UNIVERSITY OF FLORIDA
TRAINING REACTOR
ANNUAL PROGRESS REPORT

SEPTEMBER 1, 2003 – AUGUST 31, 2004

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
TRAINING REACTOR
ANNUAL PROGRESS REPORT

SEPTEMBER 1, 2003 - AUGUST 31, 2004

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

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

December 2005

TABLE OF CONTENTS

2003–4 ANNUAL REPORT

I. INTRODUCTION

The University of Florida Training Reactor's overall utilization for the past reporting year (September 2003 through August 2004) continued to be at historically high levels of quality usage, limited only by unavailability of the reactor or necessary personnel. It was a more productive year considering that there were no excessively large outages that hampered reactor usage throughout the year after conclusion of replacement of a failed fission chamber requiring a major modification lasting over six months in the beginning 192 days of the previous reporting year. The diversity of users and usages continues to rank among the best in the history of the facility, especially considering that availability this year was back to historical levels at over 85% after being down to 36.5% in the last year after less than 35% and 59% the previous two years after the 1999–2000 reporting year's value at over 88%. The good availability was primarily due to having no excessive outages with the longest forced outage of the reporting year being 14⅜ days in July/August 2004 for a sticking Safety-2 control blade. Other significant outages were for a failed log pen on the two-pen recorder in April 2004 (5⅝ days) and for repair of a secondary cooling flow meter (3⅜ days) in October 2003. There was also a lengthy planned outage (10⅝ days) from normal operations for the annual calibration of nuclear instruments in March 2004. 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 2003–4 year one part-time SRO graduated in April 2004 but continued to be employed as he sought permanent employment in the utility industry at year's end. One part time student operator trainee continued employment throughout the year as two other ex-Navy operators were hired, one who worked almost five months and left for permanent employment in April 2004 and the other a part time student trainee who began employment in late July 2004 of this reporting year. 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. One assistant was lost at the start of the year and several part time assistants were hired but were not productive with two more hired in May/June 2004.

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. Though NRC has indicated they have begun to review the submission, there has been no other official response at year's end on the relicensing submittal.

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 the 2002–3 reporting year, the Level 1 administration of the UFTR facility was changed due to the chair of the RSRS being replaced with his alternate in November 2003 after he became ill and retired from the University. There was one other significant administrative change during the 2003–4 reporting year as the new President of the University of Florida, Dr. J. Bernard Machen, replaced Dr. Charles Young in early January 2004.

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 2003–4. 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. Only two 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 2003–4 reporting year there were no changes to the Tech Specs after Technical Specification Amendment 23 was approved and implemented in the 2001–2 reporting 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 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 of the previous reporting year. This 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 2001–2 reporting year with no changes made during the past two reporting years. A revised ALARA program was generated during the 2002–3 reporting year with no changes this year. There were also no changes to the UFTR Physical Security Plan or to the Respiratory Protection Program during the 2003–4 reporting year. The UFTR Biennial Reactor Operator Requalification and Recertification Training Program was submitted for renewal with minor changes in June 2003 of the previous reporting year for the July 1, 2003–June 30, 2005 cycle with no changes during this reporting year. The only significant reactor-related document changes in the 2003–4 reporting year involved changes to various Standard Operating Procedures. Two new procedures were generated during the 2003–4 reporting year plus eight procedures were revised during this reporting year as a result of periodic reviews. In addition thirteen temporary change notices were implemented as this was a very active year in this area.

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 2004–5 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 continues to be addressed following the return to historically expected availability during the past reporting year especially noting resource limitations, pending license renewal, anticipated 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 2003 – August 2004)
B. Shea[1]	–	Student Technician and Senior Reactor Operator (1/2 time) (September 2003 – April 30, 2004)
		Technician and Senior Reactor Operator (1/2 time) (May 1, 2004 – August 2004)
M. Berglund	–	Student Technician and Senior Reactor Operator Trainee (1/2 time) (September 2003 – August 2004)
T. Sullivan	–	Ex-Navy Technician and Senior Reactor Operator Trainee (3/4 time) (November 20, 2003 – April 2, 2004)
R. Lueg	–	Student Technician and Senior Reactor Operator Trainee (1/4 time) (July 26, 2004 – August 2004)
D. Seifert	–	Secretary (September 2003 – August 2004)
J. Hurtado, G. Marinella, G. Joseph, M. Crawford	–	Student Technicians for various parts of the year usually working in NAA Laboratory but effectively providing approximately 1/4 time commitment to reactor-related activities.

[1]B. Shea graduated with a Bachelor's Degree on April 30, 2004. He resigned his position effective May 28, 2004 but continued employment through the end of the reporting year as he sought a permanent position in industry.

B. Radiation Control Office

D. L. Munroe[2]	–	Radiation Control Officer (September 2003 – August 2004)
J. J. Parker	–	Radiation Control Technician (September 2003 – August 2004)

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 2003 – October 2003)
W. S. Properzio	–	RSRS Chairman (Specified Alternate Chair) (Professor, Environmental Engineering Sciences/ Director, Environmental Health & Safety Division) (October 2003 – August 2004)
W. G. Vernetson	–	Member (Director of Nuclear Facilities) (September 2003 – August 2004)
D. L. Munroe	–	Member (Radiation Control Officer) (September 2003 – August 2004)
J. S. Tulenko	–	Member (Professor, Nuclear and Radiological Engineering) (September 2003 – August 2004)
A. Haghighat	–	Member (Chairman, Department of Nuclear and Radiological Engineering) (September 2003 – August 2004)
D. E. Hintenlang	–	Member (Associate Professor, Department of Nuclear and Radiological Engineering) (September 2003 – August 2004)

[2]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 2003 – December 2003)
J. B. Machen	–	President, University of Florida (January 6, 2004 – August 2004)
P. P. Khargonekar	–	Dean, College of Engineering (September 2003 – August 2004)
A. Haghighat	–	Chairman, Department of Nuclear and Radiological Engineering (September 2003 – August 2004)
W. G. Vernetson	–	Director of Nuclear Facilities/Acting Reactor Manager (September 2003 – August 2004)

E. Line Responsibility for the Radiation Control Office

C. E. Young	–	President, University of Florida (September 2003 – December 2003)
J. B. Machen	–	President, University of Florida (January 6, 2004 – August 2004)
J. E. Poppell	–	Vice President, Finance & Administration (September 2003 – August 2004)
W. S. Properzio	–	Director, Environmental Health and Safety (September 2003 – August 2004)
D. L. Munroe	–	Radiation Control Officer (September 2003 – August 2004)

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 much higher availability during this 2003–4 reporting year, most indicators are up, some down for the year but with good results considering reduced availability of licensed operations staff during the reporting year efforts were made to license one individual who resigned with another near year's end. 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 seventh 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.

