LOFT MONTHLY PROGRESS REPORT FOR MAY 1980

DIRECTOR'S MONTHLY SUMMARY

On May 29, 1980, the fifth in a series of nuclear experiments was conducted. The experiment, designated L6-5, simulated events which would follow a loss-of-feedwater to all of the steam generators of a large commercial nuclear powered reactor system. Initial results from the experiment indicate that all significant events occurred as expected. Analysis of experimental results is continuing.

In addition to conducting Test L6-5, preparations continued for the next small-break test, L3-7. Currently, efforts for that test are ahead of schedule and targeted for 6/19/80. This test is designed to investigate natural circulation modes and their stability. Of particular interest is two-phase cooling modes with water levels significantly reduced.

Costs to date are in good agreement with current budgets and authorized funding levels. However, overall actual expenditures are overstated due to an accrual problem of $250,000, an electrical facility overcharge of approximately $125,000, and a cost transfer of $57,000 related to the two-phase flow loop task. Corrections for this overstatement have been filed.
1. The L6-5 experiment was conducted May 29, 1980.

2. Technical Specifications and Experiment Safety Analysis (ESA) for the L3-7 experiment were submitted to the Department of Energy - Idaho Operations Office (DOE-ID) for approval.

3. The ESA and the appropriate technical specifications for L6-5 were approved by DOE-ID.

4. Work was initiated on failure mode effects and consequence analysis (FMECA) for the conduct of experiments which will incorporate experience from post-Three Mile Island (TMI), Licensing Information Service (LIS), and industry.

5. The damage criteria for the conduct of the L6-5 experiment were approved by DOE-ID and were incorporated in the appropriate technical specification.

6. A loss-of-coolant accident (LOCA) analysis was completed using current reflood analysis models and techniques for removing the reflood assist bypass valves (RABVs). Results of current analyses do not warrant modifying the existing 10-inch valves in the system at this time. Documentation of the results has begun.

7. An initial assessment was made of additional blowdown model capabilities to analyze successfully future small-break experiments.
8. A summary of significant risk and safety issues associated with the conduct of the L6-5 and L3-7 experiments was prepared and issued for management's information.

9. In response to the TMI Short-Term Lessons Learned, the task of reviewing whether additional changes to the technical specifications were required to initiate plant shutdown in the event of the loss of a safety function was completed. This in-depth evaluation concluded that the current technical specifications are adequate and need no additional changes.

10. The following technical specifications were submitted to DOE-ID for approval:

   A. DRR-3847, which clarified fracture toughness curves relative to conducting primary coolant system hydrostatic tests

   B. DRR-3849, which provides a temporary waiver for operating the loss-of-fluid test (LOFT) reactor with one high-pressure injection system (HPIS) pump operable.

11. A system is being established to track LOFT Technical Support Division's (LTSD's) response to the Nuclear Regulatory Commission's (NRC's) safety issues as established in information items and enforcement letters.

12. Design requirements were developed for the predicted curie concentration, filtration, and pump for the isotope detection system (IDS).

13. Analyses were completed and required documentation for ESA was issued for experiments L6-1, L6-2, and L6-5.
14. The first rewritten draft of the LOFT zero power physics testing document, Detailed Operating Procedure (DOP) 01-005 was completed. This rewritten DOP is much more streamlined than the old version and relies heavily on computerized data acquisition.

15. Zero power physics requalification was completed for the LOFT core following loss-of-coolant experiment (LOCE) L3-2. In comparison with the baseline, the requalification parameters have changed no more than expected through normal power operation. It has been recommended that the LOFT core be requalified for further testing.

16. The feasibility of constructing a neutron shield below the existing LOFT shield tank was analyzed. This shield would help protect neutron-sensitive measuring devices such as the pulse neutron activation (PNA) system and the gamma densitometer. The shield would also serve as a possible replacement for the existing neutron biological shield.

17. A data compression program has begun on the LOFT process computer [(plant log and surveillance system (PLSS)]. The program compresses recorded data prior to transferring the data from disk to magnetic tape storage. This allows continuous data recording by reducing tape usage by a factor of 25.

18. A plotting program has been added to the PLSS computer. The plotting program quickly produces time-history plots of any recorded instrument channel. Plots can be made of past data or can be built up in real-time by current data. The plots were used successfully during the L6-5 experiment.

19. Some improvements have been completed in the paged data display of the process computer. The selection of data on pages has been reorganized, and brief measurement descriptions are being added to the pages.
20. The Physics Division conducted a meeting with LOFT personnel to discuss its proposal for building the computerized portion of the LOFT IDS.

21. Delivery of the stack monitor has been delayed until mid-June to permit modification of the software so the stack flowrate can be used to make calculations automatically.

22. In-place testing was completed for the silver zeolite filters in heating and ventilating (HV) systems 8 and 9. Results from all three filters were satisfactory.

23. A modification was completed to supply nitrogen to outside HV valve actuators to prevent potential freezing of condensed water in the actuation line.

24. The break-flow-measuring, drag-disc turbine spool piece for the L3-4 experiment was finished.

25. Modification to the primary coolant system hot leg to allow installation of the vertical sweepolet was completed. This modification provides improved flow measurements during small-break testing. Because of the large scope of this modification, the following were included:

A. Removal of the existing emergency core cooling hot leg injection line.

B. Stress analysis of the piping modification, which led to removal of two existing supports and installation of four new rigid supports.

C. ASME Section III hydrostatic test.
26. The fluid drive control valves on both pumps of the high pressure injection system (HPIS) were replaced with new valves, and the operational checkout was satisfactorily completed. These control valves are vital to plant operation because they control the speed of the HPIS pumps.

27. The level-indicating systems of the steam generator were modified to correct errors between the narrow- and wide-range systems. This modification was satisfactorily tested and it responded as designed during operational transient L6-5. Improving the agreement between the two level systems increases the accuracy of the steam generator liquid inventory, and leads to more accurate test results.

