UNIVERSITY OF FLORIDA

Nuclear Facilities
Department of Nuclear and Radiological Engineering

202 Nuclear Sciences Center
P.O. Box 118300
Gainesville, Florida 32611-8300
Tel: (352) 392-1408
Fax: (352) 392-3380
Email: vernet@ufl.edu

September 2, 2004

USPS Certified – Return Receipt Requested

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Re: Facility License R-56, Docket No. 50-83

In compliance with our Technical Specifications reporting requirements, enclosed is one copy of the 2000-2001 University of Florida Training Reactor Annual Progress Report.

This document is intended to comply with the requirements of Section 6.6.1 of the UFTR Technical Specifications.

Please advise us if further information is needed.

Sincerely,

William G. Vernetson
Director of Nuclear Facilities

WGV/dms
Enclosure

cc: Al Adams, NRC +Report

Sworn and subscribed this 2nd day of September 2004

Notary Public

Daniel J. Sanetz
MY COMMISSION # DD161176 EXPIRES
September 30, 2005
BONDED THRU TROY FAIN INSURANCE, INC.

A020
A001

Report: DOE/NE/38152-5

UNIVERSITY OF FLORIDA TRAINING REACTOR ANNUAL PROGRESS REPORT

SEPTEMBER 1, 2000 – AUGUST 31, 2001

Submitted by
Dr. William G. Vernetson
Director of Nuclear Facilities

Department of Nuclear and Radiological Engineering
College of Engineering
University of Florida
Gainesville, Florida

August 2004

U.S. Department of Energy
Award #DE-FG02-96NE38152

UNIVERSITY OF FLORIDA
TRAINING REACTOR
ANNUAL PROGRESS REPORT

SEPTEMBER 1, 2000 - AUGUST 31, 2001

Submitted By
Dr. William G. Vernetson
Director of Nuclear Facilities

Department of Nuclear and Radiological Engineering
University of Florida
Gainesville, Florida

August 2004

TABLE OF CONTENTS

2000-2001 ANNUAL REPORT

I. INTRODUCTION

A. Overall Utilization

The University of Florida Training Reactor's overall utilization for the past reporting year (September 2000 through August 2001) continued to be at historically high levels of quality usage, limited only by unavailability of the reactor or necessary personnel. It was an especially productive year considering that there were several large outages that hampered reactor usage throughout the year including a failed two-pen recorder, two broken rupture disks and failed temperature recorder requiring a major modification as explained later in this report. The diversity of users and usages was still among the best in the history of the facility, especially considering that availability this year was down to less than 59% from last year's over 88% primarily due to having several lengthy outages including one occupying the last 36 days of the reporting year and extending to the next year involving a failure in the wide range drawer. Unlike in years prior to 1990-91, this availability accounts for lost availability for administrative reasons as well as for repair and maintenance related reasons.

The University of Florida Training Reactor (UFTR) continues to experience a high rate of utilization in a broad spectrum of areas with total utilization continuing near the highest levels recorded in the early 1970s and most usage indicators remaining high with quality usage occurring whenever system and operator availability permits. This broad-based utilization has been supported by a variety of usages including research and educational utilization by users within the University of Florida as well as by other researchers and educators around the State of Florida through the support of the Department of Energy (DOE) Reactor Sharing Program and several externally supported usages. A number of science fair projects were also accommodated. Less effort than usual has also been devoted to facility enhancement except when necessary; a key ingredient accounting for this situation has been the lack of a full-time Reactor Manager/SRO in place for the entire year as an interim acting manager has been in place since losing the full-time reactor manager as of March 28, 1997 along with one part-time Senior Reactor Operator (SRO). This acting manager was replaced with the other part-time licensed SRO on May 13, 1999 to facilitate return to normal operations following a lengthy year long outage to address a reactivity anomaly. During this year we lost a part-time SRO in December 2000 and have not been able to license another though two part-time SRO-trainees are contributing to facility activities in many other ways. Personnel associated with the UFTR are listed in Chapter II; this does not include NAA Laboratory personnel except where also involved with UFTR operations. The loss of all experienced NAA laboratory personnel at the beginning of the 1996-97 reporting year has continued to present a challenge throughout the reporting year for research usage of the facility though an acting part-time NAA Laboratory manager was appointed in May 1999 and has continued to increase his contributions to usage.

Following submittal of a formal application for consideration early in the 2000-2001 reporting year, the Board of Directors of the American Nuclear Society approved the University of Florida Training Reactor for a Nuclear Historic Landmark Award in November 2000. This award is symbolized by an inscribed bronze plaque which was presented as part of a Symposium on the Future of Nuclear Energy Honoring the Designation of the UFTR as an ANS Historical Landmark held on March 23, 2001. The letter of award is dated March 23, 2001 and signed by ANS President

James A. Lake. The symposium held in the afternoon followed tours of the UFTR facility in the morning and was led off with welcoming remarks by Dr. M. Jack Ohanian, Interim Dean of the College of Engineering and an opening address by NRC Commissioner Dr. Nils J. Diaz. The symposium continued with a panel moderated by the Director of Nuclear Facilities (Dr. William G. Vernetson) with lively questions, comments and replies for panel members (Dr. Thomas O. Hunter, Senior Vice President, Sandia National Laboratories; Dr. Gail H. Marcus, Principal Deputy Director, DOE Office of Nuclear Energy, Science and Technology; Mr. Thomas F. Plunkett, President, Nuclear Division, Florida Power & Light Company; Mr. Steven A. Hucik, General Manager, Nuclear Plant Projects, General Electric Nuclear Energy; Mr. Dale E. Young, Vice President – Nuclear, Florida Power Corporation). The plaque itself was formally presented at the evening banquet following an address by ANS President James A. Lake. The inscription of the plaque is as follows:

University of Florida
Training Reactor

First nuclear reactor in Florida, actively engaged for over forty years in first quality education, training research and service to support broad-based applications of nuclear engineering, science and technology for the benefit of society.

Plans are to mount the plaque prominently at the reactor facility but this has not yet occurred.

Phyllis Ruzicka, Editor of ANS News, requested information about the presentation of the plaque. With a letter dated July 18, 2001, she was supplied with this information and several photographs of the presentation, some of which have been published in *ANS News*. ANS President James A. Lake's letter and a copy of the symposium program are contained in Appendix B of this report. This award is a major honor for the UFTR facility acknowledging its role in nuclear science and technology for which all are grateful.

The remaining chapters of this report have contents as described below. As noted above, Chapter II summarizes University of Florida personnel associated with the reactor including those employed by the facility itself, primary support personnel from the Radiation Control Office, membership of the Reactor Safety Review Subcommittee as well as personnel in line responsibilities for UFTR administration and for the Radiation Control Office. Unlike most years, there were a number of changes in the Level 1 administration of the UFTR facility as the positions of (Interim) Dean of the College of Engineering, Chairman of the Nuclear and Radiological Engineering Department, and Chairman of the Reactor Safety Review Subcommittee all changed hands near the end of the reporting year on July 1, 2001.

Chapter III summarizes key aspects of UFTR facility operation including Reactor Sharing Program users. Table III-1A is a list of such user institutions and Table III-1B provides some details on the usage. Energy generation is listed in Table III-2, key-on time, run time and availability in Table III-3, availability and causes of unavailability in Table III-4 as well as unscheduled and scheduled (none) trips in Tables III-5A and III-5B. The log of unusual occurrences constitutes Table III-6 and is lower than in most years. Though no events are considered to have compromised reactor safety or the health and safety of the public or facility personnel, the ten occurrences

described in Table III-6 are the most significant events for the 2000-2001 reporting year. Included in Table III-6 are the three trips noted in Table III-5A.

Chapter IV contains a listing and description of all modifications and/or changes in conditions made to reactor-related facilities during the reporting year. Nine items are included with a 10 CFR 50.59 package prepared for all entries (some carried over from the previous reporting year) with none evaluated and determined to require NRC approval prior to implementation.

Chapter V contains a general introductory description of maintenance, tests and surveillances of UFTR reactor system and facilities undertaken during the reporting year. Table V-1 is a chronological tabulation and description of all scheduled UFTR surveillances, checks and tests performed on a quarterly or less frequent basis. Table V-2 then contains a chronological tabulation of UFTR preventive and corrective maintenance actions performed during the reporting year.

Chapter VI contains descriptions of changes to Technical Specifications, Standard Operating Procedures and other documents. Revision 12 to the UFTR Emergency Plan was submitted in August 2001 and the facility awaits a reply on its acceptability. The SPERT fuel (SNM-1050) license was finally terminated. The only other significant reactor-related document changes in the 2000-2001 reporting year involved changes to various Standard Operating Procedures. No new procedures were generated but one procedure was revised twice and nine temporary change notices were implemented.

Finally, Chapter VII contains a review summary of radioactivity released and environmental surveillances performed. Releases described include gaseous Argon-41 and liquid waste released at activity levels below the lower limit of detection with no solid waste shipments. Chapter VII also contains a summary of environmental monitoring performed using Luxel dosimeters including a breakdown by month. Again, all environmental dose results are essentially negligible. The last section shows a summary of personal radiation exposure for facility personnel and several visitors with all exposures well below regulatory limits.

More details in each of these areas are contained in the following six chapters. If additional information is required, the facility may be contacted.

The expectations for the 2001-2002 reporting year are very positive. Significant opportunities for expanded education and research usages are apparent. The possibilities for continued growth in existing and new program areas are a challenge that must be addressed vigorously in light of the continuing outage for the failure in the wide range channel now isolated to a failed fission chamber, license, having no permanent Reactor Manager and the need to license additional operators as well as continue training part-time students to develop and maintain expertise in the NAA Laboratory. Nevertheless, with sufficient support, there is no limit to possibilities for growth in facility usage.

II. UNIVERSITY OF FLORIDA PERSONNEL ASSOCIATED WITH THE REACTOR

A. Personnel Employed by the UFTR

W. G. Vernetson	–	Associate Engineer and Director of Nuclear Facilities and Senior Reactor Operator (September 2000 – August 2001)
J. Wolf	–	Student Senior Reactor Operator and Acting Reactor Manager (9/10 time) (September 2000 – August 2001)
G. Macdonald	–	Student Senior Reactor Operator (1/2 time) (September 2000 – December 15, 2001)
A. Vierbicky	–	Student Technician and Senior Reactor Operator Trainee (5/8 time) (September 2000 – August 2001)
C. Hartsock	–	Student Technician and Senior Reactor Operator Trainee (1/2 time) (January 18, 2001 – August 2001)
D. Krugel[1]	–	Student Radiation Control Technician (1/2 time) (September 2000 – February 2001)
B. Uhlmer	–	Student Technician/Radiation Control Technician (1/50 time) (September 2000)
D. Seifert	–	Secretary (September 2000 – August 2001)
M. Perrotti, P. Tiemann, M. Fensin, T. Carter	–	Student Technicians for various parts of the year usually working in NAA Laboratory but effectively providing approximately 1/25 time commitment to reactor related activities

[1]D. Krugel worked mostly in the NAA Laboratory but remained qualified and occasionally served as a radiation control technician through August 2001.

B. Radiation Control Office

D. L. Munroe[2]	–	Radiation Control Officer (September 2000 – August 2001)
J. Parker	–	Radiation Control Technician (September 2000 – August 2001)

Basic routine health physics is performed by UFTR staff; however, assistance from the Radiation Control Office is required for operations where a significant dose (Level I RWP) is expected or possible and where certain experiments are inserted or removed from the reactor ports. These personnel are also required for certain operations where high contamination levels may be expected such as fuel inspection activities or core area maintenance activities. They also periodically review routine UFTR radiation control records and operations and assist in performance of certain radiation safety and control related surveillances. Several others with only infrequent contact at the UFTR are not listed though they are available for backup purposes or if an emergency should arise.

C. Reactor Safety Review Subcommittee (RSRS)

M. J. Ohanian	–	RSRS Chairman (Interim Dean, College of Engineering, and Professor, Department of Nuclear and Radiological Engineering) (September 2000 – June 2001)
W. E. Bolch	–	Member-at-Large (Professor, Environmental Engineering Sciences) (September 2000 – June 2001) RSRS Chairman (Professor, Environmental Engineering Sciences) (July 2001 – August 2001)
W. G. Vernetson	–	Member (Director of Nuclear Facilities)
D. L. Munroe	–	Member (Radiation Control Officer)
J. S. Tulenko	–	Member (Chairman, Department of Nuclear and Radiological Engineering) (September 2000 – June 2001) Member (Professor, Nuclear and Radiological Engineering) (July 2001 – August 2001)
A. Haghighat	–	Member (Chairman, Department of Nuclear and Radiological Engineering) (July 2001 – August 2001)
D. E. Hintenlang	–	Member (Associate Professor, Department of Nuclear and Radiological Engineering) (July 2001 – August 2001)

[2]The specified alternates for the RCO position are K. Hintenlang (until August 2001) and G. Snyder.

D. Line Responsibility for UFTR Administration

C. E. Young	–	President, University of Florida (September 2000 – August 2001)
M. J. Ohanian	–	Interim Dean, College of Engineering (September 2000 – June 2001)
P. P. Khargonekar	–	Dean, College of Engineering (July 2001 – August 2001)
J. S. Tulenko	–	Chairman, Department of Nuclear and Radiological Engineering (September 2000 – June 2001)
A. Haghighat	–	Chairman, Department of Nuclear and Radiological Engineering (July 2001 – August 2001)
W. G. Vernetson	–	Director of Nuclear Facilities
J. Wolf	–	Acting Reactor Manager

E. Line Responsibility for the Radiation Control Office

C. E. Young	–	President, University of Florida (September 2000 – August 2001)
J. E. Poppell	–	Interim Vice President, Administrative Affairs (September 2000 – May 2001) Vice President, Administrative Affairs (June 2001 – August 2001)
W. S. Properzio	–	Director, Environmental Health and Safety
D. L. Munroe	–	Radiation Control Officer

III. FACILITY OPERATION

The UFTR continues to experience a high rate of utilization as total utilization continues at or near the highest levels recorded in the early 1970's in most areas when the reactor is available; with so much unavailability this year, some indicators are up, some down for the year but with good results considering reduced availability of licensed operations staff during the reporting year as well as a nearly year-long forced outage rate necessitating concentrating on educational usage of the facility without reactor operation. This continuation of a high rate of UFTR facility usage has been supported by a variety of usages ranging from research and educational utilization by users within the University of Florida to research, educational and training utilization by users around the State of Florida through the support of the Department of Energy University Reactor Sharing Program with much of the costs of this latter usage not covered by Reactor Sharing. Again this year, several externally supported usages have also continued to impact reactor utilization and support the continued diversification of facility activities and capabilities as they were on hold awaiting return to normal operations, especially through the hiring of part-time laboratory assistants for support work in the analytical laboratory and to provide funding for facility improvements. For the third year in a row, however, there was a Department of Energy University Reactor Instrumentation (URI) Program grant to provide support for instrumentation upgrades during the year as notice of such was received in April 2000. A new URI grant for the next year was also received in mid 2001.

As noted over the last sixteen years, the continuing refurbishment of the Neutron Activation Analysis (NAA) Laboratory has impacted favorably on all areas of utilization from research projects using NAA to training and educational uses for students at all levels especially for student design-related projects. With successful implementation of an improved remote sample-handling "rabbit" facility, efforts to advertise availability and encourage usage of the UFTR (especially for research) have proceeded in a favorable light though always less quickly than hoped over the last fourteen years. Implementation of the standard rabbit capsule size with larger carrying capacity, the subsequent additional implementation of two state-of-the-art PC-based spectrum analyzer systems with complete ORTEC software packages for spectrum analysis and data reduction, the installation of an independent sample and standards drying facility as well as improved shielding around the pneumatic sample insertion (rabbit) system are all improvements that have been key factors in supporting facility usage by assuring an easier and faster turnaround of samples submitted to be irradiated for Neutron Activation Analysis. Current efforts are being aimed at converting the NAA Laboratory to utilize computer-based analyzer systems based on Canberra software packages as more user-friendly with better support.

The Reactor Sharing usage of the reactor and NAA Laboratory facility continue to be a significant fraction of all usage. Table III-1A contains a listing of schools availing themselves of this opportunity, while Table III-1B contains brief summaries of this usage. Some usages include trace element analysis of contaminated wood products for civil engineering researchers at the University of Miami and trace element analysis of river sediments and other samples for researchers at Savannah State University as well as transmutation doping of pure germanium crystals for laser development research at the University of Central Florida and generation of P-32 labeled phosphorus trichloride for a Florida State University researcher. A number of science fair projects were also supported with good results at the state finals for students from Pine Ridge High School, Lecanto

High School and others. There was even a high school physics teacher trained extensively on nuclear technologies for several months. Literally dozens of other class and small group educational and research usages were conducted for the various educational entities running the full range from the precollegiate level, such as ATHENA Middle School Girls Camp, Gainesville Country Day School and Catalina 4-H Clear Lake Project students, to Santa Fe Community College Radiography students and teachers, Hillsborough Community College Nuclear Medicine Technology students and many other similar groups. A similar spectrum of on-campus users includes classes in Nuclear and Radiological Engineering, Environmental Science and Engineering, Reserve Officers Training Corps, Radiochemistry, Mechanical Engineering and others.

Service usages include transmission measurements on spent fuel pool absorber coupons for Holtec International, Copper-64 production for PET scanners for Shands Hospital nuclear medicine imaging researchers, air particulate and other particle irradiations for isotopic analysis for Constellation Technologies Corporation, as well as activation of P-32/Ca-45 trace biologically active silicate powder for Ralston-Purina Company researchers.

Table III-2 contains a listing of energy generation by month for the reporting year. The yearly total of 21,743.893 kilowatt-hours energy generation is quite good, partially due to having a near-full-time Acting Reactor Manager during the year and continued growth in facility interest despite having poor overall availability (<60%) with no energy generation at all in the months of February, March and August 2000.

Table III-3 lists key-on time, experiment time, run time and availability for each month during the year. Again, values are encouraging with over 335 hours of run time but a monthly average availability of only 58.47% despite relatively good personnel availability. Similarly, Table III-4 provides a detailed breakdown of availability/unavailability with primary causes of unavailability listed for each month of the reporting year. A fourth useful indicator is whether the unavailability is due to a forced outage, a planned outage or for administrative reasons such as the Thanksgiving Holiday in November 2000. As noted, the high unavailability this year was primarily due to forced outages.

Table III-5A lists and describes the three unscheduled trips for the year with minimal safety significance. Table III-5B lists no scheduled trips for the year.

Table III-6 lists ten so-called unusual occurrences for the year with the three trips described in Table III-5A listed as three of these entries. Again, all ten have very low safety significance.

TABLE III-1A

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED USAGE OF UFTR FACILITIES
(September 2000 – August 2001)

School	Usages*	Faculty	Students
1. ATHENA Middle School Girls Camp Workshop	1	3	37
2. Belleview Middle School (BMS)	5	8	64
3. Broward Community College (BCC)	1	1	1
4. Catalina 4-H Clear Lake Project (CAT4H)	11	1	20
5. Chippola Community College (CCC)	1	1	1
6. College of Engineering Recruiting Days (High School Students)	5	5	93
7. Coral Park Miami Magnet School (CPMMS)	2	4	39
8. CPET Science, Engineering & Humanities Symposium	2	11	40
9. COE Visitors/Fuels Research Group	2	6	5
10. Engineering Fair Visitors	1	0	3
11. Eye on Engineering High School Student Workshop	1	1	27
12. FLAME Middle School Minority Outreach Summer Camp	1	2	32
13. Florida A&M University (FAMU)	1	1	1
14. Florida Community College of Jacksonville (FCCJ)	1	2	20
15. Gainesville Country Day School (GCDS)	2	4	24
16. Gulliver Preparatory High School (GPHS)	1	0	1
17. Hillsborough Community College (HCC)	2	1	10
18. Kanapaha Middle School (KMS)	1	1	37
19. Lecanto High School (LHS)	6	1	1
20. Living Faith Fellowship School (LFFS)	1	1	5
21. Massachusetts General	1	0	1
22. Mount Tahoma High School (MTHS) (WA)	2	1	10
23. Pace Brantley Hall School (PBHS)	2	2	15
24. Penn State University (PSU)	1	0	3
25. Pine Plains High School (PPHS) (NY)	1	0	3
26. P.K. Yonge High School (PKYHS)	7	1	70
27. QUARKNET High School Physics Teachers Workshop	1	11	0
28. Pine Ridge High School (PRHS)	7	3	1
29. River Ridge High School (RRHS)	1	3	1
30. Santa Fe Community College (SFCC)	7	4	43
31. Sarasota Riverview High School (SRHS)	1	2	0
32. Savannah State University (SSU)	2	3	1
33. Seminole Vo Tech Engineering Magnet School (SVTEMS)	2	4	46
34. Summer Science (Research) Training Program (High School Students)	9	3	93
35. Talbot Elementary School (TES)	1	1	1
36. Tampa Bay Vo Tech Magnet School (TBVTMS)	2	3	50
37. Tampa Preparatory High School (TPHS)	2	1	5
38. TREAT Workshop Research Follow-up	8	1	5
39. Union County High School (UCHS)	10	1	2
40. University of Central Florida (UCF)	10	3	2
41. University External Facility Visitors/Student Communications	7	6	4
TOTAL	**132**	**107**	**817**

* Usage is defined as utilization of the University of Florida Training Reactor facilities for all or any part of a day with the average being over four hours. In many cases, a school can have multiple usages but all related to the same research project such as one project for the University of Central Florida that involved long term irradiations as did others such as for Union County High School and Lecanto High School.

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

NOTE: The projects marked with one asterisk (*) indicate irradiations or neutron activations. The projects marked with two asterisks (**) indicate training/ educational use. The projects marked with three asterisks (***) indicate demonstrations of reactor operations and other uses. AExperiment Time@s total time that the facility dedicates to a particular use; it includes ARun Time.@ARun Time@s inclusive time commencing with reactor startup and ending with shutdown and securing of the reactor.

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
*Transmutation Doping of Pure Germanium Research - Dr. Robert Peale, Dr. Elena Flitsiyan, Dr. Andrei Muraviev, University of Central Florida, Physics Dept. - Reactor Sharing	Neutron Irradiation of Pure Germanium Crystals for Transmutation Doping to Support Investigation of Gain, Power and Duty Enhancement of p-Ge Lasers	34.13 (0.50)	47.74 (1.24)
*Trace Element Analysis of Environmental Samples for Hazardous Element Content - Dr. Kenneth Sajwan, Savannah State University, Mr. Cletus Bergen, Clean Air and Water - Reactor Sharing	Trace Element Analysis of Various Environmental Samples Obtained from Trucks Leaving Savannah River Laboratory to Determine Potential Hazardous Element Content as Follow-up to TREAT Workshop	11.34	15.91 (0.75)
*History of Science - Dr. J. Bieber, Santa Fe Community College - Reactor Sharing	Interview Discussion with Student Jonathan Breman Concerning Selection of Nuclear Engineering as a Profession Including Directing Non-power Reactor Facility	0.00	1.00

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
*Center for Precollegiate Education and Training - Pine Ridge High School NAA Research on Trace Element Content of Human and Feline Hair - Mr. Charles Lundell, Ms. Darlene Daniels, Pine Ridge High School, Dr. W.G. Vernetson, UF - Reactor Sharing	Summer 1999 Student Research Program Project - Evaluation and Quantification of Variable Trace Element Content of Human and Feline Hair Subjected to Variations in Environment, Diet and Cleaning for Student Kristiana Sartore (Local/Regional Science Fair Winner)	27.24 (0.33)	35.00 (1.75)
*NAA Research to Quantify Certain Trace Elements in Lake Sediments - Ms. Kathie Ivy, Catalina 4-H Club Counselor Group Leader/ Dr. W.G. Vernetson, UF - Reactor Sharing	NAA Evaluation and Benchmarking of Sediment Samples for Catalina 4-H Clear Lake Project Including Consultation on Sample Collection and Base Line Trace Element Determinations to Support Long-Term 4-H Student Team Project	13.72 (0.16)	26.08 (0.83)
*NAA Research to Perform Trace Element Analysis on Various Infant Formula Samples - Ms. Renae Allen, Union County High School - Reactor Sharing	NAA Evaluation of Trace Element Content of Various Kinds of Commercially Available Infant Formula to Evaluate Variations in Trace Element Level for Health Purposes for Science Fair Project to Include Special Training for Student Jocelyn Cerdan (Local Winner/Regional Finalist)	9.10	23.77 0.42
***Broward Community College - Ms. Julie Binder, BCC /Dr. W.G. Vernetson, UF - Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities to Demonstrate Reactor Operation and Discuss Usage and Capabilities for Parent and Potential UF Student	0.50	1.00 (0.50)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
*NAA Research to Quantify Certain Heavy Trace Elements in Fresh Shrimp and Seafood Samples - Mr. Ron Worthington, Lecanto High School - Reactor Sharing	NAA Evaluation of Certain Trace Elements (Hg, As, Cr) in Fresh Gulf Fish and Shrimp Samples for a Science Fair Project for Amit Patel (Local / Regional / State Winner/ International Competition)	4.56	11.58 (0.92)
***High School Outreach for Senior Recruitment to Engineering - Ms. J. Lingard / Ms. Y. Hankerson, COE - Reactor Sharing	Series of Lectures and Walk-through Tours of Reactor and NAA Laboratory Facilities Including Use of Survey Meters and Demonstration of Trace Element and Other Analytical Capabilities for High School Students and Parents Interested in Nuclear and Radiological Engineering and/or Engineering	0.00	6.41
***Sarasota Riverview High School - Mr. C. Vierbicky, Ms. K. Vierbicky, Sarasota Riverview HS, - Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities for two Sarasota Riverview High School teachers to discuss capabilities and usage	0.00	0.75

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 B August 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
*Center for Precollegiate Education and Training B River Ridge High School NAA Research on Altered Trace Element Content of Roadside Soil Sediment - Ms. T. Tiede, Ms. J. Gartland, and Mr. R. Bradley, River Ridge HS in New Port Richey/Dr. W.G. Vernetson, UF - Reactor Sharing	Continuation of Summer 1999 Student Research Program Evaluation and Quantification of Trace Elements Especially Heavy Elements in Roadside Sediment Attributed to Transportation Vehicles for Ryan O=Leary	0.00	0.42 (0.33)
Administrative and Education Communication Activities - Dr. W.G. Vernetson, UF - Reactor Sharing	Visit by DOE Representative Relative to Reactor Sharing Activities Plus Scheduling of Future Year Usages and Communications of Power and Non-power Reactor Usage and Capabilities and Operations Information to Support Academic Efforts at Various Schools	0.00	4.00 (0.08)
**Florida Community College at Jacksonville - Dr. Chew-Lian Lee and Dr. Ker Fong Lee, FCCJ Physics Dept. - Reactor Sharing	Lecture, Tour and Demonstration Exercises on Reactor Operations, Half-life Measurement, Trace Element Analysis Using the Rabbit System and Contamination Control Using Anticontamination Clothing and Robotic Manipulators for Community College Physics Students	0.78	5.50

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Massachusetts General Hospital - Dr. W.G. Vernetson, UF - Reactor sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage, Capabilities and Potential Interest in Nuclear and Radiological Engineering Profession for Former Massachusetts General Hospital Radiation Control Technologist	0.00	1.75
**Gainesville Country Day School Science Classes - Ms. Eileen Homer, Ms. Janet Witte, Gainesville Country Day School - Reactor Sharing	Lectures, Tours and Demonstrations of UFTR Operations with Radiation Surveys and Exercises to Measure Half-life of Irradiated Elements and in Using the Rabbit System and PC-based Analyzers for Trace Element Analysis of Previously Irradiated Hair Samples Using NAA Techniques Plus Contamination Control Exercises Using Anticontamination Clothing with Subsequent Trace Element Analysis of Series of Hair Samples	1.07	6.83 (0.08)
***Familiarization Tours for Visiting University / Other Faculty / Industry Instructors - Dr. W.G. Vernetson, UF - Reactor Sharing	Series of Walk-through Tours of Reactor and NAA Laboratory Facilities to Discuss Capabilities, Usage and Operations for Various Outside University Faculty Visitors and Industry Instructors	0.00	8.34

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Santa Fe Community College Nuclear Medicine Technology Program - Mr. S. Marchionno, Ms. Beth Shultzaberger, Ms. Amy Cohen, and Ms. Rochelle Sturm, SFCC - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Isotope Identification and Trace Element Analysis of Previously Irradiated Hair Samples Using the Rabbit System PC-based Analyzers Plus Demonstration of Gas Flow Proportional Counter for Contamination Surveys with Subsequent Trace Element Analysis of Series of Student Hair Samples	0.87	6.67
**Gulliver Prep High School - Dr. W.G. Vernetson, UF - Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Nuclear Engineering as a Profession and How Non-power Reactors Are Important Including Demonstrations of Activities for High School Student Jeff Fensin and Parents from Gulliver Prep High School	0.00	2.58
***Center for Precollegiate Education 38th Annual Junior Science, Engineering and Humanities Symposium - Dr. M.J. Koroly, Ms. D. Paulin - Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Facility Operations, Capabilities and Applications for Honors Group of High School Junior Level Students and Teachers	0.00	5.08
**Kanapaha Middle School Science Class - Ms. Debra Magnusson, Kanapaha MS - Reactor Sharing	Lecture, Tour and Demonstration Exercises on Reactor Operations, Half-life Measurement, Trace Element Analysis Using the Rabbit System and Contamination Control Using Anticontamination Clothing for Science Students	0.00	2.33 (0.17)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Demonstration of Reactor and NAA Laboratory Operations for Engineering Fair Participants - Dr. W.G. Vernetson, UF - Reactor Sharing	Lecture, Tour and Demonstration of UFTR and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Discussion of Facility Usage and Capabilities for Engineering Fair Visitors	0.00	2.83
**Living Faith Fellowship School - Ms. Martha Boyle, Living Faith Fellowship School Science Teacher - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Discussions on Use of the Rabbit System and PC-based Analyzers to Determine Trace Element Content of Irradiated Hair Samples	0.00	1.25 (0.17)
**Demonstration of Reactor and NAA Laboratory Operations - Ms. Tammy Mandell, (Center for Precollegiate Education and Training) / Dr. W.G. Vernetson, UF - Reactor Sharing	Series of Lectures, Tours and Demonstrations of UFTR Operations with Radiation Surveys and NAA Laboratory Facility Operations Using Rabbit System and PC-based Analyzers for Trace Element Analysis of Previously Irradiated Hair and Other Samples Plus Follow-up Trace Element Analysis of Selected Hair Samples for Two Groups of Teachers and Students from Bellevue Middle School	2.62	9.16 (0.08)
**Tampa Bay Vo Tech Magnet High School - Mr. Earl Wade (COE) / Dr. W.G. Vernetson, UF - Reactor Sharing	Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Use of the Rabbit system and PC-based Analyzers for Tampa Bay Vo Tech Magnet High School Science Students and Teachers	0.00	3.58

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Santa Fe Community College Radiography Program - Ms. Bobbie Konter, SFCC - Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Isotope Identification and Trace Element Analysis Technique Using the Rabbit System and PC-based Analyzers Plus Demonstration of Gas Flow Proportional Counter for Contamination Surveys and Subsequent Trace Element Analysis of Series of Hair Samples	3.18	10.41 (0.33)
**Hillsborough Community College Nuclear Medicine and Radiation Therapy Technology Program - Dr. Larry Gibson, HCC - Reactor Sharing	Lecture, Tour and Demonstration of Facility Operations with Radiation Surveys and Exercise in Use of Rabbit System for Trace Element Analysis of Irradiated Hair Samples Using NAA Techniques and Demonstration of Neutron Radioisotopes and Use of Gas Flow Proportional Counters with Subsequent Trace Element Analysis of Series of Student Hair Samples	1.83	7.16 (0.33)
**Seminole Vo Tech Engineering Magnet High School - Mr. Earl Wade (COE) / Dr. W.G. Vernetson , UF - Reactor Sharing	Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Use of the Rabbit system and PC-based Analyzers for Seminole Vo Tech Engineering Magnet High School Science Students and Teachers	0.00	3.67
**Coral Park Miami Magnet High School - Mr. Earl Wade (COE) / Dr. W.G. Vernetson, UF - Reactor Sharing	Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Use of the Rabbit system and PC-based Analyzers for Coral Park Miami Magnet High School Students and Teachers	0.00	3.75

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Pine Plains High School - Dr. W.G. Vernetson, UF - Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage, Capabilities and Nuclear Engineering as a Profession for High School Student Damon Roberts and Two Harris Corporation Non-nuclear Engineers	0.00	1.67 (0.75)
***Tampa Preparatory High School Science Dept. - Mr. Paul Homier, Physics Teacher, Tampa Prep HS - Reactor Sharing	Lectures, Tours and Demonstrations of UFTR Operations with Radiation Surveys and Exercises to Include Measurement of Half-life of Elements and in Using the Rabbit System and PC-based Analyzers for Trace Element Analysis of Hair Samples Irradiated in the Rabbit System Using NAA Techniques Plus Contamination Control Exercises Using Anticontamination Clothing and Robotics Demonstrations for AP Physics Students	1.20	5.83 (0.08)
***Regular, Honors and Advanced Placement Chemistry Class Curriculum Support - Dr. Paul Becht, P.K. Yonge Laboratory School / Dr. W.G. Vernetson, UF - Reactor Sharing	Preparation for and Presentation of a Series of Five Lectures, Tours of Reactor and NAA Laboratory Facilities with Demonstration of Operations, Measurements with Survey Meters and Half-life Plus Demonstration of Trace Element Analysis of Hair Samples Irradiated Via Rabbit System Plus Follow-up Trace Element Analysis of Series of Student Hair Samples for Five Regular, Honors and AP Chemistry Classes Coordinated to Fit Curriculum Planning	4.10	15.75 (0.75)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Talbot Elementary School - Dr. Mitchell Astron. / Dr. W.G. Vernetson, UF - Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage and Capabilities of Non-power Reactors Versus Design and Usage of Power Reactors for Music Professor and Advanced Fifth Grader with Special Interest in Nuclear Engineering	0.00	1.42
***Pace Brantley Hall School Science Dept. - Mr. Mitch Sirota/ Ms. Connie Hogue, Science Teachers, PBHS - Reactor Sharing	Lectures, Tours and Demonstrations of UFTR Operations with Radiation Surveys and Exercises to Include Measurement of Half-life of Elements and in Using the Rabbit System and PC-based Analyzers for Trace Element Analysis of Hair Samples Irradiated in the Rabbit System Using NAA Techniques Plus Contamination Control Exercises Using Anticontamination Clothing and Robotics Demonstrations for AP Physics Students	2.03	8.84
Support of Gamma Source Irradiation - Dr. Larry Robinson, Florida A&M University - Reactor Sharing	Support for Research Project Utilization of Gamma Irradiation for FAMU Student LaToya Luse	0.00	0.75 (0.50)
***Demonstration of Reactor and NAA Laboratory Operations for DOE / University / Industry Fuels Research Review Group - Prof. J.S. Tulenko, UF	Lecture, Tour and Demonstration of UFTR and NAA Laboratory Operations with Discussion of Facility Usage and Capabilities for Fuels Research Review Group Visitors	0.00	1.58

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Pennsylvania State University - Dr. Haghighat, PSU - Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory Facilities for Three Students to Demonstrate Reactor Operations and Discuss Usage and Capabilities for Trace Element Analysis and Various Educational Opportunities	0.33 (0.33)	2.25 (1.50)
***Familiarization Tour for Instructor and Student from Chippola Community College - Mr. Alan Williams, CCC/Dr. W.G. Vernetson, UF	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Curriculum Applications for Potential Nuclear Engineering Student Carly Williams and Technology Instructor Alan Williams from Chippola Community College	0.00	1.75
***Athena Middle School Girls Camp Workshop - Ms. J. Lingard (COE) / Dr. W.G. Vernetson, UF - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects, Measurement of Half-life, Demonstration Use of the Rabbit System and PC-based Analyzers to Determine Trace Element Content of Irradiated Hair Samples Plus Contamination Control Exercises Involving Dress Out in Anticontamination Clothing and Use of Robots for Demonstration Purposes	0.67	4.17
***Santa Fe Community College Technical Writing Project - Dr. W.G. Vernetson, UF - Reactor Sharing	Detailed Walk-through Tour and Discussion of UFTR Capabilities and Usage Versus Power Reactors with Interview of Facility Director to Support a Technical Writing Project on Non-power Versus Power Reactor Operations for SFCC Student Carlos Romero	0.00	2.42 (0.17)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
*NAA Educational Project to Perform Trace Element Analysis of Student Hair Samples - Mr. John Curie, Science Dept., Mt. Tahoma High School, Tacoma, WA / Dr. W.G. Vernetson, UF - Reactor Sharing	Trace Element Analysis of Series of Student Hair Samples to Support Nuclear Segment on Applications in High School Physics Class	3.25	5.67 (0.17)
**Center for Precollegiate Education and Training (CPET) Summer Science Training Program for High School Students - Dr. M.J. Koroly, Ms. Debra Paulin /Dr. W.G. Vernetson, UF - Reactor Sharing	Lectures, Tours and Demonstrations of Reactor Facility Operations and Experimental Capabilities Along with Research Possibilities for Training and Familiarization in Utilization of Neutron Activation Analysis Plus Summer Research Project Selection for Two CPET Summer Program High School Students, Jennifer Bennett and Robert Newman of Spruce Creek High School	1.58 (0.33)	21.83 (7.25)
***Eye on Engineering High School Student Workshop - Mr. J. Brunson (COE) / Dr. W.G. Vernetson, UF - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects, Measurement of Half-life, Demonstration Use of the Rabbit System and PC-based Analyzers to Determine Trace Element Content of Irradiated Hair Samples Plus Contamination Control Exercises Involving Dress Out in Anticontamination Clothing and Use of Robots for Demonstration Purposes	0.65	3.75

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**QUARKNET Workshop for High School Physics Teachers - Dr. Darin Acosta, UF - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Facility Operations Including Reactor Startup, Use of Survey Meters and Robotic Manipulators Plus Use of the Rabbit System and PC-based Analyzers to Conduct Half-life Measurements and Trace Analysis of Hair Samples	0.75	4.00
**FLAME Middle School Minority Student Outreach Summer Camp - Mr. Earl Wade (COE) / Dr. W.G. Vernetson, UF - Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Facility Operations Including Reactor Startup, Use of Survey Meters and Robotic Manipulators Plus Use of the Rabbit System and PC-based Analyzers to Conduct Half-life Measurements and Trace Analysis of Hair Samples for Minority Middle School Students and Keba Hulela of Botswana University	0.67	3.42 (0.08)
*NAA Research on Sediments - Dr. K. Sajwan, Savannah State University - Reactor Sharing	Trace Element Analysis of Various Sediment Samples to Quantify Heavy Element Content	8.65	9.92 (0.08)
***Center for Pre-collegiate Education and Training - Dr. M.J. Koroly /Dr. W.G. Vernetson - Reactor Sharing	Lecture and Demonstration on Reactor Operations and Usage for Assembled Summer Science Training Program Participants (High School Students) and SSTP Student Counselors with Subsequent Facility Tours for a Number of Participants	0.00	4.08

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2000 BAugust 2001)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Facility Demonstrations to Support Summer Science Training Program Student Research - Dr. Alex Green, UF - Reactor Sharing	Detailed Tour of Reactor and NAA Laboratory Facilities to Discuss Project on Trace Element Analysis of Biomass Fuel Materials for M. Liesenfelt of Deerfield Beach High School and Ryan Scott of Newberry High School	0.00	1.67
TOTAL		**134.82 (1.65)**	**355.32 (19.31)**

1. Values in parentheses represent multiple or concurrent facility utilization (run or experiment time); that is, the reactor was already being utilized in a primary run or activity for a project so a reactor training or demonstration utilization could be conducted concurrently with a scheduled NAA irradiation, course experiment, or other reactor run.

2. Experiment time is run time (total key on time minus checkout time) plus set-up time for experiments or other reactor or facility usage.

3. These hours do not reflect the hundreds of hours of NAA Laboratory usage for analysis of irradiated samples, only a small part of which is charged to the Reactor Sharing Grant.

TABLE III-2

MONTHLY REACTOR ENERGY GENERATION[1]
(September 2000 **BAugust 2001)**

Month	Energy Generation Monthly Ranking[2]	KW-Hrs	Hours at Full Power
September 2000	1	3,549.367	35.119
October 2000	7	2,312.805	22.649
November 2000	2	2,762.525	26.899
December 2000	9	1,389.972	13.584
January 2001	6	2,455.749	19.216
February 2001	10	0.000	0.000
March 2001	10	0.000	0.000
April 2001	4	2,605.543	21.216
May 2001	3	2,634.691	25.767
June 2001	8	1,474.590	14.515
July 2001	5	2,558.651	24.848
August 2001	10	0.000	0.000
YEARLY TOTAL		**21,743.893**[3]	**203.813**

[1] The yearly total energy generation of 21.744 megawatt-hours for the 2000-2001 reporting year represents a significant 12.16% increase from last year's total of 19.387 megawatt-hours, while the 203.813 hours at full power represents a smaller 7.69% increase from the previous yearly total of 189.254 hours. The values for the 1998-99 reporting year were so low versus recent years because of the year-long outage to address the reactivity anomaly plus various other equipment failures compounded by lack of a full-time Reactor Manager, while the 1999-2000 values were closer to normal for a year with good availability. Much less outage time last year, following the over eleven-month outage until August 17, 1999, resulted in much increased facility availability as forced unavailability was one of its lowest values in history at 20.875 days. Without a full-time Reactor Manager, outage operations were still constrained by operator availability to address the outage and other equipment failures, though the ability to license a new SRO in January 2000 contributed greatly to the increased availability and energy generation last year. For the 2000-2001 reporting year, the energy generation is good but less than it could be essentially due to the high unavailability as forced unavailability was at 128.625 days with one outage lasting 36 days and continuing into the next reporting year.

[2] This column showing the ranking of monthly energy generation is included for potential correlation with results of environmental monitoring in Chapter VII, though such correlations have not been seen in the past.

[3] The 21,743.893 kilowatt-hours energy generation for the 2000-2001 year ranks fifth in the past ten-year period. As usual this ranking shows how growth in usage has been greatest and generally well maintained over the past two decades since even relatively high energy generation numbers in 2000-2001 are not special for the most recent ten-year period.

TABLE III-3

MONTHLY REACTOR USAGE/AVAILABILITY DATA
(September 2000 BAugust 2001)

Month	Key-On Time	Exp. Time[1]	Run Time[2]	Availability[3]
September 2000	51.10 hrs.	207.00 hrs.	46.40 hrs.	80.83%
October 2000	37.60 hrs.	240.25 hrs.	35.95 hrs.	65.73%
November 2000	42.10 hrs.	201.75 hrs.	40.90 hrs.	91.67%
December 2000	25.40 hrs.	183.33 hrs.	21.23 hrs.	96.37%
January 2001	32.60 hrs.	237.17 hrs.	30.52 hrs.	20.56%
February 2001	0.20 hrs.	216.17 hrs.	0.00 hrs.	0.00%
March 2001	0.50 hrs.	237.58 hrs.	0.00 hrs.	0.00%
April 2001	53.60 hrs.	223.50 hrs.	49.52 hrs.	85.42%
May 2001	49.20 hrs.	210.17 hrs.	44.68 hrs.	91.13%
June 2001	31.00 hrs.	204.75 hrs.	27.00 hrs.	94.17%
July 2001	41.50 hrs.	230.92 hrs.	39.53 hrs.	75.81%
August 2001	0.30 hrs.	225.92 hrs.	0.00 hrs.	0.00%
YEARLY TOTAL	**365.10 hrs.**	**2,617.51 hrs.**	**335.73 hrs.**	**58.47%**

[1] Experiment time is run time (total key-on time minus checkout time) plus set-up time for experiments, tours, or other facility usage including checkouts, tests and maintenance involving reactor running or facility usage.

[2] The three categories of facility usage data in this table show relatively small but significant decreases over the previous year, especially those related to reactor operations. Key-on time is down 11.08% while run time is down 8.91%, essentially due to the relatively high reactor unavailability though there was good availability of personnel such as reactor operators until December 2000 when the second of the two new part-time SROs licensed in the previous year resigned with two more in training throughout the year as the yearend outage prevented licensing. With three operators including one working about 90% time after his appointment as Acting Reactor Manager was effective May 13, 1999 plus two operator-trainees working about 50% time, operations personnel availability continued to be better than in most recent years. This was especially important in addressing the several extended outages. Experiment time, as well, is increased by 3.61% showing a continued emphasis for class usage as the experiment time was well used for research, training and education during this past year, especially related to reactor sharing visiting groups but also a growing number of on-campus groups plus better accounting of facility-related activities.

