analyzed are used to verify the computer codes and to improve the modeling of thermal-hydraulic phenomena.

The principal codes developed by NRC are TRAC-PWR and RELAP5, for use by the regulatory staff in the analysis of pressurized-water reactor transients, and TRAC-BWR for the analysis of boiling-water reactor transients. Major development of the codes will be completed in FY 1989 under international consortium arrangements. This will culminate efforts in the areas of code maintenance, code assessment, and error corrections. Further maintenance will be determined based on regulatory needs.

The Nuclear Plant Analyzer is used at the NRC Technical Training Center, as well as by NRC and contractor analysts, to convey quick comprehension of complex system transients in reactors. During FY 1989 the software for the Nuclear Plant Analyzer will begin to be modified to include the latest computing technology, to improve the representation of the balance of plant, to improve the simulator optimization of Emergency Operating Procedures, and to increase extending the number and types of plants that are represented.

Technical Support Center

The Thermal-Hydraulic Technical Support Center assists NRC in resolving safety issues and in incorporating completed research into the regulatory process. During FY 1989, the Technical Support Center will continue to maintain baseline programs in computer codes and experimental facilities that will ensure the NRC's flexibility to respond quickly to priority issues. In FY 1989, an assessment of the applicability and limitations of RELAP5 and TRAC-PWR codes to calculations of transients in Westinghouse- and Combustion Engineering-designed plants will be completed. The Technical Support Center will continue to prepare synthesis reports summarizing experimental and analytical results from completed thermal-hydraulics research activities.

HUMAN PERFORMANCE

Operating experience has shown that a key element in preventing damage to the reactor core is the ability of plant operators to recognize conditions which could potentially lead to core damage and to respond to those conditions by taking appropriate remedial action. Research is being carried out to characterize human errors that have occurred at nuclear power plants and to evaluate the need for, and character of, improved diagnostic tools or other operating aids, to enhance the effectiveness of plant operators in responding to transients. In FY 1988 and FY 1989 this program

element will be expanded to include human factors research in addition to the ongoing research in human reliability. The National Academy of Sciences (NAS) will submit to NRC their recommendations for research in human factors in mid-FY 1988. The NRC staff will incorporate the NAS recommendations, as appropriate, into its human factors research.

RELIABILITY OF REACTOR SYSTEMS

Nuclear power plant engineered safety systems are designed with a high degree of reliability to prevent reactor core damage. That level of reliability may be degraded over the life of the plant by factors such as aging, poor quality control, or improper maintenance and testing. To ensure that critical safety systems and related components continue to provide an appropriate level of safety and reliability, research is being carried out to improve methods for identifying the principal causes of equipment and safety system malfunctions, to evaluate and document various programs which have been used in industry and elsewhere to improve reliability (including test and maintenance requirements), and to contribute to the development of performance indicators for NRC to objectively monitor trends in licensee performance in maintaining plant safety at acceptable levels. This research will provide more objective and better predictive plant performance indicators that will serve as a tool to aid the Commission in decision making about plant safety. To translate reliability methods into effective tools that facilitate the regulatory decision process, research will focus on methods that integrate dependent failure analysis, systems reliability, operational reliability, and operator reliability into probabilistic safety analysis.

Operational safety reliability research emphasizes the evaluation of reliability technology to help prevent plant transients severe enough to challenge safety systems and to help assure that safety systems will function reliably when challenged. In FY 1988, this research will evaluate the effectiveness of reliability methods in preventing multiple (i.e., common cause) failures and in FY 1989, this research will conduct a trial application of reliability technology on an operating power plant system.

ACCIDENT MANAGEMENT

Part of the Commission's defense-in-depth philosophy relies on the automatic actuation and reliable performance of engineered safety systems to prevent core damage. Also, each reactor has in place a set of operating procedures that sets forth the specific steps a plant operator must follow in the event of a serious plant transient. It is essential that these procedures be continually reviewed, evaluated, and revised as appropriate to reflect recent operating experience, technological developments, and the results of related Commission and industry research programs.

Currently, most operating plants do not have written plans for managing severe accidents greater than those beyond the design basis accidents. In anticipation that such plans will be forthcoming, an accident management research program plan is being developed to include the implementation of the NRC's severe accident policy. The severe accident policy requires a systematic examination of existing plants for plant-specific vulnerabilities. These individual plant examinations (IPE) will improve a utility's understanding of severe accident behavior and the role of prevention and mitigation systems and procedures, thereby providing a better basis for developing an accident management scheme. In FY 1989, IPE results from utilities will be reviewed and the IPE Results Review Plan, developed in FY 1988, will be modified accordingly.

REACTOR CONTAINMENT PERFORMANCE AND
PUBLIC PROTECTION FROM RADIATION

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds	\$30,415	\$ 28,800	\$ 34,270
(Staff)	(65)	(59)	(58)

Despite the attention given to preventing accidents and protecting the reactor core from overheating, the Commission's defense-in-depth philosophy requires consideration and implementation of methods for protecting the public in the unlikely event of a very severe (core-melt) reactor accident. These methods include the siting of nuclear plants away from population centers, the inclusion of specially engineered safety systems designed to prevent failure of the containment, and safety systems to limit the quantities of fission products that might be released if the containment were to lose its leak tight integrity. Finally, the Commission requires that each operating plant prepare an emergency plan designed to reduce the potential exposure of the public to any radioactivity that might be released in an accident.

To ensure that existing regulatory practices relating to severe accidents (i.e., siting, general design criteria, emergency planning) continue to enhance the protection of the public, research is needed to confirm the technical bases upon which the existing regulations are founded. These bases include the behavior of fission products released from melting fuel, the temperatures and pressures produced during a core-melt event, and the capabilities of containment buildings to retain radioactive materials during such events. The behavior of radioactive materials released to the environment (movement in air and water, uptake by plants and animals) is also an important consideration in protecting the public from radiation. On the basis of such information, the Commission will be better able to confirm its practices for the siting, design, construction, and reliability of those safety systems installed to mitigate the effects of severe accidents and to identify where improvements in the regulations to further reduce the residual risks may be warranted.

The Reactor Containment Performance and Public Protection from Radiation program is composed of five major program elements: Radionuclide Source Terms, Reactor Containment Safety, Reactor Accident Risk Analysis, Severe Accident Policy Implementation, and Radiation Protection and Health Effects. The increased funding from FY 1988 to FY 1989 is for: (a) revitalizing the radiation protection and health effects program; (b) accelerating research to determine the probability of containment failure by direct heating, on increased severe accident analyses for natural circulation, fission product release and containment response, and on

core-melt progression; and (c) initiating seismic testing of steel containment models and accelerating testing of the effect of aging on structures; and (d) additional severe accident testing in the Canadian NRU test facility.

RADIONUCLIDE SOURCE TERMS

This program element provides information on the behavior of fission products released from reactor fuel and transported through various pathways to the environment during and after a severe reactor accident. Such information is essential for severe accident policy and safety goal policy implementation decisions. Fission product release during core-melt progression will be investigated to reduce the uncertainty, particularly at high temperatures, when the core geometry is changing. In FY 1988, results from previous in-pile and out-of-pile experiments concentrating on conditions up to the start of geometry change will be evaluated. Beginning in FY 1989, additional out-of-pile experiments concentrating on more severe conditions will be conducted.

In FY 1988, a pressurized-water reactor severe accident calculation, with sensitivity studies, will be completed in order to explore the uncertainties in the predicted temperatures throughout the primary system to determine if the reactor piping will fail before the vessel lower head so that high-pressure melt ejection can be precluded. These calculations will be reevaluated in FY 1989, based on improved models developed in FY 1989.

REACTOR CONTAINMENT SAFETY

The containment building is the final barrier to the release of radioactive materials to the environment after a severe accident. Probabilistic risk assessments have shown that early failure of the containment building to retain its leak integrity during a severe accident is a major contributor to increasing the chances of harmful radiation reaching the environment and the public. By contrast, a delayed loss of containment building leak integrity is expected to greatly lessen risk and the impact on the public health and safety. As such, it is important that we know at what pressure and temperature the containment building will have unacceptable leakage. NRC is conducting experimental research on a scale-model concrete containment building to validate calculation methods used to predict the structural and leak behavior of containments under severe accident conditions. Separate experiments are also being conducted on containment building penetrations such as airlocks, hatches, and valves to evaluate their leak behavior. This information will permit the staff to more accurately evaluate the need for and effectiveness of systems and procedures for preventing uncontrolled loss of containment leak integrity.

In FY 1989, seismic experiments on concrete containment models will be initiated. Containment-penetration research for seals, bellows, and valves, and research on the effect of aging of structures (e.g., material degradation with time) will be continued.

Research is also being conducted on the effects of the damaged core on containment building loading (heat and pressure). The work on damaged fuel will continue to provide characterization of the reactor core during core-melt progression as input for determining the uncertainties in hydrogen generation, fission-product release and behavior, steam explosions, and the direct-heating threat to containment integrity.

Procurement, test design, and test train construction will continue through FY 1989 for the planned severe accident test (FLHT-6) in the Canadian NRU test reactor using full length BWR-type rods and BWR control rod materials. The test will also include provisions to simulate, as closely as possible, the blockage/flow conditions expected in LWRs and, therefore, determine the effects of blockage on in-vessel hydrogen production. The results are important to our understanding of the loadings on the containment, and of ex-vessel core/concrete interactions. Tests investigating the attack of molten fuel will be conducted at Sandia National Laboratories. The results of the tests will be used to validate the results of the melt-progression code (MELPROG) and to reduce uncertainties described in NUREG-1150. In FY 1989, large-scale experiments investigating the interaction of the molten core with the concrete containment will be continued. Experiments also will be initiated to study formation of crusts on core material with overlying water. Emphasis will shift to code validation using the experiments discussed above. In FY 1988-1989, samples will be obtained from the TMI-2 reactor vessel bottom head for subsequent examination to determine the extent of core debris attack on the vessel.

Large-scale tests will be continued in the SURTSEY Containment Test Facility starting in FY 1988 and continuing through FY 1989 to study the effects of structures, different atmospheres, and water-filled cavities. In FY 1989, follow-on tests to provide early containment-failure information related to the need for prompt emergency response activities will be initiated. Some smaller-scale experiments will be conducted in FY 1989 to investigate the scaling of the processes important to direct containment heating.

In FY 1989, improved melt progression modeling for boiling-water reactors will be initiated. The results of core melt and direct-containment heating experiments will be incorporated in the models. Benchmarking of the overall plant severe accident sequence codes will be initiated based on these models using accident sequences identified from applicable risk assessments. These codes will also be used to evaluate risk change due to plant life extensions.

Beginning in FY 1988 and continuing through FY 1990, models of hydrogen transport and combustion will be improved and validated against experimental data to quantify the loads on containment walls and equipment by hydrogen combustion. In FY 1989, consideration will be given for additional experiments to obtain needed data on hydrogen combustion at high temperatures to ensure that current models accurately describe hydrogen behavior under such conditions.

REACTOR ACCIDENT RISK ANALYSIS

Probabilistic risk assessment (PRA) has been shown to be a systematic, comprehensive, and powerful method for identifying and evaluating the costs and effectiveness of safety improvements proposed to reduce accident likelihood. Information being developed in this program is or will be applied in evaluating the level of safety of selected operating plants, in assessing the adequacy of current requirements in the light of the Commission's safety goal, in monitoring plant performance, and in identifying needed improvements in equipment or operator reliability. Supporting efforts are also under way to provide PRA-based information to users who are not PRA experts.

The objectives of this program element are to: (1) provide expert review of severe accident PRAs and to assess the risk implications of accident management strategies to minimize the release of radioactive material to the environment during severe reactor accidents; (2) develop, verify, demonstrate, and maintain methods for analyzing the consequences of in-plant and offsite severe accident physical processes for use in risk assessment, and to develop and demonstrate methods for quantifying the uncertainty in risk estimates, and the relative contributions of specific issue uncertainty to the overall uncertainty; (3) periodically reassess the frequencies, consequences, and risks of severe accidents in nuclear power plants and to perform peer review of methods used and results obtained; and (4) develop risk-based management tools capable of determining the incremental risk reduction associated with proposed plant design and operational modifications and aiding the prioritization of efforts in inspection and licensing activities.

Expected accomplishments for FY 1988-1989 include complete reviews of 11 PRAs including Browns Ferry and Diablo Canyon. Major risk models (MELCOR & MACCS) will be completed and manuals published, along with validation documents. Uncertainty analyses for LaSalle and documentation of NUREG-1150 uncertainty methods will be completed, along with the final NUREG-1150 and supporting contractor documents.

In FY 1989, supplemental work for NUREG-1150 will begin with emphasis on external events. In addition, two additional plants, a Babcock & Wilcox plant and a Combustion Engineering plant, will be added to the base of five plants. Expansion of simple risk

methods tools for use by NRC management and licensing staff will continue.

SEVERE ACCIDENT POLICY IMPLEMENTATION

The results of severe accident research may create the need to change NRC regulations that influence both existing and potential future reactors. The Commission's rules regarding siting, emergency planning, and containment performance requirements may be affected.

The ability to predict how radioactive materials are transported and released during postulated reactor accidents is essential to the regulatory process. The need for and extent of protection of the public from undue risk are measured by careful assessment of possible accidents and the releases of radioactive materials for such accidents. During FY 1986, the Reassessment of the Technical Bases for Estimating Source Terms (NUREG-0956) was published and a draft of the Reactor Risk Reference Document (NUREG-1150) was issued in FY 1987. Both documents together provide the technical basis for examining NRC's rules and regulatory practices to determine the need for change. The research supporting NUREG-0956 has identified areas of uncertainty for which additional research information is needed. Accordingly, research beginning in FY 1988 will consist of an integrated program of both in-reactor and laboratory experiments and the development and validation of accident analysis models and codes. This program receives significant financial support from foreign reactor safety programs.

Regulatory changes that will be completed in FY 1989 include improvements in requirements relating to the fission product removal effectiveness of containment sprays for PWRs and suppression pools for BWRs. Potential severe-accident vulnerabilities of containments for each containment class will continue to be assessed and improvements identified. Completion of this effort is expected to occur in FY 1988 for the BWR MARK I containments. Work on the other containment types (ice condensers, large dry containments) for the MARK IIs and MARK IIIs will be initiated in FY 1988 and is scheduled for completion in FY 1989.

RADIATION PROTECTION AND HEALTH EFFECTS

This program element plans, develops, and directs safety research programs and develops standards for radiation protection and health effects. The health effects of human exposure to ionizing radiation and radioactive material will be analyzed. The potential occurrence of both late and early radiogenic health effects and estimates of the probability of increased incidence of cancer and genetic effects will be determined. These analyses provide a basis for severe-accident consequence analysis, probabilistic risk assessment and emergency plans development, identifying

radiation protection problems, allocating priorities for regulatory action, and environmental impact assessments. Risk assessments, licensee performance, cost and feasibility data, and available technical information are analyzed in accordance with Presidential guidance to provide the basis for developing regulatory guidance related to radiation protection for workers and the public.

Reduce Uncertainty in Health Risk Estimates

In FY 1988-1989, research will be performed to support dose limits for pregnant workers. In FY 1988, work will also begin on a research program on molecular and cellular effects of radiation to reduce the uncertainty in health risk estimates. The actual laboratory studies will be jointly funded by NRC and other Federal agencies and will be conducted in FY 1989 and beyond. Beginning in FY 1989, a technical base will be developed to evaluate the need to include in NRC standards the risk of both nonfatal as well as fatal cancer and excluding risks which are below NRC concerns.

Health Physics Technology Improvements

In FY 1988, a program for instrument testing, identifying biological effects, and performance criteria for "hot particle" contamination of the skin will be developed. In FY 1989, the needed technical basis for resolving the regulatory problem of "hot particle" contamination of the skin will be completed. Also in FY 1988, the development of criteria for air sampling for internal dose control will begin. This effort is expected to be completed in FY 1989. Work on establishing performance criteria for NRC-required use of extremity dosimetry, bioassay, and instrumentation calibration will continue.

Dose Reduction

In FY 1988-1989, the Radiation Exposure Information Reporting System will continue to collect information on annual statistical summaries of worker doses and worker termination reports. NRC will also continue to work with the National Cancer Institute and other organizations to develop and implement a national worker dose data base to support health effects studies in the future. During FY 1988-1989, surveillance of the industry dose reduction research effort for nuclear power plants and support of the Brookhaven National Laboratory ALARA Center for reviewing cost-effective dose reduction techniques will also continue and studies will be initiated to determine whether changes in neutron dose limits are needed. Finally in FY 1989, work to develop internal dosimetry guidance and a technical data base will continue, including methodology for adding internal and external organ dose, for implementation of Presidential guidance for worker protection.

