UNIVERSITY OF FLORIDA TRAINING REACTOR

LICENSE NUMBER: R-56

UPDATED PROPOSAL SUBMITTED TO THE NUCLEAR REGULATORY COMMISSION TO MEET 10 CFR 50.64 REQUIREMENTS FOR UPDATING SCHEDULING OF UFTR CONVERSION FROM HEU TO LEU FUEL

Dr. William G. Vernetson
Director of Nuclear Facilities

March 27, 1996

UNIVERSITY OF FLORIDA TRAINING REACTOR FUEL CONVERSION FROM HIGH ENRICHED TO LOW ENRICHED URANIUM FUEL

INTRODUCTION

This proposal is submitted to the Nuclear Regulatory Commission to meet the requirement that the licensee for the University of Florida Training Reactor (UFTR), as a licensee of a non-power reactor authorized to possess and use high enriched uranium (HEU) fuel shall develop and submit a proposal to replace all HEU fuel possessed under the R-56 license with available low enriched uranium (LEU) fuel acceptable to the Nuclear Regulatory Commission on a schedule determined pursuant to 10 CFR 50.64 Paragraph (c)(2). This proposal addresses the overall process of conversion from initial preparations following receipt of funding to support conversion to final verification, testing, and summary reporting on the converted UFTR. Three primary phases have been identified for control and administration of the overall process of conversion as follows:

I. Preparation for Conversion.

II. Conversion (assuming NRC order to convert).

III. Review and Verification of Conversion.

Table I contains a listing of key activities involved in each phase of the conversion from receipt of funding for conversion from the Department of Energy (DOE) to final submittal of summary reports to DOE and NRC on the conversion.

PHASE I: PREPARATION FOR CONVERSION

Phase I commenced with receipt of funding for conversion from DOE to cover Phase I only. This funding was considered to be certified per the letter contained in Appendix I of the 1987 proposal; this proposal was submitted to the Department of Energy and official notice of receipt of funding was received with a letter dated November 12, 1987. Because of errors in the contract description provided by DOE, the full approval for receipt of funding was delayed until receipt of the confirming letter dated December 21, 1987. Copies of both letters as well as the 1987 certification letter are enclosed in Appendix I along with documentation showing the extension of the current DOE grant to support Phase I work which has been delayed beyond the original grant period.

Initial efforts in the process to convert the UFTR from use of high enriched to low enriched fuel (HEU-LEU) consisted of preliminary tests and an evaluation to determine whether the SPERT-type fuel available to the R-56 licensee but currently under license SNM-1050 could be qualified for use in the UFTR. Visual and radiographic test results to date were positive in this regard. Unfortunately, equipment failures and the need to move the SPERT (SNM-1050) fuel storage facility impacted the schedule during the 1988 year so the radiographic tests were not completed until April, 1989 along with relicensing the SPERT fuel storage facility. Overall, the results of the radiographic tests of the SPERT fuel were positive showing that the condition of the fuel was such that its integrity was assured. Phase I then continued with activities to justify a fuel selection, either SPERT or silicide, based upon results of prequalification testing of existing SPERT fuel and identifying any modifications in existing reactor systems necessitated by use of the new fuel.

Several previously unconsidered potential complications noted in late 1988 were investigated in 1989. This effort was directed to maintaining and/or improving the UFTR neutronics characteristics while minimizing the overall cost of UFTR conversion. The only two fuels that have been considered are the existing SPERT UO_2, stainless steel clad fuel presently under the SNM-1050 license and the newly developed silicide fuel available through the RERTR program at Argonne National Laboratory.

