
BUDGET ESTIMATES FISCAL YEAR 1982

**Appropriation:
Salaries and Expenses**

U.S. Nuclear Regulatory Commission



8102260426

BUDGET ESTIMATES FOR
U. S. NUCLEAR REGULATORY COMMISSION
FISCAL YEAR 1982

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NUCLEAR REGULATORY COMMISSION
FY 1982 Budget Estimates
GENERAL STATEMENT FOR SALARIES AND EXPENSES

(Dollars in thousands, except whole dollars in narrative material)

Estimate of Appropriation

The budget estimates for Salaries and Expenses for FY 1982 provide for obligations of \$500,700,000 to be funded in total by a new appropriation.

Estimates of Obligations and Outlays

This section provides for the summary of obligations by program on page 2; the summary of financing these obligations on page 3; the analysis of outlays on page 4; obligations by function on page 5; the proposed appropriation language and analysis of the appropriation language on pages 6 through 8, and the narrative summary of NRC programs beginning on page 9.

The summaries which address obligations include the NRC's 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.

The NRC will deposit revenues derived from the licensee fee program and indemnification fees to Miscellaneous Receipts of the Treasury. FY 1982 and FY 1981 revenues from this source are estimated at \$14,000,000 and \$13,000,000 respectively.

The following table summarizes the total obligations for NRC's Direct and Reimbursable Programs for FY 1980, FY 1981 and FY 1982. The detailed justifications for direct program activities are presented in the same order as they appear in this summary table.

SUMMARY OF OBLIGATIONS BY PROGRAM
(Dollars in thousands, except whole dollars in narrative material)

Obligations by Activity:
Direct Program

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Nuclear Reactor Regulation	\$ 65,157	\$ 75,320	\$ 75,610
Standards Development	13,563	16,970	17,950
Inspection and Enforcement	47,686	59,700	67,680
Nuclear Material Safety and Safeguards	28,407	38,720	46,700
Nuclear Regulatory Research	190,368	216,150	231,940
Program Technical Support	16,658	19,400	19,140
Program Direction and Administration	<u>34,262</u>	<u>40,076</u>	<u>41,680</u>
Total Obligations - Direct Program	\$396,101	\$466,336	\$500,700
Reimbursable Program	<u>209</u>	<u>500</u>	<u>500</u>
Total Obligations	\$396,310	\$466,836	\$501,200
Unobligated balance, start of year	-5,627	-11,996	0
Unobligated balance, end of year	11,996	0	0
Recovery of prior year obligations	-2,305	0	0
Orders received from other Federal agencies ...	<u>-274</u>	<u>-500</u>	<u>-500</u>
Budget Authority	\$400,100	\$454,340 ^{1/}	\$500,700

^{1/} Includes \$6,820,000 for the proposed FY 1981 pay raise supplemental.

(Dollars in thousands, except whole dollars in narrative material)

Financing of Obligations

The financing of the estimated total obligations of \$500,700,000 proposed in the budget estimate for FY 1982 is summarized in the following table:

SUMMARY OF FINANCING

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Sources of Funds Available for Obligations:			
Recovery of prior year obligations	\$ 2,305	\$ 0	\$ 0
Unobligated balance, beginning of year	5,627	11,996	0
Appropriated to NRC	400,100	454,340 ^{1/}	500,700
Orders received from Federal sources	<u>274</u>	<u>500</u>	<u>500</u>
Total Funds Available for Obligations	\$408,306	\$466,836	\$501,200
Less: Unobligated balance, end of year	<u>-11,996</u>	<u>0</u>	<u>0</u>
Total Obligations	<u>\$396,310</u>	<u>\$466,836</u>	<u>\$501,200</u>

^{1/} Includes \$6,820,000 for the proposed FY 1981 pay raise supplemental.

(Dollars in thousands, except whole dollars in narrative material)

Outlays for Salaries and Expenses

Outlays for FY 1982 are estimated at \$484,200,000. 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>Actual FY 1980</u>	<u>Estimate FY 1981</u>	<u>Estimate FY 1982</u>
Unexpended balance, beginning of year:			
Obligated	\$ 140,630	\$156,472	\$186,168
Unobligated	5,627	11,996	0
Appropriation to NRC	<u>400,100</u>	<u>454,340</u> 1/	<u>500,700</u>
Total Funds Available for Outlays	\$ 546,357	\$622,808	\$686,868
Unexpended balance, end of year:			
Obligated	\$-156,472	\$-186,168	\$-202,668
Unobligated	<u>-11,996</u>	<u>0</u>	<u>0</u>
Total Outlays	<u>\$ 377,889</u>	<u>\$436,640</u>	<u>\$484,200</u>

1/ Includes \$6,820,000 for the proposed FY 1981 pay raise supplemental.

(Dollars in thousands, except whole dollars in narrative material)

SUMMARY OF BUDGET

OBLIGATIONS BY FUNCTION

	<u>Actual FY 1980</u>	<u>Estimate FY 1981</u>	<u>Estimate FY 1982</u>
<u>Direct Program</u>			
Salaries and Benefits	\$106,813	\$127,839	\$133,498
Program Support	232,248	269,803	293,701
Administrative Support	41,063	49,461	52,845
Travel	7,096	8,965	11,750
Equipment	<u>8,881</u>	<u>10,268</u>	<u>8,906</u>
Total Obligations - Direct Program	\$396,101	\$466,336 ^{1/}	\$500,700
Reimbursable Program	<u>209</u>	<u>500</u>	<u>500</u>
TOTAL OBLIGATIONS	<u>\$396,310</u>	<u>\$466,836</u>	<u>\$501,200</u>

^{1/} Includes \$6,820,000 for the proposed FY 1981 pay raise supplemental.

U. S. NUCLEAR REGULATORY COMMISSION

PROPOSED LANGUAGE - SALARIES AND EXPENSES

(Dollars in Thousands, except whole dollars in narrative material)

The proposed 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 5 U.S.C. 3109; publication and dissemination of atomic information; purchase, repair, and cleaning of uniforms; official entertainment expenses (not to exceed \$3,000); reimbursement of the General Services Administration for security guard services; hire of passenger motor vehicles and aircraft; \$500,700,000 to remain available until expended: Provided, That from this appropriation, transfer 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 programs may be retained and used for salaries and expenses associated with those programs, notwithstanding the provisions of 31 U.S.C. 484, and shall remain available until expended. (Energy and Water Development Appropriation Act, 1981; additional authorizing legislation to be proposed.)

U. S. NUCLEAR REGULATORY COMMISSION
Analysis of Proposed FY 1982 Appropriation Language

1. For necessary expenses of the Commission in carrying out the purposes of the Energy Reorganization Act of 1974, 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 to perform all the licensing and related regulatory functions of the Atomic Safety and Licensing Board Panel, the Atomic Safety and Licensing Appeal Board, and the Advisory Committee on Reactor Safeguards, and to carry out the performance of other functions including research, for the purpose of confirmatory assessment relating 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.) and the Energy Reorganization Act of 1974, as amended (42 U.S.C. 5801 et seq.).

2. Employment of aliens;

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

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. 2161b

42 U.S.C. 2161b directs the Commission that they shall be guided by the principle that the dissemination of scientific and technical information relating 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 entertainment 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 entertainment unless the appropriations involved are specifically available therefor. Congress has appropriated funds for official entertainment expenses to the NRC and NRC's predecessor AEC each year since FY 1950.

7. Reimbursement of 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. 638a

31 U.S.C. 638a provides in part - "(a) 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..."

Analysis of Proposed Language - continued

9. To remain available until expended;

31 U.S.C. 718

31 U.S.C. 718 provides in part that no specific or indefinite appropriation shall be construed to be available continuously without reference to a fiscal year unless it is made in terms expressly providing that it shall continue available beyond the fiscal year for which the appropriation Act in which it is contained makes provision.

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;

64 Stat 765, Sec. 1210

64 Stat 765, Sec. 1210 prohibits the transfer of appropriated funds from one account to another or working fund except as authorized by law.

11. Moneys received by the Commission for the cooperative nuclear safety research programs may be retained and used for salaries and expenses associated with those programs, 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. These are funds received from foreign governments which in turn will participate in NRC's reactor safety research experiments. These funds will be used to pay for any costs incidental to their participation.

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Regulatory Commission - continued

Nuclear Reactor Regulation..... \$75,610

SUMMARY OF NUCLEAR REACTOR REGULATION ESTIMATES BY FUNCTION

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Salaries and Benefits.....	\$24,823	\$29,320 ^{1/}	\$30,420
Program Support.....	28,491	33,978	31,335
Administrative Support.....	10,654	10,792	12,297
Travel.....	1,189	1,230	1,558
Total Obligations.....	\$65,157	\$75,320	\$75,610
Personnel.....	(628)	(684)	(681)

The Nuclear Reactor Regulation personnel requirements and program support funding requirements (primarily contractual support with DOE laboratories and private contractors) have been allocated to major programmatic functions as shown below. The narrative that follows provides justification of support in these requirements.

	Actual FY 1980		Estimate FY 1981		Estimate FY 1982	
	Dollars	People	Dollars	People	Dollars	People
Operating Reactors	\$ 8,686	203	\$ 9,992	241	\$ 6,915	242
Operator Licensing	300	12	170	24	3,920	37
Casework	10,599	132	14,150	198	10,200	157
Safety Technology	7,100	186	8,193	124	9,200	148
TMI Cleanup	1,806	10	1,473	21	1,100	21
Management Direction and Support	0	85	0	76	0	76
TOTALS	\$28,491	628	\$33,978	684	\$31,335	681

The Office of Nuclear Reactor Regulation's (NRR) primary objective continues to be the assurance of adequate protection of public health and safety and the environment in the design, siting, construction, and operation of nuclear reactors. NRR is responsible for performing the safety, environmental and antitrust reviews for applicants for construction permits (CPs) and operating licenses (OLs); changes to operating licenses for power and non-power reactors; and the licensing of reactor operators. Organizationally, the regulatory and licensing effort is divided among the office's five major divisions to (1) carry out the project management functions (2) perform detailed safety engineering and environmental reviews; (3) perform the detailed evaluations for performance-oriented nuclear plant systems; (4) perform the operational, administrative, and people-oriented reviews for human factors safety; and (5) assure that the basic safety and environmental policies, goals, and requirements are satisfied by the regulatory and licensing process.

To meet these objectives, in FY 1980 and FY 1981 NRR internally redirected resources to effectively analyze and evaluate both the accident at Three-Mile Island Unit 2 (TMI-2) and the lessons that apply to the generic effort of licensing and regulating nuclear power. The FY 1982 budget begins to integrate the lessons of TMI into the regulatory and licensing process by changing from a case-by-case application of lessons learned to the application of standard operating policy for all future licenses. Central to this effort will be a more disciplined licensing process including increased utilization of probabilistic risk assessment, evaluation of operating experience data, and systematic review of regulatory requirements. As a result of the lessons learned from the accident at TMI-2, NRR is significantly augmenting its reactor safety programs in human factors engineering, plant systems, and operator licensing, particularly reactor operator requalification examinations. NRR will continue to place special emphasis on the regulatory activities necessary for the decontamination of TMI-2, defueling the reactor, and disposition of the radioactive wastes which resulted from the March 28, 1979 accident. In addition, NRR will continue to work toward reducing the excess backlog of operating reactor licensing actions and to ensure that the NRC licensing review will not result in the delay of reactor fuel load dates.

Operating Reactors.....	FY 1980 = \$8,686 (203)	FY 1981 = \$9,992 (241)	FY 1982 = \$6,915 (242)
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The regulatory activities associated with operating power reactor will continue to be NRR's first priority. To assure the adequate protection to the public health and safety and the environment, NRR will take the appropriate action to correct identified inadequacies in plant design and operation; to review and act upon licenses request for amendments to operating licenses; and to implement new revised regulations and criteria for all operating facilities. In doing so, NRR will continue:

^{1/} Includes \$1,730,000 for FY 1981 Pay Raise Supplemental.

Nuclear Reactor Regulation - continued

- the Systematic Evaluation Program (SEP) for performing the review of operating nuclear power facilities with respect to current licensing requirements.
- to assure that plants operate safely by using operating data, design information, and inspection and enforcement findings, as the basis for taking necessary action in the form of licensing orders and changes in allowable operating conditions.
- to prevent unnecessary restrictions in plant operations by prompt review and modification of license conditions based on licensee requests to modify plant systems and reactor fuel load configurations.
- to review and evaluate operating reactor events and resolve each issue in a manner consistent with continued safe plant operation.
- to factor lessons learned from each unexpected event back into the licensing process to assure consideration of the event in the construction permit and operating license applications under review.

During FY 1980, approximately 1900 reactor licensing actions have been reviewed and processed, including the Category A short-term lessons learned actions from the TMI-2 accident. Also, several major new events and unexpected problems have occurred and resolutions are being developed to correct the problems. Major unanticipated events receive high priority attention. Events during 1980 include the failure of SCRAM rods to fully insert on a boiling water power reactor operating plant, the turbine disc cracks occurring on Westinghouse steam turbines, control and instrumentation interaction problems on Babcock and Wilcox designed reactors, and the water leakage from the fan coolers inside containment at Indian Point. In FY 1981, NRR expects to complete about 2500 reactor licensing actions and to complete the TMI-1 restart evaluation. Hearings have already commenced on the restart of TMI-1 and are expected to continue until mid-1981.

The systematic evaluation of older operating reactors was initiated late in FY 1977. This program assesses the adequacy of design and operation of these reactors, compares them with current safety criteria and provides the basis for integrated and balanced equipment backfit decisions. The program will also provide the technical basis for the conversion of Provisional Operating Licenses to Full-Term Operating Licenses. Phase I of the program, the establishment of guidelines, techniques and review areas for conducting the evaluation, has been completed. Phases II, the review of the 11 oldest operating plants, has commenced and approximately 717 topics are completed, a course of action determined, or the issue evaluated as non-applicable. An additional 410 issues are presently under review. A draft integrated assessment for the lead plant is expected to be completed in FY 1981.

NRR will continue its program in FY 1982 to improve the current methodology and approach for operating reactor licensing actions and complete approximately 2000 actions. This will continue to support the goal of reducing the excess backlog of licensing actions to zero by FY 1984. Phase II of the Systematic Evaluation Program (SEP) will be completed in FY 1982. SEP Phase III will be initiated in FY 1982 and will be integrated with Section 110 of Public Law 96-295. A detailed plan to implement the requirements of Section 110 and the interrelationship with SEP is currently under development and is expected to be published for comment in the Spring 1981. Resource Requirements for complying with Section 110 (b)(1) and (2) are not included in the NRR FY 1982 Budget request.

Operator Licensing.....	FY 1980 = \$300	FY 1981 = \$170	FY 1982 = \$3,920
	(12)	(24)	(37)

The activities associated with operator licensing include the preparation, administration and grading of examinations for the licensing of Reactor Operators (RO) and Senior Reactor Operators (SRO), the certification of students in reactor operator training programs, and the annual requalification of Reactor Operators and Senior Reactor Operators. Also included are the efforts associated with the auditing of training facilities.

All of the TMI-2 investigations identified that the training of facility personnel contributed significantly to the seriousness of the accident and recommended various actions that should be taken to upgrade the training and qualification of reactor operators. As part of the NRC effort to improve the training and qualification of licensed personnel, in order to ensure the safe operation of power and non-power reactors under normal and emergency conditions, the NRC has expanded significantly the scope of the Reactor Operator and Senior Reactor Operator examination, which now include written, oral, and simulator portions. The passing grade for the written exams have been increased to 80 percent for an overall score and a minimum of 70 percent has been established for each of the following categories:

Reactor Operator:

- Principles of Reactor Operation
- Features of Facility Design
- General Operating Characteristics
- Instruments and Controls
- Safety and Emergency Systems
- Standard and Emergency Operating Procedures
- Radiation Control and Safety
- Principles of Heat Transfer
- Fluid Mechanics

Senior Reactor Operator:

- Reactor Theory
- Radioactive materials--handling, disposal, and hazards
- Specific Operating Characteristics
- Fuel Handling and Core Parameters
- Administrative Procedures, Conditions, and Limitations
- Theory of Fluids and Thermo-dynamics

Nuclear Reactor Regulation - continued

Also, NRC will begin to administer annual requalification examinations for licensed Reactor Operators and Senior Reactor Operators and student cold certification examinations.

In FY 1980 NRR administered approximately 700 RO and SRO licensing examinations and currently anticipate licensing another 1200 ROs and SROs in FY 1981. Also in FY 1981, a pilot program for regionalizing the operator licensing effort will be initiated.

During FY 1982, NRR will administer reactor power examinations at nuclear power plant facilities. This effort comprises "cold" examinations administered two months prior to fuel loading and initial "hot" examinations administered two to three months after criticality. NRR will conduct replacement reactor operator examinations at each operating power facility and reactor operator examinations for university and industry-owned critical, research and test reactors. Also, beginning in FY 1982 the administration of annual requalification examinations of licensed Reactor Operators and Senior Reactor Operators and the administration of (cold) certification examinations to students in training programs will be conducted by NRR. Previously, NRR audited the licensee's or training facility's program for requalifying or certifying reactor operators. Current NRC planning will require replacement and requalification examinations to be administered concurrently, as appropriate. NRR will continue to audit the training programs of the 12 training centers.

NRR will license facility personnel at a level consistent with the NRC caseload forecast:

<u>Examinations</u>	<u>FY 1982 Site Visits</u>
Cold examinations	13
Hot examinations	8
Replacement examinations	140
Requalification examinations	248
Non-power examinations	50
Certification examinations and audit of training facilities	48

Casework.....FY 1980 = \$10,599
(132)

FY 1981 = \$14,150
(198)

FY 1982 = \$10,200
(157)

Casework is that effort associated with the safety, environmental, and antitrust reviews of applications for a Construction Permit (CP), Operating License (OL), standard plant design approval, and early site approval. Casework also includes topical report reviews and the necessary effort for the review and evaluation of the characteristics and processes unique to advanced reactors. The CP review includes the review of an applicant's preliminary design of a nuclear facility and a detailed review of the site selection process as well as the safety and environmental aspects of the proposed site. This review must be completed prior to the start of any construction. A limited work authorization may be issued prior to issuance of a CP if all environmental and site suitability considerations are satisfied. The OL review involves the review of the final design of the plant. This phase starts approximately three years prior to the expected fuel load date. The standard plant design concept offers an opportunity for reactor designers and architect/engineers to submit standard designs for review that can be referenced by future license applications. Early Site Reviews (ESR) are conducted to evaluate the environmental and site suitability aspects of sites to be used in future CP applications. Topical Report reviews are conducted on technical reports submitted by industry organizations (usually reactor vendors or architect/engineers) on subjects related to nuclear reactors, and their associated systems or operation. Substantial efficiencies can be derived by conducting these reviews independent of specific construction permit or operating license reviews. Technical positions result from these reviews that are then available to be incorporated by reference in the staff's evaluation of individual license applications, and need not be further considered in individual case reviews; thus, both staff and applicant resources are utilized more effectively. On all casework activities, the staff performs independent detailed audit calculations to verify applicant results in certain selected review areas which are critical to safety or for other reasons as determined by the staff.

NRR will continue to license facilities to:

ensure that safety and environmental reviews are conducted in a manner to adequately protect the public health and safety, preserve environmental values and prevent situations inconsistent with antitrust laws.

schedule reviews in a timely manner to assure the review process will not be a critical path item that would delay the reactor fuel load and startup testing.

NRR will also continue to maintain the capability to conduct standard plant design reviews, early site reviews, advanced concept reviews and topical report reviews.

Nuclear Reactor Regulation - continued

Since the TMI-2 accident, a significant portion of our resources have been concentrated on identifying lessons to be learned from that accident. This resulted in the issuance of the Commission's TMI-2 Action Plan (NUREG-0660). The associated requirements that are necessary and sufficient for the continued operation of licensed facilities and for the issuance of new operating licenses were then established. That effort culminated with the issuance of NUREG-0694 (TMI-Related Requirements for new operating licenses) and NUREG-0737 (Clarification of TMI Action Plan Requirements), and resulted in the resumption of licensing. As a result, a need has been created for resources dedicated to assume the orderly licensing of plants with fuel load dates in FY 1982 and beyond, while performing the additional indepth reviews required by the recommendations of the various TMI investigations.

The highest priority within the NRR Casework activities is given to operating license reviews, with the emphasis on the near-term OL applications. The major effort in this area has been to ensure that the TMI-related requirements for near-term OL applications have been met prior to issuing new operating licenses. In addition to the review of the implementation of TMI related requirements, the next series of OL applications require resources to resolve difficult technical problems in areas such as Seismic Design Criteria and BWR Mark II containment. Also the NRC has been working to adapt the Commission's TMI-2 Action Plan to the six pending Construction Permit (CP) applications involving eleven plants. This has resulted in issuing for public comment, NUREG-0718, "Proposed Licensing Requirements for Pending Applications for Construction Permits and Manufacturing License." During FY 1981, the NRC expects to issue to pending applicants a final version of NUREG-0718 to identify the necessary and sufficient TMI-related requirements that should be applied in CP reviews.

In FY 1982, NRR will continue to implement the TMI-2 Action Plan items in OL, CP, and standard plant reviews. We estimate that these items will involve additional staff review in every licensing case. This will be in the form of increased depth and scope of review in technical areas such as human factors, accident analyses, plants systems (e.g., residual heat removal, containment, feedwater, instrumentation and control), accident and post-accident monitoring. The NRC caseload forecasts one new CP application for two units to be submitted in FY 1982. The following table summarizes new OL applications and planned OL licensing action completions in FY 1980-1982.

	<u>FY 1980*</u>	<u>FY 1981*</u>	<u>FY 1982*</u>
OL Applications			
incoming	4(8)	7(15)	1(2)
under review	27(44)	33(57)	30(52)
completed	(2)	(7)	(10)

*Figures in () represent the number of units.

In FY 1982, NRC will continue, at a reduced level, the Department of Energy Casework Laboratory Assistance Program to allow for an orderly completion of new license application reviews initiated in FY 1981 and provide for the acquisition of resources in critical skilled areas.

<u>Safety Technology</u>	FY 1980 = \$7,100 (186)	FY 1981 = \$8,193 (124)	FY 1982 = \$9,200 (148)
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The safety technology program is directed at developing agency positions on significant issues that relate to the safety aspects of reactor design, construction and operation and to establish an integrated program to develop, review and maintain licensing and regulatory requirements. The activities encompassed in this program include:

Unresolved Safety Issues (USIs) - Conduct activities to develop technological positions on safety-related issues of nuclear power plant design, construction, or operation. These tasks are conducted in direct support of licensing activities and are analyzed within the plan and program described in NUREG-0510 "Identification of Unresolved Safety Issues Relating to Nuclear Power Plants." Progress on Unresolved Safety Issues is reported to the Congress yearly in the NRC Annual Report pursuant to Section 210 of the Energy Reorganization Act of 1974, as amended.

Designated Generic Issues - Conduct activities to develop technical positions on issues that relate to the safety or environmental aspects of nuclear power plant design, construction, or operation. These tasks are conducted in direct support of licensing activities and are analyzed within the framework of NRR's generic issues program described in NUREG-0410 "NRC Program for the Resolution of Generic Issues Related to Nuclear Power Plants".

Generic Studies - Conduct management approved studies needed to support present and future licensing positions. These studies address high priority tasks which have arisen since the development of NRR Designated Generic Issues program. Many of these studies address concerns resulting from the Three-Mile Island Unit 2 accident and are described in the NRC Action Plan (NUREG-0660).

Nuclear Reactor Regulation - continued

Operating Experience Evaluation - Provide systematic assessments of reactor operating experience with respect to facility performance and operating safety, to detect patterns in abnormal occurrences, to identify precursors of possible hazardous events, and to evaluate the adequacy of existing safety factors in the design and operation of present operating units and new ones as they go on line.

Research Coordination - Conduct activities related to interfacing with the Office of Nuclear Regulatory Research, including the development of NRR research needs to support licensing activities, participation in research review groups, reviewing contract proposals, assisting in contractor selection, and providing technical guidance for each research contract. Also to ensure that research results are documented and introduced into the licensing decision-making process.

Risk Assessment - Performance of systematic reliability and risk assessments of nuclear power plants and their systems important to safety, with principal emphasis on new or potential safety issues. Identification of high risk accident sequences for consideration in new regulatory requirements or evaluation of existing requirements; applies probabilistic risk assessment to the analysis of new safety requirements, priority setting for resource allocation or other use of measures of safety significance.

Regulatory Requirements - Maintenance and updating of the standard technical specifications for operating light water power reactors based on new regulatory requirements, new technical considerations and operating experience. Coordination of updates to the Standard Review Plans and the Standard Format and Content Guide. Performance of a continuing systematic evaluation of the adequacy of regulatory requirements for licensing and operation. Performance of analyses of relevant new information; establish and maintain a system for assessing safety significance and assignment of priorities for the resolution of new safety issues, including analyses of the value and impact of new regulatory requirements. Conduct activities related to interfacing with the Office of Standards Development.

Code Analysis and Maintenance - Evaluation, modification, verification and maintenance of analytical tools, such as computer codes, for the performance of audit calculations.

NRR redirected a large portion of its Safety Technology resources to address the high priority issues associated with the Three-Mile Island Unit 2 accident in FY 1980 and FY 1981. Several of the planned activities were reduced or deferred until FY 1982. Concurrently, the TMI Action Plan tasks recommended (based on the various TMI investigations) the immediate implementation of effort directed at operational data analysis and reliability engineering and risk assessment. As a result, NRR's FY 1982 budget request represents an important need to re-establish several efforts that can no longer be deferred. The accomplishments which resulted are:

Unresolved Safety Issues (USIs) - In FY 1980, staff reports with technical resolution for four USIs were issued for comment and final staff reports were issued for three USIs. In FY 1981, staff reports with technical resolution for three USIs are expected to be issued for comment; final staff reports for seven USIs are expected to be issued; and a proposed rule for another is expected to be issued. An additional four (three TMI-related) USIs have been identified in a report to Congress. Also, seven additional issues require further study to determine whether they should be designated as USIs.

Designated Generic Issues - Presently there are over 100 designated generic issues. Work on these issues in FY 1980 and FY 1981 was deferred due to high priority TMI tasks. NRR is currently developing a plan under which designated generic issues identified prior to the TMI accident can be reprioritized in terms of their significance to safety. This will form the basis for the development of a program plan and schedule for the resolution of these issues.

Generic Studies - Numerous TMI-related activities were conducted in FY 1979 and FY 1980, e.g., the TMI Lessons Learned Task Force (NUREGs 0578 and 0580); the Bulletin and Orders Task Force (NUREGs 0565, 0611, 0623, and 0645); the B&W Feedwater Transient Analysis (NUREG-0560); the development of the TMI Action Plan (NUREG-0660) and the development of licensing requirements resulting from TMI for near-term operating licenses (NUREG-0694). As a result of the TMI accident, numerous other studies have been identified; however, initiation of many of these studies has been deferred to FY 1982 due to the substantive reprogramming resulting from TMI. Such studies include radwaste system design and performance, upgrade of simulator training, expanded quality assurance programs and uncertainties in the performance predictions for safety systems.

