ENCLOSURE 1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
ADVISORY COMMITTEE ON REACTOR SAFEGUARDS
WASHINGTON, D. C. 20555

July 17, 1980

Honorable John F. Ahearne
Chairman
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Dr. Ahearne:

The Advisory Committee on Reactor Safeguards submits herewith its comments on the budget for FY 1982 of the Office of Nuclear Regulatory Research.

Only that portion of the budget relating to Program Support has been considered. The funding levels considered are those allocated by the EDO Staff in its preliminary markup of 2 July 1980 and those requested by RES in its reclama of 9 July 1980.

Comments on personnel requirements and allocations are included in a few instances where particularly appropriate.

Sincerely,

Milton S. Plesset

Milton S. Plesset
Chairman

Attachment:
NUREG-0699

2. LOFT

2.1 Introduction

The LOFT facility is the only integral facility which models a PWR. The shortcomings of the facility are well known and relate for the most part to deficiencies in vertical dimensions. The nuclear core is slightly less than half the height of a PWR core. This reduced height introduces some uncertainty in translating the early quench observed in the large LOCA test in LOFT to a full-size system. Further, the height relationship between the core and the steam generators affects the interpretation of measurements of natural circulation heat transfer.

2.2 The LOFT Test Program

LOFT tests were for some time directed toward a design basis accident involving the instantaneous double-ended cold leg break (DECLB). Tests of this type have contributed to the understanding of this kind of accident and also have contributed to code assessment. In response to a strongly modified view of more immediate needs, the LOFT program was redirected in FY 1980 to the study of reactor transients which were the result of small breaks. The current plans call for further tests of this kind in FY 1981. Both the FY 1980 and the FY 1981 programs as now planned include other types of transients, including, particularly in FY 1981 tests concerned with anticipated transients without scram. The significant test proposed for FY 1982 is a DECLB at the higher core power of 16 kw/ft. No further small break tests are scheduled for FY 1982. A test has been proposed for FY 1983 with pressurized fuel.

Although we believe that LOFT will essentially complete its NRC mission in FY 1982 with NRC funding phased out at the end of FY 1982, the LOFT System could still be a valuable tool for the nuclear power industry. The LOFT installation could be offered to the nuclear industry to be operated with industry financial support as a facility which would enhance operational capabilities of the nuclear industry.

2.3 Recommendations

LOFT represents the largest single expenditure in the safety research budget so that its program must be considered with special care. We recommend that the tests through FY 1982 be adequately funded and that following the 1982 tests the facility be decommissioned unless it is taken over by the nuclear industry. The final tests to be run to the completion of the program should be carefully scrutinized and evaluated by RES to obtain the most useful final series. We would also wish to contribute to the choice of these tests. Efficient operation of the facility appears to require the requested level of support and therefore we endorse that level.

ENCLOSURE 2

MEMBERS AND CONSULTANTS

OF THE

LOFT SPECIAL REVIEW GROUP

MEMBERS	AFFILIATION
D. Ross (Chairman)	Office of Nuclear Reactor Regulation, NRC
B. Sheron	Office of Nuclear Reactor Regulation, NRC
R. Bernero	Office of Nuclear Regulatory Research, NRC
R. Woodruff	Office of Inspection & Enforcement, NRC
R. Capra	Office of Nuclear Reactor Regulation, NRC
L. Jaffee	National Aeronautics & Space Administration
A. Pressesky	Department of Energy
CONSULTANTS	
H. Kouts	Brookhaven National Laboratory
A. William Snyder	Sandia Laboratories
H. Isbin	University of Minnesota
R. Pack	Institute of Nuclear Power Operations
B. Sun	Electric Power Research Institute
F. Finlayson	Aerospace Corporation
P. Griffith	Massachusetts Institute of Technology
I. Catton	University of California at Los Angeles/ ACRS Consultant

ENCLOSURE 3

CHARTER OF THE LOFT SPECIAL REVIEW GROUP

"This group is established for the purpose of reviewing the LOFT program and reporting on their findings to the NRC Commissioners.

The review shall be technical in nature, focusing on, but not limited to, the benefits expected from the program planned for the FY 1981 to FY 1983 period. The primary purpose of the group is to consider whether LOFT should be decommissioned in FY 1983, as recommended by the ACRS. The group would be expected to consider the LOFT program from the perspective of NRC's overall research program and in terms of the needs of reactor regulation. To facilitate this work, NRC and the INEL, where LOFT is located, would provide presentations, reports, and tours and interviews. Also, the group would be welcome to attend any tests performed in the LOFT reactor or related facilities.

