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January 5, 2006

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 2003–4 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 5th day of January 2006

Notary Public

Terri L. Sparks
Commission # DD346498
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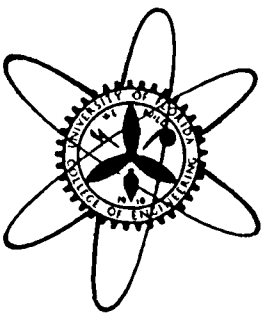
UNIVERSITY OF FLORIDA
TRAINING REACTOR
ANNUAL PROGRESS REPORT

SEPTEMBER 1, 2002 – AUGUST 31, 2003



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

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

December 2005

UNIVERSITY OF FLORIDA
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2002-3 ANNUAL REPORT

I. INTRODUCTION

The University of Florida Training Reactor's overall utilization for the past reporting year (September 2002 through August 2003) continued to be at historically high levels of quality usage, limited only by unavailability of the reactor or necessary personnel. It was a less productive year considering that there were several large outages that hampered reactor usage throughout the year including continuation of a failed fission chamber requiring a major modification as explained later in this report plus a failed deep well pump, a sticking Safety-2 control blade and an incorrect Safety Channel 1 trip setting. The diversity of users and usages was still among the best in the history of the facility, especially considering that availability this year was up only slightly above 36% after being down to less than 35% last year and 59% the previous year after the 1999–2000 year's value over 88%. The poor availability was primarily due to having several lengthy outages including one occupying the first 192 days of the reporting year for the failed fission chamber. Other significant outages were for a failed deep well pump (>8 days), a sticking safety control blade (>12 days) and an incorrect safety channel high voltage trip setting (>4 days). 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. During this 2002–3 year we lost a part-time SRO in May 2003 and licensed two more in the same month. Unfortunately one of these two resigned for his Navy commitment in July 2003 as one other part-time SRO-trainee is contributing to facility activities as he is trained. 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 the most experienced NAA laboratory assistant at the beginning of the 2002–3 reporting year has continued to present a challenge throughout the reporting year for research usage of the facility.

The package to apply for UFTR relicensing was submitted with a cover letter dated July 29, 2002 to allow the UFTR R-56 license to remain effective until action is taken on the relicensing submittal. The NRC letter acknowledging the UFTR license renewal and continued effectiveness of the R-56 license as a "timely" renewal application is dated August 26, 2002. Some errors were noted primarily due to computer formatting and retrieval errors made during the document conversion process for duplication (printing) of the Final Safety Analysis Report (FSAR). There were no actual changes to the FSAR content so these changed pages were provided to the NRC with a cover letter dated February 23, 2003.

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 in some years, the Level 1 administration of the UFTR facility was unchanged. Indeed there were no significant administrative changes during the 2002–3 reporting year.

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 (one) and scheduled (none) trips in Tables III-5A and III-5B. The log of unusual occurrences constitutes Table III-6 and contains ten items for 2002–3. 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 2002–3 reporting year. Included in Table III-6 is the one trip 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, FSAR, Emergency Plan, Standard Operating Procedures and other significant documents. During the 2002–3 reporting year there were no changes to the Tech Specs after Technical Specification Amendment 23 was approved and implemented in the previous year. The relicensing package included various updated documents including the Technical Specifications, FSAR, Emergency Plan and Requalification and Recertification Training Program. This document submittal was accepted for review by the NRC in August 2002 of the previous reporting year with no action expected for several years. There were also no changes to the FSAR though the proposed FSAR submitted for relicensing was discovered to have some errors primarily due to computer formatting and retrieval errors made during the document conversion process for duplication (printing) of the FSAR. There were no actual changes to the FSAR submitted for relicensing so these changed pages were provided to the NRC with a cover letter dated February 23, 2003. The package is available for review at the UFTR facility. Revision 12 to the UFTR Emergency Plan was submitted in August 2001 and fully implemented in February 2002 of the previous reporting year with no changes made this year. A revised ALARA program was generated during the previous reporting year with no changes this year. There were no changes to the UFTR Physical

Security Plan or to the Respiratory Protection Program during the 2002–3 reporting year. The UFTR Biennial Reactor Operator Requalification and Recertification Training Program was submitted for renewal in June 2003 for the July 1, 2003–June 30, 2005 cycle with minor changes. The only other significant reactor-related document changes in the 2002–3 reporting year involved changes to various Standard Operating Procedures. No new procedures were generated but one procedure was revised during this reporting year as a result of periodic reviews and only four 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 2003–4 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 following conclusion of the lengthy outage for the failure in the wide range channel, license renewal, HEU to LEU fuel conversion, 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/Acting Reactor Manager and Senior Reactor Operator (September 2002 – August 2003)
A. Vierbicky[1]	–	Student Technician and Senior Reactor Operator (1/2 time) (September 2002 – May 6, 2003)
C. Hartsock[2]	–	Student Technician and Senior Reactor Operator Trainee (5/8 time) (September 2002 – May 21, 2003)
		Student Technician and Senior Reactor Operator (1/4 time) (May 22, 2003 – July 14, 2003)
B. Shea	–	Student Technician and Senior Reactor Operator Trainee (2/3 time) (September 2002 – May 21, 2003)
		Student Technician and Senior Reactor Operator (9/10 time) (May 22, 2003 – August 31, 2003)
M. Berglund	–	Student Technician and Senior Reactor Operator Trainee (1/3 time) (December 26, 2002 – August 31, 2003)
D. Seifert	–	Secretary (September 2002 – August 2003)
D. Kruegel[3], C. Acosta, J. Hurtado, G. Marinella	–	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] A. Vierbicky's last day of paid employment was April 30, 2003, but he remained licensed and volunteered time occasionally until he left Gainesville for additional Navy training on August 8, 2005.

[2] C. Hartsock was licensed as an SRO effective May 22, 2003 but then left after mid-July for a naval commitment as he had graduated in spring 2003.

[3] D. Kruegel worked mostly in the NAA Laboratory but remained qualified and occasionally served as a radiation control technician through December 2002.

B. Radiation Control Office

D. L. Munroe[4]	–	Radiation Control Officer (September 2002 – August 2003)
J. J. Parker	–	Radiation Control Technician (September 2002 – August 2003)

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 or for emergency drills.

C. Reactor Safety Review Subcommittee (RSRS)

W. E. Bolch	–	RSRS Chairman (Professor, Environmental Engineering Sciences) (September 2002 – August 2003)
W. G. Vernetson	–	Member (Director of Nuclear Facilities) (September 2002 – August 2003)
D. L. Munroe	–	Member (Radiation Control Officer) (September 2002 – August 2003)
J. S. Tulenko	–	Member (Professor, Nuclear and Radiological Engineering) (September 2002 – August 2003)
A. Haghighat	–	Member (Chairman, Department of Nuclear and Radiological Engineering) (September 2002 – August 2003)
D. E. Hintenlang	–	Member (Associate Professor, Department of Nuclear and Radiological Engineering) (September 2002 – August 2003)

[4]The specified alternate for the RCO position is G.I. Snyder.

D. Line Responsibility for UFTR Administration

C. E. Young	–	President, University of Florida (September 2002 – August 2003)
P. P. Khargonekar	–	Dean, College of Engineering (September 2002 – August 2003)
A. Haghighat	–	Chairman, Department of Nuclear and Radiological Engineering (September 2002 – August 2003)
W. G. Vernetson	–	Director of Nuclear Facilities/Acting Reactor Manager (September 2002 – August 2003)

E. Line Responsibility for the Radiation Control Office

C. E. Young	–	President, University of Florida (September 2002 – August 2003)
J. E. Poppell	–	Vice President, Finance & Administration (September 2002 – August 2003)
W. S. Properzio	–	Director, Environmental Health and Safety (September 2002 – August 2003)
D. L. Munroe	–	Radiation Control Officer (September 2002 – August 2003)

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 6 months long forced outage at year's beginning and other significant forced outages in the second half of the year 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 sixth 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 June 2002.

As noted over the last seventeen 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 sixteen 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 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. A number of science fair projects were also supported with good results at the state finals for students from Spruce Creek High School, Newberry High School, Lecanto High School and others. 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 and Gainesville Country Day School, 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, and air particulate and other particle irradiations for isotopic analysis for Constellation Technologies Corporation.

Table III-2 contains a listing of energy generation by month for the reporting year. The yearly total of 10,758.10 kilowatt-hours energy generation is low, partially due to not having sufficient licensed operators during most of the year and continued but particularly because of having poor overall availability (<40%) with no energy generation at all in the months of September 2002 through February 2003.

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 201 hours of run time but a monthly average availability of only 36.17% 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 Independence Day Holiday in July 2003. As noted, the high unavailability this year was primarily due to forced outages.

Table III-5A lists and describes the one 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 one trips described in Table III-5A listed as one of these entries. Again, all ten have very relatively low safety significance.

TABLE III-1A

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED USAGE OF UFTR FACILITIES
(September 2002 – August 2003)

School	Usages*	Faculty	Students
1. Alachua County Middle Schools (Science Quest Workshop)	1	2	23
2. Bartow High School (BHS)	8	2	1
3. Branch Ely High School (BEHS) (COE Minority Outreach)	2	3	23
4. Cedar Creek Baptist Church	1	2	2
5. Central Florida Community College (CFCC)	5	2	14
6. College of Engineering Minority Step-Up Program	1	1	49
7. College of Engineering Recruiting Days (High School Students)	3	2	26
8. CPET Science, Engineering & Humanities Symposium	2	4	25
9. CPET Science Quest Workshop (Middle Schools)	2	3	46
10. Coral Park Magnet High School (COE Minority Outreach)	2	2	30
11. Ecole Polytechnic de Montreal	1	1	0
12. Fernandina High School (FHS)	1	3	28
13. Florida 4-H Symposium	1	1	1
14. Flagler Palm Coast High School (FPCHS)	1	1	0
15. Gainesville Country Day School (GCDS)	2	3	28
16. Georgia Institute of Technology	1	0	1
17. German Exchange Students	1	0	7
18. Hillsborough Community College (HCC)	1	1	10
19. Indian River Community College (IRCC)	1	1	2
20. Kansas State University	1	0	1
21. Lecanto High School (LHS)	38	1	4
22. Lely High School (L-HS)	1	2	1
23. Marion County Middle School	1	1	1
24. Memorial Middle School Honors Science	1	1	25
25. Merit Scholars (High School Students)	1	1	23
26. Miami Dade Community College (MDCC)	1	1	5
27. Miami Senior High School (MSHS) (UF Alliance)	2	4	37
28. Miramar High School (MHS) (COE Outreach Program)	2	2	30
29. Newberry High School (NHS)	1	1	2
30. Okeechobee Central Elementary School	1	1	1
31. Outstanding High School Scholars Program	1	2	3
32. Oveido High School (OHS)	1	2	2
33. Paxson High School for Advanced Students	2	1	1
34. Pineview High School (PHS)	1	0	1
35. Riverview High School (RHS)	4	1	9
36. Santa Fe Community College (SFCC)	6	4	42
37. Seminole Community College (SCC)	2	1	1
38. South Carolina State University (SCSU)	2	5	1
39. Savannah State University (SSU)	3	3	1
40. Seminole County High School (COE Minority Outreach)	2	4	34

(Table III-1A continues on next page.)

TABLE III-1A

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED USAGE OF UFTR FACILITIES
(September 2002 – August 2003)

School	Usages*	Faculty	Students
41. Southeast Consortium for Minorities in Engineering (SECME)	2	6	50
42. Spring Hill High School (SHHS)	1	2	3
43. Spruce Creek High School (SCHS)	17	4	2
44. Thomas A. Edison College (TAEC)	1	0	1
45. TREAT Workshop	1	12	15
46. TREAT Workshop Research Follow-up	3	1	5
47. Truckee Community College High School Teacher Workshop	1	26	0
48. University of Central Florida (UCF)	24	3	2
49. University External Facility Visitors/Student Communications	4	6	26
50. Valencia Community College (VCC)	1	0	1
51. Williams Elementary School	1	1	1
TOTAL	**138**	**141**	**749**

*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 two projects for Lecanto High School that involved long term irradiations as did others such as a project for Union County High School.

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

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. "Experiment Time" is total time that the facility dedicates to a particular use; it includes "Run Time." "Run Time" is 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
*Center for Precollegiate Education and Training – Lely High School NAA Research on Trace Element Composition of Tobacco Products – Lely HS/ Dr. W.G. Vernetson, UF – Reactor Sharing	Summer 2002 Student Research Program Project – Evaluation and Quantification of Trace Element Radioactivity Content in Cigarettes for Student Renan Talhadas (Local Science Fair Entrant)	0.00	3.25
*Center for Precollegiate Education and Training – Paxson High School for Advanced Studies NAA Research on Variable Trace Element Composition of Treated Versus Organic Beef – Paxson HS for Advanced Studies/ Dr. W.G. Vernetson, UF – Reactor Sharing	Summer 2002 Student Research Program Project – Evaluation and Quantification of Variable Trace Element Content of Treated Versus Organic Beef for Student Lindsey Gray (Junior Science, Engineering and Humanities Symposium Participant)	0.00	4.25

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
*Student Visits for Familiarization to Identify Potential Science Fair Research Projects – Mr. Ron Worthington, Lecanto High School/ Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour with Discussions of Facility Usage and Capabilities to Identify and Select Science Fair Projects for Future Research for Lecanto High School Students	0.00	2.42
*Center for Precollegiate Education and Training – Bartow High School NAA Research on Trace Element Composition of Dry Cereals – Ms. L.B. Langworth and Ms. Heather Holms, Bartow HS/ Dr. W.G. Vernetson, UF – Reactor Sharing	Summer 2003 Student Research Program Project – Evaluation and Quantification of Variable Trace Element Content of Various Dry Cereals for Student Eric Layton (Local/State Science Fair Winner and Junior Science, Engineering and Humanities Symposium Participant)	9.03	12.25 (0.58)
*Center for Precollegiate Education and Training – Spruce Creek High School NAA Research on Trace Element Composition of Variation in Hard Versus Soft Mollusk and Crab Shells – Ms. Andrea White and Ms. Gail E. Waller, Spruce Creek HS/ Dr. W.G. Vernetson, UF – Reactor Sharing	Summer 2003 Student Research Program Project – Evaluation and Quantification of Variable Trace Element Content of Hard Versus Soft Shell Areas of Mollusks and Crabs for Student Ross Anderson (Local Science Fair Winner)	7.67	11.50 (0.17)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Familiarization Tour for Flagler Palm Coast High School Science Teacher/Geologist Tony Cinelli – Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations and Applications Including Trace Element Analysis Geological Applications and Cerenkov Radiation Observation for Possible Future Collaborations	0.62 (0.62)	3.42 (1.83)
***TREAT Workshop – Dr. Kenneth Sajwan, Savannah State University/ Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Lectures and Demonstrations Comparing Nonpower UFTR to Power Reactors and Technology Applications as Part of Teaching Radiation, Energy and Technology (TREAT) Workshop for Savannah State University Teachers, Students, High School Teachers and Community Members	0.00	18.92 (1.50)
***Florida High School 4-H Congress – Mr. Jonathan Pollack (IFAS) / Dr. W.G. Vernetson, UF – Reactor Sharing	Tour and Discussion of UFTR Operations with Discussion of Trace Element Analysis Using NAA Techniques for Students Attending Florida 4-H Congress	0.00	0.50
***Minority Engineering Step-Up Program – Mr. Earl Wade (COE) / Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Facilities to Discuss Usage and Capabilities to Attract and Retain Minorities in Engineering and Nuclear Engineering	0.00	2.00

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
*NAA Research to Quantify Certain Heavy Trace Elements in Fresh Gulf of Mexico Shellfish – Mr. Ron Worthington, Lecanto High School/ Dr. W.G. Vernetson, UF – Reactor Sharing	NAA Evaluation of Certain Trace Elements (Hg, As, Cr) in Fresh Gulf Shellfish Samples for a Science Fair Project for Student Nilesh Patel (Local/Regional/Place at State)	15.68 (8.53)	49.25 (24.58)
Administrative and Education Communication Activities – Dr. W.G. Vernetson, UF – Reactor Sharing	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 Plus Reporting and Communications Activities	0.00	34.83 (0.50)
***Familiarization Tour for Riverview High School Science Teacher Mr. Keith Vierbicky – Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations for Science Teacher Keith Vierbicky	0.00	0.50
***High School Senior Outreach for Recruitment to Engineering / Nuclear Engineering – Ms. Jill Lingard and Ms. Yolanda 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 Other Engineering Areas	0.00	3.83

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**T.C. Williams High School – Mr. Chuck Vincent (ANS)/ Dr. W.G. Vernetson, UF – Reactor Sharing	Lectures and Demonstrations as Part of High School Teacher Workshops Including Radiation Surveys of Everyday Objects and Utilization and Applications of UFTR Reactor and NAA Laboratory Facilities	0.00	8.42
*NAA Research to Quantify Ability of Invasive Water Plants to Remove Certain Heavy Elements in Fresh Water – Mr. Ron Worthington, Lecanto HS/Dr. W.G. Vernetson, UF – Reactor Sharing	NAA Evaluation of Certain Heavy Trace Elements (Hg, As, Cr) in Fresh Water Hyacinths Versus Other Fauna for a Science Fair Project for Student Sneha Patel (Local/Regional/Place at State)	15.68 (8.48)	46.75 (24.25)
**G.A. LaJolla Visitor Facility – Mr. Chuck Vincent (ANS)/ Dr. W.G. Vernetson, UF – Reactor Sharing	Lectures and Demonstrations as Part of High School Teacher Workshops Including Radiation Surveys of Everyday Objects and Utilization and Applications of UFTR Reactor and NAA Laboratory Facilities	0.00	10.67
***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 Along with Nuclear Engineering Education Opportunities for Various Outside University Faculty Visitors (Michigan, Western Kentucky, Santa Barbara, Arizona) and Industry Instructors Plus Accompanying Students	0.25 (0.25)	6.92 (0.92)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Coral Park 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 Magnet High School Honor Students and Teachers as Part of Minority Outreach Program	0.00	4.17 (0.25)
**Memorial Middle School, Orlando – Mr. Earl Wade (COE)/Dr. W.G. Vernetson, UF – Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Use of the Rabbit system and PC-based Analyzers for Memorial Middle School Science Students and Teachers as Part of Minority Outreach Program	0.00	2.17
**Cobb Middle School, Tallahassee – Mr. Earl Wade (COE)/Dr. W.G. Vernetson, UF – Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Use of the Rabbit system and PC-based Analyzers for Cobb Middle School Science Students and Teachers as Part of Minority Outreach Program	0.00	2.17 (0.08)
**Griffin Middle Tallahassee – Mr. Earl (COE)/Dr. W.G. Vernetso Reactor Sharing	Lecture, Tour and Demonstration of Reactor and NAA Laboratory Operations Including Radiation Surveys of Everyday Objects and Use of the Rabbit system and PC-based Analyzers for Griffin Middle School Science Students and Teachers as Part of Minority Outreach Program	0.00	2.00

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Florida High School Merit Scholars Program – Dr. Jonathan Earle (COE)/ Dr. W.G. Vernetson, UF – Reactor Sharing	Lecture and Tour for Outstanding High School Student Merit Scholars Program Including Students and Parents to Discuss Facility Usage and Capabilities to Attract Superior Students into Nuclear Engineering	0.00	1.75
***Center for Precollegiate Education 40th Annual Junior Science, Engineering and Humanities Symposium – Dr. MaryJo Koroly and Ms. Debra Paulin (CPET) – Reactor Sharing	Series of Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Facility Operations, Capabilities and Applications for Honors Groups of High School Junior/Senior Level Students and Teachers	0.00	3.17 (0.25)
***Central Florida Community College – Mrs. Susan Cable, Physics Teacher, CFCC – Reactor Sharing	Series of 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 Physics Students Interested in Engineering Majors	1.71 (0.38)	13.83 (0.42)
**Marion County Middle School – Ms. Susan McMurray, MCMS – Reactor Sharing	Walk-through Tour of Reactor Facility for Marion County Middle School Teacher Susan McMurray, Her Father Plus UF Anthropology Professor Elizabeth Prog to Discuss Facility Usage and Capabilities and Potential Anthropology Applications and Middle School Student Involvement	0.00	0.83

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Branch Ely High School, Ft. Lauderdale – 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 Branch Ely High School Honors Science Students and Teachers as Part of Minority Outreach Recruitment Program	0.00	4.83
**Demonstration of Reactor and NAA Laboratory Operations for Educational Applications – Dr. Edwin D. Davis, Orthopedist / Dr. W.G. Vernetson, UF – Reactor Sharing	Lecture, Tour and Demonstration of UFTR and NAA Laboratory Operations with Discussion of Facility Usage and Capabilities for Education and Training Including Measurement of Half-Life of Radionuclides and Trace Element Analysis of Hair and Other Samples for Orthopedist Dr. E.D. Davis and Assistant – Follow-up	0.00	0.50
***Familiarization Tour for Georgia Institute of Technology Student – Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Curricular Use for Potential Nuclear Engineering Student with Utility Manager Concerned with Attracting Good Students to Nuclear Engineering	0.00	1.92
**Gainesville Country Day School Science Classes – Ms. Angela Acevedo and Ms. Barbara Herbert, GCDS – 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 Hair Samples Using NAA Techniques Plus Contamination Control Exercises Using Anticontamination Clothing with Subsequent Trace Element Analysis of Series of Hair Samples	1.87 (0.08)	08.50 (0.08)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Familiarization Tours for South Carolina State University Engineering Faculty/ Administrators – Dr. James A. Anderson, Dean, School of Engineering Technology and Science, SCSU / Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tours of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Curriculum Applications for South Carolina State University Faculty and Administrators to Encourage Potential Joint Nuclear Engineering Programs	0.00	3.33
***Familiarization Tour for Spartanburg High School Student – Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Curricular Use for Potential Nuclear Engineering Student Jason Kopp of Spartanburg High School and His Parents	0.00	1.67
***Familiarization Tour for Pineview High School Student – Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Curricular Use for Potential Nuclear Engineering Student Holly Hall of Pineview High School and Her Father	0.00	2.08 (0.33)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Santa Fe Community College Nuclear Medicine Technology Program – Mr. Karl Eckberg, Mr. John Eichner and Ms. Rochelle Sturm, SFCC – Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Isotope Identification, Half-life Measurement and Trace Element Analysis of Hair Samples Using the Rabbit System PC-based Analyzers Plus Demonstration of Gas Flow Proportional Counter for Contamination Surveys Plus Follow-up Trace Element Analysis of Hair Samples	2.88	9.25
**Santa Fe Community College Medical Radiography Program – Ms. Bobbie Konter and Mr. Karl Eckberg, 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 on Hair Samples Using the Rabbit System and PC-based Analyzers Plus Demonstration of Gas Flow Proportional Counter for Contamination Surveys Plus Follow-up Trace Element Analysis of Hair Samples	2.65 (0.50)	8.42 (0.83)
***Oviedo High School – Mr. Tony Roland, Oviedo HS – Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities for Students and Parents to Discuss Capabilities and Usage Relative to Interest in Nuclear Engineering and Nonpower Reactors	0.00	1.25

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**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 Activation for Half-life Measurements and Trace Element Analysis of Hair Samples Using NAA Techniques and Demonstration of Neutron Radioisotope Production and Use of Gas Flow Proportional Counters	0.73	5.42
***Riverview High Science Dept. – Ms. Rufener, Science Teacher, Reactor Sharing	Extensive Lectures, Tours and Demonstrations of UFTR Operations with Radiation Surveys and Exercises to Include Measurement of Half-life of Activated Elements and in Using the Rabbit System and PC-based Analyzers for Trace Element Analysis of Hair Samples Using NAA Techniques Plus Contamination Control Exercises Using Anticontamination Clothing and Non-destructive Testing of Space Shuttle Tiles Using X-rays for AP Chemistry Students Follow-up Trace Element Analysis of Hair Samples	2.90 (0.08)	11.50 (0.08)
***Familiarization Tour for University of Maine Physics Student – Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Curricular Use and Opportunities for Potential NRE Graduate Work	0.00	1.00

