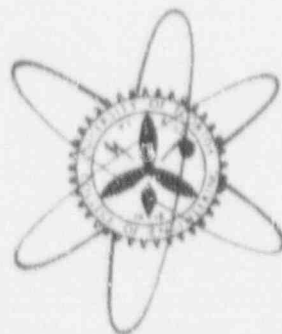


UNIVERSITY OF FLORIDA TRAINING REACTOR

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 26, 1992

DEPARTMENT OF NUCLEAR ENGINEERING SCIENCES

College of Engineering

University of Florida

Gainesville

UNIVERSITY OF FLORIDA TRAINING REACTOR

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Dr. William G. Vernetson
Director of Nuclear Facilities

March 26, 1992

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 two-year 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 another qualified student committed to assume this responsibility has 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 methodology 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 August, 1991 and will have to be completed before the package can be assembled for submission to NRC in mid-1992. A graduate assistant has nearly concluded working on the thermal hydraulics area as the 14 plate fuel bundle arrangement has been selected for the conversion. The lack of official grant extension has made the financial support of this effort more difficult but a draft report of this thermal hydraulics work has been produced.

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 have also been 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 have even visited the UFTR facility

and observed operations as well as reviewed drawings. This unexpected work effort has occupied much time and is progressing slowly but a decision on how to handle the fuel boxes should be reached by mid-May, 1992.

At this time, work is progressing to incorporate all the analysis completed to date into a single FSAR update to include the Technical Specifications. Some kinetics calculations remain in the neutronics area and the final report on thermal hydraulics is in progress. This work is proceeding slowly but is expected to progress more quickly after the end of the spring semester in May, 1992. Nevertheless, the entire package of results will then be assembled as a Revision to the UFTR Safety Analysis Report by August, 1992 with the project then expected to progress as indicated in the updated Table II.

As indicated, previous delays had necessitated an extension in the initial DOE grant which had been received as documented in Appendix I with another extension requested and verbally agreed to pick up from April, 1991 to April, 1992 requested as indicated above. Another funding extension is being requested to run forward from April 30, 1992 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, 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 August, 1992. 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 is not yet funded by the existing DOE grant for which an extension will be 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 is now progressing though 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 last 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 has begun and is expected to progress more rapidly during May with submittal in August, 1992.

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. These items are now under consideration.

Finally, Table II contains an updated tentative schedule (Revision 6) 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 December, 1994. 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. 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 probably 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 during this year although significant delays have occurred during the year again due to requirements to obtain a student assistant to perform the thermal hydraulics calculations now nearing conclusion. In the meantime we have an individual working on the submittal package. 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

It is considered to be realistic and should be attainable now that the neutronics methodology has been proven acceptable, static neutronics calculations are complete for both the HEU and LEU core and thermal hydraulics calculations are proceeding well to analyze the selected 14 plate fuel bundles in the LEU core. The associated thermal-hydraulics calculations will follow the selection of the LEU core design and should be able to be concluded in a few additional months making the proposed schedule for first submittal realistic.