[3] Average availability on a yearly basis is 58.47% as shown above and 58.78% per Table III-4. As in recent years, this availability accounts for lost availability for administrative reasons as well as for repair and maintenance related reasons. The yearly availability is lower than in most of the previous eight years (87.33%, 89.69%, 88.15%, 75.68%, 66.67%, 58.65%, 4.01%, 88.19%) at 58.47% for this reporting year with most of the forced unavailability due to maintenance to troubleshoot and repair the failed temperature monitor/recorder and maintenance to correct dump valve relay problems.

Overall the availability represents a significant decrease in the average availability recorded for the past ten or more reporting years. This is due to having several large forced outages. Of the 128.625 days forced outage time, maintenance to replace the broken rupture disk (3? days in September 2000), to troubleshoot and replace a failed solenoid on the PC dump valve (10¼ days in October 2000), to troubleshoot and then replace and modify the failed two-pen recorder (12 days in January 2001), to replace the failed temperature recorder with updated computer-based technology (61? days in January–April 2001) and troubleshooting to address the trip with detector failure in the wide range drawer (36 days continuing at year's end) involved significant forced outages. No other forced outage involved even a single full day. The only relatively significant planned outage this year involved 12 days planned unavailability in January and April 2001 for adjustments and completion of the annual calibration of nuclear instrumentation (A-2 Surveillance) as no other planned outage involved even a single day. Other than these outages, the remainder of the year saw the usual variety of maintenance activities and equipment failures. It is hoped that quality maintenance will continue this return to high availability in the next reporting year when the current outage is completed.

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2000 BAugust 2001)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
September 2000	80.83%	5.75 days	Maintenance (Forced BF) to remove primary coolant from equipment pit, replace broken rupture disk and refill primary coolant tank (3? days). Maintenance (P) to refill primary coolant storage tank (? day). Maintenance (P) to re-ink temperature recorder pads (C day). Outage (F) due to electrical power outage resulting in reactor trip (? day). Maintenance (F) to repair failed PC PUMP/PRI FLOW control console indicator (? day). Maintenance (P) to replace relay to correct dump valve buzzing (? day). Maintenance (P) to continue planning for connecting aboveground wastewater holdup tank and to pump wastewater two times from indoor tanks to aboveground holdup tank (¼ day). Administrative unavailability for the Labor Day holiday (1 day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2000 BAugust 2001)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
October 2000	65.73%	10.625 days	Maintenance (Forced BF) to troubleshoot and then replace failed solenoid on primary coolant system dump valve (10¼ days). Maintenance (P) to plan and install cell wall pipe with inboard/outboard isolation valves in preparation for connecting aboveground wastewater holdup tank (? day).
November 2000	91.67 %	2.375 days	Maintenance (P) to pump wastewater from indoor tanks to outdoor aboveground holdup tank (c day). Maintenance (P) to refill the primary coolant storage tank (? day). Maintenance (P) to clean and overhaul meter movement to restore proper reading of stack dilution fan mechanical tach rpm indicator (? day). Administrative shutdown for the Thanksgiving holiday (2 days).
December 2000	96.37%	1.125 days	Maintenance (P) to refill the primary coolant storage tank (? day). Administrative shutdown for the Christmas holiday (1 day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2000 BAugust 2001)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
January 2001	20.56%	24.625 days	Maintenance (F) to troubleshoot and repair a Wide Range Drawer test jack discontinuity to enable the A-2 Surveillance to continue (¾ day). Maintenance (F) to troubleshoot and then replace the failed two-pen recorder to enable A-2 Surveillance to continue (12 days). Maintenance (F) to troubleshoot failed temperature monitor recorder delaying completion of A-2 Surveillance (½ day). Maintenance (P) to adjust nuclear instrumentation voltages and setpoints, confirm values and continue with performing the nuclear instrumentation calibration check and calorimetric heat balance (10¼ days). Administrative shutdown for the New Years holiday (1 day).
February 2001	0.00%	28.00 days	Maintenance (F) to troubleshoot failed temperature monitor recorder and begin efforts to replace recorder with new system (28 days). Maintenance (P) for scoping work and installing improvements on overhead crane (concurrent ½ day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2000 BAugust 2001)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
February 2001 (continued)			Maintenance (P) to pump wastewater from indoor tanks to aboveground wastewater holdup tank (concurrent ? day).
March 2001	0.00%	31.00 days	Maintenance (F) to continue work to install new temperature monitor/recorder with software development/integration (31 days). Maintenance (F) to remove primary coolant from equipment pit and replace rupture disk broken by inadvertent electrical short circuit (concurrent 1? days). Maintenance (P) to pump wastewater from indoor tanks to aboveground wastewater holdup tank with final leak test of transfer system (concurrent ? day).
April 2001	85.42%	4.375 days	Maintenance (P) to complete installation and checkout of new computer-based temperature monitor/recorder as well as new extra mechanical recorder (2? days).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2000 BAugust 2001)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
April 2001 (continued)			Maintenance (F) to adjust nuclear instrumentation voltages and setpoints, confirm values and verify no need to change out resistors and subsequently perform calorimetric calibration and confirmation of results (A-2 Surveillance) (1¾ days plus 2¼ days coincident) Maintenance (P) to perform preventive roof maintenance including replacement of lightning arrestor (¼ day).
May 2001	91.13%	2.75 days	Maintenance (F) to replace a failed power supply which had caused a failed source alarm resulting in an unscheduled shutdown (½ day). Maintenance (P) to evaluate failing dilute fan mechanical tach rpm generator (? day). Maintenance (P) to replace resin cartridge in shield tank demineralizer system (? day). Maintenance (P) to replace primary coolant demineralizer system resins (¾ day). Maintenance (P) to replace drive belts on the dilute fan (¼ day). Administrative shutdown for the Memorial Day holiday (1 day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2000 BAugust 2001)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
June 2001	94.17%	1.75 days	Maintenance (F) to address failure of high voltage trip on voltage reduction on Safety Channel 1 (1¼ days). Maintenance (P) to upgrade temperature monitor computer monitor with larger monitor (? day). Maintenance (P) to replace failed GM tube in north area radiation monitor (¼ day). Maintenance (P) to replace a failed north area radiation monitor with a spare monitor with no improvement (? day).
July 2001	75.81%	7.50 days	Maintenance (F) to repair electrical grounds disabling automatic initiation of evacuation siren failed during repairs (¼ day). Maintenance (F) to address failure in Wide Range Drawer following a full trip (5 days). Maintenance (P) to replace north area radiation monitor with spare monitor including repair of system electrical grounds (1? days). Maintenance (P) to refill primary coolant storage tank (? day). Administrative shutdown for the Independence Day holiday (1 day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2000 BAugust 2001)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
August 2001	0.00%	31.00 days	Maintenance (F) to continue efforts to address failures in Wide Range Drawer following a full trip on July 26 (31 days).

TOTAL ANNUAL UNAVAILABILITY (Availability at 58.777%):	150.875 days	= 41.223%
1. TOTAL FORCED UNAVAILABILITY:	128.625 days	= 35.143%
2. TOTAL PLANNED UNAVAILABILITY:	15.250 days	= 4.167%
3. TOTAL ADMINISTRATIVE UNAVAILABILITY:	7.000 days	= 1.913%

NOTE 1. This availability summary neglects all minor unavailability for periods smaller than one-eighth day. In most cases these periods are for much less than an hour as some minor problem is corrected, such as replacing chart paper on an area radiation detector or a light bulb in an indicator, usually during or after a preoperational checkout. This availability summary also neglects unavailability for scheduled tests and surveillances except where noted when maintenance becomes necessary.

NOTE 2. The150.875 days total unavailability in the 2000-2001 reporting year was one of the highest in recent years with the forced outage rate increased to 128.625 days versus 20.875 days, 350.00 days and 131.375days in the previous three reporting years and with the planned outage rate at only 15.250 days versus 14.50 days, 0.375 days and 13.375 days in the previous three reporting years. Though the only forced outage to exceed three days were due to repair of a failed primary coolant line rupture disk (3? days), to replace a failed solenoid on the primary coolant dump valve (10¼ days), to replace a failed two-pen recorder (12 days), to replace the failed temperature monitor/recorder (61? days) and to investigate/address failure of the wide range drawer ultimately traced at year's end to a failed detector (fission chamber) (36 days and counting), they were much longer than in most years with the last one to extend well into the next reporting year. The only planned outage over three days was for the adjustments and other maintenance activities associated with the annual nuclear instrumentation calibration check (A-2 Surveillance) in January/April (12 days) interrupted by several other outages to address repairs. The total unavailability time is for maintenance for repairs, delays awaiting parts arrival, trip evaluation plus 7.00 additional days of administrative shutdown compared with 8.25 days, 0.00 days and 7.50 days in the previous three reporting years (though the 1998-99 administrative unavailability contained 6.00 days of duplicate unavailability) delineated in this table for holidays, potential external events, and associated personnel vacations or unavailability of management to approve operating where the reactor was or could have been made operational if needed. With no full-time Reactor Manager for the year and the only other part-time SRO resigning in December 2000, the last category for administrative shutdowns remains excellent.

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2000 BAugust 2001)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability

NOTE 3. It should be noted that only category 1 and 2 unavailability values were listed under repair and maintenance related (loss of reactor) unavailability prior to the 1991-92 year. The total unavailability in these categories has tended to go in cycles partially dependent on effectiveness of previous maintenance plus the wear out of equipment for which there is no on-hand spare. This was true of the outages for the solenoid valve, two-pen recorder, temperature monitor and to some extent the wide range drawer failure at year's end. The total unavailability has been at 94.25 days (25.82% unavailability) and 76.50 days (20.90% unavailability) and then to 35.25 days (only 9.66% unavailability), 34.63 days (9.49% unavailability), 38.25 days (10.48% unavailability), and then back up to 86.75 days (23.70% unavailability) 118.88 days (32.58% unavailability), 144.250 days (39.66% unavailability), then up to 350.375 days (95.99% unavailability) in 1998-99 for addressing the reactivity anomaly including restoration of the reactor to normal operations. But then unavailability was down to a manageable level at 43.625 days (11.92% unavailability) in the 1999-2000 reporting year but for this 2000-2001 reporting year, it is back up to a higher value of 150.875 days. The lost availability for administrative reasons has shown some variation in earlier reporting yearsCfrom as many as 23.25 days, 23.50 days and 11.50 days to as few as 3.50 days, 5.00 days, 2.25 days, 4.50 days and 7.50 days in recent years, and then 0.00 days in 1998-99 (versus 6.00 days without outages already causing unavailability), at 8.25 days in 1999-2000 and now at 7.00 days for 2000-2001.

TABLE III-5A

UNSCHEDULED TRIPS
(September 2000 **BAugust 2001)**

After three unscheduled trips occurred in the first three months of the 1989-90 reporting year, none occurred during the 1990-91 reporting year; in the 1991-92 reporting year, three unscheduled trips occurred in November 1991, December 1991 and May 1992. It is worth noting that in the 1992-93 reporting year, the first unscheduled trip occurred in March 1993 and was the first experienced in nearly ten months, the second unscheduled trip occurred in August 1993. As with two of the three trips in the 1991-92 reporting year, one of these trips was due to an electrical transient while the other was due to inadvertent operator action, as was the third trip in the 1991-92 reporting year, with neither considered to have significantly affected reactor safety or the health and safety of UFTR personnel or the public. All safety systems responded properly for each trip and a full review was conducted prior to restart in each case with the second trip considered to be promptly reportable. After having no unscheduled trips during the 1993-94 reporting year, the UFTR experienced two unscheduled trips during the 1994-95 reporting year as it did again in the 1995-96 reporting year. The UFTR experienced no unscheduled trips during the 1996-97 reporting year. It is also worth noting that the two trips described and evaluated in this table in the 1995-96 reporting year were the only unscheduled trips for over three reporting years until July 30, 1999 and only the second trip was evaluated to be due to equipment failure due to faults in the Safety Channel 2 loss of high voltage sensing circuit. For the 1998-99 reporting year, there was only one trip evaluated as due primarily to a somewhat more restrictive loss of voltage setting on the power supply for Safety Channel 2 plus a much taxed electrical distribution system due to a heat wave. This single unscheduled trip was described and evaluated in the single entry in this table for the 1998-99 reporting year.

Again for the 1999-2000 reporting year, there was only one unscheduled trip evaluated as due to a campus-wide power outage for less than about one minute which resulted in a full trip which was not caused by any facility-related equipment or equipment malfunction with all protection and safety systems responding properly. This single unscheduled trip was described and evaluated in the single entry in this table for the 1999-2000 reporting year report.

Although a number of failed components were replaced to complement replacement of degraded components along with preventive cleaning and repair of circuit connections in the 1989-90 reporting year, as well as in the past eleven years, these efforts clearly have represented time well spent with very few trips due to facility equipment failure in the last nine years and none during the past 1996-97 and 1997-98 reporting years until July 30, 1999. The trip in the 1999-2000 reporting year on February 9, 2000 was again not due to facility equipment malfunction.

For the 2000–2001 reporting year, there were only three unscheduled trips; all are addressed in this table. The first on September 12, 2000 was a full trip at full power due to an area power outage, again not due to facility equipment malfunction. The second trip (also a full trip) on July 20, 2001 was due to the operator inadvertently pushing the power off versus the automatic to manual control button in preparation for commencing shutdown from full power, again not due to facility equipment malfunction. Finally, the third full trip, also at full power, was due to a failure in the detector systems part of the wider range drawer and was due to facility equipment malfunction, troubleshooting for which is continuing at year's end per entry 3 in this table.

TABLE III-5A

UNSCHEDULED TRIPS
(September 2000 – August 2001)

Number	Date	Description of Occurrence
1.	12 Sep 00	At 1055 hours on September 12, 2000 during full power operation for sample irradiation, the main AC power was lost resulting in a full trip with all safety systems responding as designed. The reactor was secured at 1056 hours with all scram lights annunciating after power was restored by the diesel generator about 30 seconds later. Power was lost throughout the reactor building and the west side of campus due to an electrical outage that lasted about 30 minutes. After restoration of power and completion of UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation), a successful daily checkout was completed and the reactor approved for restart. Since this was a trip from a known cause this event was not considered to be promptly reportable. The reactor was restarted to full power beginning at 1226 hours to complete the interrupted irradiation which was completed without incident as the reactor was subsequently shutdown and secured at 1406 hours. Evaluation indicated reactor and personnel safety as well as the health and safety of the public were not affected by this trip occurrence. The completed UFTR Form SOP-0.6A is available at the facility.
2.	20 Jul 01	On July 20, 2001, the reactor was started up at 1524 hours, reaching full power (100 kW) at 1603 hours. At the end of the scheduled one hour irradiation of LEDs and mosfet structures and in preparing to shut down, the operator reached across to push the mode button to select MANUAL so the reactor could be shut down. Instead, the operator inadvertently pushed the POWER ON button which is near and on the way to the mode selector button. The result was a loss of power to various instruments so the button was cycled as it is during the weekly checkout to indicate actuation of essentially all scram indicators. As a result of pushing the POWER ON button, the reactor underwent a full trip with blades dropped and water dumped to the storage tank with all reactor safety and protection systems responding properly as expected. The reactor was then promptly secured at 1703 hours. To remove core heat, reactor coolant flow was restored as soon as possible at 1706 hours and all systems assured to be operating as expected. The trip was evaluated as having negligible impact on

TABLE III-5A

UNSCHEDULED TRIPS
(September 2000 – August 2001)

Number	Date	Description of Occurrence
		reactor safety and no impact on the health and safety of reactor personnel or the public. Because this was a trip from a known cause and actually operator initiated with all safety and protection systems responding as expected, this event is not considered to be promptly reportable but is included in the facility annual report. Completed UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) is also available at the facility with the other requirement for restart being a successful weekly and daily checkout which were accomplished with no problems noted.
3.	26 Jul 01	After commencing reactor startup at 1627 hours on July 26, 2001, the reactor reached 100 kW at 1644 hours with the rabbit system energized and ready to receive a test capsule at 1646 hours. As the regulating blade was being observed prior to capsule insertion, the reactor underwent a full trip with all blades dropped in and the water dumped to the coolant storage tank. The reactor was secured at 1647 hours with the scram limiting safety system settings indicated to be SAFETY 2, COOLANT PUMP, COOLANT FLOW and COOLANT LEVEL. Subsequently, the rabbit system was purged, deenergized and secured at 1647 hours and coolant flow was restored at 1652 hours for heat removal. Subsequently, the wide range drawer was noted to be pulse cycling from about 10 cps to about 1000 cps every few seconds. A check of the two-pen recorder showed this occurred after the trip but had not been occurring earlier. At this point, the POWER ON button was pushed dumping the coolant with no effect on the pulsing. Subsequently, under MLP #01-29, the WR drawer was deenergized to prevent the constant cycling. At this point, the meter would not respond to a test signal. On July 27, various calibration voltage values were checked and compared to the last calorimetric and found to have large discrepancies from expected values. In addition, preamps 1/P and 0/P were tested with 1/P satisfactory but 0/P apparently failed. On July 31, some additional verification tests were performed with the PuBe source in and out to test preamp 1/P with no success in verifying 0/P on the scope. At month's end, the event has been evaluated as caused by an

TABLE III-5A

UNSCHEDULED TRIPS
(September 2000 – August 2001)

Number	Date	Description of Occurrence
		electrical transient with the full trip initiated by Safety 2 due to an electrical transient induced loss of voltage caused by an external event or perhaps whatever caused the problem in the WR drawer since they occurred at the same time. Although not considered to be promptly reportable based upon the trip coming from a known cause, Safety 2 (though without a certain root cause), plans were to contact NRC and update them on the event as troubleshooting in isolating the WR drawer failure proceeds. The event is noted to have had negligible effect on reactor safety with all safety and protection systems responding as expected and no effect on the health and safety of reactor personnel or the public. A completed up to approval of restart UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) was also generated.
		During August 2001, the preamplifier and wide range drawer calibration card were tested and the calibration circuit analyzed and traced. The NRE Department Chair visited for a status report on August 2. Subsequently, some potting compound was removed from the preamp which was analyzed extensively with the charge amplifier A-3 determined to be failed. Various discussions were held with a representative engineer of Sorrento Electronics (General Atomics) with the preamp shipped back to General Atomics on August 9. Following the engineer's recommendation, the B-10 detector was pulse tested successfully though the fission chamber could not be checked. The engineer also recommended replacing the connectors and cabling on both WR drawer detectors. Subsequently, radiography shielding was removed and the detectors located, checked with the boroscope and then both were removed under RWP #01-03-I on August 21 with both showing some degradation probably resulting in the high voltage pulse failing the preamp. The repaired preamplifier and two of three needed radiation resistant (non-Teflon) connectors were received from General Atomics at a cost of over $4,100. Cable assemblies were then fabricated and pulled through under RWP #01-03-I on August 28. With two connectors replaced on the fission chamber and one on the B-10 detector, the B-10 was reinserted under RWP #01-03-I but the close fit in the graphite opening would not allow the fission chamber to be

TABLE III-5A

UNSCHEDULED TRIPS
(September 2000 – August 2001)

Number	Date	Description of Occurrence
		reinserted. Therefore, on August 30, RWP #01-03-I was closed out and RWP #01-04-I was opened to control unstacking sufficient shielding to reach the detector location from above. The A-blocks were unstacked on August 30 and blocks B6–B3 and C8–C7 were unstacked on August 31. At year's end the interlocked nature of the graphite will require more blocks to be unstacked before sufficient graphite can be removed to access the detector locations (B-10 and FC) and identify the root cause of the problem.

TABLE III-5B

SCHEDULED TRIPS
(September 2000 BAugust 2001)

There were no scheduled trips performed for experimental or training purposes during the last two reporting years and only one scheduled trip performed for experimental purposes during the 1998-99 reporting year. That trip was the first scheduled trip in a number of years. Part of the reason for this general lack of scheduled trips is the failure to schedule any large utility operator training programs where such trips are a designed part of the training program. It was anticipated that some training trips would be included in the ENU-5176L Reactor Operations Laboratory course offered during the 1996-97 or 1997-98 reporting years to demonstrate similarities and differences in power response for trips versus normal shutdown as well as in various student laboratory exercises to demonstrate rapid decay and recovery of stack count rate with power reduction and increase as part of Argon-41 stack effluent measurement exercises, but this did not occur. The nearly year-long outage for the 1998-99 reporting year again precluded such training trips. It was expected these training trips might occur in the 1999-2000 reporting year or the 2000-2001 reporting year but they did not. It is expected that one or more might occur in the 2001-2 reporting year, especially to determine some of the HEU response parameters relative to the HEU to LEU fuel conversion. Such trips can also be used to provide training in control room presence and awareness of changing conditions and responses in training UFTR operator license candidates and may be utilized as time permits in the next reporting year. Since there were no scheduled trips during this reporting year, there are no entries in the table.

Number	Date	Description of Occurrence
C	C	C

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

During this reporting year there were no events considered to have compromised reactor safety or the health and safety of the public. Ten events classified as unusual occurrences; none as promptly reportable potential abnormal occurrences. These events are described below as they deviated from the normal functioning of the facility and are included here as the most important such deviations for the reporting year. Unscheduled shutdowns are covered here as well, with one such occurring here this year (occurrence #7 below). Unscheduled trips are also addressed here though they are detailed in Table III-5A along with corrective and preventive maintenance and surveillances implemented in response to the trips where applicable; three such occurred during this reporting year (occurrences #1, #9 and #10). While in the 1998-99 reporting year one of six occurrences described in this table was also considered a potential abnormal occurrence as a potential tech spec violation and treated as promptly reportable, none of the four unusual occurrences in the previous reporting year was considered promptly reportable and none of the ten unusual occurrences this year was considered promptly reportable, though NRC was contacted for occurrence #5 due to computer utilization and for event #10 because the trip from the wide range channel failure involved loss of part of the wide range channel and was still under investigation at year's end.

All ten occurrences this year involved some equipment failure, inadequacy or other event. The most significant occurrences were the full reactor trips including occurrence #2 which involved a full trip due to an area-wide power outage (c day outage) as well as occurrence #9 which involved a full trip due to operator error (negligible outage time) and occurrence #10 which involved a full trip due to loss of part of the wide range channel (36+ days outage). One other event involved an unscheduled shutdown that resulted from failure of the source alarm; this was a significant event (occurrence #7) because it resulted in an unscheduled shutdown. The other important occurrence was breakage of the primary coolant rupture disk apparently due to fatigue failure. This event (occurrence #1) was significant because of potential contamination from primary coolant though none was involved. The same disk breakage makes occurrence #6 one of the more important occurrences. Occurrence #4 was significant because it involved a lengthy 12-day outage. Other occurrences (#3 and #8) were simple administrative items, one (#3) for less than optimal control of a key and one (#8) for a less conservative than intended but adequate test voltage for checking the Safety Channel 1 loss of high voltage trip.

In terms of effect, the most significant occurrences would be the full trip due to a power outage (occurrence #2) because it involved a challenge of the reactor protection system though it resulted in no significant forced outage time. The same is true of the full trip due to operator error (occurrence #9) and the full trip due to loss of part of the wide range channel (occurrence #10). Maintenance to address this latter occurrence #10 will extend well into the next reporting year. Of course, the unscheduled shutdown due to source alarm failure (occurrence #7) is also of interest. In terms of forced outage time, a number of these occurrences were very significant as occurrence #1 relative to rupture disk breakage involved nearly 4 days outage while occurrence #4 for the failed two-pen recorder involved a 12-day outage and occurrence #5 for the temperature monitor/recorder failure involved 61? days outage and occurrence #10 addressing the wide range channel failure and trip is an ongoing outage at year's end and already a 36-day outage. Overall, none of these ten occurrences is considered to have had significant impact on the safety of the reactor or on the health and safety of the public. In addition, all have been reviewed to assure adequate consideration of their effects with none officially reported promptly to the NRC, though all were reported for information purposes at some point. All were also reported in periodic updates to the NRC.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
1.	8 Sep 00	During the last step of the daily checkout when water is dumped, the rupture disk broke with no apparent operator error, with about 40 gallons of primary coolant dumped into the primary equipment pit. After opening the pit to verify the situation and notifying the Radiation Control Officer, the pit was cleaned up under Maintenance Log Page (MLP #00-29) and Radiation Work Permit (RWP 00-02-II) on September 8, 2000. Subsequently, under MLP #00-29, on September 11, 2000, swipes were taken to verify the pit was not contaminated, the rupture disk was replaced with an on-hand spare, the system was verified to be leak tight and a successful daily checkout was performed along with adding 45 gallons of demineralized water to the PC storage tank with no further problems noted. The rupture disk failure was attributed to fatigue failure with negligible effect on reactor safety and no effect on the health and safety of the public.
2.	12 Sep 00	At 1055 hours on September 12, 2000 during full power operation for sample irradiation, the main AC power was lost resulting in a full trip with all safety systems responding as designed. The reactor was secured at 1056 hours with all scram lights annunciating after power was restored by the diesel generator about 30 seconds later. Power was lost throughout the reactor building and the west side of campus due to an electrical outage that lasted about 30 minutes. After restoration of power and completion of UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation), a successful daily checkout was completed and the reactor approved for restart. Since this was a trip from a known cause this event was not considered to be promptly reportable. The reactor was restarted to full power beginning at 1226 hours to complete the interrupted irradiation which was completed without incident as the reactor was subsequently shutdown and secured at 1406 hours. Evaluation indicated reactor and personnel safety as well as the health and safety of the public were not affected by this trip occurrence. The completed UFTR Form SOP-0.6A is available at the facility.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
3.	15 Oct 00	During a weekend visit to access the control room to prepare for an afternoon tour, as the cell was being taken off security in the early afternoon, it was noted that the crane key had inadvertently been left out (in the control room) over part of the weekend. The crane key was immediately secured and the event evaluated and documented as a minor security event since it had been locked in the control room, there had been no attempt to use it and it was promptly secured when discovered. In addition, the event was also entered in the log of safeguards events for subsequent reporting.
4.	11 Jan 01	On January 11, 2001, the reactor was run for six hours at power to provide a high gamma background after shutdown to allow compensating voltage adjustment on the compensated ion chamber as part of the UFTR Annual Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance). During the post-shutdown compensating voltage adjustment, the failure of the compensating voltage adjustment potentiometer combined with a frequently repaired two-pen recorder to result in a failed two-pen recorder. Under MLP #01-03 opened on January 12, 2001, the two-pen recorder drive system was found to be inoperable. Fortunately a replacement two-pen recorder was available, having been purchased under the 2000-01 DOE University Reactor Instrumentation Grant. However, as with the failed two-pen recorder when it was installed, there was no installed source alarm circuit. Therefore, under MLP #01-03 and 10 CFR 50.59 Evaluation Number 01-01 (Replacement of Failed Two-Pen Recorder), the new recorder was evaluated, tested and installed, the source alarm circuit was analyzed and the necessary relay board was designed and constructed. Subsequently, the power supply and relay card for the source alarm were built and the source alarm relay card was installed with the necessary connector panel modification made behind the two-pen recorder. Subsequently, with the new two-pen recorder installed, the reactor was approved for low power

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 B August 2001)

Number	Date	Description of Occurrence
		operations to test the recorder operation on January 22, 2001. The first operation to 1 watt verified general performance. In a second operation to 1 watt, some instability was detected in the front end amplifier of the relay card during power decay so the output of the filter capacitor was scaled down. At this point, the LCOs were met with the instability located in the source alarm circuit which was noted to actuate normally but not reset properly so the front end amplifier was changed out twice and the reactor operated to 1 watt with the instability corrected at the end of the day on January 22, 2001. Subsequently, a confirmation startup to 1 watt was conducted on January 23, 2001 to verify proper operation of the linear recorder including the source alarm circuit with the instability corrected. At this point, the compensating voltage potentiometer whose failure had precipitated electrical transients resulting in failure of the two-pen recorder, was replaced under MLP #01-04 on January 23, 2001. With successful completion of the precalorimetric adjustments on January 23, 2001 and closeout of MLP #01-03 for the two-pen recorder replacement and MLP #01-04 for replacement of the compensating voltage potentiometer, the reactor was approved for checks and power operations to continue the UFTR Nuclear Instrumentation Calibration Checks and Calorimetric Heat Balance (A-2 Surveillance) with no further problems noted in this area. The two-pen recorder failure event is not considered to be promptly reportable, especially since it occurred at shutdown conditions during compensating voltage adjustments. Although a first level modification package was necessary, the recorder is essentially a somewhat upgraded (essentially a duplicate) replacement for the failed recorder which also had required that a source alarm circuit be added when it was installed some ten years or so earlier. This event is considered closed with closure of MLP#01-03 and MLP #01-04. This event was evaluated to have had no effect on the health and safety of the public or facility personnel and no effect on the safety of the reactor.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
5.	31 Jan 01	After a power operation beginning with a startup at 0945 hours and reaching full power at 1003 hours for a six hour power run conducted to provide a sufficient gamma background after shutdown to allow compensating voltage adjustment on the compensated ion chamber as part of the continuing UFTR Annual Nuclear Instrumentation and Calibration Check and Calorimetric Heat Balance (A-2 Surveillance), the temperature monitor recorder began to indicate poorly though temperature trends were still being indicated. Subsequently, as the temperature monitor failed to indicate properly, an unscheduled shutdown was begun at 1155 hours with the reactor shutdown and secured at 1157 hours with all safety and control systems operating and responding properly with no other problems noted but the temperature monitor recorder requiring repair with no impact on reactor safety or the health and safety of the public or facility personnel per the completed UFTR Form SOP-0.6B (Unscheduled Reactor Shutdown and Evaluation). Subsequently, under MLP #01-06, troubleshooting was begun on January 31, to troubleshoot and repair the temperature monitor recorder with no results at month's end. During February 2001, several days were spent troubleshooting and attempting to repair the temperature monitor recorder as the systems were analyzed and available options delineated. The decision was finally made that the temperature monitor was not repairable on February 5 so the decision was made to install the spare temperature monitor recorder bought as a replacement under the 1992-93 DOE URI grant. Unfortunately the digital monitor requires considerable engineering to be usable as a replacement, especially since the monitor provides the temperature warning and trips on high temperature for the reactor protection system. Subsequently, the necessary equipment and software needs were specified in consultation with National Instruments and ordered. As the Labview software package, software manual and hardware were obtained

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 B August 2001)

Number	Date	Description of Occurrence

throughout the month, the necessary software was developed and was begun to be integrated with the hardware. On February 26 the old temperature monitor/recorder was removed and the necessary physical support structure designed and installed to support the new temperature monitor printer. On February 28 the stack monitor alarm bell was repositioned to make room for the new recorder as the aluminum mounting material was measured and cut at month's end to construct the mounting bracket. At month's end the new temperature monitor recorder was ready to be mounted as software development and integration with the hardware continued.

The status of this modification and the use of computer software to generate high temperature trips was discussed with new NRC Project Manager Alexander Adams on February 22. In essence he indicated they will inspect based on what we decide in a 10 CFR 50.59 modification package though he does not see that any new safety question is involved. Provided that the UFTR internal 10 CFR 50.59 review at Level 2 is negative and no change of Tech Specs is needed, then NRC will simply inspect the modification package and the Tech Specs on the next visit with no necessity to submit anything to NRC for review.

During March 2001, hardware and software integration efforts continued along with software development. Support angle aluminum was also installed to support the new mechanical recorder. Much effort was also spent testing inputs and the software as it was being developed. A detailed modification package was developed (10 CFR 50.59 Evaluation and Determination Number 01-03, "Temperature Recorder/Monitor Replacement Including Software Generated Trip Function") and presented to the Reactor Safety Review Subcommittee (RSRS) at its meeting on March 15 where it was approved. This included a memorandum dated March 13, 2001 on the replacement as well as an augmented memorandum on safety-

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
		related issues for consideration. The new computer-based monitor/recorder was installed along w ith the thermal couple junction s trip o n M arch 21. S ubsequently, all h ardware w as installed and checked and the system calibrated with installation of strain supports on the thermocouple wire and a ground strap essentially completing the necessary installation and checkout of the new temperature monitor/recorder system at the end of March as the interrupted annual calibration of nuclear instruments and other delayed surveillances were to be performed in the coming month as this major project was nearing completion. A complete restart plan was developed to assure an orderly return to normal operations. The restart plan is in the form of a memorandum dated March 29, 2001. During April 2001, the precalorimetric checks and adjustments part of the UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance) were completed on April 2 and the first power operation for compensating voltage adjustment was conducted on April 3 with the computer-based temperature monitor/recorder verified to be operating properly so that the MLP #01-06 for this modification could be closed out on April 3. Subsequently, a special power run was undertaken on April 10, under the reopened MLP #01-06 to verify the proper operation of the mechanical temperature recorder which is essentially extra unrequired equipment that will be useful for input to student laboratory exercises. MLP #01-06 was then closed permanently on April 10, 2001 with no problems noted in operation of the computer-based temperature monitor/recorder or the mechanical recorder to close out this occurrence.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
6.	29 Mar 01	As connections were being made to perform the quarterly scram checks (Q-1 Surveillance), two contacts were accidentally crossed resulting in a short circuit with breaking of the primary coolant system rupture disk due to rapid opening and closing of the PC dump valve at about 1530 hours on March 28, 2001. Since tests were in progress when this disk broke, the reactor was not operating so only very low levels of contamination were involved. This event was judged to have negligible effects on reactor safety or on the health and safety of the public or reactor staff. Subsequently, with notification and approval of the Radiation Control Officer, under RWP #01-01-II and MLP #01-10, the primary coolant pit was cleaned up with about 40 gallons of primary coolant water pumped to the indoor holdup tank, a replacement rupture disk was installed and the system was checked not to be leaking with no further problems noted as the event was closed out at about 1600 hours on March 29, 2001.
7.	10 May 01	While performing low power reactor operator training operations for Laboratory Exercise #5, the 100 watt power level was reached at 1124 hours after commencing startup at 1051 hours. Subsequently, at 1129 hours, the 100 watt source alarm was checked at 100 watts and found to be inoperable. Following an unscheduled shutdown begun at 1130 hours and completed at 1132 hours, under MLP #01-15, the source alarm power supply was found to be failed and was replaced with an on-hand equivalent spare per 10 CFR 50.59 Evaluation Number 01-04 (Source Alarm Power Supply Replacement) with the source alarm verified operational and a daily checkout completed successfully at 1640 hours with restart approved with no further problems noted. Completed UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) was also generated. The source alarm was also verified operable as usual during the subsequent weekly checkouts on May 21 and May 29. This event was not considered promptly reportable since the

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
		unscheduled shutdown was undertaken immediately upon discovery; in addition, the source alarm had not been needed since last verified operable on May 7, 2001 during the weekly checkout since the source had not been used. Therefore, this occurrence was considered to have had negligible impact on reactor safety or the health and safety of reactor personnel or the public.
8.	18 Jun 01	During performance of the quarterly scram function checks (Q-1 Surveillance) on June 18, 2001, Safety Channel 1 failed to provide a reactor trip when the test button was depressed to simulate a reduction in detector high voltage. Subsequent circuit analysis under MLP #01-22 determined that comparator A1 in the A-9 bistable card was drawing excessive current into the non-inverting terminal to which the reference signal is applied. This current draw loaded down the signal from the nominal 4.00V to 3.95V. During normal operation of the test circuit, the high voltage signal applied to the comparator's inverting terminal is reduced from 4.09V to 3.960V to simulate a 3.27% reduction in high voltage. The resulting polarity change across the comparator's input terminals should have caused the bistable to trip, but since the comparator had loaded down the reference signal, the polarity change did not occur (the high voltage signal would have to have been reduced to 3.950V (corresponding to a 3.52% reduction in high voltage) to cause the bistable to trip). The test circuit simulates a 3.27% reduction in detector high voltage and the bistable card is normally adjusted to trip on this reduction, but with the loading of the reference signal a reduction in high voltage of 3.52% would have been required to cause the trip. It was only the very conservative setting of the bistable trip point that caused the trip not to initiate during testing (and allowed the problem with the comparator to be discovered and corrected before the comparator exhibited further degradation). Had the

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
		actual detector high voltage signal decreased by more than 3.52%, a reactor trip would have occurred. Even with the comparator degradation, this trip point was still far more conservative than the 10% reduction trip point called for by the UFTR Technical Specifications. Subsequently, on June 19, 2001, the comparator was replaced and checked for proper operation to give the necessary simulated trip signal with no further problems noted. Since the failure did not involve an actual loss of trip function, there was no impact on reactor safety or on the health and safety of the public. In addition, the failure was discovered at shutdown conditions. A memorandum discussing this occurrence was generated for facility records with no further problems noted.
9.	20 Jul 01	On July 20, 2001, the reactor was started up at 1524 hours, reaching full power (100 kW) at 1603 hours. At the end of the scheduled one hour irradiation of LEDs and mosfet structures and in preparing to shut down, the operator reached across to push the mode button to select MANUAL so the reactor could be shut down. Instead, the operator inadvertently pushed the POWER ON button which is near and on the way to the mode selector button. The result was a loss of power to various instruments so the button was cycled as it is during the weekly checkout to indicate actuation of essentially all scram indicators. As a result of pushing the POWER ON button, the reactor underwent a full trip with blades dropped and water dumped to the storage tank with all reactor safety and protection systems responding properly as expected. The reactor was then promptly secured at 1703 hours. To remove core heat, reactor coolant flow was restored as soon as possible at 1706 hours and all systems assured to be operating as expected. The trip was evaluated as having negligible impact on reactor safety and no impact on the health and safety of

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
		reactor personnel or the public. Because this was a trip from a known cause and actually operator initiated with all safety and protection systems responding as expected, this event is not considered to be promptly reportable but is included in the facility annual report. Completed UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) is also available at the facility with the other requirement for restart being a successful weekly and daily checkout which were accomplished with no problems noted.
10.	26 Jul 01	After commencing reactor startup at 1627 hours, the reactor reached 100 kW at 1644 hours with the rabbit system energized and ready to receive a test capsule at 1646 hours. As the regulating blade was being observed prior to capsule insertion, the reactor underwent a full trip with all blades dropped in and the water dumped to the coolant storage tank. The reactor was secured at 1647 hours with the scram limiting safety system settings indicated to be SAFETY 2, COOLANT PUMP, COOLANT FLOW and COOLANT LEVEL. Subsequently, the rabbit system was purged, deenergized and secured at 1647 hours and coolant flow was restored at 1652 hours for heat removal. Subsequently, the wide range drawer was noted to be pulse cycling from about 10 cps to about 1000 cps every few seconds. A check of the two-pen recorder showed this occurred after the trip but had not been occurring earlier. At this point, the POWER ON button was pushed dumping the coolant with no effect on the pulsing. Subsequently, under MLP #01-29, the WR drawer was deenergized to prevent the constant cycling. At this point, the meter would not respond to a test signal. On July 27, various calibration voltage values were checked and compared to the last calorimetric and found to have large discrepancies from expected values. In addition, preamps I/P and O/P were tested with I/P satisfactory but O/P apparently failed. On July 31, some additional verification tests were

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
		performed with the PuBe source in and out to test preamp I/P with no success in verifying 0/P on the scope. At month's end, the event had been evaluated as caused by an electrical transient with the full trip initiated by Safety 2 due to an electrical transient induced loss of voltage caused by an external event or perhaps whatever caused the problem in the WR drawer since they occurred at the same time. Although not considered to be promptly reportable based upon the trip coming from a known cause, Safety 2 (though without a certain root cause), plans were to contact NRC and update them on the event as troubleshooting in isolating the WR drawer failure proceeds. The event is noted to have had negligible effect on reactor safety with all safety and protection systems responding as expected and no effect on the health and safety of reactor personnel or the public. A completed up to approval of restart UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) was generated.
		During August 2001, the preamplifier and wide range drawer calibration card were tested and the calibration circuit analyzed and traced. NRE Department Chair A. Haghighat visited for a status report on August 2. Subsequently, some potting compound was removed from the preamp which was analyzed extensively with the charge amplifier A-3 determined to be failed. Various discussions were held with Mr. W. Hyde of Sorrento Electronics (General Atomics) with the preamp shipped back to General Atomics on August 9. Following Hyde's recommendation, the B-10 detector was pulse tested successfully though the fission chamber could not be checked. Mr. Hyde also recommended replacing the connectors and cabling on both WR drawer detectors. Subsequently, radiography shielding was removed and the detectors located, checked with the boroscope and then both were removed under RWP #01-03-I on August 21 with both showing some degradation probably resulting in the high voltage pulse failing the preamp. The repaired preamplifier

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2000 BAugust 2001)

Number	Date	Description of Occurrence
		and two of three needed radiation resistant (non-Teflon) connectors were received from General Atomics at a cost of over $4,100. Cable assemblies were then fabricated and pulled through under RWP #01-03-I on August 28. With two connectors replaced on the fission chamber and one on the B-10 detector, the B-10 was reinserted under RWO #01-03-I but the close fit in the graphites would not allow the fission chamber to be reinserted. Therefore, on August 30, RWP #01-03-I was closed out and RWP #01-04-I was opened to control unstacking sufficient shielding to reach the detector location from above. The A-blocks were unstacked on August 30 and blocks B6–B3 and C8–C7 were unstacked on August 31. At year's end the interlocked nature of the graphite requires more blocks to be unstacked before sufficient graphite can be removed to access the detector locations (B-10 and FC).

IV. MODIFICATIONS TO THE OPERATING CHARACTERISTICS OR CAPABILITIES OF THE UFTR

A number of modifications and/or changes in conditions were made to the operating characteristics or capabilities of the UFTR and directly related facilities during the 2000-2001 reporting period. These modifications and/or changes in conditions were all subjected to 10 CFR 50.59 evaluations and then determinations (as necessary) to assure that no unreviewed safety questions were involved.

- Carried over from the 1984-85 Reporting Year:

  Modification 7: Addition of Secondary Water Flow Sensors (Rotameters)

- Carried over from the 1991-92 Reporting Year:

  Modification 92-04: Installation of New Manometers on Core Vent System

  Modification 92-06: Modification to the UFTR Thermocouple System: Implementation of Terminal Strips and Quick Disconnects

- Carried over from the 1996-97 Reporting Year:

  Modification 96-13: Security System Power Pack Replacement

- Carried over from the 1999-2000 Reporting Year:

  Modification 00-01: Reactor Cell West Wall Penetration to Connect to Aboveground Wastewater Holdup Tank

  Modification 00-03: Manufacture and Implementation of Replacement Set of Hurricane Rods

1. Security System Power Pack Replacement (Permanent – Open Item)

(Modification 96-13: Evaluation Completed December 1996)
(Modification 99-02: Evaluation Completed 11 February 1999)

Following one spurious security alarm on November 10 and two alarms on November 11, 1996, the security system batteries were checked and replaced (S-7 Surveillance). Under MLP #96-30 the rechargeable batteries were found to be low and were recharged. Subsequently, 10 CFR 50.59 Evaluation Number 96-13 was developed to allow modification and replacement of the power pack to prevent recurrence of the problem of spurious alarms due to low voltage. Measurements were made and security system circuits checked and verified. In addition, the 6 volt batteries were recharged in mid-month. At the end of November 1996, the design and development of a new power pack per 10 CFR 50.59 Evaluation Number 96-13 was in progress; at the end of December 1996, the 10 CFR 50.59 Evaluation is complete as is the design, with installation of the new power supply on January 7, 1997 with all but one siren operational to meet requirements. Subsequently, the west lot siren was repaired on January 13 and both the west lot and journalism side siren horn drivers wiring was reterminated on January 14, 1997. Drawings and maintenance log were subsequently updated and an evaluation made that separate grounds would be needed for the security system batteries to assure proper charging and eliminate spurious alarms as the batteries discharge over time. On March 10, 1997, the power supply was removed for modification. Upon installation, various problems occurred resulting in partial and intermittent compensated outage of the security system over the period March 10-21 with circuit mapping performed for troubleshooting on March 19 and the intermittent ground finally repaired on March 21, 1997, but without installation of the modification to separate grounds, basically returning the system to its state prior to March 10. Subsequently, the 4 volt rechargeable batteries have been replaced on May 14, June 18, July 7, and July 24, 1997 (for prevention purposes on July 30, 1997), on August 29, and on September 29, 1997. Following a full S-7 Surveillance on October 24, 1997, the loss of the holdup alarm was corrected under MLP #96-30 by reterminating a loose wire. Subsequently, the 4 volt rechargeable batteries were replaced on December 16, 1997 and again on January 9, February 10, March 10, April 8, and on May 6, 1998. Following a full S-7 Surveillance on May 27, 1998, the 4 volt rechargeable batteries were replaced again on June 24, July 24, August 19, September 16 and October 13, 1998. Following a full S-7 Surveillance including replacement of rechargeable batteries on November 10, the 4 volt rechargeable batteries were replaced again on December 7, 1998 and January 4, February 1 and March 2, 1999 with upgraded 4 volt batteries installed on March 12, 1999 under 10 CFR 50.59 Evaluation Number 99-02 developed and approved in February to upgrade the 4 volt rechargeable batteries for longer life. There had been no need for further replacement through the end of July 1999 though the full S-7 Surveillance was performed on July 2, 1999. Following the full S-7 Surveillance, when the 4 volt batteries were not replaced, the 4 volt rechargeable batteries were replaced again on August 24, 1999. The 4 volt rechargeable batteries were replaced again on February 24, 2000. There had been no further need for replacement until completion of the full S-7 Surveillance on May 25, 2000. The 4 volt rechargeable batteries were again replaced on November 10, 2000 followed by a full S-7 Surveillance on December 29, 2000. The 4 volt rechargeable batteries were replaced again on February 26, 2001. There had been no further need for replacement until completion of the full S-7

Surveillance on May 22, 2001. Subsequently, the 4 volt rechargeable batteries were replaced again on August 24, 2001.