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Miami Senior High School/UF Alliance Program – Dr. Mickey Miller (UF College of Education), Mr. Nelson Carlaya and Ms. Milagros Zagueira, Miami Senior HS – Reactor Sharing	Series of 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 Previously Irradiated in the Rabbit System Using NAA Techniques Plus Contamination Control Exercises Using Anticontamination Clothing and Robotics Demonstrations for Honors Students and Faculty at Miami Senior High School to Support Alliance Program to Encourage Minority Students to Seek University Degrees Plus Follow-up for Information	0.67	6.33
**Center for Precollegiate Education and Training Summer Science Training Program for High School Students – Dr. MaryJo Koroly and Ms. Debra Paulin (CPET) / 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 Science Training Program High School Students, Ross Anderson of Spruce Creek High School in Daytona Beach, and Eric Layton of Bartow High School	4.98 (0.50)	32.50 (2.67)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Familiarization Tour for Indian River Community College Science Teacher – Mrs. Eppy Kiger, IRCC/ Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Curricular Use and Opportunities for Potential NRE Graduate Work and Undergraduate Work for Indian River Community College Science Teacher Eppy Kiger, Student from John Carroll High School T. Kiger, and America University Physics Major Chad Matheny	0.00	1.00
*NAA Archeological Research Applications – Dr. Mark Moore, Scientific Consultant, Dr. Leslie Moore, Archeologist, and Ms. Ellie Schiller, Yankeetown Science Center Board Member and Benefactor – Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage and Archeological Applications and Operations for Science Center Representative and Technical Volunteer Consultants	0.00	1.83
**Miramar High School, Miami – 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 Miramar High School Honors Science Students and Teachers as Part of Minority Outreach Program	0.00	3.50 (0.17)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**NAA Research on Arsenic Detection in the Environment – Dr. Cindy Holland, Newberry High School – Reactor Sharing	Initial Discussions with Newberry High School Chemistry Student Sarah Eagle Concerning Detection of Arsenic in Environmental Samples Using Neutron Activation Analysis	0.00	0.50
**NAA Research on Heavy Element Content of Human Tissue – Dr. Cindy Holland, Newberry High School – Reactor Sharing	Initial Discussions with Newberry High School Chemistry Student Sasha Edwards Concerning Heavy Element Concentration Measurements in Human Tissue Using Neutron Activation Analysis	0.00	0.25
**Fernandina High School Science Department – Mr. Curtis Gaus, FHS/W.G. Vernetson, UF – Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and NAA Training Exercises Demonstrating Isotope Identification, Half-life Measurement and Trace Element Analysis of Hair Samples Using the Rabbit System and PC-based Analyzerss	0.78	3.75
**Familiarization Tour for Relatives of Graduating NRE Students – W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage Capabilities and Operations for Two Graduating Students and Various Relatives Including Precollegiate and Miami Dade Community College Students Potentially Interested in Nuclear Engineering Major	0.00	1.83 (0.25)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
**Familiarization Tour for Potential NRE Graduate Students – W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage Capabilities and Operations Plus Curricular Usage for Students from Various Schools (Montana State, Wright State, Tennessee, Wisconsin Two Rivers, etc.) as Potential NRE Graduate Students	0.00	1.17
***Center for Precollegiate Education and Training Science Quest Middle School Student Workshop – Ms. Julie Bokor (CPET), Mr. John Marks, Alachua County Teacher/ Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Lectures, Tour and Demonstrations 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 Hair Samples Plus Contamination Control Exercises Involving Dress Out in Anticontamination Clothing and Use of Robots for Demonstration Purposes for Several Workshops	1.62	14.83 (0.25)
***Building Construction Senior German Exchange Students – Mr. David Forche (Building Construction)/ Dr. W.G. Vernetson, UF – Reactor Sharing	Lecture 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 Mr. David Forche and Building Construction German Exchange Students	0.00	3.92 (0.25)

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Center for Precollegiate Education and Training – Dr. MaryJo Koroly and Ms. Debra Paulin (CPET)/ Dr. W.G. Vernetson, UF – Reactor Sharing	Two Lectures and Demonstrations on Reactor Operations and Usage Comparing UFTR with Power Reactors for Assembled Summer Science Research Training Program Participants (High School Students) and Non UF College Student Mentors with Subsequent Facility Tours for a Number of Participants	0.00	11.83
*Union County High School Honors Chemistry Class – Mrs. Renae Allen, UCHS/ Dr. W.G. Vernetson, UF – Reactor Sharing	Lecture, Tours and Demonstrations of UFTR Operations with Radiation Surveys and Exercises Including 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 Anticontamination Clothing and Robotics Demonstrations for AP Chemistry Students with Follow-up Class Research Project to Quantify Elemental Constituents in Superfund Site Samples	2.85 (1.08)	19.08 (1.75)
***Familiarization Tour for Seminole Community College Student – Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Curricular Use and Opportunities for Potential Undergraduate NRE Student and Seminole Community College Science Student David Schappel and His Civil Engineering Father	0.00	2.42
***Familiarization Tour for Okeechobee Central Elementary School Student – Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour for Precocious Fifth Grader and His Science Teacher/Mother to Discuss Usage and Capabilities of Reactor Facility	0.00	1.33

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2002 – August 2003)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
***Familiarization Tour for Cedar Creek Baptist School Students – Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage and Capabilities for Two Students and Two Grandparents	0.00	1.42
	TOTAL	**72.57 (20.50)**	**415.93 (61.99)**

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 2002 – August 2003)

Month	Energy Generation Monthly Ranking[2]	KW-Hrs	Hours at Full Power
September 2002	9	0.000	0.000
October 2002	9	0.000	0.000
November 2002	9	0.000	0.000
December 2002	9	0.000	0.000
January 2003	8	0.090	0.000
February 2003	5	1,334.913	1.183
March 2003	1	2,132.424	20.833
April 2003	7	465.998	4.118
May 2003	2	1,932.292	18.968
June 2003	4	1,791.112	17.667
July 2003	3	1,831.539	17.798
August 2003	6	1,269.734	12.600
YEARLY TOTAL		**10,758.10[3]**	**93.167**

[1] The yearly total energy generation of 10.758 megawatt-hours for the 2002–3 reporting year represents a 3.71% decrease from last year's total of 11.173 megawatt-hours, while the 93.167 hours at full power represents a 10.34% decrease from the previous yearly total of 103.914 hours. With the continuing outage from the previous year, no full-time Reactor Manager and limiting licensed operators, operators were greatly constrained by operator availability to address the continuing outage and other equipment failures. Two new part-time SROs were licensed, but one previous SRO left and one of the new SROs left before year's end. Generally, operator unavailability contributed greatly to reactor unavailability and relatively low energy generation for the year. For the 2002–3 reporting year, the energy generation is lower essentially due to the high unavailability as forced unavailability was at 217.500 days with one outage lasting 192.375 days at the beginning of the 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 10,758 kilowatt-hours energy generation for the 2002–3 year ranks ninth in the past ten-year period. This low ranking is due to the extensive forced outage time during this reporting year.

TABLE III-3

MONTHLY REACTOR USAGE/AVAILABILITY DATA
(September 2002 – August 2003)

Month	Key-On Time	Exp. Time[1]	Run Time[2]	Availability[3]
September 2002	2.10 hrs.	198.75 hrs.	0.25 hrs.	0.00%
October 2002	2.90 hrs.	301.58 hrs.	0.60 hrs.	0.00%
November 2002	3.50 hrs.	178.58 hrs.	0.00 hrs.	0.00%
December 2002	5.50 hrs.	212.00 hrs.	1.30 hrs.	0.00%
January 2003	16.30 hrs.	279.17 hrs.	7.68 hrs.	0.00%
February 2003	35.20 hrs.	270.25 hrs.	32.15 hrs.	0.00%
March 2003	43.70 hrs.	295.42 hrs.	39.18 hrs.	61.29%
April 2003	15.40 hrs.	257.17hrs.	11.47 hrs.	58.33%
May 2003	36.70 hrs.	246.17 hrs.	31.35 hrs.	73.79%
June 2003	27.40 hrs.	222.92 hrs.	23.73 hrs.	58.33%
July 2003	37.50 hrs.	336.42 hrs.	32.63 hrs.	91.53%
August 2003	25.30 hrs.	269.08 hrs.	21.43 hrs.	90.73%
YEARLY TOTAL	**251.50 hrs.**	**2,678.23 hrs.**	**201.77 hrs.**	**36.17%**

[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 up 27.54% while run time is up 16.72%, low availability of personnel such as reactor operators. With two operators including one working about 50% time assured operations personnel availability continued to be poor. This was especially important in addressing the several extended outages. Experiment time, as well, is decreased by 3.25% 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 36.17% as shown above and 36.54% 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 (34.57%, 89.69%, 88.15%, 75.68%, 66.67%, 58.65%, 4.01%, 88.19%) at 36.17% 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 217.50 days forced outage time, maintenance to address the failed fission chamber (192¾ days at the beginning of the year), to troubleshoot and then replace the failed deep well pump (8¾ days in April 2003), to reset incorrect high voltage on the SC1 trip test circuit and to address a sticking S-2 control blade (4¼ days and 12¾ days, respectively, in June/July 2003) involved significant forced outages. No other forced outage involved more than three days. There were no significant planned outages this year. 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 assure a return to high availability in the 2003–4 reporting year.

TABLE III-1B

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED FACILITY UTILIZATION
(September 2003 – August 2004)

Project and User	Type of Activity	Run Time Hours	Experiment Time Hours
*Center for Precollegiate Education and Training – NAA Research on Effects of Gatorade Consumption on Trace Element Composition of Hair – Ms. Janis Tobin and Ms. G.M. Keyes, Palmer Trinity School / Dr. W.G. Vernetson, UF – Reactor Sharing	Summer 2004 Student Research Program Project – Evaluation and Quantification of Variable Trace Element Metal Content of Various Hair Samples Dependent Upon Gatorade Consumption for Student Garrett deRosset of Palmer Trinity School (Local Science Fair Entrant and Junior Science, Engineering and Humanities Symposium Participant)	8.40	15.58 (0.83)
	TOTAL	**90.87 (7.65)**	**440.34 (33.16)**

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-4

UFTR AVAILABILITY SUMMARY
(September 2002 – August 2003)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
			(F) Forced (P) Planned
September 2002	0.00%	30.00 days	Maintenance (F) to address failure of the fission chamber following the unscheduled shutdown on March 15, 2002 (30 days).
October 2002	0.00%	31.00 days	Maintenance (F) to address failure of the fission chamber following the unscheduled shutdown on March 15, 2002 (31 days). Maintenance (P) add water to the shield tank to clear the low level trip (concurrent ⅛ day).
November 2002	0.00 %	30.00 days	Maintenance (F) to address failure of the fission chamber following the unscheduled shutdown on March 15, 2002 (30 days). Maintenance (P) to add water to the primary coolant storage tank (concurrent ⅛ day). Maintenance (P) to add water to the shield tank (concurrent ¼ day). Administrative shutdown for the Thanksgiving holiday. Forced outage in progress (0 day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2002 – August 2003)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
December 2002	0.00%	31.00 days	Maintenance (F) to address failure of the fission chamber following the unscheduled shutdown on March 15, 2002 (31 days). Administrative shutdown for the Christmas holiday. Forced outage in progress (0 day).
January 2003	0.00%	31.00 days	Maintenance (F) to address failure of the fission chamber following the unscheduled shutdown on March 15, 2002 (31 days). Maintenance (F) to replace a failed PC flow return flow meter (concurrent 20¼ days). Maintenance (F) to troubleshoot the signal and data acquisition for the high speed chart recorder for the control blade drop time measurements (concurrent 1¾ days). Maintenance (F) to troubleshoot the failed north area radiation monitor (concurrent ⅛ day). Maintenance (P) to replace temporary mounting clips on the scram annunciator panel (concurrent ⅛ day). Administrative shutdown for the New Year's holiday. Forced outage in progress (0 day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2002 – August 2003)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
February 2003	0.00%	28.00 days	Maintenance (F) to address failure of the fission chamber following the unscheduled shutdown on March 15, 2002 (28 days). Maintenance (F) to retrieve the PuBe source from the vertical port (concurrent 8¾ days). Maintenance (F) to solder the span potentiometer on the two-pen recorder Maintenance (P) to replace a potentially failed Geiger tube in the north area monitor and continue troubleshooting repairs (concurrent ⅛ day).
March 2003	61.29%	12.00 days	Maintenance (F) to address failure of the fission chamber following the unscheduled shutdown on March 15, 2002 (11⅜ days). Maintenance (P) to continue trouble-shooting, repair and calibration of the north area radiation monitor (¼ day). Maintenance (P) to refill the PC storage tank (¼ day). Maintenance (P) replace the demineralizer/filter cartridges in the shield tank recirculation system (concurrent ¼ day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2002 – August 2003)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
March 2003 (continued)			Maintenance (P) to replace fuses and reset the motor overload contactors for the secondary pump (⅛ day).
April 2003	58.33%	12.50 days	Maintenance (F) to replace the failed deep well pump (8⅜ days). Maintenance (F) repair the rabbit system exhaust line (4 days) Maintenance (P) to troubleshoot and repair the city water flow meter (⅛ day).
May 2003	73.79%	8.125 days	Maintenance (F) to correct the incorrect setting for the safety channel #1 loss of high voltage trip (4⅛ days). Maintenance (F) to repair the secondary flow meter involved essentially (2¼ days). Maintenance (F) to repair the rabbit system exhaust line (1⅝ days). Maintenance (P) to add demineralized water to the primary coolant storage tank (⅛ day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2002 – August 2003)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
June 2003	58.33%	12.50 days	Maintenance (F) to adjust the Safety Channel 1 trip point from 127% to a conservative 124% (⅛ day). Maintenance (P) to address the failure of Safety Blade S-2 to drop from above 913 units (10⅜ days). Maintenance (P) to repair the failed East Area Radiation Monitor (2 days).
July 2003	91.53%	2.625 days	Maintenance (F) to address the failure of Safety Blade S-2 to drop from above 913 units (2 days). Maintenance (P) to add 31 gallons of demineralized water to the PC storage tank (⅛ day). Administrative shutdown for the Independence Day holiday (½ day).
August 2003	90.73%	2.875 days	Maintenance (F) to address the noise-induced period trip on removal of the regulating blade by installing snubbers on the two bottom limit switches (2⅝ days).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2002 – August 2003)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
August 2003 (continued)			Maintenance (P) to replace the belts and perform preventive maintenance on the stack dilute fan involved (¼ day).

TOTAL ANNUAL UNAVAILABILITY (Availability at 36.541%):	231.625 days	=	63.459%
1. TOTAL FORCED UNAVAILABILITY:	217.500 days	=	59.589%
2. TOTAL PLANNED UNAVAILABILITY:	13.625 days	=	3.733%
3. TOTAL ADMINISTRATIVE UNAVAILABILITY:	0.500 days	=	0.137%

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. The 231.625 days total unavailability in the 2002–3 reporting year is one of the highest in recent years with the forced outage rate at 217.500 days versus 235.00 days, 20.875 days and 350.00 days in the previous three reporting years and with the planned outage rate at only 13.625 days versus 1.250 days, 14.50 days and 0.375 days in the previous three reporting years. The three forced outages to exceed three days were for repairing a failed fission chamber (192⅞ days continued from the previous year) and to replace a deep well pump (8¾ days), to correct the setting for the safety channel #1 loss of high voltage (4⅛ days), and to correct a sticky S-2 control blade (10⅝ days). The total unavailability time is for maintenance for repairs, delays awaiting parts arrival, trip evaluations, etc., plus 0.5 additional days of administrative shutdown compared with 4.00 days, 7.00 days and 8.25 days in the previous three reporting years 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 technical staff members for the year, the last category for administrative shutdowns is excellent.

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 failed fission chamber and the failed deep well pump. The lost availability for administrative reasons has shown some variation in earlier reporting years—from as many as 23.50 days to as low as the current 0.5 days.

TABLE III-5A

UNSCHEDULED TRIPS
(September 2002 - August 2003)

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 the 2000–2001 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 was continuing at year's end per entry 3 in the Table III -5A for the 2000 – 2001 year.

TABLE III-5A

UNSCHEDULED TRIPS
(September 2002 – August 2003)

For the 2001–2 reporting year, there was only one unscheduled trip plus one carried over from the previous year; both are addressed in the 2001–2 table. The first carried over from July 26, 2001 of the previous year was a full trip at full power due to a failure in the detector systems part of the wider range drawer and was due to facility equipment malfunction. The second trip (a blade drop, process trip) on February 22, 2002 was due to a power surge interrupting power to the temperature/monitor/recorder resulting in a process trip on high temperature; it was not due to equipment failure.

For the 2002–3 reporting year, there was only one unscheduled trip as addressed in this table. This full trip occurred during startup on August 4, 2003 due to noise generated from the Regulating Blade bottom limit switches as updrive of the Regulating Blade was begun. A modification to suppress noise generation prevented recurrence of this trip as noted in this table as this full trip is somewhat attributable to faulty equipment

TABLE III-5A

UNSCHEDULED TRIPS
(September 2002 – August 2003)

Number	Date	Description of Occurrence
1.	4 Aug 03	On August 4, 2003, during a reactor startup, an automatic reactor period trip occurred. The blades were positioned to the following units: S1 @ 800, S2 @ 800, S3 @ 800, RB on bottom. The reactor operator pressed the "Up" button for the Regulating Blade, observing the bottom light clear. Immediately, the period meter pegged high and the period automatic full trip was initiated with all safety systems responding properly. Because the trip was from a known cause, it was not considered promptly reportable. The cause of the trip was attributed to noise generated from the Regulating Blade bottom limit switches. Noise of this type, but not usually to this extent, has been observed in the past, especially from the Regulating Blade whose control circuit is physically closest to the wide range drawer preamplifier circuit. MLP #03-33 was opened and the cause verified to be noise from the limit switches. Under 10 CFR 50.59 Evaluation Number 03-07 (Installation of Snubber Network to Regulating Blade Bottom Limit Switches for Noise Suppression), the appropriate electrical noise suppression snubbers were identified and acquired with the criterion that they operate passively and have no impact other than limiting noise. Noise suppressors were connected across the "NC" and "NO" contacts of the two bottom limit switches. Once connected, the suppressors were verified to allow minimal noise to be generated through these bottom limit switch contacts with little to no effect observed on the period meter when the Regulating Blade was removed for testing from its bottom limit switches on August 5, with about 70 shims performed to about 40 units with no significant noise observed on all occasions to affect the wide range drawer period meter. Subsequently, on August 7, appropriate preventive maintenance (S-1 and S-5 Surveillances for the Regulating Blade), preoperational checks, and a startup to 1 watt were performed to verify correction of the problem with the reactor restored to normal operation on August 7. A memorandum to the RSRS describing the event and the subsequent implementation of corrective action as well as a completed UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) constitute Attachment I to the August 2003 monthly report. The final evaluation is that this trip event was from a known cause which has been corrected with the net result that the event and the subsequent modification had negligible impact on reactor safety and no impact on the health and safety of the public.

TABLE III-5B

SCHEDULED TRIPS
(September 2002 – August 2003)

There were no scheduled trips performed for experimental or training purposes during the last three 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 yearlong 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, the 2000–2001 reporting year, 2001–2, or 2002–3 reporting year but they did not. It is expected that one or more might occur in the 2003-4 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
—	—	—

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

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 are listed in this table; 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 three such occurring here this year (occurrences #1, carried over from the previous year, #4 and #5 described 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; one such trip occurred during this reporting year (occurrence #10 described below).

All ten occurrences this year involved some equipment failure, inadequacy or other event. The most significant occurrences were the full reactor trip due to excessive noise as the regulating blade was first withdrawn during a startup (occurrence #10) plus the three unscheduled shutdowns (occurrence #1 for a failed fission chamber carried over from the previous year, occurrence #4 during an operator license exam due to the center vertical shield plug being left out after removal of the PuBe startup source, and occurrence #5 for failure of a rabbit capsule to return). Except for the extended outage continuation for the carried over occurrence #1, the other events involved short outages. The most significant other event was occurrence #8 for the sticking S-2 control blade though the reactor had not been operated with the blade above the sticking point (>925 units) except for preoperational checks. Occurrence #6 was the only promptly reportable event for the nonconservative setting of the loss of high voltage trip discovered during quarterly scram checks due to failure to follow a procedure with corrections made to preclude recurrence. Occurrence #2 for a failed flow switch discovered during quarterly scram checks and occurrence #7 for a nonconservative setting on the Safety Channel 2 High Power trip were dated and corrected as appropriate by procedure. Occurrence #3 for loss of the PuBe source requiring partial unstacking of shielding for retrieval was mostly an inconvenience with a new lifting device design to preclude recurrence. Finally, occurrence #9 for an error discovered in the annual excess reactivity measurement was corrected without any problem.

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 one 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, some more than once as regulators were kept updated.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence
1.	15 Mar 02	On March 15, 2002, a startup was undertaken for training purposes as the first startup since the discovery of the failed 10-second time delay relay for the deep well water flow trip during a daily checkout on February 28, 2002. Startup commenced at 1019 hours with the reactor reading about 0.4 watts at about 1029 hours. Because the wide range was indicating low by about an order of magnitude with the extended range going off as expected but then coming back on several times, the operator had the trainee push the regulating blade to the expected critical position (360 units withdrawn) with a stable set of readings taken at 1033 hours indicating power at ~0.3 watts but the wide range now at ~1 x 10-5, even further down than expected or given earlier. An unscheduled shutdown was commenced at 1033 hours with the reactor shut down and secured at 1034 hours. Subsequently, UFTR Form 0.6B (Unscheduled Shutdown Review and Evaluation) was mostly completed. Under MLP #02-08, opened to control troubleshooting and repair, the preamplifier was disconnected on March 15, 2002 from the wide range drawer under the regulating blade pedestal and taken to the electronics engineer for evaluation. Subsequently, on March 18, 2002, the engineer confirmed the preamplifier was operating properly so the pen traces recorded prior to and during the unscheduled shutdown were reexamined and evaluated. On March 19, troubleshooting checks were undertaken with the high voltage power supply (HVPS) for wide range (WR) drawer replaced temporarily with a spare to confirm the HVPS was not the cause of the problem. Subsequently, work was begun on a restart memorandum on March 20 to control a restart to gather information. On March 21, a pulser was connected to the WR drawer with the extended range dropping out at ~500 cps with 400 cps indicated on the pulser and no cycling. The NRC was contacted and given information on the plans to restart to obtain additional information after doing component tests. Subsequently, several NRC personnel were contacted to discuss plans. They agreed to plans and on current status that the event was not promptly reportable. However, the NRC representative emphasized reportability if a startup is undertaken and anything required by Tech Specs is lost. He also emphasized getting all the needed data on one trial restart if such was performed.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence

Subsequently, on March 22, 2002, a plateau was run on the fission chamber using the PuBe source in the thermal column and isolating higher power/neutron count levels getting the cycling to recur to focus troubleshooting on a failing fission chamber. Therefore, the plans to restart to obtain data were canceled. On March 25, the fission chamber model information was sought as the radiography north shield wall was removed. Subsequently, on March 26, the fission chamber was removed under RWP #02-02-II and the shield closed up. Due to schedule mismatches and delays, the fission chamber was not finally tested and declared out of commission until March 28 as efforts were also expended on verifying the chamber, labeled only Ionization Chamber (Model RSN314; Serial Number L2252), is indeed a fission chamber (a kind of ionization chamber) through the manufacturer (Reuter-Stokes, Inc.) who agreed to fax a quote for a replacement fission chamber. Subsequently, on March 29, the quote for the fission chamber ($4,995) was received and reviewed with NRE purchasing/accounting with Reuter-Stokes, Inc. subsequently indicating a new quote might be needed due to safety grade of the chamber. A notice was also sent to the TRTR listserver (trtr@wpi.edu) asking if anyone had a replacement available to borrow or buy with UT–Austin indicating they might have one. At the end of March, Reuter-Stokes, Inc. indicated it had initiated efforts to manufacture a replacement detector with a 60–75 day lead time so the facility will continue to investigate other alternatives. Partially completed UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) is Attachment II to the March 2002 report and the quote from Reuter-Stokes, Inc. for a replacement fission chamber is Attachment III to the March 2002 monthly report.

On April 2, 2002, the RSRS was updated as to facility status; the committee suggested buying two detectors but the cost was confirmed to be the same from Reuter-Stokes. During April, efforts were made to document the failure and with failure and then removal of the fission chamber, the NRC Project Manager confirmed on April 5, 2002 that there can be no blade removal, even for preoperational checks, to avoid a Tech Spec violation. Based on experience with some sealed detectors and a suggestion from the McMaster facility, it

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence

was decided to heat the detector in an oven set to ~130°F; this was accomplished for a week but when checked on April 12, the detector was still failed, confirmed by the electronics engineer on April 15, 2002. Checks in April showed the detector at UT–Austin to have a relatively high radiation level (~1R/hr) and to have integral connections which would necessitate a redesign of the shield plug system so this option was abandoned. On April 5, Reuter-Stokes confirmed that the detector is not so-called safety related per their procedures so the price quoted in March remains valid. IST, the only other vendor of this detector, was asked to provide a quote also. Their quote faxed on April 11 is Attachment I to the April 2002 monthly report and shows the IST cost to be ~$10,000 with an even longer lead time of 6 months so the decision was made to stay with Reuter-Stokes and just one detector was ordered. Reuter-Stokes also was able to confirm the detector model number as a fission chamber as documented in a memorandum from SRO Vierbicky dated April 19 which is Attachment II to the April 2002 monthly report.