28. Work was initiated to purchase a new 14-x 14-x 10-inch block tee for the blowdown system. This component must be monitored closely in plant cycle counting because it has a low limit on the maximum number of allowed cycles.

29. A sightglass was installed on emergency core cooling system accumulator A to improve data during accumulator blowdown testing.

30. RV-211, one of the purification system relief valves, was reworked to reduce seat leakage.

31. All system readiness reviews to support performance of the L6-5 and L3-7 experiments were completed.

32. The electrical wiring and circuitry has been installed for control valves CV-P139-57 and -58, which will be used in the small-break test.

33. The Site Work Release (SWR) was completed to replace 13.8 kV lightning arrestors in A and B buses and test all 13.8 kV cables and switchgear from the Test Area North (TAN) substation to and through LOFT.
34. "As-built" drawing documentation for installation of the new air compressor was completed.

35. Connectors in the fuel assembly A and B junction boxes were modified to allow access to tungsten-rhenium thermocouples.

36. The output capability of the vital batteries was investigated to determine if replacement or modifications are necessary. A Gould representative inspected and supervised the tests of vital batteries A and B. No immediate action is required.

37. The "as-built" drawings for the primary system motor generator (PSMG) air-handling systems were completed. The new PSMG air-handling system will ensure that ambient temperature will be maintained between 70 and 80 F in PSMG Room B-239.

38. The conceptual design report on expansion of the LOFT emergency power system was completed. The report concludes that an additional generator is necessary to provide reliability and flexibility for the LOFT test program.

39. The necessary circuit cables have been provided for the new steam generator dome pressure transducer (PE-SGS-1).

40. Instrumentation checkout for evaluating time-response characteristics of resistance temperature device (RTD) transducers used in LOFT plant protection system (PPS) circuits was completed.

41. Reliability analysis of the secondary system feedwater reactor shutdown interlock has been completed and submitted for approval.

42. The HPIS-A and HPIS-B pump speed control valves were replaced by new type control valves. This has significantly increased the pump speed control capabilities.
43. The full-page printer of the facility temperature monitor (FTM) has been completed. A malfunctioning microprocessor had delayed final checkout. The microprocessor was replaced, and the system checkout was completed.

44. Redundant water level transducer signals from the steam generator were wired into the data acquisition and visual display system (DAVDS). These signals will provide backup for the LT-P4-8A and -8B level transducers.

45. Buffered signals for TI-P138-170 and -171 were wired to the DAVDS. These temperature indicators and transmitters provide temperature information for the hot and cold blowdown legs.

46. Control valves CV-P4-186 and -187 were installed in the reference fill legs of LT-P4-8A, -8A, -8B, and -83B to provide separate fill paths for the steam generator level transmitters.

47. The meteorological recorder was modified to eliminate trace smearing.

48. A task has begun to update LOFT instrumentation drawings in the principal plant systems. Existing drawings are primarily construction drawings, often requiring several documents to gain end-to-end information on any instrumentation system. The new drawings will provide end-to-end circuit information, generally on a single drawing, and will permit following a system function schematically on a single drawing.

49. New drawings are being developed on the new computer-aided design (CAD) drafting system which will save more time than conventional drafting techniques. The quality of the drawings and the system's flexibility are excellent.
50. Wiring drawings (containing conduit lists, cable lists, cable trays, and sleeve lists) have been updated.

51. The conceptual design specification for a LOCE control system has been completed. The new control system will replace the present LOCE control panel and will control the experiment during LOCE and transient tests.

52. The final design has been completed on the power-operated relief valve (PORV) flow monitoring system. The flow measurement will be made using an acoustical flow detector system.

53. Two continuous air monitors (CAMs) have been fabricated and will be installed at the north and south air intake stations for HV System 10. These CAMs will provide redundant radioactivity air sampling for HV System 10 which provides breathing air to Building TAN-630 during periods of isolation. Readouts of all four CAMs will be provided in the HP office.

54. Design of a replacement containment differential pressure monitoring system has been initiated. The present system does not provide acceptable accuracy or resolution. The new system will provide an accuracy of 0.05 percent and readout to 0.03 psi.

55. A new displacement transducer has been procured for evaluation to replace valve position limit switches that do not meet accuracy requirements or have excessive failure rates. The transducer will be placed on valve CV-P139-47 for evaluation purposes. This valve is in the primary coolant pump circuit and has a small valve stem movement whose status (open or closed) is hard to monitor.
56. An SWR has been issued to the INEL Radio and Alarm Shop to provide signals from the Halon systems in Rooms 218 and 219 to the INEL American District Telegraph (ADT) alarm system.

57. Twelve of the 14 inservice inspection (ISI) sections have been compiled into the computer program for the ISI status report; the remaining two sections are currently being compiled. The initial computerization effort for the ISI status report is scheduled to be completed in July 1980.

58. Checkout of fuel examination equipment required for Phase III was completed. Deficiencies identified during training on the channel-spacing probe have been corrected. Equipment setup in the TAN Hot Shop is scheduled for June 1980.

59. Design has been completed on the fuel module installation and removal cask (FMIRC) coolant-boron charging system; fabrication will start in July 1980.
LOFT OPERATIONS DIVISION

1. A hydrostatic test of the primary coolant system was successfully conducted following the modification of the swooplet at the PC-2 location.

2. Inservice inspection (ISI) and surveillance testing were completed as required for the conduct of the first operational transient test (L6-5).

3. The L6-5 operational transient test was successfully completed two days ahead of schedule.

LOFT MEASUREMENTS DIVISION

1. The experiment operating specification (EOS) for the L6 experiment series was issued after receiving DOE-ID approval for L6-5 only.

2. The EOS for the L3-7 experiment was approved by DOE-ID and was issued by LOFT Configuration Document Control and Services (CDCS).