Operating Experience Evaluation - Consistent with the TMI Action Plan, program offices are to conduct special operational safety analyses to be coordinated with and results distributed as part of an integrated program on operating experience assessments. This effort will complement the activities of the Office of Analysis and Evaluation of Operational Data (AEOD). Since the centralized function was established, a systematic assessment of License Event Reports (LERs) including screening, evaluation, and follow-up was established to process approximately 5000 LER's per year which yielded about 2000 follow-up screenings and about 500 reviews. In addition, approximately 24 reports required careful review to determine whether there were generic implications indicated by the data and whether modifications to the licensing process or long-term actions were required. Approximately 12 reports prepared by the AEOD

Nuclear Reactor Regulation - continued

necessitated followup and response. Twenty-four Office of Inspection and Enforcement (I&E) Bulletins and Orders required detailed licensing review and some 24 detailed LER systematic historical searches for generic experiences were made to identify the statistical and technical significance of such events.

Research Coordination - During FY 1980, coordination of research involved review and endorsement of 36 Research Requests, review and approval of approximately 375 project work scopes and schedules, review of 137 Research Information Letters, review of approximately 700 research reports, review of approximately 80 reports for consideration of Atomic Safety and Licensing Board (ASLB) notification, review of the Five Year Research Plan, and NRR Office review and endorsement of the Annual RES Budget directed to NRR support.

Risk Assessment - Prior to the NRR reorganization in April 1980, the risk assessment evaluations had been conducted under the cognizance of the initiating Division within NRR and with substantial assistance from the Probabilistic Analysis Staff of the Office of Regulatory Research. In FY 1980, a review of risk studies of the Zion, Indian Point, and Limerick reactors was initiated, two system reliability studies of important safety systems were conducted to support licensing reviews, and NRR participated in the Interim Reliability Evaluation Program (IREP) - five IREP reviews are expected to be completed in FY 1981. In addition, risk assessment was used to identify significant contributors to risk in developing the Annual Report to Congress on Unresolved Safety Issues.

Regulatory Requirements - During FY 1980 considerable effort has been expended in developing the TMI Action Plan (NUREG-0660) and initiating the longer term TMI Action Plan requirements. Examples of these efforts include development of a plan for early resolution of safety issues and a plan for assessment of the safety of all current operating reactors (including the efforts required by Section 110 of Public Law 96-295). In addition, some 15 new Regulatory guides and 20 revisions were completed. Also, coordination between NRR and the Office of Standards Development (SD) was maintained on 130 active tasks in process. In FY 1981, the Standard Review Plan will be revised to incorporate the TMI lessons learned and to correlate with 10 CFR; the NRC response to Section 110 Public Law 96-295 will be developed and a proposed rule for a new technical specifications concept will be issued.

Code Analysis and Maintenance - NRR will continue to review vendor thermal-hydraulic analytical methods. This will include an assessment of operator guidelines (including multifailure events), the review and evaluation of transient events at operating reactors, TMI Action Plan items, and class 9 reviews. In FY 1981, activities will emphasize small break loss-of-coolant accidents and transient evaluations and assessment.

In FY 1982, NRR will continue to:

- Resolve the currently identified Unresolved Safety Issues, including the development of guidelines for implementing the solution to Operating Reactors and Casework activities. Current planning and programming projects the identification of six new USIs in FY 1982. It is anticipated that six USIs will be resolved each fiscal year. Approximately six staff-years and \$250,000 are required for each USI based upon an average working period of approximately 30 months from adoption to initiation of planned implementation.
- Provide input to the resolution of high priority generic issues, other than USIs, which have been categorized in NUREG-0410. The staff is currently developing a plan under which generic issues can be prioritized in terms of their significance to safety. This plan will form the basis for the development of a program plan and schedule for the resolution of these issues.
- Perform high priority generic studies, including TMI Action Plan effort, for tasks which have arisen since the Designated Generic Issues were drafted and their priorities established, particularly in the areas of reactor systems, equipment qualification, radiological assessment, effluent treatment, core performance, and safety systems interaction. Review, analyze, and develop NRC positions on the basis of the results of these generic studies and incorporate the findings into the regulatory and licensing process.
- NRR will provide assessments in support of evaluation of operating experience using reliability and risk assessment techniques to determine whether failure rates, common failures, and human factors considerations, as trends, contribute substantially to dominant risk sequences. Continue systematic assessments of reactor operating experience to detect patterns in abnormal occurrences and to identify precursors of possible hazardous events. Resource requirements are based on the NRC caseload forecast for operating reactors, the increasing number of Licensee Event Reports, an increased sensitivity by the licensee to reportable operational data, evaluation of more detailed information and the need to feed back the analysis into the licensing process.
- Continue to coordinate effort for establishing NRR immediate and long-term research needs and review of research reports. Audit the utilization of research results in the regulatory process.
- Perform evaluations of specific safety issues for operating reactors and in support of backfitting requirements associated with the SEP; perform evaluations of specific issues in case reviews, and review reliability studies submitted by the applicant for safety systems; develop guidelines for reliability engineering techniques to be implemented by the licensees; and apply risk assessment to the analysis of

Nuclear Reactor Regulation - continued

new safety requirements in support of Unresolved Safety Issues. This effort includes consideration of Class 9 events with quantification of core melt and containment failure probabilities and evaluation of benefits of proposed requirements. Assist in developing the National Reliability Evaluation Program (NREP) and for critical evaluation of specific high risk issues discovered by the licensee during NREP. It is estimated that it will require significant technical assistance effort to audit and make mid-course corrections to the NREP study initially involving approximately 70 plant-site combinations. The NREP program is expected to begin in FY 1982.

- Revise Standard Technical Specifications and Standard Review Plans to incorporate the lessons learned from TMI, rulemaking, and new regulatory requirements resulting from operating experience. Establish NRR Standards needs and priorities and provide a single point coordination with the Office of Standards Development to improve review time and ensure quality of comments. Audit the implementation of established regulatory requirements policy in the licensing process. Evaluate the cost/benefit of proposed regulatory requirements.
- NRR will continue to emphasize small break loss-of-coolant accidents and transient evaluations in our assessment of vendor codes. By the end of FY 1982, computer input decks will be developed for all light water power reactor plant types to support rapid evaluation of licensing problems.

TMI Cleanup.....	FY 1980 = \$1,806 (10)	FY 1981 = \$1,473 (21)	FY 1982 = \$1,100 (21)
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This activity, begun in April 1980, provides the overall review, direction and oversight of TMI-2 cleanup operations including; technical and management supervision of the related NRC inspection, licensing, analysis, public information, and government relations actions onsite, in the Middletown, PA office and in the Washington, DC area. NRC will continue to ensure the maintenance of protection of public health and safety and the environment during decontamination and disposal of radioactive waste from TMI-2.

In FY 1980 reviews and determinations were prepared for the environmental assessment related to the use of EPICOR-II for decontaminating water in the auxiliary and fuel handling building, the assessment related to the purging of the reactor building atmosphere, and the analysis of the financial aspects of TMI-2 cleanup; the Draft Programmatic Environmental Impact Statement related to "Decontamination and Disposal of Radioactive Waste from the March 28, 1979 accident at TMI-2" was published for comment; and the NRC plan of action for TMI-2 cleanup was issued. An assessment related to the first manned reentry into the TMI-2 reactor building since the accident was made, and the interim criteria for the conduct of TMI-2 cleanup activities was developed.

During FY 1981 NRC will complete the Final Programmatic Environmental Impact Statement; an inspection of the licensee's radiation protection program; and will continue to review licensee recommended design criteria, operating procedures, and all details of equipment utilized for the TMI-2 Cleanup process.

In FY 1982, the NRC will continue to maintain coverage by the NRC technical staff at the site to review and approve licensee cleanup activities, to oversee implementation of these activities so as to ensure adequate protection of public health and safety, and to verify that NRC rules and regulations are being followed, and prepare necessary environmental assessments for the various phases of the TMI-2 cleanup process and revise technical specifications as needed to assure adequate protection of the public health and safety. Conduct special evaluations of problems that arise during the course of facility decontamination and of fuel removal and disposal. In cooperation with the Department of Energy (DOE), develop and implement a plan for the safe disposal of radiologically contaminated materials resulting from TMI-2 cleanup activities. Also, in cooperation with the DOE, Electric Power Research Institute, and General Public Utilities, plan and conduct an investigation of the TMI-2 cleanup process on decontamination technology, radioactive waste handling, and fission product release, transport, and disposition. Information obtained will be used to ensure that cleanup activities are conducted in a manner that will minimize risk to public health and safety. Assess the environmental impact of each phase of the TMI-2 cleanup effort. Supplements to the Programmatic Environmental Impact Statement will be prepared and issued as needed. Continue to monitor the 10 individuals who have received excessive exposure to radiation at TMI since the March 1979 accident.

Management Direction and Support.....	FY 1980 = 0 (85)	FY 1981 = 0 (76)	FY 1982 = 0 (76)
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This effort includes the five major functions necessary to support the NRR regulatory and licensing activities.

Director's Office - Consists of the Director and the Planning and Program Analysis Staff. The Director develops and administers regulations, policies, and procedures required for regulating nuclear reactors; provides overall management and guidance on major program goals and objectives; and performs other functions necessary to execute the NRR reactor licensing program. The Planning and Program Analysis Staff provides administrative support for managing and coordinating NRR programs and resources. The staff establishes priorities, schedules, and resource allocations; forecasts resource needs; and performs long and short-term program planning. The staff also manages all personnel administration matters and prepares, reviews, and recommends administrative operating procedures, policies, and directives. In addition, the staff provides technical coordination and oversight for resolution of special technical problems, provides technical assistance to the Director, and serves as the NRR interface with the Advisory Committee on Reactor Safeguards (ACRS).

Nuclear Reactor Regulation - continued

Support to Others - Includes direct technical assistance to other NRC offices (except for the Offices of Standards Development and Nuclear Regulatory Research), other Federal agencies, and support of international technical exchange programs.

Contract Management - Includes defining objectives and scopes of work, selecting contractors, and guiding and reviewing technical progress on NRR contracts for technical support on specific licensing and generic activities.

Staff Development - Resources to provide training to ensure that the NRR staff remains knowledgeable in the technical fields associated with nuclear reactor safety and public health. The normal training requirements of the administrative and supervisory staff are included.

Correspondence - Resources to respond to Freedom of Information Act (FOIA) requests and to outside inquiries from the Administration, Congress, other Federal Agencies, and the general public.

In FY 1982, NRR will continue to provide the policy management, direction, technical and administrative assistance to ensure that the functions of the office are carried out efficiently and effectively; provide on a limited basis NRR technical manpower support as requested; select contractors and monitor progress on NRR contracts for technical assistance on specific licensing applications and generic activities; provide for minimal staff training; and continue to respond, in a timely manner, to the increasingly large volume of correspondence received by NRR.

(Dollars in Thousands, except whole dollars in narrative material)

NUCLEAR REGULATORY COMMISSION - continued

Standards Development \$ 17,950

SUMMARY OF STANDARDS DEVELOPMENT ESTIMATES BY FUNCTION

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Salaries and Benefits	\$ 5,508	\$ 6,670 ^{2/}	\$ 6,890
Program Support	5,823	7,603	8,310
Administrative Support	2,016	2,457	2,415
Travel	216	240	335
Equipment	0	0	0
Total Obligations	\$13,563	\$16,970	\$17,950
Personnel	(148) ^{1/}	(161)	(157)

The Standards Development personnel and program support funding requirements (primarily contractual support with DOE laboratories and private contractors) have been divided into the major programmatic functions as shown below. The narrative that follows provides justification in support of the requirements for each of these functions:

	Actual FY 1980		Estimate FY 1981		Estimate FY 1982	
	Dollars	People	Dollars	People	Dollars	People
Reactor Engineering						
Standards.....	\$ 387	45	\$ 870	54	\$ 650	53
Fuel Cycle & Material						
Engineering Standards.....	1,265	26	1,242	23	1,260	22
Siting Standards.....	543	12	833	12	1,050	12
Waste Management Standards...	749	21	890	28	1,120	28
Safeguards Standards.....	2,147	13	1,905	13	1,945	12
Radiation Protection						
Standards.....	732	19	1,863	19	2,285	18
Management Direction & Support.....	0	12	0	12	0	12
	\$5,823	148 ^{1/}	\$7,603	161	\$8,310	157

^{1/} Includes five full-time permanent positions actually filled by eight part-time employees in an experimental part-time employment program with SD that was authorized by OMB.

^{2/} Includes \$320,000 for FY 1981 pay raise supplemental.

1. Introduction

The primary function of the Office of Standards Development (SU) is the development of regulations and regulatory guides needed by NRC to regulate nuclear facilities and commercial uses of nuclear materials.

In addition to assuring the protection of public health and safety, such standards improve the effectiveness and efficiency of regulation by defining enforceable requirements and providing supplementary detailed guidance with respect to acceptable levels of safety, safeguards, and environmental protection; by addressing issues in a systematic way to ensure uniformity of consideration and review; by using acceptable consensus-development processes to assure a broad technical review of engineering and regulatory practices proposed for standardization; by reducing uncertainties in the areas addressed; by stabilizing requirements; by improving predictability of the regulatory process; and by shortening review times for licensing decisions and providing bases for inspection.

The NRC's process for developing standards encourages public participation and thereby builds public confidence in the regulatory process. The bases for regulatory requirements are made available for public scrutiny, and comments are invited during the development of the standards that will contain those requirements. Proposed NRC standards are issued initially for public comment. Comments received from the public as well as staff experience are considered when revising and issuing a final standard.

A value/impact analysis is prepared for each new and revised standard which addresses questions such as: What is the need for this standard? What alternative solutions exist for this particular safety, safeguards, or environmental problem? What will be the impact of the standard on safety, safeguards, or environmental protection? What will be the impact on NRC's workload, on other Government agencies, on industry, and on the public? The value/impact analysis has proven to be a valuable tool in improving safety and the quality of NRC standards, in establishing priorities, and in eliminating unnecessary regulatory requirements.

STANDARDS DEVELOPMENT - continued

In addition to the work done directly by the NRC staff in developing standards, program support in the form of contractual expertise in technical specialties is used where it is not practical or efficient to recruit permanent NRC staff for short-term, one-of-a-kind projects. (About half of SD's budget is for staff and half is for technical assistance.) Contractual program support is often used to analyze data during the development or revision of a regulation or guide. It may also be used to prepare supporting material for environmental impact statements and rulemaking actions and, in some cases, to provide input to the staff analyses for regulations and guides.

The Office of Standards Development also coordinates NRC participation in both national and international standards development activities. This activity provides direct benefits to NRC since about half of NRC's regulatory guides refer to or endorse national (consensus) standards. NRC technical staff members from all the major offices participate in standards development committees to provide a regulatory safety perspective to professional societies developing national standards and to encourage the development of standards that will enhance safety and be useful in the regulatory process. NRC's decision on how or whether to use a national standard in the regulatory program involves independent review by the staff and public comment on NRC's consideration of endorsing the national standard.

NRC participation in international standards development is related to its work with the International Atomic Energy Agency (IAEA). This work involves the development of internationally acceptable regulatory standards for nuclear power plant safety for use by developing nations. While the NRC manpower required for this activity is small, it is nevertheless important because it enables us to assure that U.S. nuclear safety and other interests are appropriately considered in these standards.

During FY 1982, the SD program will continue to emphasize standards development actions identified in the aftermath of the accident at Three Mile Island (TMI). While our FY 1981 budget reflected only SD's initial response to the TMI accident and the short-term recommendations of NRC's "Lessons Learned" task force, our FY 1982 budget takes into account the remainder of the SD actions included in the TMI Action Plan approved by the Commission.

The NRC is also undertaking a comprehensive, periodic, and systematic review of its regulations in order to assure (1) that the regulations achieve the substantive goals needed with respect to safety, safeguards and environmental protection, and (2) that in accordance with Executive Order 12044 "Improving Government Regulations" and the Regulatory Flexibility Act (Public Law 96-354), the regulations are as simple and as clear as possible, that they achieve legislative goals effectively and efficiently and that they do not impose unnecessary burdens on the economy, on individuals, on public or private organizations, on small entities or on State and local governments. SD is coordinating this effort which is to be completed within the next 5 years and substantial SD effort on this program will be expended in both FY 1981 and FY 1982.

2. <u>Reactor Engineering Standards</u>	FY 1980 = \$ 387	FY 1981 = \$ 870	FY 1982 = \$ 650
	(45)	(54)	(53)

Reactor Engineering Standards are prepared to assist applicants for, or holders of, nuclear power plant licenses, and NRC's license reviewers and inspectors in the protection of the health and safety of the public. Standards for the activity are concerned with the design, construction, and operation of nuclear power plants.

The overall objective of reactor engineering standards is to codify and maintain the primary criteria and detailed engineering standards that are used as the bases against which license applications are reviewed and facilities are inspected.

NRC has already issued general design criteria, quality assurance criteria, and other basic performance criteria that define in broad terms the safety performance requirements for nuclear power plants. However, in light of TMI, these broad performance requirements must be reevaluated. In the reactor engineering standards area, the reevaluation will be done via major rulemakings on degraded core cooling and minimum engineered safety features. The outcome of these rulemakings together with associated rulemakings on siting and emergency planning will affect the broad performance requirements now in place.

The NRC will develop and maintain detailed standards (principally regulatory guides) that describe and make available to the public one or more methods acceptable to the staff for implementing the broad performance requirements (regulations). These detailed standards will reflect changes made to the broad performance requirements and other lessons learned from TMI. The detailed standards contribute to overall safety by providing benchmarks against which the adequacy of facility design, construction, and operation can be evaluated. They are also used to stabilize the licensing review and decisionmaking process by making clear to the applicant and to the public what the NRC staff expects of a licensee with respect to safety engineering in the design, construction, and operation of nuclear power plants. In addition, SD is responding to petitions for rulemaking filed by the public on matters relating to the safety of nuclear plants.

In the area of safety-engineering standards, major accomplishments have been the development of standards for systems design and analysis, ventilation systems, quality assurance, qualification of electrical equipment, protection system and emergency power (AC and DC) system design and testing, the reporting of design or construction deficiencies, emergency core cooling systems, containment design and construction, accident analysis, and protection from natural and manmade hazards. Principal operating standards deal with preoperational and startup testing, operator qualification and training, and inservice inspection of containments and other reactor components important to safety. Through 1981, approximately 175 regulatory guides will have been

STANDARDS DEVELOPMENT - continued

issued for use in licensing and inspection of nuclear power plants in the areas of design, construction, and operation. A significant portion of our effort in engineering is being applied to maintenance of existing standards to assure that they are current. Much of this current maintenance work is in response to needs identified following the accident at TMI.

During FY 1982, the Reactor Engineering Standards effort will continue to focus on needs identified in studies of the TMI accident. These efforts are concentrated in the areas of qualification of safety-related equipment, structures and components standards, quality assurance and operations (including personnel qualification), and systems design and performance. New and revised standards will be developed for qualification of safety-related equipment under normal and accident conditions. Work will be undertaken on a general rule in this area and on regulatory guides covering specific types of equipment such as electric connectors and motors and pumps, valve operators, and valve assemblies.

In the area of structures and components, tasks associated with the TMI accident include, but are not limited to, completion of a review of generic issues to identify those that can be solved by rulemaking and continuation or initiation, as appropriate, of needed rulemaking actions identified during this review. In addition, regulations will be updated in the areas of containment leakage testing and inservice monitoring of reactor vessel material properties. SD will also endorse the American Society of Mechanical Engineers Boiler and Pressure Vessel Code.

The TMI accident has affected the program in quality assurance and operations. For example, a revision to our regulatory guide on personnel qualification and training will be completed and issued in effective form. Other related activities include work on guides on design of training simulators and use of simulators in personnel training programs, a regulation to increase the number of staff members required to be in the control room and requirements for qualification of operators. Also to be revised are the regulations on reporting of deficiencies, and guides on reporting of information, quality assurance during the operations phase of nuclear power plants, and preoperational and startup test programs.

In response to needs identified as a result of the TMI accident, work will continue on regulations addressing systems design for and performance under degraded and melted core conditions, minimum engineered safety features that would be required for all new plants, and changes to the emergency core cooling system based on operating data or on research results. A number of guides in these and related areas will also be developed.

3. <u>Fuel Cycle and Material Standards.</u>	FY 1980 = \$1,265 (26)	FY 1981 = \$1,242 (23)	FY 1982 = \$1,260 (22)
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Fuel Cycle and Material Standards address the protection of the health and safety of the public in the design, construction, and operation of facilities involved in the preparation of fuel and in the storage of spent fuel. They also address the safe decommissioning of all nuclear facilities. Material standards establish regulations, guides and procedures in the areas of transportation of all types of radioactive material, and the design, manufacture, and distribution of industrial and consumer products that contain radioactive material.

The overall objective of this program is to promulgate and maintain the primary criteria and detailed engineering standards against which are measured the design, construction, and operation of fuel cycle facilities, the decommissioning of all nuclear facilities, the transportation of radioactive materials, and the manufacture and use of products containing such materials.

Primary standards are in place for certain portions of the fuel cycle facility program and for the transportation and industrial and consumer product programs. Additional standards have been issued for fuel cycle facilities which relate to processing of uranium for the LWR fuel cycle, storage of spent fuel in an independent spent fuel storage installation (ISFSI), and prevention of criticality in fuel cycle operations. For decommissioning, the technical basis for the regulations will be largely completed and a generic environmental impact statement and proposed rule change will be issued in FY 1981. Recent transportation standards include the environmental impact statement on urban transportation, regulations implementing International Atomic Energy Agency (IAEA) transportation standards, and quality assurance and packaging standards. Recent industrial and consumer product standards include guidance on use of radioactive materials in consumer products (e.g., wrist-watches, smoke detectors) and industrial application (e.g., well logging, industrial radiography).

During FY 1982, SD plans to issue the effective regulations on decommissioning nuclear facilities and to undertake additional work on supporting guides and technical reports dealing with the decommissioning of reactors, fuel cycle facilities, and other facilities in which radioactive materials have been processed. Planned accomplishments in the fuel cycle area include issuance of new and updated standards dealing with guidance on independent spent fuel storage installations with emphasis on design and construction, guidance on fuel fabrication facility applications and review plans, and guidance on prevention of accidental criticality.

Planned accomplishments in transportation include issuing new or updated regulations and licensing guidance based on studies completed in FY 1980 and 1981 to reduce public and worker exposure due to radioactive material packaging and transport. Regulations and guidance will deal with packaging and handling procedures, chemical and physical form of radioactive material being transported, and emergency procedures for transportation incidents. Efforts will continue to develop needed changes to international transportation standards,

STANDARDS DEVELOPMENT - continued

study shipping environments associated with various transportation modes, and assess actual and acceptable risk in transportation.

Planned accomplishments in the area of industrial and consumer use of radioactive materials include development of quality assurance, design criteria, and procedural standards for production and use of industrial and consumer products, consideration of revision of regulations and policy statements regarding exempt and general license products on the basis of studies now in progress, and initiation of a study to determine the effects of radioactivity incidental to product uses.

4. Siting Standards..... FY 1980 = \$ 543 FY 1981 = \$ 833 FY 1982 = \$1,050
(12) (12) (12)

Siting standards relate to the effects on public health and safety and the environment of the location and characteristics of NRC licensed nuclear facility sites and the capability for taking effective emergency action at these locations. This subject has received a high level of public interest as a result of the Three Mile Island accident including a Congressional mandate for the NRC to include demographic criteria in its regulatory requirements.

Siting standards for nuclear power plants and other major nuclear facilities are principally based on the potential consequences of accidents at these facilities on nearby inhabitants and the environment. They also address emergency preparedness responsibilities including the interrelationships of NRC licensees and State and local governments. Siting standards also involve the requirements for protecting nuclear facilities from the damaging effects of severe natural and man-induced events such as floods, tornadoes, earthquakes and explosions. They require the assessment of radiological and nonradiological impacts associated with the construction and normal operation of nuclear facilities.

During FY 1981, a proposed rule on demographic criteria for nuclear power plant sites (Reactor Siting Criteria, 10 CFR Part 100) and a draft environmental impact statement supporting the proposed rule will be issued for comment. A final rule on procedure and performance criteria for the review of alternative sites will be issued. Rulemaking on emergency preparedness for fuel facilities and materials licensees will be initiated. Guidance will be developed on assessment of the environmental impact of nuclear facility operations.

During FY 1982 planned accomplishments for facility siting standards will include issuance of a final rule and supporting environmental assessment on demographic siting criteria for nuclear power plants; continued development of site safety standards for protection of nuclear facilities from floods and adverse meteorological conditions; and review and maintenance of existing facility siting standards.

Planned accomplishments for emergency planning standards include completing the revision of Regulatory Guide 1.101, Emergency Planning for Nuclear Power Plants; completion of the rulemaking on emergency planning for fuel facilities and materials licensees; and review and maintenance of existing emergency planning standards.

5. Waste Management Standards..... FY 1980 = \$ 749 FY 1981 = \$ 890 FY 1982 = \$1,120
(21) (28) (28)

NRC's waste management standards program can be divided into three primary parts: (1) high-level waste management (including transuranic wastes and spent fuel to be placed in deep geologic repositories for permanent disposal); (2) low-level waste management; and (3) uranium recovery waste management.

The high-level waste standards accomplishments in FY 1981 include publication of final regulations addressing the procedural aspects, proposed regulations setting forth the technical criteria for licensing the disposal of high-level waste in a geologic repository (10 CFR Part 60) and a NUREG report on the uncertainties in the potential leakage of radionuclides from disposal sites. In FY 1981, low-level waste standards accomplishments include development of proposed regulations on disposal of low-level radioactive wastes in geologic repositories and associated regulatory guides and license review procedures for shallow land and intermediate land disposal. The FY 1981 uranium recovery standards accomplishments include the publication of final regulations on criteria relating to the operation of uranium mills and disposition of their wastes and final revision of Regulatory Guide 3.5, Standard Format and Content of Uranium Mill Licenses.

During FY 1982, planned accomplishments for high-level waste management include issuance of a final rule on the technical criteria for licensing geologic disposal of high-level wastes, along with a supporting environmental impact appraisal. Regulatory guides will be developed and published describing the standard format and content of the site characterization report, safety analysis report, and environmental report that must be submitted by DOE in its application for licensing of a geologic repository. Additional regulatory guides will be published on site selection methods, accident and normal operation radionuclide release scenarios, the role of modeling, and the use of probability, sensitivity, and uncertainty in transport of radionuclide to man.

FY 1982 planned accomplishments for low-level waste management include development and issuance of a final rule (10 CFR Part 61) and a supporting environmental impact statement on disposal of low-level waste. Regulatory guidance and licensing review procedures for shallow and intermediate land disposal, site selection, and waste classification will be developed and published.

STANDARDS DEVELOPMENT - continued

FY 1982 planned accomplishments for uranium recovery waste management include development and issuance of guidance on uranium mills, such as the criteria for evaluating the need for government ownership of tailings disposal sites, cover thickness and characteristics of reclaimed tailings disposal sites, and requirements for air pollution control devices; revision of the standard format for uranium mill license applications; and issuance of a regulatory guide on financial surety to cover site decommissioning and reclamation.

6. <u>Safeguards Standards</u>	FY 1980 = \$2,147 (13)	FY 1981 = \$1,905 (13)	FY 1982 = \$1,945 (12)
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The safeguards standards program is directed toward developing, upgrading, and maintaining a body of regulations, regulatory guides, and other guidance documents which address the protection against theft of special nuclear material, including material in transit, and the sabotage of facilities which use or manufacture special nuclear material. Topics addressed include: material measurements, physical control of special nuclear material, quality control, internal and external material accounting, physical security, and training.