As noted over the last eighteen 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 continue to emphasize 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 zinc oxide 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 Spring Hill Middle School, Fort Clarke Middle School, Spruce Creek High School, Paxson High School, Lecanto High School, Barton 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 PEEK Middle School Boys Camp, Discovery Intermediate School Honors Students and Gainesville Country Day School, to Santa Fe Community College Radiography and Nuclear Medicine Technology students and teachers, Hillsborough Community College Nuclear Medicine Technology students and many other similar groups including Boy Scout Troop 432 merit badges in nuclear energy The Eye-on-Engineering High School summer camp was particularly rewarding. 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 14,536.185 kilowatt-hours energy generation is low, partially due to not having sufficient licensed operators during much of the year and continued but not particularly because of having poor overall availability which was above 85% for the year.

Table III-3 lists key-on time, experiment time, run time and availability for each month during the year. Values are very encouraging with over 272 hours of run time and a monthly average availability of only 85.11% despite relatively poor 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 Christmas Holiday in December 2003. As noted, the relatively high availability this year was primarily due to fewer and shorter forced outages, though administrative unavailability at 15.5 days is higher than in most recent years.

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 trip described in Table III-5A listed as one of these entries. Again, all ten have relatively low safety significance and essentially no impact on the health and safety of the public or reactor facility personnel.

TABLE III-1A

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED USAGE OF UFTR FACILITIES
(September 2003 – August 2004)

School	Usages*	Faculty	Students
1. Academy of Environmental Science Charter High School	2	4	68
2. Alachua County Middle Schools (Science Quest Workshop)	2	2	49
3. ANS Science Teachers Workshop	1	33	0
4. ATHENA Middle School Girls Science Workshop	1	1	10
5. Bartow High School (BHS)	1	2	1
6. Berkeley Preparatory School	1	1	0
7. Blanche Ely High School (BEHS) (COE Minority Outreach)	1	2	15
8. Boone High School – Orlando (COE Minority Outreach)	1	1	23
9. Boy Scouts of America Troop 432	4	6	20
10. Career Shadowing Day	1	1	6
11. Carnegie Science Center Science Teacher Workshop	1	34	0
12. Central Florida Community College (CFCC)	1	1	1
13. College of Engineering Recruiting Days (High School Students)	2	2	39
14. CPET Science, Engineering & Humanities Symposium	2	3	19
15. Discovery Intermediate School	2	6	25
16. Eye on Engineering Summer Camp (High School)	1	2	14
17. Florida State University	1	1	3
18. Forest High School Engineering & manufacturing Institute of	1	1	19
19 Fort Clark Middle School (FCMS)	1	3	1
20. Gainesville Country Day School (GCDS)	2	5	21
21. Graduate Student Recruiting Weekend	1	1	14
22. Graduating Senior NRE Family/Friends	2	8	5
23. Hillsborough Community College (HCC)	1	1	12
24. Howard Bishop Middle School (HBMS)	1	2	32
25. HPS Student Section Science Teachers Workshop	1	16	1
26. Indian River Community College (IRCC)	1	0	1
27. Jones High School – Orlando (COE Minority Outreach)	1	1	17
28. Lecanto High School (LHS)	23	1	5
29. Lee Middle School – Orlando (COE Minority Outreach)	1	3	24
30 Orlando memorial Middle School (COE Outreach)	1	3	24
31. Orlando Suncoast/Roosevelt/JFK Middle Schls (COE Outreach)	1	1	25
32. Outstanding High School Scholars Program	1	1	12
33. Palmer Trinity School	5	2	1
34. Paxson High School for Advanced Students	2	1	1
35. PEEK Middle School Boys Science Workshop	1	1	19
36. Pennsylvania State University (PSU)	1	0	2
37. Peidmont Lakes Middle School (COE Minority Outreach)	1	2	18
38. Proteach Student Teacher	1	1	0
39. Rensselaer Student Teacher	1	0	1
40. Ridgeland High School (RHS)	1	0	1

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

TABLE III-1A

REACTOR SHARING PROGRAM
SUMMARY OF SELECTED USAGE OF UFTR FACILITIES
(September 2003 - August 2004)

School	Usages*	Faculty	Students
41. Robert F. Munroe High School (RFMHS)	5	2	4
42. Saint Patrick Middle School (SPMS)	2	6	50
43. Santa Fe Community College (SFCC)	4	4	17
44. Spring Hill High School (SHHS)	1	2	3
45. Spruce Creek High School (SCHS)	17	4	2
46. Student Science Training Program (Summer Research)	14	3	107
47. Temple University	1	1	1
48. University of Central Florida (UCF)	8	4	2
49. University of Memphis	1	1	0
50. University of San Francisco	1	1	0
51. University of Wisconsin	1	1	0
52. University External Facility Visitors/Student Communications	2	14	2
53. Wellington High School (WHS)	1	1	1
TOTAL	**119**	**199**	**735**

*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 three projects for Lecanto High School that involved long term irradiations as did others such as one project for Palmer Trinity School, one for Robert F. Munroe High School and especially the one project for researchers at the University of Central Florida Physics Department.

TABLE III-1B

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

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 – 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)	6.71	8.83
*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 (Continued) – 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)	0.00	2.25 (0.75)

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 – 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 (Continued) – 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)	0.00	1.67 (0.75)
****Familiarization Tour for Temple University 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 and Research Opportunities for Potential Nuclear Engineering Graduate Student Matt Muscarella of Temple University	0.00	1.17
***Familiarization Tour for Support for Career Shadowing Day – 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 Career-related Opportunities for COE Mentor Melba Lopez and a Group of Suwannee and Dunnellon High School Seniors to Provide Insight into Careers Involving Nuclear and Radiological Engineering	0.00	1.25

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
*Santa Fe Community College Nuclear Radiography Program – Ms. Bobbie Konter, SFCC – Reactor Sharing	Support for Student Research Project Including Supplying Materials for the Project on Food Irradiation for SFCC Student Matt Alyassin as Well as Another Tour for General Interest Relative to the Facility for SFCC Scott Whalen	0.00	1.25
***Familiarization Tour for University of Michigan Nuclear Engineering Doctoral Candidate – 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 University of Michigan Nuclear Engineering Doctoral Candidate James Baciak as a Potential Hire for NRE Faculty	0.00	1.00
**Discovery Intermediate School Physical Science Honors Students – CPET Science Coordinator Julie Bokor / Mary Pollock, Discovery Intermediate School and W.G. Vernetson, UF – 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 for Physical Science Honors Students	2.62	8.17
***Gamma Spectrum Evaluation – T. Metzig, University of Central Florida, Chemistry Department	Project to Review and Evaluate Gamma Spectra for a UCF Chemistry Student Senior Project	0.00	0.83

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
***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	2.33
*NAA Research to Quantify Effects of Automotive Traffic on Trace Elements Content of Soil Near Highways – Mr. Ron Worthington, Lecanto High School / Dr. W.G. Vernetson, UF – Reactor Sharing	NAA Evaluation of Certain Heavy Trace Elements (V, Hg, As, Cr) in Soil Obtained Near Major Automotive Routes Versus Soil Obtained in Locations Remote from Highway Traffic for a Science Fair Project for Student Sweta Patel of Lecanto High School (Local/Regional Winner/Placed at State Science Fair)	7.82	26.08 (0.83)
**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	2.00