Controlling Documents: Maintenance Log Page #96-30 (Remains Open)
10 CFR 50.59 Evaluation Number 96-13
10 CFR 50.59 Evaluation Number 99-02

2. Reactor Cell West Wall Penetration to Connect to Aboveground Holdup Tank (Permanent – Closed Item

(Modification 00-01: Evaluation Completed 20 April 2000)

Previously, 10 CFR 50.59 Evaluation and Determination Number 99-04 (Modification/Upgrade of Effluent Discharge System for Reactor Building) was approved for replacing the two underground wastewater holdup tanks with aboveground tanks—one outside, two inside. Under MLP #99-19, PPD personnel under supervisor Ron Sandoval excavated in the west lot to locate the line feeding the tank system beginning on May 24, 1999. On May 26, 1999, they broke the freshwater line used to flush the tanks so it was valved off by Danny Grant. On May 28, 1999, they finally had the whole line excavated, temporarily cut it, got negative indications on swipes and reconnected the feed pipe to the tank as a lift station is needed to connect it directly to the sanitary sewer. A visit to Al Hawley at Southern Precast, Inc. in Alachua also identified the 1,000 gallon tank to be placed outside aboveground. At the end of May, further operations awaited delivery of a lift station to be installed below ground in the west lot as two smaller indoor sink tanks were to be ordered also.

During June 1999, the rerouting activities were discussed with RCO D.L. Munroe along with release of the east holdup tank. Mr. Steve Middleton, PPD Maintenance and Construction Superintendent for Water Systems, visited on June 2 to check on the status and apologize for the problems to date. The situation was also discussed with PPD Project Engineer Bahar on June 4 as she visited to indicate how the lift station would be installed to protect lot access. Al Hawley, Manager of Specialty Products Division for Southern Precast, Inc., visited on June 4 with the specs for the 1,000 gallon aboveground storage tank and also to check accessibility of the west lot for delivery of the tank. The specs were then delivered to Ralph Haskew to order the tank through EH&S. Excavations to install the lift station were begun on June 16 but work was stopped by EH&S due to PPD worker safety concerns about unrestrained sides of the hole. Further excavations were then performed on June 18 as the lines were cut and the lift station installed on June 22. It was not anchored so overnight rain damaged the lines so the lift station was removed and reinstalled with negative swipe indications on June 23. An electrician along with supervisor Ron Sandoval and two assistants installed the "permanent" electrical connection for the lift station on June 24. Subsequently, Steve Middleton visited again and agreed that the electrical connection for the pump could be moved inside the lift station to avoid aboveground barriers limiting lot access. This electrical connection was moved to inside the lift station on June 28. Considerable research was undertaken and a 150-gallon indoor tank was ordered from Tank Depot, Inc. for the reactor cell and several liquid wastewater collection drums were installed temporarily in the cell on June 25.

During July, approximately 295 gallons of wastewater were collected and pumped to the in-ground holdup tank system. Some grading work was accomplished following installation of the lift station in June, with Steve Middleton checking the situation on July 2. After notification that the 1,000 gallon aboveground storage tank was available, Steve Middleton, supervisor Marty Wertz, foreman John Black and another PPD technician visited to scope out concrete replacement work with old concrete broken out under Mr. Black's direction with a visit by RCO D.L. Munroe on July 8. Subsequently, Mr. Black and assistants prepared for and poured replacement concrete on July 9 with Russell Barrs visiting on July 9 to rehang the west lot entrance gate. The 1,000 gallon tank was finally delivered and placed in the west lot by Al Hawley and a truck/crane operator on July 20, 1999. Subsequently, the 150-gallon indoor tank obtained from Tank Depot, Inc. was delivered to the west lot on July 22 and moved inside for leak checks prior to set up on July 23, 1999. Both RCO D.L. Munroe and EH&S Director W.S. Properzio visited to check on both the inside 150 gallon and the outside 1,000 gallon tanks on July 29, 1999. Subsequently, RCO D.L. Munroe and NRE Professor G.R. Dalton utilized a special remote video camera system to inspect the inside of the underground tanks on July 30 in anticipation of eventual decommissioning of the tanks.

During August 1999, approximately 700 gallons of wastewater were collected and pumped to the in-ground holdup tank system, on August 28, 1999 telephone calls were made to and from Steve Middleton concerning completion of west lot work, a line was installed and sealed to direct cell AC condensate to the indoor 150 gallon tank on August 3–5, the indoor setup was cleaned up and arranged optimally around the tanks on August 12. In addition, Emil Hodge of W. W. Gay, Inc. visited to estimate costs for installation of plumbing from the cell to the aboveground tank in the west lot on August 26. Subsequently, RCO D.L. Munroe and NRE Professor G.R. Dalton utilized a special remote video camera system to inspect the inside of the underground tanks on August 31, 1999 in anticipation of eventual decommissioning of the tanks.

During September 1999, approximately 260 gallons of wastewater were collected and pumped to the in-ground holdup tank system. Subsequently, RCO D.L. Munroe and NRE Professor G.R. Dalton again utilized a special remote video camera system to inspect the inside of the underground tanks on September 22, 1999 in anticipation of eventual decommissioning of the tanks.

During October 1999, approximately 260 gallons of wastewater were collected and pumped to the in-ground holdup tank system. On October 29, EH&S Director W.S. Properzio called concerning beginning use of the aboveground tank. Subsequent contacts with Southern Precast and then W.W. Gay resulted in a commitment to receive an estimate for plumbing the tank by November 1, 1999.

During November 1999, ~120 gallons of wastewater were collected and pumped to the in-ground holdup tank. In addition to receiving the estimate for plumbing the tank on November 1, 1999, Physical Plant Division was contacted relative to providing a hole in the west cell wall for an effluent line (MWO #084826). On November 10, Emil Hodge of W.W. Gay was scheduled to check the site. Subsequently, he visited on November 17 to measure

the tank and on November 23 to check the site. Two W.W. Gay electricians (B. Bush and C. Rolling) initiated electrical connection to the tank on November 24, 1999.

During December 1999, a recirculation pump was installed on the aboveground tank by J. Scott and S. Ward of W.W. Gay on December 3/5. When the pump failed to exceed 5 rpm, E. Hodge and three W.W. Gay personnel removed it on December 6. J. Scott S. Ward, Dennis Jobe and Dennis Gahager of W.W. Gay finally reinstalled a new pump on December 10; however, it failed to pass a recirculation test with city water on December 14 so Southern Precast was contacted to verify drawings on December 15. After S. Ward of W.W. Gay primed the pump on December 17, the tank was circulated and pumped out to demonstrate proper operation on December 17. Subsequently, the tank was filled and pumped out in 90 minutes after demonstrating recirculation on December 23, 1999 along with discussions with RCO D.L. Munroe concerning release requirements and specifications on equipment needed for the water measurements. PPD technician Mike Wohl also visited on December 7 to make a preliminary inspection of the west reactor cell wall for the necessary effluent line hole to the tank.

During January 2000, the bill for W.W. Gay's services was received and transmitted to NRE Dept. staff for payment. At month's end the bill was not yet paid. In addition to discussions between RCO D.L. Munroe and Facility Director W.G. Vernetson, plans were undertaken to install a PVC run with filter and locate the west cell wall penetration for running liquid to the aboveground storage tank to include beginning work on drawings and consideration of affected documents for the modification. There was also a review of the data on the final liquid in the east underground tank to approve release.

During February 2000, there was a meeting with RCO D.L. Munroe relative to low levels of Cs-137 in the sludge of one underground tank. In addition to reviewing the status and planning on the project, a draft document was produced for the west cell wall penetration and line to move liquid from the indoor tank to the aboveground holdup tank in the west lot.

During March 2000, there was work on the modification package for the west cell wall penetration and on development of a sampling procedure for the new aboveground tank.

During April 2000, the modification package for the west wall penetration to move water to the aboveground holdup tank was finalized and subsequently fully approved by the RSRS for implementation after some updating of drawings.

During May 2000, the west underground holdup tank was pumped out with PPD technician M. Williams providing expertise to bypass the low-level interlock on the pumps. Subsequently, some effort was spent washing down the pumps. In addition, efforts were undertaken to order equipment to analyze the aboveground wastewater holdup tank contents for release. PPD senior operations engineer Jerry Canalas visited concerning providing vacuum for sample analysis but his input lead facility management to plan on acquiring a vacuum pump, funds for which may be available through end of fiscal year College of Engineering OCO money. In addition, considerable time was spent developing UFTR SOP-D.7 (Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater) to control aboveground tank releases. At month's end, this procedure was ready for RSRS review and approval.

During June 2000, there was some discussion about decommissioning the underground tanks and a visit by two representatives of Petroleum Aids, Inc. along with RCO D.L. Munroe, RCT J. Parker and Facility Director W.G. Vernetson to discuss plans for pump removal in early July. The new UFTR SOP-D.7 (Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater) was approved on June 1 and then installed in facility procedure manuals. In addition, 455 gallons of wastewater were pumped to the new aboveground holdup tank (200 gallons on June 1, 125 gallons on June 20 and 130 gallons on June 29). A proposed sharing of decommissioning costs for the underground tanks as proffered in April by RCO D.L. Munroe in an email to the COE interim dean indicates the UFTR share could be 20%, which seems high. A copy of the email is included in the June 2000 facility report.

During July 2000, two representatives of Petroleum Aids, Inc. assisted with removal of the two pumps from the underground storage tanks. After swipe/ radiological surveys by the Radiation Control Office, these pumps were removed for disposal by Petroleum Aids, Inc. and the tanks covered pending decommissioning. In addition, sample analysis equipment was ordered and received for processing water samples from the new aboveground holdup tank and the extra vacuum pump was returned to the vendor. In addition, 310 gallons of wastewater were pumped to the new aboveground holdup tank (110 gallons on July 13 and 200 gallons on July 31).

During August 2000, UFTR SOP-D.7 (Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater) was successfully applied to document sampling, analysis and finally release of 816.8 gallons of wastewater from the aboveground holdup tank to the sanitary sewer on August 15. In addition, the underground storage tanks were entered once on August 16 by RCT J. Parker to obtain swipes and again on August 17 by RCO D.L. Munroe to remove tank sediments with V. McLeod of EH&S assuring proper controls plus assistance from a Physical Plant Division technician on August 16. After discussion at the RSRS meeting on August 17 Chairman M.J. Ohanian indicated the Form 90 for the west reactor cell wall penetration should go to Denis Mercier for approval. Mercier reviewed the Form 90 on August 21 and had engineering representative Tony Smith check the type and location for the penetration on August 24 indicating this work should go to Physical Plant Division. So the Form 90 has moved forward with the penetration to be installed within a few weeks. In addition, 432 gallons of wastewater were pumped to the new aboveground holdup tank (120 gallons on August 8 before the release on August 15, 113.1 gallons on August 16 and 199 gallons on August 31).

During September 2000, equipment for implementing UFTR SOP-D.7 on a permanent basis was set up and checked out including an NMC gas flow proportional counter. The aboveground tank was also recirculated and sampled as efforts were made to develop a more efficient method for evaporating samples and then analyzing them. PPD operations engineer Rod Clemmons and contractor Dennis Wigglesworth visited and indicated the west wall penetration work would be contracted out; they will first drill a small hole from the inside, then do the full size hole from the outside to prevent damaging the brick facing material. In addition, 413.3 gallons of wastewater were pumped to the new aboveground holdup tank (213.3 gallons on September 12 and 200 gallons on September 25).

During October 2000, the aboveground wastewater holdup tank was sampled on October 2 and samples were being analyzed on October 16 as a more efficient methodology was under investigation with the CFCC NMC gas flow proportional counter finally undergoing calibration checks on October 31. Finally, under 10 CFR 50.59 Evaluation and Determination Number 00-01 (Reactor Cell West Wall Penetration to Connect to Aboveground Holdup Tank), on October 20, 2000, Dennis Wigglesworth and Brett Smith of Engineering Constructors and Consultants Inc. installed a one-inch pipe with isolation valves in the reactor cell west wall with only the various connections and piping remaining to be installed by reactor staff.

During November 2000, sample analysis continued with the aboveground wastewater holdup tank contents released to the sanitary sewer on November 17. Subsequently, 161 gallons of wastewater were pumped to the new aboveground tank on November 21.

During December 2000, little occurred as some solids were removed from the tank for analysis on December 29, by the Radiation Control Officer and staff. During January 2001, one sink drain in the NAA Laboratory was disconnected and a 2½-gallon holdup tank installed for use of the sink, if necessary, in processing reactor liquid samples.

During February 2001, 112 gallons of wastewater were pumped to the new aboveground tank on February 16. Subsequently the piping length was measured and the piping, connections and supplies needed to complete work on the permanent pipe run for transferring wastewater from the indoor tank(s) to the outside aboveground tank were priced and plans made to obtain them for installation over the spring break in March 2001.

During early March 2001, equipment and parts were arranged for installing the piping run from the indoor storage tank to the aboveground outside holdup tank. The inside pipe run was installed on March 5 and the outside pipe run on March 6. On March 7, the pump was installed in the indoor holdup system with 48.9 gallons of water transferred to the aboveground outside tank as the system was leak checked and flow was verified. A mount was manufactured for the pump and the system was walked down for a final check on March 7. On March 8 the pump and suction nozzles were mounted with final adjustments and cleanup completed for this permanent pipe run for transferring wastewater from the indoor tank(s) to the outside aboveground tank. Visits by the Radiation Control Officer and radiation control technicians also occurred for accessing the underground tanks and removing sludge. On March 20, Dr. Vernetson left a message (unreturned) with NRC Inspector Stephen Holmes asking what to do about decommissioning the underground wastewater holdup tanks. Subsequently, on March 23, RCO D.L. Munroe spoke with the NRC Senior Project Manager for the UFTR who basically indicated the NRC doesn't do partial decommissioning; so then, tank decommissioning will have to await UFTR decommissioning as a decision must be made as to disposition of the underground tanks.

During April 2001, PPD supervisor Rod Clemmons, a representative of Petroleum Aids, Inc., EH&S Director W.S. Properzio, RCO D.L. Munroe and UFTR Director W.G. Vernetson met at the underground holdup tank site in the west lot to discuss closure options on April 5, 2001. In a memorandum dated April 6, 2001, D.L. Munroe recommended to W.S. Properzio

that the tanks not be filled to allow options to remain open when the UFTR finally generates a decommissioning plan. Subsequently, W.S. Properzio sent a memorandum dated April 6, 2001 to Interim Dean M.J. Ohanian indicating the problems with decommissioning the tank and trying to use existing fill material. A return memorandum from Interim Dean Ohanian dated April 10, 2001 basically accepts keeping options open on the tanks. Subsequently, W.S. Properzio, D.L. Munroe and W.G. Vernetson met on April 19, 2001 and discussed the status as current plans are to put a locked steel cover over the tanks until they are decommissioned. Installation of this steel cover will be the last activity in this area after which this project will be closed. Subsequently, on April 20, 2001, 107 gallons of holdup water were pumped from the indoor tank to the aboveground storage tank.

During May 2001, no work was accomplished as the College of Engineering agreed to pay for covers on the tanks to mothball them in place and remove the fence around them. Later communications clarified that the fence removal only applies to the inner fence around the openings to the tanks, not to the access fence.

During June 2001, RCO D.L. Munroe continued to work with the College of Engineering (Denis Mercier) to get the covers installed. In addition, there was some sampling of sludge previously removed from the underground tanks. Also, on June 6, 15 and 28, 107 gallons, 93 gallons and 120 gallons, respectively, of holdup water were pumped from the indoor tank to the aboveground storage tank at which point the storage tank was recirculated and samples taken for analysis on June 28, 2001.

During July 2001, the samples from the aboveground wastewater holdup tank were analyzed and assured to meet release criteria. When the water was being recirculated prior to release on July 9, the recirculation valve was noted to be leaking when not in a set position, though the valve was still usable. This problem was addressed separately under MLP #01-26; 798 gallons were released to the sanitary sewer on July 10. Subsequently, as wastewater was being transferred, the inside transfer pump was found to have a failed impeller which was replaced with a spare on July 11 but the pump still remained unusable to move water between the smaller and later in-cell tanks. This problem was corrected as replacement discharge valves were acquired and installed at the pump discharge on July 12. Subsequently, on July 23, 285 gallons of holdup wastewater from the inside tanks were transferred to the external aboveground wastewater holdup tank and the pump replacement impeller was verified to be operating properly. In addition, the covers were finally installed on July 11 to secure the in-ground holdup tanks for eventual decommissioning with RCO D.L. Munroe's agreement that all necessary work is complete on July 20.

During August 2001, on the 3, 16 and 31 of August, 122 gallons, 148 gallons and 158 gallons, respectively, of holdup water were pumped to the aboveground tank. In addition, records for this project were reviewed and assured complete to close out this project with no further problems noted.

Controlling Documents: Maintenance Log Page #99-19
10 CFR 50.59 Evaluation Number 00-01

3. Manufacture and Implementation of Replacement Set of Hurricane Rods (In Progress)

(Modification 00-03: Evaluation Completed 1 June 2000)

As time allowed, it was decided to begin constructing new permanent hurricane rods. Under MLP #99-43, specifications for construction methods, materials and an encapsulation epoxy were considered as Insulcast was contacted in January 2000 concerning proper adhesives and epoxies to be used. Recommended adhesive materials were ordered in January and received in February 2000 as aluminum tubing was also specified and sourced. The aluminum tubes were ordered in April and received on May 19, 2000. A drawing to support 10 CFR 50.59 Evaluation Number 00-03 (Manufacture and Implementation of Replacement Set of Hurricane Rods) involved some effort in May and early June as the modification package was finally approved by the RSRS on June 1, 2000. No actual construction had begun as of the end of October 2000. On November 13, 2000, the cadmium sheets and aluminum rods were cut and the adhesive and epoxy were tested. On November 14, 2000, mounting hardware was procured. No further work has occurred at year's end.

Controlling Documents: Maintenance Log Page #99-43 (Remains Open)
10 CFR 50.59 Evaluation Number 00-03

4. Modification to Primary Coolant Dump Valve Relay (Permanent – Closed Item)

(Modification 00-05: Evaluation Completed 10 October 2000)

For some time, a buzzing sound was noted when the dump valve was being reset. Under MLP #00-34, it was noted that the KA20 relay was buzzing on the reset. It was also noted that the console technical manual calls for the KA20 relay to be a 120 volt relay (KRP-14-AG-120) but the relay in the socket was a 240 volt relay (KRP-14-AG-240). Therefore, under 10 CFR 50.59 Evaluation Number 00-05 (Replacement of Dump Valve Relay), the KA20 relay was replaced with the proper KRP-14-AG-120 relay with the dump valve reset several times with no discernible buzzing and no further problems noted. The evaluation noted that any failure here would have resulted in opening the dump valve for a failsafe condition so this incorrect relay was evaluated to have no adverse effect on reactor safety as it has probably been installed as such for the length of the current reactor license.

Controlling Documents: Maintenance Log Page #00-34
10 CFR 50.59 Evaluation Number 00-05

5. Modification to Primary Coolant Dump Valve Solenoid (Permanent – Closed Item)

(Modification 00-06: Evaluation Completed 7 December 2000)

During the daily checkout, the primary coolant dump valve would not close. Under MLP #00-36, troubleshooting to check relays and contacts revealed an open fuse which was replaced but blew again. Subsequently, it was determined that the solenoid was failed so a new substitute solenoid was specified and the replacement was ordered under 10 CFR 50.59 Evaluation Number 00-06 (Replacement of Dump Valve Solenoid). Next an adapter bracket was made at the ISEE shop for the 15 amp valve solenoid. When the bracket and linkage was completed, the solenoid was installed but it failed after about one minute energization. A new linkage and modified bracket were then fabricated with a second solenoid installed with the dump valve tested satisfactorily on October 18. Subsequently, on October 19 the dump valve function was tested again as the primary coolant void time was checked and verified correct and a weekly and daily checkout completed satisfactorily with no further problems noted.

Controlling Documents: Maintenance Log Page #00-36
10 CFR 50.59 Evaluation Number 00-06

6. Modification to Two-Pen Recorder (Permanent – Closed Item)

(Modification 01-01: Evaluation Completed 1 February 2001)

On January 11, 2001, the reactor was run for six hours at power to provide a high gamma background after shutdown to allow compensating voltage adjustment on the compensated ion chamber as part of the UFTR Annual Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance). During the post-shutdown compensating voltage adjustment, the failure of the compensating voltage adjustment potentiometer combined with a frequently repaired two-pen recorder to result in a failed two-pen recorder. Under MLP #01-03 opened on January 12, 2001, the two-pen recorder drive system was found to be inoperable. Fortunately a replacement two-pen recorder was available, having been purchased under the 2000-01 DOE University Reactor Instrumentation Grant. However, as with the failed two-pen recorder when it was first installed, there was no installed source alarm circuit. Therefore, under MLP #01-03 and 10 CFR 50.59 Evaluation Number 01-01 (Replacement of Failed Two-Pen Recorder), the new recorder was evaluated, tested and installed, the source alarm circuit was analyzed and the necessary relay board was designed and constructed. Subsequently, the power supply and relay card for the source alarm were built and the source alarm relay card was installed with the necessary connector panel modification made behind the two-pen recorder. Subsequently, with the new two-pen recorder installed, the reactor was approved for low power operations to test the recorder operation on January 22, 2001. The first operation to 1 watt verified general performance. In a second operation to 1 watt, some instability was detected in the front end amplifier of the relay card during power decay so the output of the filter capacitor was scaled down. At this point, the LCOs were met with the instability located in the source alarm circuit which was

noted to actuate normally but not reset properly so the front end amplifier was changed out twice and the reactor operated to 1 watt each time with the instability corrected at the end of the day on January 22, 2001. Subsequently, a confirmation startup to 1 watt was conducted on January 23, 2001 to verify proper operation of the linear recorder including the source alarm circuit with the instability corrected. At this point, the compensating voltage potentiometer whose failure had precipitated electrical transients resulting in failure of the two-pen recorder, was replaced under MLP #01-04 on January 23, 2001. With successful completion of the precalorimetric adjustments on January 23, 2001 and closeout of MLP #01-03 for the two-pen recorder replacement and MLP #01-04 for replacement of the compensating voltage potentiometer, the reactor was approved for checks and power operations to continue the UFTR Nuclear Instrumentation Calibration Checks and Calorimetric Heat Balance (A-2 Surveillance) with no further problems noted in this area. The two-pen recorder failure event is not considered to be promptly reportable, especially since it occurred at shutdown conditions during compensating voltage adjustments. Although a first level modification package was necessary, the recorder is essentially a somewhat upgraded (essentially a duplicate) replacement for the failed recorder which also had required that a source alarm circuit be added when it was installed about ten years ago. This event is considered closed with closure of MLP #01-03 and MLP #01-04. This event was considered to have had no effect on the health and safety of the public or facility personnel and no effect on the safety of the reactor.

Controlling Documents: Maintenance Log Page #01-03
Maintenance Log Page #01-04
10 CFR 50.59 Evaluation Number 01-01

7. Modification to Picoammeter Amplifier Gain for Linear Channel Calibration (Permanent – Closed Item)

(Modification 01-02: Evaluation Completed 1 February 2001)

During the second run at power to complete the UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance) on January 25, 2001, the limit was reached in adjusting the linear channel gain via the R34 potentiometer with further adjustment needed so the A-2 Surveillance was not complete which has occurred in a number of previous performances of the A-2 Surveillance at approximately four to five year intervals. Per the console manual, the requirement is then to replace the gain resistor to allow further adjustment. The proper resistor was ordered and subsequently under MLP #01-05 and 10 CFR 50.59 Evaluation Number 01-02 (Resistor Change to Increase Gain of Picoammeter A2 Amplifier to Facilitate Linear Channel Calibration), the picoammeter was removed from the console and the R25 resistor (154 KΩ 1%) was replaced with a 143 KΩ 1% resistor to increase the gain of picoammeter A2 amplifier. Subsequently, the picoammeter was reinstalled into the console on January 29, 2001 and the A1 and A2 amplifiers balanced. After final adjustments and checks, the resistor substitution was verified to be correct with no further problems noted as the reactor was approved for repeating the precalorimetric checks and performance of the A-2 Surveillance.

Controlling Documents: Maintenance Log Page #01-05
10 CFR 50.59 Evaluation Number 01-02

8. Modification to Replace Temperature Recorder/Monitor (Permanent –Closed Item)

(Modification 01-03 Evaluation and Determination Completed 15 March 2001)

After a power operation beginning with a startup at 0945 hours and reaching full power at 1003 hours for a six hour power run conducted to provide a sufficient gamma background after shutdown to allow compensating voltage adjustment on the compensated ion chamber as part of the continuing UFTR Annual Nuclear Instrumentation and Calibration Check and Calorimetric Heat Balance (A-2 Surveillance), the temperature monitor recorder began to indicate poorly though temperature trends were still being indicated. Subsequently, as the temperature monitor failed to indicate properly, an unscheduled shutdown was begun at 1155 hours with the reactor shutdown and secured at 1157 hours with all safety and control systems operating and responding properly with no other problems noted but the temperature monitor recorder requiring repair with no impact on reactor safety or the health and safety of the public or facility personnel per the completed UFTR Form SOP-0.6B (Unscheduled Reactor Shutdown and Evaluation). Subsequently, under MLP #01-06, troubleshooting was begun to troubleshoot and repair the temperature monitor recorder with no results at month's end.

During February 2001, several days were spent troubleshooting and attempting to repair the temperature monitor recorder as the systems were analyzed and available options delineated. The decision was finally made that the temperature monitor was not repairable on February 5 so the decision was made to install the spare temperature monitor recorder bought as a replacement under the 1992-93 DOE instrumentation grant. Unfortunately the digital monitor requires considerable engineering to be usable as a replacement, especially since the monitor provides the temperature warning and trips on high temperature for the reactor protection system. Subsequently, the necessary equipment and software needs were specified in consultation with National Instruments and ordered. As the Labview software package, software manual and hardware were obtained throughout the month, the necessary software was developed and was begun to be integrated with the hardware. On February 26 the old temperature monitor/recorder was removed and the necessary physical support structure designed and installed to support the new temperature monitor printer. On February 28 the stack monitor alarm bell was repositioned to make room for the new recorder as the aluminum mounting material was measured and cut at month's end to construct the mounting bracket. At the end of February, the new temperature monitor recorder was ready to be mounted as software development and integration with the hardware continued.

The status of this modification and the use of computer software to generate high temperature trips were discussed with the NRC Project Manager on February 22, 2001. In essence he indicated they will inspect based on what we decide in a 10 CFR 50.59 modification package though he does not see that any new safety question is involved.

Provided that the UFTR internal 10 CFR 50.59 review at Level 2 is negative and no change of Tech Specs is needed, then NRC will simply inspect the modification package and the Tech Specs on the next visit with no necessity to submit anything to NRC for review.

During March 2001, hardware and software integration efforts continued along with software development. Support angle aluminum was also installed to support the new mechanical recorder. Much effort was also spent testing inputs and the software as it was being developed. A detailed modification package was developed (10 CFR 50.59 Evaluation and Determination Number 01-03, "Temperature Recorder/Monitor Replacement Including Software Generated Trip Function") and presented to the Reactor Safety Review Subcommittee (RSRS) at its meeting on March 15 where it was approved. This included a memorandum dated March 13, 2001 on the replacement as well as an augmented memorandum on safety-related issues for consideration. The new computer-based monitor/recorder was installed along with the thermal couple junction strip on March 21. Subsequently, all hardware was installed and checked and the system calibrated with installation of strain supports on the thermocouple wire and a ground strap essentially completing the necessary installation and checkout of the new temperature monitor/recorder system at the end of March as the interrupted annual calibration of nuclear instruments and other delayed surveillances were to be performed in the coming month as this major project was nearing completion. A complete restart plan in the form of a memorandum was developed to assure an orderly return to normal operations and that no required tests or surveillances would be missed.

During April 2001, the precalorimetric checks and adjustments part of the A-2 Surveillance were completed on April 2 and the first power operation for compensating voltage adjustment was conducted on April 3 with the computer-based temperature monitor/recorder verified to be operating properly so that the MLP #01-06 for this modification could be closed out on April 3. Subsequently, a special power run was undertaken on April 10, under the reopened MLP #01-06 to verify the proper operation of the mechanical temperature recorder which is essentially extra unrequired equipment that will be useful for input to student laboratory exercises. The MLP #01-06 was then closed permanently on April 10, 2001 with no problems noted in operation of the computer-based temperature monitor/recorder or the mechanical recorder.

Controlling Documents: Maintenance Log Page #01-06
10 CFR 50.59 Evaluation and Determination Number 01-03

9. Modification to Source Alarm Power Supply (Permanent – Closed Item)

(Modification 01-04 Evaluation Completed 14 June 2001)

While performing low power reactor operator training operations for Laboratory Exercise #5, the 100 watt power level was reached at 1124 hours after commencing startup at 1051 hours. Subsequently, at 1129 hours, the 100 watt source alarm was checked at 100 watts and found to be inoperable. Following an unscheduled shutdown begun at 1130 hours and completed at

1132 hours, under MLP #01-15, the source alarm power supply was found to be failed and was replaced with an on-hand equivalent spare per 10 CFR 50.59 Evaluation Number 01-04 (Source Alarm Power Supply Replacement) with the source alarm verified operational and a daily checkout completed successfully at 1640 hours with restart approved with no further problems noted. Completed UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) is available for review. The source alarm was also verified operable as usual during the subsequent weekly checkouts on May 21 and May 29. This event was not considered promptly reportable since the unscheduled shutdown was undertaken immediately upon discovery; in addition, the source alarm had not been needed since last verified operable on May 7, 2001 during the weekly checkout since the source had not been used. Therefore, this occurrence was considered to have had negligible impact on reactor safety or the health and safety of reactor personnel or the public.

Controlling Documents: Maintenance Log Page #01-15
10 CFR 50.59 Evaluation Number 01-04

10. Modification to Temperature Monitor (Permanent – Closed Item)

(Modification 01-05 Evaluation Completed 2 August 2001)

A new large screen monitor was acquired to upgrade the temperature monitor computer monitor to provide more easily viewed operator input. Under MLP #01-23 and 10 CFR 50.59 Evaluation Number 01-05 (Upgrade Temperature Monitor Computer 15" Monitor with 21" Monitor), the new larger monitor was installed and tested to replace the smaller monitor with no problems noted.

Controlling Documents: Maintenance Log Page #01-23
10 CFR 50.59 Evaluation Number 01-05

11. Modification to Fire Alarm Monitoring System (Permanent – Open Item)

(Modification 01-06 Evaluation Completed 2 August 2001)

On July 12, 2001 alarm systems supervisor Skip Rockwell and technician Wayne Gravely visited the facility to discover where new air handlers/coolers were to be installed. Mr. Rockwell returned on July 13 to indicate new larger capacity air handlers/coolers were to be installed in the non-reactor section of the annex with two new smoke detectors needed to be installed on the air handlers by the fire code. Subsequently, 10 CFR 50.59 Evaluation Number 01-06 (Fire Alarm System Zone 4 Upgrade) was developed with input from Mr. Rockwell and PPD project supervisor Tim Noland and approved as of July 23, 2001. Subsequently, under MLP #01-30, this project was started with delivery of equipment and preliminary installation work occurring on July 30 with work continuing throughout August under PPD Project Manager Tim Noland. The new air handler was functional for cooling as of August 9, 2001 with preliminary checks on installation of Zone 4 smoke detectors

performed on August 16 as the fire alarm system was taken out of service (compensated) briefly by PPD Alarm Systems technician W. Gravely. Subsequently, the system was taken out of service for about an hour as the smoke detectors were installed, verified operational and the fire alarm system returned to service by W. Gravely on August 21. The remainder of the month was spent completing duct work, installing a lock system on the new air handler closet and conducting an essential completion check with some minor items indicated yet to be completed at year's end.

Controlling Documents: Maintenance Log Page #01-30 (Remains Open)
10 CFR 50.59 Evaluation Number 01-06

V. SIGNIFICANT MAINTENANCE, TESTS AND SURVEILLANCES OF UFTR REACTOR SYSTEMS AND FACILITIES

A review of records for the 1984-85 reporting year shows extensive corrective and preventive maintenance was performed on all four control blade drive systems external to the biological shield. Similarly maintenance work during the 1985-86 reporting year was even more extensive as the problem of a sticking safety blade (S-3) recurred on September 3, 1985. The recurrence necessarily demanded a detailed and complete check of all control blade drive systems to determine finally and correct the cause of the sticking blade internal to the biological shield with the 1986-87 reporting year involving relatively little maintenance and no large maintenance projects.

For the 1987-88 reporting year, there were two dominant though manageable maintenance projects. The first large scale maintenance project during the 1987-88 reporting year involved an extensive effort to clean the control blade drive motor gear assemblies to free them of hardened grease and replace worn bearings. The second large scale project involved the evaluation, corrective action, testing and monitoring of the two safety channels due to two occurrences of the downscale failure of the Safety Channel 1 meter indication (and probably the function). This was the largest maintenance effort since the control blade drive system maintenance performed internal to the biological shield in the 1985-86 reporting year. The 79.2% availability for the 1987-88 year indicated more or less routine maintenance and surveillance checks and tests throughout the year except for the two large projects cited above.

For 1988-89, the availability was up to 87.67%. Of the 45 equivalent full days of unavailability, only 28.25 days were actually due to forced unavailability primarily due to corrective maintenance for repairs. There was no single project dominating unavailability, though multiple maintenance tasks on the two-pen recorder and on the Radiation Monitoring System clearly warranted consideration of replacing these items when funds could be made available.

Maintenance efforts in the 1989-90 reporting year increased again so that total availability for the year was only 68.84%. Especially significant efforts were devoted to checks, repairs, surveillances and other maintenance activities connected with the biennial fuel inspection resulting in a two-month outage, part of which was due to the final failure and subsequent replacement of the two-pen log/linear recorder. Though no other single maintenance effort was really large, there was considerable effort devoted to Safety Channel and other control and reactor protection system-related repairs during the year both for repairs following trips or other failures and for preventive maintenance. Certainly, the 113.75 total days unavailability (31.16% unavailability) was one of the poorer records in recent years.

Although availability in the 1990-91 reporting year was not as high as hoped, it was greatly improved as there were 93 days forced unavailability, 1.25 days planned unavailability and 23.25 days of administrative shutdown. Primary sources of forced outage time were replacement of seals and connectors on the primary coolant system and extensive maintenance performed to complete the nuclear instrumentation calibration. These values were somewhat elevated, especially administrative shutdown time, by the lack of a full-time Reactor Manager and lack of replacement part inventory

along with a shortage of licensed personnel, especially senior reactor operators over the last six months of the year.

Although no permanent Reactor Manager was able to be hired in the 1991-92 reporting year, two new part-time student senior reactor operators (SROs) were licensed and certified on October 17, 1992. Although availability in the 1991-92 reporting year was not as high as had been hoped, availability was again improved significantly as there were only 72.25 days forced unavailability, 4.25 days planned unavailability and 23.50 days of administrative shutdown. The 76.50 days total unavailability (20.90% unavailability) for maintenance is approximately average for the past decade. Again, these values for unavailability were elevated by the lack of a full-time Reactor Manager, especially early in the reporting year before certification of the two new SROs. With the appointment of a part-time Acting Reactor Manager on August 11, 1992, this situation improved in the next reporting year.

Although there were no large maintenance projects for the 1991-92 year, several major projects contributed to forced unavailability. First, and most significantly, two failures of the thermocouple connections to the south center fuel box were responsible for over 31 days of forced unavailability. Similarly, various failures related to the nuclear instrumentation system, including Safety Channel 2 trip indication, Safety Channel 2 meter circuit, Safety Channel 1 +15 volt and high voltage power supplies and the control blade position indicating circuits as well as replacement of bearings and pillow blocks for the stack diluting fan and the motor on the deep well pump were responsible for significant amounts of forced unavailability. As is indicated, these four areas account for most of the forced unavailability for the 1991-92 reporting year with the failed thermocouple connections and the safety channels meriting the most concern for preventive maintenance.

Although a permanent Reactor Manager was not hired until July 1993, the availability of part-time operators was good throughout the 1992-93 reporting year. Availability in the 1992-93 reporting year returned to a high level as there were only 22.63 days forced unavailability, 12.63 days planned unavailability and 11.50 days of administrative shutdown. The 35.25 days total unavailability (9.66% unavailability) for maintenance is one of the best in ten years. With appointment of a full-time Reactor Manager in July 1993 it was hoped this situation could be improved even further in the next year though much would depend on support for part-time personnel. Significant sources of forced unavailability for the 1992-93 reporting year were repair of deep well pump piping, adjustment and repair of Safety Channel 1 during the annual calibration and repair of the north side core area thermocouple connections and replacement of wiring following failure of temperature point #4 plus repeated small outages and several unscheduled shutdowns due to failures of the control blade position indicators/indicator circuits with an effort planned to replace these nixie tube systems in the next reporting year.

With a full-time Reactor Manager available for the full 1993-94 reporting year, good availability of other licensed and unlicensed personnel and no large maintenance efforts, availability for the 1993-94 reporting year was even better than in the previous year. There were only 21.38 days forced unavailability, 13.25 days planned unavailability and 3.00 days of administrative shutdown. Significant sources of forced unavailability were to check out and verify proper detector current and operation of the compensated ion chamber and linear (red) pen following failure due to excessive moisture in October 1993, to check, locate and correct erratic response in the Safety-3 control blade

position indicating (BPI) circuit in December 1993 and January 1994, to locate and correct an open circuit in the Safety-3 control blade drive circuit in January/February 1994, and to replace the intermittently failing shield tank water level trip magnetic reed switch in February 1994. The replacement of the nixie tube indicators in the control blade position indicating circuits in June 1994 promised to reduce forced outages from failures of the BPI circuits in the future.

With a full-time Reactor Manager again available for the full 1994-95 reporting year, reasonable availability of other licensed and unlicensed personnel and a limited number (3) of medium length forced outages, availability for the 1994-95 reporting year was only slightly reduced to 88.15% from the previous year. There were 26.50 days forced unavailability, 11.75 days planned unavailability and 5.00 days administrative shutdown. The three significant sources of forced unavailability were for the outage to address the anomalous primary coolant resistivity drop in March 1995, for the outage to remove debris and perform checks of the primary coolant system return line flow trip switch following removal of debris in June 1995, and finally for the outage to repair the automatic flux controller in August 1995 and which was still in progress at year's end.

With a full-time Reactor Manager again available for most of the 1995-96 reporting year, limited somewhat by family illness until resigning the position effective August 9, 1996, and with reasonable availability of other licensed and unlicensed personnel, but with several (3) medium length forced outages plus considerable planned outage time for roof repair, availability for the 1995-96 reporting year was somewhat reduced to 75.68% from the previous year. There were 44.875 days forced unavailability, 41.875 days planned unavailability and 2.25 days administrative shutdown. The three significant sources of forced unavailability were for the continued outage at the beginning of the year in September 1995 for the outage to repair the automatic flux controller begun in August 1995, for the outage to repair the linear (red) pen circuit in October 1995, and for the outage to troubleshoot and repair the Safety Channel 2 loss of high voltage monitoring circuit in April 1996 and again in July 1996. There was also significant planned outage time for the year for two surveillances to complete the inspection of mechanical integrity of the control blade drive systems internal to the biological shielding (V-1 Surveillance) in December 1995 and the biennial inspection of incore fuel elements (B-2 Surveillance) in August 1996. Similarly, the contract work to replace and then repair the reactor building roof involved considerable planned unavailability throughout the 1995-96 year and was still in progress at the end of the 1995-96 year.

With a full-time Reactor Manager only available for about three months beginning in late December 1996 until March 28, 1997, plus the loss of one part-time SRO and the licensing of another in midyear leading to somewhat restricted availability of licensed as well as unlicensed personnel, plus considerable forced outage time for replacement of failed equipment and some planned outage time for conducting and improving the annual calibration checks of nuclear instrumentation, availability for the 1996-97 reporting year was further reduced to 62.20% from 75.68% the previous year. There were 102.25 days forced unavailability, only 16.625 days planned unavailability and 4.50 days administrative shutdown. The three most significant sources of forced unavailability were for the outage to replace the failed compensated ionization chamber (CIC) with the uncompensated ionization chamber (UIC) run in CIC mode, to obtain a new UIC, to replace the connectors and cables on both detectors and then test and assure proper calibration of the nuclear instruments in September to December 1996 (72.875 days); for replacement of the shield tank demineralizer system pump including flow circuit rearrangement in July/August 1997 (20.875 days);

and replacement of a failed reed switch in the primary coolant level trip circuit in July 1997 (2.75 days). There was also significant planned outage time for the year to make adjustments and rework the annual calibration of nuclear instrumentation (A-2 Surveillance) in March 1997 (10 days) plus continuing periodic contract work to replace and then repair/upgrade the reactor building roof until June 1997 (4.75 days).

With a full-time Reactor Manager not available at all for the 1997-98 reporting year plus the extended outage beginning in May 1998, the hiring of two SRO-trainees did not result in the licensing of any new operators for the 1997-98 year resulting in continued somewhat restricted availability of licensed as well as unlicensed personnel, plus considerable forced outage time— some involving failed equipment but the vast majority to investigate the cause of the reactivity anomaly resulting in higher than expected critical regulating blade position. There was also some planned outage time, mostly for conducting and improving the annual calibration checks of nuclear instrumentation. Therefore, availability for the 1997-98 reporting year was further reduced to 58.29% from 62.20% the previous year. There were 131.375 days forced unavailability, only 13.375 days planned unavailability and 7.50 days administrative shutdown. The most significant source of "forced" unavailability was the outage to investigate the reactivity anomaly lasting from the beginning of May through the end of the year in August (122.25 days). Only two other sources of forced outage time accounted for over two days; repair of the failure of the Safety Channel 2 high voltage power supply loss of high voltage trip (2.875 days) and replacement of a failed reed switch on the primary coolant return line flow sensor (2.875 days), both in April 1998. Several pieces of maintenance would have involved significant forced outage in the last few months of the year except the reactor was already unavailable due to addressing the reactivity anomaly. There was also significant planned outage time for the year to make adjustments and perform the annual calibration of nuclear instrumentation (A-2 Surveillance) in March 1998 (10.75 days).

With no full-time Reactor Manager for the entire1998-99 reporting year plus the outage for the reactivity anomaly extending until return to normal operations on August 17 (regular operations began on August 9 but delayed operations training had to be conducted), neither of the two SRO-trainees was able to be licensed with most of the year's outage attributed to addressing the reactivity anomaly and returning the UFTR to normal operating status after completing all required surveillances as well as delayed annual reactor operations tests. Therefore, availability for the 1998-99 reporting year was further reduced to only 4.01% from 58.29% in the previous year. Basically, there were 348.625 days forced unavailability, 0.375 days planned unavailability (in August 1999) and no days administrative shutdown as such. Of course, this forced unavailability was essentially all to address investigation of the reactivity anomaly though a number of other events during the year could have impacted unavailability had the reactor been in an operational status.