CONFIRMING SAFETY OF NUCLEAR WASTE DISPOSAL

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds -	\$ 5,005	\$ 5,770	\$ 6,900
(Staff)	(28)	(27)	(26)

Congress has directed the NRC to license and regulate facilities for the disposal of high-level radioactive waste which are being developed by the Department of Energy (DOE), and to license low-level waste disposal facilities in non-Agreement States. Also, NRC has been directed to provide support to the Agreement States and State Compacts in the development and licensing of regional sites for the disposal of low-level radioactive waste generated in the medical, academic, and industrial uses of radioisotopes as well as from nuclear power plants. To meet these responsibilities, NRC must develop independent methods for evaluating the capabilities of waste disposal facilities to isolate radioactive materials over the periods of time they remain dangerous to the public. The technical issues of concern include maintaining integrity of the waste container, understanding the interaction of the container with the environment at the disposal site, and understanding the movement of radioactive material in the repository environment after the design life of the containment system. This program is composed of two major program elements: High-Level Waste and Low-Level Waste.

The increase in FY 1989 is needed to bring full high-level waste performance assessment capability within the Center for Nuclear Waste Regulatory Analysis on a schedule commensurate with DOE's anticipated site characterization activities at Yucca Mountain, in accordance with the Nuclear Waste Policy Amendments Act of 1987, and to conduct an archival testing program assessing long-term stability of low-level waste from nuclear power reactor decontamination.

HIGH-LEVEL WASTE

In response to the Nuclear Waste Policy Act of 1982 and the Nuclear Waste Policy Amendments Act of 1987, the NRC's high-level waste (HLW) research provides the technical basis needed to independently evaluate the HLW repository being developed by the DOE for the packaging and permanent disposal of the high-level radioactive wastes generated by the commercial nuclear power industry. The HLW research and standards development program is contributing to the technical basis for this independent evaluation consistent with the milestones for repository development. To meet this first-of-a-kind undertaking, it is essential that a competent

methodology for evaluating the adequacy of DOE's activities related to site characterization and facility design be developed. Specifically, the NRC's HLW research program is providing ongoing support to NRC's precicensing consultation with DOE for timely guidance to DOE on technical issues to be addressed during characterization of the Nevada site, and is developing information specific to NRC's review of DOE's site characterization activities there.

At present, the technical basis for NRC's HLW management review capability contains large uncertainties due to the lack of any previous experience with HLW disposal and the very long periods of time involved.

In FY 1989, the primary contributions of the HLW research program element will be aimed at refining NRC's independent capability to evaluate compliance with the Environmental Protection Agency (EPA) HLW standard on releases. Planning an integrated testing program for evaluating the performance of steel waste packages in the expected repository environment will be completed and the experimental work begun. This program will provide a measure of the reliability of extrapolation of laboratory performance data to repository conditions and time scales.

Research on actinide geochemistry and the chemical conditions controlling radionuclide valence state will make a significant contribution to the source term to be used in predictive radionuclide transport calculations as well as to the transport calculations in the chemically and thermally varying repository environment.

Research on unsaturated rock systems will identify and describe parameters and relationships for hydrologic and geochemical transport models that will couple the source term to the release predictions over geologic time frames and through complex geologic formations.

LOW-LEVEL WASTE

The NRC Low-Level Waste (LLW) Research and Standards Development program is directed to provide the technical basis for implementing requirements of the Low-Level Radioactive Waste Policy Amendments Act of 1985. NRC LLW research is critical to establishing a sound technical basis for regulation of, and advice to, the States on all aspects of LLW disposal, including engineered enhancement and alternatives to shallow-land burial. This research effort will maintain both a national safety perspective and a uniform technical basis for efforts by the States to safely dispose of low-level waste. In FY 1989, the primary contributions of the LLW research program element will come in the areas of waste form performance and the understanding of geochemical retardation of radionuclides in soils. Specifically, research will continue on the performance of low-level waste

packages, including cement and bitumen waste forms and high density polyethylene containers and the results will be provided to the States as preliminary guidance. This information will be important for the evaluation of disposal facilities against 10 CFR 61 requirements on waste form performance. The performance of solidified decontamination waste with respect to waste form requirements will continue to be evaluated. The wastes being evaluated are in particularly mobile form because of the processes used in decontamination. Hence, the ability of the waste forms to immobilize these wastes is important to predictions of facility performance. Finally, research into the retardation mechanisms for radionuclides in soils will begin in FY 1989. The varied and complex nature of low-level waste makes the understanding of soil chemistry as it relates to the mechanisms that determine retardation or mobilization of radionuclides important to realistic disposal system performance assessments.

RESOLVING SAFETY ISSUES AND DEVELOPING
REGULATIONS

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds (Staff)	\$ 6,103 (85)	\$ 9,890 (87)	\$ 11,980 (84)

The Resolving Safety Issues and Developing Regulations program is directed towards developing the technical basis and related regulatory requirements needed to protect the health and safety of the public in the generation of electricity and in the manufacturing, processing, transporting, and storing of nuclear fuel. This program also supports efforts to ensure that proposed Commission regulations are adequate and that their development is carried out in an efficient and timely manner.

This program is composed of four major program elements: Generic and Unresolved Safety Issues; Standardized and Advanced Reactors; Fuel Cycle, Materials, Safeguards Research and Standards Development; and Developing and Improving Regulations. The change in resources between FY 1988 and FY 1989 is primarily due to providing resources for participation in the Small Business Innovation Research Program and the Commission decision to revitalize the human factors research.

GENERIC AND UNRESOLVED SAFETY ISSUES

This program element is directed towards the resolution of generic and unresolved safety issues related to reactor and plant systems design and plant operations. Generic safety issues being resolved include engineering, reactor systems, human factors, and severe accident. This program also prioritizes generic safety issues and research programs by assessing safety benefits and cost. In FY 1988, two unresolved safety issues and ten generic issues will be resolved. In FY 1989, resolution of three unresolved safety issues and nineteen generic safety issues will be completed. In FY 1988 and FY 1989, approximately 24 newly-identified generic safety issues will be prioritized each year. Also in FY 1988, the methodology for prioritizing Nuclear Safety Research programs and activities will be developed and implemented.

STANDARDIZED AND ADVANCED REACTORS

This program element is directed towards developing, reviewing, and implementing advanced reactor safety and policy issues in the

ongoing NRC review of the Department of Energy advanced-reactor concepts. In-depth, independent analyses to verify that advanced-reactor designs have enhanced margins of safety and utilize appropriate means to accomplish their safety function will be performed. Work conducted in this program element is focused on: identifying, reviewing, and resolving issues associated with the reactor standardization policy and overseeing its implementation; establishing licensing criteria for advanced-reactor designs for plant standardization, and for severe accident policy implementation; clarifying regulations with respect to the "important-to-safety" issue; and coordinating quality assurance activities for rulemaking and standards development.

The safety evaluation report for the initial licensability review of three DOE advanced-reactor concepts (two liquid-metal reactors and one modular high-temperature gas reactor) will be completed in FY 1988. The resolution of open items resulting from the review of the three DOE reactors and monitoring and evaluating results of ongoing DOE technology programs and design activity will be continued into FY 1989. The safety review of a proposed change to the design of the Fast Flux Test Facility to add steam generators will be completed and comments on design change provided to DOE in FY 1988. The safety evaluation reports for the two liquid-metal reactors, the Power Reactor Inherently Safe Module, and the Sodium Advanced Fast Reactor, will be supplemented to incorporate the results of a safety review of DOE's liquid-metal reactor fuel cycle. This review effort will continue into FY 1989.

In FY 1989, development will begin on the general licensing guidance (identify general-design criteria and outline licensing framework [standard review plans]) for advanced-reactor designs. The Commission has issued a policy statement to encourage standardization and to provide for certification of plant designs that are essentially complete in scope and level of detail. As part of the implementation of the Commission's licensing reform proposals, the Office of General Counsel is working on a rulemaking package to implement the standardization policy. The Office of Nuclear Regulatory Research will support the Office of the General Counsel in this rulemaking activity in FY 1988-1989.

Also in FY 1989, NRC will perform an overview of the resolution of standardization issues associated with advanced boiling-water reactors, reference safety analysis report, advanced pressurized-water reactor, and DOE advanced-reactor concepts. Agency guidance will be developed as necessary to address generic items associated with implementation of the standardization policy. These activities will continue in FY 1989 and beyond.

FUEL CYCLE, MATERIALS, SAFEGUARDS RESEARCH, AND STANDARDS DEVELOPMENT

This program element is designed to develop or modify and promulgate regulatory requirements and guidance for fuel-cycle and

materials activities; for transportation of radioactive materials to ensure adequate protection; for safe handling of strategic special nuclear material and protecting facilities; and for identifying levels of radiation risk below which government regulation can be limited or may be unnecessary.

In FY 1988, work will begin on a new initiative to draft a broad Commission policy statement to identify and define radiation risks which are below regulatory concern (i.e., de minimus levels). Coupled with the development of this broad policy statement, a more specific interim policy statement will be drafted on the issue of contamination limits for lands and structures that can be released for unrestricted, public use. The policy statement is needed to provide guidance until a federal interagency working group, chaired by EPA, develops Presidential guidance in this area. Both final policy statements will be issued in FY 1989. Based on the evaluation of the public comments submitted in response to an advance notice of proposed rulemaking on the disposal of low-level waste streams below regulatory concern, a decision paper recommending an NRC approach to rulemaking will be prepared. The proposed rule will be developed in FY 1989. Beginning in late FY 1988, petitions submitted in response to Commission policy and the advanced notice of proposed rulemaking will be evaluated to determine if specific waste streams need to go to low-level radioactive waste disposal sites. Rulemaking addressing those petitions having merit will be initiated in FY 1989.

In FY 1988-1989, work on misadministration of nuclear medicines will be performed. Final rulemaking efforts for basic quality assurance in the Radiation Therapy portion of the rule will be completed in FY 1988. The proposed rulemaking efforts for comprehensive quality assurance in the Medical Use and A Standard of Care portion of the rule will be completed in FY 1989, with the final rule being completed in FY 1990.

In the regulation of radioactive material transport, a proposed rule that will maintain compatibility between NRC regulations and the International Atomic Energy Agency regulations will be issued. The final rule will be published in FY 1989. Also in FY 1989, a proposed rule will be issued revising the regulations for phasing out the use of specific packages for transporting radioactive material.

In FY 1988, proposed and final rulemaking efforts will be completed to assure compatibility between the protection provided by DOE and NRC at facilities possessing quantities of strategic special nuclear material. A proposed policy statement on access authorization at nuclear power plants will be issued in FY 1988. A final policy statement will be issued or rulemaking initiated in FY 1989 following a Commission decision.

In FY 1988, the staff will develop and publish a proposed rule on disposal of low-level radioactivity contaminated waste oil from nuclear power plants. The final rule for this activity will be completed in FY 1989.

DEVELOPING AND IMPROVING REGULATIONS

This program element is primarily directed towards three objectives: (1) managing and coordinating the independent reviews of all NRC rulemaking activities and monitoring scheduling of such rulemakings to ensure rules are developed in a timely manner. Accomplishment of this objective requires the management and maintenance of the NRC Regulatory Agenda Report and other related management information systems; (2) supporting all NRC regulatory impact analysis (RIA) requirements through the development of generic methodology and guidance. This includes performing technical review of all RIAs, and at offices' request, providing technical oversight or developing RIAs for the initiating offices; and (3) developing regulatory products, (e.g., regulations and guides) based on results of NRC and other research. This involves proposing or initiating rulemaking, as appropriate, and managing complex rulemakings that span the technical or organizational responsibilities or that involve novel or complex questions of regulatory policy.

Initial efforts have been focused on eliminating from the NRC Regulatory Agenda those ongoing rulemaking actions that are of marginal safety significance. Over 110 rulemakings have been independently reviewed to date, and, as a result, 27 rulemaking actions have been terminated. This review process will continue in FY 1988-1989.

In FY 1988 a minimum program for the systematic review of existing light-water reactor nuclear power plant regulatory requirements will begin. The initial step is to develop and test a screening methodology for the systematic review of Part 50 regulations and associated regulatory guides and other standards to identify those that appear to have marginal importance to safety. This project is expected to take about six years to complete and a report will be issued in September of each of the project years discussing the progress made on the effort.

In FY 1989, the specific candidate requirements identified by the systematic review will be analyzed in detail to investigate the changes in plant risk and license/NRC cost resulting from the postulated deletion or relaxation of the requirement. On the basis of the analysis, recommendations will be made on whether to undertake specific rulemakings. It is estimated that approximately five candidate requirements can be analyzed each year, and that the overall project will be completed in six years.

Safety Goal Implementation

In coordination with the Advisory Committee on Reactor Safeguards, the staff will propose to the Commission a plan for implementing the safety goal. Following Commission approval of the plan, it will be implemented on a trial basis.

Grants and Small Business Innovation Research

Pursuant to Sections 31 (A) and 141 (G) of the Atomic Energy Act of 1954, NRC is authorized to award grants and cooperative agreements to educational institutions, nonprofit institutions, State and local governments, and professional societies. The program is administered in accordance with the Federal Grant and Cooperative Act of 1977, Office of Management and Budget guidance, and NRC policies and procedures. The primary purposes of this program are to increase public understanding relating to nuclear safety, to enlarge the fund of knowledge and technical information, and to enhance the protection of public health and safety. Such support to educational institutions is limited to one percent of the total annual budget for the Office of Nuclear Regulatory Research, NRC. The current NRC grant program supports a variety of professional meetings and university-based research projects.

The Small Business Innovation Research (SBIR) program is required by Public Law 97-219 to stimulate technological innovation by small businesses. The law requires that Federal agencies establish SBIR programs if their extramural research budget exceeds \$100 million. The Office of Nuclear Regulatory Research participated in the program in FY 1982, when it was established, through FY 1987. In FY 1988 NRC does not expect to participate in the program because the research budget is below the \$100 million threshold. However, the NRC expects to resume participation in FY 1989, as required by law. NRC's SBIR program supports high-quality and cutting-edge research of interest to the NRC in areas that have potential industrial applications. The program also seeks to couple this research with follow-on, private funding to pursue commercial applications and to increase technological innovation. Historically, 110 to 130 SBIR proposals are reviewed annually and about 10 to 12 contracts are awarded.

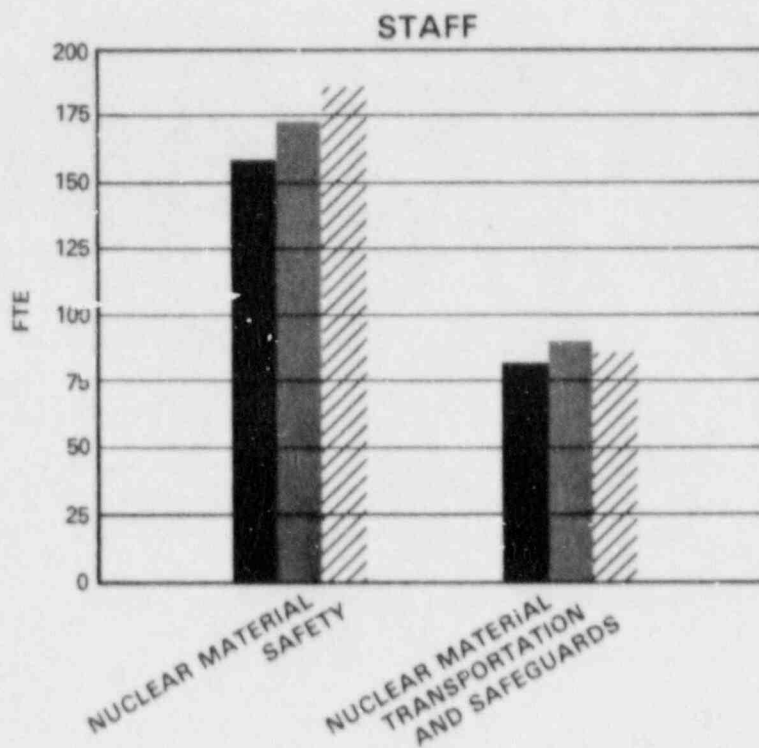
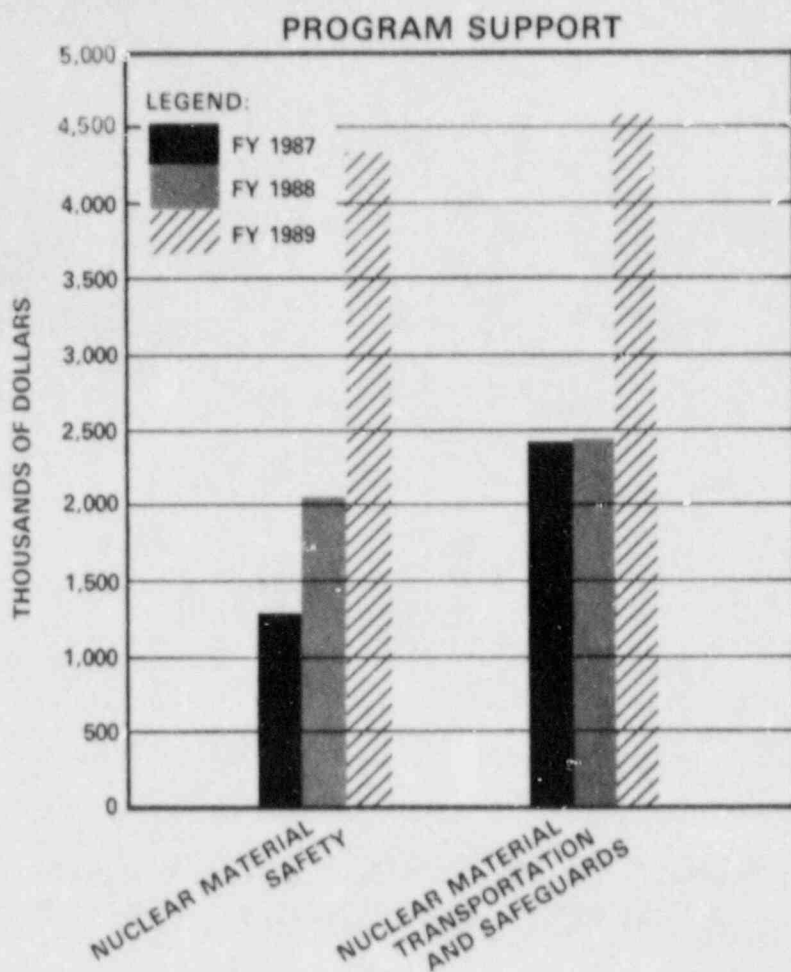
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NUCLEAR MATERIAL SAFETY AND SAFEGUARDS REGULATION



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NUCLEAR MATERIAL SAFETY AND SAFEGUARDS REGULATION

(Dollars are in thousands, except in text, where whole dollars are used; staff numbers are in full-time equivalents.)