The report would be intended to aid the Commissioners in their decision whether to continue NRC support of the LOFT project beyond FY 1982. The report should address specific regulatory needs and describe how the results of the LOFT program are expected to meet those needs. Furthermore, based on the performance and responsiveness of the program to date, the report should indicate the likelihood that the planned program will provide the expected information and that it maintains reasonable flexibility to address changing regulatory issues.

A final report would be issued by February 3, 1981 and after follow-up discussions with the Commissioners, the group would be dissolved."

ENCLOSURE 4

PLANNED LOFT TEST SEQUENCE FOR DIFFERENT OPTIONS

OPTION A: Run through FY-1982/Decommission FY-1983

OPTION B: Run through FY-1983/Decommission FY-1984

OPTION C: Run through FY-1985/Decommission FY-1986

The attached sheets show the planned tests and sequence should either Option A, B or C be selected by the Commission.

OPTION A PROGRAM

DEC 80 L3-5, SMALL BREAK WITH PUMPS ON /L8-1, CORE UNCOVERY, NO DAMAGE

JAN 81

FEB

MARCH

APRIL L3-3, SMALL BREAK WITH LOSS OF S.G. 2ARY /L9-1, LOSS OF FEEDWATER WITH DELAYED SCRAM

MAY CONTAINMENT VESSEL LEAK

JUNE

JULY L6-7, ARKANSAS NUCLEAR-1 STARTUP ACCIDENT /L9-2 COLDWATER ACCIDENT

AUG L5-1, INTERMEDIATE BREAK ACCUMULATOR LINE /L8-2 CORE UNCOVERY

SEPT CORE CHANGE, CENTRAL BUNDLE AT 600 PSI

OCT

NOV

DEC 81 L2-6, LARGE BREAK WITH LOSS-OF-OFFSITE POWER, EXPECT CLAD BURST AND CLEANUP

JAN 82

FEB CENTER BUNDLE CHANGE, PREPRESSURIZED TO 350 PSI

MAR

APRIL

MAY L9-3, TRANSIENT WITHOUT SCRAM

JUNE

JULY

AUG L8-4, CORE UNCOVERY WITH SEVERE FUEL DAMAGE

SEPT 82 BEGIN CLEANUP, POST IRRADIATION EXAMINATION AND FINAL ANALYSES, DECOMMISISON AND DISPOSE OF FUEL DURING 1983.

OPTION B PROGRAM

SEPT 81 CORE CHANGE, CENTRAL BUNDLE AT 350 PSI

OCT

NOV

DEC 81 L2-5, LARGE BREAK WITH LOSS-OF-OFFSITE POWER, NO BALLOONING EXPECTED

JAN 82

FEB CENTER BUNDLE CHANGE, PREPRESSURIZED TO 600 PSI

MAR

APR L2-6, LARGE BREAK WITH LOSS-OF-OFFSITE POWER, EXPECT CLAD BURST AND CLEANUP

MAY

JUNE

JULY CENTER BUNDLE CHANGE

AUG

SEPT L5-2, INTERMEDIATE BREAK (PRESSURIZER SURGELINE)

OCT L6-4, CONTROL ROD WITHDRAWAL

NOV

DEC 82 L9-3 TRANSIENT WITHOUT SCRAM

JAN 83

FEB L9-4 TRANSIENT WITHOUT SCRAM

MAR

APRIL CENTER BUNDLE CHANGE, PREPRESSURIZED TO 350 PSI

MAY MODIFY STEAM GENERATOR FOR TUBE RUPTURE TEST

JUNE L7-1 STEAM GENERATOR TUBE RUPTURE TEST

JULY

AUG L8-4, CORE UNCOVERY WITH SEVERE FUEL DAMAGE

SEPT 83 BEGIN CLEANUP, POST-IRRADIATION EXAMINATION AND FINAL ANALYSES, DECOMMISSION AND DISPOSE OF FUEL DURING FY 1984.