With a 90% full-time Acting Reactor Manager for the entire 1999-2000 reporting year and successful recovery from the outage to address the reactivity anomaly for most of the previous year plus licensing of a new senior reactor operator from February 15, 3000 through the end of the reporting year, availability was restored to relatively high levels. Availability for the 1999-2000 reporting year was increased to 88.19% from 4.01% in the previous year. Basically, there were 20.875 days forced unavailability, 14.500 days planned unavailability and 8.250 days administrative shutdown. The forced unavailability was primarily due to repairs on the failed temperature monitor (11 days in October and 1¼ days in June) plus repair of the failed auxiliary stack monitor

meter/alarm (2⅞ days), repair of the failed green pen mount on the two-pen recorder (1⅛ days) and replacement/cleaning and reseating relays to address failure of the dump valve to close. The only significant planned outages for the 1999-2000 reporting year were to replace/upgrade overhead lighting in the cell/control room (3½ days) and then to make adjustments and perform the annual calibration of nuclear instrumentation (A-2 Surveillance).

With a 90% full-time Acting Reactor Manager again for the entire 2000-2001 reporting year, availability of personnel was maintained during the year though one half-time SRO resigned for a well-paying industry position in December 2000. The various outages for the year made it difficult to train new operators so no new operators were licensed during the year. However, with one 5/8-time operator-trainee available for the whole year and another available from mid-January 2001 to the end of the year, personnel availability was good. Unfortunately, forced outages presented a problem. Availability for the 2000-2001 reporting year was decreased to 58.47% from 88.19% in the previous year. Basically, there were 128.625 days forced unavailability, 15.250 days planned unavailability and 7.000 days administrative unavailability. The large number of days of forced unavailability was primarily due to a series of equipment failures for a broken primary coolant rupture disk (3⅞ days in September 2000), repair of the solenoid on the PC dump valve (10¼ days in October 2000), replacement of a failed two-pen recorder (12 days in January 2001), repair and eventual replacement of failed temperature monitor/recorder with computer-based system (61⅞ days in January–April 2001), and troubleshooting to evaluate and repair failed wide range drawer (36 days in July–August 2001) extending into the next reporting year. The only significant planned outage for the year was to make adjustments and perform the annual calibration of nuclear instrumentation (A-2 Surveillance) (12 days in January and April 2001) spread out due to two-pen recorder and temperature monitor/recorder failures.

In the tables that follow, all significant maintenance, tests and surveillances of UFTR reactor systems and facilities are tabulated and briefly described in chronological order; these tabulations also include administrative checks. Table V-1 contains all regularly scheduled surveillances, tests or other checks and maintenance required by the Technical Specifications, NRC commitments, UFTR Standard Operating Procedures, or other administrative controls; these items are normally delineated with a prefix letter and a number for tracking purposes. The number of these surveillances increases each year as the UFTR Quality Assurance Program matures and requirements become more restrictive.

A listing of all the maintenance projects required to repair a failed system or component or to prevent a failure of a degraded system or component is presented in Table V-2. These maintenance efforts are frequently not scheduled though they can be when a problem is noted to be developing and preventive actions are implemented. In addition, they frequently are associated with reactor unavailability. Finally, these maintenance items can be associated with surveillances, checks or test items listed in Table V-1 since some of these scheduled surveillances are also required to be performed on a system after the system undergoes maintenance. For example, when the area monitor check sources or detectors are the subject of preventive or corrective maintenance as listed in Table V-2, the Q-2 calibration check of the area monitors must be completed as listed in Table V-1 before the reactor is considered operable. Similarly, when maintenance is performed on the control system, various surveillances such as control blade drive time and drop time measurements must be performed satisfactorily before the reactor can return to normal operations.

In Table V-2 the first date for each entry is the date when the Maintenance Log Page (MLP) was opened; in quite a few cases, this date may be one or more days after the original problem was noted. The date for work completion and the MLP number are included at the end of the maintenance description. As a result, in some years the first items listed in Table V-2 can have a starting date prior to the beginning of the current reporting year as the maintenance could be completed in a subsequent reporting year. This is the case for the first seven entries in Table V-2 which involved maintenance in progress at the end of the 1999-2000 reporting year; indeed the first item was opened during the 1993-94 reporting year as MLP #94-14 used to control planned installation of a new area radiation monitoring system. Two of these seven entries (MLP #99-19 to address replacement of wastewater holdup tanks and MLP #00-23 to address repair of the mechanical tach-generator rpm indication) were closed out during the current 2000-2001 reporting year. Nevertheless, work under MLP #94-14 is still not completed, just postponed; the same is true of MLP #96-30 to control repair and upgrade of the security system, MLP #00-07 to control repairs to the motor-operated city water valve and MLP #00-09 to control replacement of the auxiliary stack monitor meter/alarm mechanism. Work under MLP #99-43 to control production of new hurricane rods has been progressing though delayed somewhat.

Similarly, nine Maintenance Log Pages remain open at the end of the current 2000-2001 reporting year: MLP #94-14 to control installation of a new area radiation monitoring system, MLP #96-30 to control repair and upgrade of the security system, MLP #99-43 to control construction of new hurricane rods, MLP #00-07 to control repair of the motor-operated city water valve, MLP #00-09 to design a new auxiliary stack monitor/meter alarm system, MLP #01-13 to repair the AIM3BL air particulate detector chart recorder, MLP #01-14 to address repair of the mechanical tach rpm indication for the dilute fan, MLP #01-29 to address the failure of the wide range drawer, and MLP #01-30 to address installation of upgrade changes in Zone 4 of the fire alarm monitoring system. It is expected that MLP #94-14, MLP #96-30, MLP #00-07 and MLP #01-29 will be open for some time as implementation of the new area radiation monitoring system is a major modification, upgrade of the security system will be time consuming and expensive, repair of the motor-operated city water valve requires relatively expensive parts and repair of the wide range drawer will require extensive troubleshooting and possible detector replacement, with only repair of the wide range drawer currently a high priority. However, MLP #99-43, MLP #00-09, MLP #01-13 and MLP #01-30 should all be closed out relatively early in the next reporting year, though these are all of relatively low significance. Finally, MLP #01-14 for the mechanical tach rpm indication should be closed out also as the mechanical tach-generator is to be removed as unnecessary with the reliable operation of the equivalent hall effect tachometer being demonstrated sufficiently.

TABLE V-1

CHRONOLOGICAL TABULATION AND DESCRIPTION OF SCHEDULED UFTR SURVEILLANCES, CHECKS AND TESTS

Date		Surveillance/Check/Test Description
1 Sep 00	S-12	Semiannual Review of Requalification Training Program Binders (Due 1 July 2000).
5-7 Sep 00	S-2	Annual Reactivity Measurements (Worth of Control Blades, Total Excess Reactivity, Reactivity Insertion Rate and Shutdown Margin) (Completion of Data Reduction and Documentation with Generation of Memorandum on Use of New Reactivity Worth Curves) (Due 7 July 2000).
5-18 Sep 00	Q-6	Quarterly Check of Posting Requirements (Included Updating and Posting New Control Blade Worth Curves, New Limit on Energy Generation Per Argon-41 Measurements, New Memo on Individuals Approved to Carry Cell Keys for Emergency Response) (Due 22 August 2000).
7 Sep 00	S-7	Semiannual Check (Replacement) of Security System Batteries (Partial to Replace 4V Rechargeable Batteries) (Not Due).
15 Sep 00	B-3	Biennial Evaluation of UFTR Standard Operating Procedures Manuals for Completeness (Completion of RSRS Information Copies #3 and #4) (Due 30 September 1999).
18 Sep 00	Q-1	Quarterly Check of Scram Functions (Due 31 August 2000).
19 Sep 00	A-3	Annual Measurement of UFTR Temperature Coefficient of Reactivity (Partial—Completed Data Acquisition Measurements) (Due 5 August 2000).
29 Sep 00	A-5	Annual Update of UFTR Decommissioning Cost Estimates (Due 31 July 2000).

TABLE V-1

CHRONOLOGICAL TABULATION AND DESCRIPTION OF SCHEDULED UFTR SURVEILLANCES, CHECKS AND TESTS

Date		Surveillance/Check/Test Description
3-4 Oct 00	S-6	UFTR Semiannual Security Plan Key Inventory (Due 1 October 2000).
4 Oct 00	Q-7	Quarterly Check of UFTR Building Fire Alarm System (Zone 3 – Upstairs Offices and Laboratories) (Due September 30, 2000).
8 Oct 00	Q-8	Quarterly Report of Safeguards Events (Due 1 October 2000).
11 Oct 00	S-3	Semiannual Inventory of Special Nuclear Material (Due 1 October 2000).
11/31 Oct 00	B-3	Biennial Evaluation of UFTR Standard Operating Procedures Manuals for Completeness (Completion of RSRS Information Copies #1 and #2 and Final Documentation of B-3 Surveillance) (Due 30 September 1999).
4-24 Oct 00	A-3	Annual Measurement of UFTR Temperature Coefficient of Reactivity (Completion of Calculations, Review and Documentation of Results) (Due 5 August 2000).
25 Oct 00	S-8	Semiannual Leak Check of Neutron Sources (Due 27 October 2000).
26 Oct 00	Q-3	Quarterly Radiological Emergency Evacuation Drill (Due September 30, 2000).
10 Nov 00	S-7	Semiannual Check (Replacement) of Security System Batteries (Partial to Replace Rechargeable Batteries) (Not Due)
22 Nov 00	Q-4	Quarterly Radiological Survey of Unrestricted Areas (Due 31 October 2000).
22 Nov 00	Q-5	Quarterly Radiological Survey of Restricted Areas (Due 31 October 2000).
26/27 Nov 00	Q-6	Quarterly Check of Posting Requirements (Due 30 November 2000).
30 Nov 00	Q-2	Calibration Check of Area and Stack Radiation Monitors (Due 31 October 2000).
30 Nov 00	Q-9	Quarterly Calibration Check of Air Particulate Detectors (AIM3BL and AMS^4) (Due 31 October 2000).

TABLE V-1

CHRONOLOGICAL TABULATION AND DESCRIPTION OF SCHEDULED UFTR SURVEILLANCES, CHECKS AND TESTS

Date		Surveillance/Check/Test Description
10-12 Dec 00	B-6	Biennial Evaluation of Emergency Plan (Partial) (Due 12 December 2000).
14 Dec 00	Q-3	Quarterly Radiological Emergency Evacuation Drill (Large Annual Drill Involving Outside Agencies) (Due 31 December 2000).
15/17 Dec 00	S-10	Semiannual Check and Update of Emergency Call Lists (Partial for SRO G. Macdonald Departure) (Due 31 December 2000).
28 Dec 00	Q-1	Quarterly Check of Scram Functions (Due 30 November 2000).
28 Dec 00	S-1	Measurement of Control Blade Drop Times (Due 24 November 2000).
28 Dec 00	S-5	Measurement of Control Blade Controlled Insertion Times (Due 24 November 2000).
28 Dec 00	S-11	Semiannual Replacement of Control Blade Clutch Current Light Bulbs (Due 24 November 2000).
29 Dec 00	Q-7	Quarterly Check of UFTR Building Fire Alarm System (Zone 4 – Annex) (Due 31 December 2000).
29 Dec 00	S-7	Semiannual Check (Replacement) of Security System Batteries (Due 25 November 2000).
29 Dec 00	S-9	Semiannual Replacement of Well Pump Fuses (Due 31 December 2000).
2/24/29 Jan 01	Q-3	Quarterly Radiological Emergency Evacuation Drill (Large Annual Drill Involving Outside Agencies) (Follow-up Documentation) (Due 31 December 2000).
5 Jan 01	Q-8	Quarterly Report of Safeguards Events (1 Event) (Due 1 January 2001).
9/31 Jan 01	S-10	Semiannual Check and Update of Emergency Call Lists (Due 31 December 2000).
8-31 Jan 01	A-2	UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (Not Due – Incomplete Due to Temperature Recorder Failure at Month's End).
26 Jan 02	Q-6	Quarterly Check of Posting Requirements (Not Due – Partial to Post 2000-01 Gainesville Telephone Directories and UF Campus Telephone Directories).

TABLE V-1

CHRONOLOGICAL TABULATION AND DESCRIPTION OF SCHEDULED UFTR SURVEILLANCES, CHECKS AND TESTS

Date		Surveillance/Check/Test Description
22 Feb 01	Q-2	Quarterly Calibration Check of Area and Stack Radiation Monitors (Due 31 January 2001).
22 Feb 01	Q-9	Quarterly Calibration Check of AIM3BL Air Particulate Detector (Due 31 January 2001).
22/23 Feb 01	Q-9	Quarterly Calibration Check of AMS^4 Air Particulate Detector (Due 31 January 2001).
28 Feb 01	Q-4	Quarterly Radiological Survey of Unrestricted Areas (Shutdown Conditions) (Due 31 January 2001).
28 Feb 01	Q-5	Quarterly Radiological Survey of Restricted Areas (Shutdown Conditions) (Due 31 January 2001).
1 Mar 01	S-12	Semiannual Review of Requalification Training Program Binders (Due 1 January 2001).
19 Mar 01	Q-6	Quarterly Check of Posting Requirements (Due 26 February 2001).
29 Mar 01	Q-1	Quarterly Check of Scram Functions (Due 28 February 2001).
29 Mar 01	Q-7	Quarterly Check of UFTR Building Fire Alarm System (Zone 1–Reactor Cell and Control Room) (Due 29 March 2001).
29 Mar 01	A-4	Annual Check/Replacement of Fire Alarm System Monitoring Station Batteries (Due 31 March 2001).
2-4 Apr 01	A-2	UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (Not Due – Previously Incomplete Due to Temperature Recorder Failure on January 31, 2001) (Required for Return to Normal Operations).*
3 Apr 01	Q-5	Quarterly Radiological Survey of Restricted Areas (for Return to Normal Operations) (Due 31 January 2001).*
3 Apr 01	Q-4	Quarterly Radiological Survey of Unrestricted Areas (for Return to Normal Operations) (Due 31 January 2001).*
4 Apr 01	S-4	Measurement of Argon-41 Stack Concentration (Includes Measurement of Dilution Air Flow Rate—Previously A-2 Surveillance) (Due 31 January 2001).*
9 Apr 01	S-3	Semiannual Inventory of Special Nuclear Material (Due 1 April 2001).

TABLE V-1

CHRONOLOGICAL TABULATION AND DESCRIPTION OF SCHEDULED UFTR SURVEILLANCES, CHECKS AND TESTS

Date		Surveillance/Check/Test Description
9/11 Apr 01	S-6	UFTR Semiannual Security Plan Key Inventory (Due 1 April 2001).
10 Apr 01	Q-6	Quarterly Check of Posting Requirements (Partial to Post Updated List of Personnel Allowed to Carry Cell Keys During Drills and Emergencies) (Not Due).
12 Apr 01	Q-3	Quarterly Radiological Emergency Evacuation Drill (Due 14 March 2001).
11/13 Apr 01	Q-8	Quarterly Report of Safeguards Events (1 Event) (Due 1 April 2001).
18 Apr 01	S-8	Semiannual Leak Check of Neutron Sources (Due 25 April 2001).
20 Apr 01	A-6	Physical Inventory of Security-Related Locks/Cores (Due 31 March 2001).
25 Apr 01	Q-2	Quarterly Calibration Check of Area and Stack Radiation Monitors (Due 30 April 2001).
26 Apr 01	Q-9	Quarterly Calibration Check of AIM3BL Air Particulate Detector (Due 30 April 2001).
26 Apr 01	Q-9	Quarterly Calibration Check of AMS4 Air Particulate Detector (Due 30 April 2001).
27 Apr 01	A-1	Instrument and Test Equipment Calibration (Preparations for Shipment Only) (Due 31 January 2001).
2 May 01	A-1	Instrument and Test Equipment Calibration (Fluke 87III Multimeter, Omega Thermocouple Reader and Kurz Minianemometer Shipped) (Due 31 January 2001).
2 May 01	Q-6	Quarterly Check of Posting Requirements (Partial to Post Updated Memorandum on Energy Generation Limits) (Not Due).
22 May 01	S-7	Semiannual Check (Replacement) of Security System Batteries (Due 30 April 2001).
22 May 01	A-1	Instrument and Test Equipment Calibration (Fluke 87III Multimeter and Omega Thermocouple Reader Returned Calibrated) (Due 31 January 2001).

TABLE V-1

CHRONOLOGICAL TABULATION AND DESCRIPTION OF SCHEDULED UFTR SURVEILLANCES, CHECKS AND TESTS

Date		Surveillance/Check/Test Description
8-14 Jun 01	B-5	Biennial Evaluation and Recertification of Licensed Operators (Due 31 December 2000).
10/13 Jun 01	B-6	Biennial Evaluation of Emergency Plan (Completion of Documentation) (Due 12 December 2000).
18/19 Jun 01	Q-1	Quarterly Check of Scram Functions (Due 31 May 2001).
20 Jun 01	A-1	Instrument and Test Equipment Calibration (Receipt of Kurz Minianemometer and Completion of Surveillance Documenta-tion) (Due 31 January 2001).
25 Jun 01	S-1	Measurement of Control Blade Drop Times (Due 31 May 2001).
25 Jun 01	S-5	Measurement of Control Blade Controlled Insertion Times (Due 31 May 2001).
25 Jun 01	S-11	Semiannual Replacement of Control Blade Clutch Current Light Bulbs (Due 31 May 2001).
29 Jun 01	Q-7	Quarterly Check of UFTR Building Fire Alarm System – Zone 2 (Downstairs Offices and Laboratories) (Due 27 June 2001).
29 Jun 01	Q-6	Quarterly Check of Posting Requirements (Due 31 May 2001).
5 Jul 01	S-9	Semiannual Replacement of Well Pump Fuses (Due 29 June 2001).
12-13 Jul 01	Q-8	Quarterly Report of Safeguards Events (One Event) (Due 1 July 2001).
17-18 Jul 01	S-10	Semiannual Check and Update of Emergency Call Lists (Due 30 June 2001).
17 Jul 01	A-1	Instrument and Test Equipment Calibration (Correction of Surveillance Documentation) (Due 31 January 2001).
18 Jul 01	Q-2	Quarterly Calibration Check of Area and Stack Radiation Monitors (Due 25 July 2001).
21 Jul 01	Q-6	Quarterly Check of Posting Requirements (Partial for RCO Alternates and RSRS Members Appointment) (Not Due).
23 Jul 01	Q-3	Quarterly Radiological Emergency Evacuation Drill (Due 30 June 2001).

TABLE V-1

CHRONOLOGICAL TABULATION AND DESCRIPTION OF SCHEDULED UFTR SURVEILLANCES, CHECKS AND TESTS

Date		Surveillance/Check/Test Description
3 Aug 01	Q-4	Quarterly Quarterly Radiological Survey of Unrestricted Areas (Shutdown Conditions) (Due 3 July 2001).
3 Aug 01	Q-5	Quarterly Radiological Survey of Restricted Areas (Shutdown Conditions) (Due 3 July 2001).
17 Aug 01	Q-6	Quarterly Check of Posting Requirements (Partial for Update of Those Authorized to Carry Cell Key During Emergencies) (Extra).
23 Aug 01	Q-9	Quarterly Calibration Check of AMS4 Air Particulate Detector (Due 26 July 2001).
23 Aug 01	Q-9	Quarterly Calibration Check of AIM3BL Air Particulate Detector (Partial – Not Complete) (Due 26 July 2001).
28 Aug 01	Q-6	Quarterly Check of Posting Requirements (Due 31 August 2001).
31 Aug 01	S-12	Semiannual Review of Requalification Training Program Binders (Due 1 July 2001).

Note: An asterisk on the surveillance tracking designation is used to indicate surveillance was not completed within the allowable interval resulting in reactor unavailability for normal operations. Several are so marked this year (Q-4, Q-5, S-4 and A-2 completed in April 2001) due to having the extended outage with regular normal operations not resumed until completion of all overdue surveillances and approval of normal operations to allow completion of overdue surveillances.

All required UFTR surveillances, checks and tests are up to date at the end of the reporting year. In some years, surveillances have been carried over to the new year within the allowable interval; such is the case this year for the Q-1, Q-9 (AIM3BL), S-2, S-4, A-3, A-5, B-1, B-2 and B-5 surveillances, most of which were subsequently completed within the required interval, several within several days of beginning the new year. In addition, this year there are two surveillances (Q-4 and Q-5 full power radiation surveys) past due beyond the allowable interval at the end of the reporting year due to continuing reactor unavailability for the outage following a full power trip and failure of what has turned out to be the fission chamber in the wide range drawer. These two surveillances (Q-4 and Q-5 radiation surveys) were completed for the limiting case of the reactor shutdown but must be completed at full power prior to resuming normal operations when the maintenance is complete and the outage can be terminated.

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
16 Mar 1994	After the new area radiation monitoring system including a 19-inch rack, recorder, computer console, battery backup, probes, attachments, cabling and hardware was received, MLP #94-14 was used to control setup of the new ARM system including connecting the battery power supply and the recording module. During April 1994, the new detectors were also mounted. During May, electrical cables were run from the detectors to the control room monitors. Actual on-line installation of the new system will require a modification package which is partially prepared. No work has been accomplished since May 1994, again primarily because of relatively trouble-free operation. (MLP #94-14 remains open.)
11 Nov 1996	Following one spurious security alarm on November 10 and two alarms on November 11, 1996, the security system batteries were checked and replaced (S-7 Surveillance). Under MLP #96-30 the rechargeable batteries were found to be low and were recharged. Subsequently, 10 CFR 50.59 Evaluation Number 96-13 was developed to allow modification and replacement of the power pack to prevent recurrence of the problem of spurious alarms due to low voltage. Measurements were made and security system circuits checked and verified. In addition, the 6 volt batteries were recharged in mid-month. At the end of November 1996, the design and development of a new power pack per 10 CFR 50.59 Evaluation Number 96-13 was in progress; at the end of December 1996, the 10 CFR 50.59 Evaluation is complete as is the design, with installation of the new power supply on January 7, 1997 with all but one siren operational to meet requirements. Subsequently, the west lot siren was repaired on January 13 and both the west lot and journalism side siren horn drivers wiring was reterminated on January 14, 1997. Drawings and maintenance log were subsequently updated and an evaluation made that separate grounds would be needed for the security system batteries to assure proper charging and eliminate spurious alarms as the batteries discharge over time. On March 10, 1997, the power supply was removed for modification. Upon installation, various problems occurred resulting in partial and intermittent compensated outage of the security system over the period March 10-21 with circuit mapping performed for troubleshooting on March 19 and the intermittent ground finally repaired on March 21, 1997, but without installation of the modification to separate grounds, basically returning the system to its state prior to March 10. Subsequently, the 4 volt rechargeable batteries have been replaced on May 14, June 18, July 7, and

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	July 24, 1997 (for prevention purposes on July 30, 1997), on August 29, and on September 29, 1997. Following a full S-7 Surveillance on October 24, 1997, the loss of the holdup alarm was corrected under MLP #96-30 by reterminating a loose wire. Subsequently, the 4 volt rechargeable batteries were replaced on December 16, 1997 and again on January 9, February 10, March 10, April 8, and on May 6, 1998. Following a full S-7 Surveillance on May 27, 1998, the 4 volt rechargeable batteries were replaced again on June 24, July 24, August 19, September 16 and October 13, 1998. Following a full S-7 Surveillance including replacement of rechargeable batteries on November 10, the 4 volt rechargeable batteries were replaced again on December 7, 1998 and January 4, February 1 and March 2, 1999 with upgraded 4 volt batteries installed on March 12, 1999 under 10 CFR 50.59 Evaluation Number 99-02 developed and approved in February to upgrade the 4 volt rechargeable batteries for longer life. There had been no need for further replacement through the end of July 1999 though the full S-7 Surveillance was performed on July 2, 1999. Following the full S-7 Surveillance, when the 4 volt batteries were not replaced, the 4 volt rechargeable batteries were replaced again on August 24, 1999. The 4 volt rechargeable batteries were replaced again on February 24, 2000. There had been no further need for replacement until completion of the full S-7 Surveillance on May 25, 2000. The 4 volt rechargeable batteries were gain replaced on November 10, 2000 followed by a full S-7 Surveillance on December 29, 2000. The 4 volt rechargeable batteries were replaced again on February 26, 2001. There had been no further need for replacement until completion of the full S-7 Surveillance on May 22, 2001. Subsequently, the 4 volt rechargeable batteries were replaced again on August 24, 2001. (MLP #96-30 remains open.)
24 May 1999	Previously, 10 CFR 50.59 Evaluation and Determination Number 99-04 (Modification/Upgrade of Effluent Discharge System for Reactor Building) was approved for replacing the two underground wastewater holdup tanks with aboveground tanks—one outside, two inside. Under MLP #99-19, PPD personnel under supervisor Ron Sandoval excavated in the west lot to locate the line feeding the tank system beginning on May 24, 1999. On May 26, 1999, they broke the freshwater line used to flush the tanks so it was valved off by Danny Grant. On May 28, 1999, they finally had the whole line excavated, temporarily cut it, got negative indications on swipes and

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description

reconnected the feed pipe to the tank as a lift station is needed to connect it directly to the sanitary sewer. A visit to Al Hawley at Southern Precast, Inc. in Alachua also identified the 1,000 gallon tank to be placed outside aboveground. At the end of May, further operations awaited delivery of a lift station to be installed below ground in the west lot as two smaller indoor sink tanks were to be ordered also.

During June 1999, the rerouting activities were discussed with RCO D.L. Munroe along with release of the east holdup tank. Mr. Steve Middleton, PPD Maintenance and Construction Superintendent for Water Systems, visited on June 2 to check on the status and apologize for the problems to date. The situation was also discussed with PPD Project Engineer Bahar on June 4 as she visited to indicate how the lift station would be installed to protect lot access. Al Hawley, Manager of Specialty Products Division for Southern Precast, Inc., visited on June 4 with the specs for the 1,000 gallon aboveground storage tank and also to check accessibility of the west lot for delivery of the tank. The specs were then delivered to Ralph Haskew to order the tank through EH&S. Excavations to install the lift station were begun on June 16 but work was stopped by EH&S due to PPD worker safety concerns about unrestrained sides of the hole. Further excavations were then performed on June 18 as the lines were cut and the lift station installed on June 22. It was not anchored so overnight rain damaged the lines so the lift station was removed and reinstalled with negative swipe indications on June 23. An electrician along with supervisor Ron Sandoval and two assistants installed the "permanent" electrical connection for the lift station on June 24. Subsequently, Steve Middleton visited again and agreed that the electrical connection for the pump could be moved inside the lift station to avoid aboveground barriers limiting lot access. This electrical connection was moved to inside the lift station on June 28. Considerable research was undertaken and a 150-gallon indoor tank was ordered from Tank Depot, Inc. for the reactor cell and several liquid wastewater collection drums were installed temporarily in the cell on June 25.

During July, approximately 295 gallons of wastewater were collected and pumped to the in-ground holdup tank system. Some grading work was accomplished following installation of the lift station in June, with Steve Middleton checking the situation on July 2. After notification that the 1,000

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description

gallon aboveground storage tank was available, Steve Middleton, supervisor Marty Wertz, foreman John Black and another PPD technician visited to scope out concrete replacement work with old concrete broken out under Mr. Black's direction with a visit by RCO D.L. Munroe on July 8. Subsequently, Mr. Black and assistants prepared for and poured replacement concrete on July 9 with Russell Barrs visiting on July 9 to rehang the west lot entrance gate. The 1,000 gallon tank was finally delivered and placed in the west lot by Al Hawley and a truck/crane operator on July 20, 1999. Subsequently, the 150-gallon indoor tank obtained from Tank Depot, Inc. was delivered to the west lot on July 22 and moved inside for leak checks prior to set up on July 23, 1999. Both RCO D.L. Munroe and EH&S Director W.S. Properzio visited to check on both the inside 150 gallon and the outside 1,000 gallon tanks on July 29, 1999. Subsequently, RCO D.L. Munroe and NRE Professor G.R. Dalton utilized a special remote video camera system to inspect the inside of the underground tanks on July 30 in anticipation of eventual decommissioning of the tanks.

During August 1999, approximately 700 gallons of wastewater were collected and pumped to the in-ground holdup tank system, on August 28, 1999 telephone calls were made to and from Steve Middleton concerning completion of west lot work, a line was installed and sealed to direct cell AC condensate to the indoor 150 gallon tank on August 3–5, the indoor setup was cleaned up and arranged optimally around the tanks on August 12. In addition, Emil Hodge of W. W. Gay, Inc. visited to estimate costs for installation of plumbing from the cell to the aboveground tank in the west lot on August 26. Subsequently, RCO D.L. Munroe and NRE Professor G.R. Dalton utilized a special remote video camera system to inspect the inside of the underground tanks on August 31, 1999 in anticipation of eventual decommissioning of the tanks.

During September 1999, approximately 260 gallons of wastewater were collected and pumped to the in-ground holdup tank system. Subsequently, RCO D.L. Munroe and NRE Professor G.R. Dalton again utilized a special remote video camera system to inspect the inside of the underground tanks on September 22, 1999 in anticipation of eventual decommissioning of the tanks.

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	During October 1999, approximately 260 gallons of wastewater were collected and pumped to the in-ground holdup tank system. On October 29, EH&S Director W.S. Properzio called concerning beginning use of the aboveground tank. Subsequent contacts with Southern Precast and then W.W. Gay resulted in a commitment to receive an estimate for plumbing the tank by November 1, 1999.
	During November 1999, ~120 gallons of wastewater were collected and pumped to the in-ground holdup tank. In addition to receiving the estimate for plumbing the tank on November 1, 1999, Physical Plant Division was contacted relative to providing a hole in the west cell wall for an effluent line (MWO #084826). On November 10, Emil Hodge of W.W. Gay was scheduled to check the site. Subsequently, he visited on November 17 to measure the tank and on November 23 to check the site. Two W.W. Gay electricians (B. Bush and C. Rolling) initiated electrical connection to the tank on November 24, 1999.
	During December 1999, a recirculation pump was installed on the aboveground tank by J. Scott and S. Ward of W.W. Gay on December 3/5. When the pump failed to exceed 5 rpm, E. Hodge and three W.W. Gay personnel removed it on December 6. J. Scott S. Ward, Dennis Jobe and Dennis Gahager of W.W. Gay finally reinstalled a new pump on December 10; however, it failed to pass a recirculation test with city water on December 14 so Southern Precast was contacted to verify drawings on December 15. After S. Ward of W.W. Gay primed the pump on December 17, the tank was circulated and pumped out to demonstrate proper operation on December 17. Subsequently, the tank was filled and pumped out in 90 minutes after demonstrating recirculation on December 23, 1999 along with discussions with RCO D.L. Munroe concerning release requirements and specifications on equipment needed for the water measurements. PPD technician Mike Wohl also visited on December 7 to make a preliminary inspection of the west reactor cell wall for the necessary effluent line hole to the tank.
	During January 2000, the bill for W.W. Gay's services was received and transmitted to NRE Dept. staff for payment. At month's end the bill was not yet paid. In addition to discussions between RCO D.L. Munroe and Facility

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description

Director W.G. Vernetson, plans were undertaken to install a PVC run with filter and locate the west cell wall penetration for running liquid to the aboveground storage tank to include beginning work on drawings and consideration of affected documents for the modification. There was also a review of the data on the final liquid in the east underground tank to approve release.

During February 2000, there was a meeting with RCO D.L. Munroe relative to low levels of Cs-137 in the sludge of one underground tank. In addition to reviewing the status and planning on the project, a draft document was produced for the west cell wall penetration and line to move liquid from the indoor tank to the aboveground holdup tank in the west lot.

During March 2000, there was work on the modification package for the west cell wall penetration and on development of a sampling procedure for the new aboveground tank.

During April 2000, the modification package for the west wall penetration to move water to the aboveground holdup tank was finalized and subsequently fully approved by the RSRS for implementation after some updating of drawings.

During May 2000, the west underground holdup tank was pumped out with PPD technician M. Williams providing expertise to bypass the low-level interlock on the pumps. Subsequently, some effort was spent washing down the pumps. In addition, efforts were undertaken to order equipment to analyze the aboveground wastewater holdup tank contents for release. PPD senior operations engineer Jerry Canalas visited concerning providing vacuum for sample analysis but his input lead facility management to plan on acquiring a vacuum pump, funds for which may be available through end of fiscal year College of Engineering OCO money. In addition, considerable time was spent developing UFTR SOP-D.7 (Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater) to control aboveground tank releases. At month's end, this procedure was ready for RSRS review and approval.

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description

During June 2000, there was some discussion about decommissioning the underground tanks and a visit by two representatives of Petroleum Aids, Inc. along with RCO D.L. Munroe, RCT J. Parker and Facility Director W.G. Vernetson to discuss plans for pump removal in early July. The new UFTR SOP-D.7 (Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater) was approved on June 1 and then installed in facility procedure manuals. In addition, 455 gallons of wastewater were pumped to the new aboveground holdup tank (200 gallons on June 1, 125 gallons on June 20 and 130 gallons on June 29). A proposed sharing of decommissioning costs for the underground tanks as proffered in April by RCO D.L. Munroe in an email to the COE interim dean indicates the UFTR share could be 20%, which seems high. A copy of the email is included in the June 2000 facility report.

During July 2000, two representatives of Petroleum Aids, Inc. assisted with removal of the two pumps from the underground storage tanks. After swipe/ radiological surveys by the Radiation Control Office, these pumps were removed for disposal by Petroleum Aids, Inc. and the tanks covered pending decommissioning. In addition, sample analysis equipment was ordered and received for processing water samples from the new aboveground holdup tank and the extra vacuum pump was returned to the vendor. In addition, 310 gallons of wastewater were pumped to the new aboveground holdup tank (110 gallons on July 13 and 200 gallons on July 31).

During August 2000, UFTR SOP-D.7 (Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater) was successfully applied to document sampling, analysis and finally release of 816.8 gallons of wastewater from the aboveground holdup tank to the sanitary sewer on August 15. In addition, the underground storage tanks were entered once on August 16 by RCT J. Parker to obtain swipes and again on August 17 by RCO D.L. Munroe to remove tank sediments with V. McLeod of EH&S assuring proper controls plus assistance from a Physical Plant Division technician on August 16. After discussion at the RSRS meeting on August 17 Chairman M.J. Ohanian indicated the Form 90 for the west reactor cell wall penetration should go to Denis Mercier for approval. Mercier reviewed the Form 90 on August 21 and had engineering representative Tony Smith check the type and location for the penetration on August 24 indicating this work should go to Physical Plant Division. So the Form 90 has moved

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description

forward with the penetration to be installed within a few weeks. In addition, 432 gallons of wastewater were pumped to the new aboveground holdup tank (120 gallons on August 8 before the release on August 15, 113.1 gallons on August 16 and 199 gallons on August 31).

During September 2000, equipment for implementing UFTR SOP-D.7 on a permanent basis was set up and checked out including an NMC gas flow proportional counter. The aboveground tank was also recirculated and sampled as efforts were made to develop a more efficient method for evaporating samples and then analyzing them. PPD operations engineer Rod Clemmons and contractor Dennis Wigglesworth visited and indicated the west wall penetration work would be contracted out; they will first drill a small hole from the inside, then do the full size hole from the outside to prevent damaging the brick facing material. In addition, 413.3 gallons of wastewater were pumped to the new aboveground holdup tank (213.3 gallons on September 12 and 200 gallons on September 25).

During October 2000, the aboveground wastewater holdup tank was sampled on October 2 and samples were being analyzed on October 16 as a more efficient methodology was under investigation with the CFCC NMC gas flow proportional counter finally undergoing calibration checks on October 31. Finally, under 10 CFR 50.59 Evaluation and Determination Number 00-01 (Reactor Cell West Wall Penetration to Connect to Aboveground Holdup Tank), on October 20, 2000, Dennis Wigglesworth and Brett Smith of Engineering Constructors and Consultants Inc. installed a one-inch pipe with isolation valves in the reactor cell west wall with only the various connections and piping remaining to be installed by reactor staff.

During November 2000, sample analysis continued with the aboveground wastewater holdup tank contents released to the sanitary sewer on November 17. Subsequently, 161 gallons of wastewater were pumped to the new aboveground tank on November 21.

During December 2000, little occurred as some solids were removed from the tank for analysis on December 29, by the Radiation Control Officer and staff. During January 2001, one sink drain in the NAA Laboratory was

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description

disconnected and a 2½-gallon holdup tank installed for use of the sink, if necessary, in processing reactor liquid samples.

During February 2001, 112 gallons of wastewater were pumped to the new aboveground tank on February 16. Subsequently the piping length was measured and the piping, connections and supplies needed to complete work on the permanent pipe run for transferring wastewater from the indoor tank(s) to the outside aboveground tank were priced and plans made to obtain them for installation over the spring break in March 2001.

During early March 2001, equipment and parts were arranged for installing the piping run from the indoor storage tank to the aboveground outside holdup tank. The inside pipe run was installed on March 5 and the outside pipe run on March 6. On March 7, the pump was installed in the indoor holdup system with 48.9 gallons of water transferred to the aboveground outside tank as the system was leak checked and flow was verified. A mount was manufactured for the pump and the system was walked down for a final check on March 7. On March 8 the pump and suction nozzles were mounted with final adjustments and cleanup completed for this permanent pipe run for transferring wastewater from the indoor tank(s) to the outside aboveground tank. Visits by the Radiation Control Officer and radiation control technicians also occurred for accessing the underground tanks and removing sludge. On March 20, Dr. Vernetson left a message (unreturned) with NRC Inspector Stephen Holmes asking what to do about decommissioning the underground wastewater holdup tanks. Subsequently, on March 23, RCO D.L. Munroe spoke with the NRC Senior Project Manager for the UFTR who basically indicated the NRC doesn't do partial decommissioning; so then, tank decommissioning will have to await UFTR decommissioning as a decision must be made as to disposition of the underground tanks.

During April 2001, PPD supervisor Rod Clemmons, a representative of Petroleum Aids, Inc., EH&S Director W.S. Properzio, RCO D.L. Munroe and UFTR Director W.G. Vernetson met at the underground holdup tank site in the west lot to discuss closure options on April 5, 2001. In a memorandum dated April 6, 2001, D.L. Munroe recommended to W.S. Properzio that the tanks not be filled to allow options to remain open when the UFTR finally generates a decommissioning plan. Subsequently, W.S. Properzio sent a

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description

memorandum dated April 6, 2001 to Interim Dean M.J. Ohanian indicating the problems with decommissioning the tank and trying to use existing fill material. A return memorandum from Interim Dean Ohanian dated April 10, 2001 basically accepts keeping options open on the tanks. Subsequently, W.S. Properzio, D.L. Munroe and W.G. Vernetson met on April 19, 2001 and discussed the status as current plans are to put a locked steel cover over the tanks until they are decommissioned. Installation of this steel cover will be the last activity in this area after which this project will be closed. Subsequently, on April 20, 2001, 107 gallons of holdup water were pumped from the indoor tank to the aboveground storage tank.

During May 2001, no work was accomplished as the College of Engineering agreed to pay for covers on the tanks to mothball them in place and remove the fence around them. Later communications clarified that the fence removal only applies to the inner fence around the openings to the tanks, not to the access fence.

During June 2001, RCO D.L. Munroe continued to work with the College of Engineering (Denis Mercier) to get the covers installed. In addition, there was some sampling of sludge previously removed from the underground tanks. Also, on June 6, 15 and 28, 107 gallons, 93 gallons and 120 gallons, respectively, of holdup water were pumped from the indoor tank to the aboveground storage tank at which point the storage tank was recirculated and samples taken for analysis on June 28, 2001.