3. The modification program has been completed for the modular drag-disc turbine transducer (MDTT). All drawings, assembly, and test procedures have been revised and released.

4. The PC-2 instruments (MDTT) for the L3-7 experiment received Quality Division (QD) release. They were assembled into the rake and delivered to LTSF for further testing. Sufficient tests were performed to ensure there were no manufacturing defects.

5. Fabrication of the MDTT rake handling fixture has been resumed and should be complete in about six weeks.
6. Work continued on a short- and long-term design effort to correct problems of turbine bearing survivability. A design review was completed on the short-term design that uses most of the existing turbine parts but is expected to have a limited lifetime. Preliminary work on the long-term design was begun, with the goal of providing a bearing with a considerably extended lifetime.

7. A final draft was completed for the LOFT Technical Report (LTR) on the failure analysis of liquid level transducers (LLTs).

8. The data obtained from an accumulator blowdown was analyzed and found to be excellent in quality compared with previous transit time flowmeter (TTF) data. This still does not preclude the fact that once saturation temperature occurs within the region of the TTF, the thermocouple sensor efficiency drops off sharply.

9. Failed gamma densitometer detector components [photomultiplier tubes (PMTs) or preamps] were replaced. Functioning detectors are in place at all PC-1, PC-2, and BL-1 locations. Functioning units are also installed at BL-2A and BL-2B.

10. For the PC-3 nuclear-hardened gamma densitometer, large-motion scratch gauges were installed on the sliding support plate of the steam generator. Data from the gauges, taken during the L6-5 experiment will provide information on the relative motion between the pipe and the sliding plate on which the densitometer will be mounted.

11. The final draft of the operation and maintenance manual for the pump speed measurement (OMM-141-26) was routed for review comments.

12. Qualification testing of Gould pressure transducers was completed. Transducers data in all ranges were good, and with some modifications, these transducers will be acceptable for use in LOFT.
13. The following new pressure transducer installations were checked out and were found to be operating properly:

A. PdE-SV-1, Suppression tank differential pressure level transducer.

B. PDE-BL-13, Steam generator simulator differential pressure level transducer.

C. PDE-BL-14, Steam generator simulator differential pressure level transducer.

D. Pe-SGS-1, Steam generator secondary side absolute pressure transducer.

14. The engineering design file (EDF) for the ECC Pitot tube rakes was compiled. The completed EDF was submitted to LOFT CDCS.

15. A change of scope was made within the fuel rod instrumentation task to delete 30 centerline thermocouples and add 23 pellet-clad gap thermocouples. These added thermocouples will aid in evaluating the core heat transfer without perturbing the hydraulics of the rod.

16. Eleven of 13 W/Re tubes used for building fuel rod centerline thermocouples were accepted by Kaman Sciences. Two were rejected for excessive wall thinning.

17. Eddy current testing of the zircaloy-4 tubing material was completed. Reporting of this technique and the test results has started.
18. Four new neutron generators for the pulsed neutron activation (PNA) system have been received from Sandia. These units were installed and satisfactorily passed the checkout procedure. The downstream detector is functioning properly, as are the associated electronics; hence, the PNA system is in a "go" mode. During the L6-5 experiment, the PNA system will be activated to establish baselines, signal-to-noise ratio, and the effectiveness of the modified shielding. This information will be useful in conducting the L3-7 experiment.

19. Conceptual designs were completed for the new type PNA generators. The new generators are 13 inches in diameter, 26 inches long, weigh 120 pounds, and are temperature limited to 100 F.

20. Eighty-five titanium-sheathed thermocouples have been obtained from reworked Control Product and Semco thermocouples. Of these, 46 have been shipped to Exxon, while the remainder will be shipped shortly. This will be a sufficient supply for the F1 fuel bundle plus adequate spares.

21. All of the zircaloy tubing has been eddy current tested and categorized. It appears that about 40% have defects presently defined as unacceptable (defects greater than 22% of wall thickness).

22. Information has been gathered and sent to LOFT CDCS for the zircaloy TC Engineering Design File.

23. The design and drawings for the small-break thermocouple support have been completed. The thermocouples to be used in the LTSF testing have been completed, and the thermocouples to be used in LOFT will be completed in early June.

24. A feasibility study of the application of commercial, ultrasonic, flow-measurement technique to LOFT small-break tests was completed. A minimum of one year of development work would probably be needed if ultrasonic technique application is required.
25. A preliminary evaluation was completed of Auburn International Model 1080 void-fraction-measurement instrument which can measure steam-water 0-100% void fraction under high temperature pressure conditions. Potential application of this instrument is under investigation, and more detail evaluation will be made if application exists. The technical advantages are as follows:

A. No additional pressure drop.

B. Almost instantaneous response, good for measurement of a transient.

C. Moderate cost: about $20,000 per spool piece.

D. Velocity independent; can be used for a wide range of LOFT tests.

26. The change control board (CCB) for secondary cooling system temperature measurement system, at condenser inlet and condensate receiver has been approved. The project is in progress.

27. The downstream spool piece, with drag screen and turbine installed, was delivered to LOFT Test Support Facility for blowdown testing and two-phase calibration. The spool piece will ultimately be used in conducting LOFT small-break tests.

28. An analysis was performed on the steam generator secondary side liquid level measurement. This investigation led to a procedure revision to obtain more accurate level measurements.

29. The experiment data report (EDR) uncertainty statements for the L6-5 experiment were reviewed and corrected as required.

30. Final revisions to the LTR comparing 3-beam and 6-beam densitometers were completed. This report is being distributed.
31. The first draft of the pitot tube performance LTR was completed.

32. The Measurement Capabilities List (MCL) for experiments L6-5 and L3-7 has been published and distributed.

33. Pre-LOCE cold and hot pressure and frequency tests have been reduced on the 4052 computer. These data are also available as Appendices A, C, and D of LTR 141-63.