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
*NAA Research to Identify Trace Element Variations in Fish Depending Upon Living Zone – Mr. Ron Worthington, Lecanto High School / Dr. W.G. Vernetson, UF – Reactor Sharing	NAA Evaluation of Trace Heavy Elements in Different Species of Fresh Gulf of Mexico Fish Dependent Upon the Living Zone from the Gulf Surface to the Gulf Floor for a Science Fair Project for Student Sneha Patel of Lecanto High School (Local/Regional Winner/Placed Third at State Science Fair)	9.42	29.67 (6.08)
***Science Fair Project Comparing UFTR and Power Reactors – Ms. Cindy Tompkins, Spring Hill Middle School / Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour and Discussion of UFTR Versus Power Reactor Operations and Usage with Demonstrations of Differences Using Fuel and Plant Models for Comparison with Supply of Various Materials for Science Fair Project for Spring Hill Middle School Student Alan Devaney (Local Place Finisher)	0.00	2.67
***Science Fair Project on Nonpower Reactor Operations and Comparison of Variations in Background Radiation Levels – Ms. Erin Flynn, Ft. Clarke Middle School / Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour and Detailed Discussions and Demonstrations of Facility Operations Including Use of Various Radiation Survey Meters and Lending of MicroRem Meter for Use to Support a Science Fair Project Documenting Variations in Background Radiation Levels for Ft. Clarke Middle School Student Tyler Parenti (Local Fair Winner)	0.00	4.00
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	35.00 (5.75)

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
**John F. Kennedy/ Roosevelt / Suncoast Middle Schools, Orlando – Dr. Jonathan Earle (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 John F. Kennedy, Roosevelt and Suncoast Middle School Honors Science Students and Teachers as Part of Minority Outreach Program	0.00	2.67 (0.17)
**Entergy Instructional 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	11.67 (2.00)
***Demonstration of Reactor and NAA Laboratory Operations for Educational Applications – Mr. James Majerski, Crystal River Charter High School / Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Lectures, Tours and Demonstrations of UFTR and NAA Laboratory Operations with Discussion of Facility Usage and Capabilities for Education and Training Including Simulated Measurement of Half-Life of Radionuclides and Trace Element Analysis of Previously Irradiated Hair Samples Plus Contamination Control Exercises for Crystal River Charter High School Academy of Environmental Science Students	0.00	8.17
***Engineering Fair Outreach and Support – Dr. W.G. Vernetson – Reactor Sharing	Efforts to Support ANS Student Section Public Education Efforts for Annual Engineering Fair and Fall Student Society Fair	0.00	1.83

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
**Lee Middle School, Orlando, and Piedmont Lakes Middle School, Apopka, – Dr. Jonathan Earle (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 Lee and Piedmont Lakes Middle School Honors Science Students and Teachers as Part of Minority Outreach Program	0.00	4.08 (0.33)
**Familiarization Tour for Proteach Middle School Teacher – Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage, Capabilities and Operations for School of Teaching and Learning Proteach Middle School Teacher to Obtain Instructional Materials on Reactors, Radiation and Radioactivity to Support Curricular Usage	0.00	0.75 (0.08)
**Boy Scout Troop 432 Merit Badge Activities – Mr. Brad Pollitt, Scout Master, Mr. Craig Bakunonis, Asst. Scout Master / Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Lectures, Tours and Demonstrations of UFTR Operations and Comparison with Power Reactors 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 Contamination Surveys Plus Follow-up Trace Element Analysis of Hair Samples	4.52 (1.75)	14.50 (2.17)
***Familiarization Tour for Central Florida College Pre-engineering Student – Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operation Including Curricular Use for Central Florida Community College Pre-engineering Student John Harris as Potential NRE Student	0.00	0.75

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
**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	3.02 (1.05)	8.58 (1.50)
***Center for Precollegiate Education 41st Annual Junior Science, Engineering and Humanities Symposium – Dr. MaryJo Koroly and Ms. Deborah 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 Including Various Support Activities	0.00	6.75 (0.25)
***Demonstration of Reactor and NAA Laboratory Operations for Educational Applications – Ms. Esther Branch, St. Patrick School / Julie Bokor, CPET / Dr. W.G. Vernetson, UF – Reactor Sharing	Lectures, Tours and Demonstrations of UFTR and NAA Laboratory Operations with Discussion of Facility Usage and Capabilities for Education and Training Including Simulated Measurement of Half-Life of Radionuclides and Trace Element Analysis of Previously Irradiated Hair Samples for St. Patrick School Science Students	0.00	4.67

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
***Demonstration of Reactor and NAA Laboratory Operations for Educational Applications – Mr. Derrick Hicks, Howard Bishop Middle School / Dr. W.G. Vernetson, UF – Reactor Sharing	Lectures, Tours and Demonstrations of UFTR and NAA Laboratory Operations with Discussion of Facility Usage and Capabilities for Education and Training Including Simulated Measurement of Half-Life of Radionuclides and Trace Element Analysis of Previously Irradiated Hair Samples for Howard Bishop Middle School Science Students	0.00	1.67
**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	3.02 (1.05)	8.58 (1.50)
**Boy Scout Troop 432 Merit Badge Activities – Mr. Brad Pollitt, Scout Master, Mr. Craig Bakunonis, Asst. Scout Master / Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Lectures, Tours and Demonstrations of UFTR Operations and Comparison with Power Reactors 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 Contamination Surveys Plus Follow-up Trace Element Analysis of Hair Samples	4.52 (1.75)	14.50 (2.17)

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
**Santa Fe Community College Nuclear Medicine Technology Program – Mr. Karl Eckberg 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	3.65 (1.80)	9.75 (1.75)
**Familiarization Tour for Potential NRE Graduate Students – Dr. W.E. Bolch / Dr. 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 (Michigan, Tennessee, Missouri – Rolla, Maine, etc.) as Potential NRE Graduate Students	0.00	1.00
***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	2.33

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
**Forest High School Engineering and Manufacturing Institute of Technology – Ms. Bessie Harmon, Forest HS – Reactor Sharing	Lecture, Tour and Demonstration of UFTR Operations with Radiation Surveys and Exercises to Simulate Measurement of Half-life of Irradiated Elements and in Using the Rabbit System and PC-based Analyzers for Trace Element Analysis of Previously Irradiated Hair Samples Using NAA Techniques for Forest High School Engineering and Manufacturing Institute of Technology Students	0.00	2.67
**Engineering Fair Outreach and Support – Dr. W.G. Vernetson – Reactor Sharing	Efforts to Support ANS Student Section Public Education Efforts for Annual Engineering Fair and Fall Student Society Fair	0.00	1.83
**Blanche Ely High School, Pompano Beach – Dr. Jonathan Earle (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 Blanche Ely High School Honors Science Students and Teachers as Part of Minority Outreach Program	0.00	1.42
***Familiarization Tour for Albuquerque Academy 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 Jacob DeWite of Albuquerque Academy High School and His Father	0.00	1.00