During May 2002, the fission chamber was moved to fuel storage pit #1 and RWP #02-02-II was closed. The cover was moved to the low-level storage area and subsequently measured and verified to be aluminum by an NRE Professor as Reuter-Stokes was contacted and agreed to make a slightly smaller diameter aluminum cover to ease reinsertion of the replacement detector into the shielding slot. The oven was also moved back to the lab. On May 8, 2002, Reuter-Stokes indicated that personnel turnovers had resulted in a delay and the new detector would be available in late June. A memorandum to the RSRS from UFTR Staff outlining the troubleshooting and the need for a restart plan is Attachment I to the May 2002 monthly report.

During June 2002, work was begun on the restart plan and the modification package with periodic checks indicating the fission chamber should be delivered by the end of the month though it was not delivered by Friday, June 28 and its status was not confirmed by Reuter-Stokes on that date as the wait for the detector extended to July.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence
		On July 1, 2002, work was continued on the modification package as 10 CFR 50.59 Evaluation Number 02-06 (Replacement of Failed Fission Chamber and Sleeve with Equivalent Fission Chamber and Sleeve). A representative at Reuter-Stokes was unable to be reached until July 8 when he indicated that the schedule for fission chamber delivery would now be delayed until July 31. After several discussions with the representative, a technician and a machinist at Reuter-Stokes, it was decided to obtain the aluminum sleeve in Gainesville. This sleeve is not weight supporting so to allow easier insertion and removal of the assembly without unstacking the biological shielding, the aluminum sleeve is being reduced by 0.25 inches on the outer diameter. A memorandum from reactor management to the RSRS supporting this modification is Attachment I to the July 2002 monthly report. The sleeve was specced out and then purchased/picked up from Precision Tool and Engineering Company on July 24 when the modification package was essentially completed. On July 25, 10 CFR 50.59 Evaluation Number 02-06 was approved at the RSRS meeting with some effort spent during the final week of July developing a restart plan/training program to return to normal operations. The detector was not delivered at month's end and the technician at Reuter-Stokes was unavailable as the wait for the detector extended to August. On August 2, 2002, the technician again delayed delivery saying the detector would be shipped by mid month. At the RSRS meeting on August 8, the RSRS approved the UFTR plan to return to normal operations as it combines the necessary makeup operations training for licensed personnel with completion of all overdue surveillances in a scaled approach from low to full power. This restart plan is Attachment I to the August 2002 monthly report. On August 14, the technician from Reuter-Stokes indicated that the fission chamber was being assembled and would be shipped by August 21. On August 21, the technician from Reuter-Stokes asked that a copy of the UFTR license be faxed to Reuter-Stokes and next day delivery was arranged for the fission chamber. On August 22, the new fission chamber finally arrived and was temporarily stored in the reactor cell as receipt documentation was completed and the calibration procedure was reviewed with no work accomplished due to personnel unavailability

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence
		on August 23. On August 23, the Nuclear Material Transaction Report for the fission chamber was received; it is Attachment II to the August 2002 monthly report. On August 26, the fission chamber sleeve was prepared and the fission chamber was prepared for electrical verification. On August 27, the electrical signal from the detector was verified, the chamber was installed in its thermal column slot and a successful plateau was performed on the wide range. Subsequently, on August 27, a complete weekly preoperational checkout was performed by SRO Vernetson and observed by SRO Vierbicky, both as part of the restart plan and for training for SRO Vernetson. On August 28, a successful daily preoperational checkout was performed by SRO Vierbicky and observed by SRO Vernetson and then by SRO Vernetson and observed by SRO Vierbicky, again as part of the restart plan and for training. Because of noise in the wide range, especially on movement of the regulating blade (physically closest to the fission chamber), the fission chamber cable was shielded and wide range channel alignment was begun. Subsequently, on August 29, the discriminator, the calibration signal selector and the zero log amp summer were set with wide range channel alignment completed on August 30 but considerable noise still present and yet to be addressed. On September 3, 2002, the procedural changes were made for the updated alignment voltages following initial calibration efforts. Major efforts continued to isolate the wide range drawer ground. On September 4, the fission chamber was removed and the entire cable length from the chamber to the preamp was wrapped with a continuous length of RF shielding. Subsequently, on September 5, the cables and fission chamber were reinstalled and reconnected but noise persisted so consideration was given to install a band pass filter on the wires running from the WR drawer to the preamp. On September 6, noise was isolated to the 15 vdc power supply rails so it was thought that filtering the 15 volt power supply output to the preamp was needed. On September 10, 10 CFR 50.59 Evaluation Number 02-09 (Installation of Radio Frequency Interference Filter on Wide Range Drawer) was generated for installing a filter in the WR drawer. On September 11, a 15-volt DC power supply filter was installed and tested satisfactorily but the noise persisted. It was

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence
		thought that noise might be entering through the bias power supply or through a ground or other input cable. On September 12, noise entry was isolated to the preamp with detectors ruled out as source of noise so the shield was resoldered on the preamp interior and the bias supply line was tested negatively as the entry point for noise into the preamp. On September 13, the phenolic shield was cleaned of excess solder, the border was lined with conductive tape and soldered back to the preamp so the solder run continues around the interior of the preamp. After reconnection of the preamp on September 16, the fission chamber was reinstalled in the pedestal, ground connections were checked and the regulating blade power cord was wrapped in shielded cable; then the high voltage power supply loose connections and grounds in the WR drawer were connected. Since the noise problem persisted, ground isolation checks continued on September 19–20 as the AC ground to DC ground in the fission chamber was isolated on September 20 as efforts continued to isolate the second AC–DC ground in the output from the WR drawer. The second AC–DC ground was isolated on September 23 with no overall change in AC–DC ground measurements with AC–DC ground still shorted. The AC ground to earth was checked and seemed somewhat deteriorated physically. The new AC earth ground was checked with PPD who was scheduled to come and check it in the future. There was also further checking on filters to filter all noise from the regulating blade drive motor. On September 24, 10 CFR 50.59 Evaluation Number 02-10 (Installation of Radio Frequency Interference Filter on Regulating Blade Motor) was developed to install a radio frequency interference (RFI) filter on the regulating blade drive motor; the RFI filter was installed, but again with no significant reduction of the noise problem. Ground isolation efforts continued on September 25–26. On September 27, the period circuit was checked and determined to be completely operable as ground checks continued indicating the uncompensated ion chamber (UIC) detector is grounded but needs to be ungrounded. In this placement, the UIC is resting on graphite blocks which are connected to earth (AC) ground. The case of the UIC detector is the DC signal ground so the two should not be

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence
		touching; the UIC should be resting on some type of insulating material such as phenolic board or rubber. Ground isolation efforts continued through the end of the month with the noise problems persisting.
		On October 1, 2002, ground isolation efforts continued as a short to ground in the auto flux controller chopper was corrected as some bolts were removed and replaced with nylon ties temporarily. On October 2, the signal-to-earth ground on the picoammeter was repaired and parts were ordered for the bias supply and chopper. Various consultations were conducted on October 3 as some insulating washers were specified and ways of making better AC grounds in the pit were discussed. On October 4, the grounds in the servo chopper and the safety channel 2 power supply were isolated. On October 7, the ground for the console was improved and the response of the period meter to cycling power and raising/lowering water in the core were checked showing significant noise. A new high voltage plateau was also run for the fission chamber with little change noted as the adjustment from 780 volts to 800 volts was made on October 8 when the ground on the picoammeter was verified correct and the discriminator was adjusted based on a new determination of the setting. Noise and ground isolation checks continued on October 9 as water was raised and lowered (PC pump on and off) with and without the PuBe source inserted to check neutron level effects and also as a control blade was raised a few hundred units. Subsequently, the AC ground for the pump in the pit was found to be poor so a temporary ground strap was attached to improve the ground but the response of the period meter to cycling the water and resetting the key was not improved. On October 10/11, PPD and the NSC electrical contractor were contacted concerning electrical work that had been done but UFTR personnel were assured no changes had been made that could affect the UFTR. Subsequently, on October 11 and 14, Bill Hyde of General Atomics resumed checking the cable shielding and raising the discriminator level until the detector continues to count and the source interlock is still clear. He also recommended checking the filters on the high voltage lines in the preamplifier, noting there was a possibility of bad capacitors.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence
		On October 14, the PPD electrician supervisor conducted checks of the grounds to the PC pump, demineralizer pump and core vent fan determining all were fine. He also tried to ground the dilute fan with no effect. He also tested the building ground at ~60 Ω resistance which is high and was to have Physical Plant look into the problem as it should be <≅10 Ω, but did not feel this was the source of the problem as he discussed the lack of a ground on AC power to the console. Subsequently, College of Engineering consultant electricians checked the same items as the PPD electrician supervisor with no specific determination as facility staff checked the shielding on the fission chamber cables as a possible source of noise. On October 16, the fission chamber and cabling were removed in preparation for replacement of the cables and shielding with insulation made up on October 18. With the violation problem during the weekly preoperational check on October 22 (see Attachment I to the October 2002 monthly report for "operation" without a required fission chamber), no work was performed as the PPD electrician supervisor was consulted about installing a temporary AC power supply to the console. Subsequently, on October 24, under MWO #636483 the PPD electrician supervisor and PPD electricians ran new temporary ground and neutral wires to the console. On October 25, the fission chamber was tested with an independent amplifier and preamplifier and seemed satisfactory as the PA-6B was determined to be working properly. The electronics engineer and staff felt that the copper shield around the fission chamber needed to be tested as noise was probably continuing to enter via the detector.
		On October 29, with normal power to the APDs secured, three PPD electricians finally ran the neutral ground wire through the control room outlets into the power box for control console power with all four outlets on the back of the console power jumpered. They also checked the pit setup on grounds while the electronics engineer continued checking the detector circuit. On October 30, the continuity between AC ground and graphite in the thermal column was checked (~1.7 Ω) as new connectors and cable shielding were specified and discussions were conducted on making wiring connections between AC ground and the detector sleeve. On October 31, proper impedance matching for output of the preamplifier

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence

was determined and found to be good and two ceramic HN connectors were ordered from Ceramascal as ground isolation efforts continued with the noise problem somewhat lessened but persisting.

After discussing connectors and shielding on November 1, 2002 with the NRE department's electrical engineer, UFTR staff prepared 10 CFR 50.59 Evaluation Number 02-11 (Replacement of Fission Chamber Cable Shielding with Upgraded Conduit) as of November 5. The fission chamber response was compared with and without the old shielding on November 5 as some consideration was given to a fission chamber sleeve and restart conditions on November 6 and to RF noise sources on November 7. After finally being received on November 12, the upgraded shielded conduit was cut and the signal and high voltage lines run through it on November 13 with the conduit subsequently inserted through the reactor shielding on November 18 and 19. Connections were made and continuity assured at the fission chamber end of the cable on November 20 with the shielded conduit installed through the shielding with the high voltage wire and ground cable run on November 21. With the conduit installed, noise tests were conducted on November 22. Subsequently, the fission chamber shielding was reassembled to the preamplifier on November 25 as ground wires were isolated as a probable source of noise as it was confirmed that no other inputs to the preamplifier were antennas with the noise problem persisting.

On November 26 with the noise problem persisting, the fission chamber and cabling were again removed and the grounding wire was removed from inside the conduit with the grounding strap rewound on the outside of the conduit which was reinstalled through the reactor shielding. Connectors were then reinstalled and connections made to the fission chamber and the preamplifier. After checking and verifying good ground routings in the equipment pit on November 27, 10 CFR 50.59 Evaluation Number 02-12 (Installation of Improved Ground Wire from Regulating Blade (RB) Pedestal to AC Ground in Equipment Pit) was approved and a ground strap was attached from the RB pedestal to the shield tank purification system ground; subsequently, the fission chamber sleeve ground strap was also connected to the RB pedestal and all connectors on the preamplifier

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence

were checked. Nevertheless, again period stability tests showed period trips on ~25% of key resets so the decision was made to look further at loads that could be carrying noise signals as the problem persisted at month's end.

On December 2, 2002, the console key switch was removed along with the reset key wafer switch and the mechanical actuator and contactors were closed and the key switch reinstalled. Though worn, the key switch is usable. All scram relays were then checked for arcing and sparking with negative results. Again checks on the Regulating Blade showed excessive noise. At this time on December 5, 10 and 11, the wide range was realigned and on December 12, the RB pedestal cover was secured and the safety channel 1 trip setpoint was set. In addition, the Regulating Blade was exercised at low levels to check limit switch locations and integrity; based on indicated noise effects, microswitches were replaced for up and down drive and magnet on. Subsequent noise checks showed no improvement so limit switches were ordered and the bottom limit indication switch was replaced on December 17 with testing seeming to indicate improvement and blade interlocks verified okay. The limit switches were then adjusted but noise problems were noted to persist. After examining the relay schedule for the reactor protection system and finding no obvious source of the noise problem, some consideration was given to having a new console reset key switch made. The necessary measurements were made on December 18 and based on an estimated cost, the necessary funding was transmitted to Wolftek Inc. to manufacture a new switch on December 19 and the necessary schematics sent on December 20 as this key switch will be obtained as a replacement spare for the one in the console.

On December 18, it was decided to remove the preamplifier for a thorough overhaul by the electronics engineer. Initially the output was found to be unstable and thought to be due to a bad feedback circuit. A loose connection was identified on December 19 with a new set of connectors ordered and installed. On December 20, failing electrolytic capacitors were identified. Under 10 CFR 50.59 Evaluation Number 02-13 (Replacement of Electrolytic Capacitors in Preamp with Equivalent Capacitors) replacement electrolytic

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		capacitors were installed with the preamp determined to be much improved in operating characteristics on December 27. On December 30, the preamp was reinstalled and a scope and signal analyzer were set up to determine the need for higher voltage settings to get proper discriminator voltage determination curve. Subsequently, the discriminator plateau was determined on December 31 as some thought was also given to installing snubber circuits on the regulating blade limiting switches if such prove necessary, but the electronics engineer is confident that the system should be operable now. At month's end the necessary checks remained to be made before the noise problem would be considered corrected. On January 2, 2003, the digital indicator setting on the Regulating Blade was raised to remove bottom limit noise which worked and testing was conducted as the noise problem appeared to be corrected with two successful SRO-observed daily checkouts performed with the various delayed surveillances scheduled to be completed. Subsequently, on January 3, the quarterly scram checks (Q-1 Surveillance) were successfully completed except for a failed primary coolant flow return meter flow switch identified and ordered (see MLP #03-01). Subsequently, the MLP record was updated and organized on January 8, and the restart memorandum was updated per NRC and RSRS input on January 28. The updated restart memorandum is Attachment I to the January 2003 monthly report. After final successful completion of the scram checks on January 23 and a successful completion of a follow-up daily checkout on January 24, the clutch current bulbs were replaced (S-11 Surveillance) but the control blade drop time measurements were delayed due to a faulty recorder (see MLP #03-05). Subsequently, the control blade drop time measurements (S-1 Surveillance) and the control blade controlled insertion time measurements (S-5 Surveillance) were completed on January 27. After another completion of the pre-calorimetric portion of the annual nuclear instrumentation calibration (partial A-2 Surveillance) on January 28, a successful daily checkout was performed on January 29 and UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) was completed on January 29, 2003. Subsequently, before SRO

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		Vierbicky performed a startup to 1 watt observed by SRO Vernetson to verify critical position and successful maintenance. Subsequently, SRO Vernetson performed a startup to 1 watt observed by Vierbicky to meet restart conditions. At this point, on January 30–31, the reactor was brought to 100 watts and reactivity worth measurements were begun with measurements on the Regulating and S-1 blades conducted as this surveillance would extend to February in the stepped return to full power and completion of overdue surveillances.
		On February 3, 2003, after a successful weekly checkout, the PuBe was lost from its cord into the CVP during performance of the daily preoperational check. Due to the necessity to unstack shielding and move some graphite to retrieve the source under MLP #03-07, the reactor was unavailable until this maintenance was closed out on February 12, 2003. Subsequently, the control blade drop time measurements (S-1 Surveillance) and control blade insertion time measurements (S-5 Surveillance) were repeated on February 11, 2003. The critical position was checked and the reactor was brought to 100 watts and reactivity worth measurements were begun on February 13 and completed on February 18 as data reduction and documentation continued until February 24 with a new memorandum on use of the updated control blades issued on February 25, 2003 for reference use in all subsequent operations. A copy of this memorandum and the updated control blade worth curves is Attachment I to the February 2003 monthly report.
		The UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance) (required for installation of the new fission chamber and overdue anyway since October 1, 2002) was performed throughout the last week of February, from the precalorimetric on February 24 to final linear pen adjustment on February 28 and completion of the A-2 Surveillance.
		Due to the installation of the new fission chamber into the wide range power monitoring channel, both the wide range (WR) and safety channel 1 (SC1) power meters were indicating higher than the actual power level. IN order to facilitate the timely calibration of power readings, a procedure was used as with previous detector

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Number	Date	Description of Occurrence

replacements. Therefore, a preliminary lower power run with a heat balance calculation was performed to lower indicated power readings on the WR and SC1 monitoring channels. The preliminary run was made at 50 kW for 30 minutes, after that point, the heat balance was made to ensure that safety channel 2 (SC2) was indicating properly; at that time the WR and SC1 channels were adjusted down to read within approximately 5 kW of SC2. This downward adjustment of the WR and SC1 channels allowed the subsequent 6-hour power run to be made at approximately 95 kW thereby achieving a sufficient change in temperature across the core to make an accurate heat balance calculation for the calorimetric. Conservatism was maintained by keeping the WR and SC1 channels as the highest indicating power monitoring channels. A memorandum to the RSRS documenting this planned adjustment is Attachment II to the February 2003 monthly report.

On February 27, 2003, during the shutdown post calorimetric span and zero adjustments of the two-pen recorder, the linear channel began to oscillate. The reactor was returned to the reference power level to attempt to reestablish proper linear channel span and zero settings. After an extended period of time adjusting the span potentiometer with no effect, the linear channel circuitry was inspected and the span potentiometer was found to be loose, making only momentary contact with the circuit board. This loose span potentiometer was causing the amplifier to go into infinite gain, which was the source of the linear channel indication oscillation. The reactor was shut down and the potentiometer was resoldered. On February 28, 2003, the reactor was again restarted to establish proper span and zero settings for the linear channel. During reactor startup and subsequent power operations, the linear channel power level was monitored at the output of the picoammeter with a Fluke 196 scope meter. This method of power monitoring was used the day before during the restart, as the voltage output of the picoammeter is the input to the linear channel indication, and the voltage value is one tenth of the linear channel power reading. Once the reference power was reached and maintained for a short period to allow for system equilibration, the span and zero adjustments for the linear channel were made satisfactorily. After the adjustment was made, reactor

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power was maneuvered in the power range both manually and using the auto flux controller to ensure proper power level monitoring channel agreement. The reactor was then shut down and the UFTR Nuclear Instrumentation Calibration Check and Heat Balance (A-2 Surveillance) was completed per procedure. A memorandum explaining this adjustment of the linear channel indication is Attachment III from the February 2003 monthly report.

During performance of the power run for the A-2 Surveillance, at 95.6 kW on February 27, the overdue quarterly radiologic surveys of unrestricted areas (Q-4 Surveillance) and restricted areas (Q-5 Surveillance) at power were performed successfully. Since all levels were acceptable within margin, completion of the surveys at 95.6 kW was considered to meet the requirement. In addition, the Measurement of Argon-41 Stack Effluent Concentration (S-4 Surveillance) was completed during the same power run at 95.6 kW with the values prorated to full 100 kW operation and documented as such as has been done on several earlier occasions after extended outages with only the memorandum limiting energy generation remaining to be completed. The memorandum on energy generation and attachments constitute Attachment IV from the February 2003 report. At month's end the only remaining surveillances to be completed were the overdue Annual Measurement of UFTR Temperature Coefficient of Reactivity (A-3 Surveillance) plus the annual operations test for two licensed operators as well as additional radiological surveys of unrestricted and restricted areas (Q-4/Q-5 Surveillances) at 100 kW as requested by the Radiation Control Officer for completeness.

Restart status was reviewed on March 4, 2003 after completion of the Annual Measurement of Temperature Coefficient of Reactivity (A-3 Surveillance) on March 3 with documentation completed on March 5. Subsequently, the annual operations tests were completed on March 7. Documentation for the outage and restart was reviewed on March 10 with the additional radiological surveys of unrestricted and restricted areas (Q-4/Q-5 Surveillances) completed on March 11 and the maintenance finally closed out on March 12 with the entire

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Number	Date	Description of Occurrence
		occurrence evaluated to have had negligible impact on reactor safety and on the health and safety of the public.
2.	3 Jan 03	During performance of the delayed quarterly scram checks (Q-1 Surveillance), the primary coolant flow return flow meter switch was found to be inoperable. Since this failure was discovered at shutdown during a surveillance, it was not considered promptly reportable. Under MLP #03-01, specifications for the switch were identified and an identical replacement was ordered. Upon receipt on January 6, 2003, the flow switch was removed from the system under RWP #03-01-I and the new one was tried but found too short despite having the same part number. Under 10 CFR 50.59 Evaluation Number 03-01 (Replacement of Primary Coolant Return Line Flow Switch Assembly), the old and new flow meter switches were measured, a larger flange connection was designed and Precision Tool and Engineering, Inc. was contracted to machine it. After various delays, the flange connection was received on January 14 and the new flow switch assembly with flange was installed under the reissued RWP #03-01-I. After satisfactory leak checks, the switch was wired to the reactor protection system but the scram check on the flow switch was unsuccessful due to an incorrect cross connection of wires failing the switch so a new flow switch was ordered on January 14 and received on January 17. Although RWP #03-02-I was approved on January 17, the switch (bonnet head) was not installed until January 21. After successful leak checks and RWP closeout, the scram check was still unsuccessful on January 21. On January 22, RWP #03-02-I was reissued, the SPDT switch was removed from the bonnet and found to be failed. The GEMS Sensors Company agreed to send a replacement SPDT switch but with a delay, so another full switch meter was ordered overnight delivery. On January 23, RWP #03-02-I was reissued and the SPDT switch was installed and leak checked satisfactorily. Subsequently, RWP #03-02-I was closed and the flow scram checked satisfactorily to close the scram checks surveillance (Q-1 Surveillance) with no further problems noted as a successful daily checkout was completed on January 24 as this event was noted to be discovered at shutdown and evaluated to have had negligible effect on the reactor or the health and safety of the public. (On 23 January 2003, MLP #03-01 was closed.)