TEST SPERT FUEL
DEVELOP A PREQUALIFICATION
PLAN FOR SPERT FUEL
SELECT FUEL OPTION

HEU to LEU
CONVERSION
PREPARATION

NEUTRONIC ANALYSIS
THERMAL HYDRAULIC ANALYSIS
SHIELDING ANALYSIS
RADIOACTIVE EFFLUENT ANALYSIS

IDENTIFICATION OF
REQUIRED FACILITY
CHANGES

PREPARATION OF
LICENSING DOCUMENTS

SAFETY ANALYSIS
TECH SPEC CHANGES
SECURITY PLAN CHANGES
PROCEDURE CHANGES

SUBMITTAL OF APPLICATION
TO NRC WITH ALL CONVERSION
DOCUMENTATION

ORDER TO CONVERT

REVIEW/APPROVAL OF
CONVERSION DOCUMENTATION
BY NRC

ARRANGEMENT FOR POSSESSION
OF HEU AND LEU ON INTERIM
BASIS

DISCONTINUATION OF
USE OF HEU FUEL

ANALYSIS FOR SHIPMENT OF
IRRADIATED FUEL

HEU FUEL SHIPMENT
LEU FUEL RECEIPT
LEU FUEL LOADING

CONVERSION
ACTIVITIES

DESIGN/IMPLEMENTATION
OF FACILITY CHANGES
FUEL LOAD PREPARATIONS

STARTUP TESTING AND
SURVEILLANCE ACTIVITIES

REVIEW AND VERIFICATION
OF HEU TO LEU CONVERSION

REVIEW/APPROVAL
OF FULL DOCUMENTATION

RETURN TO SERVICE

SUBMISSION OF FINAL REPORT TO NRC/DOE
SUMMARIZING HEU OPERATIONAL CONDITIONS
AND COMPARING WITH SAR PREDICTIONS

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. Prototyping of Selected SPERT Fuel Pins
 - 2. Development of a Qualification Program for SPERT Fuel Pins
 - 3. Completion of Pre-Qualification Testing of Spert Fuel
 - 4. Evaluation of Comparative Conversion Options (SPERT VS. SIL/CIDE)
 - 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 II.
- 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
- E. Submission of Final Conversion Report to NRC/DOE

TABLE II

(Revision 6)

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)	August, 1992
III.	Date of NRC Order to Convert	November, 1992
	A. Date of Completion of All Plans to Convert	July, 1993
	B. Date of Receipt of LEU Fuel	September, 1993
	C. Date of Completion of Any Final Tests With HEU Fuel	December, 1993
	D. Date of Removal of HEU Fuel	February, 1994
	E. Date of Shipment of HEU Fuel	May, 1994
	F. Date of Loading of LEU Fuel	July, 1994
	G. Date of Completion of Determination of Initial Operational Parameters With LEU (Startup and Power Operations Testing)	October, 1994
	H. Date of Submittal of Report to NRC/DOE Summarizing New Operational Characteristics and Comparing With Predictions of Safety Analysis	December, 1994

APPENDIX I

LETTERS OF NOTIFICATION THAT
FEDERAL GOVERNMENT FUNDING FOR
UFTR CONVERSION IS AVAILABLE AND
HAS BEEN RECEIVED FROM THE
DEPARTMENT OF ENERGY

205 NOV 17 1987

MR



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

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)





Department of Energy

Oak Ridge Operations
Post Office Box E
Oak Ridge, Tennessee 37831

December 21, 1987

RECEIVED DEC 29 1987

Dr. William G. Vernetson
Director of Nuclear Facilities
College of Engineering
University of Florida
Gainesville, FL 32611

Dear Dr. Vernetson:

GRANT NO. DE-FG05-88ER75387 (REVISED PROJECT DESCRIPTION)

In response to telephone conversations with you and with Keith Brown at Argonne, enclosed is a revised project description for your grant from the Department of Energy to cover cost of the conversion from HEU to LEU fuel in University of Florida's training reactor. I apologize for the confusion and delay in this revision reaching you.

Please substitute the attached Part II, Project Description and Reporting Requirements, for the one transmitted to Dillard Marshall on November 12, 1987, and have Mr. Marshall sign the award and return an original to us as soon as possible. You will not be able to draw down any money from Letter of Credit on this award until the original copy is returned to us.

Thank you for calling our attention to the fact that your award is different from the other reactor fuel conversion awards the Department of Energy has.