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
***Familiarization Tour for Ridgeland 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 Roger Liang of Ridgeland High School and His Father	0.00	1.33
**HPS Precollegiate Teacher Workshop – Dr. W.E. Bolch / Dr. 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 PC-based Analyzers for a Group of Precollegiate Science Teachers from Around North Central Florida as Part of a Workshop Organized by the UF Student Health Physics and Medical Physics Societies	1.03	6.08
**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	1.02	4.83
**Jones High 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 Jones High School Honors Science Students and Teachers as Part of Minority Outreach Program	0.00	2.58

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
**Boone High 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 Boone High School Honors Science Students and Teachers as Part of Minority Outreach Program	0.00	2.50 (0.17)
**Familiarization Tour for Relatives of Graduating NRE Students – W.G. Vernetson, UF – Reactor Sharing	Two Walk-through Tours of Reactor and NAA Laboratory Facilities to Discuss Usage Capabilities and Operations for Two Graduating Students and Various Relatives Including One Student Contemplating Majoring in Nuclear Engineering	0.00	1.75
***Demonstration of Reactor and NAA Laboratory Operations for Educational Applications – Mr. James Majerski, Crystal River Charter High School/ Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Lectures, Tours and Demonstrations of UFTR and NAA Laboratory Operations with Discussion of Facility Usage and Capabilities for Education and Training Including Simulated Measurement of Half-Life of Radionuclides and Trace Element Analysis of Previously Irradiated Hair Samples Plus Contamination Control Exercises for Crystal River Charter High School Academy of Environmental Science Students	0.00	8.17
***Familiarization Tour for University of Memphis Assistant Professor – 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 University of Memphis Biomedical Engineering Assistant Professor Sanjiv Samant	0.00	1.00

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
***Familiarization Tour for Wellington 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 Christopher Wahl of Wellington High School and His Father	0.00	1.50
*Student Visits for Familiarization to Identify Potential Science Fair Research Projects – Mr. Ron Worthington, Lecanto High School/ Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour with Discussions of Facility Usage and Capabilities to Identify and Select Science Fair Project for Future Research for Lecanto High School Student Dimple Patel and Her Father Kiram Patel	0.00	3.00
***Familiarization Tour for University of San Francisco Professor – 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 Dr. Eduardo Villarreal of University of San Francisco Medical Physics Department as a Potential Nuclear Engineering Faculty Member	1.25	7.92
**Familiarization Tour for University of Wisconsin Associate Professor – Dr. W.G. Vernetson, UF – Reactor Sharing	Walk-through Tour of Reactor and NAA Laboratory Facilities to Discuss Usage, Capabilities and Operations Including Curricular Use for University of Wisconsin Associate Professor of Medical Physics Wolfgang Tome as a Potential NRE Faculty Member	0.00	1.00

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
***Familiarization Tour for Rensselaer Polytechnic Institute Nuclear Engineering 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 Work as a Student Reactor Operator for Rensselaer Polytechnic Institute Nuclear Engineering Senior Justin Dingley as a Potential NRE Graduate Student	0.00	1.00
*Basic Physics Research to Support Transmutation Studies for Solid State Laser Development – Dr. R.F. Peale and Dr. E. Flitsiyan, University of Central Florida / Dr. W.G. Vernetson, UF – Reactor Sharing	Irradiation of ZnO Compounds for Transmutation Studies to Determine Optimum Irradiation Time for Zinc Radioisotope Balances to Support Basic Physics Research for Zinc-based Solid State Laser Development	22.32	28.00 (0.42)
**Carnegie Science Center – 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	12.42
***Familiarization Tour for Indian River Community College Pre-engineering 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 Work as a Student Reactor Operator for Indian River Community College Pre-engineering Student Raymond Lueg	0.00	1.50

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 – Dr. MaryJo Koroly and Ms. Deborah Paulin (CPET)/ Dr. W.G. Vernetson, UF – Reactor Sharing	Lecture 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	5.25
***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 and Other Visitors and Industry Instructors Plus Accompanying Students	0.00	2.50
**Student Visits for Familiarization to Identify Potential Science Fair Research Project and Receive Training – Mr. Ron Worthington, Lecanto High School/ Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Detailed Walk-through Tours with Discussions of Facility Usage and Capabilities to Identify and Select Science Fair Project for Future Research for Lecanto High School Student Lakshmi Ram as Well as Other Family Members with Follow-up Training to Measure Half-lives of Radionuclides and Perform Trace Element Analysis on Various Samples for Training Prior to Beginning Science Fair Project	1.25	7.92
***PEEK Middle School Boys Workshop – J. Citty (COE) / Dr. W.G. Vernetson, UF – Reactor Sharing	Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Facility Operations Including Use of Survey Meters and Source Location Exercise Plus Demonstration of Simulated Half-life Measurement and Trace Element Analysis of Previously Irradiated Hair Samples for Middle School Boys PEEK Workshop Group	0.00	2.67

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
***ATHENA Middle School Girls Workshop – Karen Bray (COE) / Dr. W.G. Vernetson, UF – Reactor Sharing	Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Facility Operations Including Use of Survey Meters and Source Location Exercise Plus Demonstration of Simulated Half-life Measurement and Trace Element Analysis of Previously Irradiated Hair Samples for Middle School Girls ATHENA Workshop Group	0.00	1.92
***Eye on Engineering Summer Camp Workshop – J. Citty (COE) / Dr. W.G. Vernetson, UF – Reactor Sharing	Lectures, Tours and Demonstrations of Reactor and NAA Laboratory Facility Operations Including Use of Survey Meters and Source Location Exercise Plus Demonstration of Simulated Half-life Measurement and Trace Element Analysis of Previously Irradiated Hair Samples for Upper Level High School Students in Eye on Engineering Summer Camp	0.25	4.08 (0.08)
**Student Science Training Program for High School Student Researchers – Dr. M.J. Koroly / D. Paulin, CPET / Dr. W.G. Vernetson, UF – Reactor Sharing	Series of Lectures, Tours and Demonstrations of Facility Capabilities and Operations Including Various Hands-on Instruction, Half-life Measurements, Trace Element Analysis and Other Activity Participation for Two SSTP High School Juniors to Allow Selection and Preparation for Performing Summer Research Projects (Ben Stewart, Robert F. Munroe HS and Garrett deRosset, Palmer Trinity School)	3.57 (0.25)	36.67 (4.33)

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
***Familiarization Tour for Florida State University Students – Dr. W.G. Vernetson, UF – Reactor Sharing	Detailed Walk-through Tour of Reactor and NAA Laboratory to Discuss Usage, Capabilities and Operations Including Graduate Level Curricular Use and Opportunities for Facility Usage for Trace Element Analysis for FSU Science Students with Accompanying UF Student and Active US Navy Enlisted Person	0.00	2.25
***Minority Engineering Step-Up Program – Mr. Earl Wade (COE) / Dr. W.G. Vernetson, UF – Reactor Sharing	Lecture, Tour and Demonstrations of Reactor and NAA Laboratory Facilities to Discuss Usage and Capabilities to Attract and Retain Minorities in Engineering and Nuclear Engineering	0.83	5.00
**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 and Radiological Engineering	0.00	0.83
***Familiarization Tour for Pennsylvania State University 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 Doctoral Student Garry Meyers with Former PSU Student Concerned with Attracting Good Students to Nuclear Engineering	0.00	1.33