During July 2001, the samples from the aboveground wastewater holdup tank were analyzed and assured to meet release criteria. When the water was being recirculated prior to release on July 9, the recirculation valve was noted to be leaking when not in a set position, though the valve was still usable. This problem was addressed separately under MLP #01-26; 798 gallons were released to the sanitary sewer on July 10. Subsequently, as wastewater was being transferred, the inside transfer pump was found to have a failed impeller which was replaced with a spare on July 11 but the pump still remained unusable to move water between the smaller and later in-cell tanks. This problem was corrected as replacement discharge valves were acquired and installed at the pump discharge on July 12. Subsequently, on July 23, 285 gallons of holdup wastewater from the inside tanks were transferred to

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	the external aboveground wastewater holdup tank and the pump replacement impeller was verified to be operating properly. In addition, the covers were finally installed on July 11 to secure the in-ground holdup tanks for eventual decommissioning with RCO D.L. Munroe's agreement that all necessary work is complete on July 20. During August 2001, on the 3, 16 and 31 of August, 122 gallons, 148 gallons and 158 gallons, respectively, of holdup water were pumped to the aboveground tank. In addition, records for this project were reviewed and assured complete to close out this project with no further problems noted. (On 31 August 2001, MLP #99-19 was closed.)
5 Oct 1999	As time allowed, it was decided to begin constructing new permanent hurricane rods. Under MLP #99-43, specifications for construction methods, materials and an encapsulation epoxy were considered as Insulcast was contacted in January 2000 concerning proper adhesives and epoxies to be used. Recommended adhesive materials were ordered in January and received in February 2000 as aluminum tubing was also specified and sourced. The aluminum tubes were ordered in April and received on May 19, 2000. A drawing to support 10 CFR 50.59 Evaluation Number 00-03 (Manufacture and Implementation of Replacement Set of Hurricane Rods) involved some effort in May and early June as the modification package was finally approved by the RSRS on June 1, 2000. No actual construction had begun as of the end of October 2000. On November 13, 2000, the cadmium sheets and aluminum rods were cut and the adhesive and epoxy were tested. On November 14, 2000, mounting hardware was procured. No further work has occurred at year's end. (MLP #99-43 remains open.)
1 Mar 2000	The motor operated city water valve had been intermittently inoperable for some time. Under MLP #00-07, troubleshooting was initiated with the failure apparently involving the motor or controller with no further work accomplished at year's end. (MLP #00-07 remains open.)
9 Mar 2000	Although cleaning the meter movement restored proper functioning of the auxiliary stack monitor meter/alarm, reactor management considers this meter/alarm to be nearing end of life with no duplicate replacement available. Therefore, under MLP #00-09 a replacement auxiliary stack monitor

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	meter/alarm is being designed to include collecting data at power on March 9, 2000 with design, parts procurement, tests, prototyping and simulated operation of the design undertaken subsequently but no modification package yet developed. During April 2000, parts procurement, circuit testing and circuit analysis continued. No other work has been accomplished at year's end. (MLP #00-09 remains open.)
18 Jul 2000	During the daily checkout, the mechanical tachometer rpm indication in the control room was noted to be erratic. Under MLP #00-23, an oscilloscope was used to check the circuit which was responding normally by this time. Since the Tech Specs limiting condition for operation (LCO) was met by the redundant magnetic tachometer indicator, MLP #00-23 was left open but no further erratic indications were noted through the end of the August 2000, or for the next three months, so on October 23, 2000 this maintenance item was closed out following verification of proper operation with no further problems noted. (On 23 October 2000, MLP #00-23 remains open.)
5 Sep 2000	During the weekly checkout, the mechanical tachometer rpm indication in the control room was noted to be erratic. Under MLP #00-23, an oscilloscope was used to check the circuit which was responding normally by this time. Since the Tech Specs limiting condition for operation (LCO) was met by the redundant magnetic tachometer indicator, MLP #00-23 was left open but no further erratic indications have been noted through the end of the September 2000. (MLP #00-23 remains open.)
5 Sep 00	During the weekly checkout it was noted that the primary coolant storage tank level was getting low. Under MLP #00-28, 55 gallons of demineralized water were added to the PC storage tank to fill it to the 27 inch level with no problems noted. (On 5 September 2000, MLP #00-28 was closed.)
8 Sep 00	During the last step of the daily checkout when water is dumped, the rupture disk broke with no apparent operator error, with about 40 gallons of primary coolant dumped into the primary equipment pit. After opening the pit to verify the situation and notifying the Radiation Control Officer, the pit was cleaned up under MLP #00-29 and RWP 00-02-II on September 8, 2000. Subsequently, under MLP #00-29, on September 11, 2000, swipes were taken to verify the pit was not contaminated, the rupture disk was replaced with an

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	on-hand spare, the system was verified to be leak tight and a successful daily checkout was performed along with adding 45 gallons of demineralized water to the PC storage tank with no further problems noted. The rupture disk failure was attributed to fatigue failure with negligible effect on reactor safety and no effect on the health and safety of the public. (On 11 September 2000, MLP #00-29 was closed.)
15 Sep 00	During several usages, the rabbit system was noted to have a slow return speed so an air leak in the control box was suspected. Under MLP #00-30, swipes were taken to verify no contamination as expected. Thereafter, the control box was disassembled and the gas connections were tested with a bubble solution with no leakage detected. Subsequently, on September 15, 2000, a bubble solution was also used to test the supply line connection to the solenoid valve at the outlet of the pressure regulator with leakage detected so a polyacrylic was applied to the connection and allowed to set over the weekend. Subsequently, the system was reassembled and operationally tested satisfactorily with the capsule return speed noted to be faster with the slow return speed corrected and no further problems noted. (On 20 September 2000, MLP #00-30 was closed.)
18 Sep 00	During the weekly checkout, the control panel "PC PUMP/PRI FLOW" indicator light switch fell apart. Under MLP #00-31, the light was examined and no spares were available so spare parts from other panel switches were used to construct a duplicate replacement switch which was tested with no problems noted. (On 18 September 2000, MLP #00-31 was closed.)
25 Sep 00	During the weekly checkout, it was noted there was no output to the rustrak recorder for the AMS4 air particulate detector system. Under MLP #00-32, the cause of this failure to provide a signal was determined to be a failed connector which was repaired with no further problems noted. (On 25 September 2000, MLP #00-32 was closed.)
28 Sep 00	Over the preceding weeks, the temperature monitor recorder indications were noted to be becoming less and less legible. Under MLP #00-33, the temperature monitor indicator pads were reinked to restore full legibility with no further problems noted. (On 28 September 2000, MLP #00-33 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
28 Sep 00	For some time, a buzzing sound was noted when the dump valve was being reset. Under MLP #00-34, it was noted that the KA20 relay was buzzing on the reset. It was also noted that the console technical manual calls for the KA20 relay to be a 120 volt relay (KRP-14-AG-120) but the relay in the socket was a 240 volt relay (KRP-14-AG-240). Therefore, under 10 CFR 50.59 Evaluation Number 00-05 (Replacement of Dump Valve Relay), the KA20 relay was replaced with the proper KRP-14-AG-120 relay with the dump valve reset several times with no discernible buzzing and no further problems noted. The evaluation noted that any failure here would have resulted in opening the dump valve for a failsafe condition so this incorrect relay was evaluated to have no adverse effect on reactor safety as it has probably been installed as such for the length of the current reactor license. (On 28 September 00, MLP #00-34 was closed.)
2 Oct 00	During the weekly checkout it was noted that the resins used to provide demineralized makeup water were becoming depleted. Under MLP #00-35, the resins were replaced to restore the source of demineralized water with no further problems noted. (On 2 October 2000, MLP #00-35 was closed.)
11 Oct 00	During the daily checkout, the primary coolant dump valve would not close. Under MLP #00-36, troubleshooting to check relays and contacts revealed an open fuse which was replaced but blew again. Subsequently, it was determined that the solenoid was failed so a new substitute solenoid was specified and the replacement was ordered under 10 CFR 50.59 Evaluation Number 00-06 (Replacement of Dump Valve Solenoid). Next an adapter bracket was made at the ISEE shop for the 15 amp valve solenoid. When the bracket and linkage was completed, the solenoid was installed but it failed after about one minute energization. A new linkage and modified bracket were then fabricated with a second solenoid installed with the dump valve tested satisfactorily on October 18. Subsequently, on October 19 the dump valve function was tested again as the primary coolant void time was checked and verified correct and a weekly and daily checkout completed satisfactorily with no further problems noted. (On 19 October 2000, MLP #00-36 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
6 Nov 00	During the weekly checkout, the water level in the primary coolant storage tank was noted to be getting low. Under MLP #00-37, 70 gallons of demineralized water were added to the PC storage tank to refill it with no problems noted. (On 6 November 2000, MLP #00-37 was closed.)
13 Nov 00	During a control room check, the mechanical tach for the stack diluting fan RPM indication was noted to be reading low. Under MLP #00-38, the meter contacts and movement were cleaned to restore proper indication with no further problems noted. (On 13 November 2000, MLP #00-38 was closed.)
13 Nov 00	During the daily checkout, the AMS^4 air particulate detector pump power switch was noted to be failed. MLP #00-39 was used to spec out a new power switch but none had been ordered yet since the ON/OFF power switch function is satisfied just as well using the power plug temporarily for the ON/OFF function. On March 19, 2001, a new replacement AMS^4 ON/OFF power switch was installed with no further problems noted. (On 19 March 2001, MLP #00-39 was closed.)
30 Nov 00	Under MLP #00-40 the fire alarm system monitoring panel backup batteries were replaced by PPD technician Wayne Gravely as part of periodic preventive maintenance with no problems noted. (On 30 November 2000, MLP #00-40 was closed.)
18 Dec 00	During the weekly checkout, the water level in the primary coolant storage tank was noted to be getting low. Under MLP #00-41, 70 gallons of demineralized water were added to the PC storage tank to raise the level from 22 inches to 30 inches with no problems noted. (On 18 December 2000, MLP #00-41 was closed.)
21 Dec 00	As the special collimating shield was being moved to the south beam port for setup for transmission experiments, one of the rails for the surface slabs of the floor trench gave way on December 20, 2000. After assuring there was no continuing problem and the supports only had failed, MLP #00-42 was opened on December 21 to control repairs as physical plant was contacted with a long lead time for repair. Subsequently, a message was left for COE construction project coordinator Denis Mercier who was unavailable due to the holiday. Dr. Vernetson spoke with Mercier on December 26 and

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	scheduled a visit to determine the necessary repairs. On December 27, Mr. Mercier and technician Curtis McLeod visited the facility to examine the problem and schedule repairs for January 2, 2001 to involve redrilling and replacing the rail supports for essentially no changes to the facility. On January 2, sand was removed from the trench to allow access. COE construction personnel C. McLeod and D. Cannady then repaired the trench supports as planned. Subsequently, the sand was returned to the trench and the cover blocks were returned to normal position with no further problems noted. (On 2 January 2001, MLP #00-42 was closed.)
8 Jan 01	During the early performance of the precalorimetric portion of the A-2 Surveillance (UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance), certain voltages and setpoints were noted to require minor adjustments as expected. Under MLP #01-01, various voltages and setpoints were adjusted to assure proper nuclear instrumentation calibration. Subsequently, after nuclear instrumentation adjustments, the A-2 Surveillance was not able to be completed due to failure of the compensating voltage potentiometer and the two-pen recorder during the effort to set the compensating voltage after the power run to assure adequate gamma background on January 11, 2001. Subsequently, after replacement of the two-pen recorder and installation of the source alarm (MLP #01-03) and replacement of the failed compensating voltage potentiometer on January 23, the A-2 Surveillance was restarted and the reactor was run and the compensating voltage was set but the picoammeter feedback resistor had to be replaced to increase the limit on the linear channel gain adjustment determined during the second power run on January 25. After replacement of the feedback resistor (MLP #01-05), the A-2 Surveillance was again repeated and the reactor was run at power for nearly two hours on January 31, until an unscheduled shutdown was required due to failure of the temperature monitor recorder (MLP #01-06 opened). At the end of January through the end of March 2001, efforts were underway to troubleshoot, repair and then replace the temperature recorder/monitor as the A-2 Surveillance had not been completed and would have to be completely repeated when installation and implementation of the new temperature monitor/recorder is complete. With completion of installation and non-operations checkout of the new computer-based temperature monitor/recorder system at the end of March

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	2001, the voltage and other adjustments to complete the interrupted Annual UFTR Nuclear Instrumentation Calibration Checks and Calorimetric Heat Balance (A-2 Surveillance) were completed on April 2, 2001. Subsequently, the first A-2 power run was conducted on April 3, to demonstrate also completion of checkout of the computer-based temperature monitor/recorder system. With successful completion of the second power run on April 4, the A-2 Surveillance was completed with no further problems noted. (On 4 April 2001, MLP #01-01 was closed.)
9 Jan 01	During performance of the precalorimetric checks portion of the A-2 Surveillance, the Wide Range Drawer test jack was found to be failed. Under MLP #01-02, troubleshooting was undertaken and a discontinuity was repaired on the A2 card to restore proper function of the test jack with no further problems noted. (On 9 January 2001, MLP #01-02 was closed.)
12 Jan 01	On January 11, 2001, the reactor was run for six hours at power to provide a high gamma background after shutdown to allow compensating voltage adjustment on the compensated ion chamber as part of the UFTR Annual Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance). During the post-shutdown compensating voltage adjustment, the failure of the compensating voltage adjustment potentiometer combined with a frequently repaired two-pen recorder to result in a failed two-pen recorder. Under MLP #01-03 opened on January 12, 2001, the two-pen recorder drive system was found to be inoperable. Fortunately a replacement two-pen recorder was available, having been purchased under the 2000-01 DOE University Reactor Instrumentation Grant. However, as with the failed two-pen recorder when it was first installed, there was no installed source alarm circuit. Therefore, under MLP #01-03 and 10 CFR 50.59 Evaluation Number 01-01 (Replacement of Failed Two-Pen Recorder), the new recorder was evaluated, tested and installed, the source alarm circuit was analyzed and the necessary relay board was designed and constructed. Subsequently, the power supply and relay card for the source alarm were built and the source alarm relay card was installed with the necessary connector panel modification made behind the two-pen recorder. Subsequently, with the new two-pen recorder installed, the reactor was approved for low power operations to test the recorder operation on January 22, 2001. The first operation to 1 watt verified general performance. In a second operation to

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	1 watt, some instability was detected in the front end amplifier of the relay card during power decay so the output of the filter capacitor was scaled down. At this point, the LCOs were met with the instability located in the source alarm circuit which was noted to actuate normally but not reset properly so the front end amplifier was changed out twice and the reactor operated to 1 watt each time with the instability corrected at the end of the day on January 22, 2001. Subsequently, a confirmation startup to 1 watt was conducted on January 23, 2001 to verify proper operation of the linear recorder including the source alarm circuit with the instability corrected. At this point, the compensating voltage potentiometer whose failure had precipitated electrical transients resulting in failure of the two-pen recorder, was replaced under MLP #01-04 on January 23, 2001. With successful completion of the precalorimetric adjustments on January 23, 2001 and closeout of MLP #01-03 for the two-pen recorder replacement and MLP #01-04 for replacement of the compensating voltage potentiometer, the reactor was approved for checks and power operations to continue the UFTR Nuclear Instrumentation Calibration Checks and Calorimetric Heat Balance (A-2 Surveillance) with no further problems noted in this area. The two-pen recorder failure event is not considered to be promptly reportable, especially since it occurred at shutdown conditions during compensating voltage adjustments. Although a first level modification package was necessary, the recorder is essentially a somewhat upgraded (essentially a duplicate) replacement for the failed recorder which also had required that a source alarm circuit be added when it was installed about ten years ago. This event is considered closed with closure of MLP #01-03 and MLP #01-04. This event was considered to have had no effect on the health and safety of the public or facility personnel and no effect on the safety of the reactor. (On 23 January 2001, MLP #01-03 was closed.)
23 Jan 01	During attempted performance of the compensating voltage adjustment at shutdown following operation of the reactor at power for six hours to produce a sufficient gamma field background after shutdown as part of the annual UFTR Nuclear Instrumentation Calibration and Calorimetric Heat Balance (A-2 Surveillance), the compensating voltage potentiometer failed with the resulting transient contributing to failure of the two-pen recorder (see MLP #01-03). Under MLP #01-04, a duplicate replacement potentiometer was acquired and installed after successful replacement and verification of the new two-pen recorder and source alarm with no further problems noted.

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	Subsequently, for calibration purposes, another power run was accomplished on January 24, 2001; after shutdown the compensating voltage on the compensating ion chamber was successfully adjusted in partial fulfillment of the A-2 Surveillance. (On 23 January 2001, MLP #01-04 was closed.)
29 Jan 01	During the second run at power to complete the UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance) on January 25, 2001, the limit was reached in adjusting the linear channel gain via the R34 potentiometer with further adjustment needed so the A-2 Surveillance was not complete which has occurred in a number of previous performances of the A-2 Surveillance at approximately four to five year intervals. Per the console manual, the requirement is then to replace the gain resistor to allow further adjustment. The proper resistor was ordered and subsequently under MLP #01-05 and 10 CFR 50.59 Evaluation Number 01-02 (Resistor Change to Increase Gain of Picoammeter A2 Amplifier to Facilitate Linear Channel Calibration), the picoammeter was removed from the console and the R25 resistor (154 KΩ 1%) was replaced with a 143 KΩ 1% resistor to increase the gain of picoammeter A2 amplifier. Subsequently, the picoammeter was reinstalled into the console on January 29, 2001 and the A1 and A2 amplifiers balanced. After final adjustments and checks, the resistor substitution was verified to be correct with no further problems noted as the reactor was approved for repeating the precalorimetric checks and performance of the A-2 Surveillance. (On 29 January 2001, MLP #01-05 was closed.)
31 Jan 01	After a power operation beginning with a startup at 0945 hours and reaching full power at 1003 hours for a six hour power run conducted to provide a sufficient gamma background after shutdown to allow compensating voltage adjustment on the compensated ion chamber as part of the continuing UFTR Annual Nuclear Instrumentation and Calibration Check and Calorimetric Heat Balance (A-2 Surveillance), the temperature monitor recorder began to indicate poorly though temperature trends were still being indicated. Subsequently, as the temperature monitor failed to indicate properly, an unscheduled shutdown was begun at 1155 hours with the reactor shutdown and secured at 1157 hours with all safety and control systems operating and responding properly with no other problems noted but the temperature monitor recorder requiring repair with no impact on reactor safety or the

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description

health and safety of the public or facility personnel per the completed UFTR Form SOP-0.6B (Unscheduled Reactor Shutdown and Evaluation). Subsequently, under MLP #01-06, troubleshooting was begun to troubleshoot and repair the temperature monitor recorder with no results at month's end.

During February 2001, several days were spent troubleshooting and attempting to repair the temperature monitor recorder as the systems were analyzed and available options delineated. The decision was finally made that the temperature monitor was not repairable on February 5 so the decision was made to install the spare temperature monitor recorder bought as a replacement under the 1992-93 DOE instrumentation grant. Unfortunately the digital monitor requires considerable engineering to be usable as a replacement, especially since the monitor provides the temperature warning and trips on high temperature for the reactor protection system. Subsequently, the necessary equipment and software needs were specified in consultation with National Instruments and ordered. As the Labview software package, software manual and hardware were obtained throughout the month, the necessary software was developed and was begun to be integrated with the hardware. On February 26 the old temperature monitor/recorder was removed and the necessary physical support structure designed and installed to support the new temperature monitor printer. On February 28 the stack monitor alarm bell was repositioned to make room for the new recorder as the aluminum mounting material was measured and cut at month's end to construct the mounting bracket. At the end of February, the new temperature monitor recorder was ready to be mounted as software development and integration with the hardware continued.

The status of this modification and the use of computer software to generate high temperature trips were discussed with the NRC Project Manager on February 22, 2001. In essence he indicated they will inspect based on what we decide in a 10 CFR 50.59 modification package though he does not see that any new safety question is involved. Provided that the UFTR internal 10 CFR 50.59 review at Level 2 is negative and no change of Tech Specs is needed, then NRC will simply inspect the modification package and the Tech Specs on the next visit with no necessity to submit anything to NRC for review.

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	During March 2001, hardware and software integration efforts continued along with software development. Support angle aluminum was also installed to support the new mechanical recorder. Much effort was also spent testing inputs and the software as it was being developed. A detailed modification package was developed (10 CFR 50.59 Evaluation and Determination Number 01-03, "Temperature Recorder/Monitor Replacement Including Software Generated Trip Function") and presented to the Reactor Safety Review Subcommittee (RSRS) at its meeting on March 15 where it was approved. This included a memorandum dated March 13, 2001 on the replacement as well as an augmented memorandum on safety-related issues for consideration. The new computer-based monitor/recorder was installed along with the thermal couple junction strip on March 21. Subsequently, all hardware was installed and checked and the system calibrated with installation of strain supports on the thermocouple wire and a ground strap essentially completing the necessary installation and checkout of the new temperature monitor/recorder system at the end of March as the interrupted annual calibration of nuclear instruments and other delayed surveillances were to be performed in the coming month as this major project was nearing completion. A complete restart plan in the form of a memorandum was developed to assure an orderly return to normal operations and that no required tests or surveillances would be missed.
	During April 2001, the precalorimetric checks and adjustments part of the A-2 Surveillance were completed on April 2 and the first power operation for compensating voltage adjustment was conducted on April 3 with the computer-based temperature monitor/recorder verified to be operating properly so that the MLP #01-06 for this modification could be closed out on April 3. Subsequently, a special power run was undertaken on April 10, under the reopened MLP #01-06 to verify the proper operation of the mechanical temperature recorder which is essentially extra unrequired equipment that will be useful for input to student laboratory exercises. The MLP #01-06 was then closed permanently on April 10, 2001 with no problems noted in operation of the computer-based temperature monitor/recorder or the mechanical recorder. (On 4 April 2001 and 10 April 2001, MLP #01-06 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
8 Feb 01	For some time, Physical Plant Division (PPD) had been negotiating for services to overhaul the 3-ton overhead crane to meet OSHA requirements. On February 2, 2001, PPD technician Mike Williams visited the reactor cell with two Crane Pro Services personnel who evaluated and determined the upgrade work to be performed. Subsequently, under MLP #01-07, PPD technician Mike Williams and four Crane Pro Services personnel visited, implemented most of the required upgrades including installing safety rails on the crane and a cover for the crane motor. Subsequently on February 14, Mike Williams returned with T. Leach and C. Clayton of Crane Pro Services to install a safety latch on the crane hook with completion of the upgrade work awaiting delivery of the remaining parts. No further work had been accomplished so on June 12, 2001 records were reviewed and discussed with Mike Williams who indicated all contracted work was completed since a motor cover is not currently available so this crane upgrade maintenance is completed. (On 12 June 2001, MLP #01-07 was closed.)
16 Feb 01	In early February 2001, the cable for the fume hood in the laboratory classroom broke. On February 7 the fume hood was emptied out to allow repair work to proceed. Radiation Control Technician J. parker later On February 16 cognizant PPD technician John Thomas was contacted but indicated he needed a release from the Radiation Control Office before work could proceed under MWO #545083. At the end of February, repair work had not yet begun. On March 2, PPD supervisor John Thomas visited to indicate they were still awaiting clearance of the hood by EH&S. Environmental Health & Safety Coordinator Mark Yanchisin was contacted on March 20 and indicated he was sending the necessary clearance protocol to John Thomas who then contacted Dr. Vernetson to clear the work on March 23 with the hood repair occurring on March 24 by Mr. Thomas and his assistants to restore proper operation of the hood door with no further problems noted under MWO #545083. (On 24 March 2001, MLP #01-08 was closed.)
14 Mar 01	The university is readying its telephone communications system to accommodate various aspects of upgraded computer communications. Under MLP #01-09, PPD technicians D. Malcolm, A. Isaac and H. Weber visited the facility on March 14 to install the new telephone lines to the reactor facility, essentially rerouted to provide equivalent coverage to existing

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR
PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	locations with no problems noted other than the usual corrections necessary with new systems and all work completed on the second day. (On 15 March 2001, MLP #01-09 was closed.)
29 Mar 01	As connections were being made to perform the quarterly scram checks (Q-1 Surveillance), two contacts were accidentally crossed resulting in breaking of the primary coolant system rupture disk due to rapid opening and closing of the PC dump valve at about 1530 hours on March 28, 2001. Since tests were in progress when this disk broke, the reactor was not operating so only very low levels of contamination were involved. This event was judged to have negligible effects on reactor safety or on the health and safety of the public or reactor staff. Subsequently, with notification and approval of the Radiation Control Officer, under RWP #01-01-II and MLP #01-10, the primary coolant pit was cleaned up with about 40 gallons of primary coolant water pumped to the indoor holdup tank, a replacement rupture disk was installed and the system was checked not to be leaking with no further problems noted as the event was closed out at about 1600 hours on March 29, 2001. (On 29 March 2001, MLP #01-10 was closed.)
18 Apr 01	Maintenance Work Order #532639 had previously been initiated with Physical Plant Division to replace the door and door jamb to the reactor support shop facility which has been getting increasingly difficult to secure/lock due to degradation of the door and jamb. Under MLP #01-11 (MWO #532639) PPD personnel Russell Barrs and Bill Mills replaced the door jamb and door on April 18, 2001 and subsequently, on April 19, PPD personnel Greg Mericks and Carl Lee added facing bricks and sealed the door jamb with no further problems noted. (On 19 April 2001, MLP #01-11 was closed.)
18 Apr 01	Previous reactor roof preventive maintenance inspection by PPD technician Gary Wallen had identified some raised seams that needed to be resealed and a missing lightning arrestor. Under MLP #01-12 and MWO #552923, Mr. Wallen sealed the raised seams and reinstalled a lightning arrestor rod holder on April 18, 2001. Subsequently, on April 20, after allowing the cement to set, Mr. Wallen returned and replaced the missing lightning arrestor with no further problems noted. (On 20 April 2001, MLP #01-12 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
30 Apr 01	The AIM3BL rustrak recorder had been working intermittently since April 5, 2001 as noted on several daily checkouts and walk-throughs and was completely non_functional since about April 16 with the Tech Spec required recording function met by the AMS[4] air particulate detector system so there was no impact on reactor operations. Under MLP #01-13, initial evaluation of the AIM3BL rustrak recorder failure was begun with no work accomplished in April or May. On June 14, 2001, the recorder was removed and found to have a failed rustrak which would have to be replaced with the entire AIM3BL out of service. A replacement rustrak recorder was ordered in July 2001 and arrived in August 2001 with the recorder plug replaced to fit the system on August 23. At year's end, the recorder still needs to be adjusted/calibrated with installation prior to return of the AIM3BL APD to service. (MLP #01-13 remains open.)
30 Apr 01	On April 27, 2001, during the daily checkout, the mechanical tach rpm indication for the stack dilute fan was noted to be somewhat low and unsteadily wavering at 480 rpm with the Tech Spec required rpm indication met by the hall effect tachometer so there was no impact on reactor operations. Under MLP #01-14, initial evaluation of the failing mechanical tach rpm indicator was begun with no results or work accomplished in April. Subsequently, on May 8, the DC generator signal was checked with the oscilloscope with the generator providing an erratic signal and apparently failed. Since the DC generator is difficult to replace and its function is redundant with the hall effect tachometer, a memorandum was generated on May 30, 2001 recommending removing the stack dilute fan mechanical tachometer from service. At year's end closeout of this recommendation awaits generation and approval of the modification package. (MLP #01-14 remains open.)
10 May 01	While performing low power reactor operator training operations for Laboratory Exercise #5, the 100 watt power level was reached at 1124 hours after commencing startup at 1051 hours. Subsequently, at 1129 hours, the 100 watt source alarm was checked at 100 watts and found to be inoperable. Following an unscheduled shutdown begun at 1130 hours and completed at 1132 hours, under MLP #01-15, the source alarm power supply was found to be failed and was replaced with an on-hand equivalent spare per 10 CFR 50.59 Evaluation Number 01-04 (Source Alarm Power Supply Replacement)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	with the source alarm verified operational and a daily checkout completed successfully at 1640 hours with restart approved with no further problems noted. Completed UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) is available for review. The source alarm was also verified operable as usual during the subsequent weekly checkouts on May 21 and May 29. This event was not considered promptly reportable since the unscheduled shutdown was undertaken immediately upon discovery; in addition, the source alarm had not been needed since last verified operable on May 7, 2001 during the weekly checkout since the source had not been used. Therefore, this occurrence was considered to have had negligible impact on reactor safety or the health and safety of reactor personnel or the public. (On 10 May 2001, MLP #01-15 was closed.)
21 May 01	During the weekly checkout, the shield tank demineralizer resins were noted to be nearing end of life with decreasing resistance in the shield tank water sample. Under MLP #01-16, the shield tank demineralizer resin cartridge was replaced with an on-hand spare to assure proper shield tank water resistivity with no further problems noted. (On 21 May 2001, MLP #01-16 was closed.)
23 May 01	During several daily checkouts, the primary coolant resistivity was noted to be increasing with a relatively small resistivity increase across the demineralizer recorded via the installed resistivity meters. Under MLP #01-17 and RWP #01-02-II, the primary coolant resins were removed to waste storage and replaced with fresh resins to restore proper demineralizer function and a large increase in resistivity across the demineralizer recorded via the installed resistivity meters with no further problems noted. (On 23 May 2001, MLP #01-17 was closed.)
24 May 01	In mid-May during a weekly checkout, the dilute fan drive belts were noted to be worn and nearing end of life with Physical Plant Division notified for replacement. Under MLP #01-18 (MWO #561000), PPD technician M. Tkac and assistant R. Flemming replaced the belts on May 24, 2001 with proper seating assured and tautness accounting for a small decrease in rpm indication in control room evaluated acceptable and with no further problems noted. (On 24 May 2001, MLP #01-18 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
24 May 01	At the end of the work day on May 22, 2001, a cell walk-through revealed a city water line pinhole spray leak at the northwest reactor cell corner. Since it was the end of the work day and not an emergency, the supply city water line valve was secured to eliminate the leak and the need for repairs called into Physical Plant Division. Subsequently, on May 24, 2001, under MLP #01-19 (MWO #560894), PPD technician Joe Shaw installed a soft patch to stop the leak and reopened the city water supply valve with no further problems noted. (On 24 May 2001, MLP #01-19 was closed.)
6 Jun 01	Prior to startup, the east area radiation monitor recorder needle was noted not to be deflecting. Under MLP #01-20, a loose wire connection was resoldered and the needle verified to be deflecting and operation verified satisfactory with no further problems noted. (On June 6, 2001, MLP #01-20 was closed.)
13 Jun 01	During the weekly checkout, the city water makeup demineralized water supply resins were noted to be losing effectiveness. Under MLP #01-21, the city water demineralizer resins were replaced to restore the source of demineralized makeup water with no further problems noted. (On June 13, 2001, MLP #01-21 was closed.)
18 Jun 01	While performing the Quarterly Scram Checks (Q-1 Surveillance) on June 18, 2001, Safety Channel 1 failed to provide a reactor trip when the test button was depressed to simulate a reduction in detector high voltage. Subsequent circuit analysis under MLP #01-22 determined that comparator A1 in the A-9 bistable card was drawing excessive current into the non-inverting terminal to which the reference signal is applied. This current draw loaded down the signal from the nominal 4.00V to 3.95V. During normal operation of the test circuit, the high voltage signal applied to the comparator's inverting terminal is reduced from 4.09V to 3.960V to simulate a 3.27% reduction in high voltage. The resulting polarity change across the comparator's input terminals should cause the bistable to trip, but since the comparator had loaded down the reference signal, the polarity change did not occur (the high voltage signal would have to have been reduced to 3.950V (corresponding to a 3.52% reduction in high voltage) to cause the bistable to trip). The test circuit simulates a 3.27% reduction in detector high voltage and the bistable card is normally adjusted to trip on this reduction, but with

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	the loading of the reference signal a reduction in high voltage of 3.52% would have been required to cause the trip. It was only the very conservative setting of the bistable trip point that caused the trip not to initiate during testing (and allowed the problem with the comparator to be discovered and corrected before the comparator exhibited further degradation). Had the actual detector high voltage signal decreased by more than 3.52%, a reactor trip would have occurred. Even with the comparator degradation, this trip point was still far more conservative than the 10% reduction trip point called for by the UFTR Technical Specifications. Subsequently, on June 19, 2001, the comparator was replaced and checked for proper operation to give the necessary simulated trip signal with no further problems noted. Since the failure did not involve an actual loss of trip function, there was no impact on reactor safety or on the health and safety of the public. In addition, the failure was discovered at shutdown conditions. (On June 19, 2001, MLP #01-22 was closed.)
20 Jun 01	A new large screen monitor was acquired to upgrade the temperature monitor computer monitor to provide more easily viewed operator input. Under MLP #01-23 and 10 CFR 50.59 Evaluation Number 01-05 (Upgrade Temperature Monitor Computer 15" Monitor with 21" Monitor), the new larger monitor was installed and tested to replace the smaller monitor with no problems noted. (On June 20, 2001, MLP #01-23 was closed.)
27 Jun 01	Following several spurious alarms of the north area radiation monitor in the previous several weeks, the north area radiation monitor began to go into continuous alarm with the indicator needle pegged high on the scale and unable to be reset. Under MLP #01-24, the monitor GM tube was replaced with an on-hand spare tube (LND714) with no further alarms noted over a six-hour test period during the remainder of the day. Subsequently, on June 28, 2001, the north area radiation monitor was subjected to a successful calibration check and returned to service. (On June 28, 2001, MLP #01-24 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
28 Jun 01	After the north area radiation monitor (ARM) alarm problem was corrected with installation of a replacement GM tube and the monitor successfully calibration checked, the north ARM chart recorder stopped functioning. This failure was thought to be related possibly to the surge from the failed GM tube replaced under MLP #01-24. Therefore, under MLP #01-25 the problem was investigated and the ARM chart recorder was replaced with a spare but no signal was obtained with the recorder still out of service at the end of June. During July 2001, the recorder output was checked, schematics were reviewed, the system was traced and ground paths investigated as time was available. Finally, the problem was isolated to the system grounds which were repaired to correct the problem on July 18. (On July 18, 2001, MLP #01-25 was closed.)
9 Jul 01	When the aboveground wastewater holdup tank recirculation valve was noted to be failed during recirculation prior to water release under MLP #99-19 on July 9, the rupture was investigated with various sealants and epoxies considered under MLP #01-26. The valve and a small piece of piping were replaced on July 10 to restore proper system operation with no further problems noted. (On July 10, 2001, MLP #01-26 was closed.)
18 Jul 01	When the grounds for the north area radiation monitor system were repaired under MLP #01-25, the +24 volt power supply was failed in the radiation monitoring system with attendant loss of the automatic evacuation siren compensated by the continuous presence of personnel for the two-hour outage period. Under MLP #01-27, the grounds for the power supply were repaired to restore the area radiation monitoring system to full operability as verified by appropriate checks, with no further problems noted. (On July 18, 2001, MLP #01-27 was closed.)
23 Jul 01	During the weekly checkout, the level in the primary coolant storage tank was noted to be nearing the lower allowed limit. Under MLP #01-28, a total of 35 gallons of demineralized water was added to the primary coolant storage tank to restore the full level with no problems noted. (On July 23, 2001, MLP #01-28 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
26 Jul 01	After commencing reactor startup at 1627 hours, the reactor reached 100 kW at 1644 hours with the rabbit system energized and ready to receive a test capsule at 1646 hours. As the regulating blade was being observed prior to capsule insertion, the reactor underwent a full trip with all blades dropped in and the water dumped to the coolant storage tank. The reactor was secured at 1647 hours with the scram limiting safety system settings indicated to be SAFETY 2, COOLANT PUMP, COOLANT FLOW and COOLANT LEVEL. Subsequently, the rabbit system was purged, deenergized and secured at 1647 hours and coolant flow was restored at 1652 hours for heat removal. Subsequently, the wide range drawer was noted to be pulse cycling from about 10 cps to about 1000 cps every few seconds. A check of the two-pen recorder showed this occurred after the trip but had not been occurring earlier. At this point, the POWER ON button was pushed dumping the coolant with no effect on the pulsing. Subsequently, under MLP #01-29, the WR drawer was deenergized to prevent the constant cycling. At this point, the meter would not respond to a test signal. On July 27, 2001 various calibration voltage values were checked and compared to the last calorimetric and found to have large discrepancies from expected values. In addition, preamps 1/P and 0/P were tested with 1/P satisfactory but 0/P apparently failed. On July 31, some additional verification tests were performed with the PuBe source in and out to test preamp 1/P with no success in verifying 0/P on the scope. At the end of July, the event was evaluated as caused by an electrical transient with the full trip initiated by Safety 2 due to an electrical transient induced loss of voltage, caused by an external event or perhaps whatever caused the problem in the WR drawer since they occurred at the same time. Although not considered to be promptly reportable based upon the trip coming from a known cause, Safety 2 (though without a certain root cause), plans were to contact NRC and update them on the event as troubleshooting in isolating the WR drawer failure proceeds. The event is noted to have had negligible effect on reactor safety with all safety and protection systems responding as expected and no effect on the health and safety of reactor personnel or the public. A completed up to approval of restart UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) was also generated.

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	During August 2001, the preamplifier and wide range drawer calibration card were tested and the calibration circuit analyzed and traced. NRE Department Chair visited for a status report on August 2. Subsequently, some potting compound was removed from the preamp which was analyzed extensively with the charge amplifier A-3 determined to be failed. Various discussions were held with a representative engineer of Sorrento Electronics (General Atomics) with the preamp shipped back to General Atomics on August 9. Following the engineer's recommendation, the B-10 detector was pulse tested successfully though the fission chamber could not be checked. The engineer also recommended replacing the connectors and cabling on both WR drawer detectors. Subsequently, radiography shielding was removed and the detectors located, checked with the boroscope and then both were removed under RWP #01-03-I on August 21 with both showing some degradation probably resulting in the high voltage pulse failing the preamp. The repaired preamplifier and two of three needed radiation resistant (non-Teflon) connectors were received from General Atomics at a cost of over $4,100. Cable assemblies were then fabricated and pulled through under RWP #01-03-I on August 28. With two connectors replaced on the fission chamber and one on the B-10 detector, the B-10 was reinserted under RWP #01-03-I but the close fit in the graphite opening would not allow the fission chamber to be reinserted. Therefore, on August 30, RWP #01-03-I was closed out and RWP #01-04-I was opened to control unstacking sufficient shielding to reach the detector location from above. The A-blocks were unstacked on August 30 and blocks B6–B3 and C8–C7 were unstacked on August 31. At year's end the interlocked nature of the graphite will require more blocks to be unstacked before sufficient graphite can be removed to access the detector locations (B-10 and FC) and identify the root cause of the problem. (MLP #01-29 remains open.)
30 Jul 01	On July 12, 2001 alarm systems supervisor Skip Rockwell and technician Wayne Gravely visited the facility to discover where new air handlers/coolers were to be installed. Mr. Rockwell returned on July 13 to indicate new larger capacity air handlers/coolers were to be installed in the non-reactor section of the annex with two new smoke detectors needed to be installed on the air handlers by the fire code. Subsequently, 10 CFR 50.59 Evaluation Number 01-06 (Fire Alarm System Zone 4 Upgrade) was developed with input from Mr. Rockwell and PPD project supervisor Tim Noland and approved as of

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	July 23, 2001. Subsequently, under MLP #01-30, this project was started with delivery of equipment and preliminary installation work occurring on July 30 with work continuing throughout August under PPD Project Manager Tim Noland. The new air handler was functional for cooling as of August 9, 2001 with preliminary checks on installation of Zone 4 smoke detectors performed on August 16 as the fire alarm system was taken out of service (compensated) briefly by PPD Alarm Systems technician W. Gravely. Subsequently, the system was taken out of service for about an hour as the smoke detectors were installed, verified operational and the fire alarm system returned to service by W. Gravely on August 21. The remainder of the month was spent completing duct work, installing a lock system on the new air handler closet and conducting an essential completion check with some minor items indicated yet to be completed at year's end. (MLP #01-30 remains open.)

MLP #94-14 remains open from 16 March 1994 (New Area Radiation Monitoring System).
MLP #96-30 remains open from 11 November 1996 (Security system Batteries).
MLP #99-43 remains open from 5 October1999 (New Hurricane Rods).
MLP #00-07 remains open from 1 March 2000 (City Water Motor Operated Valve).
MLP #00-09 remains open from 9 March 2000 (Auxiliary Stack Monitor Meter/Alarm Modification).
MLP #01-13 remains open from 30 April 2001 (AIM3BL Chart Recorder).
MLP #01-14 remains open from 30 April 2001 (Diluting Fan Mechanical Tach).
MLP #01-29 remains open from 26 July 2001 (Wide Range Drawer).
MLP #01-30 remains open from 30 July 2001 (Zone 4 Air Handler Fire Alarm System Upgrade).

VI. CHANGES TO TECHNICAL SPECIFICATIONS, SAFETY ANALYSIS REPORT, STANDARD OPERATING PROCEDURES AND OTHER KEY DOCUMENTS

This chapter contains a narrative description and status report on the various changes to key UFTR license-related documents that occurred during the 2000-2001 reporting year. As such, this chapter provides a ready reference for the status of various license-related documents to include Technical Specifications, Safety Analysis Report, Standard Operating Procedures, Emergency Plan, Security Response Plan, Reactor Operator Requalification and Recertification Training Program, HEU-to-LEU Conversion Documents as well as Quality Assurance Program Approval for Radioactive Material Shipments and other key documents as they are generated or changed.

A. Changes to Technical Specifications

The new Technical Specifications for the UFTR were issued on August 30, 1982 and officially established on September 30, 1982. Two sets of requested corrections/changes to the Technical Specifications were submitted to the NRC during the 1982-83 reporting period. As noted in the 1983-84 annual report, the UFTR facility received approval for Amendments 14 and 15 to the UFTR Technical Specifications during that reporting year. As noted in the 1985-86 annual report, the UFTR facility requested and received approval for Amendment 16 in that year to correct an error in numbering Section 3.5 which had been incorrectly numbered Section 3.4.

Approved license (Tech Spec) Amendment 17 was received on May 3, 1988 per a letter from NRC dated April 27, 1988. The approved amendment consisted of a revision to the Tech Specs to permit conducting certain activities when the reactor is shutdown, the reactor vent system is secured and the stack monitor is reading greater than 10 cps. This Amendment 17 is basically a relaxation of UFTR Technical Specifications in Section 3.4.3 as a limiting condition for operation which states that "the vent system shall be operated until the stack monitor indicates less than 10 counts per second." As requested by NRC and submitted by the licensee, the Tech Specs were also revised to include a backup means for quantifying the radioactivity in the effluent during abnormal or emergency operating conditions in addition to administrative changes. The backup core vent sampling system was installed on May 4, 1988 and available for all subsequent reactor operations.

For the 1992-93 reporting year, Tech Spec Amendment 18 was submitted to NRC with a letter dated September 28, 1992. Approved license (Tech Spec) Amendment 18 was received on March 29, 1993 per a letter from NRC dated March 25, 1993. The approved amendment consisted of a revision to the Tech Specs to permit submittal of the annual report of activities up to December 31, rather than November 30 of each year. Also, the current mailing address for the annual report was changed to correspond to the current NRC mailing requirement.

For the 1993-94 reporting year, two Tech Spec Amendments were submitted. Tech Spec Amendment 19 was submitted to NRC with a letter dated December 2, 1993. Approved license (Tech Spec) Amendment 19 was received on March 10, 1994 per a letter from NRC dated

March 25, 1993. The approved amendment consisted of a revision to address the revised 10 CFR Part 20; areas addressed include updating the limitation on Argon-41 discharge concentrations, updating the references to Part 20 for liquid and gaseous effluent discharges and changing the reference to "Maximum Permissible Concentration" to "maximum concentration," correcting the 500 mrem/yr federal limit to 100 mrem/yr for members of the public, and deleting any reference to active plans to upgrade the UFTR to 500 kW operation. Documentation for Amendment 19 is contained in Appendix A of the 1993-94 annual report.

Tech Spec Amendment 20 was submitted to NRC with a letter dated June 2, 1994. This initial request was to permit sanitary sewage system disposal of aqueous radioactive material in accordance with 10 CFR Part 20.2002. In late August 1994, NRC staff members indicated the amendment as proposed did not address the proper sections of the new Part 20 for releases from the facility holdup tanks. As of a conference call with NRC staff on September 1, 1994, it was decided to amend the submission to address the releases from the holdup tank as normal effluents versus waste; that is, to address effluents and refer to 10 CFR Part 20.1301 and 10 CFR Part 20.1302 in Paragraphs (1) and (2), respectively, of Section 3.4.5 of the UFTR Technical Specifications on Page 12 entitled "Liquid Effluents Discharge." The key here is the facility releases via the holdup tanks are to meet normal effluent requirements; they are not to be considered waste. During review of the draft submission deleting references to all attachments to the earlier amendment submission, it was also decided to change the UFTR technical specifications in Section 4.2.4, Paragraph (3) on Page 20 to refer to release of liquid effluents versus radioactive waste in agreement with the change to Section 3.4.5 and with the existing title of Section 4.2.4 which is "Radiation Monitoring Systems and Radioactive Effluents Surveillance."

For the 1994-95 year, these changes in the revised Amendment 20 letter and attachments were mailed to NRC as a letter dated September 9, 1994. After a number of inquiries and discussions, this License Amendment 20 (Tech Specs) was finally approved by NRC per a letter dated February 6 and received on February 10, 1995. All the documentation for Tech Spec Amendment 20 including the revised Amendment 20 letter and attached Tech Spec change pages 12 and 20 as well as the letter notifying issuance of the amendment, the amendment indicating it is effective on the date of issuance as February 6, 1995, along with the amendment pages and the NRC Safety Evaluation supporting the amendment are contained in Appendix A of the 1994-95 annual report.

For the 1995-96 reporting year, one Tech Spec Amendment was submitted. Tech Spec Amendment 21 was submitted to NRC with a letter dated August 2, 1996, all of which is in Appendix A of the 1995-96 annual report. The only change is at the beginning of Section 6.6.1 and simply allows two additional months for submittal of the "routine annual report covering the activities of the reactor facility during the previous calendar year." Because December is normally a relatively high activity month at the UFTR facility with the end of fall semester classes and because a number of other commitments also come due in December, plus facility staff typically take leave time after the end of classes, this change to allow two further months for submittal is expected to provide assurance that this report can be filed on time to avoid the problem of failure to submit reports cited in NRC Inspection Report 50-83/96-01. This change as requested is not considered to have any safety significance and involves an administrative change only. Approved Tech Spec Amendment 21 was received on October 15, 1996 per a letter from NRC dated October 10, 1996 as the effective date of the amendment allowing submittal of the UFTR annual report of activities six

months following the end of the reporting year which occurs on August 31 each year. The full NRC transmittal including the cover letter, the amendment indicating it is effective on the date of issuance as October 10, 1996 along with the amendment pages and the NRC Safety Evaluation Report supporting the amendment are contained in Appendix A of the 1995-96 report.

For the 1996-97 reporting year, one more Tech Spec amendment was submitted. Tech Spec Amendment 22 was submitted to NRC with a letter dated August 21, 1997. The first change is on Figure 6.1 (UFTR Organization Chart) on page 30 in the Level 1 organization box which is updated to reflect the name change from the "Department of Nuclear Engineering Sciences" to the "Department of Nuclear and Radiological Engineering" for the department that continues to be responsible for operation of the University of Florida Training Reactor. The submittal notes that this change was initiated by the faculty of the department to reflect better the educational and research activities and goals of the department and was approved by the University of Florida administration; the change is in name only as the same administrative structure continues in existence. On page 32, this same department name change is made once in paragraph 6.2.5(1), Composition and Qualifications, and three times in paragraph 6.2.5(2), Charter and Rules, subparagraph (a) of Membership. Finally, on page 37, at the end of Section 6.6.1 (Operating Reports), the Attention Line is moved to the second line of the NRC's Washington, DC address. In addition, the address for submission of annual reports to NRC Region II is deleted to reflect the transfer of the Non-Power Reactor Inspection Program from the NRC Region II office to the Office of Nuclear Reactor Regulation, Non-Power Reactor Directorate per a letter from Luis A. Reyes, Region II Regional Administrator dated August 1, 1997 and received on August 7, 1997. These changes as requested are not considered to have any safety significance and involve nomenclature/administrative changes only. This entire Amendment 22 submittal package was contained in Appendix B of the 1996-97 report. Approval for this change request had not yet been received at the end of the 1996-97 reporting year.

A letter dated December 3, 1997 from NRC Project Manager Theodore S. Michaels approving Tech Spec Amendment 22 was received on December 8, 1997. Enclosures with the letter enumerating the changes involved in Amendment 22 included Amendment 22 to the Facility Operating License signed by Seymour Weiss, Director of the NRC Non-Power Reactors and Decommissioning Project Directorate and dated December 3, 1997 along with directions for inserting the three amendment pages and the three pages (30, 32, 37) themselves plus the two-page Safety Evaluation supporting Amendment 22 to Facility License No. R-56. Amendment 22 was subsequently prepared for insertion and inserted in document manuals during December 1997. Since that time there have been no further Tech Spec changes or requests for changes.