Sincerely,

Martha A. Lyle
Contract Specialist
Contract Management Branch
Procurement and Contracts Division

AD-423:Lyle

Enclosure:
Part II of Grant DE-FG05-88ER75387

cc: Dillard C. Marshall, Asst. Dir.
Research Administration
University of Florida
223 Grinter Hall
Gainesville, FL 32611





Department of Energy

Idaho Operations Office
78E DOE Place
Idaho Falls, Idaho 83402

December 19, 1989

205 DEC 20 '89

ML

Mr. Dillard C. Marshall
University of Florida
223 Grinter Hall
Gainesville, Florida 36211

SUBJECT: Grant No. DE-FG07-88ER75387

Dear Mr. Marshall:

We are enclosing three copies of the subject grant which have been signed on behalf of DOE. Please have all three copies signed by an authorized official and return two fully executed copies to this office within two weeks from the date of this letter. The third fully executed copy is for your retention.

Should you have any questions, please contact Ann Rydalch at
(208) 526-9617.

Sincerely,

A handwritten signature in cursive script, appearing to read "Trudy A. Thorne".

Trudy A. Thorne
Contract Specialist
Financial Assistance Branch

Enclosure

UNIVERSITY OF FLORIDA
OFFICIAL AWARD ACCEPTANCE

DATE PRINTED: 12/21/89

DECLARATION OF ACCEPTANCE (NOA) FOR THE PRESIDENT
OF THE UNIVERSITY OF FLORIDA, ACTING ON BEHALF OF
THE BOARD OF REGENTS

QUESTIONS - PLEASE CONTACT THE UF DIVISION OF
SPONSORED RESEARCH, AWARD ADMINISTRATOR
205 GRINTER HALL, 392-1582

PROPOSAL FOR GOV'T SUPPORT TO COVER COST OF UFTR CONVERSION
FROM HSH TO LEU FUEL

ADMINISTRATIVE DATA

87081032 RELATED UPN#:
AGENCY: U S DEPT OF ENERGY (P048)
AWARD DATE: 01/05/88
PRINCIPAL: VERNETSON W G
SSN: 216-44-9124
COLL: EIES - ENGINEERING
DEPT: NUCLEAR ENGINEERING SCIENCES
CO-PI:
SSN:
COLL:
DEPT:
HEGIS #: 210920
HUMAN SUBJECTS APPROVAL #:
HS APPROVAL EXPIRES:
LAB ANIMAL APPROVAL #:
RECOMBINANT DNA/RNA: BIOHAZARDS:
PROPRIETARY/CONFIDENTIAL:
SUBCONTRACTOR: UF:
PRIME NAME:
NO:
OTHER:
PE: NEW (N) CONTINUATION (C)
 RENEWAL (R) SUPPLEMENTAL (S)
 EXTENSION REVISED
CATEGORY: RESEARCH (R) TRAINING (T)
 OTHER (O)
PROGRAM: CONTRACT (C) PUR. ORDER (P)
 COOP. AGREE (A) SPA (S)
 MEMO OF UND (M) GRANT (G)
MP: GUARANTEED (G)
SM: SUPERSEDES:
BUDG BEG: 11/15/87 BUDG END: 04/30/91
OBJ BEG: 11/15/87 PROJ END: 04/30/91
OBJECT PERIOD #: 87081002
FUNDS RESTRICTED YES NO
STORY UPN#: 87081002 FLA DEMO PROJ: N

COST DATA

APPLICABLE INDIRECT COST WILL ACCRUE TO THE UNIT(S) AS SPECIFIED ON PROPOSAL

DUAL INVOLVEMENT: _____
OFF-CAMPUS _____
ACCOUNT NO: _____
DIRECT AMOUNT: \$ _____
INDIRECT AMOUNT: \$ _____
RATE _____ BASE _____
TOTAL AMOUNT: \$ _____
COST SHARING REQUIRED: \$ _____
IDC RETURN CODE: Y
OFF-CAMPUS
ACCOUNT NO:
DIRECT AMOUNT: \$
INDIRECT AMOUNT: \$
RATE _____ BASE _____
TOTAL AMOUNT: \$
COST SHARING REQUIRED: \$
TOTAL FUNDING OF THIS AWARD: \$ _____
TOTAL COST SHARING OF THIS AWARD: \$ _____
UNRECOVERED INDIRECT COST: \$ _____
CUMULATIVE PROJECT FUNDING: \$ 169,431.00
CFDA #:

REMARKS

DEPT CONTACT: EIES
ADDRESS:

Dillard C. Marshall
AUTHORIZED UNIVERSITY ACCEPTANCE SIGNATURE
DIVISION OF SPONSORED RESEARCH
NAME: DILLARD C. MARSHALL
TITLE: ASSISTANT DIRECTOR OF RESEARCH

Processed By: MWR

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

AND

Authority of Public Law 95-91, DEPARTMENT OF ENERGY ORGANIZATIONAL ACT

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

1. PROJECT TITLE FUEL CONVERSION	2. INSTRUMENT TYPE <input checked="" type="checkbox"/> GRANT <input type="checkbox"/> COOPERATIVE AGREEMENT
3. OFFICE (Name, address, zip code, area code & telephone no.) UNIVERSITY OF FLORIDA BRIEFER HALL TALLAHASSEE, FLORIDA 32311	4. INSTRUMENT NO. DE-FG07-88CR75337
	5. AMENDMENT NO. NONE
	6. BUDGET PERIOD FROM: 11/15/89 TO: 04/30/92
	7. PROJECT PERIOD FROM: 11/15/87 TO: 04/30/92
8. RECIPIENT PROJECT DIRECTOR (Name and telephone No.) WILLIAM G. VERMETSON (904) 392-1608	10. TYPE OF AWARD <input type="checkbox"/> NEW <input checked="" type="checkbox"/> REVISION <input type="checkbox"/> CONTINUATION <input type="checkbox"/> SUPPLEMENT <input type="checkbox"/> RENEWAL
9. RECIPIENT BUSINESS OFFICER (Name and telephone No.) LARRY C. MARSHALL (904) 392-1582	
11. PROJECT OFFICER (Name, address, zip code, telephone No.) (TO BE ASSIGNED) U.S. DEPARTMENT OF ENERGY CHICAGO FIELD OFFICE 500 SOUTH CASS AVENUE ARAGONNE, ILLINOIS 60439	12. ADMINISTERED FOR USE BY (Name, address, zip, telephone No.) (TO BE ASSIGNED) U.S. DEPARTMENT OF ENERGY CHICAGO FIELD OFFICE 500 SOUTH CASS AVENUE ARAGONNE, ILLINOIS 60439

13. INSTRUMENT TYPE	STATE GOV'T	INDIAN TRIBAL GOV'T	HOSPITAL	FOR PROFIT ORGANIZATION	INDIVIDUAL
	LOCAL GOV'T	<input checked="" type="checkbox"/> INSTITUTION OF HIGHER EDUCATION	OTHER NONPROFIT ORGANIZATION	C P SP	OTHER (Specify)

14. FUNDING AND APPROPRIATIONS DATA				15. EMPLOYER I.D. NUMBER/SEN
Appropriation Symbol	D. B & R NUMBER	C. FT/APP/OC	D. CFA NUMBER	87081002
N/A	N/A	N/A	N/A	

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

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

AWARD/AGREEMENT TERMS AND CONDITIONS
This award/agreement consists of this form plus the following:
Special terms and conditions (if grant) or schedule, general provisions, special provisions (if cooperative agreement)
Applicable program regulations (specify) N/A
DOE Assistance Regulations, 10 CFR Part-606, as amended, Subparts A and X (Grants); or (Cooperative Agreements)
Application/proposal dated November 17, 1989; X as submitted with changes as negotiated

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, ARAGONNE, ILLINOIS. THE EFFECTIVE DATE OF TRANSFER IS 2/29/92.

EVIDENCE OF RECIPIENT ACCEPTANCE	21. AWARDED BY
Signature of Authorized Recipient Official, (Date)	<i>Virginia L. Sandwina</i> 2-25-92 (Signature) (Date)
(Name)	VIRGINIA L. SANDWINA (Name)
(Title)	CONTRACTING OFFICER (Title)