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 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 Two Workshops	0.77	8.67
*Center for Precollegiate Education and Training – NAA Research on Effects of Hard Versus Soft Water on Prevalence of Heart Disease – M.S. Knight and S. Walker, Robert F. Munroe High School /Dr. W.G. Vernetson, UF – Reactor Sharing	Summer 2004 Student Research Program Project – Evaluation and Quantification of Trace Element Content in Various Hard Versus Soft Water Evaporative Samples for Correlation with Incidence of Heart Disease for Student Ben Stewart of Robert F. Munroe High School (Local and Regional Science Fair Winner and Junior Science, Engineering and Humanities Symposium Participant)	5.13	23.75 (1.25)

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-2

MONTHLY REACTOR ENERGY GENERATION[1]
(September 2003 – August 2004)

Month	Energy Generation Monthly Ranking[2]	KW-Hrs	Hours at Full Power
September 2003	8	728.082	6.950
October 2003	11	450.010	4.150
November 2003	10	667.313	6.467
December 2003	3	1,910.906	18.168
January 2004	4	1,883.914	18.334
February 2004	7	884.384	8.718
March 2004	2	2,110.121	18.167
April 2004	6	915.885	8.166
May 2004	1	2,957.949	29.250
June 2004	9	694.667	6.784
July 2004	5	1,256.415	12.416
August 2004	12	76.539	0.734
	YEARLY TOTAL	**14,536.185**[3]	**138.304**

[1] The yearly total energy generation of 14.536 megawatt-hours for the 2003–4 reporting year represents a 35.12% increase from last year's total of 10.758 megawatt-hours, while the 138.304 hours at full power represents a 48.45% increase from the previous yearly total of 93.167 hours. With no large outages and one part-time SRO plus the Facility Director operator unavailability was the biggest contributor to reactor unavailability and the relatively low energy generation for the year. For the 2003–4 reporting year, the energy generation is higher essentially due to the high availability as forced unavailability was at 26⅞ days with no forced outages lasting more than 15.

[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 14,536.185 kilowatt-hours energy generation for the 2003–4 year ranks sixth in the past ten-year period.

TABLE III-3

MONTHLY REACTOR USAGE/AVAILABILITY DATA
(September 2003 – August 2004)

Month	Key-On Time	Exp. Time[1]	Run Time[2]	Availability[3]
September 2003	16.30 hrs.	218.67 hrs.	14.23 hrs.	93.33%
October 2003	14.00 hrs.	252.33 hrs.	11.75 hrs.	88.71%
November 2003	25.30 hrs.	273.25 hrs.	22.18 hrs.	93.33%
December 2003	34.70 hrs.	218.58 hrs.	31.43 hrs.	83.87%
January 2004	31.20 hrs.	267.25 hrs.	27.20 hrs.	92.34%
February 2004	32.30 hrs.	259.08 hrs.	30.20 hrs.	100.00%
March 2004	28.10 hrs.	278.17 hrs.	25.68 hrs.	63.71%
April 2004	20.80 hrs.	252.75 hrs.	18.90 hrs.	79.58%
May 2004	47.90 hrs.	250.75 hrs.	44.70 hrs.	95.16%
June 2004	14.60 hrs.	259.00 hrs.	10.97 hrs.	98.75%
July 2004	22.80 hrs.	355.08 hrs.	20.10 hrs.	73.39%
August 2004	15.00 hrs.	247.83 hrs.	14.80 hrs.	59.68%
YEARLY TOTAL	**303.00 hrs.**	**3,132.74 hrs.**	**272.14 hrs.**	**85.11%**

[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 increases over the previous year, especially those related to reactor operations. Key-on time is up 20.48% while run time is up 34.88%, limited primarily by availability of reactor operators. With only two operators, including one working about 50% time, personnel availability continued to be poor as efforts to hire part time operators were not very successful. Experiment time, as well, is increased by 16.97% 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 85.11% as shown above and 85.01% 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 higher than in most of the previous eight years (36.17%, 34.57%, 89.69%, 88.15%, 75.68%, 66.67%, 58.65%, 4.01%) at 85.11% for this reporting year with most of the forced unavailability due to maintenance to troubleshoot and repair the sticking S-2 control blade, troubleshoot and repair the log pen on the two pen recorder and to repair the secondary cooling flow meter.

Overall the availability represents a significant increase in the average availability recorded for the past ten or more reporting years. This is due to having no large forced outages. Of the 26⅜ days forced outage time, maintenance to address the sticky S-2 control blade (14⅜ days in July–August 2004), to troubleshoot and then repair the log pen on the two pen recorder (5⅝ days in April 2004) and to repair the secondary cooling flow meter (3⅜ days) involved significant forced outages. No other forced outage involved even one full day. There was one significant planned outage this year to perform the annual calibration and calorimetric heat balance (A-2 Surveillance) in March 2004 (10⅝ days). 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 continued high availability in the 2004–5 reporting year.