Total FY 1989 estimated obligations..... \$30,586

Total Funds and Staff

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Salaries and Benefits	\$ 14,474	\$ 14,511	\$ 15,283
Program Support	3,710	4,465	8,915
Administrative Support	4,673	4,521	5,338
Travel	<u>1,084</u>	<u>970</u>	<u>1,050</u>
Total Obligations	<u>\$ 23,941</u>	<u>\$ 24,467</u>	<u>\$ 30,586</u>
(Staff)	(282)	(261)	(271)

Program Support Funds and Staff

The Nuclear Material Safety and Safeguards Regulation staff and program support funds are allocated as shown below. The program support funds are primarily for work done by the Department of Energy laboratories and commercial contractors. The narrative that follows describes these programs and the reasons they are needed.

	<u>FY 1987 Actual</u>		<u>FY 1988 Estimate</u>		<u>FY 1989 Estimate</u>	
	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>
Nuclear Material Safety	\$1,291	200	\$2,035	172	\$4,320	185
Nuclear Material Transportation and Safeguards	<u>\$2,419</u>	<u>82</u>	<u>\$2,430</u>	<u>89</u>	<u>\$4,595</u>	<u>86</u>
TOTALS	\$3,710	282	\$4,465	261	\$8,915	271

DESCRIPTION OF MISSION AREA

Nuclear Material Safety and Safeguards Regulation encompasses all NRC public health and safety, safeguards, and environmental activities related to the licensing and inspection of nuclear fuel-cycle facilities, users of nuclear materials, and the transport of nuclear materials. It also includes the safeguards reviews for all licensing activities involving the export of special nuclear material.

Nuclear Material Safety and Safeguards Regulation is composed of two major programs: Nuclear Material Safety and Nuclear Material Transportation and Safeguards. The Nuclear Material Safety program is conducted to ensure the safe use and handling of radioactive materials at fuel-cycle facilities and in medical, academic, industrial, and commercial operations. The Nuclear Material Transportation and Safeguards program is conducted to ensure that special nuclear materials are transported in packages that assure a very high degree of safety in the event of a transportation accident and to deter and protect against threats of radiological sabotage, theft, or diversion of special nuclear material at nuclear fuel facilities and during transport.

These programs ensure that the use, transportation, storage, and disposal of nuclear and radioactive materials are safe and are provided with adequate safeguards.

NUCLEAR MATERIAL SAFETY

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds	\$ 1,291	\$ 2,035	\$ 4,320
(Staff)	(200)	(172)	(185)

The Nuclear Material Safety program is designed to ensure that the public health and safety, workers, and the environment are protected during the use and handling of radioactive material in both normal and off-normal operations. This program is composed of three major elements: Fuel Facility Licensing and Inspection, Licensing and Inspecting Nuclear Material Users, and Event Evaluation.

The resources increase in FY 1989 is to improve regulatory oversight of medical licensees and radiography safety, to initiate a performance indicator program for nonreactor licensees, and to enhance our ability to analyze and respond to unanticipated events.

FUEL FACILITY LICENSING AND INSPECTION

The Fuel Facility Licensing and Inspection program element comprises the NRC licensing and inspection of the "front-end" of the nuclear fuel cycle after milling, including the processing of uranium ore concentrates (yellow cake) into a suitable form for fuel, the development and fabrication of the reactor fuel, and the safe storage of fresh fuel at reactor sites until the reactor core is initially loaded with fuel. This requires detailed health, safety and environmental reviews, and inspections of licensee procedures and facilities to ensure safe operations. Also included in this program is the safety overview of the Department of Energy's (DOE) high-level waste solidification activities at the closed-down West Valley, New York, reprocessing facility, including decontamination and decommissioning.

The NRC will complete the review and evaluation of approximately 100 license applications (new, amendment, and renewal) for nuclear fuel-cycle facilities each year in FY 1988 and FY 1989. The NRC will conduct health and safety inspections of approximately 30 fuel-cycle facilities each year in FY 1988 and FY 1989 to ensure that unsafe conditions involving unnecessary and harmful radiation exposure to employees and the public do not develop and that radioactive materials are properly controlled to prevent a nuclear criticality accident.

Enhanced operational safety assessments will continue to be conducted at major fuel-cycle facilities. The decision to conduct

these safety assessments was made as a result of the uranium hexafluoride (UF_6) accident at the Kerr-McGee Sequoyah Fuels Corporation facility in January 1986. These enhanced assessments differ from the "routine" health and safety inspections in that they continue to use a multi-disciplinary team approach combining the efforts of experts in several safety areas to identify significant operational safety issues that should be pursued further in our regulation of these facilities. The assessments will be conducted about one year prior to the expiration of these licenses and will help to identify important safety issues that need to be resolved during license renewals. The implementation of lessons learned from the fuel facility enhanced safety assessments and the identification of radiological and nonradiological risks will begin in FY 1988 and will continue through FY 1989. Technical positions on safety-related instrumentation and maintenance system requirements, standard fire protection license requirements, and management controls and quality assurance for fuel facilities will be developed in FY 1988 and will subsequently be incorporated into license requirements through amendments and license renewals. The coordination of safety assessments with the Environmental Protection Agency and the Occupational Safety and Health Administration, regarding chemical and other hazards at major NRC licensed sites, will continue through FY 1989. Specialized expertise will be provided for problem facilities, as required.

NRC will continue to consult with DOE on the planning and safety analyses of the West Valley, New York, project for the solidification of high-level radioactive waste, as required by the West Valley Demonstration Project Act. NRC will issue Safety Evaluation Reports for the supernatant treatment system, and the low-level waste treatment and disposal system, in FY 1988. In FY 1989, NRC expects to issue a Safety Evaluation Report for the sludge mobilization system and the vitrification facility and expects to evaluate DOE's decontamination and decommissioning analysis. DOE is scheduled to begin waste solidification in FY 1989 and is expected to complete it in FY 1991. NRC's close consultation with DOE is important to ensure that the resulting solidified high-level waste will be acceptable for disposal in the high-level waste repository.

LICENSING AND INSPECTING NUCLEAR MATERIAL USERS

The Licensing and Inspecting Nuclear Material Users program element comprises the NRC licensing and inspection of approximately 8,200 medical, academic, industrial, and commercial users of nuclear and other radioactive material for diagnostic and therapeutic treatments; medical and biological research; academic training and research; industrial gauging and nondestructive testing; production of radiopharmaceuticals; fabrication of commercial products such as smoke detectors; and the evaluation of sealed sources and devices. This requires detailed health and safety reviews and inspections of licensee procedures and facilities to ensure safe operations.

The NRC will complete the review and evaluation of approximately 5,400 applications for new licenses, license amendments, license renewals, and sealed source and device designs for the use of radioactive material each year in FY 1988 and FY 1989. The NRC will conduct approximately 2,600 health and safety inspections of materials licensees each year in FY 1988 and FY 1989 to ensure that unsafe conditions involving unnecessary and harmful radiation exposure to employees and the public do not develop. Close-out and follow-up inspections for approximately 500 materials licensees will be completed each year in FY 1988 and FY 1989 to determine whether the licensed site can be released for unrestricted use. The study of the effectiveness of the general license regulations will continue through FY 1989 and technical assistance on any rulemaking changes identified will continue to be provided each year. Comprehensive procedures to improve NRC's regulatory oversight of nuclear medicine licensees will be developed in FY 1988 and will be implemented beginning in FY 1989. This effort is being undertaken as a result of a study of diagnostic and therapeutic misadministrations involving nuclear medicine and radiation therapy that revealed a notable frequency of therapy misadministrations. An analysis of these events indicates that they are due principally to inadequate training, inattention to detail, and lack of review, making them amenable to improvement. Increased oversight by licensing and inspection personnel is needed to ensure compliance with new requirements for quality assurance.

More systematic training for nonreactor license reviewers and inspectors, including utilizing the capabilities of NRC's Technical Training Center, will begin in FY 1988 and will be expanded in FY 1989. The development of the technical basis to support new regulations for the use of large irradiators will be initiated in FY 1988. Due to the continued poor safety performance of some radiography licensees, an examination of the need for additional radiography safety requirements and of the adequacy of radiographers' current in-house training procedures will continue at least through FY 1990.

EVENT EVALUATION

The Event Evaluation program element comprises the review of licensee operational data, and incident response coordination and training for nuclear materials and fuel-cycle facility safety events.

The review and analysis of operational safety data received from nuclear fuel-cycle facility and nuclear materials licensees will continue each year to identify potential generic problems and to assess the need for additional regulatory actions to reduce or eliminate the occurrence of similar and perhaps more serious events.

The capability for response to and evaluation of unexpected materials safety events will be maintained. Examples of events include the January 1986 rupture of an overfilled uranium hexafluoride (UF_6) cylinder at the Kerr-McGee Sequoyah Fuels Corporation site in Gore, Oklahoma, numerous medical misadministrations, and numerous lost and damaged radioactive gauges. NRC capabilities to respond to nuclear emergencies will continue to be maintained by training of emergency response staff including preparation for and participation in exercises involving various accident scenarios at the NRC Operations Center. Radiological contingency planning, including coordination with the Federal Emergency Management Agency and the Agreement States will continue each year.

A project to identify significant safety issues using quantitative and qualitative indicators of licensee performance for nuclear fuel-cycle and materials licensees will be outlined in FY 1988 and will be initiated in FY 1989. The goal will be to identify licensees that require additional oversight as well as to provide incentives and penalties to stimulate improved licensee performance.

NUCLEAR MATERIAL TRANSPORTATION AND SAFEGUARDS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 2,419	\$ 2,430	\$ 4,595
(Staff)	(82)	(89)	(86)

The Nuclear Material Transportation and Safeguards program is designed to ensure that special nuclear materials are transported in packages that ensure a very high degree of safety in the event of a transportation accident, and to deter, detect, and protect against threats of radiological sabotage, theft, or diversion of special nuclear materials at licensed nuclear fuel-cycle facilities and in transport. This program is composed of three major elements: Regulating the Transport of Nuclear Materials, Safeguards Licensing and Inspection, and Specialized Safeguards Evaluations and Coordination.

The resource increase in FY 1989 provides technical assistance to the International Atomic Energy Agency (IAEA) safeguards, to the evaluation of communicated threats against licensed activities, and resources for the certification of a plutonium air shipment package pursuant to the Nuclear Waste Policy Amendments Act (NWPAA) of 1987, Section 5062.

REGULATING THE TRANSPORT OF NUCLEAR MATERIALS

Regulating the Transport of Nuclear Materials program element comprises the NRC certification and inspection of container designs used to transport large quantities of radioactive material, such as spent fuel and high-level radioactive waste, and the packaging and transport activities associated with the radioactive core debris waste from the Three Mile Island Unit 2 reactor. This requires detailed safety reviews of container design specifications to ensure the container can withstand normal transport conditions and accident conditions. This involves the use of computer modeling of shielding, criticality, and heat transfer properties of the container design. Transportation activities are closely coordinated with the Department of Transportation and, as appropriate, with the Federal Emergency Management Agency and DOE.

The NRC will complete the review and evaluation of approximately 90 container design applications (new, amendment, and renewal) submitted by commercial vendors for transport of large quantities of radioactive material and by DOE for shipment of naval reactor fuel each year in FY 1988 and FY 1989. In addition to certifying container designs, the NRC will complete the review and evaluation of approximately 60 transport safeguards plans for approximately

150 shipments of spent fuel and other special nuclear material each year in FY 1988 and FY 1989. NRC will also conduct approximately 1,400 routine transport-related safety inspections and approximately 6 transport physical security inspections each year in FY 1988 and FY 1989. Technical guidance will also continue to be provided to DOE during the design, engineering, certification, and fabrication of a prototypical family of truck, rail, and barge transport container designs.

Under the NWPA of 1987, Section 5062, the NRC will conduct a package certification review in accordance with the provisions of the act. This will only occur if an application is received for shipment of plutonium through U.S. airspace and the recipient country agrees to reimburse the Federal government for all costs associated with the required testing program.

SAFEGUARDS LICENSING AND INSPECTION

The Safeguards Licensing and Inspection program element comprises the NRC licensing and inspection of activities involving enriched uranium and plutonium. This requires detailed planning, procedures, and operational systems for maintaining accountability of material; and activities for deterring and responding to threats, theft, or diversion of nuclear material and acts of radiological sabotage. Techniques used by licensees include area access control, sophisticated detection and alarm systems, barriers, material control and accounting systems, contingency plans for response to threatening situations, and trained, armed response personnel.

The NRC conducts safeguards licensing reviews and inspections for enriched uranium fuel-fabrication facilities, uranium and advanced fuel research and development facilities, critical mass facilities, and the storage of fresh fuel at reactors that are nearing completion of construction. In FY 1988 and FY 1989, the NRC will complete the review and evaluation of approximately 160 new and amended safeguards plans for nuclear fuel-cycle facilities each year and will conduct safeguards inspections of the operations at the 10 major nuclear fuel facilities subject to safeguards requirements each year. NRC will also complete the review and evaluation of approximately 130 license applications for the export of nuclear material from the United States each year in FY 1988 and FY 1989. During these years there will be ongoing development of safeguards generic licensing criteria for Dry Cask Spent-Fuel Storage, the development of Category II/III physical security requirements, the revision of Category II material control and accounting requirements, the implementation of security upgrades based on NRC inspection reports and evaluations, and the NRC/DOE comparability review. The NRC/DOE comparability review goal is to assure that weapons-usable material, whether in the licensed or license-exempt sector, receives fully adequate and essentially comparable protection.

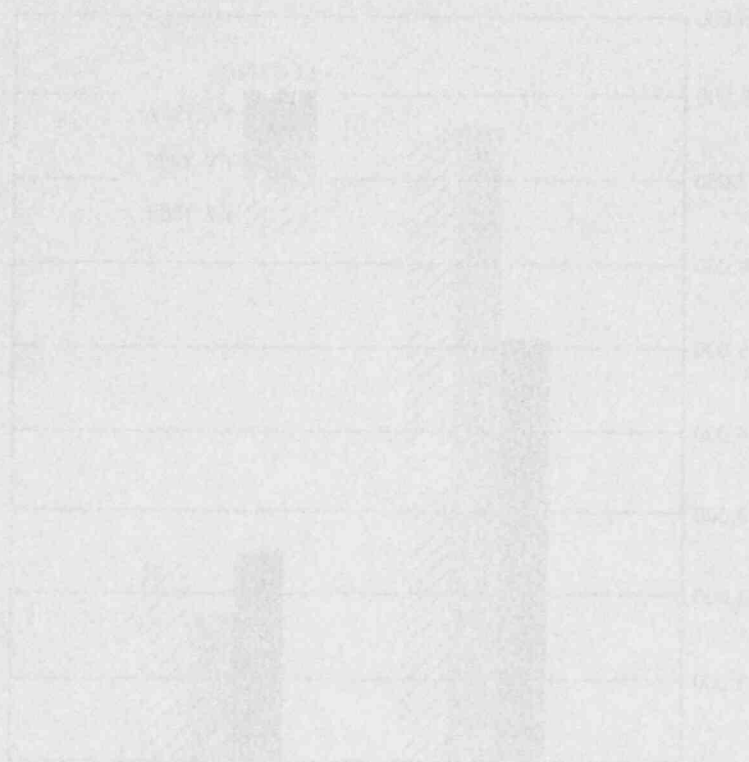
SPECIALIZED SAFEGUARDS EVALUATIONS AND COORDINATION

The Specialized Safeguards Evaluations and Coordination program element is comprised, in part, of the NRC evaluation of the threat environment to ensure the adequacy of safeguards policy regarding NRC-licensed facilities, material, and transportation activities. This program element also includes domestic and foreign threat assessment, safeguards incident response programs, and the review of foreign threat information to support the approval process of export licenses. The threat environment (all reported information concerning threats, adversary characteristics, intentions or capabilities, or actual events, foreign or domestic, nuclear or non-nuclear) will be evaluated on a continuing basis. Based on this evaluation, which may include special studies or analyses, the validity of the NRC design basis threat statements will be documented formally on a semiannual basis. Threat assessment activities will provide an appropriate response to threats as they are received and evaluated by the information assessment team. Incident response teams for events involving transportation or fuel-cycle facilities will be trained in response procedures. In support of the above activities, continuing liaison activities will be conducted with other federal and state agencies. Another basic component of this element is the review and analysis of safeguards operational data. Effective implementation involves a high degree of professional judgment and is influenced by actual events or threat-related activities. The review and evaluation of threat information, safeguards operational data, and the analysis of trends will continue each year.