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Number	Date	Description of Occurrence
3.	4 Feb 03	On February 4, 2003, while inserting the PuBe source for the daily preoperational checkout, the knot securing the source to the handling line came undone causing the source to fall into the CVP uncontrolled. Since the reactor was secured at the time and there was no radiation dose involved, this occurrence was not considered promptly reportable. In the process of attempting to retrieve the source, the source moved out of the field of vision under the lowest vertical graphite stringer. Due to the nonoperational status of the Welch-Allyn borescope, which would allow visual inspection in and around the bottom of the CVP, and possible retrieval of the source, it became apparent that a partial unstacking of the reactor shield blocks would be necessary for retrieval of the PuBe source. Initially, this retrieval was attempted on February 4 under MLP #03-07 and RWP #03-03-I as only the small and large central plugs were removed. Unfortunately, the source was still not retrievable, so RWP #03-03-I was closed on February 4. Subsequently, a proposal memorandum was generated to address plans to unstack sufficient shielding to retrieve the source. The memorandum is Attachment V from the February 2003 monthly report. After planning the retrieval on February 5, the shielding was unstacked under RWP #03-04-I. Initially, the east, north, and south shield tank blocks, the upper tier of the "B" blocks, as well as both the upper and lower tiers of the "A" blocks were removed. The lower tier of the "B" blocks over the instrumentation ports, and the "C" blocks around the thermal column remained in place. Once the partial unstacking exposed the area directly over the fuel boxes, the source was able to be retrieved. It's holding screw had also come out so the source was assured to be leak tight; however, the bottom center vertical stringer would not reseat properly. Therefore, the boral sheet was removed and then three levels of graphite stringers were unstacked to allow reseating of the vertical stringer with all graphite and shielding then replaced. Subsequently, under MLP #03-08, a PuBe source holder was manufactured and implemented under 10 CFR 50.59 Evaluation Number 03-02 (Implementation of PuBe Aluminum Source Holder for Insertion) on February 11, 2003 to assure no recurrence of this dropped source event. For security purposes the unstacking and

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		restacking of the core were accomplished during a single work period on February 6 with the cell continuously occupied by at least one authorized person. Furthermore, University Police Department security check frequency was increased while the retrieval evolution was in progress. Subsequently, RWP #03-04-I was terminated on February 11, 2003 but reconstruction of the top deck was delayed until February 12 awaiting delivery of lifting straps to assure safe handling of the fencing pieces at which point the maintenance was closed out. Subsequently, a successful daily checkout was performed on February 21 along with low power confirmatory radiation surveys at ~1 kW and ~10 kW on February 21 and 62½ kW on February 25 in the progression of return to full power. This occurrence was evaluated to have had negligible impact on reactor safety and on the health and safety of the public.
4.	14 Apr 03	On April 14 during the operation portion of the NRC licensing examination for RO-trainee, the CVP shield plug was left out after another RO-trainee removed the PuBe source from the CVP at 1 watt at 1532 hours. Due to the fact that the RO-trainee was not allowed in the control room while the operations exam was taking place, the reactor operators in the control room were informed that the source was removed with a "thumbs up" hand signal. Normally the CVP plug would also be reinstalled. The power ascension to 50 kW then proceeded with the port open. At approximately 30 kW at 1540 hours, the frisker in the airlock alarmed; this was considered normal as the frisker, due to its sensitivity, often alarms if set on its lowest setting and left with the window facing the reactor, though not usually at lower power levels. The SRO of record asked the RO-trainee to silence the alarm, but at the same time the portal monitor began to alarm as well. When the SRO turned back to the console from asking the RO trainee to silence the frisker alarm, he noticed that all three area radiation monitors were locked in the warning alarm and reading approximately 3 mR/hr. The SRO instructed the RO-trainee to lower reactor power below the Point of Adding Heat and instructed the RO-trainee to install the CVP shield plug which was accomplished at 1542 hours. The reactor was stabilized at 5 watts at 1545 hours. Following a brief discussion among the Facility Director, NRC License Examiner and the SRO of record, the decision was made to

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Number	Date	Description of Occurrence
		shut down, as conservative while evaluations were conducted. The shutdown was begun at 1551 hours and the reactor secured at 1553 hours with all safety systems responding properly. Though the reactor was shut down, the evaluation was that it did not need to be per procedure; nevertheless, the shutdown was treated as an unscheduled shutdown and a restart evaluation performed since such events are not normal occurrences and need to be evaluated. The NRC license examiner agreed with this decision as conservative and indicated the operations exam was complete. A memorandum from the SRO to Facility Director summarizing the event is Attachment I from the April 2003 monthly report while a completed UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) noting the response and internal evaluation that this was not a promptly reportable event is Attachment II from the April 2003 monthly report. Subsequent evaluation determined this event was not promptly reportable and also did not violate procedures as written. This information was communicated to NRC Inspector in a phone message and to alternate NRC Project Manager when speaking to him about another issue—all on April 15, 2003. In consultation with License Examiner, it was also decided that some clarification would be added to SOP-A.2 (Reactor Startup) to assure the operator has positive verification of vertical port plug installation prior to operations above 1 kW. Since the operation in progress was only planned to go to 50 kW, the 10 mR audible alarm would not have been reached in this event and operations personnel are considered to have responded well upon discovery of the open port. In addition, all operations personnel were reminded to assure the vertical port plugs are inserted after PuBe source removal. Nevertheless, as noted in the memorandum of Attachment I from the April 2003 monthly report, this unusual occurrence was evaluated to have had no effect on reactor safety or the health and safety of the public and negligible effect on the health and safety of UFTR personnel.
5.	18 Apr 03	On April 18, the reactor was started up beginning at 1647 hours, reaching full power at 1707 hours. At 1718 hours, a test capsule was inserted but was not able to be fully returned. Efforts to return it as well as resend it only resulted in the capsule being returned near the

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		outside of the biological shielding stacked at the west side of the reactor as noted by an observer stationed as monitor. Therefore, at 1732 hours, an unscheduled reactor shutdown was commenced with the reactor shut down and secured at 1734 hours and all reactor systems responding properly and as expected. Although all reactor systems remained functional, the failure of the test capsule to return fully (it would only return as far as the outer edge of the extra rabbit system shielding on the west side of the reactor as noted during efforts to return it) indicated an unscheduled shutdown. Under MLP #03-18, the temporary shielding at the rabbit system entrance to the permanent shielding on the west reactor face was partially unstacked with no radiation field or contamination noted and the problem thought to be a possible crack in the small rabbit system vent line, but with further investigation delayed for the weekend. On April 21, the capsule was successfully retrieved via normal rabbit system operations with the reactor secured. Several capsule insertion tests were also satisfactory. However, it was decided to unstack more temporary shielding to check the nitrogen propellant lines for cracks. Under MLP #03-18 and RWP 03-05-II, the unstacking was continued to access the bent line which was found to have a small crack probably caused by sharp points on a steel plate and exacerbated by the shielding bricks piled above it. This finding explained why the capsule would return and the system would operate satisfactorily with some shielding unstacked. On April 22, the crack was repaired by removing the cracked section and reattaching the line with the cause addressed by smoothing the sharp points of the steel plate to receive some pressure. Subsequently, the shielding was restacked, the rabbit system tested satisfactorily for proper operation and radiation surveys performed in steps to full power to assure adequate temporary shielding properly replaced with the system returned to operability on April 22, 2003. This event was evaluated to have had negligible impact on reactor safety and on the health and safety of the public or reactor personnel. The completed UFTR Form SOP-0.5B (Unscheduled Shutdown Review and Evaluation) is Attachment III from the April 2003 monthly report

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Number	Date	Description of Occurrence
6.	2 May 2003	On May 2, 2003, during performance of the quarterly scram checks it was discovered that the 10% reduction in high voltage power supplied to the wide range detectors failed to cause a trip (Step 6a in the quarterly Check of Scram Functions (Q-1 Surveillance)). MLP #03-20 was opened to troubleshoot and repair the malfunction with some checks performed on May 2 to verify the failure to trip as designed for the scram check but most effort devoted to checking circuits and diagrams. Subsequently, on May 5, 2003 a test was performed to determine the setting of the high voltage power supplied to the wide range detectors. The power supplied was 860 volts, which was consistent with a plateau completed as part of the annual UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance) on February 26, 2003. Because of personnel unavailability, the only other effort on this day was to assure understanding of circuit design and proper operation and plan further checks. Testing was conducted on May 6, 2003 to determine if there was a failure in the circuit since such failures had occurred in the past resulting in failure of the trip test circuit when the actual trip was still operable at <10% voltage drop. HVPS voltage was adjusted to determine if the circuit would cause a trip if voltage were reduced sufficiently. The circuit worked properly by causing a trip with a loss of voltage supplied to the wide range detectors. However, the bistable tripped with a voltage decrease to 693 volts versus the 774 volts (10% drop) required to meet Tech Specs representing over 19% drop in high voltage. Adjustment of the bistable set point was made and set at 787 volts. The 787 volts is 8.5% below the HVPS voltage of 860 volts. Subsequent repeated testing was performed to ensure that the 8.5% reduction of the high voltage power supply would cause a trip. The circuit tested satisfactory in two cases to close maintenance on May 6, 2003 and again to complete the scram checks (Q-1 Surveillance), closed out with successful completion of the daily preoperational

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check on May 6. The trip was successfully checked again on May 9 simply to assure the circuit was not drifting.

The circuit did not appear to be drifting and is typically set conservatively at 8.5% voltage drop to preclude a Tech Spec violation as was assured when the quarterly scram checks (Q-1 Surveillance) were last performed for this item on January 3, 2003. The bistable trip was initially set to trip at 693 volts but the high voltage was readjusted later per Standard Operating Procedure (SOP) E.4, Step 7.2.17 for the A-2 Surveillance on February 26, 2003. No mention of any bistable adjustments is made in SOP E.4 until Step 7.4.20. This adjustment was apparently overlooked by personnel performing the surveillance and not changed which is where the error occurred. Therefore, the bistable would not cause a trip (10% loss of high voltage – Limiting Safety System Setting) at the usual conservative setting of 8.5% but rather at over 19% voltage drop as determined on May 6, 2003. This loss of high voltage trip was never challenged during operations and the failure to trip was discovered and corrected during surveillances conducted at shutdown conditions.

NRC Inspector was informed of the potential violation on May 9, 2003 and briefed on the occurrence where the quarterly check of the scram function on 10% loss of high voltage to the wide range detector was unsuccessful. Two conversations occurred as the sections of the Tech Specs (Section 3.2.3 and Table 3.1) requiring the limiting safety system setting for 10% loss of high voltage on the Safety 1 channel detector were reviewed and the potential violation agreed upon. The basis for the discussion was a memorandum to the RSRS from two operator-trainees involved in correcting the mis-set scram voltage point. This memorandum is Attachment I from the May 2003 monthly report.

The occurrence of operation with the LSSS less conservative than specified in Tech Specs and the initial delayed communication with NRC was then briefly summarized in a one-day report faxed on May 9 and mailed on May 10, 2003. The delayed reporting was because of personnel unavailability with the reactor in administrative shutdown in the interim. Subsequently, the NRC Project Manager

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		was updated in a telephone conversation on May 13, with a 14-day report submitted by letter dated May 14, 2003 to summarize the event, corrective action and evaluation. Based upon the reactor control and safety systems measuring channels delineated in Section 3.2.3 of the UFTR Tech Specs and the specification for reactor safety system trips on ≥10% loss of chamber high voltage in Table 3.1, it was concluded that UFTR operation from February 26 until May 2, 2003 with the required actual safety system setting less conservative than the LSSS specified in the Tech Specs was a potentially reportable occurrence per UFTR Tech Specs Section 6.6.2 delineating requirements for special reports (Paragraphs (3) (a) and (3) (g)). The applicable sections of the Tech Specs requiring LSSS are Section 3.2.3 (Reactor Control and Safety Systems Measuring Channels) requiring the safety system detector to be operable and in Table 3.1 requiring an automatic trip on loss of ≥10% of chamber high voltage. It should be emphasized that this loss of high voltage trip was never challenged during operations and the failure to trip was discovered and corrected during surveillances conducted at shutdown conditions. In addition, this is only one of many trips available and in most cases, the loss of high voltage would be sufficient to give the trip even if a 20% loss of high voltage were required. The loss of even 10% high voltage without a trip is also likely to be noted by the applicable operator with an unscheduled shutdown initiated to investigate possible causes. In addition, reactor operation was discontinued from discovery of the event on May 2 through its characterization on May 5 and NRC notification on May 9, 2003. All operations staff have also been reminded of the need for careful and verbatim compliance with procedures to avoid overlooking required steps. Finally, plans are to revise SOP-E.4 (UFTR Nuclear Instrumentation Calibration Check) to correct Step 7.2.17 and Step 7.4.20 to assure the trip setting is changed when the high voltage on the detector is changed to preclude recurrence of this event. This change was approved at the RSRS meeting on June 17, 2003.

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		Tech Specs Paragraph 6.6.2 (3) (a) requires a prompt report for "operation with actual safety system settings for required systems less conservative than the limiting safety system settings specified in the Technical Specifications." Tech Specs Paragraph 6.6.2 (3) (g) requires such a report for a violation of the Technical Specifications. Since the reactor had been operating since February 26, 2003 (approximately 65 hours of operation) with the LSSS set to trip for too large a voltage drop, this violation extends over that period and is considered promptly reportable. Several members of the Reactor Safety Review Subcommittee (RSRS) were informed of this event but there was no operation until after the non-conservative setting was corrected on May 6, 2003 and checked on four occasions to assure proper operation plus the event was communicated to NRC on May 9. No problems were noted during subsequent return to normal operation on May 12. This potential violation for a non-conservative limiting safety system setting was reviewed with the RSRS at its regular meeting on May 13, 2003. The committee essentially agreed with actions taken and with the initial staff evaluation that the occurrence did represent a potential violation of the UFTR Technical Specifications and should be treated as reportable. Reactor Management and the Reactor Safety Review Subcommittee also agree there has been no significant compromise to reactor safety in the occurrence and no impact on the health and safety of staff or the public so this occurrence is now considered closed. The 14-day report to NRC on this event is Attachment II from the May 2003 monthly report and includes a copy of the one-day report. This is Appendix A of this report.
7.	9 Jun 03	During the daily preoperational check the Safety Channel 1 trip failed the check at 125% power and did not trip until 127% power. Under MLP #03-27 the Safety Channel 1 trip was set conservatively to 124% power and verified several times. Subsequently, the applicable steps of the daily preoperational check were performed successfully with no further problems noted and the reactor returned to normal operations. Although available to operate, no running was accomplished on June 9 as the trip was again verified with a preoperational check on June 10. Since this trip was verified prior to

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		the previous reactor operation on June 5, was discovered during a preoperational check and was corrected and verified several times prior to further operation to assure no continuing problem, this failure is not considered to be a promptly reportable occurrence. It is also considered to have had negligible effect on reactor safety and no effect on the health and safety of the public or reactor personnel.
8.	20 Jun 03	On June 20, 2003 during the performance of the control blade drop time checks (S-1 Surveillance), the S-2 control blade was found to stick at 912 units when dropped from a height above 925 units. This was determined by removing clutch current successively from 1000 units downward until the blade would drop freely. As a note, the blade was checked to drop normally from 0 units to 900 units at 100 unit intervals. All drops were successful and, when the blade did drop from the fully withdrawn position, it did so in the usual time. Furthermore, the blade could be made to drop by removing clutch current and then reapplying clutch current, raising the blade slightly, and subsequently dropping the blade. Troubleshooting began with an evaluation of the gearing and bearing systems associated with the S-2 blade. After review by the Reactor Staff and Facility Director it was decided that it was possible that the S-2 blade drive gear assembly unit was making an abnormal noise when dropped. Both the in-core blade and blade drive mechanisms are considered well protected from external material causing mechanical damage, so failure from foreign object intrusion was considered unlikely in either unit. Since the blade drive unit external to the biological shielding is much more accessible and far more mechanically complex, and with the added information of an unfamiliar noise emanating from the assembly, the decision was made on June 20 to disassemble and evaluate the unit. Initial checks on the right angle gear box to observe gears during a drop on June 20 revealed no problems; similarly, the voltage at the terminal box for the S-2 blade at fully withdrawn and with the clutch switch pressed were normal. At this point the S-2 blade shaft was uncoupled from the gearbox for further checks.

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		After disassembly of the S-2 blade drive on June 23, the clutch showed obvious wear along the splined shaft and armature unit's gearing. This wear was near the leading edge of the shaft, where rapid movement is critical for prompt engagement and disengagement of the reduction gear to the clutch. With the discovery of the wear points on the clutch spline and the clear indication that all of the other gearing appeared to be in good shape, the decision was made to replace the clutch on June 23. The clutch replacement was bought from the original manufacturer and is the same base clutch with the exception of the clutch armature. The original armature was made with a segmented face, which at the time of the outage was unavailable and would not become available for at least two weeks. The Warner Electric Company indicated that an acceptable replacement flange-mounted clutch could be obtained immediately. After much discussion with one of the Warner engineers and the local distributor (Miller Bearing – Ocala), the decision was made on June 25 to purchase the replacement and have it shipped overnight. The S-2 armature sprocket was also removed on June 25. The replacement was received at the Ocala distributor June 27 and taken to Rafferty's Machine Shop (ISO-9002 certified) in Gainesville for partial assembly. On June 27 the clutch armature assembly was also replaced on the S-2 drive mechanism shaft. On June 30 the reduction gear side of the clutch assembly was returned to the facility. This non-segmented armature performs the task correctly and is considered equivalent per 10 CFR 50.59 Evaluation Number 03-06 (Control Blade Safety-2 Clutch Replacement). At this point the clutch assembly was installed for spacing and test fit purposes and the connection wires were soldered for the electric clutch as reassembly was commenced. Since this sticking problem was discovered during normal testing, since there had been no reactor startups for which the S-2 blade was removed to the point where it was sticking and since the ability to reach a 2% shutdown margin by driving the S-2 blade in was maintained, this event is not considered to be promptly reportable. Nevertheless, the NRC was informed of the evaluation in a call the usual NRC Inspector (the NRC Project Manager was not available)

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Number	Date	Description of Occurrence
		on June 23, 2003. At month's end final reassembly and testing including a restart to 1 watt remained to be completed. After replacement of the clutch assembly and reassembly of the clutch and gear assemblies and reattachment to the main control blade shaft, thorough testing was conducted on July 1, 2003 including 75 subsequent clutching operations on the blade per a Warner engineer's recommendation. All checks indicated normal performance. On July 2, 2003, the weekly checkout removal time was normal (107 seconds). The controlled insertion time (S-5 Surveillance) was also normal (104 seconds). Blade drops were successful from 100 units at 100 unit intervals to full out with the drop time for full out improved from 0.85 sec on February 11, 2003 to 0.67 sec on July 2, 2003. The net result is that this modification and maintenance has corrected the problem with negligible impact on reactor safety and no impact on the health and safety of the public. With successful completion of all checks and surveillance activities, a start up to one watt was authorized and conducted on July 2. All systems were noted to respond properly with the critical position for the control blades (S-1/S-2/S-3/RB) established at 800/800/800/346 and noted to be essentially unchanged from the previously established position (800/800/800/348) from February 14, 2003. This result verified that no reactivity measurements would be needed as a condition for return to normal operations. Subsequently the reactor was returned to normal operations on July 2, 2003 with some time spent subsequently completing documentation. The final evaluation is that this event had negligible impact on reactor safety and no impact on the health and safety of the public. A memorandum on the occurrence to the RSRS is Attachment I to the July 2003 monthly report.
9.	23 Jun 03	During review for training of the control blade worth curves and UFTR Form SOP-A.7B (Evaluation of UFTR Blade Drop Reactivity Data) completed on February 24, 2003, an error was noted on the entry for the total integral blade worth (%Δk/k) for Safety-2 which should have been 1.37 versus 1.47 with the reactivity summation then

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LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence
		being 5.30%Δk/k versus 5.40%Δk/k. This difference is only 0.1%Δk/k. Finally, the core excess reactivity must also be adjusted downward from 0.59%Δk/k to 0.49%Δk/k. The Safety-2 reactivity worth curve itself is unchanged. This error was due to a transcription error which was overlooked in the review but is considered minor since there was no impact on reactor safety or on the health and safety of the reactor with the corrected form in use since discovery. The original UFTR Form SOP-A.7B dated February 24, 2003 is Attachment I to the June 2003 monthly report while the corrected form dated June 23, 2003 is Attachment II to the June 2003 monthly report.
10.	04 Aug 03	On August 4, 2003, during a reactor startup, an automatic reactor period trip occurred. The blades were positioned to the following units: S1 @ 800, S2 @ 800, S3 @ 800, RB on bottom. The reactor operator pressed the "Up" button for the Regulating Blade, observing the bottom light clear. Immediately, the period meter pegged high and the period automatic full trip was initiated with all safety systems responding properly. Because the trip was from a known cause, it was not considered promptly reportable. The cause of the trip was attributed to noise generated from the Regulating Blade bottom limit switches. Noise of this type, but not usually to this extent, has been observed in the past, especially from the Regulating Blade whose control circuit is physically closest to the wide range drawer preamplifier circuit. MLP #03-33 was opened and the cause verified to be noise from the limit switches. Under 10 CFR 50.59 Evaluation Number 03-07 (Installation of Snubber Network to Regulating Blade Bottom Limit Switches for Noise Suppression), the appropriate electrical noise suppression snubbers were identified and acquired with the criterion that they operate passively and have no impact other than limiting noise. Noise suppressors were connected across the "NC" and "NO" contacts of the two bottom limit switches. Once connected, the suppressors were verified to allow minimal noise to be generated through these bottom limit switch contacts with little to no effect observed on the period meter when the Regulating Blade was removed for testing from its bottom limit switches on August 5, with about 70 shims performed to about 40 units with no significant

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2002 – August 2003)

Number	Date	Description of Occurrence
		noise observed on all occasions to affect the wide range drawer period meter. Subsequently, on August 7, appropriate preventive maintenance (S-1 and S-5 Surveillances for the Regulating Blade), preoperational checks, and a startup to 1 watt were performed to verify correction of the problem with the reactor restored to normal operation on August 7. A memorandum to the RSRS describing the event and the subsequent implementation of corrective action as well as a completed UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) constitute Attachment I to the August 2003 monthly report. The final evaluation is that this trip event was from a known cause which has been corrected with the net result that the event and the subsequent modification had negligible impact on reactor safety and no impact on the health and safety of the public.

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 2002–3 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 2001-2002 Reporting Year:

  Modification 02-06: Replacement of Failed Fission Chamber and Sleeve with Equivalent Fission Chamber and Sleeve

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 and on November 9, 2001 while a full S-7 Surveillance without replacement of the 4 volt batteries was conducted on December 3, 2001. Subsequently, the 4 volt rechargeable batteries were replaced again on January 16 and on March 29, 2002 while a full S-7 Surveillance was conducted on June 6, 2002. Subsequently, the holdup alarms' batteries were replaced due to low voltage on August 16, 2002 and the 4 volt rechargeable batteries were replaced again on August 21, 2002. Current plans are to replace the entire system with an equivalent one with DOE 2001–2 URI grant funds. A full S-7 Surveillance was conducted on October 28/31, 2002. Subsequently, the 4 volt rechargeable batteries were replaced again on January 2 and on March 11, 2003, with another full S-7 Surveillance conducted on April 25, 2003. Subsequently, the 4 volt rechargeable batteries were replaced again on June 11 and on August 26, 2003.

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. Replacement of Failed Fission Chamber and Sleeve with Equivalent Fission Chamber and Sleeve (Permanent – Closed Item)

(Modification 02-06 Evaluation Completed 15 March 2002)
(Modification 02-09 Evaluation Completed 11 September 2002)
(Modification 02-10 Evaluation Completed 30 September 2002)
(Modification 02-11 Evaluation Completed 25 November 2002)
(Modification 02-12 Evaluation Completed 27 November 2002)
(Modification 02-13 Evaluation Completed 30 December 2002

On March 15, 2002, a startup was undertaken for training purposes as the first startup since the discovery of the failed 10-second time delay relay for the deep well water flow trip during a daily checkout on February 28, 2002. Startup commenced at 1019 hours with the reactor reading about 0.4 watts at about 1029 hours. Because the wide range was indicating low by about an order of magnitude with the extended range going off as expected but then coming back on several times, the operator had the trainee push the regulating blade to the expected critical position (360 units withdrawn) with a stable set of readings taken at 1033 hours indicating power at ~0.3 watts but the wide range now at ~1 x 10-5, even further down than expected or given earlier. An unscheduled shutdown was commenced at 1033 hours with the reactor shut down and secured at 1034 hours. Subsequently, UFTR Form 0.6B (Unscheduled Shutdown Review and Evaluation) was mostly completed.

Under MLP #02-08, opened to control troubleshooting and repair, the preamplifier was disconnected on March 15, 2002 from the wide range drawer under the regulating blade pedestal and taken to the electronics engineer for evaluation. Subsequently, on March 18, 2002, the engineer confirmed the preamplifier was operating properly so the pen traces recorded prior to and during the unscheduled shutdown were reexamined and evaluated. On March 19, troubleshooting checks were undertaken with the high voltage power supply

(HVPS) for wide range (WR) drawer replaced temporarily with a spare to confirm the HVPS was not the cause of the problem. Subsequently, work was begun on a restart memorandum on March 20 to control a restart to gather information. On March 21, a pulser was connected to the WR drawer with the extended range dropping out at ~500 cps with 400 cps indicated on the pulser and no cycling. The NRC was contacted and given information on the plans to restart to obtain additional information after doing component tests. Subsequently, several NRC personnel were contacted to discuss plans. They agreed to plans and on current status that the event was not promptly reportable. However, the NRC representative emphasized reportability if a startup is undertaken and anything required by Tech Specs is lost. He also emphasized getting all the needed data on one trial restart if such was performed.

Subsequently, on March 22, 2002, a plateau was run on the fission chamber using the PuBe source in the thermal column and isolating higher power/neutron count levels getting the cycling to recur to focus troubleshooting on a failing fission chamber. Therefore, the plans to restart to obtain data were canceled. On March 25, the fission chamber model information was sought as the radiography north shield wall was removed. Subsequently, on March 26, the fission chamber was removed under RWP #02-02-II and the shield closed up. Due to schedule mismatches and delays, the fission chamber was not finally tested and declared out of commission until March 28 as efforts were also expended on verifying the chamber, labeled only Ionization Chamber (Model RSN314; Serial Number L2252), is indeed a fission chamber (a kind of ionization chamber) through the manufacturer (Reuter-Stokes, Inc.) who agreed to fax a quote for a replacement fission chamber. Subsequently, on March 29, the quote for the fission chamber ($4,995) was received and reviewed with NRE purchasing/accounting with Reuter-Stokes, Inc. subsequently indicating a new quote might be needed due to safety grade of the chamber. A notice was also sent to the TRTR listserver (trtr@wpi.edu) asking if anyone had a replacement available to borrow or buy with UT–Austin indicating they might have one. At the end of March, Reuter-Stokes, Inc. indicated it had initiated efforts to manufacture a replacement detector with a 60–75 day lead time so the facility will continue to investigate other alternatives. Partially completed UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) is Attachment II to the March 2002 report and the quote from Reuter-Stokes, Inc. for a replacement fission chamber is Attachment III to the March 2002 monthly report.