During FY 1981, safeguards standards activities include two major efforts: (1) development of a proposed rule establishing an access authorization program for nuclear power plants and (2) developing guidance in support of a proposed material control and accounting upgrade rule. Additional rulemaking actions will address: NRC inspection authority; training of security personnel; transportation of irradiated reactor fuel; reactor vital area access; storage of spent reactor fuel away from reactor sites; and amendments in support of the implementation of the U.S./International Atomic Energy Agency Safeguards Agreement.

The development of Regulatory Guides initiated in FY 1981 and continuing in FY 1982 includes guides on the improvement of nondestructive assay measurements for special nuclear material; the application of advanced statistical analysis to material accounting data; and the application of controllable unit accounting. Additional tasks will include active participation on national standards writing committees, and NUREG reports in support of rulemaking action.

Other Regulatory Guides to be developed in FY 1982 will address the protection and response requirements for alternative fuel cycle facilities; security system designs and operation; definition of requirements for material control and accounting systems; performance, design, operating criteria and methods for material control and accounting systems; analysis and measurements of levels of assurance provided by safeguards systems; and maintenance of consistent, comprehensive, and technically current safeguards standards. Rulemaking efforts will focus on upgrading guard training requirements; clarifying physical security requirements for fixed sites, and upgrading material control and accounting requirements for low enriched uranium fabrication facilities.

7. <u>Radiation Protection Standards</u> ...	FY 1980 = \$ 732 (19)	FY 1981 = \$1,863 (19)	FY 1982 = \$2,285 (18)
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Radiation protection standards establish the fundamental requirements for controlling radiation exposures from the use of NRC-licensed radioactive materials in research, industrial, and medical applications as well as in the operation of nuclear power plants, research reactors, and nuclear fuel cycle facilities, including uranium milling and radioactive waste management operations.

This work involves: (1) conducting, supporting, and evaluating studies of the health effects and risks associated with human exposure to varying types and amounts of ionizing radiation; (2) developing, upgrading, and maintaining standards for the protection of workers and the general public against the radiological hazards associated with NRC-licensed facilities and activities; and (3) participation in the development of national and international standards related to radiation protection.

In FY 1981 SD will continue work on a comprehensive revision of 10 CFR Part 20, NRC's basic radiation protection standards. Continued effort will be made to coordinate Federal radiation protection activities through support of the activities of the U.S. Radiation Policy Council and the Interagency Radiation Research Committee. Work will be expanded on the establishment of a TMI worker registry and on evaluating the possibility of establishing an industry-wide radiation worker registry. Work will be completed on the Feasibility/Planning Study (a Congressionally mandated study of the feasibility of performing human epidemiologic studies on the health effects of low-level radiation) and a joint NRC/EPA report on this subject will be prepared for Congress. Medical radionuclide regulations will be modified to update procedures to provide for better control of radioactive implants. Rules will be developed to improve teletherapy safety and source monitoring, to better define the responsibilities of nuclear medicine personnel, to modify responsibilities of hospital radioisotopes committees, and to require better control of dosage of administered radiopharmaceuticals. Significant activity is expected in responding to comments and preparing a regulatory guide to support the medical misadministration rule which became effective in FY 1981. Requirements for licensee programs to maintain occupational exposures "as low as reasonably achievable" will be strengthened by a rule change and associated regulatory guides. Personnel dosimetry performance testing requirements will be developed to improve the reliability of occupational radiation dose measurements. Guidance will be issued on occupational radiation protection measurements at medical institutions and uranium mills. Additional guidance will be issued regarding requirements for proper instruction and training of workers.

STANDARDS DEVELOPMENT - continued

For FY 1982, planned accomplishments in the health effects area include continuation of NRC participation and involvement with the U.S. Radiation Policy Council and the Interagency Radiation Research Committee; publication of a proposed rule and continuation of efforts associated with the major update of 10 CFR Part 20; and participation in any follow-on projects resulting from the Feasibility/Planning Study. Effort will continue toward establishment of an industry-wide radiation worker registry, an outgrowth of the TMI worker registry. Evaluation will be made of dose effect models derived from animal data to examine radiation doses of less than 10 rem and of radiation induced cytogenetic effects. In the nuclear medicine area, SD will continue tasks related to medical misadministrations, to reduction of unnecessary patient and occupational exposure from radiopharmaceuticals and devices containing byproduct material, and to establishing minimum qualifications for paramedical personnel and physicians. In addition, increased technical assistance support will be provided for ongoing efforts to examine and evaluate epidemiological studies of radiation exposure.

Planned accomplishments in the area of occupational radiation protection during FY 1982 include improving the performance and accuracy of health physics measurements and protective devices, including personnel dosimetry, bioassay measurements, survey instruments, and respiratory protective equipment. Work on a series of guides on individual licensee programs for maintaining worker radiation "as low as reasonably achievable" will continue. Review and maintenance of existing regulations, particularly in the area of dose limits and internal emitter control, will continue. A more comprehensive examination of doses to medical technologists, doctors, and nurses associated with the use of byproduct materials in medicine to better identify occupational risks from nuclear medicine procedures is planned. Technical support will be provided for testing a national standard for the performance of health physics survey instruments. Improving the performance of these survey instruments is part of an effort to improve the accuracy and reliability of health physics measurements. Support for this effort will accelerate the measurement improvement program and will result in adequate and practical specifications for performance testing.

Planned accomplishments in the international standards area will ensure that safety considerations and other U.S. interests are adequately considered in the IAEA development of internationally acceptable nuclear power plant safety standards. Through this work NRC staff acquires knowledge of foreign experience for application to NRC standards development activities.

<u>Management Direction and Support.....</u>	FY 1980 = \$	0	FY 1981 = \$	0	FY 1982 = \$	0
	(12)		(12)		(12)	

This activity provides the central management support necessary to coordinate SD administrative activities including: preparation of the budget, contracts control, financial reports, personnel matters, facility and logistics administration, mail control, Freedom of Information Act requests, and other administrative matters.

(Dollars in Thousands, except whole dollars in narrative material)
 NUCLEAR REGULATORY COMMISSION - continued
 Inspection and Enforcement

\$67,680

SUMMARY OF INSPECTION AND ENFORCEMENT ESTIMATES BY FUNCTION

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Salaries and Benefits	\$28,374	\$36,030 ^{1/}	\$38,120
Program Support	7,682	9,256	12,391
Administrative Support	6,900	8,063	9,566
Travel	3,565	4,520	6,097
Equipment	1,165	1,831	1,506
Total Obligations	\$47,686	\$59,700	\$67,680
Personnel	(868)	(976)	(1,006)

The Inspection and Enforcement personnel requirements and program support funding requirements (primarily contractual support with DOE laboratories and private contractors) have been allocated to major program elements as shown below. The narrative that follows provides justification to support these requirements.

	Actual FY 1980		Estimate FY 1981		Estimate FY 1982	
	Dollars	People	Dollars	People	Dollars	People
Reactor Engineering and Construction Program	\$ 729	147	\$ 395	180	\$1,010	192
Reactor Operations Program	366	273	415	287	275	296
Radiological Safety Program	2,811	199	1,898	203	2,594	206
Safeguards Program	995	90	1,166	92	1,102	92
Enforcement, Investigations and Special Programs	2,781	86	5,207	134	6,985	140
Management Direction & Support	0	73	175	80	425	80
	\$7,682	868	\$9,256	976	\$12,391	1,006

^{1/} Includes \$2,200,000 for FY 1981 Pay Raise Supplemental

The mission of the Office of Inspection and Enforcement is to ensure through field inspection, investigation, and enforcement that facilities and materials under NRC jurisdiction are constructed, operated and used in a manner which protects the public and the environment. The functions of the Office are: to inspect, investigate, enforce, evaluate and inform.

The inspection, investigation, enforcement, evaluation and information activities are primarily concerned with: (1) reactor facilities - nuclear power plants (under construction, being tested or in commercial operation), test reactors and research reactors; (2) fuel facilities and nuclear materials licensees; and (3) vendors - nuclear steam system suppliers, nuclear architect/engineers and other major nuclear system component suppliers.

INSPECTION AND ENFORCEMENT - continued

Activities performed by the Office include: (a) inspecting licensees and their contractors to ascertain compliance with Commission regulations, rules, orders and license provisions; (b) inspecting license applicants as a basis for recommending issuance or denial of an authorization, permit, or license; (c) inspecting suppliers of safety-related services, components, and equipment to determine if these suppliers have established systems to assure the quality of their services and products; (d) investigating incidents, accidents, allegations, and other unusual circumstances to ascertain the facts and to take or recommend appropriate action; (e) enforcing Commission regulations, rules, orders, and license provisions; (f) issuing emergency preparedness Safety Evaluations Reports (SER's); (g) evaluating emergency preparedness at nuclear power stations to ensure adequacy of on-site and off-site plans, procedures and equipment; (h) evaluating the results of inspections, investigations, inquiries and reports to determine the effectiveness of the Commission's programs and, where necessary, recommending corrective regulatory action; (i) evaluating information concerning incidents and accidents to assure adequacy of the overall response and to provide continued response by appropriate NRC staff; and (j) informing the Commission, other NRC offices, other government agencies, licensees, and the public through notices or reports of occurrences.

Inspection and Investigation

The NRC inspection program includes two components: routine (scheduled) inspection and reactive (unscheduled) inspection/investigation. Both are based on the premise that during the conduct of regulated activities the licensee is responsible for complying with NRC requirements for safeguarding nuclear facilities and materials and protecting both the environment and the health and safety of the public. The NRC inspection program is designed to provide assurance that the licensee is properly discharging these responsibilities.

The routine component is a carefully constructed program of inspection performed on a continuing basis to evaluate the licensee's activities within the context of his ultimate responsibility for public protection. The thrust of this effort is to critically examine, by systematic selection, licensee controls designed to prevent conditions that might threaten the public and/or the environment. To insure uniformity of inspection, this program is documented by written guidance, which provides a consistent path for assurance of licensee performance and problem identification and generally involves three basic types of inspection activity:

Directly verifying licensee and system performance by means of direct observation and independent measurement.

Reviewing the licensee's basic systems and procedures to be certain they conform with requirements, are technically sound and are properly implemented.

Analyzing the licensee's records of operation and interviewing licensee personnel to confirm that actions called for by the prescribed systems and procedures are routinely followed.

Starting in FY 1981 a new dimension has been added to the current program to more thoroughly examine licensee regulatory performance. This program is the Systematic Appraisal of Licensee Performance (SALP). Under this program members of various NRC staff offices and regional personnel evaluate numerous indicators of past licensee performance to serve as a basis for redirecting regulatory attention in the future.

The reactive component is the response or "reaction" to some influence outside the preplanned inspection program. The reactive component often consists of an in-depth investigation in response to an event or allegation which may arise from routine inspections, required licensee contractor or vendor reports, or allegations made by licensee employees, members of the public, and/or public interest groups. The objective of the NRC's reactive program is to establish the facts, determine the significance of the particular condition, and take appropriate corrective action.

Enforcement

The enforcement program is aimed at achieving public safety by (a) assuring operation within requirements, (b) correcting areas of noncompliance or poor practice and (c) deterring further noncompliance. The enforcement program includes a clearly delineated and evenly applied series of deterrents that escalate according to the nature of the offense and the past history of licensee performance. Sanctions available to the NRC include Notices of Violation, Civil Monetary Penalties, Orders to Cease and Desist, and Orders to Suspend, Modify, or Revoke Licenses.

To strengthen the enforcement process, the NRC has been granted increased civil penalty authority from Congress. This provides substantial civil penalties of up to \$100,000 for each safety violation (including licensee's failure to submit required reports of safety related information) with no upper limit on combined violations. In dealing with licensees who do not comply with NRC requirements, NRC emphasizes prompt and vigorous enforcement. In any case, licensees who are unable or unwilling to comply or whose operations represent a threat to the public health and safety will not be permitted to operate.

(Dollars in Thousands, except whole dollars in narrative material)

INSPECTION AND ENFORCEMENT - continued

Revised Inspection Program

In FY 1978, the Commission initiated a modified approach (the Revised Inspection Program) for inspecting nuclear reactors and major fuel plants designed to improve the effectiveness of the IE inspection program. This Revised Inspection Program included three components: the Resident Inspector Program, increased direct verification, and the Performance Appraisal Team.

The original Resident Inspector Program plan called for one resident inspector at each power reactor operating site, one resident at selected late stage construction sites and one resident at each of two major fuel facilities. The plan was to achieve this coverage by phasing in resident assignments over a four year period ending in FY 1981. It was decided to expand the program after the Three Mile Island accident and Congress appropriated an additional 146 positions (98 inspectors and 48 support) and about \$4.5 million for FY 1980. With these additional resources, more resident inspectors have been assigned to reactor sites having one or more units in pre-operation, startup, or operation. For operating reactor sites the current program provides for two residents at all multiple unit operating sites and approximately 50 percent of single unit sites. All other single unit operating sites have one resident inspector. In all cases, each site will continue to have a senior resident inspector. The second balance resident (at selected sites) will focus primarily on direct observation of plant operations and safety equipment operability.

For reactor construction sites, the original plan called for the assignment of fifteen (15) resident inspectors at construction sites by the end of FY 1980 and twenty (20) by the end of FY 1981. That plan was accelerated and there were nineteen (19) residents assigned to construction sites by the end of FY 1980, twenty-four (24) will be on-site by the end of FY 1981 and thirty-two (32) by the end of FY 1982. By FY 1982 all sites having at least one unit under construction will have a resident inspector on-site.

In the safeguards area, the current plan calls for keeping one resident at a major fuel facility.

More emphasis has been placed on direct verification of licensee activities, primarily at reactor sites. This is achieved by expanding both direct observation and independent measurement activities. Direct observation consists of an NRC inspector observing either work-in-progress, licensee measurements, or that work has been properly completed. Independent measurements are technical measurements, equipment calibrations, and environmental sample analyses performed either by IE inspectors, commercial contractors, DOE laboratories or state personnel.

Increased direct observation is achieved through the assignment of resident inspectors. While region based inspectors will continue to provide a minimal amount of direct observation, resident inspectors will spend considerable time observing licensee activities.

Independent measurements will be performed at operating reactors, construction sites, and at fuel manufacturing facilities. Independent measurements will be conducted by:

- using NRC environmental monitoring vans and Special Nuclear Material (SNM) measurement vans,
- obtaining contractor laboratory analyses of environmental and SNM samples,
- and expanding the use of state contracts for the analysis of environmental samples, as well as in the deployment and retrieval of radiation measuring devices at operating reactor sites.

At construction sites, independent measurements will be performed in the area of both destructive and non-destructive testing of contractor work products. Non-destructive examinations will be performed by NRC inspectors, normally at the site, whereas destructive examinations will be performed in contractor laboratories. In FY 1982 IE will also expand inspections at construction sites to perform environmental qualification tests of safety related equipment.

It is believed that direct verification inspections at reactor sites have a direct positive effect on how the licensee conducts his activities and will result in improved safety at reactor facilities.

The Revised Inspection Program also included the Performance Appraisal Team that: evaluates licensees from a national perspective; evaluates the effectiveness of the IE inspection program, and confirms inspector objectivity. In evaluating the performance of licensees, IE will seek to identify those qualities that determine better performance thus enabling IE to better allocate its inspection work force and to make available to industry the qualities that lead to better performance.

The components of the Revised Inspection Program are now fully integrated with other inspection and enforcement activities and as such is no longer recognized as a separate program.

Specific program descriptions for each of IE's major programs are provided below.

<u>Reactor Engineering and Construction Program</u>	FY 1980 = \$729 (147)	FY 1981 = \$395 (180)	FY 1982 = \$1,010 (192)
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NRC rules and regulations require licensees to construct nuclear reactors in such a manner that when they become operational they will pose no threat to the public and the environment. The resources reflected in this Program are required to: (a) adequately inspect, enforce, and evaluate the construction of nuclear

(Dollars in Thousands, except whole dollars in narrative material)

INSPECTION AND ENFORCEMENT - continued

power plants, thereby assuring the public that licensees are fulfilling this aspect of their responsibilities; and (b) adequately inspect certain licensee vendors and contractors to assure that they maintain adequate controls to produce nuclear products and services of sufficient quality to assure public health and safety.

The reactor construction inspection program consists of conducting both routine inspections (scheduled) and reactive (unscheduled) inspections/ investigations. The routine component consists of a series of preplanned audit type inspections designed to assure that licensees have the required controls in place to prevent adverse situations from occurring. It is comprised of multidisciplinary inspections conducted on a schedule consistent with the licensee's construction activities plus inspections of reactors that have progressed beyond the construction phase. For these reactors, the inspections are conducted during baseline and in-service examinations as well as during periods of major modification. The reactive component consists of both inspections and investigations conducted in response to events and conditions that generally emanate from either licensee reported events, allegations of licensee noncompliance, or generic problems.

Nuclear reactors inspected are those in the stage prior to receiving a construction permit, but authorized to proceed with construction work under a limited work authorization (LWA), those in early construction (first two years), mid-construction (third and fourth years), late construction (fifth and sixth years), and those in pre-operational testing as well as those with operating licenses.

Reactor construction inspections are performed by both region-based and resident inspectors. Construction residents assume a small portion of the inspection activity previously conducted by region based inspectors and provide a substantial increase of direct verification of licensee performance through direct observation and independent measurements. The region based support consists of in-depth, specialized technical inspections.

The reactor construction evaluation program consists of reviews of licensee performance, inspection and enforcement experience, and data relating to the licensee's compliance with NRC rules and regulations, to improve both licensee performance and regulatory effectiveness.

IE continues to place importance on increasing direct observation and independent measurements of construction work as it is being performed at the site. A major portion of this increased effort is achieved through the assignment of resident inspectors. FY 1980 construction resident assignments and the plan for FY 1981 and FY 1982 are as follows:

FY 1980
19

FY 1981
24

FY 1982
32

In addition to region based and resident inspections, licensee problems/ corrective actions and performance will be routinely evaluated. Other activities such as improved field feedback to Headquarters, licensee performance evaluation from a national perspective, and evaluation of inspection program implementation will be accomplished. Program Support and technical equipment funds will be used to conduct independent measurements such as: ultrasonic testing of welds and joints; radiography analysis; testing of environmentally sensitive equipment; chemical, metallurgical and physical tests of concrete, steel, and safety related piping; composition, strength, and fracture toughness of materials used in construction; sensitization tests of stainless steel material samples to determine if they are susceptible to intergranular attacks; and weld metal tests.

Another aspect of NRC's inspection program is known as the Licensee Contractor and Vendor Inspection Program (LCVIP). This program was established in FY 1974 because a significant number of problems at licensee facilities were traced to faulty work by contractors and vendors utilized by the licensee in facility design, construction and testing. The NRC relies heavily on the LCVIP program to attest to the quality of safety related components manufactured offsite. Approximately 50% of the safety related equipment problems that are reported can be attributed to vendor activities. Utility licensees have not proven effective in dealing with many generic problems primarily because they do not have the broad perspective needed to recognize and deal with these issues. Inspectors review documented procedures, interview personnel, and examine both designs and hardware to determine if adequate quality control procedures have been prepared and are being followed. Licensees remain responsible for product acceptance.

The LCVIP consists of conducting both routine inspections (scheduled) and reactive (unscheduled) inspections/ investigations. The routine component consists of a series of preplanned audit type inspections to assure that licensees have the required controls in place to assure quality products and services. The reactive component consists of both inspections and investigations conducted in response to events and conditions that generally emanate from either licensee reported events, allegations of licensee noncompliance, or generic problems. NRC presently conducts a minimal program of inspection for vendors, architect engineers and nuclear steam system suppliers. Approximately 250 inspections are conducted annually by NRC inspectors. Emphasis is placed on the inspections of architect engineers and nuclear steam system suppliers. Added emphasis is placed on allocating inspection resources in response to feedback of licensee problems.

In FY 1977, NRC initiated what was to be a two-year trial program with the American Society of Mechanical Engineers (ASME) to test the use of third-party inspection systems as a means of supplementing the LCVIP. Adoption of the third-party inspection systems would expand and strengthen NRC inspection of mechanical component manufacturers with only limited additional NRC resources. The ASME trial program was not concluded in FY 1979 as initially anticipated. It is being continued until the ASME program can be accepted. Anticipating ultimate success, this program will be established on a routine basis and serve as a model for exploring the possible use of other third-party inspection systems.

INSPECTION AND ENFORCEMENT - continued

The Reactor Engineering and Construction Program includes developing and administering inspection programs and policies; conducting inspections; investigating incidents, accidents, allegations and unusual circumstances; enforcing NRC orders, rules, regulations and license provisions; recommending changes in licenses and standards; evaluating licensee performance nationally; and notifying licensees of generic problems. This Program includes all field resources applied to construction inspections/investigations and inspection of licensee contractor and vendor activities that are not conducted at the construction site -- inspectors, branch and section chiefs, direct clerical support personnel and technical equipment funds. It also includes headquarters program development and management personnel plus Program Support and Technical Equipment funds dedicated to this program.

Workload for the Reactor Engineering and Construction Program is displayed below:

<u>Power Reactors</u>	<u>FY 80¹</u>	<u>FY 81¹</u>	<u>FY 82¹</u>
Pre-construction Permit Units	5.50	0	0
Early Stage Units	25.50	24.50	19.75
Mid Stage Units	28.00	25.00	18.50
Late Stage Units	22.75	21.25	22.50
Pre-operation Test Units	15.50	14.75	14.50
Units with Operating Licenses	76.25	81.50	91.75
<u>Vendors and Contractors</u>			
NSSS's & AE's	15	18	20
Fuel Suppliers	5	6	6
Component Suppliers	150	150	160
ASME Vendors	10	10	12

¹Power reactor workloads are calculated on a quarterly basis to incorporate any phase changes that are projected within each year. For example, a reactor unit projected to be in the pre-operation test phase in the first quarter is counted as .25 units against that phase with the remaining .75 counted against reactor units with an OL. This method of workload identification makes manpower planning more precise.

An additional twelve (12) positions are requested for FY 1982. These positions will be used to expand the resident inspection program for reactors under construction so that by the end of FY 1982 every power reactor site will have at least one resident inspector.

<u>Reactor Operations Program</u>	FY 1980 = \$366 (273)	FY 1981 = \$415 (287)	FY 1982 = \$275 (296)
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NRC rules and regulations require licensees to operate their facilities and use nuclear material in a safe manner. The resources reflected in this Program are required to adequately inspect, enforce, and evaluate the operational safety of nuclear reactors thereby assuring the public that licensees are fulfilling this aspect of their responsibilities.

The reactor operations inspection program consists of conducting both routine (scheduled) and reactive (unscheduled) inspections/investigations. The routine component consists of a series of preplanned, audit type inspections designed to assure that licensees have the required controls in place to prevent adverse situations from occurring. The reactive component consists of both inspections and investigations conducted in response to events and conditions that generally emanate from either licensee-reported events, allegations of licensee noncompliance, or generic problems.

Nuclear reactors inspected are: power reactors in pre-operational testing, startup testing, and commercial power operation and non-power reactors.

Reactor operational safety inspections are being performed by both region based and resident inspectors. Resident inspectors not only assume a portion of the inspection activity previously conducted by region based inspectors, but also provide increased verification of licensee performance through direct observation. The region based support consists of in-depth, specialized technical inspections.

The operational inspections performed at power reactors are "phase" oriented. During the pre-operational and startup testing phases, inspection emphasis is placed on test management, procedures and results. Licensee tests are witnessed, test results are independently evaluated and licensee evaluations of test results are reviewed. During the commercial power operation phase, the inspection program focuses on: periodic verifications of licensee and system performance by means of direct NRC observations; reviews of basic systems and procedures that licensees follow to be certain that they conform with requirements and are technically sound and properly implemented; analyses of records of licensee operations and interviews of licensee personnel to confirm that prescribed procedures are routinely followed; and examinations of licensee review and audit committee actions, changes to the quality assurance program and personnel/organization changes.

(Dollars in Thousands, except whole dollars in narrative material)

INSPECTION AND ENFORCEMENT - continued

The reactor operations evaluation program consists of reviews of licensee performance, licensee event reports, inspection and enforcement experience, and data relating to the licensee's compliance with NRC rules and regulations to improve both licensee performance and regulatory effectiveness.

The Reactor Operations Program include developing and administering inspection programs and policies; conducting inspections; investigating incidents, accidents, allegations and unusual circumstances; enforcing NRC orders, rules, regulations and license provisions; recommending changes in licenses and standards; evaluating licensee performance nationally; and notifying licensees of generic problems. This Program includes all field resources applied to reactor operational safety inspections/investigations -- inspectors, branch and section chiefs, direct clerical support personnel and technical equipment funds. It also includes headquarters program development and management personnel plus Program Support funds dedicated to this program.

Workload for the Reactor Operations Program is displayed below:

<u>Power Reactor Units</u>	<u>FY 80¹</u>	<u>FY 81¹</u>	<u>FY 82¹</u>
Pre-operation Test Units	15.50	14.75	14.50
Startup Units	6.25	6.00	10.25
Operating Units	70.00	75.50	81.50
Non-power Reactor Units	84.00	84.00	84.00

¹These workloads are calculated on a quarterly basis to incorporate any phase changes that are projected within each year. For example, a reactor unit projected to be in the pre-operation test phase in the first quarter is counted as .25 units against that phase with the remaining .75 counted against reactor units with an OL. This method of workload identification makes manpower planning more precise.

IE's Revised Inspection Program is and will continue to be to increase direct observation of licensee plant operations at each nuclear reactor unit. The majority of this increased effort will be accomplished through the assignment of resident inspectors who provide added inspection coverage in seven main areas:

- (1) Engineered Safety Feature Observation and Independent Assessment
- (2) Surveillance Test Observation
- (3) Technical Specification and Operating Parameter Check
- (4) Maintenance Overview
- (5) Jumper and Bypass Control
- (6) Operating Procedure Adherence
- (7) Startup and Pre-operational Testing

By conducting these types of inspection activities and providing some inspection coverage on each shift, it is believed that the assurance of safety equipment operability will be significantly improved.

FY 1980 operations resident assignments and the plan for FY 1981 and FY 1982 are as follows:

<u>FY 1980</u>	<u>FY 1981</u>	<u>FY 1982</u>
116	136	148

An additional nine (9) positions are requested for FY 1982 to assign residents to new operating sites. In FY 1982 program support funds will be used to develop and test new direct verification inspection procedures based on an assessment of the relative safety significance of reactor systems and components. Program Support funds will be used to evaluate potential sources of human error, as they relate to operating reactor safety, and thereby revise the direct verification role of resident inspectors to focus on these areas.

<u>Radiological Safety Program</u>	FY 1980 = \$2,811	FY 1981 = \$1,898	FY 1982 = \$2,594
	(199)	(203)	(206)

NRC rules and regulations require licensees to operate their facilities and use nuclear materials in a safe manner. The programs and resources reflected in this Program are required to adequately inspect, enforce, and evaluate the use of nuclear materials at fuel cycle facilities, materials licensees, and nuclear reactors, thereby assuring the public that licensees are fulfilling this aspect of their responsibilities.