34. Pump coastdown, pump speed, and temperature tests have been reduced on the CYBER-176.

35. A proposal for development of automated data integrity techniques was prepared and renewed.

36. The pretest text for the L6-5 experiment data report was completed.

37. A computer program was completed and calculations were made for determining liquid distribution in the LOFT system during a LOCE.

38. A computer program was developed to perform an energy balance on the steam generator.

39. The Advanced Instrumentation Branch of the Water Reactor Research Division (WRRD), prepared a sample of an 0.027-inch diameter, zircaloy-sheathed thermocouple that was flattened to 0.010-inch thickness and embedded in small section (patch) of fuel-rod cladding. The purpose was to demonstrate the potential feasibility of embedding a small-diameter thermocouple within the LOFT fuel-rod cladding.

40. The LOFT center fuel module was featured on the cover of the May issue of Nuclear News and was accompanied by a short article explaining the results of examinations of this module. The results were furnished by LOFT.
41. A proposal was prepared to conduct additional tests in the blowdown facility for evaluating the behavior of surface thermocouples continuously welded to the cladding surface. It is believed that making the thermocouples a more integral part of the cladding will reduce the apparent: (a) preferential measurement of coolant temperature during reflooding events, and (b) thermocouple enhancement of fuel rod cooling.

42. A letter report summarizing the status of thin-film thermocouples for possible use in LOFT core measurement was prepared. The report concluded that a large development program would be required and that no further consideration would be given to this concept.

43. The LOFT Fuel Requalification Review Group concurred that the installed fuel was qualified for performance of the L6-5 experiment. This concurrence was transmitted to LOFT Operations.
LOFT PROGRAM DIVISION


2. A seminar on separation of two-phase flow in a tee was presented to the Program Division. The purpose of the seminar was to identify the correlation developed for two-phase separation and to elicit comments from the staff prior to completing a paper on the subject. A draft of the paper was used in the seminar.

3. A formal report, "Large Break Transient Calculations in a Commercial PWR and LOFT Prototypicality Assessment," EGG-LOFT-5093, was written by Lambert Winters of Netherlands and printed and released on April 11, 1980.

4. Errors were discovered in the Energy Inc. RETRAN experimental predictions for the first three anticipated transient tests. These errors required new runs to be made for the L6-5 experimental prediction. The runs were completed, and a simplified experimental prediction document was issued prior to the test.

5. Additional models were included in RELAP5 to allow countercurrent flow in the horizontal pipes. This will allow RELAP5 to calculate the reflux natural circulation which is expected to occur during the L3-7 experiment.

FOREIGN-FUNDED TASK SUMMARIES

Foreign-funded and in-kind LOFT support projects are summarized in this section.
SUMMARY OF JAPANESE-FUNDED (JAERI) TASKS

1. Task 5F8C1 — JAERI Management

A. The funding of office costs of the authorized JAERI delegate was approved.

B. PMS IV adjustments were made to correct minor errors in the system.

C. The annual JAERI contribution was received at the Idaho National Engineering Laboratory (INEL) at the end of May, and will be entered into PMS IV in early June. Program cost graphs do not yet reflect planned expenditures, and efforts continue to improve these graphs.

D. A LOFT Program information meeting was held for all foreign delegates.

2. Task 5F8C4 — Advanced DTT

The components needed for testing the pressure-balanced drag turbine have been identified and located. Requests have been forwarded to cognizant organizations to have the subject equipment sent to the LOFT Test Support Facility (LTSF) in preparation for transient testing in late FY-80 or early FY-81 in the blowdown facility.

3. Task 5F8C5 — PBF/LOFT Lead Rod Test

The final report review comments were incorporated, and another draft was issued for technical review.
4. Task 5F8C6 — Reevaluation of LOFT Experiments

The report on the reevaluation of the L1 experiment series is being prepared for distribution.

5. Task 5F8C7 — Miscellaneous Code Studies

This task was inactive during May.

6. Task 5F8C8 — LTSF Suppression Tank

All of the temperature and pressure instruments were installed on the catch tank. A steady-state fill and emptying were performed to compare the measurement of the load cells with the reference turbine meter. The load cells agreed with the turbine within 10 lbm out of 12,000 lbm.

7. Task 5F8CA — PC-3 and Small-Break Densitometer

The downstream spool piece, with the drag screen and turbine installed, was delivered to the LTSF for blowdown testing and two-phase calibration.

SUMMARY OF GERMAN-FUNDED (FRG) TASKS

1. Task 5F7C1 — FRG Management

   A. Various discussions were held concerning the FRG participation in LOFT, and one work package was prepared.

   B. Funding adjustments were approved for one task and were prepared for a second task.
C. A LOFT Program information meeting was held for all foreign delegates.

2. Task 5F7C4 -- Miscellaneous Tasks

Review of the Wyle transient test data for the LOFT emergency core cooling (ECC) pitot tube rake was discussed with Dr. S. Bannerjee. A design package for the rake was prepared to support the modeling efforts.

3. Task 5F7C5 — Steam Probe

This task remained inactive during May.

4. Task 5F7C8 -- LOFT State Vector

During May, an effort was made to obtain background material for this task.

5. Task 5F7CA — Small-Break Instrumentation

The FRG-funded portion of this task is completed. The total cost will be set at $206,000. JAERI funds are being used to support phase two (5F8CA) of this task, and technical information is presented under Task 5F8CA.

SUMMARY OF JAERI/FRG SHARED TASKS

1. Task 5F9C2 -- Two-Phase, Steady-State Tests

Except for the preparation of "as-built" drawings, which are 25% complete, all work on this task has been completed.
2. Task 5F9C3 — TRAC Code Studies

An additional $66,000 was transferred from reserves to pay for the cost overruns on this task. The final task report is in management review.