The first choice had been to use the already existing SPERT fuel for which a number of neutronics and thermal-hydraulics analyses are in existence. This would be the cheaper fuel if acceptable since it is already manufactured. However, even after completion of the prequalification program for the qualification tests used to assure the SPERT fuel can meet UFTR requirements without compromising safety, it was necessary to assure this SPERT fuel could be used without requiring costly modifications which could outweigh the low initial cost of SPERT fuel (no manufacturing costs) and have impact on core neutronics per earlier analyses. The Department of Energy was receptive to this evaluation of the two fuels and work in this area progressed well in 1989. Unfortunately, the complexity and cost of potential structural (the SPERT fuel loading would weigh about 2000 pounds versus the present 50 pound core loading), shielding, fuel arrangement and cooling system changes necessitated by use of the SPERT fuel resulted in a milestone decision in August, 1989 not to utilize the SPERT fuel for conversion but rather to utilize the standard plate-type silicide fuel. The anticipated cooling system fuel arrangement and shielding changes potentially necessitated by use of the SPERT fuel were especially strong factors in the decision since space in the UFTR facility is already limited and the facility had been cited for two violations in this area in 1989.

In parallel with selection of the plate type silicide LEU fuel and identification of necessary reactor systems changes, safety analysis were being performed for the selected LEU fuel conversion and associated system changes. Implementation of the neutronics codes to be used was underway during 1989 and several codes had been implemented and run for test cases. Therefore, UFTR conversion calculations were progressing reasonably well until the loss in August, 1989 of the graduate student performing the neutronics calculations as he decided to pursue his advanced degree at another university. Unfortunately, he left with much of his work inadequately undocumented. The unavailability of ano her qualified student committed to assume this responsibility resulted in further delays. Nevertheless, a student project in Fall, 1989 resulted in some progress in assuring neutronics methodology would be adequate though many calculations had to be updated and repeated due to errors in and poor documentation of the previous work. It was hoped that this individual would remain on the project for his thesis work. This retention effort was successful and the neutronics analyses were able to move forward in 1990.

Several errors due to poor documentation necessitated restarting the safety analysis when the student began work on it in early 1990. Although he spent a period at Argonne National Laboratory working with the RERTR group to receive training in the use of the codes, it still required some time for the student to become proficient in use of the codes in-house. Unfortunately several formatting and other flaws in the implemented codes used for the neutronics analysis also slowed progress in 1990. These were cleared up as part of the work on assuring proper code methodology during 1990.

Early in 1991 a student thesis project had resulted in good progress in assuring the neutronics methodolcgy to be adequate and the necessary "benchmark" modelling of the

existing core was nearly complete. Only scoping calculations had been completed for the LEU core with the number of fuel plates per bundle not yet set when the 1991 proposal required by 10 CFR 50.64(c)(2) was submitted. It was expected that DOE-supplied funding support of this work would be extended beyond the April 30, 1991 end date per verbal communications so this work could be concluded along with basic thermal-hydraulic analyses to conclude the required HEU-to-LEU conversion safety analyses. Unfortunately this grant was not officially extended until March, 1992. It was also expected that the individual working on this neutronics analysis would complete his thesis work by mid-1991. The "benchmark" static calculations on the existing UFTR HEU core were completed and an internal report generated in April, 1991. The individual working on the neutronics analysis completed his thesis work in May, 1991 making his defense on May 10, 1991 but continuing his work until May 23, 1991. After the number of fuel plates per bundle was set at 14 from the neutronics analysis, thermal hydraulics analyses were begun in August, 1991. These analyses had to be completed before the entire analysis package could be assembled for submission to NRC. A graduate assistant had nearly concluded working on the thermal hydraulics area as the 14 plate fuel bundle arrangement had been selected for the conversion in March, 1992. The lack of official grant extension made the financial support of this effort more difficult but a draft report of this thermal hydraulics work was produced in June, 1992 with the final report essentially completed during the 1994-95 fiscal year.