On April 2, 2002, the RSRS was updated as to facility status; the committee suggested buying two detectors but the cost was confirmed to be the same from Reuter-Stokes. During April, efforts were made to document the failure and with failure and then removal of the fission chamber, the NRC Project Manager confirmed on April 5, 2002 that there can be no blade removal, even for preoperational checks, to avoid a Tech Spec violation. Based on experience with some sealed detectors and a suggestion from the McMaster facility, it was decided to heat the detector in an oven set to ~130°F; this was accomplished for a week but when checked on April 12, the detector was still failed, confirmed by the electronics engineer on April 15, 2002. Checks in April showed the detector at UT–Austin to have a relatively high radiation level (~1R/hr) and to have integral connections which would necessitate a redesign of the shield plug system so this option was abandoned. On April 5, Reuter-Stokes confirmed that the detector is not so-called safety related per their procedures so the price quoted in March remains valid. IST, the only other vendor of this detector, was asked to

provide a quote also. Their quote faxed on April 11 is Attachment I to the April 2002 monthly report and shows the IST cost to be ~$10,000 with an even longer lead time of 6 months so the decision was made to stay with Reuter-Stokes and just one detector was ordered. Reuter-Stokes also was able to confirm the detector model number as a fission chamber as documented in a memorandum from SRO Vierbicky dated April 19 which is Attachment II to the April 2002 monthly report.

During May 2002, the fission chamber was moved to fuel storage pit #1 and RWP #02-02-II was closed. The cover was moved to the low-level storage area and subsequently measured and verified to be aluminum by an NRE Professor as Reuter-Stokes was contacted and agreed to make a slightly smaller diameter aluminum cover to ease reinsertion of the replacement detector into the shielding slot. The oven was also moved back to the lab. On May 8, 2002, Reuter-Stokes indicated that personnel turnovers had resulted in a delay and the new detector would be available in late June. A memorandum to the RSRS from UFTR Staff outlining the troubleshooting and the need for a restart plan is Attachment I to the May 2002 monthly report.

During June 2002, work was begun on the restart plan and the modification package with periodic checks indicating the fission chamber should be delivered by the end of the month though it was not delivered by Friday, June 28 and its status was not confirmed by Reuter-Stokes on that date as the wait for the detector extended to July.

On July 1, 2002, work was continued on the modification package as 10 CFR 50.59 Evaluation Number 02-06 (Replacement of Failed Fission Chamber and Sleeve with Equivalent Fission Chamber and Sleeve). A representative at Reuter-Stokes was unable to be reached until July 8 when he indicated that the schedule for fission chamber delivery would now be delayed until July 31. After several discussions with the representative, a technician and a machinist at Reuter-Stokes, it was decided to obtain the aluminum sleeve in Gainesville. This sleeve is not weight supporting so to allow easier insertion and removal of the assembly without unstacking the biological shielding, the aluminum sleeve is being reduced by 0.25 inches on the outer diameter. A memorandum from reactor management to the RSRS supporting this modification is Attachment I to the July 2002 monthly report. The sleeve was specced out and then purchased/picked up from Precision Tool and Engineering Company on July 24 when the modification package was essentially completed. On July 25, 10 CFR 50.59 Evaluation Number 02-06 was approved at the RSRS meeting with some effort spent during the final week of July developing a restart plan/training program to return to normal operations. The detector was not delivered at month's end and the technician at Reuter-Stokes was unavailable as the wait for the detector extended to August.

On August 2, 2002, the technician again delayed delivery saying the detector would be shipped by mid month. At the RSRS meeting on August 8, the RSRS approved the UFTR plan to return to normal operations as it combines the necessary makeup operations training for licensed personnel with completion of all overdue surveillances in a scaled approach from low to full power. This restart plan is Attachment I to the August 2002 monthly report. On August 14, the technician from Reuter-Stokes indicated that the fission chamber was being assembled and would be shipped by August 21. On August 21, the technician from Reuter-

Stokes asked that a copy of the UFTR license be faxed to Reuter-Stokes and next day delivery was arranged for the fission chamber. On August 22, the new fission chamber finally arrived and was temporarily stored in the reactor cell as receipt documentation was completed and the calibration procedure was reviewed with no work accomplished due to personnel unavailability on August 23. On August 23, the Nuclear Material Transaction Report for the fission chamber was received; it is Attachment II to the August 2002 monthly report. On August 26, the fission chamber sleeve was prepared and the fission chamber was prepared for electrical verification. On August 27, the electrical signal from the detector was verified, the chamber was installed in its thermal column slot and a successful plateau was performed on the wide range. Subsequently, on August 27, a complete weekly preoperational checkout was performed by SRO Vernetson and observed by SRO Vierbicky, both as part of the restart plan and for training for SRO Vernetson. On August 28, a successful daily preoperational checkout was performed by SRO Vierbicky and observed by SRO Vernetson and then by SRO Vernetson and observed by SRO Vierbicky, again as part of the restart plan and for training. Because of noise in the wide range, especially on movement of the regulating blade (physically closest to the fission chamber), the fission chamber cable was shielded and wide range channel alignment was begun. Subsequently, on August 29, the discriminator, the calibration signal selector and the zero log amp summer were set with wide range channel alignment completed on August 30 but considerable noise still present and yet to be addressed.

On September 3, 2002, the procedural changes were made for the updated alignment voltages following initial calibration efforts. Major efforts continued to isolate the wide range drawer ground. On September 4, the fission chamber was removed and the entire cable length from the chamber to the preamp was wrapped with a continuous length of RF shielding. Subsequently, on September 5, the cables and fission chamber were reinstalled and reconnected but noise persisted so consideration was given to install a band pass filter on the wires running from the WR drawer to the preamp. On September 6, noise was isolated to the 15 vdc power supply rails so it was thought that filtering the 15 volt power supply output to the preamp was needed. On September 10, 10 CFR 50.59 Evaluation Number 02-09 (Installation of Radio Frequency Interference Filter on Wide Range Drawer) was generated for installing a filter in the WR drawer. On September 11, a 15-volt DC power supply filter was installed and tested satisfactorily but the noise persisted. It was thought that noise might be entering through the bias power supply or through a ground or other input cable.

On September 12, noise entry was isolated to the preamp with detectors ruled out as source of noise so the shield was resoldered on the preamp interior and the bias supply line was tested negatively as the entry point for noise into the preamp. On September 13, the phenolic shield was cleaned of excess solder, the border was lined with conductive tape and soldered back to the preamp so the solder run continues around the interior of the preamp. After reconnection of the preamp on September 16, the fission chamber was reinstalled in the pedestal, ground connections were checked and the regulating blade power cord was wrapped in shielded cable; then the high voltage power supply loose connections and grounds in the WR drawer were connected. Since the noise problem persisted, ground isolation checks continued on September 19–20 as the AC ground to DC ground in the fission chamber was isolated on September 20 as efforts continued to isolate the second AC–DC ground in the

output from the WR drawer. The second AC–DC ground was isolated on September 23 with no overall change in AC–DC ground measurements with AC–DC ground still shorted. The AC ground to earth was checked and seemed somewhat deteriorated physically. The new AC earth ground was checked with PPD who was scheduled to come and check it in the future. There was also further checking on filters to filter all noise from the regulating blade drive motor.

On September 24, 10 CFR 50.59 Evaluation Number 02-10 (Installation of Radio Frequency Interference Filter on Regulating Blade Motor) was developed to install a radio frequency interference (RFI) filter on the regulating blade drive motor; the RFI filter was installed, but again with no significant reduction of the noise problem. Ground isolation efforts continued on September 25–26. On September 27, the period circuit was checked and determined to be completely operable as ground checks continued indicating the uncompensated ion chamber (UIC) detector is grounded but needs to be ungrounded. In this placement, the UIC is resting on graphite blocks which are connected to earth (AC) ground. The case of the UIC detector is the DC signal ground so the two should not be touching; the UIC should be resting on some type of insulating material such as phenolic board or rubber. Ground isolation efforts continued through the end of the month with the noise problems persisting.

On October 1, 2002, ground isolation efforts continued as a short to ground in the auto flux controller chopper was corrected as some bolts were removed and replaced with nylon ties temporarily. On October 2, the signal-to-earth ground on the picoammeter was repaired and parts were ordered for the bias supply and chopper. Various consultations were conducted on October 3 as some insulating washers were specified and ways of making better AC grounds in the pit were discussed. On October 4, the grounds in the servo chopper and the safety channel 2 power supply were isolated. On October 7, the ground for the console was improved and the response of the period meter to cycling power and raising/lowering water in the core were checked showing significant noise. A new high voltage plateau was also run for the fission chamber with little change noted as the adjustment from 780 volts to 800 volts was made on October 8 when the ground on the picoammeter was verified correct and the discriminator was adjusted based on a new determination of the setting. Noise and ground isolation checks continued on October 9 as water was raised and lowered (PC pump on and off) with and without the PuBe source inserted to check neutron level effects and also as a control blade was raised a few hundred units. Subsequently, the AC ground for the pump in the pit was found to be poor so a temporary ground strap was attached to improve the ground but the response of the period meter to cycling the water and resetting the key was not improved. On October 10/11, PPD and the NSC electrical contractor were contacted concerning electrical work that had been done but UFTR personnel were assured no changes had been made that could affect the UFTR. Subsequently, on October 11 and 14, Bill Hyde of General Atomics resumed checking the cable shielding and raising the discriminator level until the detector continues to count and the source interlock is still clear. He also recommended checking the filters on the high voltage lines in the preamplifier, noting there was a possibility of bad capacitors.

On October 14, the PPD electrician supervisor conducted checks of the grounds to the PC pump, demineralizer pump and core vent fan determining all were fine. He also tried to ground the dilute fan with no effect. He also tested the building ground at ~60 Ω resistance which is high and was to have Physical Plant look into the problem as it should be ~10 Ω, but did not feel this was the source of the problem as he discussed the lack of a ground on AC power to the console. Subsequently, College of Engineering consultant electricians checked the same items as the PPD electrician supervisor with no specific determination as facility staff checked the shielding on the fission chamber cables as a possible source of noise. On October 16, the fission chamber and cabling were removed in preparation for replacement of the cables and shielding with insulation made up on October 18. With the violation problem during the weekly preoperational check on October 22 (see Attachment I to the October 2002 monthly report for "operation" without a required fission chamber), no work was performed as the PPD electrician supervisor was consulted about installing a temporary AC power supply to the console. Subsequently, on October 24, under MWO #636483 the PPD electrician supervisor and PPD electricians ran new temporary ground and neutral wires to the console. On October 25, the fission chamber was tested with an independent amplifier and preamplifier and seemed satisfactory as the PA-6B was determined to be working properly. The electronics engineer and staff felt that the copper shield around the fission chamber needed to be tested as noise was probably continuing to enter via the detector.

On October 29, with normal power to the APDs secured, three PPD electricians finally ran the neutral ground wire through the control room outlets into the power box for control console power with all four outlets on the back of the console power jumpered. They also checked the pit setup on grounds while the electronics engineer continued checking the detector circuit. On October 30, the continuity between AC ground and graphite in the thermal column was checked (~1.7 Ω) as new connectors and cable shielding were specified and discussions were conducted on making wiring connections between AC ground and the detector sleeve. On October 31, proper impedance matching for output of the preamplifier was determined and found to be good and two ceramic HN connectors were ordered from Ceramascal as ground isolation efforts continued with the noise problem somewhat lessened but persisting.

After discussing connectors and shielding on November 1, 2002 with the NRE department's electrical engineer, UFTR staff prepared 10 CFR 50.59 Evaluation Number 02-11 (Replacement of Fission Chamber Cable Shielding with Upgraded Conduit) as of November 5. The fission chamber response was compared with and without the old shielding on November 5 as some consideration was given to a fission chamber sleeve and restart conditions on November 6 and to RF noise sources on November 7. After finally being received on November 12, the upgraded shielded conduit was cut and the signal and high voltage lines run through it on November 13 with the conduit subsequently inserted through the reactor shielding on November 18 and 19. Connections were made and continuity assured at the fission chamber end of the cable on November 20 with the shielded conduit installed through the shielding with the high voltage wire and ground cable run on November 21. With the conduit installed, noise tests were conducted on November 22. Subsequently, the fission chamber shielding was reassembled to the preamplifier on

November 25 as ground wires were isolated as a probable source of noise as it was confirmed that no other inputs to the preamplifier were antennas with the noise problem persisting.

On November 26 with the noise problem persisting, the fission chamber and cabling were again removed and the grounding wire was removed from inside the conduit with the grounding strap rewound on the outside of the conduit which was reinstalled through the reactor shielding. Connectors were then reinstalled and connections made to the fission chamber and the preamplifier. After checking and verifying good ground routings in the equipment pit on November 27, 10 CFR 50.59 Evaluation Number 02-12 (Installation of Improved Ground Wire from Regulating Blade (RB) Pedestal to AC Ground in Equipment Pit) was approved and a ground strap was attached from the RB pedestal to the shield tank purification system ground; subsequently, the fission chamber sleeve ground strap was also connected to the RB pedestal and all connectors on the preamplifier were checked. Nevertheless, again period stability tests showed period trips on ~25% of key resets so the decision was made to look further at loads that could be carrying noise signals as the problem persisted at month's end.

On December 2, 2002, the console key switch was removed along with the reset key wafer switch and the mechanical actuator and contactors were closed and the key switch reinstalled. Though worn, the key switch is usable. All scram relays were then checked for arcing and sparking with negative results. Again checks on the Regulating Blade showed excessive noise. At this time on December 5, 10 and 11, the wide range was realigned and on December 12, the RB pedestal cover was secured and the safety channel 1 trip setpoint was set. In addition, the Regulating Blade was exercised at low levels to check limit switch locations and integrity; based on indicated noise effects, microswitches were replaced for up and down drive and magnet on. Subsequent noise checks showed no improvement so limit switches were ordered and the bottom limit indication switch was replaced on December 17 with testing seeming to indicate improvement and blade interlocks verified okay. The limit switches were then adjusted but noise problems were noted to persist. After examining the relay schedule for the reactor protection system and finding no obvious source of the noise problem, some consideration was given to having a new console reset key switch made. The necessary measurements were made on December 18 and based on an estimated cost, the necessary funding was transmitted to Wolftek Inc. to manufacture a new switch on December 19 and the necessary schematics sent on December 20 as this key switch will be obtained as a replacement spare for the one in the console.

On December 18, it was decided to remove the preamplifier for a thorough overhaul by the electronics engineer. Initially the output was found to be unstable and thought to be due to a bad feedback circuit. A loose connection was identified on December 19 with a new set of connectors ordered and installed. On December 20, failing electrolytic capacitors were identified. Under 10 CFR 50.59 Evaluation Number 02-13 (Replacement of Electrolytic Capacitors in Preamp with Equivalent Capacitors) replacement electrolytic capacitors were installed with the preamp determined to be much improved in operating characteristics on December 27. On December 30, the preamp was reinstalled and a scope and signal analyzer were set up to determine the need for higher voltage settings to get proper discriminator voltage determination curve. Subsequently, the discriminator plateau was determined on

December 31 as some thought was also given to installing snubber circuits on the regulating blade limiting switches if such prove necessary, but the electronics engineer is confident that the system should be operable now. At month's end the necessary checks remained to be made before the noise problem would be considered corrected.

On January 2, 2003, the digital indicator setting on the Regulating Blade was raised to remove bottom limit noise which worked and testing was conducted as the noise problem appeared to be corrected with two successful SRO-observed daily checkouts performed with the various delayed surveillances scheduled to be completed. Subsequently, on January 3, the quarterly scram checks (Q-1 Surveillance) were successfully completed except for a failed primary coolant flow return meter flow switch identified and ordered (see MLP #03-01). Subsequently, the MLP record was updated and organized on January 8, and the restart memorandum was updated per NRC and RSRS input on January 28. The updated restart memorandum is Attachment I to the January 2003 monthly report. After final successful completion of the scram checks on January 23 and a successful completion of a follow-up daily checkout on January 24, the clutch current bulbs were replaced (S-11 Surveillance) but the control blade drop time measurements were delayed due to a faulty recorder (see MLP #03-05). Subsequently, the control blade drop time measurements (S-1 Surveillance) and the control blade controlled insertion time measurements (S-5 Surveillance) were completed on January 27. After another completion of the pre-calorimetric portion of the annual nuclear instrumentation calibration (partial A-2 Surveillance) on January 28, a successful daily checkout was performed on January 29 and UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) was completed on January 29, 2003. Subsequently, SRO Vierbicky performed a startup to 1 watt observed by SRO Vernetson to verify critical position and successful maintenance; then, SRO Vernetson performed a startup to 1 watt observed by Vierbicky to meet restart conditions. At this point, on January 30–31, the reactor was brought to 100 watts and reactivity worth measurements were begun with measurements on the Regulating and S-1 blades conducted as this surveillance would extend to February in the stepped return to full power and completion of overdue surveillances.

On February 3, 2003, after a successful weekly checkout, the PuBe was lost from its cord into the CVP during performance of the daily preoperational check. Due to the necessity to unstack shielding and move some graphite to retrieve the source under MLP #03-07, the reactor was unavailable until this maintenance was closed out on February 12, 2003. Subsequently, the control blade drop time measurements (S-1 Surveillance) and control blade insertion time measurements (S-5 Surveillance) were repeated on February 11, 2003. The critical position was checked and the reactor was brought to 100 watts and reactivity worth measurements were begun on February 13 and completed on February 18 as data reduction and documentation continued until February 24 with a new memorandum on use of the updated control blades issued on February 25, 2003 for reference use in all subsequent operations. A copy of this memorandum and the updated control blade worth curves is Attachment I to the February 2003 monthly report.

The UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (A-2 Surveillance) (required for installation of the new fission chamber and overdue anyway since

October 1, 2002) was performed throughout the last week of February, from the precalorimetric on February 24 to final linear pen adjustment on February 28 and completion of the A-2 Surveillance.

Due to the installation of the new fission chamber into the wide range power monitoring channel, both the wide range (WR) and safety channel 1 (SC1) power meters were indicating higher than the actual power level. IN order to facilitate the timely calibration of power readings, a procedure was used as with previous detector replacements. Therefore, a preliminary lower power run with a heat balance calculation was performed to lower indicated power readings on the WR and SC1 monitoring channels. The preliminary run was made at 50 kW for 30 minutes, after that point, the heat balance was made to ensure that safety channel 2 (SC2) was indicating properly; at that time the WR and SC1 channels were adjusted down to read within approximately 5 kW of SC2. This downward adjustment of the WR and SC1 channels allowed the subsequent 6-hour power run to be made at approximately 95 kW thereby achieving a sufficient change in temperature across the core to make an accurate heat balance calculation for the calorimetric. Conservatism was maintained by keeping the WR and SC1 channels as the highest indicating power monitoring channels. A memorandum to the RSRS documenting this planned adjustment is Attachment II to the February 2003 monthly report.

On February 27, 2003, during the shutdown post calorimetric span and zero adjustments of the two-pen recorder, the linear channel began to oscillate. The reactor was returned to the reference power level to attempt to re-establish proper linear channel span and zero settings. After an extended period of time adjusting the span potentiometer with no effect, the linear channel circuitry was inspected and the span potentiometer was found to be loose, making only momentary contact with the circuit board. This loose span potentiometer was causing the amplifier to go into infinite gain, which was the source of the linear channel indication oscillation. The reactor was shut down and the potentiometer was resoldered. On February 28, 2003, the reactor was again restarted to establish proper span and zero settings for the linear channel. During reactor startup and subsequent power operations, the linear channel power level was monitored at the output of the picoammeter with a Fluke 196 scope meter. This method of power monitoring was used the day before during the restart, as the voltage output of the picoammeter is the input to the linear channel indication, and the voltage value is one tenth of the linear channel power reading. Once the reference power was reached and maintained for a short period to allow for system equilibration, the span and zero adjustments for the linear channel were made satisfactorily. After the adjustment was made, reactor power was maneuvered in the power range both manually and using the auto flux controller to ensure proper power level monitoring channel agreement. The reactor was then shut down and the UFTR Nuclear Instrumentation Calibration Check and Heat Balance (A-2 Surveillance) was completed per procedure. A memorandum explaining this adjustment of the linear channel indication is Attachment III from the February 2003 monthly report.

During performance of the power run for the A-2 Surveillance, at 95.6 kW on February 27, the overdue quarterly radiologic surveys of unrestricted areas (Q-4 Surveillance) and restricted areas (Q-5 Surveillance) at power were performed successfully. Since all levels were acceptable within margin, completion of the surveys at 95.6 kW was considered to meet

the requirement. In addition, the Measurement of Argon-41 Stack Effluent Concentration (S-4 Surveillance) was completed during the same power run at 95.6 kW with the values prorated to full 100 kW operation and documented as such as has been done on several earlier occasions after extended outages with only the memorandum limiting energy generation remaining to be completed. The memorandum on energy generation and attachments constitute Attachment IV from the February 2003 report. At month's end the only remaining surveillances to be completed were the overdue Annual Measurement of UFTR Temperature Coefficient of Reactivity (A-3 Surveillance) plus the annual operations test for two licensed operators as well as additional radiological surveys of unrestricted and restricted areas (Q-4/Q-5 Surveillances) at 100 kW as requested by the Radiation Control Officer for completeness.

Restart status was reviewed on March 4, 2003 after completion of the Annual Measurement of Temperature Coefficient of Reactivity (A-3 Surveillance) on March 3 with documentation completed on March 5. Subsequently, the annual operations tests were completed on March 7. Documentation for the outage and restart was reviewed on March 10 with the additional radiological surveys of unrestricted and restricted areas (Q-4/Q-5 Surveillances) completed on March 11 and the maintenance finally closed out on March 12 with the entire occurrence evaluated to have had negligible impact on reactor safety and on the health and safety of the public.

Controlling Documents: Maintenance Log Page #02-08
10 CFR 50.59 Evaluation Number 02-06
10 CFR 50.59 Evaluation Number 02-09
10 CFR 50.59 Evaluation Number 02-10
10 CFR 50.59 Evaluation Number 02-11
10 CFR 50.59 Evaluation Number 02-12
10 CFR 50.59 Evaluation Number 02-13

3. Replacement of Primary Coolant Return Line Flow Switch Assembly (Permanent – Closed Item)

(Modification 03-01 Evaluation Completed 23 January 2003)

During performance of the delayed quarterly scram checks (Q-1 Surveillance), the primary coolant flow return flow meter switch was found to be inoperable. Since this failure was discovered at shutdown during surveillance, it was not considered promptly reportable. Under MLP #03-01, specifications for the switch were identified and an identical replacement was ordered. Upon receipt on January 6, 2003, the flow switch was removed from the system under RWP #03-01-I and the new one was tried but found too short despite having the same part number. Under 10 CFR 50.59 Evaluation Number 03-01 (Replacement of Primary Coolant Return Line Flow Switch Assembly), the old and new flow meter switches were measured, a larger flange connection was designed and Precision Tool and Engineering, Inc. was contracted to machine it. After various delays, the flange connection was received on January 14 and the new flow switch assembly with flange was installed under the reissued RWP #03-01-I. After satisfactory leak checks, the switch was wired to the

reactor protection system but the scram check on the flow switch was unsuccessful due to an incorrect cross connection of wires failing the switch so a new flow switch was ordered on January 14 and received on January 17. Although RWP #03-02-I was approved on January 17, the switch (bonnet head) was not installed until January 21. After successful leak checks and RWP closeout, the scram check was still unsuccessful on January 21. On January 22, RWP #03-02-I was reissued; the SPDT switch was removed from the bonnet and found to be failed. The GEMS Sensors Company agreed to send a replacement SPDT switch but with a delay, so another full switch meter was ordered overnight delivery. On January 23, RWP #03-02-I was reissued and the SPDT switch was installed and leak checked satisfactorily. Subsequently, RWP #03-02-I was closed and the flow scram checked satisfactorily to close the scram checks surveillance (Q-1 Surveillance) with no further problems noted as a successful daily checkout was completed on January 24 as this event was noted to be discovered at shutdown and evaluated to have had negligible effect on the reactor or the health and safety of the public.