No further requests for changes in the approved Tech Specs are anticipated for the operation of the UFTR with its present high-enriched fuel at a rated power level of 100 kWth. It is expected, however, that another substantive amendment to the Technical Specifications will be required before the UFTR can be converted from utilizing high-enriched MTR plate-type fuel to utilizing low-enriched silicide plate-type fuel. New Tech Specs will also be generated for the submittal requesting a renewed UFTR R-56 License due to expire on August 30, 2002.

B. Revisions to UFTR Final Safety Analysis Report

FSAR Revision 5 was submitted to NRC and inserted in the UFTR Safety Analysis Report (FSAR) in 1988 to incorporate changes that were the result of ongoing reviews of the UFTR Safety Analysis Report to assure updated accurate contents. Revision 6 of the FSAR comprises a complete updating of Chapter 11 (Radioactive Waste Management) of the UFTR Safety Analysis Report as part of a continuing effort to assure an accurate document for controlling facility operations. This revision was submitted to NRC with a letter dated September 18, 1989. During the 1991-92 reporting year, Revision 7 of the UFTR FSAR was submitted with a letter dated April 3, 1992 and consisted of changes to two pages. The first change was on Page 5-8 to allow use of an equivalent deep well pump per the slightly changed but equivalent description in Section 5.2 describing the UFTR Secondary Cooling System. The second change was to Page 9-6 in Sections 9.2.3 and 9.2.4 to allow use of an equivalent resin in the Demineralized Water Makeup System and the Primary Coolant Purification System because the Amberlite IRN-150 nuclear grade resins previously specified for use in the purification systems are no longer available.

Revision 8 of the UFTR Safety Analysis Report dated 5/95 was submitted to NRC with a letter dated May 11, 1995. Revision 8 consists of changes to two pages. The revision resulted from the need to make certain minor changes in the schematics describing the UFTR Secondary Water Cooling System to reflect modifications that have been implemented. There were no textual changes required in the Safety Analysis Report.

Revision 9 of the UFTR Safety Analysis Report dated 8/95 was submitted to NRC with a letter dated September 14, 1995 and consists of changes to two chapters. Although the changes were initiated for only several pages as a result of the CY 1993 audit by the Reactor Safety Review Subcommittee, continuing review resulted in changes on Pages 1 through 5 and Pages 19 and 20 of Chapter 12 (Radiation Protection) and a complete update of all pages for Chapter 13 (Conduct of Operations). The changes are not considered to involve any unreviewed safety question or to impact the UFTR Safety Analysis and include a number of simple wording clarifications, updates of organization names, corrected document references, deletion of references to UFTR power upgrades, updates of surveillance references and examples, update of UFTR administrative structure diagram to delete specific named individuals as well as a number of corrections to match Tech Spec requirements, and many typographical error corrections made in the interest of readability. There are also a number of changes made to match the designations in Chapter 13 with the current approved UFTR Requalification and Recertification Training Program. For details on the changes in Revision 9, the reader is referred to complete documentation for FSAR Revision 9 contained in Appendix B of the 1995-96 annual report.

For the 1996-97 reporting year, Revision 10 of the UFTR Safety Analysis Report was submitted to NRC with a letter dated March 17, 1997. This change was approved as 10 CFR 50.59 Evaluation and Determination Number 97-03; it was made to correct inconsistent labeling of scales for percent power and power level in Figure 7.2 (Operating Range of UFTR Neutron/Power Level Detectors) on page 7-5. The complete submittal for FSAR Revision 10 including letter of transmittal and revised page 7-5 labeled "REV10, 3/97" was contained in Appendix C of the 1996-97 annual report. As expected, there was no response on this submittal to date but it was inserted into facility copies of the FSAR in the 1996-97 reporting year. Although the facility submitted no revisions to

the UFTR Final Safety Analysis Report during the 1997-98 reporting year, a considerable effort was undertaken to assure all copies of the FSAR through Revision 10 are complete and uniformly documented, signed off as complete, and maintained available around the facility.

During the 1998-99 reporting year, Revision 11 to the UFTR Safety Analysis Report (FSAR) was initiated as a result of changes in personnel monitoring badges supplied to the University by the NVLAP-accredited supplier (Landauer). By memorandum dated December 10, 1998 and received on December 16, 1998, the UFTR facility was informed by the Radiation Control Office that the University's dosimeter company, NVLAP-certified Landauer, Inc., was switching from film badges to Luxel dosimeters for personnel monitoring badges. The memorandum as well as the Luxel Dosimeter Information Sheet and a Radiation Dosimeter Fact Sheet were used to support 10 CFR 50.59 Evaluation and Determination Number 98-10 (Personnel Monitoring Device Change from Film/TLD Badges to Luxel Dosimeters) supporting the change in dosimetry and the associated change in the UFTR Safety Analysis Report as well as various procedural changes (Temporary Change Notices, or TCNs, for SOP-A.8, SOP-C.3, SOP-D.2, SOP-D.3, SOP-D.4 and SOP-D.5) to refer to personnel monitoring badges instead of film badges. During January 1999, the various procedural changes and the change to the FSAR were developed for review and approval at the February 11, 1999 RSRS meeting after which they were implemented in late February 1999. The new radiation dosimetry report now reports data for the new Luxel dosimeter down to 1 millirem versus the previous 10 millirem limit.

This change was submitted to NRC with a cover letter dated February 19, 1999. Essentially, this change was made because the University-contracted NVLAP-approved supplier of personnel radiation monitoring badges has now changed from using film to using Luxel dosimeters in their badges. Other extra badges for some operators were already utilizing thermoluminescent dosimeters (TLDs). The change occurs in FSAR Section 12.3.4.4 on page 12-20 where the reference to operators and other personnel working in the reactor wearing "film badges" at all times is changed to read wearing "film, TLD, Luxel or other individual personnel monitoring badges" in the first two lines of the first paragraph. The change is general to allow various types of radiation sensitive materials to be used in personnel monitoring badges. Currently, the Luxel dosimeter is the primary material with supporting documentation showing this material to be superior to film; nevertheless, sufficient generality is incorporated in the new wording so that any change by the NVLAP-approved supplier, whoever it might be that is contracting with the University, would be allowable under the Safety Analysis Report. The usual vertical line in the page margin is used to delineate the change in the report so that it is easily located.

This Revision 11 change was fully reviewed by UFTR management and by the Reactor Safety Review Subcommittee to assure no unreviewed safety question was involved and so is not considered to relax the requirements for assuring protection of the health and safety of the public and of the reactor facility. The change simply updates the Safety Analysis Report to reflect the existing facility and its operations by updating the allowable types of personnel monitoring badges to be worn by those working in the reactor. A copy of the transmittal letter dated February 19, 1999 and mailed on February 22, 1999 and the revised FSAR page 12-20 is Attachment III to the facility February 1999 monthly report which is available at the facility for those interested. To date there has been no formal response from the NRC nor is any expected as this does not constitute an unreviewed safety

question. This change was incorporated into all facility copies of the UFTR FSAR in February 1999 to close out this change.

There have been no other subsequent revisions of the UFTR FSAR. However, with completion of most neutronics and thermal-hydraulics analyses to support the HEU-to-LEU conversion, other FSAR updates are planned as necessary to keep the FSAR current and to support the planned HEU-to-LEU fuel conversion and subsequent preparations for relicensing the UFTR.

C. Generation of New Standard Operating Procedures

One new Standard Operating Procedure (SOP) was generated during the 1999-2000 reporting year but no new SOPs were generated during the latest 2000-2001 reporting year. This condition marks the maturity of the UFTR Standard Operating Procedures as great efforts have been undertaken to implement good practice requirements in generating new procedures. At the end of the reporting year, also in contrast to many earlier previous years, no further new procedures are in progress.

D. Revisions to Standard Operating Procedures

All existing UFTR Standard Operating Procedures were reviewed and rewritten into a standard format during the 1982-83 reporting period as required by a commitment to NRC following an inspection during that year. As committed to NRC, the final approved version of each SOP (except certain security response procedures which are handled separately) is permanently stored in a word processor to facilitate revisions and updates which are incorporated on a continuing basis in the standard format.

Table VI-1 contains a complete list of the approved UFTR Standard Operating Procedures as they existed at the end of the previous (1999-2000) reporting year exclusive of applicable Temporary Change Notices (TCNs) since these do not change procedure intent. Table VI-2 contains a similar complete up-to-date list of the approved Standard Operating Procedures as they exist at the end of the current (2000-2001) reporting year. The latest revision number and date for each non-security (not withheld from public disclosure) related procedure is listed in Table VI-2 in parentheses for each SOP; TCNs refer to minor changes made to an SOP in lieu of a full revision and are not noted on the two tables to simplify the presentation. A comparison of Tables VI-1 and VI-2 indicates that there was only one revision to SOPs generated during this reporting year. There were five revisions to SOPs generated during the last (1999-2000) reporting year versus no revisions to SOPs generated during the previous (1998-99) reporting year versus two in 1997-98, three in 1996-97 and none in the 1995-96 reporting year which was in contrast to the significant administrative effort by UFTR facility staff when eight revisions were generated in the 1994-95 reporting year. The most common reasons for SOP revisions are to update minor inconsistencies, correct typographical errors, clarify intent, collect all previous TCNs, etc. Few revisions involve any substantial change in procedural intent but are intended to clean up the procedure in question, usually as a result of the biennial evaluation of procedures (B-4 Surveillance).

Part of the reason for five revisions in the last reporting year was simply that the biennial review and evaluation of all procedures (B-4 Surveillance) was performed in that year. The one revised procedure for this year as noted in Table VI-2 is SOP-E.4 which was revised twice:

- SOP-E.4, "UFTR Nuclear Instrumentation Calibration Check" (REV 2, 12/00)
- SOP-E.4, "UFTR Nuclear Instrumentation Calibration Check" (REV 3, 3/01)

A copy of each revision is available at the UFTR facility for review if desired.

The first revision (REV 2, 12/00) was primarily to collect various changes but the second revision (REV 3, 3/01) was primarily required due to the modification implemented for the temperature monitor/recorder system.

In contrast to recent previous years when twenty-nine TCNs were issued in 1995-96, eleven in 1996-97, eight in 1997-98, fifteen in 1998-99, and twenty in 1999-2000, a total of only nine (9) TCNs were issued in this 2000-2001 reporting year to correct minor discrepancies or better express the unchanged intent of seven (7) different procedures including SOP-0.5, SOP-A.1, SOP-A.2, SOP-A.3, SOP-A.4, SOP-D.7, and SOP-E.4. Two of these procedures, SOP-0.5 and SOP-E.4 had two TCN changes during the reporting year. It should be noted that the TCNs for SOP-0.5 (QA Program) simply updated surveillance data sheets; the other TCNs usually affected one or at most a few pages. When more pages are affected, a revision is usually generated.

As noted above, the TCNs involve minor changes affecting one or a few sections of the respective SOP, sometimes as little as a single sentence. All were fully reviewed by UFTR facility management and approved by the RSRS. Because of the quantity of paper involved and the relatively minor nature of TCNs, copies of these SOP changes or the SOPs as currently revised and implemented are not included in this report. A copy of each may, however, be obtained directly from the UFTR facility if desired.

E. Revisions to UFTR Emergency Plan

With a letter dated December 10, 1992, Revision 8 was submitted to the NRC, providing updates and minor revisions to fifteen (15) pages. In a letter dated July 20, 1993, the NRC notified the facility of their evaluation that these changes do not decrease the effectiveness of the Plan which maintains compliance with 10 CFR 50 Appendix E. Therefore, the approved changes were incorporated into the current Emergency Plan. Revision 8 was then distributed to all holders of the Plan with a letter dated August 2, 1993 just prior to the beginning of the 1994-95 year.

During the 1994-95 reporting year, with a letter dated January 20,1995, Revision 9 was completed and submitted to the NRC. Revision 9 consists of a set of updates and revisions to thirteen (13) pages: iii, iv, 1-12, 5-1, 5-2, 7-5, 7-6, 7-7, 8-2, 8-3, 10-2, 10-6 and 11-1, as well as Appendix I – Shands Teaching Hospital and Clinics, Inc. Plan for Emergency Handling of Radiation Accident Cases. In addition, Appendix II – Agreement Letters and Appendix III – Emergency Implementing Procedures were to be removed from the Plan.

Revision 9 was reviewed by UFTR management and the Reactor Safety Review Subcommittee (RSRS) to assure Revision 9 did not decrease the effectiveness of the UFTR Emergency Plan. All the changes were considered relatively minor in nature; they were the result of reviews of the Plan and our response to simulated emergencies following emergency drills. The two revised emergency procedures (SOP-B.1 and SOP-B.2) were implemented in early February 1995. Further minor revisions to SOP-B.1 were implemented in July 1995. Minor revisions to SOP-B.2 were implemented in August 1995. The remainder of the changes were not implemented during the 1994-95 reporting year awaiting NRC approval of the submittal before distributing changes to holders of the Emergency Plan. Except for discussing the implementation of the revised emergency procedures and the general content and scope of Emergency Plan Revision 9 with Craig Bassett during a call on January 26, 1995, and documenting his favorable evaluation, there had been no response from NRC up to August 1995. Documentation for Emergency Plan Revision 9 omitting the emergency procedures and including only the title page and signature page for the "Shands Hospital Emergency Department Plan for Emergency Handling of Radiological Accident Cases" was contained in Appendix D of the 1994-95 report.

In a letter dated October 10, 1995, the NRC indicated that their staff had reviewed this Revision 9 and found that the changes in the body of the plan as well as the new Shands Hospital Emergency Plan in Appendix I are acceptable and can be implemented without prior NRC approval in accordance with 10 CFR 50.54(q). However, in addition to these minor modifications, the NRC letter indicated that certain other changes, i.e., removal of Appendix II – Letters of Agreement, and Appendix III – Emergency Implementing Procedures were found to be of a substantive nature. These changes were reviewed by the NRC staff for their impact on the effectiveness of the Plan and/or their potential safety significance which concluded that the Letters of Agreement should be an integral part of the Plan and must be maintained in the Emergency Plan on the basis that their removal would decrease the effectiveness of the Plan. Further, the NRC found that the Emergency Implementing Procedures may be removed from the Plan; however, a list of these procedures, by title, must be referenced in the Plan. A copy of this NRC letter approving Emergency Plan Revision 9 subject to the above noted limitations is contained in Appendix F of the 1995-96 annual report. Subsequently, all of the Revision 9 changes were incorporated into the Plan with the exception that the Letters of Agreement were left in Appendix II and a list of the Emergency Implementing Procedures by title is referenced in the Plan as had been incorporated into Revision 9. This Revision 9 was completely implemented and supplied to all Emergency Plan holders in December 1995.

During the 1996-97 reporting year, with a letter dated April 10, 1997, Revision 10 of the UFTR Emergency Plan was completed and submitted to the NRC. Revision 10 of the Emergency Plan consists of a set of updates and revisions to thirteen (13) pages: ii, iv, 1-11, 3-1, 3-2, 3-3, 3-4, 3-5, 3-8, 7-1, 8-1, 8-4 and 8-5, as well as Appendix I - Shands Teaching Hospital and Clinics, Inc. Plan for Emergency Handling of Radiological Accident Cases and Appendix II - Agreement Letters. First, Figure 1.8 on page 1-11 is updated to show a large addition made to the J.W. Reitz Union building and show its location a little better. This addition has no effect on UFTR building access routes.

Second, there are a number of changes on six pages in Chapter 3, all updating the Plan to account for various department name changes. On page 3-1, section 3.1, paragraph 1 is updated in two places to reflect the name change from the "Department of Nuclear Engineering Sciences" to the

"Department of Nuclear and Radiological Engineering" and also to correct a misspelling where "education" should be "education." On page 3-2, the UFTR Organization Chart in Figure 3.1 is updated to reflect the name change from the "Department of Nuclear Engineering Sciences" to the "Department of Nuclear and Radiological Engineering" in the Level 1 organization box. On page 3-3, section 3.2.3, line 4 is updated to reflect the name change from the "Department of Nuclear Engineering Sciences" to the "Department of Nuclear and Radiological Engineering" and section 3.3 is updated in two places to reflect the name change from the "State of Florida Department of Health and Rehabilitative Services Office of Radiation Control" to the "State of Florida Department of Health, Bureau of Radiation Control." On page 3-4, section 3.4.3 is changed to correct a typographical error in the reference to the Shands Hospital "Plan for Emergency Handling of Radiation Accident Cases" which is changed to the "Plan for Emergency Handling of *Radiological* Accident Cases." In addition, on page 3-4, section 3.4.4 is updated to correct an incorrect word in line 2 so that "of" the environs now reads "to" the environs. Also on page 3-4, section 3.4.5 is updated as the section title changes from "State of Florida Office of Radiation Control" to the "State of Florida Bureau of Radiation Control" and the first line of the section 3.4.5 text is updated to reflect the name change from the "State of Florida Department of Health and Rehabilitative Services Office of Radiation Control" to the "State of Florida Department of Health, Bureau of Radiation Control." On page 3-5, section 3.5 is updated near the end of the first paragraph to reflect the name change from the "State of Florida Department of Health and Rehabilitative Services Office of Radiation Control" to the "State of Florida Department of Health, Bureau of Radiation Control." On page 3-8, section 3.9 is updated to reflect the name change from the "State of Florida Department of Health and Rehabilitative Services Office of Radiation Control" to the "State of Florida Department of Health, Bureau of Radiation Control."

Third, on page 7-1, section 7.1.1, paragraph 4 is updated to reflect the name change from the "Department of Health and Rehabilitative Services" to the "Department of Health."

Fourth, there are changes to three pages in Chapter 8, one to account for a name change and two to correct typographical errors. On page 8-1, section 8.2, paragraph 2 is updated to reflect the name change from "Department of Nuclear Engineering Sciences" to the "Department of Nuclear and Radiological Engineering." On page 8-4, section 8.3, paragraph 1 is changed to correct a typographical error in two references to the "Plan for Emergency Handling of Radiation Accident Cases" which are changed to the "Plan for Emergency Handling of *Radiological* Accident Cases." Similarly, on page 8-5, section 8.3.4 is also changed to correct the typographical error in the reference to the "Plan for Emergency Handling of Radiation Accident Cases" which is changed to the "Plan for Emergency Handling of *Radiological* Accident Cases." Also on page 8-5, section 8.4, paragraph 1, the area code for the telephone in the Emergency Support Center is noted to be changed to reflect the new Gainesville area code so the number becomes "*352*-392-1428" versus "904-392-1428."

Fifth, Appendix I of the UFTR Emergency Plan is updated by removing the version dated 12/94 and adding the latest updated version of the Shands Hospital "Plan for Emergency Handling of Radiological Accident Cases" dated 12/95. The Appendix I cover sheet is also updated to reflect the typeface used for other changes.

Sixth, Appendix II of the UFTR Emergency Plan is updated by removing older versions of agreement letters for the Alachua County Office of Emergency Management and Shands Teaching Hospital and Clinics Inc. and replacing them with current letters dated December 10, 1996 for the Office of Emergency Management and March 20, 1997 for Shands.

Finally, the Table of Contents is updated on page ii to reflect the name change in section 3.4.5 from the "State of Florida Office of Radiation Control" to the "State of Florida Bureau of Radiation Control" and on page iv to add back Appendix II – Agreement Letters, removed inadvertently with Revision 9.

Several changes were also made in SOP-B.1, "Radiological Emergency," primarily as a result of the recent name changes. However, the Emergency Procedures are no longer contained in the Emergency Plan document but are maintained separately, so these changes were not submitted for approval since they are not part of Revision 10 of the Emergency Plan.

As indicated, all these Revision 10 changes were reviewed by UFTR management and by the Reactor Safety Review Subcommittee to assure they do not decrease the effectiveness of the UFTR Emergency Plan. In general, these changes make the Plan better suited to assuring a proper response to emergencies at the University of Florida Training Reactor.

In a letter dated August 22, 1997 and received on August 28, 1997, NRC Senior Project Manager of the Non-Power Reactors and Decommissioning Project Directorate, Division of Reactor Program Management, Office of Nuclear Reactor Regulation, acknowledged receipt of Revision 10 to the University of Florida Training Reactor Emergency Plan. Based on our determination that the changes do not decrease the effectiveness of our Emergency Plan, and that it continues to meet the requirements of Appendix E to Part 50, the letter indicated NRC approval is not required. The letter also notes their initial review of these changes indicates them to be in accordance with 10 CFR 50.54(q). However, implementation of these changes will be subject to inspection to confirm that they did not decrease the effectiveness of our Emergency Plan. The submission to the NRC including the cover letter summarizing Revision 10 plus the changes themselves are included in Appendix E except that only the first page of the Shands "Plan for Emergency Handling of Radiological Accident Cases" is included in the interest of space. In addition, the attachments are deleted from the agreement letter from Alachua County Emergency Management. Both are available at the UFTR facility for those interested. A copy of the Project Manager's acknowledgment letter is also available at the facility.

At the end of September 1997, preparations were under way to install this revision in all facility copies of the Emergency Plan and to send them to all off-site holders of the Emergency Plan. In October, with a memorandum dated October 17, 1997, copies of the changes were sent to all off-site holders of the plan with directions for insertion. Subsequently, Pam Koltz of UPD called to say that part of their copy of the Emergency Plan was missing and they needed a new copy. Subsequently, a complete current copy of the Emergency Plan in a 3-ring binder for ease of inserting future changes was supplied to UPD.

At the end of October 1997, preparations were under way to obtain 3-ring binders for all facility copies of the Emergency Plan to facilitate insertion of changes and to track locations on all

copies as is done for SOP manuals. The binders were obtained in November and the necessary cover pages planned for tracking purposes. All facility copies of the Emergency Plan were converted in this way with new 3-ring binder copies placed in assigned locations including Director's office, control room, staff offices and Emergency Support Center during the month of December 1997 with a page inserted in all binder copies for ease of tracking future updates.

During the 1998-99 reporting year, Revision 11 to the approved UFTR Emergency Plan was submitted to NRC with an explanatory cover letter dated February 18, 1999. These changes are considered relatively minor in nature and are the result of reviews of the Plan and UFTR plans for and responses to simulated emergencies. Most are simple changes to account for name changes or correct typographical errors.

Revision 11 consists of a set of updates and revisions to twenty-three (23) pages: title page, ii, iii, 1-3, 1-12, 2-2, 3-2, 3-7, 3-8, 7-1, 7-2, 7-3, 7-4, 7-5, 7-6, 7-7, 7-8, 8-1, 8-4, 8-5, 9-1, 10-1 and 10-3, as well as Appendix II - Agreement Letters. The new pages are marked with the usual vertical lines for easy location of specific changes. In this letter, the page number and line references are to those in your current copy of the Emergency Plan.

First, the title page is updated to reflect inclusion of Revision 11 and the Table of Contents is updated on page ii to reflect and add the inadvertently omitted record of the REV 8, 12/92 change for tracking purposes on the bottom of the page. Also on page ii, the location of section 3.8 is updated to appear on page 3-8 due to page reformatting. On page iii, the locations of many of the sections in Chapter 7 are updated due to page reformatting that occurred with the retype of the entire chapter. Also on page iii, the title of section 7.2.4 is changed from "Protection Actions" to "Protective Actions" to match the section 7.2.4 in Chapter 7. In addition, the typographical error "ssessment" in the title of section 7.4.2 is corrected to be "Assessment."

Second, there are a number of changes on two pages in Chapter 1. On page 1-3, section 1.3.2, paragraph 2 in line 1, designation of the "reactor room or cell (area 101)" is changed to "reactor room or cell (Rooms 5 and 6)" to reflect renumbered reactor building rooms from several years ago. Similarly, in paragraph three, line five, "reactor cell (area 101)" becomes "reactor cell (Room 5)," in line eight, "radiochemistry laboratory (area 104)" becomes "radiochemistry laboratory (Room 3)" and in line 10, "offices (area 201)" becomes "offices (Room 103)." On page 1-12, section 1.5, paragraph 3, at the end of line 2 in subparagraph (1), the word "place" is a typographical error and is corrected to be "plate."

Third, on page 2-2, in the definition of Facility Director, the reference to "his" designate is updated to "a" designate to eliminate a gender specification. In the definition of Offsite, the word "Offsite" is changed to be underlined as "Offsite" for consistency of presentation. In the definition of Operations Boundary, a sentence is added to clarify that the *"operations boundary includes the west fenced lot as necessary."* This addition allows for evolutions such as fuel and waste shipments as well as potential accidents where this lot is subject to operations control for these evolutions. This is also a designation that has been traditionally understood for such evolutions.

Fourth, there are a number of changes on three pages in Chapter 3. In Figure 3.1 on page 3-2, the UFTR Organization Chart is updated to correct a typographical error carried over from

Revision 10, 2/97 to change "Radiation Control Office" at Level 3 in Figure 3.1 to "Radiation Control Officer" to agree with Figure 6.1 in the UFTR technical specifications.

On page 3-7, in section 3.6, line 1 is updated to reflect the name change from "Nuclear Engineering Sciences Department" to "Nuclear and Radiological Engineering Department" to reflect the name change from late 1996 that was inadvertently omitted in the Revision 10, 2/97 change to the Emergency Plan. Also in section 3.6, in line 4 the reference to "Gainesville fire department" is changed to "City of Gainesville Fire/Rescue Department," and the reference to "Alachua ambulance service" is changed to "Alachua County Ambulance Service" as the proper designations. These updates required additional space on page 3-7 with subsequent reformatting of section 3.8 from the bottom of page 3-7 to the top of page 3-8. On page 3-8, the first section to appear at the top of the page is now 3.8, "Emergency Coordinator."

Fifth, all pages in Chapter 7 are being replaced with Revision 11. All pages reflect reformatting changes where certain sections or partial sections now appear on the next page; four of the older version pages include specific updates and/or corrections referenced as follows: On page 7-2, in section 7.1.2.1.1, the reference to "parking lot" at the end of the first partial paragraph is changed to "service drive" since the referenced area outside the southwest door of the Nuclear Sciences Center is a service drive, not a parking lot. Also on page 7-2, in section 7.1.2.2, the first sentence is reworded to say "*the use of* respiratory *protection* equipment and protective clothing shall be *considered* whenever airborne contamination is suspected . . . *and then used as appropriate*," instead of requiring its use to reflect better the requirements of the new 10 CFR Part 20 where internal and external dose are considered equivalent and overall dose is to be minimized. Also in section 7.1.2.2, in line 4 the reference to the "City of Gainesville Fire Department" is changed to "City of Gainesville Fire/Rescue Department" as the proper designation. In addition, section 7.1.2.2, line 3 and section 7.1.2.4, line 5 are updated so the words "Decon Room" and "Decontamination Room" are changed to "Emergency Support Center" to reflect better the proper designation for the facility that serves as the response center location for addressing emergencies.

On page 7-3, section 7.1.2.4, paragraph (a) is updated so the words "of" at the end of line 1 and "rate" in line 3 are removed as typographical errors. In line 2 of that same paragraph, the reference to "his" delegate is updated to "a" delegate to eliminate a gender specification. Also on page 7-3, section 7.1.2.4, paragraph (b), line 2 and section 7.2.1, paragraph 1, lines 5 and 6 are updated so the words "Decontamination Room" are replaced with "Emergency Support Center (Decontamination Room)" to reflect better the proper designation of the response center location for addressing emergencies. Additionally, on page 7-3, section 7.1.2.4, paragraph (d) is updated to change the word "is" in line 2 to "are" to correct a grammatical error and the word "enclosed" in line 3 is changed to "included" as it more accurately describes material located in Appendix I.

On page 7-4, section 7.2.4, line 5 is updated to change the words "protection actions" to "protective actions" as the proper term to be used. In section 7.3.1, lines 4 and 5 the instructions to "(Dial 2-1111), identify himself" are changed to "(call 2-1111, identify self" to update terminology, remove inappropriate parenthesis and eliminate a gender specific reference. In addition, in section 7.3.1, lines 6 and 7 are updated to correct the phrase "in the Decontamination Room" to be "at the Emergency Support Center" since the referenced call lists are posted not only in the Decontamination

Room but also at other locations outside the Decontamination Room and in the adjacent Auxiliary Support Center Room, all as part of the Emergency Support Center.

On page 7-6, section 7.3.4, in the last line of paragraph 1, "operating boundary" is corrected to be "operations boundary" to reflect the proper term used to designate the area within which the Facility Director has direct authority over all activities. Also on page 7-6, paragraph 4, lines 3 and 4 are updated to reflect the name change from "Nuclear Engineering Sciences Department" to "Nuclear and Radiological Engineering Department" to reflect the name change from late 1996 that was inadvertently omitted in the Revision 10, 2/97 change to the Emergency Plan. Additionally, on page 7-6, section 7.4.1, line 4 of paragraph 1 is updated to change the word "He" to "The Emergency Director" to eliminate a gender specific reference.

Sixth, there are changes on three pages in Chapter 8. On page 8-1, in section 8.1, for Location 2, the reference to "Parking Lot" in the first line is changed to "Service drive" since the referenced area outside the southwest door of the Nuclear Sciences Center is a service drive, not a parking lot.

On page 8-4, section 8.3.2, line 1 of paragraph 1 is updated to change the phrase "Nuclear Sciences Center Decontamination Room" to "Emergency Support Center (Decontamination Room)" as the proper designation for the location where first aid is normally available.

On page 8-5, section 8.4, in the first line of paragraph 1 the phrase "Decontamination Room (Room 108 NSC)" is changed to "Emergency Support Center (Room 108 NSC)" as the proper reference to where the telephone is located for primary communications during emergencies. In addition, in line 3 of paragraph 2, the reference to "main Nuclear Engineering office" is corrected to read "the Nuclear and Radiological Engineering Department main office" again to reflect the 1996 department name change that was inadvertently omitted in the Revision 10, 2/97 change to the Emergency Plan.

Seventh, on page 9-1, section 9.0, line 2 of paragraph 3 is updated to change the phrase "Decontamination Room (Room 108 NSC)" to "Emergency Support Center (Room 108 NSC)" as the proper designation for the location to which evacuations are made and from which emergencies are addressed.

Eighth, there are changes on two pages in Chapter 10. On page 10-1, section 10.1.1, lines 4 and 5 of paragraph 1 are updated to reflect the name change from "Nuclear Engineering Sciences Department" to "Nuclear and Radiological Engineering Department" to reflect the name change from late 1996 that was inadvertently omitted in the Revision 10, 2/97 change to the Emergency Plan. Also in section 10.1.1, in lines 5 and 6 the reference to "Occupational Health and Safety" personnel is changed to "Environmental Health and Safety" as the proper campus entity and in lines 11 and 12 the reference to the "City of Gainesville Fire Department" is changed to the "City of Gainesville Fire/Rescue Department" as the proper designation. In addition, in section 10.1.2, second paragraph, line 5, the reference to the Office of Environmental Health and Safety is updated to the "Division of Environmental Health and Safety" to reflect campus administrative reorganization of some years ago where this division includes the Radiation Control Office and in the last line on the page, the

reference to the "City of Gainesville Fire Department" is changed to the "City of Gainesville Fire/Rescue Department" as the proper designation.

On page 10-3, Table 10.1 is updated so the last entry in column 1 is changed from referring to "Environmental Devices (Film Badges and TLDs)" to referring to "Environmental Monitoring Devices (TLDs, Luxel or Other Dosimeters)" to reflect a change from film badges and TLDs to only TLDs documented as allowed in Revision 3, 1987 of the UFTR Safety Analysis Report where film badges were allowed to be removed from usage as environmental dosimeters due to their frequent damage due to high temperature and humidity versus TLDs which are the dosimeter devices of choice for environmental monitoring. The alternative possibility of using Luxel or other dosimeters is added to reflect a pending implementation of Luxel dosimeters in 1999.

Finally, Appendix II of the UFTR Emergency Plan is updated by removing the two older versions of agreement letters for the Alachua County Office of Emergency Management and Shands Teaching Hospital and Clinics, Inc. and replacing them with two more recent letters.

All these changes have been reviewed by UFTR management and by the Reactor Safety Review Subcommittee to assure they do not decrease the effectiveness of the UFTR Emergency Plan. In general, these changes make the Plan better suited to assuring a proper response to emergencies at the University of Florida Training Reactor. A copy of the cover letter dated February 18, 1999 and mailed on February 22, 1999 as well as the complete text of Revision 11 to the Emergency Plan is Attachment IV to the February 1999 facility monthly report for easy reference.

In a telephone conversation on February 25, 1999, NRC Senior Project Manager Ted Michaels indicated that, based on our review and no reduced effectiveness of our Emergency Plan, Revision 11 can be implemented subject to our schedule with no prior NRC approval needed. This implementation was in progress at the end of February.

During March 1999, Revision 11 was supplied to all offsite holders of the Plan with a cover letter and instructions on maintaining a complete copy. The cover letter is Attachment III to the March 1999 facility monthly report. Gainesville Fire Rescue acknowledged receipt of Revision 11 by letter dated March 25, 1999 and received on April 1, 1999. With a letter dated April 16, 1999 and received on April 23, 1999 from Senior Project Manager Ted Michaels, the NRC indicated that based on the licensee evaluation that the changes do not decrease the Plan effectiveness and it continues to meet the requirements of 10 CFR 50, Appendix E, no NRC approval is needed. However, he indicated initial NRC review of the changes shows they are in accordance with 10 CFR 50.54(q) so implementation of the changes will be subject to inspection to confirm that the changes do not decrease effectiveness of the Plan. The NRC letter is Attachment IV to the April 1999 facility monthly report. The facility copies of the Plan were expected to be updated during April, May and then June 1999 but this was delayed until July 29, 1999 when all facility copies were updated to close out this revision in the 1999-2000 reporting year.

During the 2000-2001 reporting year, Revision 12 to the approved UFTR Emergency Plan was submitted to the NRC on August 20, 2001 with an explanation cover letter dated August 13, 2001. Revision 12 was reviewed by UFTR management and the Reactor Safety Review Subcommittee (RSRS) to assure Revision 12 would not decrease the effectiveness of the UFTR Emergency Plan.

The changes are considered relatively minor in nature; they are the result of reviews of the Plan and UFTR plans for and responses to simulated emergencies. Most are simple changes to account for name changes or correct typographical errors.

Revision 12 consists of a set of updates and revisions to eleven (11) pages: title page, v, 1-6, 1-11, 5-1, 7-3, 8-1, 8-2, 8-3, 8-4, and 8-5, as well as Appendix II – Agreement Letters. The new pages are marked with the usual vertical lines in the right margin for easy location of specific changes. In this letter, the page number and line references are to those in your current copy of the Emergency Plan.

First, the title page is updated to reflect inclusion of Revision 12. Second, on page v in the List of Tables, the title of Table 8.1 is changed to delete the word "Typically" so the title becomes "Equipment Available from the Radiation Control Office for Emergency Dose and Radiation Level Assessment." Since Table 8.1 now includes nonspecific types of equipment versus specific instruments, the functional requirement continues to be met without concern about specific instruments which are periodically replaced and/or updated.

Third, on page 1-6 in Section 1.4, paragraphs 1 and 2, three grammatical errors are addressed: in paragraph 1, line 3, a capitalization error is corrected so that "North Central" becomes "north central" and in line 4 a spelling error is corrected so that "penninsula" becomes "peninsula"; in paragraph 2, line 2, "Building No. 557" is corrected to include quotation marks and eliminate the superfluous word "No." between "Building" and "557" so it becomes "Building 557." Also in Section 1.4, paragraph 2, the last sentence (lines 9–11) has been rewritten to address grammar and spelling corrections (a colon replaces a semicolon after Figure 1.8 in line 9; the hyphen is eliminated from references to North South Drive in lines 9 and 11), as well as elaborating on the location of service drives for emergency vehicle access and a parenthetical addition to note that the Journalism lot access to the facility is "limited during construction to enlarge the Journalism building." Next, in Section 1.5, paragraph 1, line 10, the acronym "SER" has been added after University of Florida Safety Evaluation Report since it is referenced as such in the last paragraph on this page. Finally, in Section 1.5, the last paragraph, line 6, a grammatical error is addressed so the verb "are" becomes "is" and the sentence reads ". . . set of required conditions is essentially not possible." and in line 10 (last line on the page), the reference to "one full fuel assembly (11 plates)" is changed to "one full fuel plate" — the proper reference as indicated in Table 1.1 and in the existing Safety Evaluation Report for the UFTR— to correct a typographical error not previously noted.

Fourth, on page 1-11, the sketch is updated to show additions to the J. W. Reitz Union and the elevated addition to the Journalism building, both of which are in progress. The page orientation has been shifted so the north arrow is now pointing upward and the figure label appears at the bottom of page.

Fifth, on page 5-1, in Section 5.0, on line 7 the references to Emergency Action Levels in Section 7.0 should include subsection 7.4.1 so the reference now reads ". . . subsections 7.2.1, 7.3.1 and 7.4.1 of Section 7.0 . . . ." This change is not new but simply the inclusion of an additional reference for completeness.

Sixth, on page 7-3, in Section 7.1.2.4, paragraph b, line 1, the word "inured" is changed to "injured" to correct a typographical error.

Seventh, on page 8-1, in Section 8.2, the last two lines of the first paragraph reference Table 8.1 (for equipment typically available through the Radiation Control Office) and Table 8.2 (for equipment typically available in the UFTR facility). A sentence is added and the end of the paragraph emphasizing that neither table is intended to be all inclusive but only representative of the range of instruments typically available.

Eighth, on page 8-2, the revised Table 8.1 contains an updated listing of equipment typically available from the Radiation Control Office for emergency dose and radiation level assessment. Ninth, similarly, on page 8-3, the revised Table 8.2 contains an updated listing of equipment typically available from the UFTR facility for emergency dose and radiation level assessment. Neither table is intended to require specific equipment nor are they intended to be complete.

Tenth, on page 8-4, in Section 8.3.1, in the first paragraph, the fact that the other sink and showers in the Nuclear Sciences Center and UFTR Facility complex do not drain to holdup tanks any longer is acknowledged, so beginning at the end of line 5 the sentence now reads, ". . . normal sanitary sewer so these would also need to be plugged before usage for decontamination." Also on page 8-4, in Section 8.3.2, in line 6, "Decon Room" is replaced with "Emergency Support Center (Decon Room)" as the proper designation for this emergency facility. Next, on page 8-4, in Section 8.3.3, in the second sentence the reference to a "designated health physicist will accompany the victim . . ." is changed to a "designated radiation control qualified technician or equivalent (or health physicist if available). . . " to avoid an unnecessary requirement. For limiting doses and assuring proper handling with respect to limiting spread of contamination, the radiation control qualified technicians are who is usually available. There is no reason to limit victim transport to depend on arrival of an unlikely to be available individual, especially since personnel responding at the Emergency Support Center can assure proper transport via ambulance or other transport until the victim arrives for treatment in the fully certified hospital emergency room facility.

Eleventh, on page 8-5, in Section 8.4, in the first paragraph, the use of the acronym "UPD" in line 6 has been replaced with "University Police Department" to clarify the reference since this is the only mention of this entity in this Section 8.0.

Finally, Appendix II of the UFTR Emergency Plan is updated by removing the older version of the agreement letter for the Alachua County Office of Emergency Management and replacing it with a more recent letter.

All these changes have been reviewed by UFTR management and by the Reactor Safety Review Subcommittee to assure they do not decrease the effectiveness of the UFTR Emergency Plan. In general, these changes make the Plan better suited to assure a proper response to emergencies at the University of Florida Training Reactor. A copy of the cover letter dated August 13, 2001 and mailed on August 20, 2001 as well as the complete text of Revision 12 to the Emergency Plan is an attachment to the August 2001 facility monthly report for easy reference. At the end of the 2000-2001 reporting year there had been no response from NRC so this change has not yet been implemented.

As the Emergency Plan continues to be evaluated, it is likely that additional changes may be implemented during the upcoming year, especially as the Emergency Plan is reviewed for training purposes. However, at reporting year's end, no further revisions are planned.

F. Revisions to UFTR Physical Security Plan

In the 1994-95 reporting year, as a result of a Safeguards and Material Control and Accountability Inspection conducted by NRC inspectors on May 18-19, 1995, several recommendations were made including submitting a Security Plan change concerning material allowed on site. They also reviewed a security plan procedure change identified by UFTR review and outlined the proper submission procedure. No violations were identified. With a letter dated July 18, 1995, Physical Security Plan Revision 12 was submitted to NRC as promised to the NRC inspectors. As indicated to the inspection team, this revision involved one change to the plan concerning allowable quantities and locations for special nuclear material on site as well as one correction of a section number in SOP-F.2. In addition, one further minor change was submitted to update SOP-F.2. Since these changes involved no reduction in the effectiveness of the Security Plan, they were submitted per 10 CFR 50.54(p) to keep the Plan updated. The NRC requested and additional information was submitted by letter dated October 27, 1995 and the revision was finally approved by letter dated November 2, 1995. This revision is withheld from public disclosure.

As a result of the annual RSRS audit and a review for training, Physical Security Plan Revision 13 was submitted to NRC per 10 CFR 50.54(p) with a letter dated June 6, 1996 to update various sections of the Security Plan to correct typographical errors, name changes, errors in the text and a number of inconsistencies in the Security Plan, all of which were considered minor in nature. Subsequently, this revision was approved by letter from NRC dated June 19, 1996. This revision is also withheld from public disclosure.

As a result of conducting the Biennial Evaluation of the UFTR Standard Operating Procedures (B-4 Surveillance) completed near the end of the 1996-97 reporting year, Temporary Change Notices were generated and approved for six security response procedures per Table VI-3. The procedures are withheld from public disclosure and are part of the UFTR Physical Security Plan. Changes involved primarily updating the procedures for the name change to the Nuclear and Radiological Engineering Department and movement of all UFTR inspection and reporting requirements from NRC Region II to NRC Headquarters. As a result, Revision 14 of the UFTR Physical Security Plan was under development at the end of the 1996-97 reporting year for submission in the 1997-98 reporting year.

Physical Security Plan Revision 14 was finally submitted to NRC on October 9, 1997 via letter dated October 7, 1997 referencing an attached letter dated September 25, 1997 describing changes and attached change pages submitted per 10 CFR 50.54(p). Most of the changes were administrative in nature such as updating the Plan for changes in the name of the department from "Nuclear Engineering Sciences" to "Nuclear and Radiological Engineering," updating the name of the Radiation Control Office to the Environmental Health and Safety Division, Radiation Control and Radiological Services Department, and changing written submissions to reflect that regulation of non-power reactors is now from the NRC Non-Power Reactor Directorate office and not Region II

per a letter from Luis A. Reyes, Region II Regional Administrator dated August 1, 1997 and communications with Project Managers Marvin Mendonca and Ted Michaels at the Non-Power Reactor Directorate. The cover page is Attachment III to the October 1997 facility monthly report. There had been no response from NRC; however, NRC inspector Stephen Holmes indicated on October 8, 1998 that no approval would be given for changes reviewed by the licensee as not reducing Security Plan effectiveness per 10 CFR 50.54(p). Therefore, the changes were incorporated into the Security Plan on October 23/26, 1998 to close out implementation of Revision 14 which was the last revision implemented.

No further changes have been requested.

G. Biennial Reactor Operator Requalification and Recertification Program

When the operator requalification and recertification program training cycle for the UFTR was scheduled to end in June 1997, the renewal of the program for the July 1, 1997 through June 30, 1999 period with minor changes and new dates was undertaken by submission to the NRC of a new two-year program cycle with a letter dated May 29, 1997. Since the entire program had been rewritten and approved by NRC in the 1991-92 reporting year, as contained in Appendix H of the 1991-92 annual report, this renewed training program was not expected to require significant review and approvals. In effect, the revised plan was essentially the same as that used for the previous two-year training cycle with only the name of the Department of Nuclear Engineering Sciences changed to Department of Nuclear and Radiological Engineering to reflect a change made in late 1996, and several training sessions being moved to later in the cycle. Subsequently, in a letter from the NRC Project Manager dated July 9, 1997 and received on July 14, 1997, the NRC indicated that the revisions did not alter the intent of the approved Plan and therefore were acceptable. A copy of the renewal letter, the revised plan and the NRC letter approving the revised Plan was contained in Appendix F of the 1996-97 annual report. This program was not changed during the 1997-98 reporting year.