INSPECTION AND ENFORCEMENT - continued

The Radiological Safety inspection program consists of conducting two types of inspections; (1) safety inspections (including transportation) at fuel facilities and materials licensees and (2) reactor health physics inspections which examine licensee's radiation/environmental protection, environmental monitoring, and radwaste processing and control programs. The routine component consists of a series of preplanned audit type inspections designed to assure that licensees have the required controls in place to prevent adverse situations from occurring. The reactive component consists of both inspections and investigations conducted in response to events and conditions that generally emanate from either licensee-reported events, noncompliance findings, allegations of licensee noncompliance, unsafe operations, and generic problems.

Fuel facilities inspected are: uranium mills; uranium hexafluoride facilities; fuel processing and fabrication (uranium and plutonium) facilities; spent fuel reprocessing facilities; short-term fuel storage facilities; and facilities for storage and disposal of high level radioactive wastes. The inspection program for fuel facilities presently requires, in frequency of inspection, four inspections per year of reprocessing, plutonium processing and fuel fabrication plants; three inspections per year of uranium processing and fuel fabrication plants; and one inspection each year of uranium hexafluoride conversion plants, uranium mills, reactor fuel storage sites, R&D facilities, and decommissioned facilities.

Materials licensees are those authorized by the NRC to possess and use byproduct, source and special nuclear materials in radiography, medical, academic, and industrial applications as well as to operate low-level nuclear waste disposal facilities. Inspection frequency and depth for these licensees are based on risk potential. The highest risk category, priority 1 (about 25 licensees) is inspected twice each year; priority 2 (about 350 licensees) is inspected once each year; priority 3 (about 200 licensees) is inspected once every two years; priority 4 (about 3500 licensees) once every three years; priority 5 (about 100 licensees) once every five years; priority 6 (about 1200 licensees) once every 10 years. The remaining licensees (about 3500) in the lowest frequency grouping (priority 7) are not routinely inspected, but 5% are inspected on a sample basis each year.

Nuclear reactors inspected are power reactors in pre-operational testing, startup testing, and in commercial power operation, as well as non-power test and research reactors. In January, 1980, IE modified the routine Health Physics inspection program at operating reactors by initiating special team appraisals using contractual assistance. Through this comprehensive evaluations have been conducted and generic problems have been identified to serve as a vehicle to make further improvements in NRC requirements and guidance. The contracted on-site inspections at power plants will be completed in February, 1981. Starting in FY 1981, additional emphasis was also placed on inspection of health physics programs by expanding the amount of direct verification that resident inspectors performed relative to radiation safety. Residents now conduct about 30 man-days per year of direct inspection, looking at in-plant health physics, emergency preparedness, radwaste transportation, and environmental monitoring programs at operating reactors.

The evaluation program consists of reviews of licensee performance, inspection and enforcement experience, and data relating to the licensee's compliance with NRC rules and regulations, to improve both licensee performance and regulatory effectiveness.

The Radiological Safety Program includes developing and administering inspection programs and policies; conducting inspections; investigating incidents, accidents, allegations and unusual circumstances; enforcing NRC orders, rules, regulations and license provisions; recommending changes in licenses and standards; evaluating licensee performance nationally; and notifying licensees of generic problems. This Program includes all field resources applied to radiological safety inspections/investigations -- inspectors, branch and section chiefs, direct clerical support personnel, and technical equipment funds. It also includes headquarters program development and management personnel plus Program Support funds dedicated to this program.

Workload for the Radiological Safety Program is displayed below:

<u>Fuel Facilities</u>	<u>FY 1980 ^{1/}</u>	<u>FY 1981 ^{1/}</u>	<u>FY 1982 ^{1/}</u>
Fuel Reprocessing	4	4	4
Plutonium Processing	7	7	7
Uranium Processing	16	16	16
UF-6 Processing	2	2	2
Uranium Mills	13	13	13
R&D Facilities	4	4	4
Fuel Storage Facilities	2	2	2
Decommissioned Facilities	2	2	2
<u>Materials Licensees</u>			
Manufacturing & Distribution, Academic, Other	3,753	3,373	3,474
Industrial Medical	4,819	4,906	5,053
Radiography/Waste Disposal	378	379	379
Telephone Questionnaire	1,299	1,299	1,299
<u>Reactors</u>			
Pre-op Test Units	15.5	14.75	14.50
Startup Units	4	6.00	10.25
Operating Units	71	75.50	81.25
Non-Power Units	84	84.00	84.00

^{1/}Power reactor workloads are calculated on a quarterly basis to incorporate any phase changes that are projected within each year. For example, a reactor unit projected to be in the pre-operation test phase in the first quarter is counted as .25 units against that phase with the remaining .75 counted against reactor units with an OL. This method of workload identification makes manpower planning more precise.

(Dollars in Thousands, except whole dollars in narrative materials)

INSPECTION AND ENFORCEMENT- continued

In FY 1982, twelve (12) additional manyears are being requested for the resident program (9 resident inspectors and 3 support staff). The three additional manyears requested in this Program are three of the twelve. The other nine are addressed in the Reactor Operations Program. The three manyears represent that portion of the resident program growth that will be used to perform health physics work at reactors coming into the operational phase in FY 1982.

Program Support funds will be used to:

- Continue the support of aerial radiological surveys of reactor and fuel facility sites.
- Continue the support of State contracts and the on and offsite radiation measurement program.
- Continue the support of the Measurement Assurance Program.
- Continue to maintain and calibrate region based environmental monitoring vans.
- Increase the use of contractor laboratories to support expanded independent measurements of licensee activities.

Technical equipment funds will be used to maintain and upgrade region based equipment used to perform independent measurements.

<u>Safeguards Program</u>	FY 1980 = \$995 (90)	FY 1981 = \$1,166 (92)	FY 1982 = \$1,102 (92)
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NRC rules and regulations require licensees to control and account for certain types of special nuclear materials; to protect nuclear materials, reactor facilities and fuel facilities against theft, sabotage, or unauthorized entry; and to ensure that special nuclear material and irradiated fuel are transported safely. The resources reflected in this Program are required to adequately inspect, enforce, and evaluate the safeguarding of nuclear facilities and materials thereby assuring the public that licensees are fulfilling this aspect of their responsibilities.

The Safeguards inspection program consists of conducting two types of inspections: (1) material accountability inspections designed to assure that the licensees are adequately controlling and accounting for special nuclear material; and (2) physical security inspections designed to assure that licensees are adequately protecting facilities and shipments and their contents against theft, diversion and sabotage. Both types of inspections can be routine (scheduled) or reactive (unscheduled). The routine component consists of a series of pre-planned audit type inspections designed to assure that licensees have the required controls in place to permit adverse situations from occurring. The reactive component consists of both inspections and investigations conducted in response to events and conditions that generally emanate either from licensee-reported events, non-compliance findings, allegations of licensee noncompliance or unsafe operations and generic problems.

Facilities inspected include: power reactors in the pre-operational test phase, power reactors with operating licenses, non-power reactors (test and research), spent fuel storage facilities, certain materials licensees, licensees who transport special nuclear material both within and outside the United States and licensees who transport irradiated reactor fuel.

The evaluation program consists of reviews of licensee performance, inspection and enforcement experience, and data relating to the licensee's compliance with NRC rules and regulations to improve both licensee performance and regulatory effectiveness.

The Safeguards Program includes developing and administering inspection programs and policies; conducting inspections; investigating incidents, accidents, allegations and unusual circumstances; enforcing NRC orders, rules regulations and license provisions; recommending changes in licenses and standards; evaluating licensee safeguards performance nationally; and notifying licensees of generic problems. This Program includes all field resources applied to safeguards inspections/investigations -- inspectors, branch and section chiefs, direct clerical support personnel, and technical equipment funds. It also includes headquarters program development and management personnel plus program support funds dedicated to this program.

Workload for the Safeguards Inspection Program is displayed below.

	<u>FY 1980¹</u>	<u>FY 1981¹</u>	<u>FY 1982¹</u>
Pre-Operational Test Reactors	15.50	0	14.00
Reactors with Operating Licenses	86.75	81.50	94.00
Non-power Reactors	70	35	35.00
High Enriched Uranium Fuel Facilities	13	13	13
Low Enriched Uranium Fuel Facilities	6	6	6
Materials and Spent Fuel Storage Facilities	17	37	37
Shipments	70	68	57

¹Power reactor workloads are calculated on a quarterly basis to incorporate any phase changes that are projected within each year. For example, a reactor unit projected to be in the pre-operation test phase in the first quarter is counted as .25 units against that phase with the remaining .75 counted against reactor units with an OL. This method of workload identification makes manpower planning more precise.

(Dollars in Thousands, except whole dollars in narrative materials)

INSPECTION AND ENFORCEMENT - continued

Most Program Support funds will be used by the New Brunswick Laboratory to independently verify measurements that licensees take of special nuclear material in their possession.

Technical equipment funds will be used to buy parts for the regional laboratories and new portable independent measurements equipment.

Enforcement, Investigations & Special

<u>Programs</u>	FY 1980 = \$2,781 (86)	FY 1981 = \$5,207 (134)	FY 1982 = \$6,985 (140)
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Most of the programs and resources described here complement the programs of inspection described above in the Reactor Engineering and Construction, Reactor Operations, Radiological Safety, and Safeguards Programs. It includes the NRC's enforcement program through which notices of violation, civil penalties, and orders are issued, when it is deemed that these sanctions are necessary to assure safety and compliance with NRC requirements. Also included is the investigation function, which augments the inspection activity. It has been organized to systematically collect and examine evidence or other relevant information to uncover the facts and establish the truth concerning a matter of interest to the NRC. Both HQ IE and each regional office have enforcement and investigative staffs who manage and conduct enforcement and investigation activities at their respective levels with technical assistance being provided from each of the major programs as needed. Most investigations are conducted in the regions. Enforcement actions emanate from the regions with the HQ IE staff becoming involved in escalated actions referred to HQ by regional offices.

For the first time this Program includes the resources to centrally manage the Emergency Preparedness Program for the NRC. The people associated with this program; a) issue emergency preparedness Safety Evaluation Reports (SER's) as an input to the licensing process, and b) evaluate emergency preparedness at nuclear power stations to insure adequacy of on-site and off-site plans, procedures and equipment.

This Program also includes the staffing and other resources associated with the management of the NRC's Operations Center and a direct computer link - Nuclear Data Link (NDL) - between the NRC Operations Center and operating power reactors. There is the NRC Operations Center in Bethesda, Maryland and a small operations center in each regional office. The NRC Center is staffed 24 hours/day - 7 days/week by NRC staff personnel who have the experience and expertise to be able to respond to events or accidents that might occur.

In addition, this Program also contains the Performance Appraisal Team (PAT) whose purpose is to focus on licensee performance, inspection program effectiveness and inspector objectivity from a national perspective. The Performance Appraisal Team provides the capability to assess management control systems of nuclear power plant licensees on a national basis. It also provides the NRC with a capability to obtain additional assurance of inspection program consistency and inspector objectivity by conducting comprehensive inspections and comparing their results to those documented in earlier regional/resident inspections.

This Program contains the IE specialized technical training function. Newly hired and existing inspector personnel, as well as other NRC personnel, must be sufficiently knowledgeable of the facilities, processes and activities within their technical purview. Training must be provided to assure that necessary levels of knowledge are developed and maintained. Most personnel hired to be future inspectors do not possess all the technical and regulatory qualifications required to properly perform their duties. Moreover, existing personnel must be kept abreast of current industry state-of-the-art. IE personnel receive this training through classroom instruction by NRC instructors; on-the-job training conducted by senior resident inspectors; technology and codes courses developed and taught by contractors; simulator training by NRC instructors at TVA simulator facilities to enable NRC personnel to obtain "hands on" experience; and programmed self-study training and "off-the-shelf" courses related to the NRC inspection and enforcement program.

Program Support and Technical Equipment funds will be used to develop a small test prototype Nuclear Data Link which will link selected power reactors to the NRC operations center. Remaining Program Support funding will be used to obtain contractual assistance in the review and evaluation of emergency preparedness plans, to develop and conduct specialized technical training courses, to increase utilization of TVA reactor simulation facilities for training purposes and to obtain an independent evaluation of licensee management as an input to IE's overall performance Appraisal activities.

<u>Management Direction & Support</u>	FY 1980 = \$ 0 (73)	FY 1981 = \$175 (80)	FY 1982 = \$425 (80)
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The resources reflected above are used to provide overall support to IE's main functions. For IE Headquarters it includes the Office of the Director, the Director of the Training and Administration Staff and the Director of the Enforcement and Investigations Staff. For the regions, it includes the offices of the regional Directors, regional division directors and the regional administrative staffs. Program Support funds included in this Program are for information system studies, management studies, and effectiveness measurement studies.

The regional administrative support personnel included in this Program are for secretarial support for regional office management personnel, clerical support for personnel assigned to regional offices from other NRC offices, receptionists in each region, and management information coordination.

(Dollars in thousands, except whole dollars in narrative materials)

INSPECTION AND ENFORCEMENT - continued

The Administrative Support funds for regional offices are for: rent and utilities; telephone and non-telephone communications; purchase lease, and maintenance of office equipment; general office equipment; general office supplies and materials; space alterations; and health services.

The Director of I&E is responsible for overall program management. The Director, Training and Administration Staff and the Director, Enforcement and Investigations Staff provide necessary technical and administrative services. They:

- Develop policy for and assist in investigations and enforcement actions.
- Provide technical liaison with NRC's Office of Research and with other agencies (e.g., EPA, DOT)
- Respond to Freedom of Information Act (FOIA) request
- Maintain and distribute the IE Inspection Manual
- Provide centralized headquarters administrative support (e.g., file room, mail distribution, word processing)
- Plan, budget, evaluate and control resource utilization
- Administer contracts
- Operate an office-wide management information system
- Operate the NRC Operations Center for incident response
- Conduct studies on alternative policies and programs

The Offices of the Regional Directors are responsible for executing the inspection and enforcement programs and for managing assigned resources. The Regional Directors also serve as the NRC's senior official in their respective geographical areas.

(Dollars in Thousand, except whole dollars in narrative material)

Nuclear Regulatory Commission - continued

Nuclear Material Safety and Safeguards \$46,700

Summary of Nuclear Material Safety and Safeguards Estimates by Function

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Salaries and Benefits.....	\$ 9,521	\$11,910 ^{1/}	\$13,050
Program Support.....	13,190	17,095	24,040
Administrative Support.....	5,293	3,155	9,075
Travel.....	403	560	535
Equipment.....	0	0	0
Total Obligations.....	\$28,407	\$38,720	\$46,700
Personnel.....	(264)	(329)	(329)

The Office of Nuclear Material Safety and Safeguards is responsible for the health and safety licensing of all NRC-regulated activities except reactors and for the total safeguards licensing for all licensees including reactors. In addition, it exercises lead NRC responsibility for the transportation of nuclear materials. These licensing and regulating responsibilities include such cases as the licensing of the national high-level waste repository, fuel reprocessing plants, away-from-reactor storage facilities, uranium mills, and fuel manufacturing plants, as well as a wide range of radioisotope uses. Safeguards responsibilities include the review and assessment of safeguards against potential threats, thefts and sabotage involving licensed facilities and materials.

To carry out these responsibilities and other statutory requirements, NMSS has established and manages three major programs: Fuel Cycle and Material Safety, Safeguards, and Waste Management. These programs are managed and supported by the Management Direction and Support Program. The narrative that follows provides justification for the resources required for these programs and their component program elements.

Programs	Actual FY 1980		Estimate FY 1981		Estimate FY 1982	
	Dollars	People	Dollars	People	Dollars	People
Fuel Cycle and Material Safety.....	\$ 2,471	86	\$ 4,250	102	\$ 4,330	105
Safeguards.....	1,801	94	2,510	102	2,735	94
Waste Management.....	8,768	70	10,235	106	16,875	111
Management Direction and Support...	150	14	100	19	100	19
Totals	\$13,190	264	\$17,095	329	\$24,040	329

Summary of Fuel Cycle and Material Safety Program

Program Elements	Actual FY 1980		Estimate FY 1981		Estimate FY 1982	
	Dollars	People	Dollars	People	Dollars	People
Fuel Cycle Licensing.....	\$1,731	34	\$3,595	42	\$2,025	41
Transportation Certification.....	195	12	305	17	305	17
Radioisotopes Licensing.....	545	40	350	43	2,000	47
Total	\$2,471	86	\$4,250	102	\$4,330	105
Fuel Cycle Licensing.....	FY 1980 = \$1,731 (34)		FY 1981 = \$3,595 (42)		FY 1982 = \$2,025 (41)	

The goal is to protect the health and safety of workers and of the public and to protect the environment through the administration of an effective licensing program for fuel cycle plants. This includes: performing safety and environmental reviews on new, existing, and formerly licensed facilities; performing radiological assessments of formerly licensed sites and selected DOE sites; developing radiological contingency plans for coping with accidents; improving the efficiency and effectiveness of the licensing process; and formulating and coordinating standards and regulatory research requirements for resolving fuel cycle issues.

The major objectives are to:

- (1) Perform safety and environmental assessments for fuel cycle licensing decisions and remedial actions. This includes: performing safety reviews and environmental analyses of initial, renewal and amendment applications; identifying formerly licensed sites which are contaminated, planning and approving remedial actions for these sites, and reviewing remedial actions planned by DOE for selected DOE sites; implementing new regulations developed by NRC or other agencies for limiting environmental releases and personnel exposures; and developing and implementing improved radiological contingency planning; and
- (2) Provide technical support for licensing actions and rule making activities. This includes: resolving generic and specific fuel cycle issues; improving the efficiency and effectiveness of the licensing process; and implementing recommendations applicable to fuel cycle operations that are identified by the Three Mile Island (TMI) Action Plan (Task IV.C.).

^{1/} Includes \$400,000 for FY 1981 Pay Raise Supplemental.

Nuclear Material Safety and Safeguards - continued

- (1) Completed 26 major and 89 minor fuel cycle licensing actions within established review times; continued the review of docket files of former byproduct, source and special nuclear material licenses to identify ones which do not contain adequate documentation that facilities were properly decontaminated when decommissioned; issued orders implementing new EPA Radiation Protection Standards for the uranium fuel cycle (40 CFR 190) to licensees affected by this regulation; developed an improved interim capability for incident response and radiological contingency planning requirements for licensees needing such plans; and
- (2) Contributed to the NRC Report to Congress on Alternative Fuel Cycles; developed estimates of fuel cycle costs and provided testimony in support of reactor licensing; reviewed broad nuclear fuel cycle environmental studies and statements; began a study to develop alternatives for waste management within waste-generating institutions; formulated and coordinated requirements for confirmatory research and standards in support of fuel cycle licensing; and reviewed value-impact analyses for new regulations and regulatory guides.

- (1) Complete approximately 35 major and 70 minor licensing actions for uranium fuel cycle plants and facilities; complete the review of former byproduct, source, and special nuclear material licensee docket files; conduct radiological surveys of selected formerly licensed sites to evaluate radioactive contamination; conduct reviews of proposed actions for sites identified in the DOE Remedial Action Program; and continue implementation of radiological contingency planning requirements for licensees needing such plans; and
- (2) Continue the development of alternatives for waste management within waste-generating institutions; conduct a review of licensing procedures for fuel cycle plants; and continue to formulate and coordinate requirements for confirmatory research and standards in support of fuel cycle licensing.

- (1) Complete approximately 30 major and 100 minor licensing actions for uranium fuel cycle plants and facilities; continue to evaluate remedial actions for former licensee sites and known contaminated sites and review remedial actions planned by DOE for selected DOE sites to enable completion of the DOE program in FY 1985; and continue development and implementation of improved radiological contingency planning with emphasis on formalizing requirements and in implementing and testing plans and providing assistance to Agreement States; and
- (2) Continue to develop alternatives for waste management within waste-generating institutions; respond to information requests from other offices, agencies and Congress; maintain a system for evaluation of licensee operational data and event reports and the integration of appropriate findings into the review and licensing process; and implement recommendations, as appropriate, of the TMI Action Plan.

The goal is to perform safety reviews for package designs and operations for shipment of radioactive materials in quantities defined in 10 CFR Part 71 to assure they meet established NRC standards; to review package certification procedures and package standards; and to develop, maintain, and improve package analysis methods to assure quality and timely reviews.

- (1) Conduct safety reviews of major package (e.g., spent fuel cask, plutonium package, high-level waste, etc.) designs within one year and of other designs within four months, and maintain a registry of package users; and
- (2) Provide technical expertise for structural, thermal, criticality, and shielding analysis for licensing requests; review licensee quality assurance plans; maintain and improve standardized analysis methods; evaluate the safety effectiveness of regulations, procedures, and methods of analysis; and implement recommendations, as appropriate, from the TMI Action Plan (Task IV.C.).

- (1) Completed 183 safety reviews; and
- (2) Maintained and improved heat transfer, shielding, and criticality codes with various input simplifications for more efficient analysis.

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Material Safety and Safeguards - continued

The significant accomplishments planned during FY 1981 are to:

- (1) Complete approximately 140 safety reviews; and
- (2) Maintain and improve heat transfer, shielding, and criticality programs on a continuing basis; and provide technical and policy input for the Office of Nuclear Regulatory Research's conduct of the Modal Study.

The significant accomplishments planned during FY 1982 are to:

- (1) Complete approximately 140 reviews, including new designs, modifications of existing designs, renewals and administrative amendments; and
- (2) Maintain criticality, shielding and heat transfer programs and data base on a continuing basis; provide technical and policy input for the Office of Nuclear Regulatory Research's conduct of the Modal Study; evaluate the results of the Modal Study and develop appropriate action plans for possible rule making or suggested changes to IAEA rules; and implement recommendations, as appropriate, of the TMI Action Plan.

Radioisotopes Licensing.....	FY 1980 = \$545 (40)	FY 1981 = \$350 (43)	FY 1982 = \$2,000 (47)
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The goal is to assure protection of worker and public health and safety through a system of licensing for the possession, use, transfer, and disposal of radioactive material (byproduct, source, and special nuclear material).

The major objectives are to:

- (1) Perform safety evaluations required for materials licensing. This includes: completing licensing decisions on all cases within an average time of 30 to 45 days; evaluating approximately 200 sealed sources and devices per year on a continuing basis; conducting approximately 70 post-licensing evaluations per year on a continuing basis to confirm the validity of licensing actions; and providing technical assistance and training as requested by Agreement States and
- (2) Provide technical support for licensing actions and rule making activities. This includes: conducting generic studies to improve the licensing process; reviewing and updating existing radioisotope licensing guides, regulations, and standards and developing new ones relative to current safety needs; completing and maintaining a licensing information program to supplement the license application guides with instructional materials, quarterly bulletins, and regional seminars; developing and maintaining standard license review plans; and implementing recommendations, as appropriate, from the TMI Action Plan (Task IV.C.).

The significant accomplishments achieved during FY 1980 were:

- (1) Processed 4,614 licensing applications with an average turnaround time of 95 days from receipt; evaluated 133 sealed sources and devices; conducted 44 post-licensing evaluations to confirm the validity of licensing actions; and continued to furnish technical assistance and training to Agreement States; and
- (2) Continued studies to examine how operations at radiopharmaceutical facilities can be carried out to maintain occupational exposures and effluent releases at "as low as reasonably achievable" (ALARA) level, to improve the evaluation of sealed sources and devices, and to develop NRC policy on consumer products containing radioactive material; and developed new licensing guides and amendments to regulations.

The significant accomplishments planned during FY 1981 are to:

- (1) Process approximately 4,100 licensing applications and reduce the turnaround time to 30 to 45 days; evaluate approximately 55 sealed sources and devices; conduct approximately 70 post-licensing evaluations; and continue to provide assistance and training to Agreement States; and
- (2) Complete studies to examine the application of ALARA for occupational exposures and effluent releases at radiopharmaceutical manufacturers and to develop NRC policy on consumer products; continue the study to improve methods for evaluating and licensing sealed sources and devices; initiate a study of the general license concept; continue to develop new licensing guides and amendments to regulations; and initiate an information program for licensees concerning licensing requirements and the licensing process.

The significant accomplishments planned during FY 1982 are to:

- (1) Review approximately 4,100 applications and take licensing actions in a timely manner so as to prevent delays in essential services; evaluate approximately 200 sealed sources and devices; review environmental reports submitted by applicants and prepare independent environmental impact assessments and/or environmental impact statements for materials licensees in categories required by 10 CFR Part 51; conduct approximately 70 post-licensing evaluations per year to confirm the validity of licensing actions and to determine whether current licensing practices are necessary and sufficient to adequately protect public health and safety with minimum government regulation; and provide assistance and training to Agreement States; and
- (2) Complete a program to improve the evaluation and certification of sealed sources and devices; continue a study of the general license concept; review, revise, and develop guides, regulations, and standards necessary to keep current with changing conditions in the field; and implement recommendations, as appropriate, of the TMI Action Plan.

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Material Safety and Safeguards - continued

Program Elements	Summary of Safeguards Program					
	Actual FY 1980		Estimate FY 1981		Estimate FY 1982	
	Dollars	People	Dollars	People	Dollars	People
Material Control and Accounting.....	\$ 781	46	\$ 728	50	\$1,140	42
Physical Security.....	1,020	48	1,782	52	1,595	52
Total.....	\$1,801	94	\$2,510	102	\$2,735	94
Material Control and Accounting.....	FY 1980 = \$781 (46)		FY 1981 = \$728 (50)		FY 1982 = \$1,140 (42)	

The goals are to assure the protection of the public health and safety and promote the common defense and security through the development, implementation, and maintenance of effective material control and accounting (MC&A) programs at licensed power reactors, nonpower reactors, and fuel cycle facilities; and to support international safeguards and nonproliferation objectives through participation with other U.S. agencies in programs to strengthen international safeguards.

The major objectives are to:

- (1) Perform timely MC&A safeguards licensing casework reviews required for new rules, licensee applications, and remedial issues identified by inspections and evaluations; conduct reviews associated with the international program, retransfer requests and International Agreements for Cooperation; implement and maintain International Atomic Energy Agency (IAEA) MC&A programs in licensed facilities, and support and strengthen IAEA safeguards in order to achieve U.S. nonproliferation objectives; develop and maintain a nuclear materials data base and information system for domestic and international safeguards use; analyze and evaluate MC&A data and facility procedures to determine the adequacy of implemented programs; and
- (2) Resolve safeguards issues raised by the staff, Congress, and the public; use value/impact analyses to develop and formulate regulations and licensee guidance responsive to the issues; develop MC&A research requirements and coordinate the use of products in the regulatory base; perform interagency planning in anticipation of technical and industry changes which affect MC&A programs; provide integrated program planning and management for the NRC Domestic Safeguards Program Area.

The significant accomplishments achieved during FY 1980 were:

- (1) Completed 127 licensing cases; completed 141 reviews associated with the international program; provided safeguards consultation to IAEA and foreign countries in support of U.S. nonproliferation goals; and developed procedures for preparation of country analyses describing status of IAEA safeguards implementation;
- (2) Continued efforts on issues which included the ability to promptly detect losses of nuclear material, protection of MC&A systems against a collusion of insiders, and contingency planning to respond to alarms; completed 33 cases concerning generic casework for Category I Fuel Cycle Materials; planned, coordinated, and developed eight new MC&A regulatory research requirements; conducted agencywide reviews for about 50 MC&A research and technical assistance projects to ensure maximum utility of the projects and prevent duplication; and provided management for integration and coordination of the NRC Domestic Safeguards Program.