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

4. Implementation of PuBe Aluminum Source Holder for Insertion (Permanent – Closed Item)

(Modification 03-02 Evaluation Completed 11 February 2003)

Because of the loss of the PuBe source in the center vertical port and the removal of its lifting lug as discovered on retrieving the dropped PuBe source on February 6, the decision was made to use a more reliable method of source insertion. Under MLP #03-08 and 10 CFR 50.59 Evaluation Number 03-02 (Implementation of PuBe Aluminum Source Holder for Insertion), on February 7, a source holder was manufactured from aluminum tubing with four holes to provide redundant lifting by attached nylon cords. On February 11, the source holder was tested and verified to be implemented with no problems noted.

Controlling Documents: Maintenance Log Page #03-08
10 CFR 50.59 Evaluation Number 03-02

5. Replacement of Stack Dilute Fan Motor (Permanent – Closed Item)

(Modification 03-03 Evaluation Completed 24 February 2003)

For some time the dilute fan motor and bearings have been under consideration for replacement. On January 28, 2003, a PPD mechanical technician visited to check the dilute fan motor and bearings to specify replacement needs. At the end of January, the facility was awaiting information on a replacement motor under MWO #626061. On February 6, 2003, the PPD technician indicated that PPD had a $400 replacement motor and he would be providing documentation. The documentation was faxed by PPD on February 7 but apparently not seen by facility personnel. Subsequently, the PPD technician arrived with the replacement 5 hp motor on February 14 but was told that a modification package with the motor documentation was required prior to installation. After being contacted, a PPD

supervisor resent the fax documentation and several days were spent developing the modification package. Subsequently, the PPD technician visited on February 19 to verify the existing dilute fan motor was 5 hp. Subsequently, on February 24, the replacement motor was installed under MLP #03-10 (MWO #626061) and 10 CFR 50.59 Evaluation #03-03 (Replacement of Stack Dilute Fan Motor) by the PPD technician and an assistant, with the dilute fan system verified to provide proper rpm (486 rpm) and air flow (12,500 cfm) with no problems noted.

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

6. Repair of North Area Radiation Monitoring System Channel with Equivalent Electronic Components (Permanent – Closed Item)

(Modification 03-04 Evaluation Completed 18 March 2003)

During the weekly checkout, the north area radiation monitor was noted to be giving erratic indications and then completely failed. Under MLP #03-06, the north monitor module was checked for obvious failures with none noted. Subsequently, the north detector module was disassembled, checked and the GM tube identified as likely to be failed. Replacement tubes have been ordered from LND, Inc. as the only supplier (and a previous supplier) with payment remitted as required prior to shipment with no acceptance of credit cards. The replacement GM tubes finally arrived on February 17, 2003. Subsequently, the north area radiation monitor GM tube was replaced on February 28 but did not correct the problem so troubleshooting and repair continued at month's end.

During March 2003, troubleshooting and repair continued as a failed fuse was replaced to restore meter response to the check source on March 1. However, the "No Fail" light was still lit so the Q-105 transistor was replaced with a duplicate to restore operation of the "No Fail" circuit. When the north monitor was reassembled, the Trip 1 light was on continuously and the "No Fail" light was out. On March 2, the Q-105 and A105 operational amplifier were found to be failed, possibly due to power surges when connecting the north area monitor to the extender card. On March 4, the A105 was replaced with a duplicate. On March 5, the Q-105 was replaced. Under 10 CFR 50.59 Evaluation Number 03-04, "Repair of North Area Radiation Monitoring System Channel with Equivalent Electronic Parts," on March 14, the A105, Q102, Q103, Q104 and R171 electronic components were replaced with equivalents ordered on March 11 with the north ARM appearing to function properly but needing adjustment of the check source. On March 17, the internal source was adjusted to give an "active zero." Finally, on March 17, the quarterly calibration check and necessary adjustments (Q-2 Surveillance) were made for the north area radiation monitor to restore it to full normal operation.

Controlling Documents: Maintenance Log Page #03-06
10 CFR 50.59 Evaluation Number 03-04

7. Secondary Well Water Pump Replacement (Permanent – Closed Item)

(Modification 03-05 Evaluation Completed 11 April 2003)

On March 13, 2003, during a lengthy low power run for neutron transmission studies beginning at 922 hours, the deep well pump tripped off line at 1533 hours with power at 125 watts. Since the secondary coolant was not required for cooling, there was no trip but city water was initiated at 1535 hours to keep experiment conditions relatively unchanged. On March 14, 2003, under MLP #03-16, the 60 amp fuse in the external well pump fuse box was replaced but the pump would still not operate. Tests on the 40 amp fuses in the internal well pump fuse box were satisfactory. Subsequently, the thermal contactor in the overload protection box was reset to restore operation of the secondary pump. The maintenance item was left open to observe the secondary pump for trips possibly indicative of a pump motor winding fault with operations returned to normal. On April 3, about one hour after shutdown from full power reactor operations, the deep well pump was noted to be tripped off and it was secured. Subsequently, at 1330 hours, the thermal contactor on the overload box was reset, but at 1345 hours the secondary pump was secured after it was again found in a tripped condition. Subsequent efforts to contact Hare Well Company (previous installer) and other companies were unsuccessful. On April 4, Ripp's Pump Service visited and determined the pump was locked up. Subsequently, on April 7, Mr. Ripp and an assistant removed 126 feet of pipe and the seized pump. Subsequently, after some delays and financial arrangements and discussions, under 10 CFR 50.59 Evaluation Number 03-05, an equivalent replacement pump was installed by Ripp's service on April 11 with operability and scrams checks completed satisfactorily and the MLP closed. Subsequently, MLP #03-16 was reopened on April 25 as some verification work was performed and fuses were replaced and the secondary strainer cleaned by two PPD electricians checking the pump motor controller on April 28 under MWO #664757 and noting it is acceptable but on the high end of amperage after an overload trip.

Controlling Documents: Maintenance Log Page #03-16
10 CFR 50.59 Evaluation Number 03-05

8. Control Blade Safety-2 Clutch Replacement (Permanent – Closed Item)

(Modification 03-06 Evaluation Completed 2 July 2003)

On June 20, 2003 during the performance of the control blade drop time checks (S-1 Surveillance), the S-2 control blade was found to stick at 912 units when dropped from a height above 925 units. This was determined by removing clutch current successively from 1000 units downward until the blade would drop freely. As a note, the blade was checked to drop normally from 0 units to 900 units at 100 unit intervals. All drops were successful and, when the blade did drop from the fully withdrawn position, it did so in the usual time. Furthermore, the blade could be made to drop by removing clutch current and then reapplying clutch current, raising the blade slightly, and subsequently dropping the blade.

Troubleshooting began with an evaluation of the gearing and bearing systems associated with the S-2 blade. After review by the Reactor Staff and Facility Director it was decided that it was possible that the S-2 blade drive gear assembly unit was making an abnormal noise when dropped. Both the in-core blade and blade drive mechanisms are considered well protected from external material causing mechanical damage, so failure from foreign object intrusion was considered unlikely in either unit. Since the blade drive unit external to the biological shielding is much more accessible and far more mechanically complex, and with the added information of an unfamiliar noise emanating from the assembly, the decision was made on June 20 to disassemble and evaluate the unit. Initial checks on the right angle gear box to observe gears during a drop on June 20 revealed no problems; similarly, the voltage at the terminal box for the S-2 blade at fully withdrawn and with the clutch switch pressed were normal. At this point the S-2 blade shaft was uncoupled from the gear box for further checks.

After disassembly of the S-2 blade drive on June 23, the clutch showed obvious wear along the splined shaft and armature unit's gearing. This wear was near the leading edge of the shaft, where rapid movement is critical for prompt engagement and disengagement of the reduction gear to the clutch. With the discovery of the wear points on the clutch spline and the clear indication that all of the other gearing appeared to be in good shape, the decision was made to replace the clutch on June 23.

The clutch replacement was bought from the original manufacturer and is the same base clutch with the exception of the clutch armature. The original armature was made with a segmented face, which at the time of the outage was unavailable and would not become available for at least two weeks. The Warner Electric Company indicated that an acceptable replacement flange-mounted clutch could be obtained immediately. After much discussion with one of the Warner engineers and the local distributor (Miller Bearing – Ocala), the decision was made on June 25 to purchase the replacement and have it shipped overnight. The S-2 armature sprocket was also removed on June 25. The replacement was received at the Ocala distributor June 27 and taken to Rafferty's Machine Shop (ISO-9002 certified) in Gainesville for partial assembly. On June 27 the clutch armature assembly was also replaced on the S-2 drive mechanism shaft. On June 30 the reduction gear side of the clutch assembly was returned to the facility. This non-segmented armature performs the task correctly and is considered equivalent per 10 CFR 50.59 Evaluation Number 03-06 (Control Blade Safety-2 Clutch Replacement). At this point the clutch assembly was installed for spacing and test fit purposes and the connection wires were soldered for the electric clutch as reassembly was commenced.

Since this sticking problem was discovered during normal testing, since there had been no reactor startups for which the S-2 blade was removed to the point where it was sticking and since the ability to reach a 2% shutdown margin by driving the S-2 blade in was maintained, this event is not considered to be promptly reportable. Nevertheless, the NRC was informed of the evaluation in a call to the usual NRC Inspector (the NRC Project Manager was not available) on June 23, 2003. At month's end final reassembly and testing including a restart to 1 watt remained to be completed.

After replacement of the clutch assembly and reassembly of the clutch and gear assemblies and reattachment to the main control blade shaft, thorough testing was conducted on July 1, 2003 including 75 subsequent clutching operations on the blade per a Warner engineer's recommendation. All checks indicated normal performance.

On July 2, 2003, the weekly checkout removal time was normal (107 seconds). The controlled insertion time (S-5 Surveillance) was also normal (104 seconds). Blade drops were successful from 100 units at 100 unit intervals to full out with the drop time for full out improved from 0.85 sec on February 11, 2003 to 0.67 sec on July 2, 2003. The net result is that this modification and maintenance has corrected the problem with negligible impact on reactor safety and no impact on the health and safety of the public.

With successful completion of all checks and surveillance activities, a start up to one watt was authorized and conducted on July 2. All systems were noted to respond properly with the critical position for the control blades (S-1/S-2/S-3/RB) established at 800/800/800/346 and noted to be essentially unchanged from the previously established position (800/800/800/348) from February 14, 2003. This result verified that no reactivity measurements would be needed as a condition for return to normal operations. Subsequently the reactor was returned to normal operations on July 2, 2003 with some time spent subsequently completing documentation. The final evaluation is that this event had negligible impact on reactor safety and no impact on the health and safety of the public. A memorandum on the occurrence to the RSRS is Attachment I to the July 2003 monthly report.

Controlling Documents: Maintenance Log Page #03-30
10 CFR 50.59 Evaluation Number 03-06

9. Installation of Snubber Network to Regulating Blade bottom Limit Switches for Noise Suppression (Permanent – Closed Item)

(Modification 03-07 Evaluation Completed 7 August 2003)

On August 4, 2003, during a reactor startup, an automatic reactor period trip occurred. The blades were positioned to the following units: S1 @ 800, S2 @ 800, S3 @ 800, RB on bottom. The reactor operator pressed the "Up" button for the Regulating Blade, observing the bottom light clear. Immediately, the period meter pegged high and the period automatic full trip was initiated with all safety systems responding properly. Because the trip was from a known cause, it was not considered promptly reportable.

The cause of the trip was attributed to noise generated from the Regulating Blade bottom limit switches. Noise of this type, but not usually to this extent, has been observed in the past, especially from the Regulating Blade whose control circuit is physically closest to the wide range drawer preamplifier circuit. MLP #03-33 was opened and the cause verified to be noise from the limit switches. Under 10 CFR 50.59 Evaluation Number 03-07 (Installation of Snubber Network to Regulating Blade Bottom Limit Switches for Noise Suppression), the appropriate electrical noise suppression snubbers were identified and acquired with the

criterion that they operate passively and have no impact other than limiting noise. Noise suppressors were connected across the "NC" and "NO" contacts of the two bottom limit switches. Once connected, the suppressors were verified to allow minimal noise to be generated through these bottom limit switch contacts with little to no effect observed on the period meter when the Regulating Blade was removed for testing from its bottom limit switches on August 5, with about 70 shims performed to about 40 units with no significant noise observed on all occasions to affect the wide range drawer period meter. Subsequently, on August 7, appropriate preventive maintenance (S-1 and S-5 Surveillances for the Regulating Blade), preoperational checks, and a startup to 1 watt were performed to verify correction of the problem with the reactor restored to normal operation on August 7.

A memorandum to the RSRS describing the event and the subsequent implementation of corrective action as well as a completed UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) constitute Attachment I to the August 2003 monthly report. The final evaluation is that this trip event was from a known cause which has been corrected with the net result that the event and the subsequent modification had negligible impact on reactor safety and no impact on the health and safety of the public.

Controlling Documents: Maintenance Log Page #03-33
10 CFR 50.59 Evaluation Number 03-07

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 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.

For the 2001–2 reporting year a two-thirds time SRO/Acting Reactor Manager was available for three months of the reporting year to aid in recovery from the outage to address future the Wide Range drawer which was completed in mid October 2001 accounting for 45¼ forced outage days, subsequently there was high availability and usage for four months. However, with reduction to one-quarter time for three months for the SRO Acting Reactor Manager, and then termination at the end of February 2002, the facility was left with only one licensed SRO for the last half of the reporting year. The facility was then subjected to a number of failures, the most serious of which was failure of the fission chamber the outage for which occupied 169⅜ days through the end of the reporting year. Other significant outages were for a broken ruptured disk (6⅛ days) in December 2001/January 2002 plus an 8 day "planned" outage to repair scram annunciator light bulb holder and spacer clips in July 2002. The result was an availability of only 34.2 % for the 2001–2 reporting year.

For the 2002–3 reporting year there was no reactor manager with one part time SRO plus the Director to start the year to address the failed fission chamber extending over the first 192⅜ days of the reporting year. The part time SRO resigned effective at the end of April 2003 with two more part time student SROs licensed in late May 2003. Subsequent to the fission chamber outage availability was relatively high though outages for a failed deep well pump (8⅜ days) and for a failure of the S-2 control blade to drop (12⅜ days) contributed to nearly 232 days unavailability for the year and annual availability was attributable to limited licensed staff especially until two more part time student SROs were licensed in late May 2003. Interestingly enough the availability for the final few months of the reporting year was over 91% and the potential outage for a sticky control blade lasted on 12⅜ days in June. Nevertheless, the resultant yearly average availability for the 2002–3 reporting year was only slightly better than the previous year at 36.5% versus 34.2%.

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 three entries in Table V-2 which involved maintenance in progress at the end of the 2001–2 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. One of these three entries (MLP #02-08 to failure of the fission chamber in the wide range drawer) was closed out during the current 2002–3 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.

Similarly, three Maintenance Log Pages remain open at the end of the current 2002–3 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, and MLP #02-26 to address repair of a portable nimbin single channel analyzer and timer/counter modules. It is expected that MLP #94-14 and MLP #96-30 will be open for some time as implementation of the new area radiation monitoring system is a major modification and upgrade of the security system will be time consuming and expensive. Repair of the nimbin modules requires specialized expertise and will be expensive so it is not a high priority. However, MLP #02-26 should be closed out relatively early in the next reporting year when the electronics engineer can get to it.

TABLE V-1

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

Date		Surveillance/Check/Test Description
3 Sep 02	S-12	Semiannual Review of Requalification Training Program Binders (Due 1 July 2002).
18 Sep 02	Q-6	Quarterly Check of Posting Requirements (Due 31 August 2002).
24 Sep 02	Q-6	Quarterly Check of Posting Requirements (Partial to Post EH&S Telephone Directory and Updated Memorandum on RSRS Appointments).
6 Oct 02	Q-8	Quarterly Report of Safeguards Events (Due 1 October 2002).
9 Oct 02	Q-7	Quarterly Check of UFTR Building Fire Alarm System (Zone Upstairs Offices and Labs) (Due 30 September 2002).
9/10 Oct 02	S-6	UFTR Semiannual Security Plan Key Inventory (Due 1 October 2002).
11 Oct 02	S-3	Semiannual Inventory of Special Nuclear Material (Due 1 October 2002).
28/31 Oct 02	S-7	Semiannual Check (Replacement) of Security System Batteries (Due 31 October 2002).
30 Oct 02	Q-3	Quarterly Radiological Emergency Evacuation Drill (Due 30 September 2002).
30 Oct 02	A-5	Annual Update of UFTR Decommissioning Cost Estimate (Due 31 July 2002).
31 Oct 02	Q-9	Quarterly Calibration Check of AMS[4] and AIM3BL (Early) Air Particulate Detectors (Due 31 October 2002).

TABLE V-1

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

Date		Surveillance/Check/Test Description
1 Nov 02	Q-10	Temperature Monitor/Recorder Data Transfer for Storage (Due 1 October 2002).
5 Nov 02	S-8	Semiannual Leak Check of Neutron Sources (Due 5 October 2002).
7 Nov 02	Q-2	Quarterly Check of Area and Stack Radiation Monitors (Due 31 October 2002).
20 Nov 02	Q-4	Quarterly Radiological Survey of Unrestricted Areas (Shutdown Conditions) (Due 30 October 2002).
20 Nov 02	Q-5	Quarterly Radiological Survey of Restricted Areas (Shutdown Conditions) (Due 30 October 2002).
12 Dec 02	Q-3	Quarterly Radiological Emergency Evacuation Drill (Large Annual Drill Involving Outside Agencies as Appropriate) (Due 31 December 2002).
17 Dec 02	S-9	Semiannual Replacement of Well Pump Fuses (Due 31 December 2002).
20/23 Dec 02	S-10	Semiannual Check and Update of Emergency Call Lists (Due 26 December 2002).
24 Dec 02	Q-6	Quarterly Check of Posting Requirements (Due 30 November 2002).
26-30 Dec 02	B-6	Biennial Evaluation of Emergency Plan (Due 12 December 2002).

TABLE V-1

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

Date		Surveillance/Check/Test Description
2 Jan 03	S-7	Semiannual Check (Replacement) of Security System Batteries (Not Due – Partial to Change Out 4 Volt Rechargeable Batteries Due to Low Voltage).
3–23 Jan 03	Q-1	Quarterly Check of Scram Functions (Due 28 Feb 2002).*
4 Jan 03	Q-8	Quarterly Report of Safeguards Events (Due 1 January 2003).
6 Jan 03	A-7	Visual Inspection of Emergency SCBA MSA Model 401 Tanks (Due 1 Jan 2003).
7 Jan 03	Q-7	Quarterly Check of UFTR Building Fire Alarm System (Zone 4 – Reactor Annex) (Due 29 December 2002).
11 Jan 03	Q-6	Quarterly Check of Posting Requirements (Not Due – Partial to Post New UF Campus Directories).
24 Jan 03	S-11	Semiannual Replacement of Control Blade Clutch Current Light Bulbs (Due 31 May 2002).*
27 Jan 03	S-5	Measurement of Control Blade Controlled Insertion Times (Due 31 May 2002).*
27 Jan 03	S-1	Measurement of Control Blade Drop Times (Due 31 May 2002).*
28 Jan 03	A-2	UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (Required by New Fission Chamber Anyway) (Partial – Pre-calorimetric Calibration Checks) (Due 1 October 2002).*
29 Jan 03	Q-10	Temperature Monitor/Recorder Data Transfer for Storage (Due 1 January 2003).
30 Jan 03	Q-9	Quarterly Calibration Check of AMS[4] and AIM3BL Air Particulate Detectors (Due 31 January 2003).
30–31 Jan 03	S-2	Annual Reactivity Measurements (Worth of Control Blades, Total Excess Reactivity, Reactivity Insertion Rate and Shutdown Margin) (Partial for Worth Measurements on Regulating Blade and S-1 Blade) (Due 31 July 2002).*

TABLE V-1

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

Date		Surveillance/Check/Test Description
3 Feb 03	S-2	Annual Reactivity Measurements (Worth of Control Blades, Total Excess Reactivity, Reactivity Insertion Rate and Shutdown Margin) (Partial to Complete Worth Measurements on S-1 Blade Interrupted by Core Unstacking to Retrieve PuBe Source) (Due 31 July 2002).*
11 Feb 03	S-1	Measurement of Control Blade Drop Times (Not Due – Extra Due to Core Unstacking)
11 Feb 03	S-5	Measurement of Control Blade Controlled Insertion Times (Not Due – Extra Due to Core Unstacking)
13–14 Feb 03	S-2	Annual Reactivity Measurements (Worth of Control Blades, Total Excess Reactivity, Reactivity Insertion Rate and Shutdown Margin) (Completion Including Blade Measurements and Data Reduction) (Due 31 July 2002).*
24–28 Feb 03	A-2	UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (Required by New Fission Chamber Anyway) (Completion) (Due 1 October 2002).*
26 Feb 03	Q-6	Quarterly Check of Posting Requirements (Including Posting New Control Blade Worth Curves and Updated NRE Department Directory) (Due 28 February 2003).
27 Feb 03	Q-5	Quarterly Radiological Survey of Restricted Areas (at 95.6 kW) (Due 30 April 2002).*
27 Feb 03	Q-4	Quarterly Radiological Survey of Unrestricted Areas (at 95.6 kW) (Due 30 April 2002).*
27 Feb 03	S-4	Measurement of Argon-41 Stack Concentration (Due 28 Feb 2002).*

TABLE V-1

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

Date		Surveillance/Check/Test Description
3 Mar 03	A-3	Annual Measurement of UFTR Temperature Coefficient of Reactivity (Due 31 August 2002).*
3/17 Mar 03	Q-2	Calibration Check of Area and Stack Radiation Monitors (Due 31 January 2003).
3 Mar 03	S-12	Review of Requalification Training Program Binders (Due 1 January 2003).
11 Mar 03	Q-4	Radiological Survey of Unrestricted Areas (Extra – Not Due).
11 Mar 03	Q-5	Radiological Survey of Restricted Areas (Extra – Not Due).
11 Mar 03	S-7	Semiannual Check (Replacement) of Security System Batteries (Partial to Change Out 4 Volt Rechargeable Batteries Due to Low Voltage) (Not Due).
12-31 Mar 03	A-1	Instrument and Test Equipment Calibration (Partial to Send Fluke 87-III for Calibration) (Due 31 January 2003).
16 Mar 03	Q-6	Check of Posting Requirements (Partial to Post Memorandum Limiting Energy Generation) (Not Due).
8 Apr 03	S-3	Semiannual Inventory of Special Nuclear Material (Due 1 April 2003).
8/9 Apr 03	S-6	UFTR Semiannual Security Plan Key Inventory (Due 1 April 2003).
8–9 Apr 03	A-1	Instrument and Test Equipment Calibration (Partial to Return Fluke 87-III from Calibration and send Omega Thermocouple reader, Kurz Minianemometer and Fluke Scopemeter for Calibration) (Due 31 January 2003).
9 Apr 03	Q-8	Quarterly Report of Safeguards Events (Due 1 April 2003).
10 Apr 03	Q-3	Radiological Emergency Evacuation Drill (Due 12 March 2003).
22 Apr 03	Q-6	Check of Posting Requirements (Partial to Post Updated EH&S Spill Emergency Procedures) (Not Due).
23 Apr 03	A-4	Check/Replacement of Fire Alarm System Monitoring Station Batteries (Due 31 March 2003).
23 Apr 03	Q-7	Check of UFTR Building Fire Alarm System (Reactor Cell and Control Room) (Due 31 March 2003).

TABLE V-1

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

Date		Surveillance/Check/Test Description
25 Apr 03	S-7	Semiannual Check (Replacement) of Security System Batteries (Due 28 April 2003).
29 Apr 03	Q-9	Calibration Check of AIM3BL Air Particulate Detectors (Due 30 April 2003).
30 Apr 03	Q-10	Temperature Monitor/Recorder Data Transfer for Storage (Due 1 April 2003).
30 Apr 03	Q-9	Calibration Check of AMS4 Air Particulate Detectors (Due 30 April 2003).
1 May 03	Q-2	Calibration Check of Area and Stack Radiation Monitors (Due 30 April 2003).
1 May 03	S-8	Leak Check of Neutron Sources (Due 30 April 2003).
2/6 May 03	Q-1	Check of Scram Functions (Due 3 April 2003).
5/23 May 03	A-1	Instrument and Test Equipment Calibration (Partial to send Omega Thermocouple Reader, Kurz Minianemometer and Fluke Scopemeter for Calibration and Check Shipping) (Due 31 January 2003).
16 May 03	Q-6	Check of Posting Requirements (Due 26 May 2003).
19 May 03	Q-6	Check of Posting Requirements (Partial to Post Updated List of Individuals Allowed to Carry Cell Keys for Drills and Emergencies) (Not Due).
2 Jun 03	A-1	Instrument and Test Equipment Calibration (Completion with Return of Omega Thermocouple Reader, Kurz Minianemometer and Fluke Scopemeter from Calibration) (Due 31 January 2003).
6/30 Jun 03	B-5	Evaluation and Recertification of Licensed Operators (Due 31 December 2002).
13 Jun 03	Q-7	Check of UFTR Building Fire Alarm System (Downstairs Labs and Offices) (Due 30 June 2003).
20 June 03	S-1	Measurement of Control Blade Drop Times (Done Early – Not Due Until August 11, 2003).