3. Task 5F9C4 — Two-Phase Loop Boiler Building

A. This is not a newly approved task but is a part of Task 5F9C2. It has been identified separately to clarify progress monitoring.

B. The construction package for the two-phase loop boiler building is in final review prior to its release.

SUMMARY OF NETHERLANDS-FUNDED (ECN) TASKS

1. Task 5PNC1 — ECN Management

A. A new $22,000 task proposal on Wyle test mass-flow analysis was prepared.

B. Program monitoring continued during May, and efforts continue to improve the comparisons between the budget and the actual cost.

C. A LOFT Program information meeting was held for all foreign delegates.

2. Task 5PNC3 — RPI Subcontract

Analysis of two-phase flow through orifices continued under the direction of Dr. R. Gay at Rensselaer Polytechnic Institute (RPI). Development of techniques for using orifices to measure two-phase mass flow, and comparison with experimental data were continued.
3. Task 5FNC5 — INEL Support to RPI Subcontracts

A review of the LOFT drag turbine transducer (DTT) modeling effort at RPI was discussed with Mr. P. Kamath. His analysis using Wyle data has been completed, and a report is being prepared.

4. Task 5FNC6 — Analysis of PNA Techniques

Monte Carlo calculation results have shown an improvement in the pipe fluid transverse activity for two or more neutron sources, compared to one source. However, the axial dispersion from these sources remains essentially the same, despite the number of sources. If it is desirable to tag only a limited axial region, then the sources may have to be placed farther from the pipe and collimate the neutrons. This increases the cost of the experiment because the intensity will be reduced from the distant source and more sources may be needed.

5. Task 5FNC7 — Critical Flow Scaling Studies

This task was inactive in May. Efforts will begin in mid-June.

6. Task 5FNC8 — Two-Phase Loop Platform Addition and Stairs

The design for the two-phase loop platform and stairs was completed and has been approved. Material is being procured.

SUMMARY OF AUSTRIAN-FUNDED (SGAE) TASKS

1. Task 5FAC1 — SGAE Management

A. Efforts continue to develop new, in-kind work proposals for performance at Vienna. Two of the existing tasks were cancelled because they were no longer valuable to the LOFT Program.
B. A LOFT information meeting was held for all foreign delegates.

2. SGAE In-Kind Support to LOFT

A. The RELAP4 scaling study was cancelled, but a new task may be negotiated when SGAE has adequately resolved current difficulties associated with running RELAP4/MOD6.

B. Approval was obtained to continue the literature survey on optical probe material. A final task report was requested by June 30, 1980.

C. The LOFT downcomer void pattern task was cancelled because the task was not beneficial to the program.

D. SGAE was requested to prepare new work proposals for in-kind support.

SUMMARY OF SWITZERLAND IN-KIND (EIR) SUPPORT

1. NEPTUN Reflood Test Program

A. LOFT has received the thermocouple (TC) material and is preparing to fabricate finished TCs for installation in the NEPTUN facility.

B. EIR has provided comments on the NEPTUN test program developed within LOFT.

FOREIGN COOPERATIVE SUPPORT TO LOFT

Various foreign organizations provide cooperative support to the LOFT Program. This section summarizes those efforts.
SUMMARY OF KERNFORSCHUNGSZENTRUM KARLSRUHE (KfK)

1. LTSF 9-Rod Bundle TC Quench Test

   A. FEBA and REBEKA full-length electric heater rods are being used in this LTSF test. Laser welding of LOFT TCs onto one REBEKA rod has been completed.

   B. The heater vessel has been installed in the blowdown loop.

2. REBEKA Thermocouple Tests

   Two TC tests were conducted before May 19, and computer data on the tests were to be evaluated before proceeding. Additional tests were expected in late May.

3. COSIMA Thermocouple Tests

   Results of the tests of the COSIMA heater with and without LOFT-type external thermocouples were discussed with the COSIMA staff at KfK. The tests of this heater rod were conducted in January and February. Because the results were unexpected, extensive testing of additional COSIMA rods has been carried out at KfK. Analysis of these tests is continuing, but it appears that KfK has demonstrated repeatability of results from rod to rod for rods that are similarly fabricated and tested, and a consistent variation of measured temperatures has been shown as repeated tests are made with the same rod.
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*Test Completed

Figure 1. Management Summary Schedule.
LOFT Overall Funding

5xxxxx
The Nuclear Regulatory Commission (NRC) and foreign-funded budgets reflect the LOFT Q80-4-3 Baseline approved in May. Refer to Director's Monthly Summary for comments.
5N—NRC Operating Funding

5F—Foreign Funding
Refer to the summary cost accounts for comments.
Refer to the summary cost accounts for comments.
LOFT 189a Summary

5NX---NRC 189a

5FXX---Foreign 189a
Budget and actuals should be more in line by yearend as spending level is decreasing.
The variance is caused by a subcontract S-210 payment ($250K) that was costed against the 5N2D account instead of the actual account. The mistake will be corrected in June.
Refer to the summary cost accounts for comments. Corrective action is continuing.
No significant variance.
No significant variance.
No significant variance.
No significant variance.
Budgets for the remainder of the year are being adjusted to correct the apparent overrun.
The Austrian funds include a $12,000 management reserve and contingency. No significant variance exists.
The variance is a result of: (1) delayed billing; (2) manpower requirements for higher priority items; (3) improperly spread budget.
The variance is due primarily to: (1) completion of tasks ahead of schedule; and (2) cost overruns on small break instrumentation. Corrective action has been initiated to transfer overruns to JAERI-funded portion of this task.
Variance is due to: (1) a delay in transferring costs from another account; (2) a delay in subcontract billing; (3) manpower requirements.
Summary Cost Accounts