The significant accomplishments planned during FY 1981 are to:

- (1) Complete approximately 100 licensing cases which will include the review of MC&A programs submitted in response to the Part 73 Upgrade Rule; complete approximately 190 reviews associated with the international program; initiate/implement action of the US/IAEA Safeguards Agreement in licensed facilities, and provide safeguards consultation to IAEA and foreign countries in support of U.S. nonproliferation goals; improve the model to analyze MC&A data; process reports for licensee transfers of material, and carry out initial technical development of an Integrated Safeguards Information System (ISIS); and
- (2) Continue efforts on issues which include the ability to promptly detect losses of nuclear material, protection of MC&A systems against a collusion of insiders, and contingency planning to respond to alarms; complete approximately 40 cases concerning generic casework for Category I, II/III Fuel Cycle Materials; conduct about 50 MC&A research and technical assistance agencywide project reviews; continue Domestic Safeguards Program Area management; prepare and implement an agencywide NRC Domestic MC&A Safeguards Program Plan for FYs 1983-1987.

The significant accomplishments planned during FY 1982 are to:

- (1) Review approximately 100 license amendment cases including those required to meet 10 CFR Part 70 Upgrade Rule; implement the US/IAEA Safeguards Agreement by reviewing facility MC&A design information and by preparing facility attachments for facilities selected by the IAEA; complete approximately 190 reviews

Nuclear Material Safety and Safeguards - continued

associated with the international program; continue to participate in U.S. efforts to strengthen international safeguards; conduct MC&A field assessments at two fuel facilities using improved evaluation and synthesis methods; analyze MC&A Inventory Difference and other accounting data at three facilities to assess impact of implementation of the Upgrade Rule; continue to operate and improve the Nuclear Material Management Safeguards System (NMMSS) information system for domestic and international safeguards; process reports for licensee transfers of material; process approximately 25 IAEA reports from the 200 eligible facilities; monitor the technical performance of the ISIS contractor; and

- (2) Process approximately 40 cases concerning generic issues for Category I, II/III Fuel Cycle Materials; plan and manage an MC&A research program to ensure maximum utility of the results; continue agencywide review of the overall NRC safeguards research and technical assistance program; provide integrated program planning and management for the NRC Safeguards program area; implement an agencywide NRC Domestic MC&A Safeguards Program Plan for FYs 1984-1988; and pursue new MC&A technology to meet changing safeguards needs.

Physical Security.....	FY 1980 = \$1,020 (48)	FY 1981 = \$1,782 (52)	FY 1982 = \$1,595 (52)
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The goals are to assure the protection of the public health and safety and promote the national security through the development, implementation and maintenance of effective physical security programs at licensed power reactors and nonpower reactors, fuel facilities, and during the shipments of Special Nuclear Material (SNM); and to support nonproliferation objectives and physical protection of nuclear material by other countries through participation with other U.S. agencies in programs to strengthen international safeguards.

The major objectives are to:

- (1) Perform safeguards licensing casework reviews for physical protection, contingency, and guard training plans as well as for remedial actions; conduct reviews of international physical security import/export license applications, retransfer requests, International Agreements for Cooperation, and in-country evaluations of foreign physical protection programs in support of nuclear nonproliferation objectives; develop threat assessments and carry out contingency planning in support of both domestic and international activities; evaluate in-place protection systems throughout the licensed industry to establish the adequacy of the regulatory requirements from a systems standpoint in countering the design basis threat; and
- (2) Resolve safeguards issues raised by the staff, Congress, and the public, use value/impact analyses to develop and formulate regulations and licensee guidance responsive to the issues; develop physical security research requirements and coordinate the use of products in the regulatory base and perform interagency planning in anticipation of technical and industry changes which affect physical security programs; provide integrated program planning and management for the NRC Domestic Safeguards Program Area.

The significant accomplishments achieved during FY 1980 were:

- (1) Completed 240 licensing cases; completed 209 activities associated with transportation of SNM; completed eight vital area analyses of power reactors; completed 203 physical protection reviews associated with the international program; completed and published the study of the "Potential Threat to Nuclear Activities from Insiders"; completed applications for contingency planning relative to transport of nuclear materials by contact with 250 state law enforcement agencies involving route surveys of approximately 11,000 road miles covering 27 routes; completed four interagency agreements; completed vulnerability assessments of safeguards at three nuclear facilities; completed two field tests of vulnerability assessment techniques for nuclear power plants; and
- (2) Completed 51 cases involving generic casework for Category I, II/III facilities, nonpower reactors and spent fuel shipment issues; published rules, implementation guidance and provided testimony involving spent fuel shipments, reactor safeguards, transient shipments, strategic SNM, and Category II/III material; planned and coordinated agency physical security research programs; conducted approximately 50 research and technical assistance agencywide project reviews; provided management for integration and coordination of NRC Domestic Safeguards Program in physical security area.

The significant accomplishments planned during FY 1981 are to:

- (1) Complete approximately 250 licensing actions of all types for fixed sites; complete approximately 350 licensing actions associated with transportation of SNM; complete about 13 vital area analyses for power reactors; complete approximately 190 reviews associated with the international program; complete about four foreign in-country analyses; evaluate local law enforcement agency contingency planning; complete about 13 vulnerability assessments of safeguards at nuclear facilities; validate SNM vault systems and complete a Security Force Study; and
- (2) Complete approximately 40 cases involving generic issues for Category I, II/III facilities, reactors and spent fuel shipments; publish rules, implementation guidance and provide testimony dealing with spent fuel shipments, reactor safeguards, transient shipments, strategic SNM, and Category II/III material; plan and coordinate physical security research programs; conduct approximately 50 research and technical assistance agencywide project reviews; implement an agencywide NRC Domestic Physical Security Safeguards Program Plan.

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Material Safety and Safeguards - continued

The significant accomplishments planned during FY 1982 are to:

- (1) Complete approximately 270 licensing actions of all types for fixed facilities; conduct approximately 35 spent fuel plan reviews and monitor approximately 376 spent fuel shipments; complete analysis of vital components and systems for approximately six power reactors; complete approximately 190 physical protection reviews associated with the international program; evaluate local law enforcement contingency planning; assess the vulnerability of about five fuel facilities, and 13 power reactors; validate the performance of two types of critical safeguards components/systems; and
- (2) Complete approximately 40 cases involving generic issues for Category I, II/III facilities, reactor and spent fuel shipments; plan and manage the physical security research program to ensure maximum utility of results; continue agencywide review of the NRC physical security research and technical assistance program; provide integrated program planning and management for the NRC Safeguards Program Area physical security program activities; prepare and implement an agencywide NRC Domestic Physical Security Safeguards Program Plan; and pursue new physical security technology to meet changing safeguards needs.

Summary of Waste Management Program

Program Elements	Actual FY 1980		Estimate FY 1981		Estimate FY 1982	
	Dollars	People	Dollars	People	Dollars	People
High-Level Waste Management.....	\$ 5,274	28	\$ 5,990	40	\$10,640	39
Low-Level Waste Management.....	1,517	26	1,975	28	4,000	38
Uranium Recovery Licensing.....	1,977	22	2,270	38	2,235	34
Total.....	\$ 8,768	70	\$10,235	106	\$16,875	111
High-Level Waste Management.....	FY 1980 = \$5,274 (28)		FY 1981 = \$5,990 (40)		FY 1982 = \$10,640 (39)	

The goal is to ensure that high-level waste (HLW) is disposed of in such a manner that the EPA standard for releases to the accessible environment will not be exceeded, and so as to have no unacceptable adverse effect on public health and safety.

The major objectives are to:

- (1) Develop a capability for and perform reviews of DOE's site screening and characterization reports and activities on a schedule that will not delay implementation of DOE's program;
- (2) Develop technical and scientific information required for and publish generic regulations and regulatory guidance (technical directives and regulatory guides); and
- (3) Evaluate the overall DOE program content and progress and participate in interagency activities and NRC HLW Management related rule making and licensing proceedings.

The significant accomplishments achieved during FY 1980 were:

- (1) Completed development of models for assessing radionuclide transport in bedded salt, completed an in-house evaluation of these models, and developed an in-house capability to run these models; began initial assessments of DOE's screening activities in two media;
- (2) Published the proposed procedural portion of the high-level waste disposal regulation (10 CFR Part 60) for public review and comment, and published the technical portion as an advanced notice of proposed rule making; completed the technical support for the draft regulatory guide on the Format and Content of Site Characterization Reports, and issued three technical directives; and
- (3) Participated in the interagency preparation and review of the National Plan for Radioactive Waste Management; reviewed and provided comments to DOE on the Draft Generic Environmental Impact Statement (GEIS) on the Management of Commercially Generated Radioactive Waste; and made an assessment of the extent to which DOE's HLW Programs are directed at developing the information necessary to comply with the draft 10 CFR 60.

The significant accomplishments planned during FY 1981 are to:

- (1) Determine the extent to which the completed bedded salt models can be applied to the assessment of radionuclide transport in basalt and domed salt, and begin development of additional models if necessary; prepare a review plan for Site Characterization Reports; expand initial assessments of DOE's screening activities to three media; complete the review of one Site Screening Plan;
- (2) Publish the procedural portion of the high-level waste disposal regulation (10 CFR Part 60) as a final rule and publish the technical portion for public review and comment as a proposed rule, along with the supporting environmental assessment; complete preparation of the final technical rule; complete the regulatory guide on the Format and Content of Site Characterization Reports; and issue three technical directives; and

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Material Safety and Safeguards - continued

- (3) Continue review of the National Plan for Radioactive Waste Management; continue the assessment of the extent to which DOE's HLW programs are directed at developing the information necessary to comply with the draft 10 CFR 60, and continue to provide the results to DOE; review the EPA standard for the disposal of high-level waste; and coordinate with DOE the role each agency will play to comply with the West Valley Demonstration Project Act.

The significant accomplishments planned during FY 1982 are to:

- (1) For basalt: complete the review of the Site Screening Plan; continue to review the DOE site screening investigations; complete the review of the Site Characterization Report, and issue the Director's opinion on the site characterization program. For domed salt and volcanic tuff, continue to review the DOE site screening investigations. For bedded salt, review the site screening plan and the site screening investigations. Begin the development of models for assessing radionuclide transport in welded tuff and granite;
- (2) Complete preparation of the final technical rule and begin public hearings if required; begin development of support for preparation of format and content guides for the license application preliminary safety analysis report (PSAR) and the environmental report; issue three technical directives; and
- (3) Continue the assessment of the extent to which DOE's HLW programs are directed at developing the information necessary to comply with 10 CFR Part 60, and continue to provide the results to DOE; update NRC portions of the National Plan for radioactive waste management; review and comment on the DOE/USGS Earth Science Technical Plan; and complete the formal review of the EPA standard for the disposal of high-level waste.

Low-Level Waste Management.....	FY 1980 = \$1,517	FY 1981 = \$1,975	FY 1982 = \$4,000
	(20)	(28)	(38)

The goal is to assure that low-level waste (LLW) disposal facilities are constructed, operated, and closed in a manner which will protect the public health and safety and the environment.

The major objectives are to:

- (1) Perform thorough, yet expeditious, safety and environmental assessments to provide the basis for licensing and regulatory decisions for low-level waste operations; as requested by the Agreement states, provide technical support to such States to assist them in carrying out their responsibilities; and characterize and analyze disposal of Three Mile Island accident decontamination waste;
- (2) Publish final regulations governing the disposal of low-level wastes by shallow land burial and intermediate depth land burial; and publish final amendments to the regulation governing the disposal of low-level waste by alternative methods; and
- (3) Complete regulatory guides to support the regulation and to support amendments to the regulation. On a continuing basis, provide methodology for evaluation and technical criteria for regulatory positions to facilitate the review of waste disposal operations and NRC licensees generating significant amounts of low-level waste.

The significant accomplishments achieved during FY 1980 were:

- (1) Completed the licensing review of the NRC Hanford SNM license renewal and completed one minor license amendment; provided technical assistance to the states of Kansas, South Carolina, and Washington; continued characterization and analysis of decontamination waste resulting from the Three Mile Island accident;
- (2) Completed a preliminary draft LLW regulation and sent the draft to a wide cross-section of individuals for comment, sponsored and participated in national and regional workshops to discuss the informal draft LLW regulation, and analyzed comments received on the informal draft; and
- (3) Continued to work on regulatory guides in support of the LLW regulation; continued the development of a policy statement of volume reduction; and continued development of the technical basis and methodologies for health, safety and environmental assessments.

The significant accomplishments planned during FY 1981 are to:

- (1) Complete the licensing review of the NRC Barnwell SNM license renewal; complete approximately six minor license amendments, complete approximately one fourth of the review of two anticipated applications for new commercial sites; complete the Sheffield environmental analysis; complete scoping study for assessing NRC licensees generating significant LLW; complete preparation of a proposed policy statement on volume reduction; provide technical assistance to the states of Kansas, South Carolina, Nevada, Washington, and any other Agreement States that request technical assistance; and continue characterization and analysis of decontamination waste resulting from the Three Mile Island accident;

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Material Safety and Safeguards - continued

- (2) Publish a draft low-level waste regulation and draft environmental impact statement (EIS) specifically addressing shallow land burial (SLB) and intermediate depth land burial (IDLB) and analyze comments on the drafts; and determine the scope and extent and initiate development of appropriate amendments to the regulation specifically addressing waste not suitable for disposal in SLB and IDLB sites; and
- (3) Continue development of the technical basis and methodologies for health, safety, and environmental assessments.

The significant accomplishments planned during FY 1982 are to:

- (1) Complete approximately nine licensing decisions (new licenses, renewals, and/or amendments) for LLW disposal facilities; provide technical assistance to Agreement States on approximately eight reviews supporting state's licensing decisions for LLW disposal facilities; continue to characterize and analyze Three Mile Island accident decontamination waste; and continue assessments on NRC licensees generating significant LLW;
- (2) Publish a final LLW regulation and final EIS specifically addressing shallow land burial and intermediate depth land burial; and
- (3) Publish draft and final guides for SLB/IDLB; continue to provide methodology for evaluation and technical criteria for regulatory positions to facilitate the review of waste disposal operations and NRC licensees generating significant LLW.

Uranium Recovery Licensing.....	FY 1980 = \$1,977 (22)	FY 1981 = \$2,270 (38)	FY 1982 = 2,235 (34)
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The goal is to assure that uranium recovery facilities are constructed, operated, and decommissioned in a manner that protects the public health and safety and the environment.

The major objectives are to:

- (1) Make licensing and regulatory decisions to assure that the preceding goal is achieved which includes activities to issue license amendments to bring operating mills into compliance with new EPA radiation standards and regulations from GEIS on Uranium Milling; perform environmental and safety reviews of license amendment requests for proposed facility modifications; review operating facilities' safety and environmental monitoring data and NRC inspection reports and issue license amendments where appropriate action is necessary; perform safety and environmental reviews of license renewal applications; evaluate DOE remedial action plans, as mandated by Public Law 95-604; perform safety and environmental assessments required to provide the basis for licensing decisions for new uranium recovery operations; and provide technical assistance, as requested by Agreement States with respect to uranium recovery facilities, to assure technically satisfactory Agreement States licensing actions; and
- (2) Improve the regulatory basis upon which licensing decisions are made.

The significant accomplishments achieved during FY 1980 were:

- (1) Issued two license amendments to assure compliance with new EPA radiation standards and with regulations from the GEIS on Uranium Milling; issued twelve license amendments in response to requests for proposed facility modifications; issued nine license amendments in response to new requirements resulting from review of monitoring data and inspection reports; issued four license renewals; reviewed the initial phases of several DOE plans in an effort to complete DOE remedial action on 25 abandoned tailing sites; completed two decisions on new applications for uranium recovery operations; provided technical assistance for 21 Agreement State licensing actions; and
- (2) Completed the final GEIS on Uranium Milling and the associated mill tailings regulations.

The significant accomplishments planned during FY 1981 are to:

- (1) Issue approximately 15 license amendments to assure compliance with new EPA radiation standards and with regulations from the GEIS on Uranium Milling; issue approximately 24 license amendments in response to requests for proposed facility modifications; review approximately 140 monitoring and inspection reports and issue license amendments where appropriate action is necessary; issue approximately five license renewals; continue review of several DOE plans in an effort to complete DOE remedial action on 25 abandoned tailing sites; complete approximately five decisions on new applications for uranium recovery operations; and provide technical assistance for approximately nine Agreement State licensing Actions; and
- (2) Begin work on regulatory guides to properly implement the GEIS and regulations and to control uranium mill tailings disposal and mill decommissioning as required by the Uranium Mill Tailings Radiation Control Act of 1978 (UMTRCA).

Nuclear Material Safety and Safeguards - continued

- (1) Issue approximately 11 license amendments to assure compliance with regulations from the GEIS on Uranium Milling; issue approximately 17 license amendments in response to requests for proposed facility modifications; complete approximately 140 monitoring and inspection report reviews and issue license amendments where appropriate action is necessary; issue approximately four license renewals; continue analysis and licensing of DOE remedial action sites; complete approximately six decisions on new facilities; and provide technical assistance for approximately four Agreement State licensing actions; and
- (2) Continue work on regulatory guides to properly implement the GEIS and regulations to control uranium mill tailings disposal and mill decommissioning as required by the Uranium Mill Tailings Radiation Control Act of 1978.

<u>Management Direction and Support.....</u>	FY 1980 = \$150 (14)	FY 1981 = \$100 (19)	FY 1982 = \$100 (19)
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The major objectives are to:

- (1) Provide overall management direction and policy guidance as necessary to achieve NMSS program goals and objectives;
- (2) Conduct special independent technical and management evaluations of program resource utilization to ensure that programs are planned and executed in an efficient manner;
- (3) Manage the NMSS Program Planning and Status Assessment System (PPSAS) which provides NMSS managers with program and resource planning and status assessment information;
- (4) Support NMSS programs by the placement of technical assistance projects with private contractors, DOE laboratories, and other government agencies; and
- (5) Provide administrative and personnel services required to operate NMSS programs.

- (1) Provided policy guidance and management direction to resolve issues and restructure programs as necessary to accomplish the major objectives of NMSS within allocated resources;
- (2) Provided the NMSS Director, at his request, independent technical and management assessments of selected technical programs, proposals and other issues which included the proposed annual budget submission, proposed mid-year financial reprogramming, executive program analysis reports, Congressional budget testimony, and responses to Congressional inquiries;
- (3) Implemented the full operational capability of the PPSAS manpower reporting subsystem for casework;
- (4) Executed 100 procurement actions with private contractors and 103 procurement actions with DOE laboratories; and
- (5) Provided required administrative and personnel services which include responding to FOIA requests, controlling suspense items, controlling classified documents, evaluating resumes, and processing personnel action requests to the NMSS Director and Divisions.

- (1) Continue to provide policy guidance and management direction to resolve issues and restructure programs as necessary to accomplish the major objectives of NMSS within allocated resources;
- (2) Continue to provide the NMSS Director, at his request, independent technical and management assessments of selected technical programs, proposals and other issues;
- (3) Achieve full PPSAS operational capability by integrating the budget subsystem and implementing the reporting subsystem;

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Nuclear Material Safety and Safeguards - continued

- (4) Execute approximately 100 procurement actions with private contractors and the same number with DOE laboratories; and
- (5) Continue to provide required administrative and personnel services.

The significant accomplishments planned during FY 1982 are to:

- (1) Continue to provide policy guidance and management direction to resolve issues and restructure programs as necessary to accomplish the major objectives of NMSS within allocated resources;
- (2) Continue to provide the NMSS Director, at his request, independent technical and management assessments of selected technical programs, proposals and other issues;
- (3) Continue to manage the NMSS Program Planning and Status Assessment System (PPSAS) and provide appropriate management information reports to NMSS program managers and the EDO staff;
- (4) Execute approximately 100 procurement actions with private contractors and the same number with DOE laboratories; and
- (5) Continue to provide required administrative and personnel services.

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Regulatory Commission - continued

Nuclear Regulatory Research \$231,940

Summary of Nuclear Regulatory Research Estimates By Function

	<u>Actual FY 1980</u>	<u>Estimate FY 1981</u>	<u>Estimate FY 1982</u>
Salaries and Benefits	\$ 6,625	\$ 7,595 ^{1/}	\$ 7,840
Program Support.....	173,296	196,953	213,200
Administrative Support.....	2,372	2,545	2,925
Travel.....	379	580	575
Equipment.....	7,696	8,477	7,400
Total Obligations.....	\$190,368	\$216,150	\$231,940
Personnel.....	(154)	(164)	(170)

The Nuclear Regulatory Research personnel requirements and program support funding requirements (primarily contractual support with DOE laboratories and private contractors), have been allocated to major programmatic functions as shown below. The narrative that follows provides justification in support of these requirements.

<u>Program Elements</u>	<u>Actual FY 1980</u>		<u>Estimate FY 1981</u>		<u>Estimate FY 1982</u>	
	<u>Dollars</u>	<u>People</u>	<u>Dollars</u>	<u>People</u>	<u>Dollars</u>	<u>People</u>
LOCA & Transient.....	\$65,949	25	\$61,917	26	\$51,000	24
LOFT.....	42,300	7	42,400	7	44,000	7
Plant Operational Safety.....	17,601	24	29,624	26	37,000	27
Severe Accident Phen. & Mitigation.....	17,313	13	19,798	15	20,200	16
Siting & Environmental.....	9,756	13	12,014	13	14,400	13
Waste Management.....	6,059	12	11,700	14	21,500	16
Safeguards & Fuel Cycle Safety.....	7,028	12	8,500	13	10,200	13
Systems & Reliability Analysis.....	7,290	24	11,000	26	14,900	28
Program Direction & Support.....	0	24	0	24	0	26
Total.....	\$173,296	154	\$196,953	164	\$213,200	170

The Office of Nuclear Regulatory Research has the responsibility and authority under the Energy Reorganization Act of 1974 to perform research in support of the nuclear regulatory process. A basic objective of the research program is to develop a sound and complete base of technical information on basic safety issues for the Commission to consider, and an independently verified source of safety, health, environmental, and safeguards information to be used together with information furnished by applicants or licensees as a basis for Commission licensing and regulatory decisions. An important part of this activity includes the development of safety data and analytical methods to support Commission rulemaking activities.

NRC's world leadership in promoting international cooperation and open exchange of information in the field of reactor safety research has led to the signing of more than 30 research agreements with foreign agencies. These agreements have been of significant benefit to the U.S. in (a) effecting substantial savings in NRC research costs through cooperative efforts and avoidance of duplicative research, (b) in providing for direct dollar contributions to the NRC research program, and (c) in providing for the assignment of experienced foreign specialists to U.S. laboratories.

The FY 1982 request reflects focusing and redirection of research priorities and emphasis for the coming years. A number of research programs are being completed or phased out with new programs being initiated emphasizing current NRC directions based on lessons learned from the Three Mile Island accident. The request reflects a curtailment of and shift of emphasis in research work in loss-of-coolant accidents (LOCAs) and increases in efforts related to plant operational safety, severe accident research, system and reliability analysis, and waste management.

The Loss-of-Fluid Test (LOFT) program through FY 1982 has been formulated to respond to licensing concerns related to loss of offsite power, research on bursting of prepressurized fuel, and to address items specified in the TMI action plan. At the request of the Commission, the LOFT program is being reviewed by a special review group to gain insight to the proper experimental emphasis and funding for LOFT plans after FY 1982. A recommendation from this review group to the Commission is expected by early February 1981.

A decision to pursue development of a fast breeder demonstration plant would require resources to be dedicated to accomplishment of an appropriate fast breeder reactor safety research program.

Research efforts involving the application of reliability engineering techniques to the entire spectrum of nuclear safety issues were rising steadily in importance even before the TMI accident, and their value has since been emphasized by reports of the President's Commission, The NRC Special Inquiry Group on TMI, and the Advisory Committee on Reactor Safeguards (ACRS). The tools of probabilistic risk assessment are being developed and increasingly used in the nuclear regulatory process to foster more efficient and effective

^{1/} Includes \$400,000 for FY 1981 Pay Raise Supplemental.

Nuclear Regulatory Research - continued

regulation by focusing on the issues that pose the highest risks and providing a tool to assess the relative risk reduction provided by various regulatory approaches. Research in Systems and Reliability Analysis will apply increased emphasis to system reliability analysis with added attention to human reliability and the operator/machine interface. Efforts on accident sequence and consequence analyses will be increased to cover a broad range of potential nuclear accidents.

As mentioned above, the work in Severe Accident Phenomena and Mitigation Research will be redirected, commencing in FY 1981, to more fully support NRC rulemaking for degraded core cooling and other interrelated rulemakings. This research will cover the whole range of severe accident phenomenon from fuel failure and possible core melting through fission product transport and release to provide a data base for realistic analysis of the entire spectrum of severe accident sequences. An analysis of the feasibility, value, and impact of additional accident mitigation features such as filtered vented containment and core catchers will be made using best estimate methods to obtain a realistic assessment of their design requirement and performance. Studies of health effects and property damage consequences of severe accidents will be conducted to assess the ultimate effects of severe accidents.

In support of NRC's reactor licensing program, Plant Operational Safety research is directed toward providing a sound basis for guidance and standards for licensees to strengthen the operation and maintenance of reactors. Studies will be carried out to improve human-machine interfaces and to assess plant status monitoring and diagnostic display requirements. Responsibilities of plant personnel will be analyzed during normal and off-normal operation, and these responsibilities will be related to operator selection and training. Instrumentation and electrical equipment will be evaluated to identify their ability to withstand accident conditions. Operational transients and their effect on systems behavior and the safety consequences of shared systems within the plant in coping with accident conditions will also be studied. Research efforts will likewise continue on seismic safety margins, thermal shock on pressure vessels, the effect of long-term plant operation on pressure envelope integrity, structural response, valve and component testing, and equipment and process design qualification.

In the 1979 redirection of several key reactor safety research programs to be more responsive to TMI-related safety research, the level of emphasis on design basis accidents such as large-break loss-of-coolant accidents was reevaluated and the need recognized to consider a broader range of accidents. As a consequence, emphasis was shifted to smaller break LOCAs, to other reactor transients, and to operator performance deficiencies that characterized the TMI event. The planned phasedown of the LOCA and Transient Research program in the period FYs 1980-1984 includes comprehensive evaluation and transfer of the research results to the licensing staff and continuation of all efforts identified as necessary by the TMI-2 lessons-learned reviews. Research on computer code assessment and application, and the development of better understanding of the progression and consequence of severe core damage in both reactor and containment systems will continue as the major components of this program in FY 1982.

The disposal of all types of nuclear waste continues to be a major public concern requiring the timely development of criteria and licensing guidance by an aggressive and well-focused NRC program. The NRC waste management research program has been developed in close coordination with NRC's licensing staff through the development of regulatory criteria and procedures. Our waste management research is directed at providing basic scientific understanding and data necessary to allow the NRC to evaluate safety and long-term performance of waste isolation systems designed by DOE. The program is designed to take maximum advantage of the DOE engineering and site exploration research program while developing independent criteria for site characterization as a part of the site selection and approval process. Other major research efforts will provide a sound basis for assessment of waste form integrity and the adequacy of waste disposal facility engineering design. These waste management research efforts are paced to provide the required technical bases for NRC regulatory decisionmaking in a timely manner.

LOCA and Transient Research	FY 1980 = \$65,949	FY 1981 = \$61,917	FY 1982 = \$51,000
	(25)	(26)	(24)

This research provides experimental data and analytical methods to assess the behavior of nuclear power plants during anomalous transients and loss-of-coolant accidents (LOCA). The accident at Three Mile Island focused attention on the need for better understanding of the course of anomalous transients and small and medium break loss-of-coolant accidents (LOCAs) including fuel damage and hydrogen generation. Providing this information is the major objective of this program. The program will also give early support to rulemaking regarding degraded cores. Another objective is to conclude most of the research begun several years ago on large-break loss-of-coolant accidents.