TABLE V-1

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

Date		Surveillance/Check/Test Description
20 June 03	S-5	Measurement of Control Blade Controlled Insertion Times (Done Early – Not Due Until August 11, 2003).
20 Jun 03	S-11	Replacement of Control Blade Clutch Current Light Bulbs (Due 24 June 2003).
23 Jun 03	S-2	Annual Reactivity Measurements (Worth of Control Blades, Total Excess Reactivity, Reactivity Insertion Rate and Shutdown Margin) (Not Due – Partial to Correct Error in Excess Reactivity Calculation).
27 Jun 03	A-6	Physical Inventory for Security-Related Locks/Cores (Due 31 March 2003).
2 Jul 03	S-1	Measurement of Control Blade Drop Times (Not Due – Safety 2 Blade Done Following Maintenance).
2 Jul 03	S-5	Measurement of Control Blade Controlled Insertion Times (Not Due – Safety 2 Blade Done Following Maintenance).
9 Jul 03	Q-4	Radiological Survey of Unrestricted Areas (Due 11 June 2003).
9 Jul 03	Q-5	Radiological Survey of Restricted Areas (Due 11 June 2003).
10 Jul 03	Q-9	Calibration Check of AIM3BL Air Particulate Detector (Due 29 July 2003).
15 Jul 03	Q-8	Quarterly Report of Safeguards Events (Due 1 July 2003).
23 Jul 03	Q-10	Temperature Monitor/Recorder Data Transfer for Storage (Due 1 July 2003).
24 Jul 03	S-10	Check and Update of Emergency Call Lists (Lists Updated but Not Posted) (Due 20 June 2003).
23 Jul 03	Q-2	Calibration Check of Area and Stack Radiation Monitors (Due 31 July 2003).
24 Jul 03	Q-9	Calibration Check of AMS4 Air Particulate Detector (Due 30 July 2003).
24 Jul 03	S-9	Replacement of Deep Well Secondary Pump Fuses (Due 17 June 2003).
29 Jul 03	Q-9	Calibration Check of AMS4 Air Particulate Detector (Not Due – Recalibration to Correct Sensitivity).
30 Jul 03	Q-3	Radiological Emergency Evacuation Drill (Due 30 June 2003).

TABLE V-1

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

Date		Surveillance/Check/Test Description
1 Aug 03	Q-1	Check of Scram Functions (Due 3 July 2003).
5–7 Aug 03	B-4	Evaluation of UFTR Standard Operating Procedures (Partial – 0, A, B, C Series Evaluated with Changes in Progress) (Due 30 April 2003).
7 Aug 03	S-1	Measurement of Control Blade Drop Times (Not Due – Regulating Blade Done Following Maintenance).
7 Aug 03	S-5	Measurement of Control Blade Controlled Insertion Times (Not Due – Regulating Blade Done Following Maintenance).
8 Aug 03	S-10	Check and Update of Emergency Call Lists (Complete Posting) (Due 20 June 2003).
22 Aug 03	S-4	Measurement of Argon-41 Stack Concentration (Includes Measurement of Dilution Air Flow Rate) (Due 27 August 2003).
26 Aug 03	S-7	Semiannual Check (Replacement) of Security System Batteries (Not Due – Partial to Change Out 4 Volt Rechargeable Batteries Due to Low Voltage).
26 Aug 03	S-12	Review of Requalification Training Program Binders (Due 1 July 2003).
31 Aug 03	Q-6	Check of Posting Requirements (Due 16 August 2003).

Note: An asterisk is used to indicate the surveillance was not completed within the allowable interval resulting in reactor unavailability for normal operations.

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 A-5, B-1 and B-4 surveillances, all of which were subsequently completed within the required interval.

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 2002–3 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

Technical Specifications Amendment 23 to request that the biennial fuel inspections (B-2 Surveillance) be on a five-year interval like the control blade drive system inspection (V-1 Surveillance) to reduce core entries, decrease likelihood of fuel mechanical damage and better follow ALARA principles was developed and was discussed several times with the NRC Project Manager. It was then reviewed and approved by the Reactor Safety Review Subcommittee on November 8, 2001 and then faxed to the Project Manager on November 8, 2001 and submitted to NRC on November 16. After a round of questions, the facility was informed on December 28, 2001 that the amendment was approved and should be dated December 28 and to contact the Project Manager in the New Year to get a copy. A faxed copy was received on January 3, 2002; the two approved changed pages were then inserted into the console copy of the SOP Manual as approved prior to reactor startup on January 4, 2002. The full original of the NRC approval with Tech Spec Amendment 23 package of pages 19 and 21 dated December 28, 2001 was received on January 7, 2002. This package with the two revised pages marked to agree with facility Tech Spec page markings is included in Appendix A of the 2001–2 report as distributed to all document manuals in early February 2002. There were no requests to change technical specifications during the 2002–3 reporting year.

B. Revisions to UFTR Final Safety Analysis Report (Relicensing Documentation)

The requirements for renewal of the R-56 operating license were communicated by letter dated May 3, 2002 and received on May 13, 2002. A copy of the letter is Attachment V to the May 2002 monthly report as this set of documents had to be received by NRC at least 30 days before the current license expires on August 30, 2002 in order for the license to remain effective during the relicensing review process which could require several years. The entire relicensing package was submitted to the NRC Document Control Desk with a copy to NRC Region II offices under cover letter dated July 29, 2002. This cover letter is Attachment VII to the July 2002 monthly report. The contents of the package included the following items:

- *Letter of Application* for relicensing per 10 CFR 2.104, signed by the NRE Chairman, the Dean of the College of Engineering, and the University Provost which is Attachment VIII to the July 2002 monthly report.

- Updated *Safety Analysis Report* (original and 10 copies) following the NUREG-1537 format which includes financial qualifications, environmental report information and technical specifications in the applicable portions of the report.

- Updated *Technical Specifications* (1 copy) with a separate cover letter to explain the major changes in the tech specs aside from simple reformatting and reorganization into standard form which involved a complete rewriting of the tech specs. The separate cover letter is Attachment IX to the July 2002 monthly report.

- Updated *Emergency Plan* (original) with a separate cover letter to explain changes which are relatively minor and related to changes in the Tech Specs. The separate cover letter is Attachment X to the July 2002 monthly report noting this would be proposed Revision 13 of the Emergency Plan.

- Updated *Operator Requalification and Recertification Training Program Plan* (1 copy) with a separate cover letter to explain minor changes which are again related to changes in the tech specs. The separate cover letter is Attachment XI to the July 2002 monthly report.

No documentation was included in the package for the Physical Security Plan since an approved PSP for the UFTR is on file with the NRC. The intent is that the NRC will use the existing approved security plan to support the application to relicense the UFTR.

Verification that the submittal was received to meet the application deadline for relicensing per 10 CFR 2.104 to keep the UFTR licensed during the extensive review process was made in a telephone call from the NRC Project Manager on July 31, 2002. By letter dated August 16 and received on August 26, the facility was officially notified that NRC acknowledges receipt of the application dated July 29, 2002. Furthermore, the letter states, "Since your application has been submitted at least 30 days prior to the expiration date of your license, you have satisfied the requirements of 10 CFR Part 2, Section 2.109 (10 CFR 2.109), entitled, 'Effect of Timely Renewal Application.' Accordingly, pursuant to 10 CFR 2.109, the existing license will be deemed not to have expired until the request for renewal has been finally determined." Since the letter clearly referred to the UFTR but incorrectly referenced Operating License R-130 versus R-56, the NRC Project Manager was contacted on August 27 and indicated the letter is only a courtesy and not required so the license number error is not important and the UFTR license will remain in effect past August 30, 2002. The letter acknowledging the UFTR license renewal application is Attachment III to the August 2002 monthly report.

Because of the size of this submittal, the various documents are on file and available as allowed at the facility. The letter of application for relicensing and the NRC letter of acknowledgement of receipt are contained in Appendix B of the 2001–2 annual report. After submittal some errors were noted, primarily due to computer formatting and retrieval errors made during the document

conversion process for duplication (printing) of the Final Safety Analysis Report (FSAR). There were no actual changes to the FSAR content or analysis so these changed pages were provided to NRC with a cover letter dated February 23, 2003. As allowed, this package as submitted to NRC is available for review at the UFTR facility.

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 2000–2001, 2001–2 or 2002–3 reporting years. 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 (2001–2) 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 (2002–3) 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. 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—most are intended to clean up the procedure in question, usually as a result of the biennial evaluation of procedures (B-4 Surveillance), as are all the revisions in the 2001–2 reporting year, and, in some cases, simply to update the computer medium/format of storage for the procedure. The one procedure for which a revision was generated in this reporting year was UFTR SOP-0.5, "Quality Assurance Program." The primary reason for the revision was to collect nearly forty TCNs and assure up-to-date storage format for the many surveillance data sheets it contains. A copy of this revision is available at the UFTR facility for review if desired.

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, twenty in 1999–2000, nine in 2000–2001, and twenty in 2001–2, a total of only four TCNs were issued in this 2002–3 reporting year to correct minor discrepancies or better express the unchanged intent of four different procedures including SOP-A.2 and SOP-E.4 with SOP-E.4 having had three TCNs during the reporting year. It should be noted that the TCNs usually affected only one page, 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 and even the revisions, 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 August 13, 2001, Revision 12 to the approved UFTR Emergency Plan was submitted to the NRC on August 20, 2001. Revision 12 was reviewed by UFTR management and the Reactor Safety Review Subcommittee (RSRS) to assure Revision 12 does not decrease the effectiveness of the UFTR Emergency Plan. All the changes are considered relatively minor in nature; they are the result of reviews of the Plan and our 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.

All these changes had been reviewed by UFTR management and by the Reactor Safety Review Subcommittee to assure they did 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 complete submittal is Attachment III to the August 2001 report and is contained in Appendix C of the 2001–2 annual report.

With a letter dated January 29, 2002 and received on February 4 the NRC acknowledged receipt of the letter dated August 13, 2001 which transmitted Revision 12 changes to the Emergency Plan for the University of Florida Training Reactor. The NRC letter notes that based on our determination that the changes do not decrease the overall effectiveness of our Emergency Plan, NRC approval is not required. The letter also notes that the initial screening of these changes using NUREG-0849, "Standard Review Plan for the Review and Evaluation of Emergency Plans for Research and Test Reactors," indicates them to be in accordance with 10 CFR 50.54(q) and that our plan continues to meet the requirements of Appendix E to 10 CFR Part 50. Therefore, implementation of these changes would be subject to inspection to confirm that they did not decrease the effectiveness of our Emergency Plan. A copy of this letter is Attachment IV to the February 2002 monthly report. Subsequently, with a distribution memorandum dated February 11, 2002, the

changes were distributed internally to be inserted in facility copies of the Emergency Plan and externally to all holders of the Emergency Plan to implement this change fully. All facility copies of the Emergency Plan were updated by February 14, 2002 to implement fully Revision 12.

There were no further revisions of the Emergency Plan generated during the 2002–3 reporting year.

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 though a number of so-called compensatory measures have been and are being generated and/or are under consideration as a result of NRC efforts to address heightened security concerns.

G. Biennial Reactor Operator Requalification and Recertification Program

The existing operator requalification and recertification program training cycle for the University of Florida Training Reactor as submitted with a letter dated May 10, 2001 was scheduled to end in June 2003. Therefore, it was proposed to renew the current plan with minor changes. The revised plan is essentially the same as that currently being used for the two-year training cycle except for date changes. A copy of this renewed plan was submitted to NRC on June 10, 2003 with a letter dated June 6, 2003. The renewed plan will cover the UFTR operator requalification and recertification training program from July 2003 through June 2005. As indicated in the letter to NRC, the UFTR facility plans to continue using this proposed program beyond the next two-year cycle; that is, we will automatically restart the same two-year requalification and recertification program training cycle every two years. By letter dated July 15, 2003 and received on July 21, 2003, NRC Project Manager Al Adams indicated that the plan had been reviewed and NRC had concluded the proposed changes meet the applicable requirements of 10 CFR 55 and are acceptable. The complete submission to NRC is contained in **Appendix A** of this annual report along with the letter from NRC.

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. This ALARA Program was updated via Revision 1 in August 2002 to remain consistent with the University Program. Though the changes are considered minor, a copy of the revised ALARA Program was contained in Appendix D of the 2001–2 annual report with no changes occurring in the current 2002–3 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, 2000–2001, 2001–2 or 2002–3 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 2002 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 27, 2002 with a letter dated March 27, 2002 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 update in April 2005. The proposal cover letter and the updated schedule are available for examination at the facility.

By email dated July 22, 2002, a DOE DDR Program Manager, transmitted a summary report of fuel assemblies received and projected receipts through 2035 and asked for an update. From the data table, it was not possible to determine if UFTR fuel was included. Therefore, the current UFTR status was communicated indicating that after relicensing submittal, the facility would hope to do an HEU to LEU conversion sometime in the not too distant future, probably in 2004. She indicated that they were showing the UFTR shipping 24 assemblies in 2004 and asked if this was correct to which the reply was that it probably was correct as far as we can tell subject to relicensing uncertainty and DOE support. At the TRTR meeting in Salt Lake City on November 12, 2002, a DOE representative asked that he be sent a copy of the UFTR letter requesting relicensing so they would have justification to include the UFTR in new fuel manufacturing plans so a copy of the relicensing request was provided.

As required, the 2003 updated proposal on the HEU-to-LEU conversion to meet requirements of 10 CFR 50.64(c)(2) was not submitted by March 27, 2003 due to an oversight. It was finally submitted to NRC with a letter dated April 3, 2003. This letter contained the usual summary and reasons for delays and indicated the updated proposal for the conversion schedule is dependent upon DOE support. The letter with the proposal notes that the entire package will be assembled for submission to NRC within two months of DOE indicating LEU fuel will be made available with the project progressing as predicted in the enclosed updated proposal. Currently, as noted in the proposal, DOE has indicated there is no money for conversion in fiscal year 2002 (Phase II) and they are not sure about 2003 as they had indicated plans to wait until the UFTR would submit a timely relicensing package for its R-56 license which occurred by letter dated July 29, 2002 in the 2001–2 reporting year. The submittal to NRC is to be prepared and submitted whenever DOE provides the conversion money and subsequently the replacement LEU fuel will be made available, although DOE has been noncommital due to budget limitations. Nevertheless, the facility expects to complete a submission within two months of DOE indicating availability of support. The latest proposal cover letter and the updated schedule are Attachment IV to the April 2003 monthly report and are available for examination at the facility.

K. Quality Assurance Program Approval for Radioactive Material Package

There was no activity since closeout of the SNM-1050 license in the previous reporting year.

On March 14, 2003, an NRC NMSS representative called to check on the proper contact to send notification that the approved QA Program for Part 71 activities was due to expire on May 31, 2003 so he was updated on the proper contact. The QA Program Approval Expiration Notice dated March 28, 2003 was received on April 3, 2003 and is Attachment V to the April 2003 monthly report and is contained in **Appendix B** of this annual report.

TABLE VI-1

LISTING OF APPROVED UFTR STANDARD OPERATING PROCEDURES
(as of August 31, 2002)

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 1, 4/02)
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, 2002)

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 4, 10/01)
D.4 Removing Irradiated Samples from UFTR Experimental Ports (REV 7, 10/01)
D.5 UFTR Reactor Waste Shipments: Preparations and Transfer (REV 2, 6/02)
D.6 Control of UFTR Radioactive Material Transfers (REV 1, 4/00)
D.7 Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater (REV 1, 4/02)

E. MAINTENANCE PROCEDURES

E.1 Changing Primary Purification Demineralizer Resins (REV 5, 11/99)
E.2 Alterations to Reactor Shielding and Graphite Configuration (REV 4, 4/02)
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 1, 4/02)

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 3, 4/02)
F.8 UFTR Safeguards Reporting Requirements (REV 1, 12/97)

TABLE VI-2

LISTING OF APPROVED UFTR STANDARD OPERATING PROCEDURES
(as of August 31, 2003)

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 3, 2/03)
O.6 Reactor Trip and Unscheduled Shutdown Review and Evaluation (REV 1, 4/02)
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

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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, 2003)

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 4, 10/01)
D.4 Removing Irradiated Samples from UFTR Experimental Ports (REV 7, 10/01)
D.5 UFTR Reactor Waste Shipments: Preparations and Transfer (REV 2, 6/02)
D.6 Control of UFTR Radioactive Material Transfers (REV 1, 4/00)
D.7 Circulation, Sampling, Analysis, and Discharge of Holdup Tank Wastewater (REV 1, 4/02)

E. MAINTENANCE PROCEDURES

E.1 Changing Primary Purification Demineralizer Resins (REV 5, 11/99)
E.2 Alterations to Reactor Shielding and Graphite Configuration (REV 4, 4/02)
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)
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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 3, 4/02)
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 2002	0.0000×10^{6} μCi/Month	0.0000×10^{-9} μCi/ml
October 2002	0.0000×10^{6} μCi/Month	0.0000×10^{-9} μCi/ml
November 2002	0.0000×10^{6} μCi/Month	0.0000×10^{-9} μCi/ml
December 2002	0.0000×10^{6} μCi/Month	0.0000×10^{-9} μCi/ml
January 2003	0.0000×10^{6} μCi/Month	0.0000×10^{-9} μCi/ml
February 2003	6.3449×10^{6} μCi/Month	2.0747×10^{-9} μCi/ml
March 2003	10.1354×10^{6} μCi/Month	3.3141×10^{-9} μCi/ml
April 2003	2.2149×10^{6} μCi/Month	7.2424×10^{-9} μCi/ml
May 2003	9.1842×10^{6} μCi/Month	3.0031×10^{-9} μCi/ml
June 2003	8.5274×10^{6} μCi/Month	2.7883×10^{-9} μCi/ml
July 2003	8.7199×10^{6} μCi/Month	2.8513×10^{-9} μCi/ml
August 2003	4.7701×10^{6} μCi/Month	1.5471×10^{-9} μCi/ml

TOTAL ARGON-41 Releases for the Reporting Year: 49.8968 Ci

YEARLY AVERAGE ARGON-41 Release Concentration: 1.9018×10^{-9} μCi/ml

UFTR Technical Specifications require the average Argon-41 release concentration averaged over a month to be less than 1.0×10^{-8} μCi/ml. All such monthly values are measured to be well below this limiting release concentration with an average monthly release concentration of 1.9018×10^{-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 75% of the allowable limit and the second highest is less than 34% 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. 2002 - Jan. 2003	4054.51 μCi/kW-hr	10.400×10^{-8} μCi/ml
Feb. 2003- July 2003	4753.01 μCi/kW-hr	11.190×10^{-8} μCi/ml
Aug. 2003	3756.78 μCi/kW-hr	8.773×10^{-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 2.67×10^{-8} μCi/ml (β-γ) and 7.78×10^{-9} μCi/ml (α) for this 2002-2003 reporting period. There were two discharges from the Wastewater Holdup Tank for this reporting period. On November 11, 2002, a total of 3306 liters were discharged. The discharge contained less than 1.00×10^{-3} μCi of Total Activity, less than 1.00×10^{-3} μCi of Dissolved Activity, and less than 1.00×10^{-3} μCi Activity of Suspended Solids all of which were less than the Lower Limit of Detection. On August 6, 2003, a total of 3514 liters were discharged. The discharge contained less than 8.83×10^{-10} μCi of Total Activity, less than 1.00×10^{-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 two shipments of solid waste from the UFTR were on December 10, 1985 and June 20, 2002. The shipment of solid waste that was made on December 10, 1985 was 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 had been planned for about fifteen reporting years to remove all of the products resulting from the control blade restoration and maintenance project of 1985–1986, this shipment had not occurred prior to the 2001–2 reporting year. With waste consolidated for shipment to clear space for waste expected to be generated during the UFTR conversion from HEU to LEU fuel expected within the next five 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 was updated and used along with guidance provided in several NRC Information Notices published in the last several years to assure proper control of the waste shipment so for the 2001–2 reporting year, the UFTR facility shipped fourteen 55-gallon drums containing radioactive scrap metal parts, paper, plastic, protective clothing, and other reactor-related waste materials on June 20, 2002. Table VII-3 gives the total activity for each of the 14 drums that were shipped out to the centralized radioactive waste handling facility on the University of Florida campus.

No waste has been shipped since the 2001–2 reporting year.

TABLE VII-3

RADIOACTIVE REACTOR WASTE

Container	Cobalt -60 Total Activity (μCi)	Silver-110 Total Activity (μCi)
1	18.7	
2	499.9	1.7
3	12.2	
4	28.8	
5	9.9	
6	6.6	
7	13.6	
8	9.4	
9	6.2	
10	17.3	
11	19.9	
12	12.8	
13	12.5	
14	7.4	

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 2002 to August 2003 along with months for non-zero values are summarized in Table VII-4A. Overall, the values in Tables VII-4A and VII-4B 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-4B. The values recorded in Tables VII-4A and VII-4B are considered to support the conclusion of minimal environmental exposures from UFTR operations.

TABLE VII-4A

CUMULATIVE RESULTS OF ENVIRONMENTAL MONITORING
SEPTEMBER 1, 2002 TO AUGUST 31, 2003

TLD Designation	Total Exposure (mrem) [1]	Month(s) of Exposure
1	16	9/02, 12/02, 3/03, 4/03,5/03,6/03,7/03
2	5	6/03,7/03
3	M	--
4	M	--
5	7	3/03,4/03,6/03
6	M	--
7	4	4/03, 6/03
8	5	3/03
9	M	--
10	M	--
11	4	3/03
12	11	12/02, 3/03, 4/03
13	M	--

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

TABLE VII-4B

LUXEL DOSIMETER
EXPOSURE RECORD BY MONTH OF EXPOSURE [1]

TLD Number	Sep 02 (mrem)	Oct 02 (mrem)	Nov 02 (mrem)	Dec 02 (mrem)	Jan 03 (mrem)	Feb 03 (mrem)	Mar 03 (mrem)	Apr 03 (mrem)	May 03 (mrem)	Jun 03 (mrem)	Jul 03 (mrem)	Aug 03 (mrem)
1	1	M	M	2	M	M	5	4	2	2	1	M
2	M	M	M	M	M	M	M	M	M	3	2	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	M	M	M	M	M	M	1	3	M	3	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	M	M	M	M	M	M	M	1	M	3	M	M
8	M	M	M	M	M	M	5	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	4	M	M	M	M	M
12	M	M	M	7	M	M	2	2	M	M	M	M
13	M	M	M	M	M	M	M	M	M	M	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-5 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-5

ANNUAL UFTR PERSONNEL EXPOSURE

Name	Position	Permanent Badge Exposure (mrem) [1,2]
W. Vernetson	Facility Director/ Senior Reactor Operator	M
A. Vierbicky	Senior Reactor Operator	5
C. Hartsock	Senior Reactor Operator	M
B. Shea	Senior Reactor Operator	4
M. Berglund	Senior Reactor Operator Trainee (1/03-8/03)	M

[1]The exposure recorded here is for deep/whole-body dose.
[2]M denotes minimal (<1 mrem) exposure.

Table VII-6 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 and in most cases are minimal.

TABLE VII-6

ANNUAL NON-PERMANENT UFTR PERSONNEL EXPOSURE

Name	Position	Permanent Badge Exposure (mrem) [1,2]
M. Fensin	NAA Lab/Reactor Facility Technician	2
J. Hurtado	NAA Lab/Reactor Facility Technician	M
B. Addicott	NAA Lab/Reactor Facility Technician	M
D. Kruegel	NAA Lab/Reactor Facility Technician	4
C. Acosta	NAA Lab/Reactor Facility Technician	M

[1]The exposure recorded here is for deep/whole-body dose.
[2]M denotes minimal (<1 mrem) exposure.

Table VII-7 lists the Radiation Work Permits opened and worked for the 2002-2003 reporting year. Table VII-8 lists doses for RWP 03-04-I which is the only Radiation Work Permit for which personnel had measurable doses. All Radiation Work Permits are available at the UFTR facility.