5Nxx—NRC Summary Cost Accounts

5Fxxx—Foreign Summary Cost Accounts
No significant variance.
Program has experienced a delay in fabricating thermocouples to be used in NEPTUN. Material received and should now spend at a rate to catch projected spending.
The budget reflects the latest change in schedule. Assuming no further schedule delays, the cost concurrence will occur at about the end of July.
The variance is caused by a subcontract S-210 payment ($250K) that was costed against the 5N2D account instead of the accrual account. The mistake will be corrected in June.
The overrun is caused by: (1) the unanticipated "facility rate" ($57/hr) charges for consulting services of Nondestructive Engineering Branch engineer ($34 hr) in March, April, and May; (2) concentrated effort on the Fission Gas Collection and Analysis System by Mechanical Design Branch in March; (3) a 138% higher labor rate charge by Fuel Technology Branch engineers than is used in CAPS labor rate file. The NDE Engineering Branch participation termination has been scheduled. Other activities will be curtailed to satisfy the yearend budget value.
The variance is a result of the following:

1. Underspending in the Experimental Measurements Section "B" which consists of the following:

   (a) A CCB to add $57K for the secondary side instrumentation was input incorrectly, starting the task in April, which reflects as under-spending on cost graph. Another CCB is in process to correct this error. (b) A portion of 53AMB09 was inadvertently coded into FY-80 during the transition from Q80-3-3 to Q80-4-0. This resulted in the transfer to $69,000 from FY-81 into FY-80. A CCF has been approved, but not reflected in the cost graph, to transfer $69K from FY-80 back into FY-81. (c) $40,000 owed to Sandia Corp. for PNA generators is not reflected in May actuals. (d) A CCB is approved, but not reflected in the cost graph, returning $51K to management reserve from the fuel rod instrument task (53AMB03).

2. A CCB adding $69K to the computer budget to compensate for the computer overrun is reflected in the cost graph as underspending at this time; however, as computer charges continue to be high, the variance will become less as FY-80 closes.

3. Drag disc turbine rakes scheduled to be built for L2-5 have been delayed until later in the year. A CCF has been prepared to reflect this change, but is not shown below in cost graph.
A management plan has been implemented to bring Advance Instrument within budget by yearend. CCB 80-156 has been approved which moves both actuals and budget to the 3-D Program in June.
No significant variance.
No significant variance.
Actual costs reflect configuration modifications and test acceleration caused by schedule adjustments. The summary cost account was prepared to support the L3-4 and L3-5 spool piece design and installation. However, recent endeavors not only include the above, but also include significant instrument support. In addition, the account does not include all the costs incurred to support the L3-7 instrumentation. CCB corrective action has been initiated.
EG&G IDAHO INC.
PLANT SUPPORT - PLANT SYS. NO. 1

NUMBER SN4100000

TOTAL PROGRAM

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<tr>
<th>BUDGET</th>
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<th>361</th>
<th>459</th>
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<th>888</th>
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<td>16</td>
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<td>36</td>
<td>38</td>
<td>43</td>
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MANPOWER

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<th>23</th>
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<th>25</th>
<th>23</th>
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<tr>
<td>ACTUAL</td>
<td>23</td>
<td>21</td>
<td>20</td>
<td>22</td>
<td>25</td>
<td>26</td>
<td>24</td>
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<td></td>
</tr>
</tbody>
</table>

No significant variance.
No significant variance.
Corrective action has been taken (increased manpower) which will correct this underrun by yearend if the manpower is retained.
Lack of design engineering manpower is still the major cause of the budget underrun. Increased recruiting should help in the next few months. Also, some tasks have been deferred and the money will be returned to management reserve.
Overall spending as of June 1, 1980 is within 10% of the actual budget. Future projections indicate that yearend actuals will be close to budgeted funds.
No significant variance.
Cost graphs indicate slight underexpenditure basically due to outstanding requisitions. Material requisitions in process/unpaid are presently estimated to be about $50K.
No significant variance.
No significant variance.
No significant variance.
Staffing is beginning to level out and should be close to projected budget by yearend.
The material overrun is a result of LOFT operations being charged for the electric power used by the TAN area. Corrective action will be taken.
No significant variance.
No significant variance.
Labor overruns occurred during the first quarter of FY-80 to support the test schedule and plant modification. Underruns during the balance of the year are expected to correct the problem.
Steps have been taken to limit expenditures to the budget at yearend.
No significant variance.
No significant variance.
No expenditures have been incurred. Assessment of program on June 12 with Dr. R. Gay at RPI, will determine if funds can be returned to reserve.
Spending is below budget and activities are nearly complete. The status as of July 1 should indicate if funds can be returned to reserve.
No billing has yet been received from the subcontractor, Rensselaer Polytechnic Institute. Work has been proceeding since September, 1979.
Task has not started because of manpower assignments; however, it will start on July 1, 1980.
Budget is scheduled incorrectly. Work is underway with completion scheduled for August 1980.
This portion of the small break test is completed. Cost overruns will be transferred to the JAERI-funded portion of the task. Corrective action is in progress.
No significant variance.
No significant variance.
Work has been completed ahead of schedule.
Task inactive due to higher priority activities for performer. Review meeting and "wind-up" will occur during June 1980.
The task has not started due to higher priority work assignments.
The variance is due to completion of work ahead of schedule. Corrective action will be taken for realignment of budget.
There was an increase in actuals due to cost transfer of $198,465 for work associated with the boiler installation on the Two-phase Flow Loop Task. Previously, this amount was charged incorrectly to an L.T.S.F. account. $57,000 is under investigation.
Work has been completed ahead of schedule.
Cost underrun will be corrected when appropriate costs are transferred from FRG-funded portion of this task.
No significant variance.
Expenditures to date are consistent with the budget; however, limitations on time for availability of test facility will force testing into FY-81, and associated costs will be delayed correspondingly.
This task is complete. Corrective action is in process to remove the task variance.
This task has been delayed. Budget realignment is necessary.
No significant variance.
No significant variance.
Work has been completed ahead of schedule.
A CGB adding $69K to the complete budget to compensate for the computer overrun is reflected in the cost graph as underspending at this time. However, as computer charges continue to be high, the variance will become less as FY-80 closes.
No significant variance.
Drag disc turbine rakes scheduled to be built for L2-5, have been delayed until later in the year. A CCP has been prepared to reflect this change, but is not shown in cost graph.
The underspending reflected in the graph is the result of the following items: (1) a CCB to add $57K for the secondary side instrumentation was input incorrectly, starting the task in April, which reflected as under-spending on cost graph. Another CCB is in process to correct this error. (2) A portion of 53AMB09 was inadvertently coded into FY-1980 during the transition from Q80-3-3 to Q80-4-0. This resulted in the transfer of $69,000 from FY-81 into FY-80. A CCF has been approved, but not reflected in the cost graph, to transfer $69K from FY-80 back into FY-1981. (3) $40,000 owed to Sandia Corp. for PMA generators is not reflected in May actuals. (4) A CCB is approved, but not reflected in the cost graph, returning 51K to management reserve from the Fuel Rod Instrument Task (53AMB03).