A national data base and information support system for tracking nuclear materials under the safeguards control or the special accounting procedures of the U.S. Government, the Nuclear Materials Management and Safeguards System (NMMSS), is also maintained within this program element. The NMMSS will continue to be jointly operated by NRC and DOE at the DOE Oak Ridge facility. The development of agreements governing the importation of nuclear materials, and nuclear plant and facility component parts will continue to be coordinated with the Executive branch.

In addition, this program element includes activities associated with agency implementation of the Safeguards Agreement between the United States and the IAEA. The US/IAEA Safeguards Agreement places selected U.S. nuclear facilities under IAEA safeguards. The documentation of facility descriptions, the formal implementation of IAEA safeguards, and the compilation of nuclear materials transaction and inventory data for these facilities will continue each year. NRC will assist the IAEA in inspection activities at selected U.S. facilities, as required. Each year NRC will continue to participate in the management and direction of the Technical Support Coordination Committee, U.S. Interagency Action Plan Working Group, and other efforts to strengthen IAEA safeguards.

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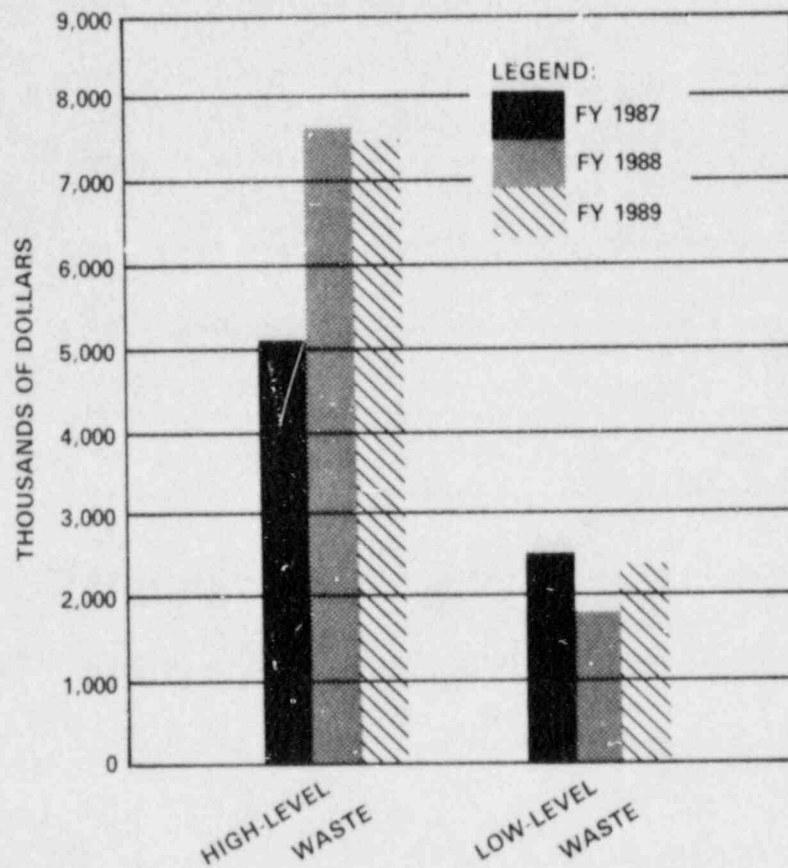


NUCLEAR WASTE REGULATION

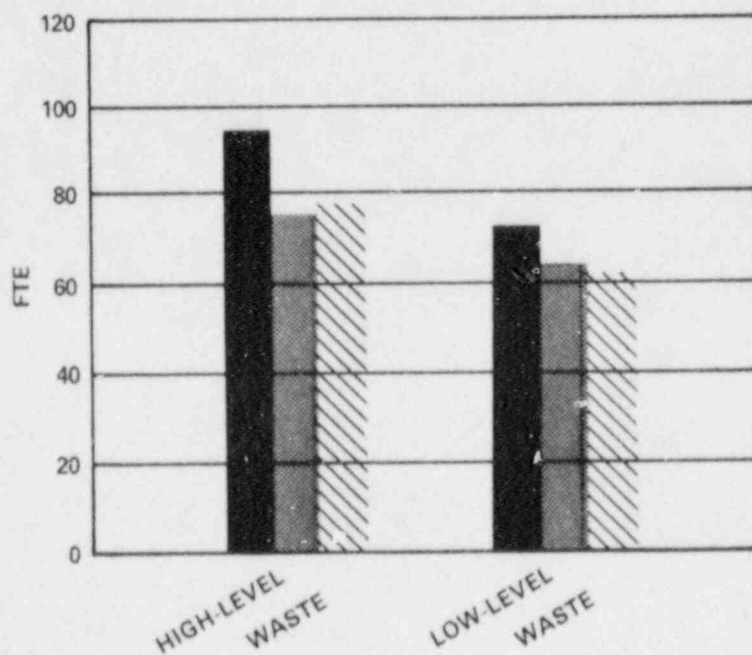


NUCLEAR WASTE REGULATION

PROGRAM SUPPORT



STAFF



NUCLEAR WASTE REGULATION

(Dollars are in thousands, except in text, where whole dollars are used; staff numbers are in full-time equivalents.)

Total FY 1989 estimated obligations..... \$22,394

Total Funds and Staff

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Salaries and Benefits	\$ 9,077	\$ 7,960	\$ 8,137
Program Support	7,606	9,421	9,825
Administrative Support	4,250	3,243	4,098
Travel	<u>403</u>	<u>324</u>	<u>334</u>
 Total Obligations	 <u>\$21,336</u>	 <u>\$ 20,948</u>	 <u>\$ 22,394</u>
 (Staff)	 (169)	 (140)	 (141)

Program Support Funds and Staff

The Nuclear Waste Regulation staff and program support funds are allocated as shown below. The program support funds are primarily for work done by the Department of Energy laboratories and commercial contractors. The narrative that follows describes these programs and the reasons they are needed.

	<u>FY 1987 Actual</u>		<u>FY 1988 Estimate</u>		<u>FY 1989 Estimate</u>	
	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>
High-Level Waste	\$5,095	95	\$7,626	76	\$7,475	78
Low-Level Waste	<u>2,511</u>	<u>74</u>	<u>1,795</u>	<u>64</u>	<u>2,350</u>	<u>63</u>
 TOTALS	 \$7,606	 169	 \$9,421	 140	 \$9,825	 141

DESCRIPTION OF MISSION AREA

Nuclear Waste Regulation encompasses all NRC public health and safety licensing, inspection, and environmental reviews for: the safe management, storage, and disposal of high-level radioactive wastes (including spent fuel); the safe management and disposal of low-level radioactive wastes; and uranium recovery activities and related remedial actions. In addition, Nuclear Waste Regulation includes the establishment of an integrated agency program for the decontamination and decommissioning of nonreactor materials licensees. Nuclear Waste Regulation is strongly affected by the Nuclear Waste Policy Act (NWPA) of 1982, the Nuclear Waste Policy Amendments Act (NWPAA) of 1987, the Low-Level Radioactive Waste Policy Act (LLRWPA) of 1980, the Low-Level Radioactive Waste Policy Amendments Act of 1985 (LLRWPA), and the Uranium Mill Tailings Radiation Control Act (UMTRCA) of 1978.

The NWPA lays out a detailed approach for the long-range undertaking of high-level waste disposal with the Department of Energy (DOE) having operational responsibility and NRC having regulatory responsibility. This undertaking involves a complex, integrated system of waste handling, transportation, interim storage, and ultimate deep geologic disposal of high-level radioactive waste requiring a high certainty of acceptable health and environmental impacts over thousands of years.

The NWPAA directs DOE to characterize only one candidate site, the Yucca Mountain site in the State of Nevada, and to terminate site-specific activities at all other candidate sites. It also creates an Office of Nuclear Waste Negotiator to identify a State or Indian Tribe willing to host a Monitored Retrievable Storage (MRS) facility or high-level waste repository, and it establishes a Nuclear Waste Technical Review Board and an MRS Commission to review DOE's program and report to Congress.

The LLRWPA makes each state responsible for providing for disposal of low-level waste generated within its borders. The LLRWPA gave NRC responsibility for defining low-level wastes, for licensing the Federal disposal of commercial, low-level waste greater-than-Class C (as defined in 10 CFR 61), for granting individual waste generators emergency access to non-Federal disposal facilities, for providing regulatory guidance on alternatives to conventional shallow land burial, for ensuring that license reviews can be completed within 15 months, and for establishing regulatory standards for wastes below regulatory concern.

The UMTRCA directed the NRC to develop regulations and to license the disposal of mill tailings from licensed uranium mills. Congressional action has directed that the NRC regulations be amended to conform to the Environmental Protection Agency (EPA) standards for both radiation and groundwater protection. UMTRCA directs NRC to approve licensee mill tailings disposal plans, to review and concur in the site-by-site implementation of the DOE

program for mill tailings remedial actions, and to license DOE possession of these sites.

This mission area is composed of two major programs: High-Level Waste and Low-Level Waste. The nuclear waste research program conducted by NRC's Office of Nuclear Regulatory Research supports the technical basis for NRC nuclear waste regulations and licensing decisions and is described in the Nuclear Safety Research mission area. These programs ensure that nuclear waste is safely managed and disposed of.

HIGH-LEVEL WASTE

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds	\$ 5,095	\$ 7,626	\$ 7,475
(Staff)	(95)	(76)	(78)

The High-Level Waste program is designed to ensure the effective and efficient discharge of NRC's responsibilities under the NWSA and NWPA. In the absence of unresolved safety concerns, this program will not delay implementation of the Executive branch's program. This program is composed of two major elements: High-Level Waste Disposal Facility Licensing, and Independent Spent-Fuel Storage and Monitored Retrievable Storage Facility Licensing.

On December 22, 1987, the President signed the Nuclear Waste Policy Amendments Act of 1987 which directed DOE to characterize the Yucca Mountain site and to terminate site-specific activities at the Washington and Texas candidate sites. DOE issued a draft site characterization plan (SCP) for the Yucca Mountain site on January 8, 1988, and plans to conduct technical workshops with affected parties through March 1988 and to conduct surface testing at the site. Based on comments received on the draft SCP and the additional site information acquired, DOE plans to issue the statutory required SCP in FY 1989.

The small staffing increase in FY 1989 is to conduct audits of DOE quality assurance programs.

HIGH-LEVEL WASTE DISPOSAL FACILITY LICENSING

The High-Level Waste Disposal Facility Licensing program element comprises the NRC's licensing and inspection of the high-level waste repository. To fulfill this responsibility without causing costly delay or rework in the DOE program, early, ongoing interaction and prelicensing consultation is necessary between NRC and DOE. In order to provide for an effective and efficient licensing process for this first-of-a-kind undertaking, NRC must develop compliance demonstration methods to permit an independent determination of the adequacy of DOE licensing information to meet NRC requirements. NRC must also provide guidance to ensure that the DOE program provides essential and acceptable data; provides onsite overview of activities; identifies and resolves issues; and reviews and evaluates DOE submittals.

The Center for Nuclear Waste Regulatory Analysis, a Federally funded research and development center (FFRDC), has been established to perform technical assistance and research for NRC's High-Level Waste program under contract to the NRC. The center will provide support, under NRC direction, for NRC activities related to geologic repository and MRS facilities, transportation, environmental, and other activities associated with the storage and disposal of nuclear waste under the NWPAA.

As a result of the NWPAA repealing requirements for a second repository, no NRC resources are budgeted for the second repository.

NWPA Regulatory Requirements and Technical Guidance

NRC must provide appropriate and timely regulatory guidance to DOE to ensure that licensing issues are identified and resolved in a timely manner and that DOE provides complete and high-quality information required by NRC for licensing. Staff technical positions will continue to be developed each year on issues identified by NRC as necessary for repository licensing. DOE's products and activities requiring guidance are the SCP and updates, test procedures and documentation, and methodologies for demonstrating compliance with NRC and EPA regulations. The development of review plans to ensure compliance with EPA and NRC regulations and for staff use in review of DOE repository-related documents will continue through FY 1989. The SCP review plan for the Yucca Mountain site will be completed in FY 1988. The revision of 10 CFR 51 and 10 CFR 60 to conform NRC regulations to NWPA requirements, including criteria for adoption of DOE's Environmental Impact Statement and development of licensing procedures to meet the NWPA schedule for licensing reviews, will be completed in FY 1989. Development work on a standard format and content guide for use in preparation of a license application for the high-level waste repository will continue through FY 1989. Consultation with the State of Nevada, Indian Tribes, and other government agencies will continue each year, as needed, to identify and resolve licensing issues for the high-level waste repository. Review and comment on DOE's amendments to the Mission Plan, the Project Decision Schedule (PDS), and other programmatic documents will continue each year, as required, to ensure that NWPA and NWPAA statutory actions are completed and PDS mandated schedules are met.

Technical Assessment Capability for Repository Licensing Reviews

NRC will continue to develop a capability to conduct independent reviews of DOE's performance assessments of geologic repository systems and subsystems (e.g., geologic setting system, engineered barrier system, and waste package subsystem) and to ensure that DOE systems and subsystems comply with NRC licensing criteria. Development of these methodologies involves five technical areas:

hydrogeology, geochemistry, geology/geophysics, materials science, and design/rock mechanics. Methodologies to resolve the issue of uncertainty in performance assessments for scenario screening, model validation/verification and data and parameter values will also continue each year. Models and codes needed to implement methodologies for review of DOE's site characterization activities and for review of the high-level waste repository license application will be developed each year, as needed.

Quality Assurance

NRC will continue to develop internal guidance for NRC staff evaluation and oversight of DOE's quality assurance program for site characterization activities, as well as formal guidance for DOE quality assurance. In addition, oversight of the DOE waste program and the audit of a sample of DOE and DOE contractor quality assurance programs for site characterization will continue each year. Five audits of DOE's high-level waste repository program will be conducted in FY 1988 and seven audits will be conducted in FY 1989. The objective of these audits is to identify and resolve concerns with DOE's program before significant data collection activities are performed during site characterization.

Site Characterization Reviews

DOE will submit an SCP for the Yucca Mountain site describing the characteristics of the site, the conceptual design of the repository, and the waste form and package design. The NRC budget provides for the review of a draft SCP in FY 1988 and a final SCP in FY 1989. The SCP is expected to contain approximately 7,000 pages of text plus more than 4,000 pages of associated documents. In general, NRC's reviews of the SCP will: (1) determine the extent to which DOE's plans and activities will provide the information needed for licensing, and (2) determine whether DOE's planned activities will have any significant adverse effects on the waste isolation capabilities of the site. NRC will complete review of the final SCP within six months after it is accepted for review and will prepare a site characterization analysis for the site. The SCP will be updated semiannually by DOE and reviewed semiannually by NRC, until DOE submits a license application. Generally, NRC will review: (1) new information about the site and designs, (2) new issues and plans to resolve them, and (3) changes to the original plans and schedules. NRC site liaison at the Nevada site will continue each year in order to facilitate direct information exchange and to provide quality assurance and technical review of data, documents, and activities related to site characterization.

INDEPENDENT SPENT-FUEL STORAGE AND MONITORED RETRIEVABLE STORAGE FACILITY LICENSING

The Independent Spent-Fuel Storage and Monitored Retrievable Storage Facility Licensing program element comprises the NRC's

licensing and inspection of the safe interim storage of radioactive wastes by industrial licensees at licensed facilities and the safe interim storage of spent fuel outside of reactor facilities or at any MRS facility that DOE may pursue under the NWPAA. The MRS involves the receipt, handling, packaging, and storage of spent fuel and high-level waste in a facility that permits continuous monitoring and ready retrieval for subsequent shipment to a permanent repository. Under the NWPAA, NRC is responsible for licensing any MRS developed by DOE.