The program includes:

- o Testing of engineering models of reactors systems and components to better understand and confirm how nuclear power plants behave during accidents and to measure emergency core coolant flow distribution (program elements include Semiscale, separate effects, and 2D/3D programs);

Nuclear Regulatory Research - continued

- o Testing reactor fuel rods to evaluate how fuel, fission products, and hydrogen behave during accidents (program elements include fuel behavior during operational transients, core damage beyond LOCA, and operation of the Power Burst Facility);
- o Incorporating the resulting experimental data into computer codes to improve capabilities for modeling and predicting the behavior of nuclear power plants during accidents (program elements include code improvement and assessment).

The program is described in greater detail below:

Semiscale is an electrically heated test loop which simulates a pressurized water reactor and its coolant system. It is located at the Idaho National Engineering Laboratory (INEL). In FY 1982, Semiscale testing will continue to experimentally study the course of reactor transients and small-break loss-of-coolant accidents and will evaluate recovery procedures from multiple-fault accidents. Tests will simulate nuclear station blackout, steam generator tube breaks, steam line break, feedwater line break and loss of feedwater. The results will support NRC licensing actions, code development and assessment, and LOFT test planning.

Separate-effects experiments, utilizing both intermediate and small-scale facilities, provide insight into phenomena which affect plant behavior during abnormal operation and loss-of-coolant accidents. Recent results from intermediate-scale facilities include heat transfer data for uncovered fuel bundles at high pressure and data on boiling-water reactor core spray effectiveness. These data have had immediate applicability to NRR's assessment of vendor-submitted calculations following the TMI-2 accident. Several of these intermediate-scale experiments are being concluded in FY 1981-1982. Small scale experiments, conducted largely at universities, will be continued in FY 1982 to complement the larger-scale experiments, focusing on selective phenomena identified through both the separate effects experiments and the integral systems tests (e.g., Semiscale and the Loss-of-Fluid Test).

The international cooperative 2D/3D program is conducted jointly by NRC, the Federal Republic of German Federal Ministry for Research and Technology (FRG BMFT) and the Japanese Atomic Energy Research Institute (JAERI). Each country funds roughly one-third of the program. The NRC responsibility includes advanced instrumentation and computer code analyses for the experiments conducted in German and Japanese facilities. The primary objective is to measure the flow distribution of emergency core coolant in large-scale engineering models of a reactor during a large-break loss-of-coolant accident. The 2D/3D program also tests natural circulation, core uncover, and cooling of blocked fuel bundles during small-break loss-of-coolant accidents. In FY 1982, 20 blocked fuel bundle tests in the slab core test facility in Japan will be completed, yielding significant data on the thermal hydraulic behavior of a damaged reactor core. In addition, 20 to 30 systems-effects tests will be conducted with the second core of the PKL facility in Germany. The results will provide information on the conservatism of regulatory judgements regarding emergency core coolant on reflood and natural circulation.

In order to improve NRC's capability to analyze transients and small-break loss-of-coolant accidents, including effects of equipment failure, operator actions, and recovery procedures, codes for computer analysis must be improved and assessed against experimental data. Several versions of an advanced code, TRAC, have been developed for this purpose. In FY 1982, code improvement and maintenance will complete the fast running version, TRAC-PF1, for analysis of pressurized-water-reactor (PWR) transients and small-break LOCAs, and will complete the subchannel code COBRA-TF. In addition, we will complete the independent assessment of the detailed safety analysis codes, TRAC-PD2 for PWRs and TRAC-BD1 for boiling water reactors (BWRs).

Research on fuel behavior addresses two areas: (1) fuel failure during design basis transients, and (2) fuel failures during transients beyond the design basis; i.e., transients that could lead to severe core damage. In this second area, this decision unit covers the starting conditions of fuel undergoing severe damage and is closely coordinated with the Severe Accident Phenomena and Mitigation research which covers the remaining phases of core melt accidents.

The first area of fuel behavior research on fuel damage during design basis transients, has provided results from a test reactor. The Power Burst Facility shows that under most design-basis accident conditions, fuel rods can survive film boiling at full power for tens of minutes rather than experiencing cladding failure instantly through cladding embrittlement and cracking as previously, conservatively, assumed. In FY 1982, an operational transient test is scheduled in the Power Burst Facility to determine fuel behavior and fuel/clad interaction under transient conditions such as BWR turbine trips, power level ramps, anticipated transients without scram, control-rod withdrawal, and locally decreased flow rate. In addition, separate effects tests at other facilities will provide data on fuel pellet-cladding interaction effects, and fission gas release. The experiments on clad ballooning in full-length bundles of fuel rods being conducted for NRC at the NRU test reactor in Canada will be essentially completed in FY 1982. The results will be used to improve the NRC fuel codes for steady state and transient analysis and for fuel failure analysis and to support the degraded core rulemaking.

The second area of fuel behavior research on severe core damage will experimentally assess fuel behavior during loss-of-coolant accidents that are not successfully terminated. The research addresses the formation and coolability of debris beds, fission product release from the fuel and distribution in the reactor coolant system, post accident coolant chemistry, and hydrogen generation and detonability. The results will provide

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Nuclear Regulatory Research - continued

Input to Severe Accident Phenomena and Mitigation Research. Accomplishments to date include multirod burst tests that provided the major data base for NRC evaluation of vendor models of cladding ballooning and flow blockage. In FY 1982, multirod burst testing will be completed. Preparations will continue on core damage experiments. Preparations for the test will ensure that the work is carefully focused and will provide information essential to derive a quantitative understanding of fuel conditions occurring during the initial phase of severe fuel-damage accidents. Initial results on hydrogen behavior will be available, and studies will continue on the behavior of post-accident iodine and other fission products in reactor coolants.

Foreign safety research on transients and loss-of-coolant accidents is comparable in magnitude with U.S. efforts. Information exchanges and cooperative research programs with foreign reactor safety research organizations will continue to provide valuable reactor-safety research results.

Loss-of-Fluid Test.....	FY 1980 = \$42,300 (7)	FY 1981 = \$42,400 (7)	FY 1982 = \$44,000 (7)
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The Loss-of-Fluid Test (LOFT) facility provides a unique, nuclear test facility to assess the performance of control rooms, display systems, instrumentation and engineered safety features for water reactors under accident conditions. The objectives of the program are to provide test data (1) to assess the accuracy of computer codes used to analyze accidents in pressurized water reactors (PWRs), (2) to better understand the behavior of PWRs under accident conditions and the operator actions needed to stabilize and recover the plant, and (3) to evaluate improved instrumentation and advanced display systems, to assist the operator in identifying the accident conditions and taking the best actions to assure public safety and plant recovery.

The LOFT test program includes anomalous transients and loss-of-coolant accidents with large, intermediate and small pipe breaks. The first nuclear tests performed in LOFT, in FY 1979, were large-break loss-of-coolant accidents. In these tests, the engineered safety features kept the reactor core at acceptably low temperatures, and the resulting data enhanced our understanding and ability to analyze the behavior of a reactor during a large-break loss-of-coolant accident. After the accident at Three Mile Island, the planned test sequence at LOFT was changed to advance the series of smaller breaks and anomalous transients with multiple failures.

The small break test series is designed to study the behavior of a plant subjected to various pressure transients, the effectiveness of different decay heat sinks available to commercial reactors, the question of operating main coolant pumps during small break accidents, and the effect of different break locations. The first test, done only two months after the TMI-2 accident, was a stuck open pressurizer relief valve to study some of the events which occurred early in the TMI-2 accident. The second test simulating a 4-inch break, caused a slow continuous depressurization and eventual activation of the ECC systems to refill the vessel and avoid core uncover. The third test, simulating a 1-inch diameter break caused a very slow pressure reduction with stabilization at an intermediate value. Operator intervention then brought the pressure down sufficiently to actuate the ECC systems and the plant was recovered without uncovering the core. Of special interest was the indication that the steam generator transitioned from liquid natural circulation to liquid-vapor natural circulation, and possibly to reflux cooling (or condensate fall-back) and then back again to liquid natural circulation with no evidence of instability. Another important discovery was the realization that flow paths which bypass the core and which exist in all PWRs sometimes have an important influence over the course of a small break accident. The fourth small break test examined the effectiveness of various heat sinks available to PWRs. The results suggest that for larger small breaks (4" pipe and above), the break flow is sufficient to carry away all decay heat while for small breaks (1" pipe) the steam generator is the dominant heat sink and its pressure therefore controls the primary system pressure. The most recent small break tests confirmed the basis for NRC direction to commercial nuclear plants to shut off the main coolant pumps in the event of a small-break loss-of-coolant accident. During these tests, an advanced display system in the control room proved essential to the operators in diagnosing a core uncover and in taking the appropriate actions to recover the core and plant control. To date, four in a series of seven anticipated transients have been run, providing an understanding of the different categories of transients, data needed to assess codes for transient analysis, and a data base for planning the forthcoming multiple failure tests.

Two tests planned in FY 1981 will simulate accidents that occurred at two nuclear power plants, and the results will be used to assess codes needed to predict these accidents as well as the ability of LOFT to scale the behavior of commercial plants. Each of these tests is combined with another test to increase testing efficiency. An intermediate sized break will complete the spectrum of break sizes needed to assess licensing codes and the transient test series will be continued in FY 1981.

In FY 1982, the LOFT program will perform the final two tests in the large-break loss-of-coolant-accident series. Both tests will use prepressurized fuel for the first time, and will simulate a loss of offsite power. This will impose the most severe conditions required for consideration by NRC regulations (Appendix K of 10 CFR 50). The two tests will be run at power densities and fuel prepressurization values typical of commercial plants, and selected so that the first test should not result in clad ballooning while the second test should cause clad ballooning and rupture. In support of these tests, the reactor must be refueled: the central fuel bundle will be replaced twice, and the irradiated fuel will be examined.

FY 1982 test results will provide important information on reactor behavior under conditions leading to fuel damage, and on the conservatism of NRC's emergency core cooling rule for large sized break loss-of-coolant accidents. Test results will be used to assess the accuracy of computer codes used for safety analyses of commercial nuclear power plants. During the LOFT tests, data on diagnostic display systems and accident-monitoring instrumentation will continue to be obtained under projects supported by LOFT and some projects within Plant Operational Safety Research described below.

Nuclear Regulatory Research - continued

During preparation of the FY 1983 budget, the Commission will determine whether additional LOFT tests are needed in FY 1983 or whether LOFT testing can be concluded at the end of FY 1982 with the tests described above.

<u>Plant Operational Safety Research.....</u>	FY 1980 = \$17,601 (24)	FY 1981 = \$29,624 (26)	FY 1982 = \$37,000 (27)
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After the TMI accident, much more emphasis was placed on plant operational safety research. Issues addressed by this research include human-factors engineering, plant system behavior during transients, instrumentation and control, mechanical, structural, and materials behavior, seismic effects, and design verification of important safety equipment. The increasing number of years of operation of nuclear plants and the increasing number of hardware failures and human error-related accidents occurring in existing plants now in operation have led to an accelerated need for additional research to provide safety information to the NRC licensing staff in these areas. The goal is to provide the staff with independently generated safety information relating to ways to reduce human, mechanical, electrical and structural failures to provide a technical basis for decisions and rules that will result in fewer and less severe accidents that may affect the health and safety of the public.

Research on human-factors engineering is intended to reduce the human contribution to risk from nuclear accidents by improving the quality of the human-machine interface. In FY 1980 and FY 1981, operator task analysis was initiated, and in conjunction with the LOFT program, a computer-based diagnostic display system employing video screens was installed at LOFT to evaluate enhanced operator information. This work will continue in FY 1982 and status monitoring and diagnostic display recommendations will be developed, permitting evaluation of systems proposed for operating nuclear plants. Also, this activity will analyze accident sequences which include multiple failures and system interactions which are likely to result in core damage. This will include identification of potential corrective actions by operators, the information needed to take those actions, recovery and recommendations for training, design or procedural changes to reduce risk. The proposed increase in FY 1982 augment the technical basis for regulatory decisions concerning the human-machine interface. The results will assist the regulatory staff in developing standard review plans for technical areas now lacking such guidance and in quantitatively assessing the risk reduction associated with potential improvements so that design changes can be implemented optimally in operating and future reactors, i.e., with cost-effective regulation.

Instrumentation and control research addresses fire protection in electrical cables; design verification of electrical equipment, and instrumentation to monitor the course of accidents. In FY 1980 and FY 1981, fire protection research concerning cable spreading and separation requirements has verified the industry standard test fire and has identified the limitations of the standard, and tests have shown halon to be an effective fire-suppression agent. The qualification methodology and LOCA signature used in the IEEE Class 1E equipment qualification standards have been tested. Also, testing has started to help evaluate instrumentation that might be used to monitor water level in a reactor vessel during an accident. In FY 1982, work on fire suppression systems will be completed, and NRC fire protection standards will be assessed by full-scale cable-area replication fire tests for selected nuclear power plant configurations. Qualification-testing evaluation of electrical equipment to withstand a LOCA environment will be expanded to include design verification of selected instrumentation and electrical equipment. This work will continue in FY 1983. Instruments to follow the course of an accident will be evaluated. Also in FY 1982, failure studies of electrical power systems will be initiated. The safety benefits of a continuous on-line surveillance system for early detection of plant abnormalities will be tested on the Sequoyah Nuclear Power Plant. Also, control system failure studies affecting plant safety will be conducted. When TMI-2 equipment becomes available, the adequacy of qualification requirements for plant safety equipment will be assessed by the postmortem analysis of TMI-2 equipment.

Research in structural and mechanical engineering is designed to provide information on the behavior of structures, systems, components and equipment of light water reactors. Prior to the end of FY 1981, the Seismic Safety Margins Research Program (SSMRP) will have completed initial studies to determine the uncertainties in the present seismic design methodology. The SSMRP is a multidiscipline effort that will develop mathematical models to realistically define elements that affect the probabilities of radioactive release due to earthquakes. These models will be used to gain engineering insights which can be used by the staff for plant safety evaluation and can be used to develop improved design methods and criteria. In FY 1982, the SSMRP will continue work on an analysis that will determine the contribution of individual structures, systems, components and equipment items to the overall plant safety and, thus, identify how to improve the present USNRC Standard Review Plan seismic methodology. This will lead to more cost-effective regulations and a better balance of requirements for seismic design and evaluation of nuclear power plants. Beyond FY 1982, experiments will be conducted to determine fragilities (failure) of components and systems considered to be major contributors to seismic risk and estimate the conservatism (or lack of conservatism) in the current licensing criteria for seismic design.

In FY 1982, studies investigating the failure modes and safety margins of structures will include the development of numerical models to predict the response of the containment to hydrogen explosion and accidents involving core melt.

A current critical issue in the licensing process is the definition of and way of combining the various loadings that must be resisted by plant structures, systems and components. In FY 1981, preliminary studies will be completed assessing the need to assure plant safety under a simultaneous combined earthquake and loss-of-coolant accident load. In FY 1982, recommendations will be made to the licensing staff on criteria for combining any

Nuclear Regulatory Research - continued

series of loadings, such as a simultaneous seismic and accident loadings. Load combination methods developed in FY 1982 will be employed as a risk assessment tool for older plants built to less stringent requirements than current plants. In addition, the load combination criteria will be applied to containment structures. The operability and reliability of operating and new plants will be evaluated in FY 1982 through programs that will develop methods for qualification of pumps, valves and other components.

Research in Primary System Integrity is a particularly important area to be studied because failure of the pressure vessel, primary piping, and steam generators can have serious safety significance. These components must operate in a hostile environment of elevated temperature, high pressure, nuclear radiation and a corrosive environment for 40 years with only limited ability to check and inspect for embrittlement, degradation, cracks, leaks, etc. Furthermore, plants must be capable of withstanding overpressure, accident, and seismic loadings despite service degradation. A review of the past several years' operating experience shows a number of plant shutdowns because of pipe cracks and leaks and steam generator tube failures, and operation or construction delays because of improperly welded pipes, embrittled vessel welds and the inability to analyze vessels for the potential consequences of pressurized thermal shocks from accident loadings. The present nondestructive examination techniques have been shown inadequate to characterize flaws in important carbon and stainless steel welds. Finally, the corrosion and cracking in some steam generator tubing have been so severe that some entire steam generators are being removed from service and replaced with new units. The primary system integrity program addresses all these problems and has as its objective the development of a reference foundation of knowledge upon which materials and engineering licensing decisions are made. While the main program is focused on current urgent problems requiring licensing decisions and improvements in pertinent pressure vessel and piping codes, the program also looks to potential problems that could arise in the future of these plants as corrosion and aging continue to degrade components.

Research in Fracture Mechanics through FY 1981 will result in a completed LOCA thermal shock analysis method for use in evaluating plant performance, especially for the 20 older plants with particular materials problems. A pressurized thermal shock facility will be built in FY 1981, with a first test being conducted in FY 1982; this program will provide a validated method for analyzing overcooling and steam line break thermal shock accidents, for immediate use by the licensing staff. The newly-developed tearing instability method for analysis of vessel and piping performance under operating temperature thermal shock accidents will be evaluated using small scale pipes in FY 1982 as well as with data from foreign sources. Further in FY 1982, results will be available from pipe-to-pipe impact research and from a validated pipe whip code to better evaluate consequences to other safety-related systems during an accident. Under the Operating Effects subelement, the tearing instability method will be validated for analysis of crack initiation and breach of an irradiated reactor vessel under thermal shock. Methods for prediction of embrittlement in vessels will be greatly enhanced in FY 1982 by establishment of a benchmark for in situ measurements of dosimetry and embrittlement in an experimental vessel wall. Following establishment of the Steam Generator Examination Program in FY 1981, using a steam generator from the Surry nuclear power plant, nondestructive examination baseline and experimental measurements will be started for correlation with mechanical property measurements on cracked and degraded tubes removed from the generator. Such data will be invaluable to the licensing staff for early prediction of the tube failures based on inspection results. Testing in FY 1982 will continue on laboratory scale piping to evaluate countermeasures proposed by vendors to eliminate pipe cracks and thus lead the staff to prompt conclusions on current and future pipe safety. Research in nondestructive examination in FY 1982 will utilize round robin test results obtained in FY 1981 to develop updated ASME Code rules for improved ultrasonic flaw detection of stainless and carbon steel piping. Following laboratory development of improved real-time ultrasonic testing in FY 1982, the method will be adapted for field application for real-time flaw detection so that field validation can be undertaken in FY 1983. During FY 1981, a vessel fatigue and burst test will be monitored by acoustic emission to determine if prefailure cracking can be observed and accurately characterized. In FY 1982, the system will be used on an operating reactor to assess whether accurate monitoring can be accomplished in the noisy and complex environment of a real operating reactor.

Severe Accident Phenomena

<u>and Mitigation Research</u>	FY 1980 = \$17,313 (13)	FY 1981 = \$19,798 (15)	FY 1982 = \$20,200 (16)
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The objective of this program is to provide the Commission with the technical basis for (1) decisions which are expected to be made in the course of the rulemaking proceedings on degraded core cooling, emergency planning, siting, and on minimum engineered safety features, (2) reducing the uncertainties associated with risk assessment studies, (3) evaluating engineered features to improve LWR safety, and (4) the assessment of advanced reactor safety as needed.

To meet these objectives, research is being conducted to provide data and analysis methods for (1) describing the behavior of consequences of core melting and response of the containment; (2) defining the radiological source term from the containment; (3) evaluating and testing of severe accident consequence mitigation systems; and (4) continuing the development of the key safety analysis codes and models for gas cooled reactors, plus coordination for NRC of the NRC/DOE/EPRI/GPU efforts in obtaining post accident data from TMI-2 during cleanup operations. The starting conditions of the fuel obtained from related work is scheduled to be performed in conjunction with the severe core damage program in LOCA and Transient Research.

The program will involve the planning and performance in FY 1982 and FY 1983 of a major experiment using reactor materials to answer the question: Can a molten core be cooled in-vessel? One of the most important public

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Regulatory Research - continued

health and safety contributions NRC can make is to keep the core from melting through the pressure vessel. If research should produce information to allow effective regulatory action to prevent melt through.

Conceptual design studies and supporting concept feasibility and critical component performance verification testing toward understanding molten core coolability will continue to support the degraded core cooling rulemaking.

Steam explosion experiments in the Fully Instrumented Test Series (FITS) will be completed for reactor vessel load assessment and final report issued. An improved estimate of the steam pressure spike following a vessel melt through will be determined. Initial experiments will be conducted to test the models for coolability of fuel debris under anticipated PWR and BWR conditions. The core melt/concrete interactions code (CORCON) for a dry reactor cavity will be improved, tested in separate effects and large-scale tests and incorporated into an improved containment systems code. Tests on effects of coolant reflood in cavity will be initiated. A modified version of the SIMMER code will be completed and used to predict the transition from a badly damaged core (as at TMI-2) to a debris bed and its subsequent relocation.

This activity will provide data and analytical methods to more accurately predict the post-accident fission-product inventory and location inside containment using input from LOCA and Transient Research. Improvements to fission product and aerosol transport models will be completed and integrated into a code more readily usable by the licensing staff. Transport model verification tests will continue at the Nuclear Safety Pilot Plant (NSPP) in Oak Ridge. Experiments on radioiodine transport, filtration and retention will continue. New studies will address fission product leaching and bypass of containment via fluid system pathways.

Conceptual designs, value impact assessment, design requirements, systems interaction analyses, and cost estimates will be completed for accident mitigation concepts, such as filtered vented containment, improved containment designs and core retention systems. Tests will be initiated on vent filter system components and tests in support of core retention system feasibility will continue. The development of test estimate methods for the analysis of severe accident consequences will proceed in parallel with experiments to test these methods.

In fast breeder safety research, no funds are requested for continuation of the program in FY 1982 and beyond. Should the FY 1982 and later years' budgets for DOE contain funding for a fast breeder reactor research and development program aimed at an eventual demonstration plant, the NRC should carry on a fast breeder reactor safety research program of appropriate size keyed to the scheduled and anticipated needs of licensing actions, ultimately including the review of a plant of close to commercial design and the safety issues associated therewith. The focus of this program and its planned accomplishments would reflect initially the prior experience in the licensing review of the Clinch River Breeder Reactor (CRBR) as well as the subsequent programmatic reviews by the ACRS. As the licensing effort was reconstituted, the program would respond to new directions developed in the licensing area.

As in the previous several years, this FY 1982 budget for gas cooled reactors at about the \$2 million level supports the NRC's Ft. St. Vrain responsibilities and it attempts to maintain several selected groups of gas reactor safety research experts who can provide the nucleus of anticipated NRC efforts if a decision is made to continue a program of work on advanced converter reactor (HTGR).

<u>Siting and Environmental Research</u>	FY 1980 = \$9,756 (13)	FY 1981 = \$12,014 (13)	FY 1982 = \$14,400 (13)
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The Siting and Environmental Research program is directed towards obtaining information and developing methods for assessing the interaction between a nuclear facility and the environment required for both safety and NEPA-mandated reviews. This includes methods for predicting the impacts of severe natural phenomena on the facilities and methods to assess the impacts of facility operation on man and important ecological systems. Important elements in this program are research on earthquake phenomena, the movement of radionuclides in air, water, and soils, the biological effects of radiation on man and the socioeconomic impacts of facility construction and operation. The program is divided into two principal areas, the Geology, Seismology, Meteorology program and the Environmental Effects program. These are described below. Additional funds requested in FY 1982 are to support increased deep geophysical exploration of key Eastern United States earthquake zones to define seismic risk and for conducting meteorological dispersion testing in coastal regimes. Increased funding is also requested to support studies on occupational exposures and radiation health effects reflecting an increased emphasis on neutron radiobiology.

Geology, Seismology, and Meteorology

The Geology, Seismology, and Meteorology program provides information for the safety evaluation of nuclear facility sites, structures, components and equipment subjected to normal operating and extreme environmental events such as earthquakes, tornadoes and floods. The program also assists in the development and confirmation of regulations, standards and guides which define the safety design bases for nuclear facilities to withstand these phenomena. These objectives are achieved through advanced analysis, experiments, field tests and observations.

During FY 1982, current effort on regional seismological and meteorological investigations will be continued, including expansion of the seismic monitoring network near the Indian Point, New York, reactor site. Estimation of the potential earthquake hazards at different reactor sites, development of methods for interpreting earth stress measurements, reevaluation of reactor site seismic instrumentation requirements, and evaluation of real-time meteorological modeling and site network requirements for emergency response are the projected accomplishments for the year.

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Regulatory Research- continued

Environmental Effects Research

In FY 1982, environmental effects research will continue to provide physical data for mathematical modeling of the movement, dispersion and deposition of effluents from nuclear facilities in air, water, and soil. Research on the effects of cooling-water intake structures on Hudson River fisheries and an assessment of the general effectiveness of environmental monitoring systems and sampling methods used by operating nuclear power stations will be completed.

Research related to regulation of occupational radiation exposure and understanding radiation health effects issues of particular relevance to NRC's regulatory scope will be continued. Methods for assessing occupational exposures to radiation and alternative means of reducing work related exposure will be analyzed in support of the "as low as reasonably achievable" (ALARA) exposure control concept.

Research will be continued measuring and evaluating the performance of protective equipment for use by workers in nuclear facilities. Radiobiological research will be done to determine the radiation dose patterns resulting from inhalation and ingestion of particulate fuel materials. Measurement of radionuclides in tissue relating the internal deposition of thorium to measurements made by whole body counting and thoron breath analyses will be continued. Codes for calculating radiation dose from internal depositions of radionuclides will be developed to improve assessments of radiation effects required for safety and environmental impact analyses.

Socioeconomic research, carried out to support NEPA requirements, will continue assessing land use and changes in value to derive cost/benefit methodology studies on population growth and composition, trends in needs for public services, taxes and living costs associated with nuclear power plant construction and operation will be determined. A capability for predicting the need for electrical generating capacity on a regional basis applicable to the six New England states will be completed. This program carried out by the New England Regional Commission will provide a power plant siting methodology for use by six New England states.

Emergency preparedness research, initiated in FY 1981 to assess the effectiveness of alarm and warning systems to a range of 10 miles from a nuclear facility, will be continued. Emergency instrumentation and ancillary systems for calibration, and air sampling will be field tested under severe environmental conditions.

Emphasis on verification of emergency preparedness planning since TMI has indicated need for evaluating specific types of nuclear accidents in order to assess possible counter-measures to be applied in the event of a major environmental release. Work initiated on this subject area in FY 1981 would be accelerated in FY 1982.

<u>Waste Management</u>	FY 1980 = \$6,059	FY 1981 = \$11,700	FY 1982 = \$21,500
	(12)	(14)	(16)

The nuclear waste management research program will provide technical information essential to support and improve methods and capabilities for regulating the management of high-level wastes from nuclear fuel processing; low-level wastes from nuclear power plant operations and the uses of radioisotopes in commercial, medical, and research applications. Wastes, such as mill tailings, from uranium recovery operations are also included. The results of the waste management research program will provide reliable technical bases for NRC regulations, criteria, codes, and regulatory guides. The data will support licensing decisions by providing information needed for the development and evaluation of environmental and health impact assessments, and will improve NRC capability to evaluate the performance, reliability, and safety of planned or available engineered facilities, components and structures, as well as to improve the capability to assess site monitoring requirements.