A no-cost extension of the Department of Energy Grant DE-FG05-88ER75387 entitled "Conversion of University of Florida Reactor to Low Enriched uranium (LEU)" was submitted to Ms. Ann Rydalch via a letter dated April 25, 1991 with a copy supplied to

Keith Brown. The extension was agreed to be until April 30, 1992. Unfortunately, no further information had been received on the no-cost extension until March, 1992 making some plans and efforts difficult to implement. In addition, time consuming efforts were also in progress with the Department of Energy representatives in Idaho to investigate the possibility of replacing the UFTR core fuel boxes which make reloading and unloading the core difficult and time consuming. DOE representatives even visited the UFTR facility and observed operations as well as reviewed drawings as several days were spent in discussions of how best to proceed in 1992. This unexpected work effort occupied much time and progressed slowly but a decision not to change the fuel boxes was finally reached in summer, 1992. Similarly efforts to review fuel drawings and to evaluate the holddown/spreader pin in use in each fuel box had occupied some considerable facility time in the previous year. This latter effort is now essentially complete with the official fuel drawings in draft form from DOE at the UFTR facility and ready to be reviewed when the grant would be officially extended in April, 1995.

During the 1994 year, work to incorporate all the analysis completed to date into a single FSAR update to include the Technical Specifications progressed very slowly with some kinetics calculations still remaining in the neutronics area. During that year it was expected that the DOE supplied funding support for this work would again be extended beyond April 30, 1993 with the DOE project manager checking on this per a telephone request made in June, 1993. A letter dated August 9, 1993 requesting such an extension was submitted to DOE. In a letter dated November 5, 1993, DOE indicated that the no-cost extension needed to be submitted to the Oak Ridge office; the resubmittal of the extension request to the Oak Ridge Operations Office was accomplished via a letter dated

December 15, 1993. During January, 1994, the Oak Ridge office indicated that the proper submission really is to the Idaho Operations Office; when informed of this, the project manager was to check, but the grant was not extended as needed until November, 1994. This work was expected to be completed by June, 1994. However, little work was accomplished as the funding remaining in the grant is for support of a non-permanent employee (student) who has still not been identified. In April, 1995, DOE officially extended the grant with its remaining support to a March 31, 1996 ending date; since little work was accomplished in this period due to personnel unavailability, we are in the process of getting the funding extended further and the support funding category changed to allow completion of work through submittal of SAR changes. This change will require several months. However, DOE has also advised in mid-March that additional funding for the next phase (Phase II) of the conversion will not be available during fiscal year 1996. The entire package of results will then be assembled as a Revision to the UFTR Safety Analysis Report by October, 1996 with the project then expected to progress as indicated in the updated Table II.

As indicated, previous delays have necessitated several extensions in the initial DOE grant which had been received as documented in Appendix I with another extension requested and verbally agreed to, to pick up from April, 1993 as indicated above to assure continuous funding throughout the remainder of the conversion process with a new grant to be required for Phase II. In addition to neutronic and thermal-hydraulic analysis, shielding and effluent analyses will be documented to identify any changes in procedures (few expected), security plan, technical specifications or other license documents that must be considered as part of conversion. These should be minimal. This submittal will also

contain documentation detailing the various tests and surveillances planned as part of the conversion. At this point a complete set of licensing documents for the conversion will be submitted along with a conversion application for review and approval. This result is now expected by October, 1996. Assuming resolution of all questions, this submittal will conclude the Phase I licensee efforts. Phase I will then conclude with the issuance by the NRC of the specific Order to Convert.

PHASE II: CONVERSION (Assuming NRC Order to Convert)

Phase II (Conversion) will begin with receipt of the NRC Order directing the conversion and any necessary changes to the license, facility and/or procedures per 10 CFR 50.64(c)(3). This second phase was not yet funded by the existing DOE grant for which an extension has been requested and will include all final tests conducted with the HEU fuel to serve primarily as the basis for later comparison with similar tests with LEU fuel. Phase II will then involve a number of key activities aimed ultimately at having LEU fuel replace HEU fuel at the UFTR facility to include:

1. Shutdown core decay for several weeks followed by core unloading and shipment of irradiated HEU fuel.
2. Qualification of the selected LEU fuel (as applicable).
3. Implementation of required facility changes necessitated for use of LEU fuel; this may involve some changes related to having both HEU and LEU fuel on site simultaneously for a brief time.
4. Receipt of unirradiated LEU fuel.
5. Shipment of irradiated HEU fuel.
6. Documentation of all changes.