TABLE VII-7

RADIATION WORK PERMITS
SEPTEMBER 1, 2002 TO AUGUST 31, 2003

Date	Serial Number	Job Description
01/14/2003	03-01-I	Replace Primary Coolant Flow/No Flow Detector
01/23/2003	03-02-I	Replace Primary Coolant Flow Bonnet
02/05/2003	03-03-I	Removal of Center Shield Plugs
02/11/2003	03-04-I	Removal of Reactor Shield Blocks for PuBe Source Retrieval
04/22/2003	03-05-II	Rabbit System Temporary Shield Block Removal
05/14/2003	03-06-II	Rabbit System Temporary Shield Block Removal

All personnel involved in the unstacking of the reactor shielding and graphite blocks in the thermal column to replace the fission chamber were monitored using prompt-reading dosimeters. During this project four different people received measurable exposures. The exposures are indicated in Table VII-8.

TABLE VII-8

RADIATION EXPOSURE ACQUIRED DURING THE RWP 03-04-I
REMOVAL of REACTOR SHIELD
BLOCKS for PuBe SOURCE RETRIEVAL
FEBRUARY 2003

Name	Exposure
UFTR Personnel:	
B. Shea	2 mR (whole body)
A. Vierbicky	10 mR (whole body)

Table VII-9 lists the prompt reading dosimeter exposures recorded for visitors, students, or other non-permanent UFTR personnel. Few individuals had greater than 1 mrem prompt reading dosimeter exposure measurement over the entire reporting period as indicated in Table VII-9.

TABLE VII-9

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

Personnel[1]	Date	Exposure (mrem) [1]	Comments
C. Bassett	01/15/2003	5	NRC Inspector
S. Turner	05/29/2003	3	Experimenter
J. Musser	05/29/2003	2	Experimenter
M. Perrotti	05/29/2003	3	Experimenter

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

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

BIENNIAL REACTOR OPERATOR
REQUALIFICATION AND RECERTIFICATION
PROGRAM

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

June 6, 2003

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

Requalification Training Program

University of Florida Training Reactor, Facility License R-56, Docket No. 50-83

The current operator requalification and recertification program training cycle for the University of Florida Training Reactor as submitted with a letter dated May 10, 2001 is scheduled to end in June 2003. Therefore, we propose to renew the current plan with only minor changes to update to new dates reflecting the next two-year training cycle. The revised plan will be essentially the same as that currently being used. A copy of the revised "University of Florida Training Reactor Operator Requalification and Recertification Program Plan" dated June 6, 2003 is enclosed and will be effective from July 2003 through June 2005. It should also be noted that a significantly revised program will be implemented when the UFTR is relicensed per submissions in July 2002 as part of the UFTR relicensing submittal and revised technical specifications.

As usual, we plan to continue using this proposed program beyond the next two-year cycle; that is, we will automatically restart the same two-year requalification and recertification program training cycle beginning in July 2005 and again every two years thereafter. If you need further information on this plan or the proposed usage of it for all future two-year training cycles, please let us know.

Sincerely,

William G. Vernetson
Director of Nuclear Facilities

WGV/dms
Enclosure

cc: A. Adams, NRC
Reactor Safety Review Subcommittee

Sworn and subscribed this 9th day of June 2003.

Daniel J. Sanetz
MY COMMISSION # DD061176 EXPIRES
September 30, 2005
BONDED THRU TROY FAIN INSURANCE, INC.

Notary Public

UNIVERSITY OF FLORIDA TRAINING REACTOR

OPERATOR REQUALIFICATION AND

RECERTIFICATION TRAINING PROGRAM PLAN

JULY 2003 through JUNE 2005

Submitted by

Dr. William G. Vernetson

Director of Nuclear Facilities

Department of Nuclear and Radiological Engineering

University of Florida

Gainesville, Florida

JUNE 6, 2003

OPERATOR REQUALIFICATION AND RECERTIFICATION

TRAINING PROGRAM PLAN

(July 2003 through June 2005)

1.0 GENERAL

A training program for the periodic requalification of UFTR operators shall be conducted in accordance with the requirements established by this document. The requalification and recertification training for UFTR personnel meets or exceeds the requalification training requirements established by 10 CFR 55 and the ANSI/ANS-15.4-1988 standard entitled, "Selection and Training of Personnel for Research Reactors."

The objectives of this program are to refresh in areas of infrequent operation, to review facility and procedure changes, to address subject matters not usually reinforced by direct use, and to improve in areas of performance or knowledge weakness. The Program is designed to evaluate an operator's knowledge and proficiency for his duties and to provide and assure retraining where necessary in order to assure improvement. Emphasis is on those subjects considered necessary for continued proficiency. In addition, the Program takes into consideration the specialized nature and mode of operation of the UFTR as well as the background, skill, degree of responsibility, and participation of certified personnel in related facility activities. The Program also reflects facility modifications and changes in procedures.

Responsibility for the administration of the program shall rest with the Director of Nuclear Facilities for the Department of Nuclear and Radiological Engineering and his/her duly designated representative. Requalification examinations shall be administered by one knowledgeable of facility operation and applicable subject matter.

All licensed and certified operators are required to participate in all phases of this program except where specifically exempted. Normally exemptions are allowed only for the individual responsible to produce and administer the examinations. Persons in training for an operator's license also participate in the requalification program. An operator receiving a license during a requalification period is required to complete only those portions occurring after the effective date of the license received.

The requalification training program effective at the UFTR shall consist of ten (10) component areas described in the following sections and listed in Table 1. The requirements that must be met in order to complete the requalification program successfully are delineated in these sections.

Table 1

Operator Requalification and Recertification Program Requirement Areas

1. Requalification Schedule
2. Lectures, Reviews and Examinations
3. Operations and Checkouts
4. Emergency Drills
5. Absence from Authorized Activities
6. Evaluation and Retraining of Operators
7. Certification
8. Requalification Documentation and Records
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1.1 REQUALIFICATION SCHEDULE

The UFTR requalification and recertification training program shall be conducted biennially and shall be followed by successive two-year programs. To assure that the program is effective, the various requirements should be executed according to the time schedules outlined in this program guide. The current two-year Requalification Training Schedule (July 2003 - June 2005) is contained in Appendix A of this Program Plan.

1.2 LECTURES, REVIEWS AND EXAMINATIONS

1.2.1 Lectures

The requalification and recertification training program is divided into the group of topics listed below in Table 2, for which preplanned training or preparation is scheduled. The schedule is set up so that the entire program covering the topics listed in Table 2 is completed over the two year period.

Table 2

Requalification Training Lecture Program Topics

1. Nuclear Theory and Principles of Operation
2. Design and Operating Characteristics
3. Instrumentation and Control Systems
4. Reactor Protection System
5. Normal, Abnormal and Emergency Operating Procedures (all procedures are covered once in the two-year period, independent of special training on significant changes and independent of emergency drills)
6. Radiation Control and Safety
7. Technical Specifications and Applicable Portions of Title 10, Code of Federal Regulations
8. Emergency Plan
9. Security Plan (including security response procedures)

Self-study methods are also considered to be an adequate and appropriate training method for the lecture program topics when learning objectives are properly measured by examination or documentation of expertise. Self-study methods are especially advised in combination with lectures.

1.2.2 Examinations

1.2.2.1 Lecture Program Topics

An examination shall be administered at the end of each lecture session listed in Table 2; each examination should be administered no later than four weeks after the lecture or review session. For designated cases, a final examination covering all topics in a series of lectures may be substituted for individual examinations. Results of the certified individual's evaluation from the examinations is used as one input to determine the operator's proficiency, weakness or deficiency.

Examination is encouraged but not required for training sessions given but not required by this program.

The individual responsible for developing the examinations for the requalification program may be exempted from the examination. This exemption should be rotated among the eligible staff members as appropriate.

1.2.2.2 Biennial Comprehensive Examination

A comprehensive requalification written examination shall be required for all operators on a biennial schedule. A lecture may be given prior to this examination but is not required.

1.2.2.3 Annual Operations Test

Each reactor operator and senior reactor operator is required to take an annual operations test to demonstrate operational proficiency and understanding of system responses. This examination is administered by a designated Senior Reactor Operator.

1.2.2.4 Annual Walk-through Examination

Each licensed Reactor Operator and Senior Reactor Operator shall demonstrate satisfactory understanding of the operation of the facility systems, operating procedures and license as well as facility procedure and license changes during an annual walk-through examination administered by a designated Senior Reactor Operator.

1.2.3 Fuel Handling

Practical training in fuel handling shall be conducted biennially. Prior to any refueling operation and/or fuel handling operation, a special training session shall be held discussing/practicing the required operations and reviewing procedures to assure proficiency of all personnel involved, including emergency actions. This training may be credited as the required biennial fuel handling practical training.

1.2.4 Procedure/Technical Specifications Changes

Any changes in procedures, technical specifications, regulations, as well as any change with safety significance to the facility shall be reviewed by every licensed operator. Any procedural changes will be distributed directly to all licensed reactor operators and discussed as needed. Furthermore, a written monthly report

summarizing the activities in the reactor facility, including modifications, maintenance, results of calibrations and tests, as well as significant occurrences such as potential violations, failures of systems, etc. will be made available as required reading for all licensed operators.

1.2.5 Required Reading List

Documents, letters and memos pertinent to operational safety shall be maintained in the Required Reading List prior to permanent filing. Each operator is responsible for reviewing the list periodically and in a timely manner to remain current with the information contained in the Required Reading List. This reading list will be indexed with a master listing with spaces provided for initials of all required readers. This list should be reviewed at intervals not to exceed one month; when an item has been reviewed, the proper initials should be affixed to acknowledge completion of review.

1.2.6 Yearly Review

A yearly review of facility operations, maintenance, modifications, etc. is conducted with the operating staff by the Director of Nuclear Facilities or the Reactor Manager using the UFTR Annual Report as a basis for the review. More frequent reviews may be conducted as appropriate.

1.3 REQUALIFICATION OPERATIONS AND CHECKOUTS

1.3.1 Reactivity Control Manipulations

Over the two year requalification period, each certified individual shall perform at least ten reactivity control manipulations in any combination of reactor startups, shutdowns, or significant reactivity changes.

1.3.2 Schedule of Operations and Checkouts

To insure operator proficiency over a range of ordinary operations, the following schedule of operations and checkouts shall be maintained by all licensed operators when the reactor is operable.

1.3.2.1 Startups and Shutdowns

Each licensed operator shall perform at least one reactor startup quarterly at intervals not to exceed four months. This operation shall include at least one additional reactivity manipulation on a quarterly basis.

1.3.2.2 Daily Checkouts

Each licensed operator shall perform at least one daily checkout quarterly at intervals not to exceed four months.

1.3.2.3 Weekly Checkouts

Each licensed operator shall perform at least one weekly checkout semi-annually at intervals not to exceed eight months.

1.3.2.4 Quarterly Licensed Activities

To maintain certification, each licensed reactor operator shall exercise his/her operator's license for a minimum of four (4) hours of licensed activities during each calendar quarter.

1.3.2.5 Remediation Requirements

Any operator who fails to perform the required licensed activities listed in Section 1.3.2.1 through 1.3.2.4 must receive supervised practical training to meet each of these requirements prior to resuming solo operation for certified activities. In particular, if the requirement to exercise the operator's license for a minimum of four (4) hours of licensed activities during each calendar quarter is not met, then the license becomes inactive; prior to reactivation of the license (recertification), the Reactor Manager or alternate must verify that qualifications are current and the operator must perform six (6) hours of licensed activities under the direction of a licensed operator or senior reactor operator.

1.3.2.6 On-the-Job Training

The specific operational practices delineated in this Training Program Plan including the annual operations test, the annual walk-through examination, and the requirements for conducting facility checkouts, startups, shutdowns, reactivity manipulations including at least four (4) hours of certified activities per calendar quarter constitute the bulk of the operator on-the-job training requirements. In addition, the biennial fuel handling training as well as semi-annual training on emergency response equipment, quarterly emergency drills, and annual special equipment training are also considered a major portion of the practical on-the-job training and are considered adequate to assure safe operation of the facility.

1.3.3 Credit for Reactivity Control Manipulations

For the purpose of meeting minimum requalification and recertification requirements, other than the four (4) hours of licensed activities required per Section 1.3.2.4, each licensed operator may take credit only for reactivity control manipulations which they perform themselves. For senior reactor operators, direct supervision of these operations may be considered equivalent to actual performance.

1.3.4 Records

It is the responsibility of each operator to insure that Requalification Training Program's training requirements are met and logged in the operator's Requalification Notebook. Each operator shall also be responsible to ensure that monthly operating hours are logged in the same notebook.

1.4 EMERGENCY DRILLS

1.4.1 Scheduling and Participation

Emergency drills shall be held quarterly, per UFTR Technical Specifications Section 4.2.6(3). At least once per year these drills shall involve the participation of the University Police Department, the Gainesville Fire Department and other emergency assistance teams as appropriate for the drill in question. Each operator is required to participate in two emergency drills per year at intervals not to exceed eight months.

Any operator failing to meet this two-drill requirement must receive special training on proper response to emergencies and must receive a documented review of the last drill missed as well as a walk-through of the facility related to proper emergency responses. This remediation shall be conducted prior to performing certified activities.

1.4.2 Postdrill Critique

A review of the drill and applicable emergency procedures shall be performed with all certified individuals within 30 days after completion of the drill. This review should include any deficiencies as well as recommendations for improvement and is normally conducted immediately after the drill for all operators and other staff and radiation control personnel involved in the drill. Nonparticipating certified individuals may perform this review using the drill record in the required reading file or participate in a special training session. Documentation is provided via initials in the Required Reading List or on forms documenting special training sessions.

1.5 ABSENCE FROM AUTHORIZED ACTIVITIES

An operator who has not been actively performing certified functions for a period in excess of four months shall be required to demonstrate to the Reactor Manager or duly authorized representative that his/her knowledge and understanding of the operation and administration of the facility are satisfactory before returning to certified duties. This shall be accomplished through an interview and evaluation or a written, oral or operational examination or a suitable combination thereof. Any deficiencies uncovered must be corrected before the individual resumes performance of certified functions.

1.6 EVALUATION AND RETRAINING OF OPERATORS

1.6.1 Grade Requirements

The acceptance criterion on all graded examinations shall be 80%; all operators are required to complete each examination satisfactorily according to the following requirements:

1.6.1.1 A score on the written or other examinations equal to or greater than 80% may require no additional training. Nevertheless, the results of all examinations to include missed questions should be reviewed with the operator to assure proper understanding.

1.6.1.2 A score on the written or other examination in the range of 65%-79% requires additional training in those areas or topics where weaknesses or deficiencies are indicated. This retraining and retesting shall be completed within 60 days from the date the examination was administered and prior to the candidate being recertified. In this case the candidate need not be removed from licensed duties subject to the evaluation of the Reactor Manager or his/her duly authorized representative.

1.6.1.3 A score on the written or other examination of less than 65% requires that an evaluation be performed by the Facility Director or designated representative within one month. The evaluation shall determine if the deficiencies require that the individual's certification be withdrawn pending completion of any accelerated retraining effort. The evaluation shall take into account the individual's past performance record, the supervisor's evaluation, and past test scores as well as current deficiencies. Additional oral or operational examinations may also be given to aid in the evaluation. In any case certification shall be withdrawn within four months if the candidate does not achieve passing scores after reexamination.

1.6.2 Accelerated Training

Accelerated training programs shall be completed within four months following the grading of an examination. Furthermore, within one month after the grading of the examination, there shall be an evaluation by the Reactor Manager or a designated representative to determine if the deficiencies uncovered warrant withdrawal of the individual's certification pending completion of the accelerated training program. The evaluation shall consider the individual's past performance record, the supervisor's evaluation and past test scores as well as current deficiencies. Additional oral or operational exams may also be given to aid in the evaluation.

1.6.3 Additional Training Requirements

Additional training shall be provided whenever needed to correct weaknesses or deficiencies uncovered. Such additional training shall be completed prior to the conclusion of the specific requalification program or application for renewal of operator's license, whichever occurs first.

Additional appropriate training requirements in the form of formal lectures, tutoring, self-study or on-the-job training shall be based on the results of examinations conducted.

1.6.4 Deficiencies Affecting Safety

Regardless of the score, if the individual's test indicates a deficiency in a critical area that affects safety, training shall be promptly administered to correct the deficiency or the operator will be removed from performing certified duties in the affected area until the deficiency is corrected.

1.6.5 Evaluation Via Annual Examinations

The annual operations test and the annual walk-through examination are key factors in evaluating the continued competence of the certified operator both for demonstrating operational proficiency and understanding of system responses and for demonstrating overall satisfactory understanding of the operations of the facility, operating procedures and facility license changes. The results of these two examinations should be utilized as primary input for evaluating operator performance for recertification purposes.

1.6.6 Biennial Evaluations

An in-depth evaluation of the operating performance of each licensed operator shall be performed and documented biennially as a minimum by a summary and judgmental statements. The operational evaluation provides an estimate of the knowledge, competence and dexterity of the operator to operate the reactor safely and to take appropriate actions in response to abnormal and emergency situations that may arise. Additional operational training shall be provided to correct performance weaknesses that may be identified.

The biennial evaluation shall include results from the written examinations, the annual operations test, the annual walk-through examination and other on-the-job evaluation of operational proficiency as well as any other available indications of the operator's capability to discharge his/her duties in a safe and competent manner including participation in practical and special training, instructional activities and other work activities.

1.6.7 Additional Evaluations

An evaluation shall be made of an operator at any time his/her physical or mental condition appears impaired in a manner that his/her performance of duties as an operator appears to be affected. Any exemplary performances or additional duties performed by an operator should be noted in his/her Requalificational Folder/ Notebook to aid later evaluations.

1.7 RECERTIFICATION

1.7.1 Certified individuals who have successfully completed the requalification program may be recertified by the Facility Director or designated alternate.

1.7.2 All certified individuals must be cognizant of facility technical specifications, design and procedure changes in a timely manner.

1.8 REQUALIFICATION DOCUMENTATION AND RECORDS

1.8.1 Operator Requalification Records

Operator requalification records shall be kept to assure that all the requirements of the "UFTR Operator Requalification and Recertification Program Plan" are met.

Each operator shall have an individual folder or notebook containing signature blocks for lectures attended, prepared or assigned self-study sessions, reactivity manipulations performed, weekly and daily checkouts performed, and quarterly drills participated in by the operator. The notebook shall also contain copies of written examinations administered, the answers given by the operator, results of any evaluations and documentation of any additional training administered in areas in which an operator has exhibited deficiencies. The performance of, or participation in, special training such as for fuel handling, use of emergency equipment, crane operation, etc., should also be logged in the applicable Requalification Notebook.

1.8.2 Requalification Training Manual

A Master Requalification Training Manual will be used to organize training requirements; this manual shall contain a schedule of all required lectures, reviews, emergency drills, and other exercises. The date the item is performed shall be indicated in this manual. A section of this manual shall be designated to contain completed training items, attendance sheets, master copies of tests given and lecture outlines if available.

A separate section of this manual shall also indicate operator license amendment commitments and the dates for each including relicense dates for all licensed operators.

1.8.3 Records Retention

Required documents and records pertaining to the Requalification and Recertification Program shall be maintained at the UFTR as part of the facility records for at least six years. Per 10 CFR 55.59(5)(i), these records including the master training file shall be retained for each reactor operator or senior reactor operator until the respective operator's license is renewed or surrendered.

1.9 REQUALIFICATION DOCUMENT REVIEW AND AUDIT

The individual Requalification Folders or Notebooks shall be reviewed on a semi-annual basis, at intervals not to exceed eight (8) months, by a designated Senior Reactor Operator and shall be noted by the inclusion of the SRO's dated signature. Any deficiencies noted during the review shall be brought to the attention of the Director of Nuclear Facilities or the Reactor Manager who will then insure that appropriate corrective action is taken.

An audit of requalification program records shall be conducted by the Reactor Safety Review Subcommittee (RSRS) biennially at intervals not to exceed thirty (30) months. Such an audit should be performed annually at intervals not to exceed fifteen (15) months. All such audits shall be documented by the RSRS via its audit report or equivalent document.

1.10 REFERENCES

1.10.1 Title 10 Code of Federal Regulations, Part 55, "Operators' Licenses."

1.10.2 American National Standard ANSI/ANS-15.4-1988, "Selection and Training of Personnel for Research Reactors."

APPENDIX A

UFTR REQUALIFICATION

TRAINING PROGRAM SCHEDULE

2003-04 UFTR REQUALIFICATION TRAINING SCHEDULE

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
	(L) Design and Operating Characteristics	(P) EMERGENCY DRILL	(P) Emergency Equipment Training	(L) Nuclear Theory and Principles of Operation	(P) EMERGENCY DRILL (involves outside agencies as appropriate)
			(P) Special Equipment Training (Rabbit System, Overhead Crane)		(L) Security Plan
					(I/P) Annual Operations Test
JANUARY	**FEBRUARY**	**MARCH**	**APRIL**	**MAY**	**JUNE**
	(L) Normal, Abnormal and Emergency Procedures	(P) EMERGENCY DRILL	(L) Reactor Protection System	(I) Operator Walk-through Exams	(P) EMERGENCY DRILL
	(P) Fuel Handling Training		(P) Emergency Equipment Training		
	(S) Annual Report Review				

(P) = PRACTICAL TRAINING (S) = STAFF TRAINING (I) = INDIVIDUAL TRAINING (L) LECTURE/EXAM

2004-05 UFTR REQUALIFICATION TRAINING SCHEDULE

JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
(L) Instrumentation and Control Systems	(L) Radiation Control and Safety	(P) EMERGENCY DRILL	(L) Technical Specifications		(L) Emergency Plan
			(P) Emergency Equipment Training		(P) EMERGENCY DRILL (involves outside agencies as appropriate)
			(P) Special Equipment Training (Rabbit System, Overhead Crane)		(I/P) Annual Operations Test
JANUARY	**FEBRUARY**	**MARCH**	**APRIL**	**MAY**	**JUNE**
	(I) Operator Walk-through Exams	(P) EMERGENCY DRILL	(P) Emergency Equipment Training		(P) EMERGENCY DRILL
	(S) Annual Report Review				BIENNIAL COMPREHENSIVE EXAM

(P) = PRACTICAL TRAINING (S) = STAFF TRAINING (I) = INDIVIDUAL TRAINING (L) LECTURE/EXAM

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

July 15, 2003

RECEIVED JUL 2 1 2003

Dr. William G. Vernetson
Director of Nuclear Facilities
Nuclear Reactor Facility
University of Florida
202 Nuclear Sciences Center
P.O. Box 118300
Gainesville FL 32611-1429

SUBJECT: UNIVERSITY OF FLORIDA OPERATOR REQUALIFICATION AND RECERTIFICATION TRAINING PROGRAM PLAN REVIEW (TAC NO. MB9654)

Dear Dr. Vernetson:

We have reviewed the revised Reactor Operator Requalification and Recertification Training Program Plan that you submitted by letter dated June 6, 2003. Our review concluded that these proposed changes meet the applicable requirements of 10 CFR Part 55 and are acceptable.

Sincerely,

Alexander Adams, Jr. Senior Project Manager
Research and Test Reactor Section
New, Research and Test Reactors Program
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-083

cc: Please see next page

cc:

Dr. Alireza Haghighat, Chairman
Nuclear & Radiological Engineering Department
University of Florida
202 Nuclear Sciences Center
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Administrator
Department of Environmental Regulation
Power Plant Siting Section
State of Florida
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State Planning and Development
Clearinghouse
Office of Planning and Budgeting
Executive Office of the Governor
The Capitol Building
Tallahassee, FL 32301

William Passetti, Chief
Department of Health
Bureau of Radiation Control
4052 Bald Cypress Way, Bin #C21
Tallahassee, FL 32399-1741

APPENDIX B

QUALITY ASSURANCE PROGRAM
APPROVAL EXPIRATION NOTICE

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

March 28, 2003

RECEIVED APR 0 3 2003

Dr. William G. Vernetson
University of Florida, Nuclear
Reactor Facility
Nuclear Reactor Building
Gainesville, FL 32611

SUBJECT: 10 CFR PART 71 QUALITY ASSURANCE APPROVAL EXPIRATION NOTICE

Dear Dr. Vernetson:

Your Quality Assurance (QA) Program Approval for Radioactive Material Packages No. 0578 expires on May 31, 2003.

If you are a Nuclear Regulatory Commission licensee and conduct activities under the General Licenses of Subpart C of 10 CFR Part 71, or an Agreement State Licensee subject to the requirements of 10 CFR Part 71, as required by 10 CFR 150.20, a QA Program approved by the Commission as satisfying the provisions of Subpart H of 10 CFR Part 71 is required. You should request renewal of your QA Program at least 30 days before the expiration date. This will provide for continuation of your QA Program to satisfy certain provisions of Subpart C of 10 CFR Part 71 until a final determination has been made on your application.

Please note that there is no fee required for renewal. If you do not desire to renew your QA Program, please let me know.

Sincerely,

Charles Pierson for

Robert J. Lewis, Chief
Transportation and Storage Safety
and Inspection Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket No. 71-0578