The program requests additional funds to expand and accelerate work on important issues in licensing the high-level waste repositories that DOE will propose in siting, operating, or decommissioning low-level waste facilities; and for reducing the potential for impacts of uranium mill tailings on the public; thereby ensuring long-term compliance with EPA standards.

High Level Waste

The research program provides the information and analytical capabilities required to evaluate DOE proposed sites or facilities for the storage of high-level wastes relative to their predicted health and environmental impacts. The NRC evaluation requires an improved understanding of natural phenomena and geologic processes over long periods of time, and requires the application of analytical and engineering methods, and other data to improve the NRC capability to predict the long-term performance of waste packages and high-level waste repositories. The major increase in this program will be directed toward the development and use of field testing facilities to provide practical data and to test methods needed to establish siting requirements for deep geologic repositories. Research on the evaluation of site characterization methods will emphasize the evaluation of in situ measurements, on a large scale, of the physical and hydrologic properties of rocks in a high-level waste repository. Work will continue on determining the effectiveness of methods for assessing rock mechanics and the chemical properties of rock with a minimum disruption of the rock. This will include assessments of the effects of heat and radiation on these rock properties important to the integrity of a repository. Research to assess methods for plugging and sealing boreholes will be continued and expanded to include consideration of large diameter shafts and tunnels. New work will be initiated to assess the consequences of shaft seal failure on water movement and radionuclide migration under the relatively high temperature conditions in a repository. Ongoing efforts to identify and conduct research on geochemical interactions between waste packages (including radioactive materials that may escape from waste containers); and repository geologic media will be expanded to include predictions of the long-term migration of radionuclides from the repository.

Nuclear Regulatory Research- continued

Ongoing evaluations of engineered barriers to further reduce radionuclide migration will be coordinated with the hydrologic and geochemical assessments needed for site characterization. Repository safety engineering research will be expanded to assess the structural response and safety of repository designs, construction, and operations practices with respect to accidents and natural geologic and climatic phenomena. The program will also be broadened to develop and verify methods for predicting, monitoring, and assessing occupational safety, public exposure to radiation, and environmental impacts.

Low-Level Waste

The major increased efforts under this program will include a new emphasis on testing solidified wastes arising from reactor accident clean-up and from the routine decontamination of operating reactors. This program will include an assessment of the effects of chelating agents found in decontamination agents on the potential for enhanced radionuclide migration from shallow land burial sites. New work will be initiated to compare past test results obtained from simulated waste forms with real full-size waste forms to evaluate the effectiveness of proposed standard tests of waste forms. Research will also be initiated to define the characteristics of volume reduced wastes produced by DOE and industry. For wastes that are difficult to solidify, high integrity containers will also be evaluated for long-term confinement capability. Evaluations of shallow land burial facility design, construction, and operating practices, initiated in FY 1981, will be continued. Continuing work at existing sites, being carried out in cooperation with States, will examine the accuracy of methods for measuring, analyzing, and predicting waste transport in soils. Studies at existing burial sites to evaluate the effectiveness of surface water monitoring to providing data for predicting transport of radionuclides and rates of erosion will be completed. Scoping studies on site performance and risk analysis will be initiated for low-level wastes.

Uranium Mill Tailings

Laboratory, field, and modeling research will evaluate engineering designs and methods for managing tailings of operating uranium mills. Research on attenuation of radon emission from uranium tailings piles for use by NRC and prospective licensees as guidance for reducing gaseous radioactive emanations from tailings will be completed. The main additional work in this program will be devoted to assessing the problem of liquid radioactive waste seeping from tailings ponds into surface and ground waters and in testing methods for controlling such seepage methods. This will include assessment of the effectiveness of various engineered methods and process alternatives such as dewatering techniques and sand/slime segregation processes for reducing seepage. Related new work will be undertaken to assess methods for concentrating and removing radionuclides and non-radioactive toxic materials from tailings. An increased effort will also be devoted to the testing and assessment of methods for stabilizing active operational tailings and to assess methods for improving control of potential groundwater contamination from in situ mining, monitoring of contamination associated with uranium recovery activities, disposal of tailings allowing contact with groundwaters and prediction of the effects of long-term erosional processes. This program will provide information needed to support scheduled licensing actions and provide guidance to mill operators for stabilizing mill tailings for minimizing the emanation of radon from inactive tailings piles, and for minimizing the migration of contaminated water.

Safeguards and Fuel Cycle Facility

Safety Program.....	FY 1980 = \$7,028	FY 1981 = \$8,500	FY 1982 = \$10,200
	(12)	(13)	(13)

Research in this area is focused on providing confirmation of the performance and effectiveness of various systems employed in nuclear facilities to prevent or limit the release of radioactive materials from nuclear activities and to provide a comprehensive and more realistic basis for emergency planning, physical protection against theft and sabotage, and the control and accounting of special nuclear material. The scope of the facilities included in this program is uranium conversion, fuel fabrication, enrichment and reprocessing, spent fuel storage, and facilities for the manufacture and use of radioisotopes.

Work conducted in this area is divided into Systems Performance Research and Safeguards Research. Each is discussed below. Increased funding in this area is being requested principally to support additional Systems Performance research on the application of "as low as reasonably achievable criteria" for worker protection to nuclear facilities other than nuclear power plants.

Systems Performance Research

In support of siting standards and emergency planning, FY 1982 work will continue to provide data and verified methods for realistic evaluation of radioactive releases from major fuel cycle facility accidents. Improved models to analyze the consequences of fires, explosions, and tornados will be developed. Extension of these methods to the analysis of byproduct material facility accidents will be initiated in FY 1982 with a study to define accident scenarios in these facilities.

The study undertaken to develop an improved technical basis for evaluating shipping container response to extremely severe accidents for each transport mode will be continued. Definition of performance test standards will be completed for truck and rail transport, and the data on shock and vibration environments necessary for development of regulatory guides for truck and rail package designs will be developed.

Measurements of radionuclide concentrations in releases from operating LWRs, needed to assure the accuracy of NRC's evaluation models, will be continued in FY 1982 at the sixth and last plant in the series. Measurements to confirm radionuclide releases from fuel cycle facilities will be initiated in FY 1982.

In decommissioning research, studies are being carried out to provide NRC with actual decommissioning data to identify unanticipated aspects of decommissioning and to establish decommissioning standards on a cost-

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Regulatory Research- continued

effective basis. The study to evaluate long-lived activation products in reactor materials will be completed in 1982. Studies to evaluate contamination levels and decontamination effectiveness related to decommissioning will continue. Research at fuel cycle facilities undergoing decommissioning will continue, and a similar study at LWRs will be initiated.

An overview study on the causes of increased occupational exposure in LWRs and the effectiveness of different regulatory approaches to dose reduction will be continued in FY 1982. Evaluation of the impact of decontamination operations on the performance of effluent control systems, particularly on waste solidification methods, will also continue.

In FY 1982, a study will be initiated to independently test consumer products containing radioactive materials (e.g., smoke detectors). The objective is to independently evaluate the degree which these products meet NRC design and testing requirements as well as to test the efficacy of the manufacturers' quality control measures.

Safeguards Research

Safeguards research is continuing the development and improvement of systematic methods for uniform evaluations of the effectiveness of licensees' safeguards systems, and to provide confirmed data and tested methods to improve the basis for license review, field evaluation and inspection, and upgraded regulations. This research covers physical protection and material control and accounting at fixed facilities and the protection of special nuclear material and spent fuel in transit.

In FY 1982, research in physical protection will continue on the application of fault tree methods to identify vital areas in a nuclear reactor for use in evaluation of licensee response to upgrade safeguard rules. This technology will include a method to rank vital areas in a reactor plant which could have significant licensing implications related to physical protection requirements. In addition, new studies to support augmented rule requirements dealing with the problem of reactor sabotage from insiders will be explored. This study will draw heavily on the prior work, computer models developed previously under this program, and a concurrent study which is gathering data on the methods and times required to sabotage vital power plant components. Finally, a concerted effort will be made in FY 1982 to critically examine current generation safeguards evaluation techniques and identify the role of the various methods to support their application for rulemaking, licensing, inspection, and performance evaluation.

Physical protection research will continue to address the feasibility of instrumenting a MILES (Multiple Integrated Laser Engagement System) test range for potential use in training and evaluating nuclear facility security officers in their use of tactics.

In FY 1981, research developed improved physical protection inspection procedures for IE regional inspectors to conduct field compliance inspections. The FY 1982 research program will continue to develop improved methods for conducting field assessment of licensed facilities and SSNM transportation activities. In addition, new inspection methods will be developed which will permit IE regional inspectors to determine if a licensee has adequate procedures for preventing unauthorized access to National Security Information or Restricted Data.

In FY 1982, research in material control and accounting will concentrate on improving previously developed effectiveness evaluation methods in response to comments following IE's and NMSS's use of these methods. A method for balancing and selecting material control and accounting and physical protection criteria will be tested using information from an existing fuel cycle facility. Elements of the experimental program which are aimed at evaluating in-process holdup of special nuclear material and recommending improved measurement techniques within fuel cycle facilities will be continued.

In FY 1982, research will continue to improve methods to assess the reliability of communicated threats and to provide guidance to the Commission on the range of adversary characteristics and strategies that are considered realistic.

Realistic data on source terms (releases) resulting from the sabotage of spent fuel shipping casks will be published to technically support evaluation of interim safeguard rules for spent fuel storage and transit.

<u>Systems and Reliability Analyses</u>	FY 1980 = \$7,290 (24)	FY 1981 = \$11,000 (26)	FY 1982 = \$14,900 (28)
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Systems and Reliability Analysis now entails the application of reliability engineering techniques to nuclear safety issues throughout the nuclear fuel cycle. Prior to the accident at Three Mile Island, the research supported by Systems and Reliability Analysis constituted the principal NRC research in fuel damage and fuel-melt accident analysis for the commercial light-water reactor designs. Insights gained from the TMI accident have caused this research to increase in importance and to be applied across the entire fold of nuclear safety. The technical research disciplines supported by Systems and Reliability Analysis are (1) system reliability analysis, (2) accident sequence analysis, (3) risk assessment, (4) human reliability and human factors research applied to operations personnel at nuclear facilities, (5) operations research, and (6) severe accident consequence analysis.

Research supported by Systems and Reliability Analysis serves three basic functions: (1) the performance of risk assessments to gain perspective on the regulatory program and to support regulatory standards development, (2) the development of reliability evaluation techniques and criteria for direct application in the regulatory process, and (3) technical support for the Commission, the adjudicatory boards, and the regulatory offices in matters of reactor and fuel cycle risk assessment and fuel melt accident analysis. The basic objective of 52

Nuclear Regulatory Research- continued

Systems and Reliability Analysis is to bring nuclear regulations into better congruence with the risks; that is, to identify and close loopholes in regulatory requirements in risk-significant areas, to identify instances of off-target or unnecessary regulations, and ultimately to stabilize the regulatory process.

Systems and Reliability Analysis performs an integrating function for the phenomenological research performed under other activities of Nuclear Regulatory Research. Risk assessment perspectives are being used increasingly to guide research priorities throughout the office. In addition, the research results developed elsewhere in RES provided some of the technical foundations for risk assessment and reliability analysis performed within this program, as well as providing direct input to regulatory decision making.

The risk and reliability research supported by Systems and Reliability Analysis has the strong endorsement of the President's Commission on the Accident at TMI, the NRC Special Inquiry, the Risk Assessment Review Group, and the Advisory Committee on Reactor Safeguards (ACRS). To accommodate the recommendations of these bodies and to fulfill Commission needs, the following major efforts are underway:

- Risk and reliability assessments are being employed to provide research perspectives with which to guide several rulemaking initiatives. Specifically, research is underway to support rulemaking in (1) emergency planning, (2) reactor site selection, (3) design bases for accident mitigation and containment systems (called the Degraded Core Rulemaking), (4) design bases for accident prevention (Standard Engineered Safety Features Rulemaking), and (5) fuel melt accident environmental impact assessments. A comprehensive set of parametric and sensitivity studies are required to scope the relationships between reactor characteristics (siting, design, and procedures) and public risk measures. These studies include analysis of a spectrum of contributing accident scenarios and the evaluation of the benefits and costs of the options to reduce risk.
- Human factors and human reliability analysis techniques are being developed to provide an objective basis for criteria dealing with reactor personnel selection, training, and qualification testing; for design criteria governing the human-machine interface; for criteria of acceptability for operating, maintenance, and emergency procedures; and for the consideration of human fallibility in safety analyses and risk assessments. This work is closely correlated with plant operational safety research devoted to improved displays and human engineering of plant monitoring and control equipment.
- Standardized methods are being developed to assess the course, the likelihood, and consequences of a comprehensive set of accidents at nuclear power plants. Such studies are being required of reactor operating licensees by NRR, in keeping with the recommendations of the several TMI accident review groups. The program is being called the National Reliability Evaluation Program (NREP). Systems and Reliability Analysis is supporting the development of the methods to be employed by licensees, the quality control standards, and the NRC review procedures for these studies. These methods have been and are being proven in pilot-study applications within RES under the aegis of the Interim Reliability Evaluation Program (IREP). Further development and codification of these new safety analysis techniques entailing probabilistic reliability analysis is being performed by professional societies (IEEE and ANS) under our sponsorship.
- Systems and Reliability Analysis continues to support a program to develop a reliability data base embracing component failure rates, human error rates, and initiating event frequencies for nuclear power plants. In addition, patterns of particularly high failure rates are flagged and brought to the attention of I&E, NRR, and AEOD. In addition, event screening techniques are being developed to systematize the evaluation of operating experiences in order to identify potential accident precursors, in support of AEOD.

Management Direction and Program Support..... FY 1980 = (24) FY 1981 = (24) FY 1982 = (26)
(Personnel)

The personnel requirements for this area consists of the Director's Office, administration support staff and the resource control and contract execution staff. This staff provides the Director of RES with technical and administrative assistance and support to direct and evaluate complex technical projects; and plans, coordinates, directs, and executes the business matters of the Office, including contractual agreements, budget formulation, fiscal management, personnel administration, travel assistance, and research coordination.

By the nature of its function, this area is interrelated with all other NRC offices and organizations, related groups external to NRC, and the other programmatic functions within RES. These relationships involve both providing information to and receiving information from these other offices, organizations, and groups. The workload within this area is directly related to the workload within the other RES organizational elements, by the demand for RES action by other NRC offices and organizations and by the interaction with those groups external to NRC. The requested increase in FY 1982 will provide stronger administrative assistance required by an expanding competitive contractor selection process and the implementation and execution of advanced automatic data processing and management information systems.

Equipment..... FY 1980 = \$7,696 FY 1981 = \$8,477 FY 1982 = \$7,400

In FY 1982 equipment will be required to support the engineering programs as discussed in program support. In particular, the LOCA and transient, LOFT, plant operational safety, and severe accident mitigation efforts will require test facility modifications and expansions in order to productively utilize these engineered experiments. Data gathering and analysis systems for these facilities must be upgraded to provide for new and expanded instrumentation to properly describe experimental results.

(Dollars in Thousands, except whole dollars in narrative material)

Nuclear Regulatory Research - continued

Equipment is requested to modify facilities to allow more accurate simulation of reactor small- and medium-break LOCAs and operational transients, and for operational safety tests of fire protection and safety equipment qualification. Upgraded equipment is needed in the continuing LOFT program and facility support activities. Further, as the LOFT project is directed into the smaller break program, new equipment needs are being identified. In particular, equipment is needed for steady-state flow calibration and to provide a new fault-diagnostic unit being installed to study operator/reactor interaction.

Equipment is needed to upgrade the Power Burst Facility for testing at conditions beyond design basis accidents to better define the conditions leading to severe fuel damage. Expanded research on large-scale steam-explosion testing, fission-product release at high temperatures, and hydrogen generation and behavior in containment will require new equipment. Also, equipment is needed for research on inspection techniques and on environmental effects on piping and pressure vessel materials. Waste management equipment will also be procured. This will include sampling and measuring devices, analytical and test instruments for waste activities.

(Dollars in Thousands, except whole dollars in narrative material)

NUCLEAR REGULATORY COMMISSION - continued

Program Technical Support.....\$19,140

SUMMARY OF PROGRAM TECHNICAL SUPPORT

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Salaries and Benefits	\$ 9,803	\$10,889 ^{1/}	\$11,280
Program Support	2,231	2,786	2,463
Administrative Support	3,866	4,590	4,217
Travel	738	1,135	1,180
Equipment	20	0	0
Total Program Costs	\$16,658	\$19,400	\$19,140
Personnel	(263)	(267)	(278)

This budget activity includes salaries and other costs for the staff offices that provide direct program technical support. These are the Advisory Committee on Reactor Safeguards, the Atomic Safety and Licensing Board Panel, the Atomic Safety and Licensing Appeal Panel, the Office of the Executive Legal Director, the Office of State Programs, the Office of International Programs, and the Office for Analysis and Evaluation of Operational Data.

- a. The Advisory Committee on Reactor Safeguards (ACRS) established in 1957 by Statute, reviews and reports on safety studies and facility license applications referred to it; advises the Commission on potential hazards of proposed or existing reactor facilities and the adequacy of proposed safety standards; and performs such other duties as the Commission may request. The ACRS reviews each application for a construction permit or an operating license for power and test reactors and spent fuel reprocessing plants, any application for an amendment to an operating license referred to it by the Commission and any matter related to nuclear facilities specifically requested by the Department of Energy. The Committee's report on applications for facility licenses becomes a part of the record of the application and is made available to the public, except for privileged or security material. Section 29 of the Atomic Energy Act of 1954 also requires that the ACRS advise the Commission with respect to the safety of operating reactors. The President, in his response to the Kemeny Commission Report, supported the concept of a strengthened ACRS role. The requested increase of 3 technical positions over the FY 1981 level of 39 represents a response to this goal and will be used to provide increased analytical capability for the ACRS office to do independent analysis of reactor safety issues.
- b. Atomic Safety Licensing Board Panel (ASLBP) conducts statutory adjudicatory hearings through its hearing boards which issue decisions with respect to granting, suspending, revoking, or amending licenses or authorizations under the provisions of applicable laws or regulations. These decisions cover both the construction and operation of nuclear power plants, and antitrust issues relating to the operation of such plants. Three-person boards, appointed from members of the Panel, conduct the hearings which deal with environmental issues as well as matters of health and safety, national defense, financial qualifications and economic considerations. Boards are also appointed to resolve issues that may arise as a result of interventions by members of the public or any other party. Accordingly, the Panel has authority to rule on Petitions for Intervention and to conduct rulemaking hearings as designated by the Commission. The Boards are required to initiate most of the hearings in the vicinity of the plant site.
- c. From the Atomic Safety and Licensing Appeal Panel (ASLAP) are drawn three-member tribunals which review decisions of administrative law judges and the Atomic Safety and Licensing Boards, and perform other appellate functions in proceedings on applications for licensing of production and utilization facilities (under 10 CFR Part 50), and such other licensing proceedings as the Commission may specify. In addition, these Appeal Boards perform such other regulatory functions as may be delegated to them by the Commission. Members of an Appeal Board for a particular proceeding are assigned from the Atomic Safety and Licensing Appeal Panel, the members of which are designated by the Commission. The Appeal Panel is organizationally separate from the Atomic Safety and Licensing Board Panel. Its activities and the assignment of Panel members to serve in particular proceedings are responsibilities of the permanent Chairman and, in his absence, of the permanent Vice Chairman.
- d. The Office of the Executive Legal Director (ELD) is responsible for providing legal advice and services to the Executive Director for Operations and the NRC programmatic and support offices which report to that official. ELD responsibilities include providing legal representation for the NRC staff in administrative proceedings involving the licensing of nuclear facilities and materials, enforcement actions and rulemaking. In addition, ELD is responsible for providing legal advice and services with respect to such matters as health and safety, environmental impact and antitrust aspects of licensing and regulation; research programs; general agency administration, including contracts, patents, personnel, security and labor regulations; safeguards and waste management programs; and the export/import licensing program.

^{1/} Includes \$410,000 for FY 1981 Pay Raise Supplemental.

Program Technical Support (continued)

The diverse responsibilities of ELD are performed by five divisions: Hearing Division, Antitrust Division, Regulation Division, Rulemaking and Enforcement Division and the Operations and Administration Division.

- e. The Office of State Programs (OSP) was established in 1976 to develop and direct a program of cooperation and liaison with States, local governments and interstate organizations; administer the State Agreements Program under section 274 of the Atomic Energy Act of 1954, as amended; provide guidance, training and assistance to State and local governments in radiation control and cooperate with other NRC offices and U. S. Government agencies having State and interstate responsibilities. As of FY 1981 the Emergency Preparedness function will be transferred from OSP to the Federal Emergency Management Agency.

The remaining functions of the office fall into two program areas: (1) State Program Development. Assist the Commission in formulating policies involving NRC/State cooperation and liaison; conduct national conferences, workshops and administrative and contractual programs for coordinating and integrating Federal and State regulatory responsibilities involving the streamlining of the licensing process, the transport of radioactive materials, safeguarding public health and safety, the decommissioning of nuclear facilities, the storage and disposal of radioactive waste materials and the identification and resolution of technical problems involving uranium mills and mill tailings; maintaining liaison with and provide guidance and support to State, interstate regional and quasi-governmental organizations, NRC offices and other U. S. Government agencies on nuclear regulatory matters; and in monitoring nuclear-related State legislation.

(2) State Agreements. Administer the State Agreements program in which 26 States are exercising regulatory responsibility for certain classes of radioactive materials; conduct reviews of State radiation control programs, provide annual training for State radiation control personnel, and render technical assistance to the Agreement States to ensure adequacy and compatibility with NRC standards; negotiate with and assist in qualifying other States to enter into agreements with NRC and administer the Uranium Mill Tailings Radiation Control Act of 1978.

- f. The Office of International Programs (OIP) is responsible for negotiating and implementing regulatory and safety information exchange agreements with other countries, licensing the import and export of nuclear materials and nuclear facilities, and providing direct program support for other NRC international activities including nonproliferation and international safeguards matters. Major objectives of OIP are to improve public health and safety by assuring timely U. S. access to operating data and safety research information from foreign nuclear activities, especially that which concerns foreign nuclear facilities of U. S. design or bears on current regulatory decisions in the U. S.; to provide to other countries on a reciprocal basis the benefit of NRC nuclear safety experience, including information pertaining to the design and operation of exported U. S. reactors; to review comprehensively and carefully export and import license applications for nuclear materials and equipment to ensure that such exports and imports will not adversely affect the common defense and security or the public health and safety of the U.S.; and to develop and implement NRC policy in support of U. S. goals concerning nonproliferation, the strengthening of international safeguards and other controls against misuse of U. S. nuclear exports.

OIP, with technical support from and in coordination with NMSS, will develop NRC's contributions to U. S. government international safeguards and physical security policy on measures to detect, deter, and prevent diversion and theft of nuclear material exported from the United States. OIP is also responsible for NRC's interagency liaison on the implementation of the US/IAEA Safeguards Agreement, which entered into force in December 1980.

- g. Office for Analysis and Evaluation of Operation Data (AEOD). The Office for Analysis and Evaluation of Operational Data is responsible for gathering, analyzing and disseminating information on operating experience from all NRC licensed activities. Events will be reviewed for safety implications and adherence to regulatory policies and procedures. In addition, the important events will also be the basis for indepth analysis. The number of new operating reactors will be increasing as will the complexity of the operation of these reactors. AEOD will also be increasing the scope and depth of its analysis of non-reactor operating experience as improved data become available. The FY 1982 staff level of 30 reflects an eight-position increase over the FY 1981 level. This planned increase is to allow the office to effectively deal with the increased amount of operational data from the newer and more complex reactors, the increased analysis of non-reactor operating experience, and the dissemination of recommendations for action to other NRC offices and the nuclear industry.

(Dollars in Thousands, except whole dollars in narrative material)

NUCLEAR REGULATORY COMMISSION - continued

Program Direction and Administration.....\$41,680

SUMMARY OF PROGRAM DIRECTION AND ADMINISTRATION ESTIMATE BY FUNCTION

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Salaries and Benefits.....	\$22,159	\$25,425 ^{1/}	\$25,898
Program Support	1,535	2,092	1,962
Administrative Support	9,962	11,859	12,350
Travel	606	700	1,470
Total Program Costs	\$34,262	\$40,076	\$41,680
Personnel	(716)	(755)	(775)

Program Direction and Administration offices provide overall policy direction, resource management, administration and logistic support, and include the staff offices of the Commissioners and the Executive Director for Operations as shown below:

The Commission:

Commission
Secretary
General Counsel
Policy Evaluation
Inspector and Auditor
Congressional Affairs
Public Affairs

EDO:

EDO
Equal Employment Opportunity
Controller
Management and Program Analysis
Office of Small & Disadvantaged Business Utilization
Administration

- The Office of the Commissioners (OCM) is the governing body which must exercise the overall NRC responsibilities of the Energy Reorganization Act of 1974 and the Atomic Energy Acts of 1946 and 1954, as amended. This body provides fundamental policy guidance and administration and management direction necessary to assure that the civilian use of nuclear energy is developed in a manner consistent with the public health and safety, environmental quality, national security and antitrust laws.
- The Office of the Secretary (SECY) develops policies and procedures for complete secretariat services for the conduct of Commission business and implementation of Commission decisions; advises and assists the Commission and staff on the planning, scheduling and conduct of Commission business; prepares for and records Commission meetings in accordance with requirements of the Sunshine Act; provides senior-level management and administrative guidance on preparation and submission of Commission staff papers to include monitoring the status of all items requiring action; maintains a forecast of matters for future Commission consideration; processes and controls institutional correspondence; maintains the Commission's official records; controls the handling and service of documents issued and received in all adjudicatory matters and public proceedings; coordinates protocol activities at the Commission level; maintains liaison with and support for the Atomic Safety and Licensing Board Panel, Atomic Safety and Licensing Appeal Panel and the Advisory Committee on Reactor Safeguards; performs services for the Federal Advisory Committee Management Officer; operates a reproduction facility; administers the NRC Historical Program; operates the classified document control system for the Commissioners; provides personnel, administrative and logistical support services to the Commission and other NRC offices located in Washington, D. C.; and supervises and administers the NRC Public Document Room, which is organized to maintain and provide to the public regulatory information, reference services and access to docket material pertaining to NRC regulatory and adjudicatory activities.
- Office of the General Counsel (OGC) is the chief legal advisor to the Commission. The General Counsel provides legal opinion, advice, and consultation to the Commission in connection with the quasi-judicial responsibilities of the Commission and in the development of substantive policy matters. It represents the Commission in matters relating to litigation and, in cooperation with the Department of Justice, represents the Commission in court proceedings affecting the NRC program in the Federal District Courts. It represents the Commission, unassisted by the Department of Justice, in Courts of Appeal proceedings to review Commission orders. The office also provides legal advice with respect to legislative matters of concern to NRC, including drafting of legislation, preparation and review of testimony, and preparation and transmission of statements of views requested on proposed legislation.

In response to the expanding volume of appellate workload, the increased effort related to the revision of statutes and regulation, and increased Commission reliance on OGC for ad hoc studies, and a wide scope of other mandatory legal matters, the OGC staffing level reflects a three position increase in FY 1982 over the FY 1981 level.