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2003 – August 2004)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
			(F) Forced (P) Planned
September 2003	93.33%	2.00 days	Maintenance (F) to adjust the Safety Channel 1 Trip from 120% to 125% (⅛ day). Maintenance (F) to correct the control room power outage from the overload burnout of the diesel generator (¼ day). Maintenance (P) to identify a broken seam and make minor roof repairs (¼ day). Maintenance (P) to replace the diesel generator contactor and timing coil to restore the backup power availability to the reactor (⅜ day). Administrative shutdown for the Labor Day holiday (1 day).
October 2003	88.71%	3.5 days	Maintenance (F) to repair the secondary flow meter, discovered during a walk-through (3⅜ days). Maintenance (P) to troubleshoot and repair a broken terminal in the East area radiation monitor (concurrent ⅜ day). Maintenance (P) to refill the PCT storage tank (⅛ day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2003 – August 2004)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
November 2003	93.33%	2.00 days	Administrative shutdown for the Thanksgiving holiday (2 days).
December 2003	83.87%	5.00 days	Administrative shutdown for the Christmas holiday (5 days).
January 2004	92.34%	2.375 days	Maintenance (P) to refill the primary coolant storage tank (⅛ day). Maintenance (P) to adjust the striker on the east area radiation monitor recorder (¼ day). Administrative shutdown for the New Year's and Martin Luther King holidays (2 days).
February 2004	100.00%	0.00 days	
March 2004	63.71%	11.25 days	Maintenance (P) to replace overhead cell (¼ day). Maintenance (P) to replace the shield tank filter demineralizer cartridge (⅜ day). Maintenance (P) to adjust for the annual UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (10⅝ days).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2003 – August 2004)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
April 2004	79.58%	6.125 days	Maintenance (F) to address the SEC PRESS trip (½ day). Maintenance (F) to address the log (green) pen failure (5⅝ days)
May 2004	95.16%	1.500 days	Maintenance (F) to address the Safety Channel 1 trip and annunciation on high power (⅜ day). Maintenance (P) to refill the primary coolant storage tank (⅛ day). Administrative shutdown for the Memorial Day holiday (1 day).
June 2004	98.75%	0.375 days	Maintenance (F) to address the broken rupture disk and primary coolant in the equipment pit (⅜ day).
July 2004	73.39%	8.250 days	Maintenance (F) to address the broken rupture disk (1 day). Maintenance (F) to repair the break/leak in the rabbit system exhaust line (¼ day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2003 – August 2004)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
July 2004 (continued)			Maintenance (F) to evaluate, investigate and make plans to repair the sticking Safety-2 blade discovered during the drop time measurement (S-1 Surveillance) (4¾ days) Maintenance (P) to improve repairs to the rabbit system exhaust line (¼ day). Administrative shutdown for the Independence Day holiday and for the Facility Director's absence (2 days).
August 2004	59.68%	12.5 days	Maintenance (F) to complete plans, implement repairs and verify corrective action to correct the sticking safety-2 control blade discovered during the drop time measurement (S-1 Surveillance) (9⅝ days). Maintenance (F) to correct lack or response on the log (green) pen of the two-pen recorder determined to be due to a switch out of position (⅛ day). Maintenance (P) to refill primary coolant tank (⅛ day). Maintenance (P) for PPD technicians to evaluate need for and identify proper replacement belts for the dilute fan drive motor (⅛ day).

TABLE III-4

UFTR AVAILABILITY SUMMARY
(September 2003 – August 2004)

Month	Availability	Days Unavailable	Primary Cause of Lost Availability
August 2004 (continued)			Administrative shutdown for potential effects of Hurricane (2½ days).

TOTAL ANNUAL UNAVAILABILITY (Availability at 85.006%):	54.875 days	=	14.993%
1. TOTAL FORCED UNAVAILABILITY:	26.375 days	=	7.206%
2. TOTAL PLANNED UNAVAILABILITY:	13.000 days	=	3.552%
3. TOTAL ADMINISTRATIVE UNAVAILABILITY:	15.500 days	=	4.235%

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 54.875 days total unavailability in the 2003–4 reporting year is one of the lowest in recent years with the forced outage rate at 26.375 days versus 217.50 days, 235.00 and 20.875 days in the previous three reporting years and with the planned outage rate at only13.000 days versus 13.625 days, 1.250 days and 14.50 days in the previous three reporting years. There were three forced outages to exceed three days were for repairing the secondary flow meter (3⅜ days), to address the log (green) pen failure (5⅝ days) and to troubleshoot and repair the sticking Safety-2 blade discovered during the drop time measurement (S-1 Surveillance) (4⅜ days). The total unavailability time is for maintenance for repairs, delays awaiting parts arrival, trip evaluations, etc plus 15.5 additional days of administrative shutdown compared with 0.5 days, 4.00 days and 7.00 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 remains excellent though increased and including 2.5 days for a hurricane watch.

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 in the previous 2002–3 reporting year and somewhat for the sticking control blade problem in this 2003–4 reporting year. 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 0.5 days.

TABLE III-5A

UNSCHEDULED TRIPS
(September 2003 - August 2004)

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 2003 - August 2004)

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. 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 in the 2002–3 report as this full trip was somewhat attributable to faulty equipment.

For the 2003–4 reporting year, there was only one unscheduled trip as addressed in this table. This blade drop, process trip occurred during power reduction for temperature coefficient measurements on April 6, 2004 due to hysteresis effects in the trip on loss of secondary cooling which was evaluated as acceptable but not noted as explained in the only table entry for the 2003–4 reporting year.

TABLE III-5A

UNSCHEDULED TRIPS
(September 2003 – August 2004)

Number	Date	Description of Occurrence
1.	6 Apr 04	On April 6, 2004, the reactor commenced startup at 1331 hours for measurement of the temperature coefficient of reactivity (A-3 Surveillance) completing two hours at full power at 1557 hours. As power was lowered to secure the secondary cooling below 1 kW, the secondary pump was secured at ~300 watts at 1559 hours, a process scram (SEC PRESS) trip occurred inserting all control blades after the 10 second delay. The reactor was secured at 1600 hours with all safety and control systems noted to respond properly with some review of schematics and trip evaluation undertaken. Subsequently, under MLP #04-07 opened on April 7, 2004, schematics of the scram logic and bistable trip circuits were reviewed. A test of the K22 relay operability was verified satisfactory at 1 kW, a check of the secondary flow bistable functionality was verified satisfactory. The K22 relay was noted to energize at about 800 watts and deenergize at about 400 watts due to hysteresis built into the bistable card. After consultation with the electronics engineer, the decision was made to monitor for any change in hysteresis over time; if significant change is found then the bistable would need to be repaired, probably involving check of the feedback resistor in the circuit. As it is, the system is somewhat more conservative than necessary, but it was evaluated as acceptable with the maintenance checks and evaluation concluded on April 7 with successful completion of the daily preoperational checks. Completed UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) approving restart was completed on April 7 and is Attachment I to the April 2004 monthly report. Because this trip was from a known cause with all safety systems responding properly and the trip conservative anyway, this event is not considered promptly reportable. This occurrence is evaluated to have had minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with no further problems noted.

TABLE III-5B

SCHEDULED TRIPS
(September 2003 – August 2004)

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, 2002–3, or 2003–4 reporting year but they did not. It is expected that one or more might occur in the 2004–5 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 2003 – August 2004)

During this reporting year there were no events considered to have compromised reactor safety or the health and safety of the public. Ten events classified as unusual occurrences, none as promptly reportable potential abnormal occurrences are listed in this table. 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, though none occurred here this year. 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 occurred during this reporting year (occurrence #3) for a process trip for loss of secondary cooling due to hysteresis effects below 1 kW as power was reduced and cooling secured for a surveillance.

All ten occurrences this year involved some equipment failure, inadequacy or other event. The most significant occurrence was the process blade drop reactor trip described in occurrence #3 which involved a process trip for loss of secondary cooling due to hysteresis effects below 1 kW as power was reduced and cooling secured for a temperature coefficient measurement. The next most significant event would occurrence #9 for the failure of the S-2 control blade to drop when removed above 900 units for the drop times checks which involved the longest forced outage (14⅜ days) for the year during July–August 2004. Occurrence #8 for leaks in the reactor cell side of the rabbit system did not involve any contamination and the occurrence #6 for operator error causing breakage of the rupture disk were the next most significant events though neither involved significant contamination problems. Occurrence #1 is important only because the campus power outage produced various alarms though again all responses were adequate. The two wastewater leakage events (occurrence #2 and #7) are of low significance as no contamination was involved. Event #4 for the failure of the log (green) pen of the two-pen recorder is of importance only because of the 5⅝ day forced outage involved especially since it was discovered during preoperational check. Finally occurrence #10 is included because the emergency flood procedure (SOP-B.4) was implemented to address the potential for Hurricane Charley to impact the facility. Though there was a 2½ day administrative shutdown per campus directive, the hurricane changed course and had no effect on the facility.