PLANNED LOFT TEST SEQUENCE
-OPTION C -**
AND TARGET DATES* AS OF SEPTEMBER 1980
SPECIAL LOFT REVIEW GROUP OPTIONS A & B INDICATED AS "A" AND "B"

*for each year, committment dates are roughly 2 months later

TEST ID	TARGET DATE		INITIAL POWER LEVEL (MW)	INITIAL CORE ΔT °F	COMMENTS
L3-6	12-1-80	OPTIONS A & B	50	35	Small break (2.5%) intact loop cold leg --- pumps on. Pumps tripped at end of experiment to measure water remaining.
L8-1	12-1-80		Add on to L3-6		Core uncovery without ECC at low decay heat level.
L9-1	3-4-81		50	35	Loss of all feedwater (multiple failures) with scram on high pressure; PPS setpoints representative of LPWR (PORV challenged.) Mild ATWS.
L3-3	4-8-81		50	35	Small cold leg break (0.16%) HPIS flow approximately equal to break flow. Dry steam generator secondary. Determine the boundary between break heat removal and PORV heat removal. Needs further justification.
CV Leak Test	6/81				Required test of containment leak integrity.
L6-7	7/81		50	65	LOFT typicality to Arkansas Nuclear One startup test.
L9-2	7/81		Add on to L6-7		Rapid cold water accident, upper plenum voiding.
L5-1	8/81		50	65	Intermediate size break (accumulator line). Determine if large break and small break models continue to predict intermediate break results. Also check out liquid level device.
L8-2	8/81		Add on to L5-1		Core uncovery at high decay heat level. Reflood with degraded ECC capability. May be the same as L5-1.

**-NOTE: Option C includes all items listed, including those under Option A and B

PLANNED LOFT TEST SEQUENCE AND TARGET DATES AS OF SEPTEMBER 1980 (continued)

TEST ID	TARGET DATE		INITIAL POWER LEVEL (MW)	INITIAL CORE ΔT °F	COMMENTS
Whole core Changeout	10/81				F1 center bundle at 350 psi (BOL). Large peaking factor if only CB changed.
L2-5	1/82	B	16 kw/ft	65	Worst prototypic hydraulic conditions in core. Investigate fuel behavior at BOL fuel pressure (no fuel damage expected).
Replaces CB F1 with F2	3/82				F2 will be pressurized to 700 psi.
L2-6	5/82	A,B	16 kw/ft	65	Same as L2-5 with 700 psi fuel pressure (EOL). Fuel damage and fission product release expected.
Replaces F2 with unpress A1	7/82				Only minimal fuel damage experiments can be done until F1 is examined for damages.
L5-2	9/82	B	16 kw/ft	65	Intermediate size break on hot leg. Pressurizer surge line. Needs further justification based on L5-1.
L6-4	9/82	B	16 kw/ft	65	Uncontrolled rod withdrawal at power. Investigate worst case moderate frequency accident.
L9-3	12/82	A,B	16 kw/ft	65	ATWS. Loss-of-Feedwater is initiating event. (Multiple failures.)
L9-4	3/83	B	16 kw/ft	65	ATWS. Loss of offsite power is initiating event. (Multiple failures.)
Put F1 Bundle back in					F1 inspection completed and fuel is assumed not damaged.
L8-3	8/83		16 kw/ft	65	Small break with slow core heat up (1°F/min). Uniform clad swelling and blockage of flow channel. Investigate potential initiating events. (Candidate: Loss-of-Feedwater.)
Replace F1 with A3					

PLANNED LOFT TEST SEQUENCE AND TARGET DATES AS OF SEPTEMBER 1980 (Continued)

TEST ID	TARGET DATE		INITIAL POWER LEVEL (MW)	INITIAL CORE ΔT °F	COMMENTS
L7-1	12/83	B	16 kw/ft	65	Large break with S.G. tube ruptures at start of reflood/refill (>25 tubes ruptures). Provides upper bound of envelope on effect of ruptures). Critical number of tube ruptures resulting in extreme core temperatures expected to be between 10 and 25 based on Semiscale results.
L7-2	2/84		16 kw/ft	65	Large break with S.G. tube ruptures at start of reflood/refill (<10 tubes ruptured). Provides a lower bound of envelope on effect of ruptures. L7-3 should be inserted if possible which has critical number of ruptures.
L4-1	5/84		16 kw/ft	65	200% cold leg break. Accumulator injection into U.P. Investigate topdown core quench. Applicability to UHI plants.
L4-2	8/84		16 kw/ft	65	200% cold leg break. U.P. LPIS injection. Investigate W two loop plant phenomena.
Replace A3 with press F3	12/84				
L8-4	3/85	A,B	16 kw/ft	65	Severe core damage. Investigate potential initiating events. (Candidate: Loss of offsite power.)
Whole core changeout	4/85				F4 Center bundle.
L10-1	7/85		16 kw/ft	65	Override test. Override of L8-3 transient.
L10-2	9/85		16 kw/ft	65	Override test. Override of L8-4 transient.
L8-5	11/85		16 kw/ft	65	Severe core damage. Investigate potential initiating events (Candidate: Steam line rupture).
Decommission	12/86				