The review and evaluation of approximately five applications for site-specific interim storage of spent fuel outside of reactor pools and of topical reports for dry-storage cask designs will be completed each year in FY 1988 and FY 1989. The DOE system for inventory and forecast of waste generation will continue to be monitored closely to enable timely and adequate waste management and early warning of capacity problems. NRC will continue to maintain awareness of any potential delays in the DOE waste disposal program in order that safe interim alternatives can be identified and developed by the industry. NRC will continue to inspect spent-fuel storage during the course of regular reactor inspections.

The NWPAA authorized DOE to site, construct, and operate an MRS facility, under certain conditions specified in the act. NRC will consult with DOE on technical siting criteria and with the MRS Commission, as needed, each year in FY 1988 and FY 1989.

LOW-LEVEL WASTE

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 2,511	\$ 1,795	\$ 2,350
(Staff)	(74)	(64)	(63)

The Low-Level Waste program is designed to ensure the effective and efficient discharge of NRC responsibilities under the LLRWPA, the LLRWPA, and the UMTRCA. This program is composed of four major elements: Low-Level Waste Disposal Licensing and Inspection, Uranium Recovery Facility Licensing and Inspection, Uranium Mill Tailings Remedial Actions, and Decommissioning.

The funding increase in FY 1988 is to conduct surveys and site studies relating to the clean-up and decommissioning of licensed low-level waste sites and to review topical reports on low-level waste form and containers.

LOW-LEVEL WASTE DISPOSAL LICENSING AND INSPECTION

This program element comprises the NRC's licensing and inspection of those facilities under agency jurisdiction that are engaged in near-surface land disposal and alternatives to conventional shallow-land disposal practices. Regulatory responsibilities are implemented through detailed health, safety, and environmental reviews and inspections of licensee procedures and facilities to ensure safe operations. Oversight of the NRC-licensed operations at the Hanford and Barnwell low-level waste disposal sites will continue each year. Also included in this program element is the development of joint guidance with the EPA for mixed waste (waste containing both radioactive and hazardous chemical materials).

During FY 1988 and FY 1989, NRC's principal efforts will be to implement rules and develop supporting regulatory guidance, complete preparations for the review of an application for a new low-level waste disposal facility, develop and implement an inspection program for all aspects of low-level waste management, and continue to perform timely licensing reviews and other related actions.

The revision to the definition of low-level waste will be completed in FY 1989 to define the disposition of wastes that are in the greater-than-Class C category. The development of regulatory requirements for granting individual generators emergency access to regional low-level waste disposal sites will be completed in 1988, and NRC will be prepared to respond to requests for access within the mandated 45 days. The development of a capability to process license applications within 15 months will be completed in FY 1989. During FY 1988-1989, NRC expects to review two standard designs

for alternative disposal methods. The review of petitions to exempt from NRC jurisdiction, those waste streams that are below regulatory concern, will begin in FY 1988. To ensure prompt and efficient implementation of 10 CFR 61 requirements applicable to the disposal of low-level radioactive waste at commercial sites, the review of topical reports on waste solidification processes, waste classification systems, and improved disposal containers will be expedited to eliminate the present backlog of 15 topical reports as well as to process new topical reports at a rate of three per year.

Regulatory guidance will continue to be provided each year on waste above Class C limits, alternatives to shallow-land burial, and radioactive waste below regulatory concern. Improvements in the license review capability and the development and maintenance of a low-level waste regulatory data base will continue each year. The development of guidance for the protection of the public health and safety from chemically hazardous low-level waste will be completed in FY 1989. The development of a comprehensive inspection program for low-level waste management will be initiated in FY 1988, and the program implementation will begin in FY 1989. This inspection program, in addition to radiation protection and environmental surveillance, will address industrial safety and other nonradiological aspects of waste management.

Technical assistance for the regulation of design and operational aspects of low-level waste disposal will be provided to Nevada, South Carolina, and Washington, where the existing low-level waste disposal sites are located. Nevada is currently processing a renewal application for the Beatty site and has projected the need for NRC staff technical assistance regarding hydrology, site engineering, and pathway analysis. Washington is expected to request technical assistance on mixed-waste issues. Washington also has included numerous reporting requirements in its recently renewed license and is expected to request engineering assistance in the review of these reports. To ensure that the requirements of the LLRWPA are met, technical assistance also is being provided to the other NRC Agreement States, the low-level waste compacts, state regulatory bodies, and low-level waste site owners to facilitate the siting and development of safe disposal facilities.

URANIUM RECOVERY FACILITY LICENSING AND INSPECTION

This program element comprises the NRC's licensing and inspection of those facilities under agency jurisdiction that are engaged in uranium extraction activities (other than conventional mining) and ore milling activities. This requires detailed health, safety, and environmental reviews, and inspections of licensee procedures and facilities to ensure safe operations. Also included in this program element are the development of regulatory guidance to ensure consistency with the EPA standards for regulating mill tailings and the site-by-site approval of licensee plans for disposal of mill tailings.

Regulatory responsibilities are implemented through safety and environmental reviews required for the licensing and inspection of uranium mills, heap leaching facilities, ore-buying stations, commercial solution mining, and uranium extraction research and development projects. The NRC will complete the review and evaluation of approximately 75 license applications (new, amendment, and renewal) for uranium recovery activities each year in FY 1988 and FY 1989. The review of approximately 100 licensee monitoring and agency inspection reports will be completed each year to assess licensee performance. The NRC will conduct approximately 35 inspections of uranium recovery facilities each year in FY 1988 and FY 1989. These inspections thoroughly review the licensee's program and implementation of license conditions, assuring the protection of public health, safety, and the environment. In FY 1988, a project will be initiated to monitor the implementation of 10 CFR 40 revisions to conform to EPA standards for groundwater protection from radiological and chemical hazards at mill tailings sites. This effort also will provide any needed guidance or policy clarifications on implementation of the revised regulations and will continue through FY 1989.

URANIUM MILL TAILINGS REMEDIAL ACTIONS

The Uranium Mill Tailings Remedial Actions program element comprises the NRC's review and concurrence in the remedial actions to be taken by DOE at inactive uranium mill tailings sites. Before the remedial actions can begin, NRC must: (1) review DOE environmental impact statements, environmental assessments, and remedial action plans for the 24 mill tailings piles at 22 sites, as well as for several thousand contaminated properties located near the sites; and (2) concur in DOE plans for long-term control of radiation or radioactive releases from the sites and for protection of groundwater at inactive mills which generated mill tailings in the production of uranium for sale to the U.S. Government. Once the remedial actions have been completed, NRC is responsible for licensing DOE for long-term care and maintenance. NRC already has concurred in remedial action plans for six sites: remedial action construction is nearly complete at two of these sites, under way at three others, and about to begin at one. The reviews for the remaining 16 sites will be complete by FY 1993. Based on DOE's schedule, NRC plans to complete 77 separate actions in FY 1988, including 61 environmental, design, remedial action plan, and other reviews, and 3 licensing actions for long-term maintenance and monitoring. In FY 1989, NRC plans to complete 65 actions, including 54 reviews and 2 licensing actions.

DECOMMISSIONING

The Decommissioning program element comprises the development of NRC's integrated requirements for the decontamination and decommissioning of nonreactor materials licensees. This effort has been

established to ensure that the regulatory requirements for decontamination and decommissioning are identified and provided, that the required review methodologies and capabilities are established, and that the reviews are carried out in a timely and consistent manner.

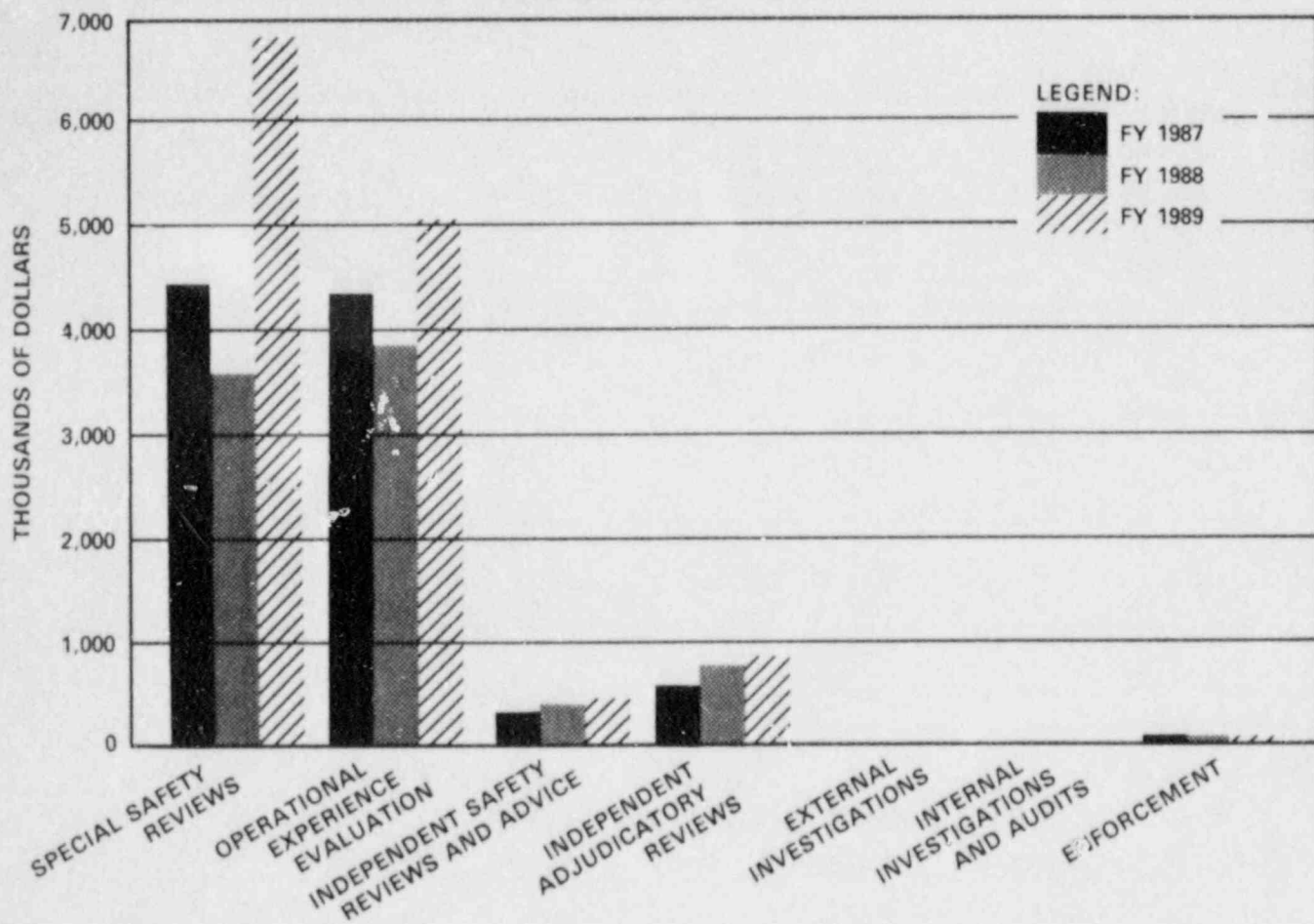
The development of a proposed NRC policy on decommissioning will be completed in FY 1988 and decommissioning guidance will be developed in FY 1989. Standard format and content guides and standard review plans for licensee decommissioning funding plans will be prepared and available for the review of the approximately 750 such plans that will be submitted in compliance with the new decommissioning amendments to 10 CFR 30, 40, 70, and 72. Guidance also will be provided for standard methods for establishing financial assurances and determining the required amounts. A program for the cleanup and decommissioning of approximately 14 licensed sites with large volumes of low-level source material contamination will be initiated in FY 1988.

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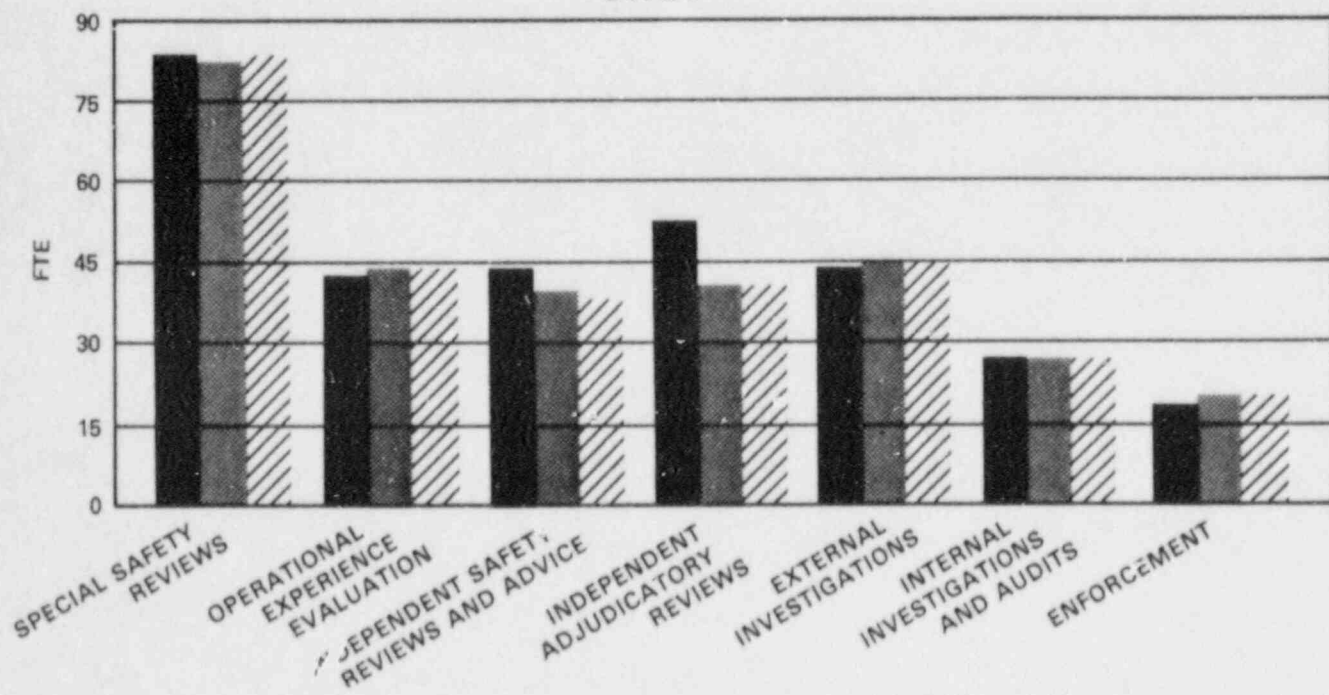
**SPECIAL AND INDEPENDENT REVIEWS,
INVESTIGATIONS, AND ENFORCEMENT**

SPECIAL AND INDEPENDENT REVIEWS, INVESTIGATIONS, AND ENFORCEMENT

PROGRAM SUPPORT



STAFF



SPECIAL AND INDEPENDENT REVIEWS, INVESTIGATIONS,
AND ENFORCEMENT

(Dollars are in thousands, except in text, where whole dollars are used; staff numbers are in full-time equivalents.)

Total FY 1989 estimated obligations \$ 40,965

Total Funds and Staff

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Salaries and Benefits	\$16,795	\$17,501	\$17,742
Program Support	9,611	8,655	13,216
Administrative Support	7,732	6,988	8,808
Travel	<u>1,208</u>	<u>1,163</u>	<u>1,199</u>
Total Obligations	<u>\$35,346</u>	<u>\$34,307</u>	<u>\$40,965</u>
(Staff)	(305)	(294)	(294)

Program Support Funds and Staff

The Special and Independent Reviews, Investigations, and Enforcement staff and program support funds are allocated as shown below. The program support funds are primarily for work done by the Department of Energy laboratories and commercial contractors. The narrative that follows describes these programs and the reasons they are needed.

	<u>FY 1987 Actual</u>		<u>FY 1988 Estimate</u>		<u>FY 1989 Estimate</u>	
	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>
Special Safety Reviews	\$ 4,408	83	\$ 3,592	82	\$ 6,865	83
Operational Experience Evaluation	4,309	42	3,870	43	5,040	43
Independent Safety Reviews and Advice	297	43	405	39	425	38
Independent Adjudicatory Reviews	582	52	773	40	871	40
External Investigations	0	42	0	45	0	45
Internal Investigations and Audits	0	26	0	26	0	26
Enforcement	<u>15</u>	<u>17</u>	<u>15</u>	<u>19</u>	<u>15</u>	<u>19</u>
TOTALS	\$ 9,611	305	\$ 8,655	294	\$13,216	294

DESCRIPTION OF MISSION AREA

Special and Independent Reviews, Investigations, and Enforcement comprises programs that provide for the evaluation, inspection, and review of NRC's licensees and NRC's internal operations; the evaluation and analysis of operational events and experience at both domestic and foreign reactor and nonreactor facilities; a comprehensive enforcement policy; and independent safety review and advice to the Commission, all in furtherance of the protection of the public health and safety and to ensure the integrity of NRC programs and operations. The mission area is composed of the following seven programs: Special Safety Reviews, Operational Experience Evaluation, Independent Safety Reviews and Advice, Independent Adjudicatory Reviews, External Investigations, Internal Investigations and Audits, and Enforcement.