Overall, none of these ten occurrences is considered to have had significant impact on the safety of the reactor or on the health and safety of the public. In addition, all have been reviewed to assure adequate consideration of their effects with none officially reported promptly to the NRC, though all were reported for information purposes at some point. All were also reported in periodic updates to the NRC.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 - August 2004)

Number	Date	Description of Occurrence
1.	10 Sep 03	At approximately 1538 hours on September 10, a power outage occurred on the UF campus involving many buildings to the north and west of the reactor resulting in loss of normal building electrical power during a daily preoperational check which was cancelled and a security alarm which was transmitted to UPD dispatch. As usual, the diesel generator actuated to restore power to much of the building with the security alarm cleared at about 1550 hours and the facility assured okay. At about 1600 hours, as a student tour was being conducted in the classroom a small fire was noted in the power transfer timer coil for the diesel generator in the power transfer box at the back of the laboratory in the northwest corner which was extinguished as the coil burned up, apparently due to non-switching from diesel generator power back to normal A/C power as normal power returned following the outage. The tour was concluded by SRO W.G. Vernetson and the incident investigated initially by SRO B. Shea. The result was a loss of power to the control room and another security alarm. PPD dispatch was contacted and under MWO #684945 and MLP #03-39, first one evaluator and then a second PPD technician visited. Subsequently, dispatch and the PPD director's office were contacted to indicate the problem required immediate attention. Finally, the PPD assistant director and a PPD electrician arrived to remove the diesel generator input and restore normal A/C power to the control room and clear the security alarm to restore the reactor to normal condition. Since no claim is made for the diesel generator in any safety analysis, it is not required and was so evaluated with all systems responding normally at 1730 hours. Subsequently, the security event was reviewed as minor with compensation implemented. On September 12, the PPD electrician supervisor and a PPD electrician visited to identify parts to be replaced to restore the diesel generator backup power source. Subsequently, on September 19, a PPD electrician replaced the contactor and timing coil for the transfer switch, first with one rated incorrectly at 110 volts which began to overheat and then with a properly

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 - August 2004)

Number	Date	Description of Occurrence
		rated one at 220 volts, to restore the diesel generator backup power transfer with no further problems noted to close out this maintenance issue and with no impact on facility safety or the health and safety of reactor personnel or the public.
2.	11 Oct 03	In opening the irradiated fuel storage pits on October 11, 2003 to perform the SNM inventory (S-3 Surveillance), several pits without fuel stored in them were discovered to have considerable water in them apparently from the cell wastewater tank overflow that occurred on August 7, 2003. After verifying all pits containing fuel were okay, the pits not containing fuel were left for a day. On October 12, the items (failed fission chamber and activated bolts) in two pits were removed to dry and the pits cleared of water. The pits were then dried on October 13 and the inventory of the contents of all pits completed on October 13, 2003 to close out this event with no impact on reactor safety or the health and safety of the public.
3.	6 Apr 04	On April 6, 2004, the reactor commenced startup at 1331 hours for measurement of the temperature coefficient of reactivity (A-3 Surveillance) completing two hours at full power at 1557 hours. As power was lowered to secure the secondary cooling below 1 kW, the secondary pump was secured at ~>300 watts at 1559 hours, a process scram (SEC PRESS) trip occurred inserting all control blades after the 10 second delay. The reactor was secured at 1600 hours with all safety and control systems noted to respond properly with some review of schematics and trip evaluation undertaken. Subsequently, under MLP #04-07 opened on April 7, 2004, schematics of the scram logic and bistable trip circuits were reviewed. A test of the K22 relay operability was verified satisfactory at 1 kW, a check of the secondary flow bistable functionality was verified satisfactory. The K22 relay was noted to energize at about 800 watts and deenergize at about 400 watts due to hysteresis built into the bistable card. After consultation with an electronics engineer,

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 - August 2004)

Number	Date	Description of Occurrence
		the decision was made to monitor for any change in hysteresis over time; if significant change is found then the bistable would need to be repaired, probably involving check of the feedback resistor in the circuit. As it is, the system is somewhat more conservative than necessary, but it was evaluated as acceptable with the maintenance checks and evaluation concluded on April 7 with successful completion of the daily preoperational checks. Completed UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) approving restart was completed on April 7 and is Attachment I to the April 2004 monthly report. Because this trip was from a known cause with all safety systems responding properly and the trip conservative anyway, this event is not considered promptly reportable. This occurrence is evaluated to have minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with no further problems noted.
4.	23 Apr 04	During performance of the daily preoperational checkout on April 23, 2004, near completion, the log (green) pen of the two-pen recorder was noted to be unresponsive and later to be alternately sluggish or non-responsive. Since this failure was discovered during checkout and previous operations showed proper response, this occurrence was not reportable and did not affect any operations. Under MLP #04-08 opened on April 23, 2004, a pinched wire leading to the log pen was repaired but had no effect as the green pen was noted to be erratic regardless of signal input indicating a probable faulty component—either the pen motor or the card. Subsequently, on April 24, the wide range drawer signal to the green pen was verified; the power signal from the transformer card was also verified good. An oscilloscope connected to the signal to the motor showed a spurious signal regardless of change to the input signal from the wide range drawer which isolated the problem to a faulty L708.5 card for the green pen. After some discussions and verification that in-house repairs were not advised, a replacement L708.5

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 - August 2004)

Number	Date	Description of Occurrence
		card was ordered from Linseis on April 26 with the module replaced on April 28 and proper operation verified on April 29 with operation to full power to confirm green pen response over its full range with no further problems noted as the maintenance was closed out and normal operations resumed after the verification run on April 29, 2004. This occurrence is evaluated to have minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with no further problems noted.
5.	27 May 2004	On May 27, 2004, during the daily preoperational checkout, the Safety 1 high power scram was noted to be giving a blade drop with no scram annunciator indicating blade drop. Under MLP #04-10, this malfunction was verified several times for several blades as the preliminary diagnosis was that the Safety 1 high power bistable was misaligned or the scram relay was malfunctioning. After checking system diagrams, it was decided that the applicable K3 relay mechanical behavior was simply losing effectiveness. After replacing the K3 relay, there was a marked improvement in the Safety Channel 1 annunciator and blade drop behavior. This behavior is noted to be a limitation of the mechanical relay system and can be improved by using relays with less wear as was accomplished here. The proper trip behavior was tested several times to conclude the daily checkout with a subsequent daily checkout on May 28 also showing proper behavior. Since this occurrence was discovered during a preoperational check and corrected, it is not considered to be promptly reportable. This occurrence is also evaluated to have minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with no further problems noted.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 – August 2004)