The existing operator requalification and recertification program training cycle for the University of Florida Training Reactor was scheduled to end in June 1999. Therefore, renewal of the approved plan for the July 1, 1999 through June 30, 2001 period with minor changes and new dates was undertaken by submission to the NRC of the new two-year program cycle with a letter dated May 14, 1999. In effect, the revised plan was essentially the same as that used for the previous two-year training cycle with the removal of the duplicate training on standard operating procedures the only significant change. In recent years the procedures for the UFTR have not changed significantly and when they do, special training is conducted to assure all operations staff are cognizant of the change. For this reason there is no need to have procedure training conducted in February of one year and then April of the next. Therefore, the second training lecture and examination on standard operating procedures was deleted from the training schedule. This renewed plan was intended to cover the UFTR operator requalification and recertification program from July 1999 through June 2001. Subsequently, in a letter from the NRC Project Manager dated June 15, 1999 and received on June 21, 1999, the NRC indicated that the revisions do not alter the intent of the approved Plan and therefore are acceptable. A copy of the revised Plan is available for reference purposes at the UFTR facility and was applicable through June 2001 in the 2000-2001 reporting year.

As noted above, the existing operator requalification and recertification program training cycle for the University of Florida Training Reactor was scheduled to end in June 2001. Therefore, renewal of the approved plan for the July 1, 2001 through June 30, 2003 period with minor changes and new dates was undertaken by submission to the NRC of the new two-year program cycle on May 22, 2001 with a letter dated May 10, 2001. In effect, the revised plan is essentially the same as that used for the previous two-year training cycle. This renewed plan is intended to cover the UFTR operator requalification and recertification program from July 2001 through June 2003. Subsequently, in a letter from the NRC Project Manager dated July 27, 2001 and received on August 6, 2001, the NRC indicated that their review of the revised program was concluded and that the proposed changes meet the applicable requirements of 10 CFR 55 and therefore are acceptable. A copy of the revised Plan is available for reference purposes at the UFTR facility and is applicable through June 2003.

H. UFTR ALARA Program

As the part of the process of implementing the requirements of the new 10 CFR Part 20, a UFTR ALARA Program was generated. This ALARA Program was developed to be consistent with the University of Florida ALARA Program as well and was implemented along with the new 10 CFR Part 20 in January 1994. A copy of the original UFTR ALARA Program was in Appendix D of the 1993-94 annual report and was not changed during this reporting year.

I. UFTR Respiratory Protection Program

NRC Inspection Report No. 50-83/94-01 dated April 6, 1994 contained a Severity Level IV Notice of Violation for the failure to have issued a written policy statement on respirator usage and for not having advised users that they could leave an area at any time for relief. Also, the potential respirator users had not been fit tested for the types of respiratory protection equipment at the facility. During May 1994 much work was performed on developing the required respiratory protection program. The facility reply to the Notice of Violation was submitted to NRC as a letter dated May 6, 1994. It indicated that a written statement to all potential respirator users informing them that they may leave the area at any time for relief was issued on May 2, 1994 and that the written policy statement concerning respirator usage was under development with full compliance including documented review and approval of the policy committed to be achieved by August 31, 1994. In a letter dated May 25, 1994 and received on May 31, 1994, the NRC indicated that they had evaluated the UFTR response and found it met the requirements of 10 CFR 20.201 [should be 20.2001].

A draft Respiratory Protection Program was completed and submitted to the RSRS on August 25, 1994. The NRC (Craig Bassett) was informed that the Program would not be approved by the August 31, 1994 commitment date and indicated that such should be officially transmitted to NRC. Subsequently, via letter dated August 31, 1994, the delay in the UFTR commitment was transmitted to the NRC with a new commitment to have the UFTR Respiratory Protection Program approved at the next RSRS meeting scheduled for September 29, 1994 and full compliance including documented review and approval of the policy achieved by September 30, 1994. The initial revised version of the Respiratory Protection Program with a Policy Statement was finally reviewed and approved by the RSRS at its meeting on September 29, 1994 and implemented on September 30,

1994. A revised UFTR Respiratory Protection Program (Revision 1) amending the required frequency of medical examinations was implemented on March 16, 1995. The original (Revision 0) Program Document as well as the Revision 1 version of the UFTR Respiratory Protection Program are contained in Appendix E of the 1994-95 annual report. The Severity Level IV Notice of Violation for failure to comply with all portions of the Respiratory Protection Program was finally closed out during the NRC Inspection conducted on May 22, 1996 per page 7 of NRC Inspection Report No. 50-83/96-01.

As a result of core area maintenance, disassembly and inspection efforts in response to a reactivity anomaly, at the end of June 1998 and throughout the month of July, efforts were under taken to modify the approved UFTR Respiratory Protection Program to allow use of half respirator masks and to schedule the necessary medical examinations for which there was some delay. The necessary physicals for two individuals were conducted on 10 July 1998. The revised UFTR Respiratory Protection Program was ready for internal review and approval by 24 July 1998 but the RSRS Executive Committee was unable to meet for several days. On 24 July 1998, NRC Senior Project Manager Ted Michaels was updated on the status of the checks on the reactivity problem including probable separation on one control blade and plans to disassemble the entire core since borescope indications are somewhat limited. He was also informed of the detection of airborne particulates at low levels and stop of work and delays in developing and approving the revised Respiratory Protection Program. Specifically, we discussed the use of half-face respirators, status of exams/physicals, etc., and 10 CFR 20.1703(d) requiring notification of the Region II Administrator 30 days before the date of using respiratory protection equipment the first time. Since we normally go directly to the NPR Directorate, we requested direction on what to do next. He was not sure whether we should send in something and asked that he be contacted again on July 28 which was done, whereupon he indicated we should send in the proposed Program when internally approved. Revision 2 of the UFTR Respiratory Protection Program was finally internally approved along with the proposed Policy Statement at an RSRS Executive Committee meeting on July 30, 1998. Subsequently, NRC Senior Project Manager Ted Michaels was contacted on July 30 and he requested submission of the Program for review indicating it should not require 30 days. The internally approved Respiratory Protection Program Revision 2 and the proposed Policy Statement were faxed to the Project Manager on July 30, 1998 to get the review started with the formal submission by letter to the Document Control Desk then accomplished on August 3, 1998.

At the beginning of August, maintenance operations were awaiting NRC review of the Respiratory Protection Program Revision 2. On August 3, 1998, NRC Inspector Stephen Holmes of the Non-Power Reactor Directorate indicated he would visit for an inspection on August 13-14, 1998 in order to provide on-site review verifying that the Respiratory Protection Program Revision 2 was acceptable and reviewed by NRC prior to implementation. Therefore, all the preliminary aspects of implementing the Respiratory Protection Program Revision 2 were addressed prior to his arrival to include acquiring half-face respirators and arranging a visit by Mary Russell on August 6 to provide half-face respirator fits and training three personnel. Subsequently, Vince McLeod provided the same fit tests and training for two other operations personnel including the Facility Director with the whole Respiratory Protection Program Revision 2 administratively reviewed and all documentation completed prior to Mr. Holmes arrival. Upon his arrival on August 13, Mr. Holmes toured the facility to check on maintenance status, he checked records of fit testing and training as well as the Program itself. Though he continued to interview personnel and check the fit testing equipment on

August 14, Mr. Holmes evaluated that the Program was ready for implementation on the afternoon of August 13, 1998. Therefore, the official implementing memorandum for the Program was issued on August 13, 1998. A new Radiation Work Permit 98-8-I was also opened allowing use of respirators per the Respiratory Protection Program Revision 2 and requiring SRO supervision of operations among other controls with respirators used for moving graphite on the afternoon of August 13with observation by Mr. Holmes. Inspector Holmes held his exit interview on August 14 prior to leaving indicating no problems were identified and respirators are not required but are optional at the worker's convenience. Subsequently, more graphite was removed on the afternoon of August 14 which was the last day that workers opted to wear respirators as airborne radioactivity levels were measured to be quite low. Subsequently, the RWP 98-8-I was reissued several times during the month as work progressed slowly on further disassembly of the reactor core to address the reactivity anomaly. These respirators were used only a couple of times as airborne contamination levels were very low. There have been no further changes to the UFTR Respiratory Protection Program in the 1998-99, 1999-2000 or 2000-2001 reporting years.

J. HEU to LEU Fuel Conversion Documents

The original proposal submitted to NRC to meet 10 CFR 50.64 requirements for scheduling UFTR conversion from HEU to LEU fuel was accepted as meeting the legal requirements for submission in March 1987. However, in a letter dated April 17, 1987 and received on April 22, 1987, the NRC claimed the scheduled span of time from receipt of funding to submittal of our application to convert was too long. The updated (reduced) schedule (Revision 1) showing a reduction of 8 months as presented in Table VI-4 was then submitted to NRC licensing in Washington with a cover letter dated May 14, 1987. During subsequent reporting years, new proposals updating the UFTR conversion schedule and work status per 10 CFR 50.64(b)(2) requirements were submitted to NRC each March to meet the annual March 27 deadline.

After receiving funding, work proceeded as quickly as possible though a shortage of graduate students to perform the neutronic and other analyses caused this work to lag each year. In addition, because of extensive efforts to decontaminate and remodel a room in which to store the SPERT LEU fuel, to change the license description of the SPERT storage facility, to move the fuel to the new facility, to release the previous storage room to unrestricted usage, to revise the facility security plan (SNM-1050) and then to perform a detailed pin by pin visual inspection and verification of serial numbers, the conversion analysis was further delayed in the first two years.

The required visual inspection and identification of SPERT fuel pins was completed on September 19, 1988. As committed, a sufficient number of SPERT fuel pins were radiographed to provide an LEU core and replacement pins for the UFTR by March 31, 1989, when the SPERT usage license was to expire. As for the SNM-1050 License, a significant effort was involved as the renewal license application for renewal under "storage only" conditions was submitted with a letter on March 1, 1989 as required. License No. SNM-1050, as renewed, was dated June 23, 1989 and was received on June 29, 1989. The renewed license authorized "storage only" conditions and has an expiration date of June 30, 1994. The cover letter also specified that any request for amendment to the SNM-1050 License should be submitted in the form of replacement pages to the renewal application submitted on March 1, 1989 with changes or new items clearly identified. Subsequently, in June 1989, an engineering-based decision was finally made not to use the SPERT fuel but rather to

use the alternate low enriched silicide plate-type fuel. As a result plans were developed to ship the fuel.

A proposal for support to provide 1200 SPERT fuel pins for transfer for shipment to Oak Ridge National Laboratory was submitted to Martin Marietta Energy Systems, Inc. in January 1990 in response to Request for Proposal CO378-19 dated December 12, 1989. This proposal was submitted to Martin Marietta Energy Systems in January and accepted. Loading of the drums was completed per approved UFSA SOP-U.4 on May 16, 1990 and 1200 pins in 19 DOT type 6M drums plus one (1) empty drum were transferred to Mr. Leon Fair of Martin-Marietta Systems Inc. for shipment by truck to a secure DOE facility at Oak Ridge National Laboratory on May 17, 1990. Revision 3 of the Physical Security Plan (PSP) for the SNM-1050 License was then transmitted to the NRC with a letter dated June 7, 1990 to update the Special Nuclear Material on site following the May 17 transfer of 1200 pins to Martin-Marietta's control. Approval of Revision 3 to the University of Florida SPERT Assembly Physical Security Plan occurred with a letter dated June 20, 1990 and received on June 26, 1990.

An application to amend the storage-only SNM-1050 License to allow storage of the fuel in the North Quonset Hut (Room 6) versus Room 5 of the Nuclear Research Field Building was submitted to NRC with a letter dated June 6, 1990. This SNM-1050 License amendment making the smaller Room 6 an allowed storage location was approved per a letter and license amendment dated June 14, 1990. All of the remaining 4200 SPERT fuel pins not previously shipped were then moved to Room 6 on July 30. Revision 4 of the SNM-1050 Physical Security Plan was submitted to NRC with a letter dated September 13, 1990 while the response to several security allegations was submitted as a letter also dated September 13, 1990. The next security inspection was conducted on October 25, 1990 by NRC Security Inspector Orysia Masnyk, to investigate security violation allegations associated with the SNM-1050 License as well as to consider final approval of Revision 4 to the Physical Security Plan for the SNM-1050 License. In NRC Inspection Report No. 50-83/90-02 dated November 23, 1990, NRC Region II did close out the allegation and accept implementation of Revision 4 of the UFSA Security Plan.

Throughout the 1988-89 reporting year, the neutronics analysis to support the conversion had been progressing at a slow pace with the graduate student involved deciding to leave for another university when not approved to pursue a doctoral degree. This loss greatly hindered analysis work at the beginning of the 1989-90 reporting year. As a result of the overall slow progress on this work related to UFTR HEU to LEU conversion and funded by DOE, the proposal submitted to NRC with a letter dated March 22, 1989 to meet the annual March 27, 1989 and 1990 deadlines per 10 CFR 50.64(b)(2) showed a further lengthening of the schedule.

An updated proposal was submitted to NRC with a letter dated March 26, 1991 explaining that a student thesis project had resulted in good progress in assuring neutronics methodology is adequate and the modeling of the existing core was nearly complete lacking only several confirmatory calculations and calculations to predict changes caused by temperature effects. NRC was also updated that only scoping calculations had been completed for the proposed LEU core with the number of fuel plates per bundle not yet set in March 1991. It was expected that DOE-supplied funding support of this work would be extended beyond April 30, 1991 so this work could be concluded along with basic thermal hydraulics analysis to conclude the required HEU to LEU safety

analysis. 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 with notification of the extension not received until fall 1991 making some plans and efforts difficult to implement. The updated proposed schedule submitted as required by March 27, 1991 per 10 CFR 50.64(b)(2) therefore showed a further schedule slippage.

The individual working on the neutronics analysis completed his benchmark calculations on the existing UFTR HEU core in April 1991. Subsequently, he completed his thesis work in May 1991 and continued 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 late in the 1990-91 reporting year. During the 1991-92 reporting year, a graduate assistant continued working on the thermal hydraulics area on the 14 plate fuel bundle arrangement selected for the conversion with good progress made to nearly complete this work during that reporting year. Work on the NRC submission package was also begun with limited progress made. During the 1992-93 reporting year and again in the 1993-94, 1994-95 and 1995-96 reporting years, the delay of official grant extension and unavailability of personnel made financial support of this effort more difficult. The same was true in this latest reporting year, so the latest updated proposal schedule submitted as required on March 27, 1997 per 10 CFR 50.64(b)(2) as Revision 11 therefore shows a further schedule slippage as depicted in Table VI-5 of the 1996-97 report. This further delay is because the basic thermal-hydraulics analysis proceeded more slowly than expected and because of DOE questions about fuel and core design arrangements that are requiring staff time to answer in preparation for approving the final fuel bundle design.

Early in the year, a call was made to Dennis Wilson to have the small remaining DOE-supplied funding support for this HEU to LEU analysis work extended to keep the grant open, but no money is available to support actual conversion as explained in the submittal to NRC and as indicated in a letter from John Gutteridge, Program Director, Office of Planning and Analysis, Office of Nuclear Energy, Science and Technology, dated February 23, 1998 and received in early March 1998. Little was accomplished during this year until October 1997 when visiting Professor Marc Caner from the SOREQ Institute in Israel began working on the project with hopes this project could be concluded this year, since the loss of several facility personnel had prevented work in this area previously. There had been a delay in the response to the grant support extension request to DOE; however, as of the end of January 1998, some DOE money was available to be used to support some of Dr. Caner's work. As required, the 1998 updated proposal on the HEU-to-LEU conversion to meet requirements of 10 CFR 50.64(c)(2) was submitted to the NRC with a letter dated March 27, 1998 again explaining the reasons for delays and indicating the updated proposal for the conversion schedule to include submission of the license amendment safety analysis package is now scheduled for October 1998. However, little was accomplished during the year since the loss of several facility personnel had prevented work in this area, but at year's end Dr. Marc Caner is now spending his sabbatical time since December 1997 on the project and work is progressing though confirming dimensions and materials to support the calculations has involved considerable time during July 1998 with Dr. Caner receiving a tour to observe the unstacked core on August 27, 1998.

During the 1998-99 reporting year, Dr. Caner provided some information on reactivity coefficients and completed his reactor physics analyses for the HEU-to-LEU conversion. A draft copy of his work to date on conversion dated September 23, 1998 was received on September 28, 1998. A "final" copy of his work to date was received on December 16, 1998. During March 1999, the internal review was completed and the report finalized with this work generally agreeing with earlier reactor physics analyses. Several discussions have occurred since as Dr. Caner provided proposed Tech Spec changes in June and left all his work well documented before he finally left on July 20, 1999 to return to the SOREQ Institute.

As required, the 1999 updated proposal on the HEU-to-LEU conversion to meet requirements of 10 CFR 50.64(c)(2) was submitted to the NRC with a letter dated March 29, 1999 again explaining the reasons for delays and indicating the updated proposal for the conversion schedule to include submission of the license amendment safety analysis package would now be scheduled for June 1999. The updated schedule is Attachment I to the March 1999 facility monthly report. Though too late to include in the proposal, a formal letter from John Gutteridge, Program Director, University Programs, in the DOE office of Nuclear Energy, Science and Technology, dated April 7, 1999 and received on April 12, 1999 indicated no conversion funding is available during fiscal year 1999 so there was no need for submission of the HEU-to-LEU conversion document to NRC. The letter is available at the UFTR facility for anyone desiring to examine it.

NRC Project Manager Ted Michaels called on October 15, 1999 to emphasize the need to get the conversion package in within the next few months for proper review. During November 1999, a graduate student indicated interest in working on this submittal for a master's project. During December 1999, she decided to do so as project needs were outlined; she also indicated an interest in doing the license renewal package for her engineer's degree project. In a call on December 2, the NRC Project Manager again emphasized the need to get the conversion package submitted in the next few months.

During January–March 2000, the graduate student began to put the conversion package together though some additional calculations were noted also to be needed for control blade worths and kinetics. In response to a call from Mr. Michaels in March, a message was left that we were preparing the submittal and completing calculations and hoping to get him something by the end of March 2000 but that without DOE funding support, the issue is moot. During April 2000, it was decided the PARET code was needed for kinetics/thermal analysis along with information on control blade geometry both of which were obtained with PARET available by month's end. Access to the NRE storage facility for the previous conversion calculations was not possible due to having the wrong key on April 16. A correct key was ordered and still did not fit in early May 2000 when another key finally accessed the facility to verify no computer output was present. Arrangements were made for the graduate student to have access to an SOP Manual, Tech Specs, Emergency Plan and FSAR on May 19, 2000 and discussions with her on May 31 indicated the CITATION calculations she was to run for control blade worth measurements will require additional funding. Discussions with NRC Project Manager Ted Michaels during a visit to NRC on May 24, 2000 indicated a late summer submission of the HEU to LEU package would be acceptable since fuel is not due before October 2001 and the new federal government fiscal year doesn't start until October 1, 2000. During June 2000, a limited-use computer account was set up for the graduate student with discussions in use of PARET code with a faculty member cognizant of its use and review of some of

the package in preparation for NRC submittal. During July 2000, there were several discussions with the graduate student plus partial review of drafts of the NRC submittal package. During August 2000, at the end of the last reporting year, a considerable portion of the submittal was reviewed and discussed as the package was nearing completion.

As required, the 2000 updated proposal on the HEU to LEU conversion to meet requirements of 10 CFR 50.64(c)(2) was submitted to the NRC with a letter dated March 29, 2000 again explaining the reasons for delays and indicating the updated proposal for the conversion schedule to include submission of the license amendment safety analysis package which is now scheduled for May 2000. The proposal cover letter and the updated schedule are available for examination at the facility.

Review and discussions of the HEU to LEU submittal package continued in September, October and November 2000 of this reporting year as a number of calculations and checks continued with the package nearly ready for submittal. At the TRTR meeting on October 19, 2000, Mr. Tony Vinnola of DOE indicated there was a possible delay in getting our LEU fuel in late 2001. He suggested we send a letter documenting the expectation to submit the conversion package soon and the desire to receive fuel before the end of 2001. This letter was submitted as required, dated October 24, 2000.

During December 2000, the graduate student successfully defended her project on December 15 so the package is ready for submission to NRC after generation of a cover letter which has not yet been accomplished. During January 2001, she and a fellow graduate student enrolled in ENU-6937 Special Topics in Nuclear and Radiological Engineering Sciences to measure HEU core physics parameters in preparation for conversion. This work was obviously on hold during the extended outage from January 31, 2001 through the end of March 2001.

On March 8 and again March 20, there were discussions with Tony Vinnola of DOE concerning the UFTR HEU to LEU conversion. It appears the UFTR fuel may have to be made in two sets if at all. After the March 20 discussion, Mr. Vinnola was to speak with DOE headquarters about UFTR fuel for conversion as we indicated our package was essentially ready for submittal. There has been no word from DOE as there is every likelihood they will not fund our fuel, at least not in the foreseeable future.

With the reactor back up in early April and May 2001, the two students, as part of ENU-6937 - Special Topics in Nuclear and Radiological Engineering Sciences, performed a number of experiments measuring parameters needed for the HEU to LEU conversion and/or relicensing. During June 2001, an email was sent to Tony Vinnola at DOE summarizing UFTR HEU to LEU conversion considerations. Subsequently, during June there were a number of emails and telephone conversations concerning conversion with Tony Vinnola and DOE headquarters representatives as they are trying to determine plans. No word was received in July 2001 but Tony Vinnola indicated in a conversation on August 15 that Bill Magwood is looking at the cost of HEU to LEU conversion versus a replacement HEU core! He was told the cost wouldn't be much different but the regulatory agency might have some concerns. On August 6 an email was sent to Offsite Fuels Receipt Coordinator (SNM) for Westinghouse Savannah River Company at the Savannah River site, indicating no HEU fuel will be shipped from the UFTR before the end of 2002 at the earliest.

As required, the 2001 updated proposal on the HEU-to-LEU conversion to meet requirements of 10 CFR 50.64(c)(2) was submitted to the NRC on March 30 with a letter dated March 27, 2001 again explaining the reasons for delays and indicating the updated proposal for the conversion schedule to include submission of the license amendment safety analysis package which is now essentially ready for submission pending DOE commitment of support and tentatively scheduled for May 2001. The proposal cover letter and the updated schedule are available for examination at the facility.

K. Quality Assurance Program Approval for Radioactive Material Package

During the 1987-88 reporting year, plans were made to ship ~1200 SPERT fuel pins held under the SNM-1050 License to Oak Ridge National Laboratory (ORNL). Since ORNL wanted the University of Florida to be the shipper of record, an approved Quality Assurance Program was needed with the University to be responsible to see that the shipment would meet all 10 CFR 71 requirements. ORNL was planning to have these pins shipped in 6M Type drums on which they would have performed the necessary criticality calculations. The initial request for QA Program approval to ship SPERT F-1 LEU fuel pins was submitted to NRC with a letter dated September 2, 1987. NRC Quality Assurance Program Approval for Radioactive Materials Packages No. 0578, Revision No. 1 with an expiration date of October 31, 1992 and dated November 5, 1987 was received on November 9, 1987.

These 1200 fuel pins were finally transferred to the Oak Ridge National Laboratory on May 17, 1990 under the existing QA Program approval. Efforts are underway to transfer the remainder of the pins but no specific acceptance has ever been received from DOE. Indeed, several inquiries were made by ORNL seeking to ship the 1200 fuel pins back to the University of Florida. Since there was no longer any room to store them in the smaller storage room, this return was categorically disallowed and documented in a letter to Don Ingersoll at ORNL dated October 13, 1992. Even if some or all of the remaining pins are not wanted by ORNL, the QA Program approval will also allow transfer shipment of the SPERT fuel to other secure facilities such as the low power training reactor at RPI. Therefore, it had been hoped that all of these pins could be transferred during this most recent year since they are no longer being considered for the HEU-to-LEU fuel conversion of the UFTR and since the QA Program Approval was to expire on October 31, 1992. However, because DOE has been unable to locate space at a storage facility and because RPI will not accept the fuel unless DOE funds a larger storage facility for them and pays for the fuel shipment, UFTR management is no longer hopeful of near-term shipment of these pins. Therefore, an amended program dated September 30, 1992 was submitted to NRC on September 30, 1992. Quality Assurance Program approval for Radioactive Material Packages No. 0578, Revision 2, dated October 20, 1992 was received on October 26, 1992 and has an expiration date of October 31, 1997. It is contained in Appendix D of the 1994-95 annual report for ease of reference. Nevertheless, the presence of the remaining 4200 SPERT fuel pins in the more confining North Quonset Hut (Room 6) of the Nuclear Research Field Building promises to make the transfer more difficult, time consuming and costly whenever it occurs.

The SNM-1050 License was due to expire on June 30, 1994. However, with a letter dated May 31, 1994, the SNM-1050 License Renewal Application for storage only was submitted on June 4, 1994 under Docket No. 70-1068 to assure extension of the license until the NRC NMSS

office could decide on the storage only renewal package in the upcoming year. In various discussions with NRC, NMSS representatives, one of whom visited the facility to clarify geometry and subcriticality considerations, it was decided to cite two unlikely events based on geometry and moderator exclusion in modifying the relicensing submittal. The revised paragraph on Page 4-1 referencing both geometry control and moderator exclusion to prevent inadvertent criticality was finally submitted by fax and letter dated May 12, 1995. NRC NMSS called several more times to say they would extend the exemption on the criticality alarm except when moving fuel and to clarify license renewal to say both Room 6 and Room 5 would be allowed by the license renewal for storage. They verified there is no sprinkler in Room 6. They also verified concern of no sprinkler in Room 5 for fire suppression; that is, they do not want a sprinkler available. Double contingency requires geometry control and moderator (H_2O!) exclusion. They indicated that we could submit a change deleting Room 5 as allowable or they could disallow Room 5 as a license condition. It was agreed that such a license condition is acceptable, so the license renewal was finally received on June 12, 1995 with a letter dated June 8, 1995. The renewal was effective on June 8, 1995 through June 30, 2000. The cover letter and license renewal are contained in Appendix F of the 1994-95 annual report.

NRC representatives of Region II and Region III conducted a material control and accountability inspection of this SNM-1050 fuel storage facility on February 24, 1998. No violations or other concerns were noted.

During the 1998-99 reporting year, there was no activity in this area as efforts to get the Department of Energy to take this fuel back have been unsuccessful to date. It is hoped that renewed efforts spearheaded by the Radiation Control Office will be able to get this fuel removed to allow cancellation of the SNM-1050 License and decommissioning of the facility during the next reporting year (1999-2000). There is some expectation for success as the DOE now has a program for accepting back such material.

In a related area there was administrative activity. The largest external project accomplished during the 1998-99 reporting year was to oversee and assist with delivery of two 600 Ci Cobalt-60 sources which were accepted into the reactor cell making use of the overhead crane. In addition to receiving the two fresh Co-60 sources, two depleted sources (<150 Ci each) were processed, repackaged and shipped back to the vendor. This required an amendment to the UFTR Quality Assurance Program No. 0578 to make it very general. Proposed Revision 4 to the QA Program was sent to NRC with a letter dated March 29, 1999. Subsequently, Quality Assurance Program Approval for Radioactive Material Packages No. 0578, Revision No. 4 was approved by NRC letter dated May 19, 1999. It was hoped this renewed QA Program Revision 4 would also be useable for shipping the SNM-1050 Licensed fuel when the time comes. The spent Co-60 sources were then shipped out in May 1999 with no problems encountered.

In response to a request for information on unneeded uranium fuel from DOE representatives whom we hope will take the SPERT (SNM-1050) and other fuel, some information was assembled in a memorandum to RCO D.L. Munroe early in the reporting year on September 20, 1999 for Mr. Ivan Beltz who was one of the three AMES consultants who visited on September 29 in anticipation of eventually (soon) taking the SPERT fuel. A copy of the memorandum is available at the UFTR facility. On October 26, 1999, contact was finally made with the new project manager for

the SNM-1050 license; Mr. Tom Pham indicated they would work with the facility on any requirements to be met to ship fuel. He also noted that if the fuel is shipped with less than six months to the license expiration date (June 30, 2000), we would need to get a license extension. During November and December 1999, the AMES consultants contacted the RCO and the Facility Director on several occasions requesting further information which they were provided. Ivan Beltz transmitted a one-page DOE SPERT Fuel Retrieval Plan Roles and Responsibilities document to the RCO. This document was reviewed on December 28, 1999 as the SNM-1050 license was also reviewed. Also in a letter dated December 22 and received on December 27, 1999, the facility was finally informed that Mr. Thomas Pham was assigned as Project Manager for the SNM-1050 facility, approximately one year after its occurrence! A copy of this letter is available at the facility.

During January 2000, the RCO spent considerable time with DOE consultants going over plans for shipping the fuel and seeking information on license agreements for the material. Work on the procedures to package and then transfer the SNM-1050 fuel occupied some time in February 2000 as did looking for the original DOE loan agreement (not found) and responding to Mr. Pham as to intentions to ship the fuel and extend the SNM-1050 license as necessary to meet regulatory requirements prior to site decommissioning. During March 2000, considerable effort was spent developing the two procedures to control packing the fuel in drums and then transferring them to a DOE representative for shipment. There was also a discussion with NRC Project Manager Pham on March 27, 2000 concerning documentation needed to meet NRC requirements; since Mr. Pham had recently overseen a similar shipment from the University of Washington, he promised to transmit further information on the requirements within a week or so. During April 2000, there was further review of shipping-related procedures and discussion of plans as progress slowed considerably with a second DOE subcontractor now in charge and working on shipping Cornell University unirradiated enriched pin-type fuel in April. There was also some concern about having sufficient space at the SPERT final storage location to load all fuel subject to new constraints being discussed by the second DOE subcontractor.

During May 2000, pictures of the Cornell University shipment were obtained and it became clear that not all fuel could be loaded and shipped from Room 6 (SPERT facility) in Building #554. It was also discovered that drums have not been ordered yet by DOE (~$1,600 each) and from another DOE contractor it was learned that the company supplying the Cornell drums has been removed from DOE's approved list of suppliers. As a result, NRC SNM-1050 Project Manager Tom Pham was called on May 4, 2000 and he agreed that a license extension (one year) should be submitted and then later submit a license amendment request allowing internal transfer of the fuel as it is loaded and sealed in 2R containers within 6M drums to another properly controlled facility. The one-year license extension request was submitted by letter dated May 8, 2000 requesting extension of the license to June 30, 2001; this letter is available at the UFTR facility. During the remainder of May, the decision was made to utilize the University of Florida Waste Management Facility (UFWMF) for the internal transfer as a license amendment request was forwarded for review and approval by the RSRS at its meeting scheduled for June 1, 2000. The key points per the conversation with SNM-1050 Project Manager Tom Pham on May 4, 2000 were to assure physical control of the fuel, assurance of no theft or tampering, and material balance control. Subsequently, in a conversation with Mr. Pham on May 17, 2000, he indicated the license amendment should provide information on the transfer building and assurance that we, as the licensee, will internally track and document all the fuel so its location can be verified at all times. He indicated he was pleased with

our responses to date. At the end of May, the license amendment was ready for RSRS review. It was reviewed at the June 1 RSRS meeting and sent to NRC on June 1. A copy of this submission is also available as desired.

An email indicating the license extension was close to complete was received from Tom Pham on June 12, 2000. In the email he also indicated Dan Martin would be taking his place. A lengthy conversation with Dan Martin on June 19 indicated the SNM-1050 license extension was coming but there were concerns about the license amendment and the UF Waste Management Facility building. Subsequently, Andrew Ragland of NRC NMSS Material Control and Accountability (MC&A) called on June 20 indicating he was working on the Safety Evaluation Report for the SNM-1050 license amendment and the UFWMF would probably need to be occupied or have an intrusion detection system in operation. Checks with RCO D.L. Munroe on June 21 indicated the University Police Department (UPD) charges are $30/hour for such after-hours security work. Dan Martin was contacted on June 26 to answer three questions he had raised earlier:

(1) There is a sprinkler system in the UFWMF.
(2) We do not have a criticality monitor for the Waste Facility.
(3) Radiation levels the last time we shipped SNM-1050 fuel in unirradiated 6M containers were <0.5 mR/hr on contact.

He again iterated that MC&A personnel were expected to require a 24-hour guard at the Waste Management Facility and a controlled access area. Subsequent efforts in June included measurements of the SNM-1050 fuel on June 27 and extensive discussions with UFWMF management, the RCO and Director of Nuclear Facilities concerning how to move the fuel out and some of the costs involved. A forklift could cost $1,000/day. The RCO provided a lengthy document dated June 27 summarizing the Cornell University uranium retrieval by GEM Technologies Inc. on behalf of the Department of Energy. The cover memorandum from GEM Project Manager Robert L. Clark concerning the Cornell Fuel Handling Procedures and miscellaneous documents along with the Roles and Responsibilities Agreement between DOE and Cornell and the proposed agreement between DOE and the University of Florida were provided and are available. The SNM-1050 license extension dated June 21, 2000 was finally received on June 27, 2000 extending the license to June 30, 2001. A copy of the extended license is contained in Appendix C of the 1999-2000 annual report.

On July 13, 2000, the new SNM-1050 NRC license manager Dan Martin's phone call was returned during which he indicated the new license amendment had been issued and that it would require a 24-hour watchman with constant surveillance during the day as well by a dedicated person. The license amendment package including the approval letter and amendment dated July 13, 2000 along with Guidelines for Decontamination and the Safety Evaluation Report was received on July 17, 2000 with the expected restrictions. This package is available at the reactor facility also. During July, preparations also continued for shipping the fuel as a hoist was set up at the facility and verified to lift the requisite weight with assistance from Waste Management Facility personnel. The criticality monitor was also calibrated and verified to be operable. Measurements were also made to assure 76 SPERT fuel pins would fit in a 2R container (simulated with a pipe). The initial GEM Technologies Criticality Safety Evaluation was received near the end of the month and is available. An initial Safety Evaluation was performed by Reactor management and documented in a

memorandum to the RCO dated July 31, 2000. This memorandum also contains an updated drawing of the fuel locations in the storage room and is also available. As discussed previously in RSRS meetings and as requested by the Interim Dean of Engineering, a memorandum was supplied from the RCO to Associate Dean Paul Thompson discussing the return of the SPERT fuel rods to DOE and providing a cost estimate for this return ($7,222) which did not include personnel time which had been and was expected to be considerable. NRE Chairman Tulenko indicated that this cost was excessive but activities proceeded with expectations that fuel transfers would begin before the end of the 1999-2000 reporting year.

During early August 2000, some time was spent reviewing criticality safety analyses produced by GEM Technologies. In addition, considerable time was spent setting up counting systems and preparing for shipping the fuel. UFSA SOP-U.4, Revision 1 (SPERT Fuel Inventory and Preparation for Shipment Procedure) was reviewed and approved at the RSRS meeting on August 17. Other pre-shipping activities included contamination swipes, checking calibration of counting systems in Room 6, assuring the criticality monitor was operating along with review and approval of UFSA SOP-U.6 (Procedure for Meeting License Requirements for Controlled Access to Interim Storage Facility) to assure proper security controls on fuel moved in sealed drums to the UF Waste Management Facility (WMF). NRC Project Manager Dan Martin was notified on August 18 of plans to begin shipping operations on August 23 expecting to ship the fuel out in 7–10 days and he indicated there was no need to notify them but we could call Region II as a courtesy. Also, a message was left at Region II on August 21 and NRC Inspector Craig Bassett called back later that day to get the information on the planned shipment indicating he would check back if further information was needed. He did not call back. The RCO provided training on August 22 for four Reactor facility staff and ten Radiation Control Office staff on UFSA SOP-U.4 as well as general controls and the Radiation Work Permit (RWP 00-01-II) to be used to control the loading and movement of the SPERT fuel. Subsequently, this training was conducted again on August 23 for three DOE representatives (Dr. Spyros A. Traiforos of AIMS Engineering & Management Support Services, Robert L. Clark of GEM Technologies, and Robert Gatrell of Bechtel Jacobs and Manager of Facilities, Portsmouth Gaseous Diffusion Plant) plus three UF Waste Management Facility personnel. The shipping drums arrived on August 23 about noon and one drum was loaded with 76 pins and sealed on August 23. Subsequently, 11 more drums were loaded and sealed and all 12 moved to the Controlled Access Area (CAA) set up in the WMF with a guard posted continuously at this time on August 24. Fourteen more drums were loaded and sealed on August 24 with 12 more moved to the WMF until use of the forklift was discontinued per Environmental Health & Safety. A Safety Plan was also generated. Subsequently, 14 more drums were loaded and sealed within Room 6 on August 25. Twelve more drums were loaded and sealed on August 28 within Room 6 and then the final 4 drums loaded and sealed and then the 32 loaded and sealed drums were moved to the CAA within the WMF on August 29. Shipping paperwork was completed on August 30 and the 56 drums containing all 4200 SPERT fuel pins were loaded on a sole use truck on August 31 and transferred to DOE through Mr. Robert Gatrell, DOE's facility representative for the Portsmouth Plant where the fuel was shipped. After the fuel left, NRC Project Manager Dan Martin was called on August 31 to determine whether the SPERT fuel security system could be turned off. He couldn't say and called back at the end of the day saying his boss would let us know on September 1. At the end of the 1999-2000 reporting year, the fuel had been shipped, the SPERT storage room was still on security awaiting NRC permission to shut it off, and the Room 6 facility was awaiting decommissioning expected to be relatively simple.

At the beginning of the reporting year, on September 1, 2000, Chuck Emeigh called to say the SNM-1050 Physical Security Plan could be canceled and a letter to this effect should be sent to the usual NRC contact. Subsequently, the University Police Department was informed that the UFSA facility was to be removed from security and the facility was removed from security at the end of September 1, 2000. Subsequently, the letter to NRC canceling the UFSA PSP dated September 5, 2000 was prepared and transmitted to NRC on September 7, 2000. This letter is available at the facility. Meanwhile, the SPERT fuel finally arrived at the Portsmouth Gaseous Diffusion Plant on September 5, 2000 per communication to the RCO who indicated the 741 form also had an error which was corrected. At the end of September 2000, it only remained to complete radiological checks and notify NRC that decommissioning is complete.

In early October 2000, the package for completed radiological checks was received from the RCO. This package was reviewed briefly on October 8 and discussed with the RCO on October 9 but no submission was made to NRC for decommissioning. The NRC Project Manager was consulted on November 7 about what to do for SNM-1050 license termination. He indicated to follow guidelines in the attachment to the license and send the package in as an application for license termination with a copy to the appropriate NRC Region II contact. He indicated that, as long as the fuel racks and other materials meet guidelines, they can be disposed.

The letter dated December 20, 2000 requesting SNM-1050 license termination along with completed NRC Form 314, Certificate of Disposition of Materials, and the package of materials supplied by the RCO was finally sent to the NRC Office of Nuclear Material Safety and Safeguards in December. This letter and completed form are in Appendix C of this report. There had been no response until a letter dated February 2, 2001 was received from the NRC Project Manager on February 5, 2001 basically accepting the application for license termination for formal review. Subsequently, the Project Manager called on February 22, 2001 concerning the SNM-1050 license termination. He basically wanted to verify all swipes were negative including the semiannual swipes taken during the license period and that all pins were swiped before shipping. He indicated he might need a letter to this effect but there was no further communication from him. A letter dated March 7 and received on March 12, 2001 from Philip Ting, Chief, Fuel Cycle Licensing Branch provides the termination documentation for the SNM-1050 license. The letter and the attached Safety Evaluation Report terminating the license are also in Appendix C of this report.

TABLE VI-1

LISTING OF APPROVED UFTR STANDARD OPERATING PROCEDURES (as of August 31, 2000)

O. ADMINISTRATIVE CONTROL PROCEDURES

- O.1 Operating Document Controls (REV 2, 7/91)
- O.2 Control of Maintenance (REV 4, 5/87)
- O.3 Control and Documentation of UFTR Modifications (REV 1, 10/99)
- O.4 10 CFR 50.59 Evaluation and Determination (REV 2, 7/00)
- O.5 UFTR Quality Assurance Program (REV 2, 7/91)
- O.6 Reactor Trip and Unscheduled Shutdown Review and Evaluation (REV 0, 5/87)
- O.7 Control of NRC 10 CFR 50 Written Communications Requirements (REV 1, 12/97)
- O.8 Operator Licensing Requalification Examination Controls (REV 1, 10/89)

A. ROUTINE OPERATING PROCEDURES

- A.1 Pre-Operational Checks (REV 16, 2/97)
- A.2 Reactor Startup (REV 12, 5/87)
- A.3 Reactor Operation at Power (REV 12, 11/94)
- A.4 Reactor Shutdown (REV 11, 10/89)
- A.5 Experiments (REV 4, 12/88)
- A.6 Operation of Secondary Cooling Water (REV 3, 5/95)
- A.7 Determination of Control Blade Integral or Differential Reactivity Worth (REV 1, 6/85)
- A.8 Pneumatic Rapid Sample Transfer (Rabbit) System (REV 1, 10/99)

B. EMERGENCY PROCEDURES

- B.1 Radiological Emergency (REV 5, 1/95)
- B.2 Fire (REV 9, 1/95)
- B.3 Threat to the Reactor Facility (Superseded by F-Series Procedures)
- B.4 Flood (REV 2, 8/97)

C. FUEL HANDLING PROCEDURES

- C.1 Irradiated Fuel Handling (REV 4, 2/85)
- C.2 Fuel Loading (REV 5, 10/99)
- C.3 Fuel Inventory Procedure (REV 4, 8/97)
- C.4 Assembly and Disassembly of Irradiated Fuel Elements (REV 0, 9/84)

TABLE VI-1 (CONTINUED)

LISTING OF APPROVED UFTR STANDARD OPERATING PROCEDURES
(as of August 31, 2000)

D. RADIATION CONTROL PROCEDURES

D.1 UFTR Radiation Protection and Control (REV 5, 12/93)
D.2 Radiation Work Permit (REV 10, 3/87)
D.3 Primary Equipment Pit Entry (REV 3, 5/95)
D.4 Removing Irradiated Samples from UFTR Experimental Ports (REV 6, 5/95)
D.5 UFTR Reactor Waste Shipments: Preparations and Transfer (REV 1, 4/92)
D.6 Control of UFTR Radioactive Material Transfers (REV 1, 4/00)
D.7 Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater (REV 0, 5/00)

E. MAINTENANCE PROCEDURES

E.1 Changing Primary Purification Demineralizer Resins (REV 5, 11/99)
E.2 Alterations to Reactor Shielding and Graphite Configuration (REV 3, 5/87)
E.3 Shield Tank and Shield Tank Recirculation System Maintenance (REV 2, 4/83)
E.4 UFTR Nuclear Instrumentation Calibration Check (REV 1, 4/90)
E.5 Superseded
E.6 Argon-41 Concentration Measurement (REV 1, 9/93)
E.7 Measurement of Temperature Coefficient of Reactivity (REV 0, 5/85)
E.8 Verification of UFTR Negative Void Coefficient of Reactivity (REV 0, 12/85)

F. SECURITY PLAN RESPONSE PROCEDURES (Reactor Safeguards Material, Disposition Restricted)

F.1 Physical Security Controls (Confidential, except for UFTR Form SOP-F.1A)
F.2 Bomb Threat (Confidential, except for UFTR Form SOP-F.2A)
F.3 Theft of (or Threat of the Theft of) Special Nuclear Material (Confidential, except for UFTR Form SOP-F.3A)
F.4 Civil Disorder (Confidential)
F.5 Fire or Explosion (Confidential)
F.6 Industrial Sabotage (Confidential)
F.7 Security Procedure Controls (REV 2, 10/89)
F.8 UFTR Safeguards Reporting Requirements (REV 1, 12/97)

TABLE VI-2

LISTING OF APPROVED UFTR STANDARD OPERATING PROCEDURES (as of August 31, 2001)

O. ADMINISTRATIVE CONTROL PROCEDURES

O.1 Operating Document Controls (REV 2, 7/91)
O.2 Control of Maintenance (REV 4, 5/87)
O.3 Control and Documentation of UFTR Modifications (REV 1, 10/99)
O.4 10 CFR 50.59 Evaluation and Determination (REV 2, 7/00)
O.5 UFTR Quality Assurance Program (REV 2, 7/91)
O.6 Reactor Trip and Unscheduled Shutdown Review and Evaluation (REV 0, 5/87)
O.7 Control of NRC 10 CFR 50 Written Communications Requirements (REV 1, 12/97)
O.8 Operator Licensing Requalification Examination Controls (REV 1, 10/89)

A. ROUTINE OPERATING PROCEDURES

A.1 Pre-Operational Checks (REV 16, 2/97)
A.2 Reactor Startup (REV 12, 5/87)
A.3 Reactor Operation at Power (REV 12, 11/94)
A.4 Reactor Shutdown (REV 11, 10/89)
A.5 Experiments (REV 4, 12/88)
A.6 Operation of Secondary Cooling Water (REV 3, 5/95)
A.7 Determination of Control Blade Integral or Differential Reactivity Worth (REV 1, 6/85)
A.8 Pneumatic Rapid Sample Transfer (Rabbit) System (REV 1, 10/99)

B. EMERGENCY PROCEDURES

B.1 Radiological Emergency (REV 5, 1/95)
B.2 Fire (REV 9, 1/95)
B.3 Threat to the Reactor Facility (Superseded by F-Series Procedures)
B.4 Flood (REV 2, 8/97)

C. FUEL HANDLING PROCEDURES

C.1 Irradiated Fuel Handling (REV 4, 2/85)
C.2 Fuel Loading (REV 5, 10/99)
C.3 Fuel Inventory Procedure (REV 4, 8/97)
C.4 Assembly and Disassembly of Irradiated Fuel Elements (REV 0, 9/84)

TABLE VI-2 (CONTINUED)

LISTING OF APPROVED UFTR STANDARD OPERATING PROCEDURES
(as of August 31, 2001)

D. RADIATION CONTROL PROCEDURES

D.1 UFTR Radiation Protection and Control (REV 5, 12/93)
D.2 Radiation Work Permit (REV 10, 3/87)
D.3 Primary Equipment Pit Entry (REV 3, 5/95)
D.4 Removing Irradiated Samples from UFTR Experimental Ports (REV 6, 5/95)
D.5 UFTR Reactor Waste Shipments: Preparations and Transfer (REV 1, 4/92)
D.6 Control of UFTR Radioactive Material Transfers (REV 1, 4/00)
D.7 Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater (REV 0, 5/00)

E. MAINTENANCE PROCEDURES

E.1 Changing Primary Purification Demineralizer Resins (REV 5, 11/99)
E.2 Alterations to Reactor Shielding and Graphite Configuration (REV 3, 5/87)
E.3 Shield Tank and Shield Tank Recirculation System Maintenance (REV 2, 4/83)
E.4 UFTR Nuclear Instrumentation Calibration Check (REV 3, 3/01)
E.5 Superseded
E.6 Argon-41 Concentration Measurement (REV 1, 9/93)
E.7 Measurement of Temperature Coefficient of Reactivity (REV 0, 5/85)
E.8 Verification of UFTR Negative Void Coefficient of Reactivity (REV 0, 12/85)

F. SECURITY PLAN RESPONSE PROCEDURES (Reactor Safeguards Material, Disposition Restricted)

F.1 Physical Security Controls (Confidential, except for UFTR Form SOP-F.1A)
F.2 Bomb Threat (Confidential, except for UFTR Form SOP-F.2A)
F.3 Theft of (or Threat of the Theft of) Special Nuclear Material (Confidential, except for UFTR Form SOP-F.3A)
F.4 Civil Disorder (Confidential)
F.5 Fire or Explosion (Confidential)
F.6 Industrial Sabotage (Confidential)
F.7 Security Procedure Controls (REV 2, 10/89)
F.8 UFTR Safeguards Reporting Requirements (REV 1, 12/97)

VII. RADIOACTIVE RELEASES AND ENVIRONMENTAL SURVEILLANCE

This chapter summarizes the gaseous, liquid, and solid radioactive releases from the UFTR facility for this reporting year. Argon-41 is the primary gaseous release. Finally, this chapter includes a summary of personnel exposures at the UFTR facility.