7. Completion of all requirements for core loading with LEU fuel followed by loading of the LEU fuel and startup testing to low power.
8. Documentation and record organization for the LEU fuel implementation.

PHASE III: REVIEW AND VERIFICATION OF CONVERSION

Phase III (Review and Verification of Conversion) will consist of a series of activities designed to verify the quality of the conversion process to include both the physical implementation of the LEU fuel and the documentation of the implementation. Activities in Phase III will include:

1. Completion of startup as well as power testing and related surveillances.
2. Verification and evaluation of UFTR operational characteristics.
3. Review of conversion plan and data for consistency.
4. Approval for return of UFTR to normal operations.
5. Return to normal operations.
6. Submission of Final Report to NRC/DOE summarizing HEU operational conditions and comparing these results with the predictions contained in the Safety Analysis submitted to NRC at the end of Phase I and approved as part of the Order to Convert.

SUMMARY CONCLUSIONS

As noted earlier, a relatively detailed list of the various elements that must be obtained, produced or otherwise generated as required throughout the three phases of the UFTR conversion from HEU to LEU fuel is presented in Table I. The current plan

continues to be to generate as much of the required safety analysis and design work in-house as possible. Only items such as silicide fuel (now the selected fuel) would be designed and manufactured outside the administrative control of the UFTR licensee. At this point, without having identified all required changes, it is not possible to delineate exactly what other external support may be needed. The neutronics and thermal-hydraulics analyses are all being conducted in-house which has necessitated some external support from the RERTR program at Argonne National Laboratory to assure proper code implementation at the University of Florida to carry out the required safety analysis. Work has progressed slowly with delays due to SPERT fuel inspection delays, graduate student changes and inability to identify qualified graduate students to work on the project for their thesis work up until the previous two years when progress on the use of the neutronics methodology was delayed by several code inconsistencies and lack of documentation which have now been corrected. The effort to generate the submittal package is underway and is expected to progress well during summer, 1996 with submittal in October, 1996.

The overall flow diagram for HEU to LEU conversion of the UFTR is presented in Figure 1. Key stages in the three phases, as well as key input items at the various stages, are indicated at each stage. Nevertheless, there is still some uncertainty in the exact plan of events in Phase II such as whether LEU fuel will be accepted on site prior to shipping HEU fuel off site. Another concern is the physical fit of the fuel in the fuel boxes which will necessitate some considerable experimental measurement and verification efforts after this year. These items are now under consideration.

Finally, Table II contains an updated tentative schedule (Revision 10) for the major milestone events in the UFTR conversion process commencing with the notification of

receipt of funding effective in November, 1987 and concluding with submittal of a final report to NRC and DOE summarizing the results of the conversion by June, 1997. It should be noted that this schedule is tentative and, as required by 10 CFR 50.64, will be updated yearly. There has been considerable schedule slippage during the past few years. The schedule is also subject to variations caused by availability of replacement fuel or other items involved in required facility changes as well as variations in the level of DOE funding after the first two year period (now extended) for which funding has been received. Since DOE will provide no new conversion money during fiscal year 1996, this does not appear to be a problem. Other areas which may impact the schedule are the availability of a shipping cask especially for irradiated HEU fuel (we are currently using our HEU fuel at a rate of about 1.5 MW-Days energy generation per year so it will almost certainly require a fuel cask versus a 6M container though this may depend on the cooling period) and final usage of the UFTR with HEU fuel to provide a basis for comparison of changes in operating characteristics or to meet education, research and service commitments. Within these constraints and conditions, the schedule in Table II is one which the licensee is committed to meeting and which the licensee considers relatively realistic based upon expected resources and recent progress with neutronics calculations.