These seven programs maintain special and independent reviews and investigations of NRC activities and those that it regulates.

SPECIAL SAFETY REVIEWS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 4,408	\$ 3,592	\$ 6,865
(Staff)	(83)	(82)	(83)

The Special Safety Reviews program is designed to protect the public health and safety by developing and implementing NRC programs to identify, evaluate, and respond to potentially significant events and safety concerns involving U.S. commercial nuclear power reactors and nonreactor facilities. This program is composed of five major elements: Performance Indicators, Diagnostic Evaluations, Incident Investigation, NRC Incident Response, and Technical Training Center.

Increases in program support from FY 1988 to FY 1989 include increased funding for the Incident Response program to provide for development and refinement of analytical and consequence assessment tools; funding to begin implementation of the Emergency Response Data System; and increased funding for the Technical Training program to provide additional technical training for NRC licensing, inspection, and other technical staff.

PERFORMANCE INDICATORS

The Performance Indicators program element comprises those activities aimed at developing and implementing a method of identifying, as early as practical, those individual nuclear power plants or groups of plants whose performance may warrant specific regulatory attention. Performance indicators are intended to provide ready information concerning nuclear power plant performance trends and will assist NRC management in determining appropriate regulatory actions in response to poor or declining performance, as well as assisting in identifying good or improving performance.

A trial Performance Indicator program was undertaken in FY 1986. The Commission approved implementation of a modified program in December 1986 utilizing the following indicators: automatic scrams while the reactor is critical, selected safety system actuations, significant events, safety system failures, forced outage rate, and equipment forced outage per 1,000 critical hours. Subsequently, collective radiation exposure was added to the program as an indicator. A report showing trends in performance and comparisons to industry averages for each licensed nuclear power plant and each individual indicator has been prepared on a quarterly basis since

February 1987 and will continue. These reports are made available to the public after dissemination to the NRC management and Commission.

Review and evaluation of the Performance Indicator program continues and new indicators of licensee performance are under development. Program revisions will be made, as appropriate, in future years. Performance indicators for nonreactor licensees are being developed under the Nuclear Materials Safety and Safeguards Regulation mission area.

DIAGNOSTIC EVALUATIONS

The Diagnostic Evaluations program element provides additional information for the Reactor Safety and Safeguards Regulation mission area. The diagnostic evaluations are independent of the region and the program office and they supplement the Systematic Assessment of Licensee Performance (SALP) program, performance indicators, and other assessment data to enable NRC senior management to make more informed decisions concerning overall nuclear power plant performance. For example, diagnostic evaluations can provide specific assessments on the actions and involvement of licensee management and staff in safe plant operation. These assessments include NRC activities in order to assist the NRC in taking appropriate corrective actions where warranted.

Up to four diagnostic evaluations of individual nuclear power plant safety will be conducted each year, as determined by NRC senior management. Each evaluation will consist of a formal, independent, in-depth assessment conducted by an NRC team, for the purpose of providing expert insight into significant aspects of plant operations, plant performance, and safety, with emphasis on root cause determinations.

INCIDENT INVESTIGATION

The Incident Investigation program element comprises those activities for ensuring that particularly significant operational events involving nuclear power reactors and nonreactor facilities licensed by NRC are investigated in a systematic and technically sound manner. Information pertinent to the causes of the event is obtained, including those involving NRC activities, in order for the NRC to take effective and timely corrective actions. For events of a potentially major significance, an incident investigation team, independent of the region and the program office, is established. The investigation of less significant operational events is conducted by an augmented inspection team, consisting of a regional-directed team complemented by headquarters personnel.

Special and Independent Reviews, Investigations, and Enforcement

The staff will continue to participate on incident investigation teams and augmented inspection teams each year, as necessary, at nuclear power reactor and nonreactor facilities.

NRC INCIDENT RESPONSE

The NRC Incident Response program element assures that the NRC is prepared to carry out its role in a radiological emergency at a licensed nuclear facility. It ensures that the licensee's response is consistent with licensee responsibilities and that the NRC response is coordinated with other Federal response activities. The NRC Incident Response program element responsibilities are to: (1) manage the NRC Operations Center; (2) develop, maintain, and integrate NRC agencywide response plans, procedures, and training of personnel and organizations; (3) conduct exercises to achieve and test readiness objectives; (4) provide operational support and contract management for agency response activities; (5) evaluate and assess headquarters and regional response capabilities; and (6) provide continuous shift manning of the Operations Center with systems engineers capable of receiving reactor and nonreactor event reports, as well as other information, performing a preliminary evaluation, determining which warrant prompt notification to the offices of Nuclear Reactor Regulation and Nuclear Material Safety and Safeguards, the regions, and upper-level management, and making that notification.

As one of the key activities, NRC will continue to maintain a 24-hour-a-day, 365-day-a-year Operations Center for direct communication, through dedicated communication channels, with licensed nuclear power plants and certain fuel-cycle facilities to receive reports of and to deal with significant events at these facilities.

Operations Center computers and other equipment will continue to be maintained to provide the capability for agency response to incidents. Analytical and consequence assessment tools necessary for reactor safety evaluations, protective measures evaluations, airborne monitoring following a release, and information management will be developed and refined as needed each year. Emergency communications from the licensee's emergency response facilities and analytical capabilities will be upgraded to achieve the necessary reliability and quality of information transfer.

As one of the key Operations Center capabilities, the Emergency Response Data System (ERDS) will provide for licensee-activated automatic transmission of preselected power plant data from the licensee's emergency response facilities to a computer at the NRC Operations Center. The development of an emergency response data communication system will begin in FY 1988 and its implementation will begin in FY 1989 and be completed in FY 1992. This system is essential to improve the NRC's ability in a radiological emergency to effectively carry out its role of advising the licensee and offsite officials on actions to protect the public's radiological

health and safety. The ERDS will provide NRC with a timely, reliable set of key parameters on which to base such advice or recommendations.

Training programs on the technical and organizational aspects of emergency response will be developed and conducted each year for headquarters and regional response personnel. Standardized technical procedures and training materials will continue to be developed to assure consistent and adequate response agencywide. A limited number of exercises involving various accident scenarios will be conducted to confirm and maintain the capabilities of NRC response personnel. In addition, response personnel will participate in onsite, full-scale licensee emergency preparedness exercises with each NRC region, as part of the annual assessment of the region's implementation of its emergency preparedness and incident response program. The regional response program will be coordinated with other Federal, State, and local response agencies.

TECHNICAL TRAINING CENTER

The Technical Training Center program element provides technical training to resident inspectors, headquarters and region-based inspectors, reactor operator license examiners, Operations Center duty officers, other NRC technical staff, and certain other Federal, State, and foreign government employees. Courses are offered in reactor technology, system design and operation, and in other specialized technical areas such as engineering support, safeguards, health physics, and inspection or examination techniques. The NRC reorganization has resulted in identified needs for new or modified technical training courses and a substantial increase in the number of individuals requiring training.

The development of new or revised technical training programs to satisfy identified needs is performed in coordination with the headquarters program offices and the regions. The development of new qualification programs for technical positions without existing programs will begin in FY 1988 and continue in FY 1989. Such program development will result in the identification of specific initial, supplemental, and periodic refresher training requirements by job categories for the technical staff. Expansion of both the reactor technology curriculum and the specialized technical training curriculum (begun in FY 1988) will continue on a much broader scope in FY 1990 to support high-priority needs identified by the headquarters office and regions.

All existing and new curricula will continue to be maintained and revised to provide appropriate coverage of the General Electric, Babcock and Wilcox, and Combustion Engineering reactor and designs. Initial reactor technology training will be provided each year to NRC inspectors and other high-priority NRC personnel, and refresher training will be provided to

Special and Independent Reviews, Investigations, and Enforcement

NRC inspectors and reactor operator license examiners. Training of headquarters and regional inspection and response staff on vendor-specific emergency operating procedures will continue each year as necessary. High-priority enhancements to improve the accuracy of modeling of certain events will be made in FY 1989 to full-scope reactor simulators under direct control of the NRC. Training in the area of reactor plant maintenance (begun in FY 1988) will be expanded on a more detailed level in FY 1989.

The specialized technical training curriculum will continue to be maintained and revised as necessary to provide appropriate coverage of the associated training areas. Extensive curricula modifications will be implemented in FY 1989 in the reactor and nuclear materials/fuel-cycle health physics areas.

OPERATIONAL EXPERIENCE EVALUATION

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 4,309	\$ 3,870	\$ 5,040
(Staff)	(42)	(43)	(43)

The Operational Experience Evaluation program is designed to collect, analyze, and disseminate information about operational safety data associated with commercial nuclear power reactor licensees and NRC nonreactor licensees. Operating experience from U.S. licensees, Agreement States, and foreign sources is reviewed to identify significant events or situations that warrant detailed evaluation. These significant events or situations are then studied to assess the root causes of the identified deficiency, the adequacy of corrective actions implemented and planned, and to determine the lessons of experience and safety concerns that warrant regulatory attention. This program is composed of two major elements: Operational Data Analysis and Operational Data Collection and Dissemination.

Increases in program support from FY 1988 to FY 1989 will allow the staff to extend its analysis activities and perform transient analyses of actual unanticipated events, to evaluate licensee event reporting requirements for potential improvements, and to improve the sequence coding and search system. In addition, the funding increase provides a basis to proceed with new studies that characterize the failure modes for safety equipment, facilitate evaluations of testing requirements, evaluate licensee corrective action programs to identify lessons learned, and provide selected analyses in support of the Office for Analysis and Evaluation of Operational Data case studies of generic issues.

OPERATIONAL DATA ANALYSIS

The Operational Data Analysis program element comprises the review of nuclear power reactor licensee event reports (LERs), as well as the review of extensive documentation of events involving foreign reactors, inspection reports, and U.S. industry reports. This review also includes nonreactor operational events such as overexposure to radioactive materials and medical misadministrations.

Each event reported to the NRC Operations Center by a licensee or regional office is reviewed to determine whether there are any generic implications for other facilities. Follow up of plant specific events is accomplished by the appropriate region. Licensee event reports are analyzed to identify problems with potential

Special and Independent Reviews, Investigations, and Enforcement

safety significance that may be common to specific types of plants. The NRC completes the review and analysis of approximately 3,500 reactor LERs each year. The review of approximately 6,000 nonreactor event reports associated with the use, transportation, safeguarding, and disposal of nuclear materials is also completed each year. Abnormal occurrences are identified, analyzed, and appropriate recommendations provided to the Commission. On a quarterly basis, those occurrences are reported to the Congress and the public.

The Nuclear Plant Reliability Data System (NPRDS) is a data base voluntarily supported by the U.S. nuclear power plant industry and maintained by the Institute of Nuclear Power Operations. The NRC analyzes component failure data from that system to identify component attributes that may signify an unrecognized safety concern.

Based on the comprehensive and systematic review of all the reactor LERs, significant operating events are identified and selected for further in-depth evaluation. The evaluation assesses the root causes of the identified deficiency, the safety significance and generic implications of the deficiency, the adequacy of corrective actions and recommendations to prevent recurrence. The results, findings, suggestions, and recommendations for actions based on these evaluations of operating experience are documented in technical study reports which are widely disseminated to the nuclear industry and the public on a timely basis. The recommendations from these studies are formally tracked and the follow-up status is periodically reported to the Commission.

By identifying the underlying causes of significant operating events and the practices that can prevent recurrence, the benefits of experience can be shared with the entire nuclear power plant industry in order to upgrade safety performance. Resolution of any associated safety issues will be identified and action will be taken, as appropriate.

OPERATIONAL DATA COLLECTION AND DISSEMINATION

The Operational Data Collection and Dissemination program element comprises the data bases associated with information collection. Activities are designed to detect trends and patterns and assist in identifying potential safety concerns, in developing the risk perspective associated with operational experience, and permit actions to be taken before the situation becomes a serious incident. The information is also utilized to trend licensee performance.

The NRC will continue to maintain operational and reliability data storage and retrieval systems. The analysis of trends and patterns utilizes information primarily from two commercial power reactor reporting systems. The first is the Licensee Event Reporting System

that is required by NRC regulation (10 CFR 50.73). Its reports are based on certain events, of a fairly high-significance level, at reactor sites. The data from the LERs are coded and entered into data bases to capture the sequence of events, the failures that occurred, the cause of the events, and corrective actions to avoid similar failures in the future. The second reporting system is the previously discussed NPRDS, a voluntary reporting system that is maintained by the industry. This system captures events of lesser significance, specifically individual component failures in nuclear power plants. These data bases will continue to be analyzed to detect trends in the safety performance of domestic plants and identify specific issues and corrective actions to improve or maintain safe operations. As the nuclear plants age throughout their licensed life, these data bases will grow and continue to be the primary systems to reveal trends in equipment and personnel performance. U.S. events will continue to be reported to other countries through the Nuclear Energy Agency's Incident Reporting System (IRS reports), as appropriate.

Domestic operational experience on all NRC-licensed activities is collected, screened, analyzed, and evaluated. Significant operational events are identified and selected for in-depth technical evaluations to assess the root causes of the observed failures and deficiencies, to determine the safety significance and generic implications of the failures, and to develop effective corrective actions to prevent recurrence. Foreign operational experience is screened and independently analyzed for applicability to the U.S. nuclear program. Increased attention will be focused on the feedback of operating experience by the NRC, the industry, and each licensee, in order to use the lessons of experience to prevent serious nuclear incidents from occurring in the future.

INDEPENDENT SAFETY REVIEWS AND ADVICE

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds (Staff)	\$ 297 (43)	\$ 405 (39)	\$ 425 (38)

The program for Independent Safety Reviews and Advice is designed to provide the Commission with independent reviews and advice on safe operation of reactors and other licensing issues. Such activities are statutory responsibilities of the Advisory Committee on Reactor Safeguards (ACRS), which stem from the Atomic Energy Act of 1954, and subsequent laws.

In executing their responsibilities, the ACRS reviews and provides advice on activities such as proposed standards and measures of performance for operating plants; proposed corrective action when individual plants or groups of plants do not satisfy performance standards; plant-specific probabilistic risk assessments; proposals to use safety goals in regulatory decisions; severe accident policy methodology development and implementation at operating power reactors; proposed implementation of resolved generic issues and action on unresolved safety issues; proposed prioritization of generic safety issues; and proposed resolution of generic safety issues.

The ACRS recommends and comments on proposed regulatory guides and standards being considered and/or promulgated as the basis for NRC regulatory activities. The ACRS also recommends and comments on regulatory questions directed from the Commission. Specific examples include: proposed NRC views of desirable safety characteristics of advanced reactor designs and associated licensing criteria; proposed seismic qualification requirements; proposed criteria for decommissioning power reactors; proposed criteria for renewal of power plant licenses; proposed standards and performance measures in connection with plant protection against sabotage; and criteria and proposals for changes in regulations and other regulatory guidance, and elimination of such guidance which is of marginal importance to safety.

In FY 1988, the Commission expects to establish a new Advisory Committee on Waste Management. This committee will be formed using a portion of the resources shown above. This action will establish a more focused center of expertise to provide the Commission with independent advice on waste management activities.

INDEPENDENT ADJUDICATORY REVIEWS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds (Staff)	\$ 582 (52)	\$ 773 (40)	\$ 871 (40)

The program for Independent Adjudicatory Reviews is designed to conduct hearings pursuant to the Administrative Procedure Act, the Atomic Energy Act, and the National Environmental Policy Act, and to provide tribunals for the review of such decisions.

ATOMIC SAFETY AND LICENSING BOARD PANEL

The Atomic Safety and Licensing Board Panel is the statutory, adjudicatory office of the agency. Administrative judges sitting alone and in three-member boards conduct adjudicatory hearings pursuant to the Administrative Procedure Act, the Atomic Energy Act, and the National Environmental Policy Act. The boards hear and decide issues granting, suspending, revoking, or amending licenses to construct and operate nuclear power plants and other nuclear facilities. Hearings address matters such as health, safety, environmental, and economic issues. Single administrative law judges decide cases in enforcement, civil penalties, and antitrust proceedings. Single presiding officers hear other cases as directed by the Commission. Current work load is characterized by an increasing proportion of proceedings pertaining to facilities in operation.

ATOMIC SAFETY AND LICENSING APPEAL PANEL

The Atomic Safety and Licensing Appeal Panel's three-member tribunals review all decisions of administrative law judges and the Atomic Safety and Licensing Boards rendered in formal adjudicatory proceedings. In discharging this review function, the panel is governed by the applicable provisions of the Administrative Procedure Act and the agency's Rules of Practice.

EXTERNAL INVESTIGATIONS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 0	\$ 0	\$ 0
(Staff)	(42)	(45)	(45)

The External Investigations program conducts agency investigations of all allegations of wrongdoing by NRC licensees. Such investigations are accomplished through the Office of Investigations.