With the above incorporated, the Experimental Measurement Section "B's" variance is 1%. 
No significant variance.
PERFORMANCE ANALYSIS

The LOFT Performance Measurement System provides timely, valid project status information that combines cost and schedule performance data for trend analysis. The Budgeted Cost of Work Scheduled (BCWS) forms a Performance Measurement Baseline for subsequent comparisons with the Budgeted Cost of Work Performed (BCWP). The BCWP also is compared with the Actual Cost of Work Performed (ACWP).

<table>
<thead>
<tr>
<th></th>
<th>BCWS</th>
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<th>BCWP</th>
<th></th>
<th>ACWP</th>
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<td>Month</td>
<td>Year-To-Date</td>
<td>Month</td>
</tr>
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<td>5N2D000</td>
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<td>263</td>
<td>1631</td>
<td>227(^1)</td>
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<td>5N4K000</td>
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<td>149</td>
<td>911</td>
<td>195</td>
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<td>598</td>
<td>84</td>
<td>459</td>
<td>71</td>
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</table>

For 5N2D000, refer to the comment on the summary cost account chart.

For 5N4K000, refer to the comment on the summary cost account chart.

For 5N4P000, refer to the comment on the summary cost account chart.

1. Excludes costs of $254,000 due to accrual reversal not being accomplished for the month of May 1980. Corrective action in process.
TABLE I. FOREIGN FUNDS AVAILABILITY AT END OF MAY 1980
(In Thousands of Dollars)

<table>
<thead>
<tr>
<th>Participant</th>
<th>Actual Reserve</th>
<th>Contingency</th>
</tr>
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<tr>
<td>JAERI</td>
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<td>71</td>
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<tr>
<td>FRG</td>
<td>24</td>
<td>13</td>
</tr>
<tr>
<td>ECN</td>
<td>107</td>
<td>25</td>
</tr>
<tr>
<td>SGAE</td>
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<tr>
<td>Total</td>
<td>420</td>
<td>109</td>
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TABLE 2. FOREIGN-FUNDED TASK SUMMARY AT END OF MAY 1980

<table>
<thead>
<tr>
<th>Project Description</th>
<th>Total Proposal</th>
<th>Total Spending</th>
<th>Funds Spent to Date</th>
<th>Expected Task Completion Date</th>
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<tbody>
<tr>
<td></td>
<td>Est. Inc.</td>
<td>Auth. by CCB</td>
<td>($K)</td>
<td></td>
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<tr>
<td></td>
<td>Contingency</td>
<td>($K)</td>
<td>($K)</td>
<td></td>
</tr>
<tr>
<td>JAERI TASKS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5F8C1 JAERI Management</td>
<td>210</td>
<td>210</td>
<td>176</td>
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<tr>
<td>5F8C2 Completed Tasks</td>
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<td>820</td>
<td>820</td>
<td>Done</td>
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<td>5F8C4 Advanced DTT</td>
<td>154</td>
<td>154</td>
<td>135</td>
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</tr>
<tr>
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<td>1876</td>
<td>1859</td>
<td>1864</td>
<td>July 80</td>
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<td>5F8C6 Reevaluation of LOFT L1 Exper.</td>
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<td>25</td>
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<td>10</td>
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</tr>
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<td>July 80</td>
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<td>114</td>
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<td>800</td>
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<td>5F8C93 Shared-TRAC Code Studies</td>
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<td>83</td>
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<td>June 80</td>
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<td>FRG TASKS</td>
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<td>July 80</td>
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<td>5F7C7 Ultrasonic Density Detectors</td>
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<td>May 80</td>
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<td>5F7CA Small Break Inst.</td>
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<td>200</td>
<td>206</td>
<td>May 80</td>
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<td>5F7C93 TRAC Code Studies</td>
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<td>83</td>
<td>83</td>
<td>June 80</td>
</tr>
<tr>
<td>Project Description</td>
<td>Total Proposal Est. Inc. Contingency ($K)</td>
<td>Total Spending Auth. by CCB ($K)</td>
<td>Funds Spent to Date ($K)</td>
<td>Expected Task Completion Date</td>
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<tr>
<td><strong>ECN TASKS</strong></td>
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<td>Completed Tasks</td>
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**BUDGET STATUS REPORT**

**TABLE 3. LOFT FY-80 SUMMARY STATUS REPORT**

NUCLEAR REGULATORY COMMISSION

(In Thousands of Dollars)