Although much of the detail of the conversion process has depended upon the final selection of fuel types, this selection is now finalized; therefore, the information, especially the tentative schedule in Table II provided in this updated proposal, shows that the LEU conversion at the UFTR has progressed up until this past year with significant delays occurring during the year again due to delays in getting the extension to the DOE grant to document completion of the thermal hydraulics calculations and to work with the

Department of Energy, EG&G Idaho on fuel review and checks for insertion into the core. As previously indicated, we lost the individual working on the submittal package two years ago. At this point, reactor staff including the Director are still planning to complete the package without graduate assistant support which has proven unreliable in supporting this project. The key decisions remaining will involve identification and evaluation of system changes required by the conversion, especially concerning utilization of the existing fuel boxes, shipment of used fuel and delivery of new fuel as well as development and implementation of a test program for both the HEU and LEU cores some of this uncertainty is also involved with the possibility of DOE replacement of UFTR fuel boxes. The schedule will likely be most impacted, however, in the near future by the times required for completing and documenting the safety analysis in a submittal package and perhaps for manufacture of the LEU fuel. The schedule presented in Table II is considered to be realistic and should be attainable now that the neutronics methodology has been proven acceptable, neutronics calculations are complete for both the HEU and LEU core and thermal hydraulics calculations are also complete except for several relatively minor documentation points. All analyses show the 14 plate LEU fuel bundle is acceptable for the conversion. As a result we should be able to conclude in a few additional months making the proposed schedule for first submittal realistic assuming DOE extension of their grant.

The one further drawback may be DOE funding available for the conversion. Appendix I contains the original letters of notification that federal government funding for UFTR conversion was available and had been received from the Department of Energy as well as the extension letter for support through March, 1996 plus the latest letter indicating funding for conversion will not be available during fiscal year 1996.