The number of cases dealing with applications for operating licenses is decreasing, and the number of cases dealing with operating facilities is increasing. Each case must be thoroughly and completely examined and subsequent findings must be evaluated to ensure prompt attention to safety concerns. All subsequent findings must be evaluated and disseminated so as to avoid undue delay to licensing and enforcement activities. Quality control standards are being developed, administered, and maintained to oversee the conduct of investigations.

The Commission and appropriate agency offices are apprised of matters under investigation that may affect the public health and safety or other aspects of the agency's mission. The Office of Investigations maintains liaison with other agencies and organizations to ensure the timely exchange of information of mutual interest and makes appropriate referrals to the Department of Justice on matters judged to be criminal.

In response to congressional directives, effective February 1, 1988, the Office of Investigations began reporting as a unit to the Executive Director for Operations. Thus, rather than reporting directly to the Commission, the Office of Investigations will now report to the Commission through the Office of the Executive Director for Operations. Full compliance with the conferee's directive will occur as a second step after a permanent organizational plan for integrating the investigative functions of the Office of Investigations within the Office of the Executive Director for Operations has been developed by the Commission.

INTERNAL INVESTIGATIONS AND AUDITS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 0	\$ 0	\$ 0
(Staff)	(26)	(26)	(26)

The Internal Investigations and Audits program is designed to provide the Commission with an independent review and appraisal of its programs and operations. The organizational responsibility for this program rests with the Office of Inspector and Auditor, which functions as the agency's Inspector General. The Office of Inspector and Auditor is responsible for developing policies and standards that govern the financial and management audit program; planning, directing, and executing the long-range, comprehensive audit program; conducting and reporting on investigations and inspections, as necessary, to ascertain and verify the facts with regard to the integrity of internal agency operations, employees, contractors, organization's programs, and activities; and referring suspected or alleged criminal violations concerning NRC employees or contractors to the Department of Justice. The Office also maintains liaison with government audit and law enforcement agencies.

ENFORCEMENT

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 15	\$ 15	\$ 15
(Staff)	(17)	(19)	(19)

The Enforcement program is designed to ensure compliance with regulations and license conditions; to obtain prompt correction in areas of noncompliance; to deter further noncompliance; and to encourage improvement of licensee performance. The Enforcement program employs a series of sanctions that escalate according to the seriousness of the noncompliance and the past history of licensee performance. Notices of violation, civil penalties, and orders are issued, as necessary, to ensure safety and compliance.

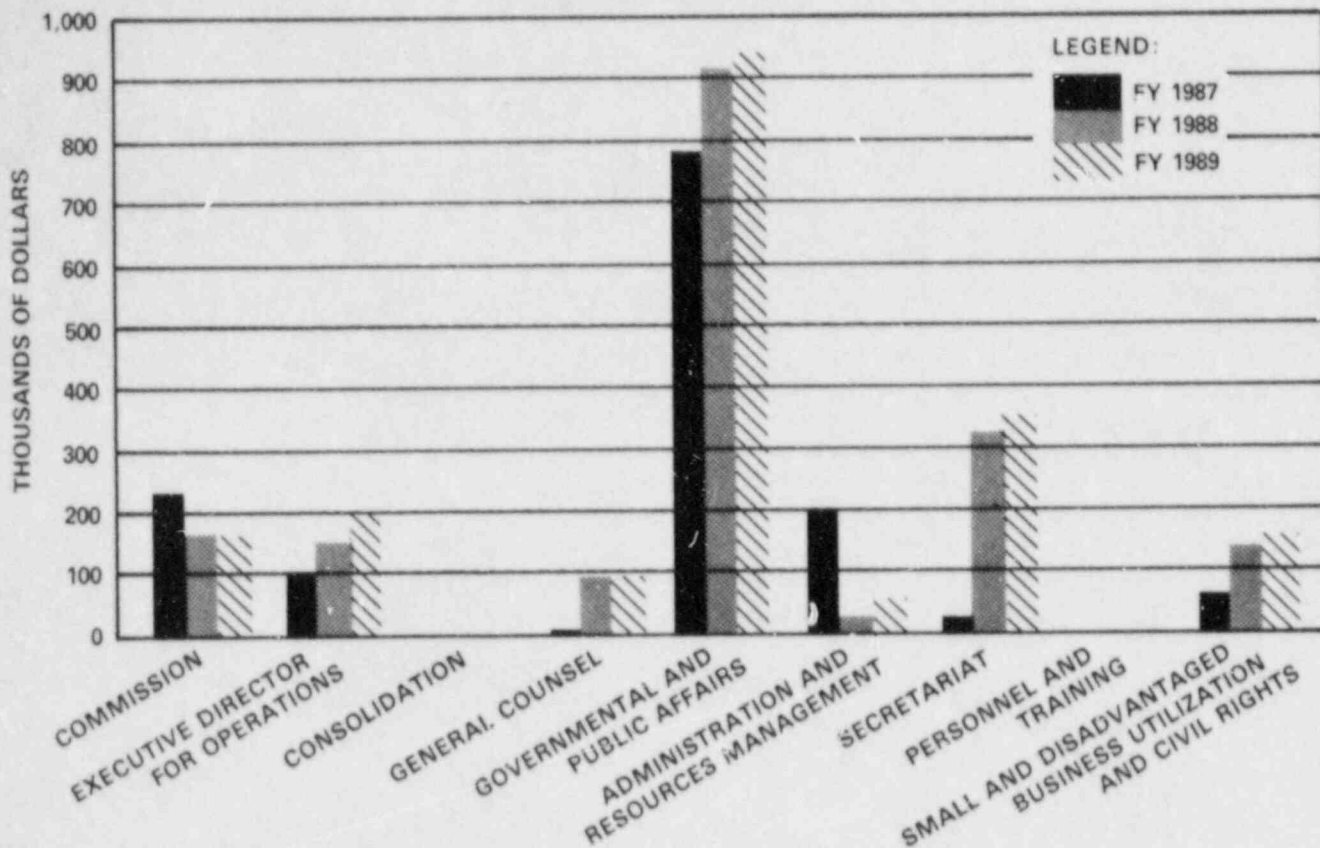
Organizationally, the Office of Enforcement is responsible for implementing the Enforcement program with support from the regional offices. Activities include overseeing and evaluating regional enforcement efforts; coordinating and developing regional enforcement actions and recommendations; evaluating potential enforcement cases; reviewing inspection reports and investigation reports; initiating and processing notices of violations, civil monetary penalties, and various orders; and developing and promulgating enforcement policy, including preparation and maintenance of an enforcement manual.

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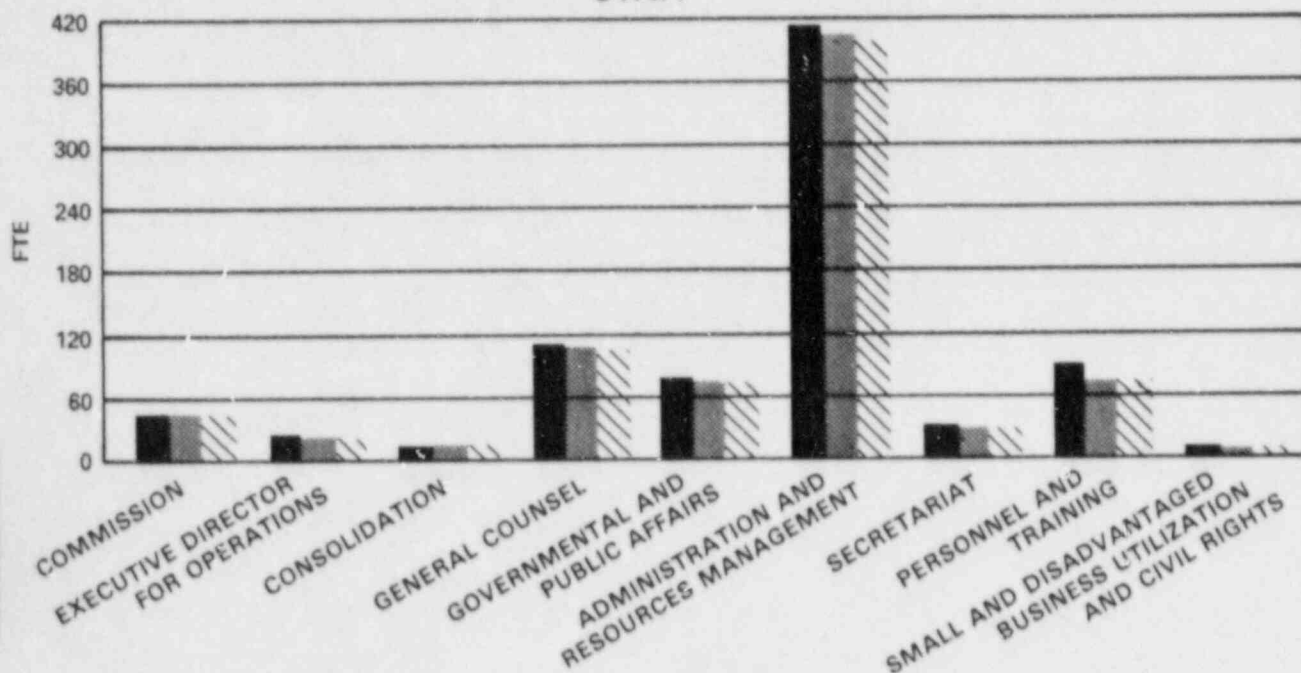
**NUCLEAR SAFETY MANAGEMENT
AND SUPPORT**

NUCLEAR SAFETY MANAGEMENT AND SUPPORT

PROGRAM SUPPORT



STAFF



NUCLEAR SAFETY MANAGEMENT AND SUPPORT

(Dollars are in thousands, except in text, where whole dollars are used; staff numbers are in full-time equivalents.)

Total FY 1989 estimated obligations..... \$67,316

Total Funds and Staff

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Salaries and Benefits	\$37,775	\$40,635	\$40,853
Program Support	1,394	1,807	1,939
Administrative Support	21,407	18,833	23,490
Travel	<u>997</u>	<u>1,048</u>	<u>1,034</u>
Total Obligations	<u>\$61,573</u>	<u>\$62,323</u>	<u>\$67,316</u>
(Staff)	(806)	(772)	(764)

Program Support Funds and Staff

The Nuclear Safety Management and Support staff and program support funds are allocated as shown below. The program support funds are primarily for work done by the Department of Energy laboratories and commercial contractors. The narrative that follows describes these programs and the reasons they are needed.

	<u>FY 1987 Actual</u>		<u>FY 1988 Estimate</u>		<u>FY 1989 Estimate</u>	
	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>	<u>Funds</u>	<u>Staff</u>
Commission	\$ 229	43	\$ 160	43	\$ 160	43
Executive Director						
for Operations	100	24	150	22	200	22
Consolidation	0	8	0	9	0	9
General Counsel	5	110	89	109	89	104
Governmental and						
Public Affairs	780	79	911	75	941	74
Administration and						
Resources Management	200	415	32	404	49	402
Secretariat	20	29	325	28	350	28
Personnel and						
Training	0	89	0	75	0	75
Small and Disadvan-						
taged Business						
Utilization and						
Civil Rights	<u>60</u>	<u>9</u>	<u>140</u>	<u>7</u>	<u>150</u>	<u>7</u>
TOTALS	\$1,394	806	\$1,807	772	\$1,939	764

DESCRIPTION OF MISSION AREA

Nuclear Safety Management and Support encompasses NRC central policy direction, resource management, administrative and logistic support, and liaison with other agencies and the Government. The mission area is comprised of nine programs: Commission, Executive Director for Operations, Consolidation, General Counsel, Governmental and Public Affairs, Administration and Resources Management, Secretariat, Personnel and Training, and Small and Disadvantaged Business Utilization and Civil Rights.

Nuclear Safety Management and Support

COMMISSION

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds (Staff)	\$ 229 (43)	\$ 160 (43)	\$ 160 (43)

The Commission is the governing body of the Nuclear Regulatory Commission. It is responsible for providing the fundamental policy guidance to staff offices to ensure that the civilian use of nuclear energy is regulated in a manner consistent with the public health and safety, environmental quality, national security, and antitrust laws.

EXECUTIVE DIRECTOR FOR OPERATIONS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 100	\$ 150	\$ 200
(Staff)	(24)	(22)	(22)

The Office of the Executive Director for Operations supervises and coordinates NRC operational activities, implements policy development of both line and staff offices, and implements the Commission's policy directives pertaining to these offices.

CONSOLIDATION

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 0	\$ 0	\$ 0
(Staff)	(8)	(9)	(9)

The NRC is consolidating its headquarters staff, currently located in 11 different buildings in the Washington, D.C., area, in a single complex located in Rockville, Maryland. More than one-half of NRC's headquarters' employees will be consolidated in the complex's first office building by early 1988. It is also expected that the General Services Administration will conclude agreements with the developers, including required building permits, later this year to construct an adjacent office building which will house the remainder of NRC's headquarters' employees.

Staff activities associated with the two-phased consolidation effort include preparing housing plans and office standards using approved staffing plans for the 2,400 NRC headquarters employees; coordinating the activities of building architects, space planners, the General Services Administration, and NRC staff to develop support and special space requirements to accommodate approximately 1,400 employees in the first building at the White Flint complex and approximately 1,000 employees in the second building; performing procurement planning and managing contracts for ergonomic chairs, demountable walls, systems furniture, local area network cabling, furniture, equipment, and supplies; and scheduling and coordinating the moves of NRC staff to the consolidated facility.

The NRC's costs for these buildings include facility and space layout, design, and preparation; telecommunications equipment; systems furniture; property and supply; and moving and relocation. These costs are covered by administrative support funds allocated to each of NRC's mission areas. An increase in these costs from FY 1988 to FY 1989 reflects work associated with the second building.

GENERAL COUNSEL

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 5	\$ 89	\$ 89
(Staff)	(110)	(109)	(104)

The Office of the General Counsel (OGC) provides legal advice, opinions, and services to the Commission and staff on all issues before the agency, including the discharge of the Commission's quasi-judicial responsibilities, development of substantive policy matters, and the conduct of administrative proceedings involving the licensing of nuclear facilities and materials. The office also provides legal advice, opinions, and assistance to the Commission and staff on enforcement actions and rulemaking and represents the Commission in the courts of appeal and, in cooperation with the Department of Justice, the district courts and the Supreme Court.

LICENSING AND REGULATION

OGC provides legal advice to the Commission in the review of adjudicatory decisions, on the implementation of employee-conduct regulations, on external investigations, on internal audits, and on the application of Federal openness laws to Commission functions. OGC drafts proposed legislation for Commission consideration and provides advice on the legal and policy implications of legislation sponsored by others which is referred to the Commission for comment by the Office of Management and Budget or Congress. OGC provides advice to NRC offices that are developing NRC regulations and guides pertinent to the licensing of nuclear facilities and the use of nuclear materials, represents the NRC staff in public rulemaking hearings, and provides legal assistance to NRC offices involved in issuing licenses for the use or possession of nuclear materials.

HEARINGS AND ENFORCEMENT

OGC develops legal policy and represents the NRC staff in public hearings conducted in conjunction with the licensing of nuclear facilities and the users of nuclear materials; develops legal policy associated with such licensing; and provides advice and consultation to the staff on health and safety, environmental, and antitrust issues arising from the licensing process.

OGC provides legal advice and assistance to the Commission, all regional offices, and the offices of Enforcement, Nuclear Material Safety and Safeguards, and Nuclear Reactor Regulation on inspection and enforcement matters. It also advises and represents NRC

offices in enforcement proceedings against licensees involving imposition of civil penalties, modifications, suspension, or revocation of licenses.

OGC also provides advice and assistance to NRC offices involved in interagency and international agreements, procurement, intellectual property, budget, security, and administrative functions, and represents NRC in administrative hearings involving procurement, personnel, personnel security, labor relations, and equal employment opportunity matters.

GOVERNMENTAL AND PUBLIC AFFAIRS

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 780	\$ 911	\$ 941
(Staff)	(79)	(75)	(74)

The Governmental and Public Affairs program provides for liaison with the Congress, information to the public and the news media, coordination of participation in international programs, and liaison with State and local governments, and Indian Tribes. The program is managed by the Office of Governmental and Public Affairs (GPA), and is composed of four major elements: Congressional Affairs, Public Affairs, International Programs, and State, Local, and Indian Tribe Programs.

CONGRESSIONAL AFFAIRS

The Congressional Affairs program element comprises those activities that are designed to assist the Commission and senior staff with congressional matters, coordinate agency congressional relations, and provide the principal liaison for the Commission with congressional committees, subcommittees, and individual members of Congress.

The primary objective is to ensure that the Congress is kept fully and currently informed of agency activities and that congressional requests and inquiries are responded to in a timely manner. Congressional Affairs provides the Commission and senior NRC staff with relevant and current information as to major legislative activities likely to affect the agency. Additionally, Congressional Affairs seeks to ensure that individual members of Congress are kept currently and adequately informed of significant NRC licensing activities that might impact their respective States and districts.