<table>
<thead>
<tr>
<th>WBS#</th>
<th>#</th>
<th>Q80-4-1</th>
<th>Approved CL.I CCBs</th>
<th>Current PMB</th>
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<th>Current BAC</th>
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Supplementary programs 4,015
NRC discretionary reserves 50
NRC management reserves 1,256
Total NRC funding (FY-80) 45,789
TABLE 4. LOFT FUNDING SUMMARY FOR FY-80  
(In Thousands of Dollars)

<table>
<thead>
<tr>
<th>Funds</th>
<th>Current FIN Plan No. 7</th>
<th>Current Budget File (Q80-4-3)</th>
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<td>LOFT Foreign Funds</td>
<td>2,037</td>
<td>2,220</td>
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<td>LOFT Lead Rod Tests</td>
<td>170</td>
<td>170</td>
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<tr>
<td>Total</td>
<td>2,207</td>
<td>2,390</td>
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<tr>
<td>NRC Operating Funds</td>
<td>45,176</td>
<td>41,773</td>
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<tr>
<td>Electric Heat Rod Evaluation</td>
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<td>328</td>
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<tr>
<td>Computer Code Support</td>
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<td>233</td>
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<tr>
<td>TC-2 Tests</td>
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<tr>
<td>LTSF</td>
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<tr>
<td>PWR/BWR Task Group</td>
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<td>700</td>
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<tr>
<td>Standard Problem Analysis</td>
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<td>150</td>
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<tr>
<td>Total</td>
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<td>45,788</td>
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<tr>
<td>Total LOFT Funding</td>
<td>47,383</td>
<td>48,178</td>
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TABLE 5. LOFT FY-80 SUMMARY BUDGET STATUS REPORT OF LOFT FOREIGN FUNDS
(In Thousands of Dollars)

<table>
<thead>
<tr>
<th>LOFT WBS</th>
<th>189 #</th>
<th>Q80-4-1 (CCB 80-140)</th>
<th>Approved CL.I CCBs</th>
<th>Current PBM # Q80-4-1</th>
<th>Approved CL.II CCBs</th>
<th>Current FY-80 Budget</th>
<th>Total Authorized Spending Limit</th>
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<tbody>
<tr>
<td>5FAxx</td>
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<td>346</td>
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<td>5F7xx</td>
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<td>979</td>
<td>0</td>
<td>980</td>
<td>4198</td>
</tr>
<tr>
<td>5F8xx</td>
<td>A6111</td>
<td>1191</td>
<td>76</td>
<td>1,098</td>
<td>0</td>
<td>1,260(1)</td>
<td>4,659(1)</td>
</tr>
<tr>
<td>5F9xx</td>
<td>A6104S</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5fxxx</td>
<td></td>
<td>2,280</td>
<td>109</td>
<td>2,219</td>
<td>0</td>
<td>2,390</td>
<td>9,341</td>
</tr>
</tbody>
</table>

Foreign contingency reserves 109 109
Foreign management reserves (590) (590)
Total FY-80 LOFT foreign funds 1,909 8,860
Foreign funds spent through FY-79 6,860

Foreign funds budgeted in FY-81 91 0
Total foreign funds received to date 8,860 8,860

(1) Includes LOFT Lead Rod.
### TABLE 5. LOFT CAPITAL EQUIPMENT STATUS REPORT THROUGH MAY

<table>
<thead>
<tr>
<th>Schedule 139s</th>
<th>Title</th>
<th>Prior Year Uncosted</th>
<th>Current Year Funds</th>
<th>Total Available to Cost</th>
<th>Current Year Costs</th>
<th>Outstanding Commitments</th>
<th>Balance Less Costs and Commitments</th>
<th>Estimate to Complete</th>
<th>Balance</th>
</tr>
</thead>
<tbody>
<tr>
<td>4CA101</td>
<td>Integral System Design and Fabrication</td>
<td>111,731</td>
<td>16,000</td>
<td>101,731</td>
<td>31,547</td>
<td>39</td>
<td>70,145</td>
<td>65,653</td>
<td>3,531</td>
</tr>
<tr>
<td>4CA102</td>
<td>LOFT Operations</td>
<td>194,419</td>
<td>68,000</td>
<td>126,419</td>
<td>114,858</td>
<td>640</td>
<td>10,921</td>
<td>19,206</td>
<td>1,355</td>
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<tr>
<td>4CA103</td>
<td>UI and Requalification Program</td>
<td>140,034</td>
<td>78,000</td>
<td>218,034</td>
<td>165,587</td>
<td>0</td>
<td>52,447</td>
<td>54,013</td>
<td>1,566</td>
</tr>
<tr>
<td></td>
<td><strong>Total DOE</strong></td>
<td><strong>446,184</strong></td>
<td><strong>0</strong></td>
<td><strong>446,184</strong></td>
<td><strong>311,992</strong></td>
<td><strong>679</strong></td>
<td><strong>133,513</strong></td>
<td><strong>130,872</strong></td>
<td><strong>3,320</strong></td>
</tr>
</tbody>
</table>

|                  | A-6061 Experimental Measurements*         | 788,759             | 800,000            | 1,588,759               | 838,658            | 144,424                  | 605,687                             | 738,793             | 13,318  |
|                  | A-6084 Integral System Design & Fab.      | 589,139             | 1,400,000          | 2,089,139               | 474,943            | 298,363                  | 1,313,833                           | 1,638,686            | 22,490  |
|                  | A-6088 LOFT Operations                     | 18,091              | 100,000            | 118,091                 | 20,883             | 18,045                   | 79,145                              | 85,489              | 11,719  |
|                  | **Total NRC**                              | **1,495,999**       | **2,300,000**      | **3,795,999**           | **1,334,484**      | **460,832**              | **2,000,683**                       | **2,458,968**        | **2,547** |
|                  | **Total LOFT**                             | **1,942,183**       | **2,300,000**      | **4,242,183**           | **1,646,476**      | **461,511**              | **2,134,196**                       | **2,589,840**        | **5,867** |