A. Gaseous (Argon-41)

The gaseous releases from the UFTR facility for this reporting year are summarized in Table VII-1. The basis for the gaseous activity release values is indicated in Table VII-2. These values are obtained by periodic measurements of stack concentrations as required by Technical Specifications following UFTR SOP-E.6, "Argon-41 Concentration Measurements."

TABLE VII-1

UFTR GASEOUS RELEASE SUMMARY

Month	Release	Monthly Average Concentration
September 2000	14.5354×10^{6} μCi/Month	4.7014×10^{-9} μCi/ml
October 2000	9.4714×10^{6} μCi/Month	3.0635×10^{-9} μCi/ml
November 2000	11.3131×10^{6} μCi/Month	3.6591×10^{-9} μCi/ml
December 2000	5.6922×10^{6} μCi/Month	1.8411×10^{-9} μCi/ml
January 2001	10.0568×10^{6} μCi/Month	3.2528×10^{-9} μCi/ml
February 2001	0.0000×10^{6} μCi/Month	0.0000×10^{-9} μCi/ml
March 2001	0.0000×10^{6} μCi/Month	0.0000×10^{-9} μCi/ml
April 2001	10.7387×10^{6} μCi/Month	3.4733×10^{-9} μCi/ml
May 2001	10.8588×10^{6} μCi/Month	3.5122×10^{-9} μCi/ml
June 2001	6.0775×10^{6} μCi/Month	1.9657×10^{-9} μCi/ml
July 2001	10.5454×10^{6} μCi/Month	3.4108×10^{-9} μCi/ml
August 2001	0.0000×10^{6} μCi/Month	0.0000×10^{-9} μCi/ml

TOTAL ARGON-41 Releases for the Reporting Year: 89.2893 Ci

YEARLY AVERAGE ARGON-41 Release Concentration: 2.4067×10^{-9} μCi/ml

UFTR Technical Specifications require average Argon-41 release concentration averaged over a month to be less than 1.0×10^{-8} μCi/ml. All such monthly values are well below this limiting release concentration with an average monthly release concentration of 2.4067×10^{-9} μCi/ml. Even with the newest 10 CFR Part 20 values reducing the Argon-41 release concentration limit to 1.0×10^{-8} μCi/ml in January, 1994, there has been no problem expected as the highest monthly value listed in Table VII-1 is less than 47% of the allowable limit and the second highest is less than 37% of the allowable limit.

Total releases and average monthly concentrations are based upon periodic Argon-41 release concentration measurements made at equilibrium full power (100 kW) conditions. The results for these experimental measurements used in calculating the gaseous Argon-41 release data are summarized in Table VII-2. Entries in Table VII-2 represent the average results of analyses of a minimum of three (3) samples per UFTR SOP-E.6 using a new gas standard obtained in response to NRC Inspection Report No. 88-01.

TABLE VII-2

UFTR GASEOUS RELEASE DATA TABLE

Month(s)	Releases per Unit Energy Generation	Instantaneous Argon-41 Concentration at Full Power [1]
Sep. 2000 - Dec. 2000	4097.86 μCi/kW-hr	9.5430×10^{-8} μCi/ml
Jan. 2001 – Jun. 2001	4121.48 μCi/kW-hr	9.5980×10^{-8} μCi/ml
Jul. 2001 - Aug. 2001	4121.48 μCi/kW-hr	9.5980×10^{-8} μCi/ml

[1]Values used to assure average release concentration meets 10 CFR 20 limits.

B. Liquid Waste from the UFTR/Nuclear Sciences Complex

The UFTR normally releases about one (1) liter of primary coolant per week to the holdup tank as waste from primary coolant sampling. A total of 52 weekly samples were taken during this reporting year; the average activity for these coolant samples was 9.47×10^{-8} μCi/ml (β-γ) and 4.76×10^{-9} μCi/ml (α) for this 2000-2001 reporting period. There were two discharges from the Wastewater Holdup Tank this reporting period. On 11/17/00 a total of 3233 liters were discharged. The discharge contained 3.78×10^{-3} μCi of Total activity, 2.40×10^{-3} μCi of Dissolved Activity, and less than 1.00×10^{-3} μCi Activity of Suspended solids which was less than the Lower Limit of Detection. On 07/09/01 a total of 3021 liters were discharged. The discharge contained 2.61×10^{-3} μCi of Total activity, 1.65×10^{-3} μCi of Dissolved Activity, and less than 1.00×10^{-3} μCi Activity of Suspended solids which was less than the Lower Limit of Detection.

C. Solid Waste Shipped Off-site

The UFTR facility made no shipments of solid waste during this reporting year. The last shipment was made on December 10, 1985 through ADCO Services, Inc. and consisted of one 55-gallon drum containing radioactive scrap metal parts as well as paper, plastic, and other reactor-related waste materials associated primarily with the work to restore proper functioning of the UFTR control blade drive systems. The activity of the shipment was approximately 3.125 Curies with the activity primarily attributed to Cobalt-60. Though a similar shipment of two drums was planned for the last seven reporting years and again this reporting year to remove all of the products resulting from the control blade restoration and maintenance project of 1985-1986, this shipment has not occurred to date. No date has been set for this shipment though it is expected to occur sometime during the next reporting year as waste from several other small maintenance projects is consolidated for shipment to clear space for waste expected to be generated during the UFTR conversion from HEU to LEU fuel expected within two years. The new Standard Operating Procedure UFTR SOP-D.5, "UFTR Reactor Waste Shipments: Preparations and Transfer" originally generated in the 1986-1987 reporting year and revised in April, 1992 will be used to assure proper control of the waste shipment as will guidance provided in several NRC Information Notices published in the last several years.

D. Environmental Monitoring

The UFTR maintains continuous Luxel dosimeter monitoring in areas adjacent to and in the vicinity of the UFTR complex. The cumulative totals for this reporting year from September, 2000 to August, 2001 are summarized in Table VII-3A. As can be noted, the values for the 12 months of the reporting period are either minimal or low in all. Overall, the values in Tables VII-3A and VII-3B show minimal environmental radiation dose from UFTR operations. The recorded TLD exposures are essentially background to within the accuracy of the monitoring instruments.

The accumulation of exposure recorded by month of exposure on the monitoring badges is presented in Table VII-3B. The values recorded in Tables VII-3A and VII-3B are considered to support the conclusion of minimal environmental exposures from UFTR operations.

TABLE VII-3A

CUMULATIVE RESULTS OF ENVIRONMENTAL MONITORING
SEPTEMBER 1, 2000 TO AUGUST 31, 2001

TLD Designation	Total Exposure (mrem) [1]	Month(s) of Exposure
1	23	9/00, 10/00, 11/00, 12/00, 2/01, 4/01, 6/01
2	27	9/00, 10/00, 11/00, 12/00, 2/01, 5/01, 6/01
3	M	--
4	M	--
5	9	9/00, 10/00, 11/00, 6/01
6	M	--
7	6	9/00, 11/00, 6/01
8	M	
9	M	--
10	M	--
11	M	10/99
12	9	10/00, 11/00, 2/01, 4/01, 5/01, 6/01

[1]M denotes minimal (<1 mrem) exposure.

TABLE VII-3B

LUXEL DOSIMETER
EXPOSURE RECORD BY MONTH OF EXPOSURE [1]

TLD Number	Sep 00 (mrem)	Oct 00 (mrem)	Nov 00 (mrem)	Dec 00 (mrem)	Jan 01 (mrem)	Feb 01 (mrem)	Mar 01 (mrem)	Apr 01 (mrem)	May 01 (mrem)	Jun 01 (mrem)	Jul 01 (mrem)	Aug 01 (mrem)
1	1	4	4	2	M	1	M	7	M	4	M	M
2	1	4	6	7	M	3	M	M	4	2	M	M
3	M	M	M	M	M	M	M	M	M	M	M	M
4	M	M	M	M	M	M	M	M	M	M	M	M
5	1	1	5	M	M	M	M	M	M	2	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	1	M	3	M	M	M	M	M	M	2	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	M	M	M	M	M	M
11	M	M	M	M	M	M	M	M	M	M	M	M
12	M	1	1	M	M	1	M	2	2	2	M	M

[1]M denotes minimal (<1 mrem) exposure.

E. Personal Radiation Exposure

UFTR-associated personnel exposures greater than minimum detectable during the reporting period are summarized in this section.

Table VII-4 lists the permanent whole-body badge exposures recorded above background for the reporting year for personnel employed directly at the UFTR. These exposures are summarized for all badged personnel on an annual basis.

TABLE VII-4

ANNUAL UFTR PERSONNEL EXPOSURE

Name	Position	Permanent Film Badge Exposure (mrem) [1]
G. Macdonald	Senior Reactor Operator	21
R. Salazar	Reactor Operator Trainee	25
W. Vernetson	Senior Reactor Operator	19
A. Vierbicky	Reactor Operator Trainee	31
J. Winn	Reactor Operator Trainee	26
J. Wolf	Senior Reactor Operator	26

[1]The exposure recorded here is for deep/whole-body dose.

Table VII-5 lists the permanent whole-body badge exposures recorded above background for the reporting year for non-permanent personnel employed at the UFTR. These exposures are summarized for all badged non-permanent UFTR personnel on an annual basis with no further breakdown because all exposures are well below 100 mrem for the year.

TABLE VII-5

ANNUAL NON-PERMANENT UFTR PERSONNEL EXPOSURE

Name	Position	Permanent Film Badge Exposure (mrem) [1]
B. Uhlmer	NAA Lab/Radiation Control Technician	21
S. Iverstine	NAA Lab/Reactor Facility Technician	24
J. Smith	NAA Lab/Reactor Facility Technician	21
J. Gilliam	NAA Lab/Reactor Facility Technician	16
M. Perrotti	NAA Lab/Radiation Control Technician	1
D. Candeto	Summer Student	14
K. Sartore	Summer Student	21

[1]The exposure recorded here is for deep/whole-body dose.

Table VII-6 lists the prompt reading dosimeter exposure measurement for visitors, students, or other non-permanent UFTR personnel. These exposures are on an annual basis with no further breakdown because all exposures are well below 100 mrem for the year.

TABLE VII-6

EXPOSURE RECORDS FOR UFTR VISITORS AS RECORDED BY PROMPT-READING DOSIMETERS

Personnel[1]	Date	Exposure (mrem) [1]	Comments
Stan Turner	01/04/2001	1	Visiting Experimenter
Beth Blackman	07/11/2001	1	Tour

[1]All exposures readings are for whole-body exposures.

It should be noted that tours of reactor facilities are strictly controlled and limited during periods when the reactor is running or ports are open or other opportunities for significant radiation fields are present. Therefore, the lack of visitor exposure is expected and in agreement with ALARA guidelines.

APPENDIX A

CORRECTIONS TO 1999-2000 UFTR ANNUAL PROGRESS REPORT

PAGE V-14
PAGE V-35

(corrections indicated by vertical line in margin)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
5 Apr 1993	Following general checkout of the new temperature recorder obtained under the DOE instrumentation grant, the unit is considered generally acceptable. Under MLP #93-10, maintenance work is being performed to develop a safety evaluation and investigate installation of the new temperature recorder to include various checks and consultation with Professor G.J. Schoessow in April 1993; in May 1993 work continued in design development for installing the new recorder; in June 1993, work continued in design development with considerable computer work completed including work descriptions and evaluations along with proposed changes to the annual nuclear instrumentation calibration check (UFTR SOP-E.4) and consultations with NES electronics engineer D. Ekdahl; in July 1993 work continued at a slower rate as the change package is nearing the point for final drafting with the complete modification package submitted to the RSRS for review at its September 30, 1993 meeting where the modification was approved to the point of being ready for implementation at which the RSRS wishes to review the materials including SOP changes prior to implementation. During October 1993 the materials necessary for this modification to be completed were ordered and their delivery was being awaited; during November, most but not all of the material arrived; the remainder of the material arrived in January 1994. During March 1994, linearity checks were performed on the new temperature monitoring system. No work had been performed since that time, especially since the recorder had been relatively problem free; however, during August 1999, the recorder was removed from storage, cleaned and partially checked out. During September 1999, a new manual was ordered from Mark Troissel for the DPR 3000 temperature monitor. In October 1999 it was decided to conduct all subsequent work under more current MLPs so this one was closed out. (On 8 Oct 1999, MLP #93-10 was closed.)
16 Mar 1994	After the new area radiation monitoring system including a 19-inch rack, recorder, computer console, battery backup, probes, attachments, cabling and hardware was received, MLP #94-14 was used to control setup of the new ARM system including connecting the battery power supply and the recording module. During April 1994, the new detectors were also mounted. During May, electrical cables were run from the detectors to the control room monitors. Actual on-line installation of the new system will require a modification package which is partially prepared. No work has been

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
22 Aug 2000	During the weekly checkout, the shield tank conductivity was noted to be getting low. Under MLP #00-27, the shield tank ion exchange resin cartridge was replaced to assure proper conductivity of the shield tank water. (On 22 Aug 2000, MLP #00-27 was closed.)

MLP #94-14 remains open from 16 Mar 1994 (New Area Radiation Monitoring System).
MLP #96-30 remains open from 11 Nov 1996 (Security system Batteries).
MLP #99-19 remains open from 24 May 1999 (Replacement of Wastewater Tanks).
MLP #99-43 remains open from 5 Oct 1999 (New Hurricane Rods).
MLP #00-07 remains open from 1 Mar 2000 (City Water Motor Operated Valve).
MLP #00-09 remains open from 9 Mar 2000 (Auxiliary Stack Monitor Meter/Alarm Modification).
MLP #00-23 remains open from 18 Jul 2000 (Mechanical Tach-Generator RPM Indication).

APPENDIX B

DOCUMENTATION FOR
UFTR DESIGNATION AS
AMERICAN NUCLEAR SOCIETY
NUCLEAR HISTORIC LANDMARK

Symposium on the Future of Nuclear Energy
Honoring the Designation of UFTR as an ANS Historic Landmark Site

March 23, 2001

Sheraton Gainesville Hotel
2900 SW 13 Street

1:30 – 5:00 PM **SYMPOSIUM ON THE FUTURE OF NUCLEAR ENERGY**

Welcoming Remarks
Dr. M. Jack Ohanian, Interim Dean
College of Engineering
University of Florida

Opening Address
Dr. Nils J. Diaz, Commissioner
Nuclear Regulatory Commission

Panel on the Future of Nuclear Energy

Dr. William G. Vernetson, Director of Nuclear Facilities (Panel Moderator)
Nuclear & Radiological Engineering Department
University of Florida

Dr. Thomas O. Hunter, Senior Vice President
Sandia National Laboratories

Dr. Gail H. Marcus, Principal Deputy Director
DOE Office of Nuclear Energy, Science and Technology

Mr. Thomas F. Plunkett, President, Nuclear Division
Florida Power & Light Company

Mr. Steven A. Hucik, General Manager, Nuclear Plant Projects
General Electric Nuclear Energy

Mr. Dale E. Young, Vice President - Nuclear
Florida Power Corporation

5:30 – 7:00 PM **RECEPTION – "Attitude Adjustment"** (Cash Bar/Complimentary Soft Drinks)

7:00 – 9:00 PM **BANQUET**
Buffet Dinner followed by Banquet Address

Speaker: Dr. James Lake
President, American Nuclear Society

AMERICAN NUCLEAR SOCIETY

555 North Kensington Avenue
La Grange Park, Illinois
60526-5592 USA

Tel: 708/ 352-6611
E-Mail: NUCLEUS@ans.org
http://www.ans.org
Fax: 708/ 352-0499

March 23, 2001

Dr. William G. Vernetson
Director of Nuclear Facilities
UFTR/Nuclear and Radiological Engineering Dept.
University of Florida
PO Box 118300
Gainesville, FL 32611-8300

Dear Dr. Vernetson:

The Board of Directors of the American Nuclear Society approved the University of Florida Training Reactor for a Nuclear Historic Landmark Award in November 2000. This award is symbolized by an inscribed bronze plaque, presented today. The inscription reads:

University of Florida
Training Reactor

First nuclear reactor in Florida, actively engaged for over forty years in first quality education, training research and service to support broad-based applications of nuclear engineering, science and technology for the benefit of society.

As a further explanation of the University of Florida Training Reactor's place in history, the Board approved this citation:

The UFTR was the first reactor ever constructed in the State of Florida and one of the first on a campus of an educational institution. The UFTR was planned beginning in 1957 and first went critical on May 19, 1959. The reactor was dedicated on February 13, 1960. This dedication was celebrated after initial testing and the expected operational characteristics of this 10 kilowatt facility were confirmed. Participants in the ceremonies included J. Wayne Reitz, President of the University of Florida, Joseph Weil, Dean of the UF College of Engineering, J. J. Daniel, Chairman of the Board of Control (now Board of Regents) for the State University System, and LeRoy Collins, Governor of the State of Florida. The Dedicatory Address was given by Allen J. Vander Weyden, Deputy Director, Division of Reactor Development for the Atomic Energy Commission.

The UFTR went into routine operation on May 27, 1959 after extensive testing and inspection by representatives of the AEC. It became part of the teaching program of the Nuclear Engineering (Sciences) Department (now the Nuclear and Radiological Engineering Department) in September 1959 following an active summer of operational testing and has remained active to the present in education, training, research and service.

James A. Lake, President

INEEL
MS-3860 / P.O. Box 1625
Idaho Falls, ID 83415

Tel: 208-526-7670
Fax : 208-526-2930
Email: lakeja@inel.gov

In its initial decade of operation, the UFTR concentrated on student training and research support, especially in the radiochemistry area where much original research on reaction chemistry and fission analysis was undertaken. A power upgrade from 10 kW to 100 kW was completed before the end of the first decade of operation in 1967. In the 1970s, the facility was involved in considerable research on fission-enhanced lasers and training of operators for Florida Power & Light Company, Florida Power Corporation, Louisiana Power and Light, and Georgia Power Company, among others.

Over the last twenty years, UFTR programs have continued evolving as the facility has made itself available to provide utility services in characterizing absorber panel materials used to ensure adequate subcriticality in nuclear power plant spent-fuel pools. Indeed, the development of neutron radiography capability at the UFTR in 1987 was driven by this work as absorber coupons for dozens of plants have been analyzed at the UFTR facilities in the past 14 years. Production of copper-64 for the Shands Hospital Nuclear Medicine Department is another frequent service usage.

The UFTR has now tailored its reactor operations laboratory to be a stand-alone course taken by many nuclear engineering students planning to work for the utility industry. These students are well served and frequently become staff engineers at nuclear power plants. The UFTR also developed a unique set of cooperative work training exercises designed for two-year radiation protection technology students. Well over a hundred such trainees from the Central Florida Community College Radiation Protection Technology Program have successfully completed this hands-on course and taken positions in the nuclear industry.

With the gradual reduction and elimination of funded utility training programs in the mid-1980s and with the advent of the U.S. Department of Energy's Reactor Sharing Program in 1984, the UFTR facility undertook to restructure its clientele base and provide reactor usage for a broad range of students in dozens of colleges, universities, community colleges, high schools and middle schools located throughout Florida. With the resultant resurgence of external usage of the UFTR, there has been a corresponding resurgence of interest in the UFTR within the University of Florida community so that a dozen or more different courses now utilize the facility each year, some for entire series of experimental uses. In a typical year over 2,500 visitors utilize the facility in a substantive manner representing various University of Florida departments and disciplines as well as institutions around Florida and the Southeast. This societal service—ensuring an informed citizenry in matters related to radiation, nuclear power, reactor technology and safety, dose levels, and myriad other areas—has become an integral part of the public education process in addressing nuclear energy issues in Florida, a state with five large power reactors producing about 20% of the state's electrical energy each year.

The diversity of the users for research, education and training of students and faculty clearly demonstrates the vitality of this facility. The UFTR is the only Argonaut-type nonpower reactor still operating in the United States. Nevertheless, the uniqueness of this facility is the manner in which it has evolved in usage. In-house training and radiochemical research dominated the first decade, gradually evolving to utilization primarily for nuclear engineering classes and as a source for fission-enhanced laser research. For the decade-plus period starting in the mid 1970s, the emphasis moved almost entirely to utility operator license training under the able direction of the Facility Director, Dr. Nils J. Diaz, who is now an NRC Commissioner. As utilities acquired their own plant-specific simulators, this utility training utilization diminished to elimination in the early 1990s. Again the

UFTR reinvented itself emphasizing things that could be done well such as nuclear energy familiarization classes, student and faculty training in a variety of nuclear concepts including neutron activation analysis where the facility was one of the first to implement the k_0-standardization methodology. The advent of the DOE Reactor Sharing Program in the mid-1980s allowed the building of an academic clientele outside the University of Florida which has synergistically worked to encourage users throughout various scientific and even nonscientific disciplines within the University of Florida to utilize the UFTR both for education/training and research, with even occasional service usages. This synergistic interaction has worked well to assure the facility is productive well into the new century. It is also a key reason why the facility is actively planning for renewal of its R-56 license for operation well into the second decade of the new millennium. With a continuing record of safety that is second to none, the University of Florida Training Reactor will be an active, vibrant and well-used landmark facility, not a shrine.

This plaque is presented today, March 23, 2001, at a special banquet which is the culmination of a day-long celebration featuring a Symposium on the Future of Nuclear Energy Honoring the Designation of the UFTR as an ANS Nuclear Historic Landmark Site. For their participation in today's events, special thanks are extended to Dr. M. Jack Ohanian, Interim Dean of the College of Engineering at the University of Florida; Dr. Nils J. Diaz, keynote speaker and Commissioner of the United States Nuclear Regulatory Commission; and the afternoon panelists—Dr. Thomas O. Hunter, Senior Vice President at Sandia National Laboratories; Dr. Gail H. Marcus, Principal Deputy Director at the United States Department of Energy's Office of Nuclear Energy, Science and Technology; Mr. Thomas F. Plunkett, President, Nuclear Division at Florida Power & Light Company; Mr. Steven A. Hucik, General Manager, Nuclear Plant Projects at General Electric Nuclear Energy; Mr. Dale E. Young, Vice President – Nuclear at Florida Power Corporation.

Sincerely,

James A. Lake

James A. Lake
President

APPENDIX C

SNM-1050 LICENSE
TERMINATION DOCUMENTATION

UNIVERSITY OF FLORIDA

Nuclear Reactor Facility
Department of Nuclear and Radiological Engineering

202 Nuclear Sciences Center
P.O. Box 118300
Gainesville, Florida 32611-8300
Tel: (352) 392-1429
Fax: (352) 392-3380
E-mail: vernet@server1.nuceng.ufl.edu

December 20, 2000

Director, Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Re: SNM-1050 License (Storage Only) – Docket No. 70-1068
Request for License Termination

All of the special nuclear material held under the SNM-1050 license has now been transferred to the U.S. Department of Energy (DOE). Originally 5400 fuel rods were held under this license. In 1990, we shipped 1200 fuel rods to Oak Ridge National Laboratory; subsequently, we shipped the remaining 4200 fuel rods off site, transferring them to DOE on August 31, 2000.

No special nuclear material is currently held under this license and the storage facility has been verified ready for other usage. The attached materials with the completed NRC Form 314 (Certificate of Disposition of Materials) should provide documentation that this SNM-1050 license is ready for termination. Therefore, we are requesting termination of SNM-1050.

If there are further questions, please advise.

Sincerely,

William G. Vernetson
Director of Nuclear Facilities

WGV/dms
Attachments

Copies: Dan Martin, Project Mgr., NMSS Licensing Branch
Ed McAlpine, Chief, Fuel Facilities Branch, Region II
D. L. Munroe, RCO (letter only)
USRS Committee (letter only)
J. Wolf, UFTR RM (letter only)
SNM-1050 License File

Sworn and subscribed this 20 day of December 2000.

Notary Public

Terri L. Anderson
MY COMMISSION # CC741436 EXPIRES
June 1, 2004
BONDED THRU TROY FAIN INSURANCE, INC.

NRC FORM 314 (6-95)
10 CFR 30.36(d)(1)(iv)
10 CFR 40.42(d)(1)(iv)
10 CFR 70.38(d)(1)(iv)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0028 EXPIRES: 06/30/98

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 30 MINUTES. THIS SUBMITTAL IS USED BY NRC AS PART OF THE BASIS FOR ITS DETERMINATION THAT THE FACILITY HAS BEEN CLEARED OF RADIOACTIVE MATERIAL BEFORE THE FACILITY IS RELEASED FOR UNRESTRICTED USE. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-6 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0028), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503. AN AGENCY MAY NOT CONDUCT OR SPONSOR, AND A PERSON IS NOT REQUIRED TO RESPOND TO, A COLLECTION OF INFORMATION UNLESS IT DISPLAYS A CURRENTLY VALID OMB CONTROL NUMBER.

CERTIFICATE OF DISPOSITION OF MATERIALS

INSTRUCTIONS: ALL ITEMS MUST BE COMPLETED -- PRINT OR TYPE
SEND THE COMPLETED CERTIFICATE TO THE NRC OFFICE SPECIFIED ON THE REVERSE

LICENSEE NAME AND ADDRESS

University of Florida
PO Box 118300
Gainesville, FL 32611-8300

LICENSE NUMBER
SNM-1050
Docket No. 70-1068

LICENSE EXPIRATION DATE
June 30, 2001

A. MATERIALS DATA *(Check one and complete as necessary)*

THE LICENSEE OR ANY INDIVIDUAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE LICENSEE CERTIFIES THAT:
(Check and/or complete the appropriate item(s) below.)

[ ] 1. NO MATERIALS HAVE EVER BEEN PROCURED OR POSSESSED BY THE LICENSEE UNDER THIS LICENSE.

OR

[X] 2. ALL ACTIVITIES AUTHORIZED BY THE LICENSE HAVE CEASED AND ALL MATERIALS PROCURED AND/OR POSSESSED BY THE LICENSEE UNDER THE LICENSE NUMBER CITED ABOVE HAVE BEEN DISPOSED OF IN THE FOLLOWING MANNER. *(If additional space is needed, use the reverse side or provide attachments.)*

Describe specific material transfer actions and, if there were radioactive wastes generated in terminating this license, the disposal actions including the disposition of low-level radioactive waste, mixed waste, Greater-than-Class-C waste, and sealed sources, if applicable.

All SPERT fuel elements were packaged in accordance with established procedures and transferred to a DOE facility. No radioactive waste was generated in terminating licensed activities.

For transfers, specify the date of the transfer, the name of the licensed recipient, and the recipient's NRC license number or Agreement State name and license number.

Transfer Date: August 31, 2000
Recipient: U.S. Department of Energy Portsmouth Gaseous Diffusion Plant, Piketon, Ohio. See attached DOE/NRC Form 741.

If materials were disposed of directly by the licensee rather than transferred to another licensee, licensed disposal site or waste contractor, describe the specific disposal procedures *(e.g., decay in storage).*

B. OTHER DATA

[X] 1. OUR LICENSE HAS NOT YET EXPIRED; PLEASE TERMINATE IT.

2. A RADIATION SURVEY WAS CONDUCTED BY THE LICENSEE TO CONFIRM THE ABSENCE OF LICENSED RADIOACTIVE MATERIALS AND TO DETERMINE WHETHER ANY CONTAMINATION REMAINS ON THE PREMISES COVERED BY THE LICENSE. *(Check one)*

[ ] NO *(Attach explanation)*
[X] YES, THE RESULTS *(Check one)*
  [X] ARE ATTACHED, or
  [ ] WERE FORWARDED TO NRC ON *(Date)*

3. THE PERSON TO BE CONTACTED REGARDING THE INFORMATION PROVIDED ON THIS FORM	NAME	TELEPHONE NUMBER *(Include Area Code)*
	William G. Vernetson	352-392-1408/1429

4. MAIL ALL FUTURE CORRESPONDENCE REGARDING THIS LICENSE TO

Dr. William G. Vernetson, Director of Nuclear Facilities, PO Box 118300, Gainesville, FL 32611-8300

CERTIFYING OFFICIAL

I CERTIFY UNDER PENALTY OF PERJURY THAT THE FOREGOING IS TRUE AND CORRECT

PRINTED NAME AND TITLE	SIGNATURE	DATE
Donald L. Munroe Radiation Control Officer	Donald L Munroe	12/20/00

WARNING: FALSE STATEMENTS IN THIS CERTIFICATE MAY BE SUBJECT TO CIVIL AND/OR CRIMINAL PENALTIES. NRC REGULATIONS REQUIRE THAT SUBMISSIONS TO THE NRC BE COMPLETE AND ACCURATE IN ALL MATERIAL RESPECTS. 18 U.S.C. SECTION 1001 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTIONS.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

February 2, 2001

RECEIVED FEB 0 5 2001

Dr. William G. Vernetson
Director of Nuclear Facilities
University of Florida
Nuclear Engineering Sciences Department
202 Nuclear Sciences Center
Gainesville, FL 32611

SUBJECT: ACCEPTANCE OF APPLICATION FOR LICENSE TERMINATION (TAC NO. L31450)

Dear Mr. Vernetson:

We have received your application for termination of Materials License SNM-1050 transmitted by letter dated December 20, 2000. Your request has been assigned TAC No. L31450. Please reference this number in any future correspondence associated with this request.

We have completed our acceptance review of your application and have identified no administrative omissions or deficiencies. The application has been accepted for formal review. Please note that the complete technical review may identify omissions in the submittal information or technical issues that require additional information.

Based on our acceptance review and projection of current review schedules, we anticipate completing our review by the end of April 2001. This date could change depending on the findings of our technical review, urgent assignments, or other factors. We will promptly communicate any significant changes to this schedule. I can be reached at (301) 415-7254 or by e-mail at dem1@nrc.gov.

In addition, a copy of your submittal has been forwarded to the License Fee and Accounts Receivable Branch, Office of the Chief Financial Officer, who will contact you separately if the appropriate license fee has not been submitted for your request, or for billing if your request is subject to full cost fee recovery.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

Dan E. Martin, Project Manager
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards

Docket 70-1068
License SNM-1050

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 7, 2001

RECEIVED MAR 1 2 2001

Dr. William G. Vernetson
Director of Nuclear Facilities
University of Florida
Nuclear Engineering Sciences Department
202 Nuclear Sciences Center
Gainesville, FL 32611

SUBJECT: UNIVERSITY OF FLORIDA - TERMINATION OF LICENSE SNM-1050 (TAC NO. L31450)

Dear Dr. Vernetson:

In accordance with your application dated December 20, 2000, and pursuant to Part 70 to Title 10 of the Code of Federal Regulations, Materials License SNM-1050 is hereby terminated.

Enclosed is a copy of the NRC staff's Safety Evaluation Report, which includes the Categorical Exclusion.

If you have any questions regarding this matter, please contact Dan Martin of my staff at (301) 415-7254 or by e-mail at dem1@nrc.gov.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,

Philip Ting, Chief
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards

Docket 70-1068
License SNM-1050

Enclosure: Safety Evaluation Report

DOCKET: 70-1068

LICENSEE: University of Florida
Gainesville, FL

SUBJECT: SAFETY EVALUATION REPORT: APPLICATION FOR LICENSE TERMINATION DATED DECEMBER 20, 2000

BACKGROUND

The University of Florida (UF) was first issued Materials License SNM-1050 in December 1967. The license authorized nondestructive testing and storage of 190 kilograms of U-235 in SPERT fuel pins. Nondestructive testing activities were completed by March 31, 1989, and the licensee has sought since that time to have the SPERT fuel pins removed from the site. In 1990, 1200 pins were accepted by the U.S. Department of Energy (DOE) and shipped to Oak Ridge National Laboratory, leaving 4200 SPERT fuel pins remaining at UF. The license was last renewed on June 8, 1995, for storage only, with all 4200 SPERT fuel pins required to be stored in Room 6 of UF Building 554. The license was further extended for an additional year on June 21, 2000, to provide additional time for the licensee to arrange for the removal of all licensed material. By letter dated September 5, 2000, UF notified NRC that all licensed material, consisting of 4200 SPERT fuel rods, had been transferred to DOE representatives and removed from the site on August 31, 2000.

On December 20, 2000, UF submitted an application for license termination, together with the required NRC Form 314, Certificate of Disposition of Material, and supporting survey data for all surface areas in and around Room 6 of Building 314.

DISCUSSION

All radioactive material under License SNM-1050 was within the 4200 sealed SPERT fuel pins which have been removed from the site. In accordance with 10 CFR 70.38(j)(1), UF has certified the disposition of all licensed material, by transfer to an authorized recipient, by submitting a completed NRC Form 314. In accordance with 10 CFR 70.38(j)(2), UF has conducted a radiation survey of the premises where licensed activities (i.e., storage of the SPERT fuel pins) were carried out and submitted a report of those surveys demonstrating that the premises are suitable for release in accordance with the criteria for decommissioning in 10 CFR Part 20, Subpart E (survey data demonstrate the absence of radiation or radioactivity levels above background).

In evaluating the licensee's request, the staff also reviewed the guidance in NUREG/BR-0241, "NMSS Handbook for Decommissioning Fuel Cycle and Material Licensees." Based on information provided by the licensee, the UF license is a Type I license for decommissioning purposes in that the licensee possessed and used only sealed sources, no activation of adjacent materials occurred during storage and possession of the SPERT fuel pins, and the most recent (and all previous) leak test results demonstrate that the pins did not leak. In

addition, although not required by NUREG/BR-0241 for a Type I license termination, the licensee performed and reported radiation surveys demonstrating the absence of residual contamination in and around the storage area.

NUREG/BR-0241 specifies that for termination of a Type I license, the licensee is required to submit a completed NRC Form 314 or equivalent, and provide a radiation survey or other demonstration of the absence of residual contamination, such as confirmatory leak test results. The licensee's application for license termination included a completed NRC Form 314 and confirmed that all pre-transport leak tests performed prior to transfer of the SPERT fuel pins to DOE were negative. These actions meet the requirements in NUREG/BR-0241for termination of a Type I license. In addition, the licensee has confirmed verbally, in a telephone conversation on February 22, 2001, between Dr. William G. Vernetson, UF Director of Nuclear Facilities, and Dan E. Martin, NRC Project Manager, that all prior routine leak tests were negative. The licensee also performed and submitted radiation surveys demonstrating the absence of contamination.

Radiation Survey Results

The licensee's radiation surveys were performed in accordance with 70.38(j)(2), and demonstrate compliance with, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," (the Guidelines) dated April 1993, which was required by License SNM-1050 license condition No. 13.

By license condition, storage was permitted only in Room 6 of UF Building 504. The licensee's survey included:

1. Contamination surveys of the four walls and floor of the storage room (Room 6), and the concrete pad outside the entrance doorway.

2. Contamination surveys of the racks and baskets that held the SPERT fuel rods within Room 6.

3. Radiation surveys of the walls, floor, outside concrete pad, and racks and baskets using a microrem meter, a pancake GM meter, and a NaI meter.

The licensee interprets the results of these surveys to demonstrate that there is no contamination in the storage room, and no radiation above background due to the SPERT fuel pins. The licensee notes the presence of slightly elevated radiation levels in the storage room due to red bricks used in wall construction and other concrete bricks stacked within the room. The staff has reviewed the slightly elevated levels in the area where the walls are constructed of red bricks or other concrete bricks are stacked and considers them to be normal for the materials of construction; they are also within the regulatory limits for acceptable release, as described below.

All surface contamination levels are well within the limits in the Guidelines (i.e., no result indicates surface contamination above 50 dpm and the Guidelines limit is 5,000 dpm for either average uranium or beta/gamma fixed contamination). Similarly, all microrem meter readings are less than or equal to 0.005 mr/hr at 6 inches distance, while the Guidelines limit is 0.2 mr/hr at 100 cm distance. On the basis of these results, the staff agrees with the licensee's

determination that there is no residual contamination or radiation from the SPERT fuel pins and the facility is acceptable for unrestricted release for other use.

Compliance with 70.38(k)

Section 70.38(k) states that specific licenses will be terminated by written notice to the licensee when the Commission determines that requirements specified in 70.38(k)(1) through 70.38(k)(4) are met.

The licensee has met 70.38(k)(1) by properly disposing of all SNM, and has met 70.38(k)(2), which requires that reasonable effort be made to eliminate residual radioactive material, if present.

The licensee has met 70.38(k)(3)(i) by performing and reporting a radiation survey demonstrating the premises are suitable for release in accordance with the criteria for decommissioning in 10 CFR Part 20, Subpart E. The licensee's survey, as discussed above, demonstrates the absence of residual radiation or radioactivity levels above background. In addition, 70.38(k)(3)(ii) allows for substitution of other information demonstrating the premises are suitable for release, and the licensee's negative leak test results satisfy this alternative requirement.

The licensee has also met the requirements of 70.38(k)(4), which requires the submittal of any records required by 70.51(b)(6) because the licensee has no such records. Records required by 70.51(b)(6) include records of onsite disposals, disposals by release to sewer systems, disposal by incineration, records of spills or other occurrences involving the spread of contamination, and records of contamination in inaccessible locations. Because the licensee has no such records, the staff determines that the licensee has met the requirements of 70.38(k)(4).

Therefore, the staff determines that the licensee has met all requirements of 70.38(k) and license SNM-1050 should be terminated

CATEGORICAL EXCLUSION

The proposed license termination is considered administrative in nature and does not adversely affect public health and safety or the environment. Also, the proposed action concerns the decommissioning and license termination of a site where licensed activities have been limited to the use of radioactive materials in sealed sources and there is no evidence of leakage from these sealed sources. As such, in accordance with 10 CFR 51.22(c)(20)(ii), this license termination action is categorically excluded from the requirement to prepare a site-specific environmental assessment or impact statement. Therefore, an environmental assessment or impact statement is not required or warranted for this action.

CONCLUSION

The staff concludes that the licensee has met all regulatory requirements for termination of license SNM-1050, as specified in §70.38(k). It is noted that NUREG/BR-0241 specifies that, for termination of a Type I license, a confirmatory survey by NRC is not required and none has been performed. Therefore, based on the licensee's application and the above discussion, the staff recommends that License SNM-1050 be terminated as proposed. The staff will implement

this recommendation by issuance of a letter of notification of license termination to the licensee, as specified in §70.38(k) and NUREG/BR-0241.

The Region II inspection staff has no objection to this proposed action.

PRINCIPAL CONTRIBUTORS:
Dan Martin
Michael A. Lamastra

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR BYPRODUCT, SOURCE, OR SPECIAL NUCLEAR MATERIAL

U.S. Nuclear Regulatory Commission
Division of Fuel Cycle Safety
and Safeguards
Washington, DC 20005

April 1993

Attachment

The instructions in this guide, in conjunction with Table 1, specify the radionuclides and radiation exposure rate limits which should be used in decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table 1 do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control is considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.

2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table 1 prior to the application of the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement shall be presumed to be contaminated in excess of the limits.

4. Upon request, the Commission may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to anther organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:

   a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.

   b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment, or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.

5. Prior to replace of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes contamination is within the limits specified in Table 1. A copy of the survey report shall be filed with the Division of Fuel Cycle Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and also the Administrator of the NRC Regional Office having jurisdiction. The report shall be filed at least 30 days prior to the planned date of abandonment. The survey report shall:

   a. Identify the premises.
   b. Show that reasonable effort has been made to eliminate residual contamination.
   c. Describe the scope of the survey the general procedures followed.
   d. State the findings of the survey in units specified in the instruction.

   Following review of the report, the NRC will consider visiting the facilities to confirm the survey.

TABLE 1

ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES (1)	AVERAGE (2, 3, 6)	MAXIMUM (2,4,6)	REMOVABLE (2,5,6)
U-nat, U-235, U-238, and associated decay products	5,000 dpm a/100 cm2	15,000 dpm a/100 cm2	1,000 dpm a/100 cm2
Transuranics, Ra-226, Ra-228, Th-230, Th-22, Pa-231, Ac-227, I-125, I-129	100 dpm/100 cm2	300 dpm /100 cm2	20 dpm/100 cm2
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	1000 dpm/100 cm2	3000 dpm/100 cm2	200 dpm/100 cm2
Beta-gamma-emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above.	5000 dpm by/100 cm2	15,000 dpm b/100 cm2	1000 dpmby/100 cm2

(1) Where surface contamination by both alpha- and beta-gamma-emitting nuclides exists, the limits established for alpha- and beta-gamma-emitting nuclides should apply independently.

(2) As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.

(3) Measurements of average contaminant should not be averaged over more than 1 square meter. For objects of less surface area, the average should be derived for each such object.

(4) The maximum contamination level applies to an area of not more than 100 cm2.

(5) The amount of removable radioactive material per 100 cm2 of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally and the entire surface should be wiped.

(6) The average and maximum radiation levels associated with surface contamination resulting from beta-gamma-emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.