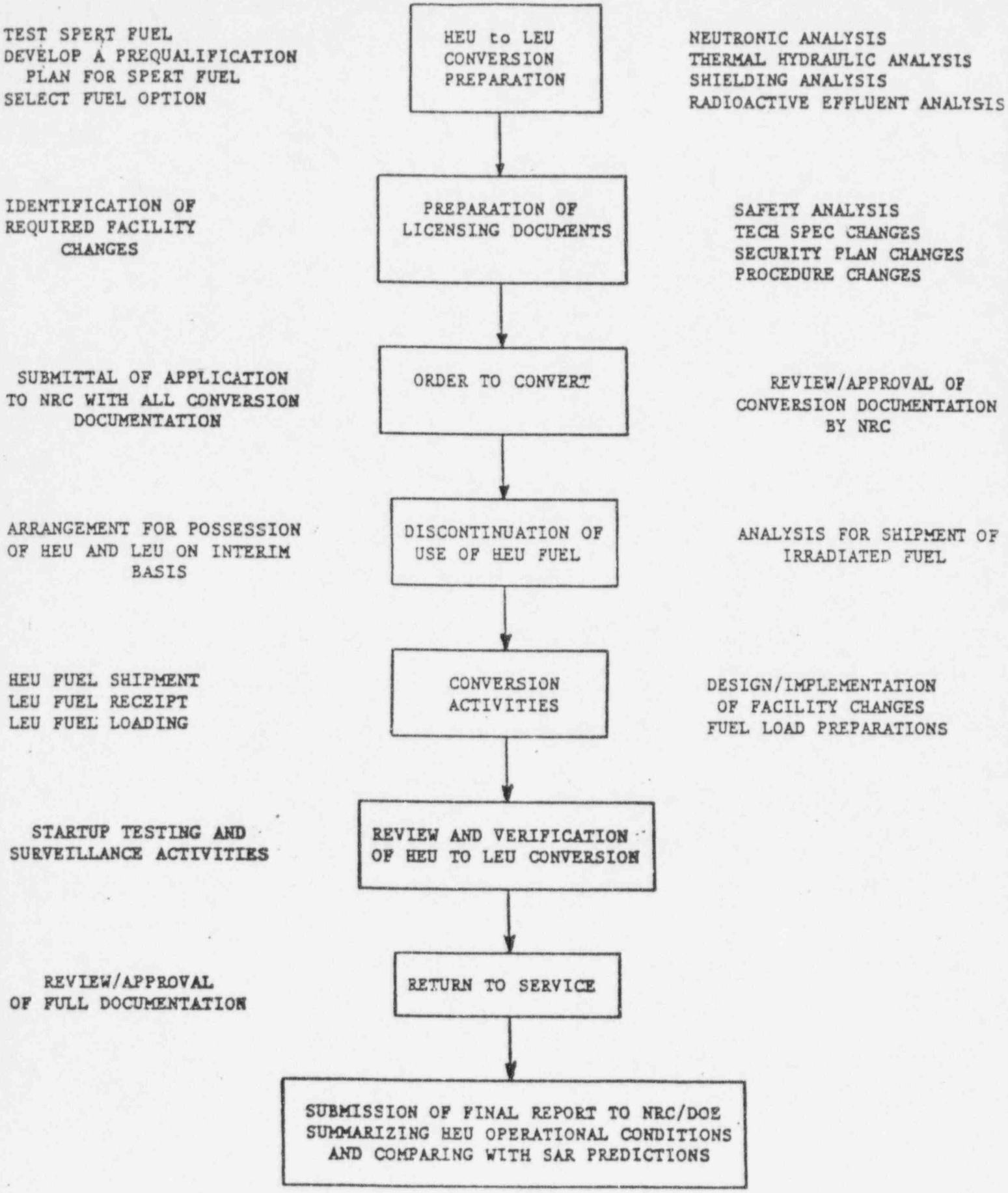

Figure 1. University of Florida Training Reactor HEU to LEU Conversion Flow Diagram

TABLE I

University of Florida Training Reactor
Key Activities for HEU-to-LEU Fuel Conversion

I. PHASE I - PREPARATION FOR CONVERSION

A. Receipt of Funding from Department of Energy

B. Analysis of UFTR-Specific LEU Conversion Options

1. Pretesting of Selected SPERT Fuel Pins
2. Development of a Qualification Program for SPERT Fuel Pins
3. Completion of Prequalification Testing of SPERT Fuel
4. Evaluation of Comparative Conversion Options (SPERT Vs. Silicide)
5. Selection of LEU Fuel Option for UFTR Conversion

C. Safety Analysis/Licensing Studies

1. Neutronic Analysis of LEU-Fueled UFTR
2. Thermal-Hydraulic Analysis for LEU-Fueled UFTR
3. Shielding Analysis for LEU-Fueled UFTR
4. Radioactive Effluent Analysis as Required

D. Identification of Changes in the R-56 License, Technical Specifications, Facility, Security Documents and Procedures Under the Scope of 10 CFR 60.64(c)(3) as Necessitated by Fuel Conversion

E. Preparation of Full Submittal to NRC to Support Conversion Including all Supporting Documents

II. PHASE II - CONVERSION

A. NRC Order to Convert

B. Fuel-Related Activities

1. Qualification of Selected LEU Fuel
2. Final UFTR Operations with HEU Fuel
3. Shipment of Irradiated Fuel
4. Receipt of LEU Fuel

C. Implementation of Required Changes in R-56 License per Item ID.

D. LEU Fuel Loading Activities

1. Completion of Preparations for Core Load
2. Loading of LEU Fuel
3. Startup Testing and Surveillance

E. Completion of Startup Documentation

III. PHASE III - REVIEW AND VERIFICATION OF CONVERSION

A. Completion of Startup Testing and Related Surveillances
B. Completion of Power Testing and Surveillances
C. Determination of UFTR Operational Characteristics
D. Return to Normal Operations