^{1/} Includes \$1,130,000 for FY 1981 Pay Raise Supplemental.

Program Direction and Administration - continued

- d. Office of Policy Evaluation (OPE) advises the Commission on a broad range of substantive policy matters to enhance the information base on which Commission decisions are made. The office provides the Commission with an independent evaluation of program policy objectives; reviews staff papers, provides independent technical evaluation of issues presented to the Commission, including cases under adjudication, and contributes technical and policy advice for projects being conducted and managed by other NRC offices for outside agencies.
- e. Office of Inspector and Auditor (OIA) functions as the Agency Inspector General and is responsible for developing policies and standards that govern the financial and management audit program, including planning and directing the long-range comprehensive audit program, as well as conducting day-to-day internal audit activities; conducting investigations and inspections, as necessary, to ascertain and verify the facts with regard to the integrity of all operations, employees, organizations, programs and activities; referring suspected or alleged criminal violations to the Department of Justice; administering the Commission's "Open Door" policy; serving as point of contact with the General Accounting Office (GAO) and maintaining liaison with GAO, the Department of Justice and other audit and law enforcement agencies.

The objective of OIA is to provide the Commission with an independent review and appraisal of programs and operations to assure that responsibilities are discharged with effectiveness and efficiency, and to provide a capability to verify facts to assure continued maintenance of the highest standards of integrity of all NRC organizations, programs and activities.

OIA is involved in a wide variety of activities leading to the issuance of audit reports and memoranda related to NRC operations and activities. Typically these activities involve coordination with the General Accounting Office, interviews with NRC and industry officials, visits to utilities (reactor licensees), steam supply system vendors, architect engineers, reactor sites, and fuel fabrication facilities. In addition, the office is responsible for conducting a significant number of investigations and referring items, when appropriate, to the Department of Justice. In all of OIA's activities, a continuous effort is made to eliminate waste, fraud, and error. The FY 1982 staff reflects a four position increase above the FY 1981 level of 28 positions. This increase is required to relieve the continually expanding burden on the audit staff resulting from the shifting of audit resources to investigations over the past five years. This has caused a severe slippage in the initial audit of all agency functions. The investigative workload shows no signs of decreasing and without additional resources, chronic slippages will continue to be exacerbated.

- f. The Office of Congressional Affairs (OCA) assists and advises the Commission and senior staff on Congressional matters, coordinates interagency Congressional relations activities and is the principal liaison for the Commission with Congressional committees and members of Congress.

The primary objective of the office is to assure that the Congress is kept fully and currently informed of NRC activities as required by Section 202 of the Atomic Energy Act of 1954, as amended. The office seeks to assure that individual members of Congress are kept currently and adequately informed of significant NRC licensing activities that impact on their respective states and districts. Additionally, the office provides the Commission and senior NRC staff with relevant and current information as to major legislative activities likely to effect NRC.

- g. Office of Public Affairs (OPA) activities can be broken down into three broad categories. These categories are: (1) issuance of public announcements both from headquarters and the regional offices; (2) responding to telephone inquiries from the news media and the public; and (3) responding to letters from the media and the public, including the bulk of the NRC referrals from the White House. In addition, OPA arranges press conferences in the Washington area and in the vicinity of nuclear facilities, and coordinates requests for Commission speakers before civic groups and other organizations interested in the role of the NRC. The office also assists the licensing boards, the appeal boards and the ACRS at the hearings and meetings in which a high degree of public and press interest is evidenced, and advises the Commission and senior NRC staff on public affairs impacts of planned programs and other activities.

Three additional positions are requested in FY 1982 over the FY 81 level of 18 to initiate a Consumer Affairs Program in NRC to assist and advise the Commission and the public in the conduct of public meetings or rulemaking hearings of broad general interest.

- h. The Executive Director for Operations (EDO) is responsible for supervision and coordination of policy development and operational activities of both line and staff offices and for implementation of the Commission's policy directives pertaining to these offices. The office consists of the EDO and his immediate staff and the Administrative and Correspondence Branch which is responsible for the EDO correspondence system including the assignment, review, and coordination of all correspondence. One additional position is requested in FY 1982 over the FY 1981 level of 11 to provide for increased attention to staff coordination in the areas of policy compliance and resource utilization.
- i. The Office of Equal Employment Opportunity (EEO) is responsible for defining the procedures and practices necessary to attain and maintain equal employment opportunity within the NRC. The office develops and prepares the agency's Affirmative Action Plan, advises and assists on recruitment plans and provides investigation of discrimination complaints when necessary.

Program Direction and Administration - continued

Major objectives of the office are to emphasize a program that will increase employment of minorities and women in the agency; provide interaction with community groups concerned with equal opportunities for minorities and women; promote continued growth of the Upward Mobility Programs; provide training in Equal Employment Opportunity awareness for NRC managers and supervisors; and assure a climate for improved employee morale by promoting and maintaining EEO counseling activities and supporting advisory committees made up of special emphasis groups.

Two additional positions are requested in FY 1982 over the FY 1981 level of 4 to initiate a program to ensure licensee compliance with EEO policies as required by Title IV of the Energy Reorganization Act and Title VI of the Civil Rights Act.

- j. The Office of the Controller (CON) provides the budgetary and fiscal management organization for the NRC, including the development and maintenance of a financial control system and a system of accounting designed to conform to the standards prescribed by the Comptroller General. It provides resource planning and evaluations to assess the relationship between program workload and resource allocation, develops manpower standards, evaluates overhead ratios, and provides work measurement analyses.

Productivity increases continue to accommodate the increasing workload within the Division of Accounting, although some backlogs are still anticipated.

- k. The Office of Management and Program Analysis (MPA) provides management information and analyses for a variety of users within the NRC and is the office responsible for developing and maintaining the agency's key management information systems. This office designs and maintains a comprehensive management information capability for NRC policy makers and operating officials to use in program management and planning. It collects, reviews, and disseminates information on the operating experiences of licensees for use by NRC offices, Congress and other parts of the government, and the public at large, and prepares special studies based on that information. To assist in managing regulatory functions and analyzing data supplied by licensees, MPA develops activities related to the use of these systems. It identifies and analyzes policy, program and management issues of major significance and conducts long and short range planning.

In order to provide information on NRC policies and programs, MPA manages and coordinates special projects including Congressionally mandated reports such as the NRC Annual Report. MPA also assists other offices in applying statistical methods and theory to nuclear regulation through agency technical administrative and management programs.

- l. The Office of Small and Disadvantaged Business Utilization (OSBDU) was created in response to Public Law 95-507 (an Amendment to the Small Business Act). The Commission established this office on June 27, 1979. Program Support resources are to provide for workshops and other outreach programs designed to stimulate greater small business awareness of NRC requirements and provide training for small businesses in agency contract procedures. The FY 1982 staffing level is a new requirement of 2 people.
- m. The Office of Administration (ADM) is responsible for personnel administration; security and classification; document control; agency-wide training; facilities and materials license fees; contracting and procurement; transportation services; telecommunications; administration of Freedom of Information Act requests; centralized automatic data processing; printing and reproduction; records management; Privacy Act requests; and a variety of other housekeeping functions as well as support for 152 local public document rooms.

The substantive work of ADM is performed by the Management Development and Training Staff, the License Fee Management Branch and seven divisions: Organization and Personnel, Security, Facilities and Operations Support, Technical Information and Document Control, Automatic Data Processing, Rules and Records, and Contracts.

In FY 1982, ADM will increase its staff by 5 positions to a total of 433. The Division of Contracts will add three permanent positions to provide for the administration of contracts, the timely closeout of contracts, and for a 10% increase in the estimated number of contract actions. In order to have good contract administration, the Division of Contracts must perform the following: monitor progress of a contract, handle protests before and after contract award, execute modifications such as change orders, bilateral agreements, cost overruns, etc., when required, handle mistakes in bids, perform voucher review, handle claims during contract life, handle all disputes, negotiate final overhead rates for contracts, request final audit of cost-type contracts and review such audits, perform contract close-out actions. The Division of Rules and Records will add two positions. The first position will be to handle the transition of hardcopy to microfiche at the Local Public Document Rooms (LPDR's) and to process the expanding volume of material sent to the LPDR's in support of the Commission's policy for making documents available to the public. The second position will be assigned to handle the increase in rulemaking actions brought about by the increasing workload to support the Office of Standards Development rulemaking, the requirements of EO 120444 regarding review of current regulations, and translating regulations into plain English.

(Dollars in Thousands, except whole dollars in narrative material)

Program Direction and Administration - continued

The Division of Facilities and Operations Support will add one telecommunications specialist to support and monitor the increased number and complexity of additional telecommunication services, facilities and equipment. Technical support is needed for the increasing requirements of the reactor emergency communications system, data ADP links, upgrading and maintenance of the NRC Operations Center, the Nuclear Data Link and the Health Physics Network. This increase will be offset by a reduction of two positions in the Division of Facilities and Operations Support to reflect projected efficiencies as a result of the interim consolidation. The overall effect for this division is a reduction of one position.

The License Fee Management Branch will add one Inspection Fee Analyst to process the substantial increase in license fee activity and to reduce accumulated backlogs resulting from the revised license fee schedule. This person has the responsibility for the review of about 2,000 routine inspections conducted annually by Inspection and Enforcement to (1) determine which are subject to fees, (2) preparation of reports to the Controller for billing purposes, (3) maintain records of these bills and those that do not remit proper fees, and (4) preparation of licensee correspondence responding to inquiries concerning fees for the inspection program.

U. S. NUCLEAR REGULATORY COMMISSION

FY 1982 Budget Estimates

(Dollars in Thousands, except whole dollars in narrative material)

ALL PROGRAMS - NRC DIRECT EMPLOYMENT

Year-end strengths and average employment for permanent full-time employees and total salaries and benefits by programs are shown in the tables below. The bases for the increases in year-end strengths are described in the respective narrative justification.

EMPLOYMENT SALARIES AND BENEFITS

Program	Actual FY 1980			Estimate FY 1981			Estimate FY 1982		
	End Strength	Av. Time	Full Obligations	End Strength	Av. Time	Full Obligations	End Strength	Av. Time	Full Obligations
Nuclear Reactor Regulation	628		617	684	656	29,320	681	682	30,420
Standards Development	148 <u>2/</u>		141	161	155	6,670	157	159	6,890
Inspection and Enforcement	868		799	976	922	36,030	1,006	991	38,120
Nuclear Material Safety and Safeguards	264		263	329	297	11,910	329	329	13,050
Nuclear Regulatory Research	154		154	164	159	7,595	170	167	7,840
Program Technical Support	263		257	267	265	10,889	278	272	11,280
Program Direction and Administration	716		712	755	735	25,425	775	766	25,898
TOTAL NUCLEAR REGULATORY COMMISSION	3,041		2,943	3,336	3,189	127,839 <u>1/</u>	3,396	3,366	133,498

1/ Includes \$6,820,000 for the proposed FY 1981 pay raise supplemental.

2/ Includes equivalent 5 full-time personnel accomplished by 8 part-time personnel.

U. S. NUCLEAR REGULATORY COMMISSION

FY 1982 Budget Estimates

(Dollars in Thousands, except whole dollars in narrative material)

NRC DIRECT TRAVEL

	Actual FY 1980	Estimate FY 1981	Estimate FY 1982
Nuclear Reactor Regulation	\$1,189	\$1,230	\$ 1,558
Standards Development	216	240	335
Inspection and Enforcement	3,565	4,520	6,097
Nuclear Material Safety and Safeguards	403	560	535
Nuclear Regulatory Research	379	580	575
Program Technical Support	738	1,135	1,180
Program Direction and Administration	606	700	1,470
Total	\$7,096	\$8,965	\$11,750

The NRC estimate for travel covers the cost of official travel for Government employees while discharging assigned duties away from their official duty stations. The travel costs reflect the travel of NRC permanent full-time employees, NRC intermittent employees such as members of advisory groups, members of boards and panels, individual consultants, and NRC trainees.

A majority of the travel is required in connection with inspection responsibilities of licensee facilities by IE personnel working out of five regional offices; by NRR and NMSS licensing offices in examination and oversight of all commercial reactor and fuel cycle facilities; coordination with DOE offices and contractors and travel associated with the health, safety and compliance function of the Advisory Committee on Reactor Safeguards and the Atomic Safety and Licensing Board Panel.

A significant portion of the planned travel is required to maintain technical and administrative supervision of Commission programs, and to provide for attendance of NRC personnel at necessary domestic and foreign meetings.

U. S. NUCLEAR REGULATORY COMMISSION

FY 1982 Budget Estimates

(Dollars in Thousands, except whole dollars for narrative material)

	<u>LEGISLATIVE PROGRAM PROJECTIONS</u>						
	<u>Actual FY 1980</u>	<u>Estimate FY 1981</u>	<u>Estimate FY 1982</u>	<u>Estimate FY 1983</u>	<u>Estimate FY 1984</u>	<u>Estimate FY 1985</u>	<u>Estimate FY 1986</u>
NRC Total							
Budget Authority	\$ 400	\$ 454 ^{1/}	\$ 501	\$ 530	\$ 550	\$ 550	\$ 550
Budget Outlays	378	437 ^{1/}	484	498	528	528	528

^{1/} Budget Authority includes \$6,820,000 for the proposed pay raise supplemental. Budget Outlays associated with this supplemental total \$6,680,000.

U. S. NUCLEAR REGULATORY COMMISSION
Consulting Services

Account Title	Type	Obligations (in thousands)		
		FY80	FY81	FY82
Nuclear Reactor Regulation	Contractual Services	68	75	80
	Personnel Appointments	72	90	100
	Advisory Committee Obligations	-	10	10
	Total	140	175	190
Standards Development	Contractual Services	-	-	-
	Personnel Appointments	35	100	100
	Advisory Committee Obligations	-	-	-
	Total	35	100	100
Inspection and Enforcement	Contractual Services	-	177	345
	Personnel Appointments	8	8	7
	Advisory Committee Obligations	-	-	-
	Total	8	185	352
Nuclear Material Safety and Safeguards	Contractual Services	260	250	-
	Personnel Appointments	84	101	93
	Advisory Committee Obligations	26	31	31
	Total	370	382	124
Nuclear Regulatory Research	Contractual Services	50	54	59
	Personnel Appointments	19	74	91
	Advisory Committee Obligations	-	-	-
	Total	69	128	150
Program Technical Support	Contractual Services	20	20	20
	Personnel Appointments	142	135	115
	Advisory Committee Obligations	390	390	390
	Total	552	545	525
Program Direction and Administration	Contractual Services	805	100	100
	Personnel Appointments	76	80	80
	Advisory Committee Obligations	-	-	-
	Total	881	180	180
Total Nuclear Regulatory Commission	Contractual Services	1,203	676	604
	Personnel Appointments	436	588	586
	Advisory Committee Obligations	416	431	431
	Total	2,055	1,695	1,621

MAJOR PROGRAM AREAS - Consulting Services

Nuclear Reactor Regulation	Consultants are obtained to provide expert technical advice/opinions on highly complex and controversial areas such as the regulation and licensing of nuclear power plant construction and operation, and in the areas of siting and operator licensing. In addition, a Three Mile Island Advisory Panel has been established, consistent with Section 106 of H.R. 7881, to obtain citizen input to TMI clean-up activities. Absence of these contractual services would seriously hamper the agency's ability to ensure an adequate level of public health and safety for operating nuclear power plants. An alternative to these contractual services would be to hire equivalent expertise. However this would not be practicable because of the intermittent nature of the need, the independence desired, and the fact that experts required are not generally available on a full-time basis.
Standards Development	Consultants evaluate staff radioepidemiological studies; assess the health impact of NRC licensed activities; provide advice on nuclear medicine technology; and analyze NRC emergency planning documents. In the area of waste management, consultants provide advice on the development of regulatory guides on spent fuel storage and on the technical aspects of licensing high-level waste geologic repositories. In the areas of siting and safeguards, consultants contribute to and perform technical reviews of geologic siting criteria and provide independent advice on methodology and completeness of standards. Consultants also provide advice on revising rules related to the packaging and transport of radioactive material. The services of these consultants are used to provide ad hoc assistance in areas where it is not economical to maintain full-time staff, and allows maximum control in efficiently directing the timely completion of projects.
Inspection and Enforcement	Consultants develop methodology for evaluating resident inspector objectivity in their interaction with NRC licensees, between headquarters and regional management. Consultants review and evaluate the effectiveness of current I&E programs and research, and review alternative approaches and experiences of other regulatory agencies. Medical consultants furnish medical advice pertaining to possible radiation effects upon NRC licensees, their employees, or members of the public. Consultant services for training consist of preparing and presenting training segments for I&E construction resident inspectors.
Nuclear Material Safety and Safeguards	The Advisory Committee on Medical Uses of Isotopes advises on policies and standards for the regulation and licensing of medical uses of radioisotopes. Consulting services are also used to analyze the materials license application review process. In the areas of teletherapy and medical physics matters, consultants develop standards and criteria for radiopharmaceutical quality and tests applicable to the regulation and licensing of uses of radioisotopes, and also assist in the development of structural-mechanical systems analysis for fuel cycle plants. Consulting services are also used to provide a technical expertise not available within NRC (for example a study group involves consultants in the "Review of People Related Problems in Nuclear Security") and to evaluate procedures for assessing credibility determination. Consulting services will be used to formulate a program plan for the development of an NRC capability for regulating the management of radioactive wastes, to review structural and hydrological geologic features of repositories and to prepare an environmental assessment of water quality impacts attributable to past, present, and future operations of the uranium mill. A personnel appointment is used to provide technical editing services. Since the technical expertise provided by these consultants is not available within the NRC and is not required on a daily basis, consultants are used instead of acquiring in-house resources. In most cases if consultants are not used, there may be an adverse affect on the health and safety of the public.
Nuclear Regulatory Research	Contractors review foreign codes, requiring some language translations and assistance in relating foreign codes to domestic codes. Due to the wide diversity of types of research accomplished, specialists are periodically required to advise NRC on matters involving waste management (hydrologists; geophysicists; geochemists), environmental effects (ecologists; radiological effects specialists) and severe phenomena (flooding specialists and site safety specialists).
Program Technical Support	The heaviest concentration of consulting services for the Program Technical Support offices is in the Offices of the Advisory Committee on Reactor Safeguards and the Atomic Safety Licensing Board. Because of the nature of these two offices, which is that of providing a highly technical advisory assistance capability to the Commission, the offices have been structured so that experts are retained on a consulting basis to provide for knowledge and special abilities that are not generally available within the agency. The balance of the consulting services required for the PTS offices is in the Offices of State and International Programs. Consultants for these offices will be used to review and develop a computer plan for State emergency preparedness plans. The remainder [of contractual services] is in the Office of International Programs, and this consultant expertise is focused on the agreement between the U.S.A. and the IAEA, and the IAEA application and strengthening of safeguards. The proposed contractual support will provide, in addition to the before mentioned issue, an analysis of the agreement and the effectiveness of the dissemination of information to foreign nations.

MAJOR PROGRAM AREAS - Consulting Services (continued)

Program
Direction and
Administration

In FY 1980, money for two major NRC consultant projects was committed. These consisted of an examination of NRC's EEO program and an overall NRC management study. The balance of FY 1980 consultant services as well as projected FY 1981 and FY 1982 services is for ad hoc, Commission consultants on a variety of primarily technical issues as well as consultants to advise other PDA offices on such issues as job evaluation standards.

U. S. NUCLEAR REGULATORY COMMISSION
FY 1982 and FY 1983 Budget Estimates
(Dollars in Thousands)

The Administration approved a FY 1983 planning estimate for NRC in the amount of \$530 million in conjunction with the approval of our FY 1982 budget request. In this approval the Office of Management and Budget did not provide any specific program guidance. However, the total estimate approved can be addressed in general categories of funding requirements based on the definitive estimate that we submitted to OMB for FY 1983 as a part of our FY 1982 budget request. These general categories along with appropriate explanation are shown on the following pages.

	<u>FY 1982</u>	<u>FY 1983^{1/}</u>	<u>Change</u>
Nuclear Reactor Regulation			
Salaries and Benefits	\$ 30,420	\$ 31,200	\$ 780
Program Support	31,335	32,330	995
Administrative Support	12,297	13,122	825
Travel	1,558	1,628	70
TOTAL	\$ 75,610	\$ 78,280	\$ 2,670
Standards Development			
Salaries and Benefits	\$ 6,890	\$ 7,000	\$ 110
Program Support	8,310	8,075	- 235
Administrative Support	2,415	2,565	150
Travel	335	350	15
TOTAL	\$ 17,950	\$ 17,990	\$ 40
Inspection and Enforcement			
Salaries and Benefits	\$ 38,720	\$ 39,450	\$ 730
Program Support	12,391	10,795	- 1,596
Administrative Support	9,566	10,563	997
Travel	6,097	6,492	395
Equipment	1,506	2,970	1,464
TOTAL	\$ 67,680	\$ 70,270	\$ 2,590
Nuclear Material Safety and Safeguards			
Salaries and Benefits	\$ 13,050	\$ 13,600	\$ 550
Program Support	24,040	24,440	400
Administrative Support	9,075	9,420	345
Travel	535	560	25
TOTAL	\$ 46,700	\$ 48,020	\$ 1,320
Nuclear Regulatory Research			
Salaries and Benefits	\$ 7,840	\$ 8,100	\$ 260
Program Support	213,200	231,080	17,880
Administrative Support	2,925	3,100	175
Travel	575	620	45
Equipment	7,400	9,280	1,880
TOTAL	\$231,940	\$252,180	\$ 20,240
Program Technical Support			
Salaries and Benefits	\$ 11,280	\$ 11,850	\$ 570
Program Support	2,463	2,623	160
Administrative Support	4,217	4,907	690
Travel	1,180	1,230	50
TOTAL	\$ 19,140	\$ 20,610	\$ 1,470
Program Direction and Administration			
Salaries and Benefits	\$ 25,898	\$ 26,400	\$ 502
Program Support	1,962	1,962	-
Administrative Support	12,350	12,958	608
Travel	1,470	1,330	- 140
TOTAL	\$ 41,680	\$ 42,650	\$ 970
TOTAL NRC	\$500,700	\$530,000	\$ 29,300

^{1/} Excludes inflation; these are FY 1982 equivalent dollars.

FY 1983 Budget Summary

Nuclear Reactor Regulation

In FY 1983, the TMI-related tasks should be fully embodied into the NRC operating procedures. We will continue our effort to eliminate the excess backlog of operating reactor licensing actions by the end of FY 1984, and will implement Phase III of the systematic evaluation program of operating reactor facilities. Annual requalification of reactor operators will continue and we should still be very involved in the oversight of the TMI-2 cleanup operations. We also plan to phase out the DOE laboratory licensing assistance program in FY 1982 and utilize in-house capability in FY 1983 to meet the projected caseload requirements for construction permits and operating licenses reviews. Safety technology will require resources to support the first full year of the National Reliability Evaluation Program which is a program to identify high risk accident sequences and major contributions to risk for operating power reactors.

Standards Development

In FY 1983, the planned SD effort continues at about the same overall level as in FY 1982 with change in emphasis. Waste Management work will continue on effort initiated in FY 1982 with particular emphasis on high-level waste to assure the timely development of regulatory guidance needed for review of a high-level waste repository application by DOE. In low level waste, we will begin developing licensing criteria for construction of shallow and intermediate land burial facilities. Radiation protection technical criteria on protection against radiation, personnel dosimetry, bioassay measurement and respiratory equipment will be completed in FY 1982, which will permit the development of standards in FY 1983.

Inspection and Enforcement

The FY 1983 resources estimates for Inspection and Enforcement essentially provide for a continuation of inspection of the activities ongoing in FY 1982. Some increased resources will be required for new operating reactors coming on line and for additional regional inspectors to implement new or revised Commission rules for emergency preparedness and safeguards. We will continue our independent measurement program of environmental testing of safety-related equipment at reactors. The Nuclear Data Link will continue to be further developed and equipment acquired as it moves from a limited prototype toward a more comprehensive system which will ultimately link all operating power reactors with the NRC Operations Center. The FY 1983 estimate also provides for a new NRC Technical Training Center co-located with the TVA training facility near Chattanooga, Tennessee. In this regard we have initiated preliminary planning action with officials of TVA.

Nuclear Material Safety and Safeguards

Our Nuclear Material Safety and Safeguards program will be similar to the FY 1982 program with some additional resources required for caseload increase in radioisotopes licensing as a result of revisions to Federal regulations requiring environmental assessments for materials licensees in previously exempt categories. Fuel cycle and transportation certification efforts remain level with FY 1982. The safeguards program will continue emphasizing the use of improved methodology to detect the diversion of material and to evaluate effectiveness of protection programs. Efforts will also continue to implement the U.S./International Atomic Energy Agency agreement and to encourage stronger international safeguards to protect against proliferation. The waste management program will continue developing and implementing a framework for all types of radioactive waste consistent with the achievement of national goals for safe, long-term disposal.

Nuclear Regulatory Research

The FY 1983 estimate provides for a continuation of the redirection of research priorities and emphasis reflected in the FY 1982 request. In FY 1983, large integrated system tests will be further curtailed and increased research efforts will be continued related to plant operational safety, severe accident research, systems and reliability analysis and waste management.

The Commission will review the recommendations of the LOFT special review group in February 1981 and will decide on the LOFT program direction beyond FY 1982 at that time. The FY 1983 estimate for LOFT is based on a program plan which assumes completion of experiments in the LOFT facility related to specific licensing concerns in FY 1983 with final post test analysis and decommissioning activities planned for FY 1984. The planned phasedown of the LOCA and transient research program will continue in FY 1983 reflected by reduced integral system tests in the Semiscale and similar large-scale experimental facilities, and a shift of emphasis from large system code development to application of codes for better understanding of the progression and consequence of accidents in both reactor and containment systems. Small scale experiments to study particular phenomena of interest in understanding specific component behavior and tests of fuel behavior under accident conditions will continue as part of this program in FY 1983.

FY 1983 Budget Summary (continued)

The increased emphasis in plant operational safety research and work in severe accident phenomena and mitigation reflected in the FY 1982 request will be continued in FY 1983. Additional effort and priority in FY 1983 will be given to component qualification testing under severe accident conditions, field testing of nondestructive examination techniques, understanding of complex plant system transient behavior, and fission product transport and release experiments needed for realistic analysis of severe accident sequences. The NRC will also continue efforts to improve human-machine interfaces and plant diagnostic capability by providing criteria for improved plant instrumentation, control room design and display systems for commercial development.

Research in Systems and Reliability Analysis in FY 1983 will continue to apply increased emphasis to application of probabilistic risk assessment techniques in the nuclear regulatory process, system reliability analysis and evaluation of improved decay heat removal and containment systems. Waste management research in FY 1983 includes studies required to provide a technical basis for the development of independent criteria for site characterization as a part of the site selection and approval process.

Program Technical Support

In FY 1983 the planned effort is for an increased utilization of the Nuclear Safety Information Center and for the abstracting and indexing of foreign reactor operating experience. Professional staff increases will strengthen the safety review role of the NRC, increase the ability to perform comprehensive and timely legal services and in-depth representation in the licensing of nuclear facilities and materials and increase the assistance to state operated programs.

Program Direction and Administration

In FY 1983, additional positions will provide for a projected increase in the audit workload; to accommodate a projected increase in appellate workload and ad hoc Commission studies; and to accommodate a projected 10% increase in the number of contract actions as well as to support the workload growth in materials reviewed for classification/declassification appraisals.

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