PUBLIC AFFAIRS

The Public Affairs program element comprises those activities that involve issuing public announcements from both headquarters and the regional offices; responding to telephone and written inquiries from the news media and the public; conducting press conferences and editorial board meetings in the Washington area and the regions; arranging for Commission speakers before civic groups and other organizations interested in the role of the agency; conducting educational seminars for the news media and administering a cooperative program to assist schools with science studies, tutoring, and career planning.

Public Affairs also assists the licensing boards, the appeal boards, and the Advisory Committee on Reactor Safeguards whenever hearings and meetings are held in which a high degree of public and press interest is evident; advises the Commission and senior staff on public affairs impacts of planned programs and other activities; and advises and assists the Commission and the public on the conduct of public meetings and rulemaking hearings of broad general interest.

INTERNATIONAL PROGRAMS

This program element comprises those activities that involve administering the Commission's responsibilities in the areas of nonproliferation, international safeguards, and nuclear exports and imports; providing informational support to the Commission and staff on international matters; maintaining liaison with other agencies; and facilitating the flow of nuclear health and safety-related information and technical assistance between the United States and foreign countries and international organizations.

STATE, LOCAL AND INDIAN TRIBE PROGRAMS

This program element comprises those activities that maintain cooperation and liaison with States, local governments, Indian Tribes, and interstate organizations. As a part of these responsibilities, the NRC administers agreements with 29 Agreement States. This program element also provides guidance, training, and assistance to State and local governments in radiation control; coordinates activities of interest to State, local and Indian Tribal governments with other NRC offices and Federal agencies; and supports the Conference of Radiation Control Program Directors, Inc. (an association of State radiation control program directors).

ADMINISTRATION AND RESOURCES MANAGEMENT

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 200	\$ 32	\$ 49
(Staff)	(415)	(404)	(402)

The Administration and Resources Management program provides budgetary and fiscal management for the agency, administrative and logistical support services for headquarters and some services for the regional offices, and information resources management for a variety of users within the agency. The program is managed by the Office of Administration and Resources Management (ARM), and is composed of three major elements: Financial Management, Administration, and Information Resources Management.

FINANCIAL MANAGEMENT

This program element consists of budget and analysis activities and accounting and finance activities. The budget and analysis activities include providing agency senior management with analyses of policy, program, and resource issues; developing and maintaining policies, procedures, and operations to formulate and execute approved NRC budgets; developing and administering NRC authorization and appropriation legislation; presenting budget estimates and information to the Executive Director for Operations, Commission, the Office of Management and Budget, and Congress; designing and developing systems and criteria for resource planning and control; assisting NRC offices in the use of sound statistical practices; and maintaining liaison with the Office of Management and Budget and congressional committees.

The accounting and finance activities include developing and administering policies, principles, standards, and procedures for financial and cost accounting, financial management, pricing, and license fee management; maintaining accounting and internal controls over agency appropriations; maintaining centralized payroll and travel accounting and reporting functions; maintaining centralized government and commercial accounting and reporting; developing and maintaining the agency's financial management information systems; authorizing all foreign and domestic travel, coordinating relocation services and headquarter's issuance of airline tickets; preparing fee regulations, fee schedules, analyzing licensing costs for determining fee bases, and assuring fee payments; maintaining liaison with the General Accounting Office, the Department of the Treasury, and other agencies on financial procedures and related matters; and developing policies, standards, and practices governing cost principles and other financial arrangements under agency contracts.

ADMINISTRATION

This program element consists of five activities: Contracts, Security, Rules and Records, Publications Services, and Facilities and Operations Support.

The Contracts activity develops and implements agencywide contracting and financial assistance policies and procedures; and directs and coordinates contracting and financial assistance activities, including selection, negotiation, administration, and closeout of contracts. It provides advice and assistance to program officials on acquisition regulations and requirements and methods of meeting program objectives consistent with such requirements; executes and modifies contracts, financial assistance relationships, and interagency actions; settles claims and terminations; and performs other normal duties of a contracting office specified in the Federal Acquisition Regulations.

The Security activity administers the agency's overall security program, including the safeguarding of Restricted Data and National Security Information documents or material (e.g., classified matter) at NRC headquarters and regional offices, and at contractor, licensee and other facilities containing such matter; the safeguarding of sensitive unclassified information; the physical protection of NRC headquarters and regional offices, and other agency locations; the processing and maintenance of access authorizations (clearances) for agency employees, consultants, contractors, licensees, and others; and the processing of criminal history checks on individuals with unescorted access to nuclear power facilities or access to safeguards information.

The Rules and Records activity develops policies, procedures, and rules for implementing the Freedom of Information Act, Privacy Act, and the Regulatory Flexibility Act; develops and reviews amendments to agency regulations and petitions for rulemaking; provides advice and assistance to offices and the public regarding regulations and procedures for filing petitions for rulemaking; and directs and coordinates local public document room activities near reactor sites throughout the United States.

The Publications Services activity provides centralized agencywide publication services, electronic text processing, technical writing and editing services, and translation services; publishes agency books, regulatory and technical reports, pamphlets, and periodicals; provides direction and coordination for agencywide provision of document composition, printing, graphics, photography, and audiovisual and related services.

The Facilities and Operations Support activity develops and administers programs for space acquisition and utilization, motor vehicle operation, building management, and transportation services; and develops and administers programs for property management, supply and warehouse operations, and office and equipment moves.

INFORMATION RESOURCES MANAGEMENT

This program element consists of two activities: Computer and Telecommunications Services, and Information Support Services.

The Computer and Telecommunications Services activity provides all information technology-related product evaluation and acquisition, and all systems development to ensure the most effective delivery of services to NRC management and staff. Major subactivities associated with this activity include analyzing NRC requirements for automated information systems; developing and implementing data management policies, standards, and procedures to achieve agencywide data integration and sharing; acquiring, installing, and maintaining hardware and software for agency automated data processing systems and office automation systems; and evaluating requirements for acquiring, installing, and maintaining agency telecommunications equipment.

The Information Support Services activity provides computer and telephone support enhancing the flow of information throughout the NRC. Major subactivities include providing comprehensive support services to increase staff effectiveness in using information technology; acquiring and maintaining library collections to support official activities of the NRC; providing reference, literature search, and other library support services; managing the NRC central files system and retrieval services; operating NRC minicomputer and remote job-entry computer equipment; operating agency telephone, teleconferencing, Telex, and facsimile equipment; providing mail and messenger services; and developing and implementing agency policy for records management, including operating the agency document control system.

SECRETARIAT

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>
Funds	\$ 20	\$ 325	\$ 350
(Staff)	(29)	(28)	(28)

The Office of the Secretary provides general management services to support the Commission and to implement Commission decisions; advises and assists the Commission and staff on the planning, scheduling, and conduct of Commission business; prepares for and records Commission meetings; manages the Commission staff paper system and monitors the status of all items requiring actions; integrates automated data processing and office automation initiatives into the Commission's administrative system; maintains a forecast of matters for future Commission consideration; processes and controls Commission correspondence; maintains the Commission's official records; maintains the official Commission adjudicatory and rulemaking dockets, and serves Commission issuances in all adjudicatory matters and public proceedings; administers the NRC historical activities; and directs and administers the agency's public document room.

PERSONNEL AND TRAINING

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds	\$ 0	\$ 0	\$ 0
(Staff)	(89)	(75)	(75)

The Personnel and Training program is managed by the Office of Personnel and is composed of three major elements: Personnel, Training and Development, and NRC-Wide Support.

PERSONNEL

This program element provides for personnel management and organization activities including staffing and placement services, recruitment, position classification and evaluation, personnel policy and program development, Federal labor relations and employee relations services, organization and staffing analyses, management analyses, and position management; occupational health and safety; and other agencywide services, such as interviewee travel, alcohol and drug abuse activities, and support to the Executive Resources Board and its subgroups.

TRAINING AND DEVELOPMENT

This program element provides for all training (other than at the Technical Training Center), including career development counseling, training, and development of agency executives and Senior Executive Service candidates; management and supervisory training and development to improve managerial performance; internships and upward mobility activities; and other training and education programs in response to Commission, statutory, and interagency requirements. The program element also provides for organizational development, including management succession activities, team building, and rotational assignments.

NRC-WIDE SUPPORT

This program element provides secretarial and clerical support staff to meet short-term needs by headquarters offices, and provides for students participating in the Cooperative Education program. The Office of Personnel manages these functions in response to agency requirements and/or policy.

SMALL AND DISADVANTAGED BUSINESS
UTILIZATION AND CIVIL RIGHTS

	<u>FY 1987 Actual</u>	<u>FY 1988 Estimate</u>	<u>FY 1989 Estimate</u>
Funds (Staff)	\$ 60 (9)	\$ 140 (7)	\$ 150 (7)

The Small and Disadvantaged Business Utilization and Civil Rights program comprises three major elements: Small and Disadvantaged Business Utilization, Civil Rights, and the Federal Women's Program.

SMALL AND DISADVANTAGED BUSINESS UTILIZATION

The Small and Disadvantaged Business Utilization activities are authorized by P.L. 95-507, and Sections 8 and 15 of the Small Business Act of 1958, as amended. They include locating small businesses capable of performing NRC contractual requirements, conducting outreach efforts designed to stimulate greater small business interest in NRC programs, and disseminating information to small businesses interested in NRC contracting procedures.

CIVIL RIGHTS

The Civil Rights activities are responsive to the Civil Rights Act of 1964, as amended, and implemented by 29 CFR Part 1613 of the Equal Employment Opportunity Commission regulations. They include obtaining and maintaining equal opportunity within the NRC; developing and revising the agency's Affirmative Action Plan; advising and assisting in recruitment plans and activities; providing counseling and investigations of discrimination complaints; providing equal employment opportunity training for all agency employees; coordinating activities associated with all agency civil rights matters; interacting with community groups concerned with equal opportunity and human rights in the workplace; and overseeing the implementation of the agency's Federal Financial Assistance Program, under Section 274 of the Atomic Energy Act of 1954, as amended.

FEDERAL WOMEN'S PROGRAM

The Federal Women's Program activities aim to expand and enhance opportunities for NRC women employees, reform policies and practices which serve as barriers in the workplace, identify underrepresentation and underutilization of women in the work force and

recommend corrective action, participate in internal personnel management evaluation and recruitment actions, and maintain communication between women's organizations and agency management.

SPECIAL SUPPORTING TABLES

LEGISLATIVE PROGRAM PROJECTIONS

(Dollars in Millions)

	<u>FY 1987</u> <u>Actual</u>	<u>FY 1988</u> <u>Estimate</u>	<u>FY 1989</u> <u>Estimate</u>	<u>FY 1990</u> <u>Estimate</u>	<u>FY 1991</u> <u>Estimate</u>	<u>FY 1992</u> <u>Estimate</u>	<u>FY 1993</u> <u>Estimate</u>
NPC Total							
Budget Authority....	\$401.0	\$392.8	\$450.0	\$486	\$468	\$465	\$465
Budget Outlays.....	\$392.6	\$440.6	\$429.6	\$474	\$476	\$468	\$465

CONSULTING SERVICES

(Dollars are in thousands)

<u>Account Title</u>	<u>Type</u>	<u>Obligations</u>		
		<u>FY 1987</u>	<u>FY 1988</u>	<u>FY 1989</u>
Nuclear Material Safety and Safeguards Regulation	Contractual Services	\$ 0	\$ 0	\$ 0
	Personnel Appointments	82	45	45
	Advisory Committee			
	Consultants	10	10	10
	Total	\$ 92	\$ 55	\$ 55
Nuclear Waste Regulation	Contractual Services	\$ 0	\$ 0	\$ 0
	Personnel Appointments	302	187	55
	Advisory Committee			
	Consultants	0	0	0
	Total	\$ 302	\$ 187	\$ 55
Special and Inde- pendent Reviews, Investigations, and Enforcement	Contractual Services	\$ 14	\$ 30	30
	Personnel Appointments	119	109	78
	Advisory Committee			
	Consultants	126	130	135
	Total	\$ 259	\$ 269	\$ 243
Nuclear Safety Management and Support	Contractual Services	\$ 5	\$ 15	\$ 15
	Personnel Appointments	127	113	113
	Advisory Committee			
	Consultants	0	0	0
	Total	\$ 132	\$ 128	\$ 128
Total Nuclear Regulatory Commission	Contractual Services	\$ 19	\$ 45	45
	Personnel Appointments	630	454	291
	Advisory Committee			
	Consultants	136	140	145
	Total	\$ 785	\$ 639	\$ 481

MISSION AREAS

NUCLEAR MATERIAL SAFETY AND SAFEGUARDS REGULATION

Personnel appointments are used to provide technical advice on fuel processing operations, including high-level waste solidification activities. Advisory committee expenses include the Advisory Committee on Medical Uses of Isotopes, which considers medical questions referred to it by the NRC staff, renders expert opinions regarding medical uses of radioisotopes, and provides advice on matters of policy.

NUCLEAR WASTE REGULATION

Personnel appointment services are used to provide: (1) advice on the review of critical technical plans and data resulting from these plans associated with repository site performance and evaluation; (2) continuity of technical assistance during the initial status of the newly-awarded contract for the Federally Funded Research and Development Center; and (3) assistance to the staff on implementing the Low-Level Radioactive Waste Policy Amendments Act of 1985, resolving the mixed waste issue, and assessing financial responsibilities of licensees.

SPECIAL AND INDEPENDENT REVIEWS, INVESTIGATIONS, AND ENFORCEMENT

Contractors and personnel appointments are used to provide engineering and scientific expertise not otherwise available to the Advisory Committee on Reactor Safeguards to obtain advice and/or opinions on the highly complex areas associated with the disposal of high-level waste. Consultants provide advice and expert opinions to the membership of the Advisory Committee on Reactor Safeguards, in conducting project reviews, operating license reviews, generic reviews, and safety assessments for power reactors.

NUCLEAR SAFETY MANAGEMENT AND SUPPORT

Contractual services are used to provide third-party evaluations and recommendations for personnel related hearings. Personnel appointments provide the agency with advice and assistance: (1) concerning the retrieval and maintenance of documents located in the local public document rooms, (2) in performing technical editorial review of licensing documents and in preparing the Annual Report to the Congress, (3) in reviewing certain security clearance applications, and (4) in performing evaluations and proposals related to automated data processing systems utilizing a minicomputer.

U.S. NUCLEAR REGULATORY COMMISSION
SUMMARY OF HEADQUARTERS AND REGIONAL RESOURCES BY MISSION AREA

(Dollars in thousands, staff in full-time equivalents)

	FY 1987 ACTUAL		FY 1988 ESTIMATE		FY 1989 ESTIMATE	
HEADQUARTERS RESOURCES	DOLLARS	(STAFF)	DOLLARS	(STAFF)	DOLLARS	(STAFF)
Reactor Safety and Safeguards Regulation	88,861	705	88,945	703	91,187	604
Nuclear Safety Research	122,468	255	111,611	246	137,117	239
Nuclear Material Safety and Safeguards Regulation	15,110	137	15,947	137	21,430	137
Nuclear Waste Regulation	20,322	154	19,882	126	21,336	127
Special and Independent Reviews, Investigations, and Enforcement	33,884	281	33,070	276	39,734	276
Nuclear Safety Management and Support	60,652	791	61,225	756	66,220	748
Subtotal	341,297	2,327	330,680	2,244	377,024	2,131
REGIONAL RESOURCES						
Reactor Safety and Safeguards Regulation	53,448	850	58,417	834	60,435	867
Nuclear Material Safety and Safeguards Regulation	8,831	145	8,520	124	9,156	134
Nuclear Waste Regulation	1,014	15	1,066	14	1,058	14
Special and Independent Reviews, Investigations, and Enforcement	1,462	24	1,237	18	1,231	18
Nuclear Safety Management and Support	921	15	1,098	16	1,096	16
Subtotal	65,676	1,049	70,338	1,006	72,976	1,049
TOTAL RESOURCES						
Reactor Safety and Safeguards Regulation	142,309	1,559	147,362	1,537	151,622	1,471
Nuclear Safety Research	122,468	255	111,611	246	137,117	239
Nuclear Material Safety and Safeguards Regulation	23,941	282	24,467	261	30,586	271
Nuclear Waste Regulation	21,336	189	20,948	140	22,394	141
Special and Independent Reviews, Investigations, and Enforcement	35,346	305	34,307	294	40,965	294
Nuclear Safety Management and Support	61,573	806	62,323	772	67,316	764
Total	406,973	3,376	401,018	3,250	450,000	3,180

BIBLIOGRAPHIC DATA SHEET

SEE INSTRUCTIONS ON THE REVERSE

NUREG-1100, Volume 4

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12. SUPPLEMENTARY NOTES

13. ABSTRACT (200 words or less)

This report contains the fiscal year budget justifications to Congress. The budget provides estimates for salaries and expenses for fiscal year 1989.

14. DOCUMENT ANALYSIS -- a. KEYWORDS/DESCRIPTORS

b. IDENTIFIERS/OPEN ENDED TERMS

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Public Safety
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