TABLE II

(Revision 10)

University of Florida Training Reactor
Tentative Milestone Schedule
for HEU to LEU Fuel Conversion

I.	Effective Date of Receipt of Funding	November, 1987
II.	Date of Full Submittal to NRC of Application to Convert (including all necessary documents)	October, 1996
III.	Date of NRC Order to Convert	January, 1997
	A. Date of Completion of All Plans to Convert	September, 1997
	B. Date of Receipt of LEU Fuel	November, 1997
	C. Date of Completion of Any Final Tests With HEU Fuel	February, 1998
	D. Date of Removal of HEU Fuel	April, 1998
	E. Date of Shipment of HEU Fuel	July, 1998
	F. Date of Loading of LEU Fuel	September, 1998
	G. Date of Completion of Determination of Initial Operational Parameters With LEU (Startup and Power Operations Testing)	December, 1998
	H. Date of Submittal of Report to NRC/DOE Summarizing New Operational Characteristics and Comparing With Predictions of Safety Analysis	February, 1999

3/96

APPENDIX I

ORIGINAL LETTERS OF NOTIFICATION THAT FEDERAL GOVERNMENT FUNDING FOR UFTR CONVERSION WAS AVAILABLE AND HAD BEEN RECEIVED FROM THE DEPARTMENT OF ENERGY

AS WELL AS THE EXTENSION LETTER FOR SUPPORT THROUGH MARCH, 1996

PLUS THE LATEST LETTER INDICATING FUNDING FOR CONVERSION WILL NOT BE AVAILABLE DURING FISCAL YEAR 1996

F 1600.1
5-8.1

U.S. DEPARTMENT OF ENERGY
NOTICE OF FINANCIAL ASSISTANCE AWARD

r the authority of Public Law 95-91 DEPARTMENT OF ENERGY ORGANIZATIONAL ACT and

ect to legislation, regulations and policies applicable to (cite legislative program title):
ERSION OF UNIVERSITY REACTOR

ROJECT TITLE
EU FUEL CONVERSION

2. INSTRUMENT TYPE
X GRANT COOPERATIVE AGREEMENT

ECIPIENT (Name, address, zip code, area code & telephone no.)
NIVERSITY OF FLORIDA
23 GRINTER HALL
AINESVILLE, FLORIDA 32611

4. INSTRUMENT NO.
DE-FG07-88ER75387

5. AGREEMENT NO.
M006

6. BUDGET PERIOD
FROM: 11/15/89 THRU: 04/30/92

7. PROJECT PERIOD
FROM: 11/15/87 THRU: 04/30/92

ECIPIENT PROJECT DIRECTOR (Name and telephone No.)
ILLIAM G. VERNETSON (904) 392-1408

10. TYPE OF AWARD
NEW CONTINUATION RENEWAL
X REVISION SUPPLEMENT

ECIPIENT BUSINESS OFFICER (Name and telephone No.)
ILLARD C. MARSHALL (904) 392-1582

DOE PROJECT OFFICER (Name, address, zip code, telephone No.)
(TO BE ASSIGNED)
U.S. DEPARTMENT OF ENERGY
CHICAGO FIELD OFFICE
9800 SOUTH CASS AVENUE
ARGONNE, ILLINOIS 60439

12. ADMINISTERED FOR DOE BY (Name, address, zip, telephone No.)
(TO BE ASSIGNED)
U.S. DEPARTMENT OF ENERGY
CHICAGO FIELD OFFICE
9800 SOUTH CASS AVENUE
ARGONNE, ILLINOIS 60439

RECIPIENT TYPE
STATE GOV'T INDIAN TRIBAL GOV'T HOSPITAL FOR PROFIT ORGANIZATION INDIVIDUAL
LOCAL GOV'T X INSTITUTION OF HIGHER EDUCATION OTHER NONPROFIT ORGANIZATION C P SP OTHER (Specify)

ACCOUNTING AND APPROPRIATION DATA

15. EMPLOYER I.D. NUMBER/SSN
87081002

a. Appropriation Symbol	b. B & R Number	c. FT/AFF/OC	d. CFA Number
N/A	N/A	N/A	N/A

BUDGET AND FUNDING INFORMATION

a. CURRENT BUDGET PERIOD INFORMATION		b. CUMULATIVE DOE OBLIGATIONS	
1) DOE Funds Obligated This Action	$ 0	(1) This Budget Period [Total of lines a.(1) and a.(3)]	$ 0
2) DOE Funds Authorized for Carry Over	$ 0	(2) Prior Budget Periods	$ 169431
3) DOE Funds Previously Obligated in this Budget Period	$ 85957		
4) DOE Share of Total Approved Budget	$ 85957	(3) Project Period to Date [Total of lines b.(1) and b.(2)]	$ 169431
5) Recipient Share of Total Approved Budget	$ 0		
6) Total Approved Budget	$ 85957		

17. TOTAL ESTIMATED COST OF PROJECT $ 169431
his is the current estimated cost of the project. It is not a promise to award nor an authorization to expend funds in this amount.

18. AWARD/AGREEMENT TERMS AND CONDITIONS
This award/agreement consists of this form plus the following:
a. Special terms and conditions (if grant) or schedule, general provisions, special provisions (if cooperative agreement)
b. Applicable program regulations (specify) N/A (Date) / /
c. DOE Assistance Regulations, 10 CFR Part 600, as amended, Subparts A and X B(Grants) or C(Cooperative Agreements) with changes as negotiated
d. Application/proposal dated November 17, 1989, X as submitted

19. REMARKS
THE PURPOSE OF THIS AMENDMENT IS TO TRANSFER THIS GRANT FROM THE U.S. DEPT. OF ENERGY, IDAHO FIELD OFFICE, IDAHO FALLS, IDAHO, TO THE U.S. DEPT. OF ENERGY, CHICAGO FIELD OFFICE, ARGONNE, ILLINOIS. THE EFFECTIVE DATE OF TRANSFER IS 2/29/92.

20. EVIDENCE OF RECIPIENT ACCEPTANCE

(Signature of Authorized Recipient Official) (Date)

(Name)

(Title)

21. AWARDED BY

Virginia L. Sandwina 2-25-92
(Signature) (Date)

VIRGINIA L. SANDWINA
(Name)

CONTRACTING OFFICER
(Title)

FEB 28 '92 11:38AM DOE ID (IETC)

Department of Energy
Oak Ridge Operations
Post Office Box E
Oak Ridge, Tennessee 37831

205 NOV 17 1987

MR

November 12, 1987

Mr. Dillard C. Marshall
Assistant Director
Office of Research Administration
University of Florida
Gainesville, FL 32611

Dear Mr. Marshall:

GRANT NO. DE-FG05-88ER75387 - AMENDMENT NO. A000

Enclosed are two copies of the subject grant document which have been signed on behalf of the Department of Energy.

If this document is satisfactory, please have the two enclosed copies signed by the proper official on behalf of your organization and return one fully executed copy to this office. The remaining fully executed copy is for your retention.

In addition, please have executed the enclosed Assurance of Compliance - Nondiscrimination in Federally Assisted Programs, and return the signed original to this office together with the executed copy of the grant and a completed Form DOE-538, Notice of Energy RD&D Project. Please return two copies of the DOE-538.

Sincerely,

Charles D. Crowe
Contracting Officer
Contract Management Branch
Procurement & Contracts Division

AD-423:Lyle

Enclosures:
1. Grant (2 cys.)
2. Assurance of Compliance
3. DOE 538 (3 cys)