Number	Date	Description of Occurrence
6.	30 Jun 04	Upon completion of the daily checkout at 1315 hours in preparation for a possible reactor operation later in the afternoon, the operator removed the key, inadvertently moving it back to operate, closing the already opened dump valve resulting in a broken rupture disk at 1315 hours with the reactor secured. The RCO was informed of the break at 1325 hours. Under MLP #04-11, opened to address this breakage, the radiation levels in the pit were verified to be low at ~1.0 foot above the pit floor using the E140/1048 meter at ~1600 hours at <0.01 mR/hr everywhere except on the side nearest the demineralizer resin where 0.02 mR/hr was measured. With low radiation levels, a hose was lowered and the primary coolant in the pit sampled and verified to have low radioactivity content with ~50 gallons pumped to a holdup tank. On July 1, 2004, the pit was verified not to be contaminated and the rupture disk was replaced under a Radiation Work Permit (RWP #04-01-II) with the loop verified leak tight following completion of rupture disk replacement. The Maintenance Log Page and Radiation Work Permit were closed on July 1 though housekeeping and documentation efforts continued to July 2, 2004. This occurrence was caused by operator error and is not considered to be promptly reportable as all safety systems responded properly. This occurrence is evaluated to have minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with all systems responding as designed.
7.	14 July 04	As wastewater from the cell was being pumped to the 1000 gallon aboveground wastewater holdup tank at about 1750 hours on July 14, 2004, it was observed to overflow at about 993.4 gallons, with estimated less than 2 gallons on the tank and concrete as the pump was promptly secured. This wastewater was controlled with absorbent paper and a series of swipes on the concrete slab and the tank verified no contamination with no further problems noted. This occurrence was reported to the Radiation Control Officer on July 15, 2004. Future operations

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 – August 2004)

Number	Date	Description of Occurrence
		will keep contents below 975 gallons to avoid recurrence of this event. This occurrence is evaluated to have no impact on reactor safety and no impact on the health and safety of the public or reactor staff.
8.	23 July 04	After a walk-through revealed no apparent problems, reactor startup commenced at 1045 hours on July 23, 2004 and 100 kW was reached at 1107 hours in preparation to irradiate samples via the rabbit system. The rabbit system was energized at 1117 hours and a test capsule inserted at 1120 hours to verify operation. Reactivity effects indicated the capsule entered the core and left the core but did not return to the receiving station. After three unsuccessful efforts to return the test capsule, an unscheduled shutdown was commenced at 1122 hours with the reactor shutdown and secured at 1124 hours. A subsequent walk-down revealed a partial break in the rabbit exhaust line preventing completion of capsule return. Under MLP #04-13, swipes were taken around the cracked line and revealed no contamination on the line or other nearby areas. The broken line was repaired using duct tape as a temporary fix. With SRO Vernetson observing the line, the rabbit system capsule return was activated and the test capsule returned without being seen by the observer in the cell indicating the capsule was apparently returned to the wall before losing momentum. The rabbit system was then purged, secured and deenergized with the valves closed at 1141. Subsequently, additional duct tape was used to improve the integrity of the polyethylene purge line with two tests conducted with the reactor secured to prove proper operation with the temporary fix and the system approved for operation by the Facility Director and the Radiation Control Officer. Subsequently, on July 23, the system was utilized with no problems. However, on July 26, 2004, the crack was noted to be shear through wall so another better temporary fix was implemented under MLP #04-13 to provide better support for

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 - August 2004)

Number	Date	Description of Occurrence
		the two ends of the break which are under considerable stress. Again the system was declared operable and utilized without any problem. Nevertheless, the intent was to implement a permanent repair in the near future. Subsequently, on August 5, 2004, tubing was cut to assure proper pressure fitting with pressure fitting applied and the rabbit system leak tested satisfactorily after several adjustments to implement the necessary permanent vent line repair with no further problems noted. Based upon the completed unscheduled shutdown evaluation, this occurrence is evaluated to have minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff. The completed UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) is Attachment I to the July 2004 report.
9.	27 July 04	During performance of the control blade drop time measurements (S-1 Surveillance), the Safety-2 blade was noted not to drop from above about 900 units. Under MLP #04-14 on July 27, 2004, various checks showed drops at 200, 500 and 800 units, among other values, to be normal and the blade was able to be driven in but was delayed from near 900 units and above. In addition, the controlled insertion time (S-5 Surveillance) was normal as was the weekly removal time. On July 28, 2004, the Safety-2 blade was removed to full withdrawal and dropped to the sticking point at ~900 units. Following a very slight tap on the control blade through the right angle gear box, the blade dropped, though it seemed to exceed the requisite <1 sec time. This response and past experience was evaluated to indicate that a slight change in the external shimming for this blade could restore the proper drop time. At the end of July 2004, plans were being formulated for addressing the Safety-2 blade failure to drop, dependent on personnel availability. The S-2 control blade behaved similarly in June 2003, where the problem was determined to be the clutch and it was promptly replaced.

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 - August 2004)

Number	Date	Description of Occurrence

It was decided to begin troubleshooting with an evaluation of the gearing and bearing systems associated with the S-2 blade. Both the in-core blade and blade drive mechanisms are considered well protected from outside mechanical contamination, 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, the decision was made on August 5, 2004 to disassemble and evaluate the control drive mechanism. No obvious signs of mechanical binding could be seen. The mechanism was partially assembled to allow for an alignment of the main control blade shaft and the drive mechanism to ensure the linkage was able to move freely over the entire range necessary for reactor operations. With the alignment complete (a small change in shimming), the S-2 control blade was fully withdrawn and subsequently successfully dropped by removing clutch current 25 times. An unofficial drop time was recorded and was within the technical specifications requirement of less than 1 second.

Subsequently, on August 6, 2004, the weekly checkout removal time was measured to be normal (107 seconds); the controlled insertion time (S-5 surveillance) was also measured to be normal (105 seconds). The official drop time (S-1 Surveillance) for full out was measured to be improved from 0.88 sec on December 17, 2003 to 0.77 sec on August 6, 2004.

With successful completion of all checks and surveillance activities, a start up to one watt was authorized and conducted on August 10, 2004. All systems were noted to respond properly with the critical position for the control blades (S-1/ S-2/S-3/RB) established at 800/800/800/357 and noted to be essentially unchanged from the previously established position (800/800/800/356) from April 1, 2004. Subsequently the reactor was returned to normal operations on August 10, 2004 with

TABLE III-6

LOG OF UNUSUAL OCCURRENCES
(September 2003 - August 2004)

Number	Date	Description of Occurrence
		concurrence of the Facility Director with no further problems noted. A memorandum summarizing this failure to drop and subsequent corrective action is Attachment I to this report. The net result is that this occurrence (failure to drop and reshimming) was evaluated to have had minimal impact on reactor safety and no impact on the health and safety of the public.
10.	13 Aug 04	On August 13, 2004, as Hurricane Charley was predicted to have possible effects on the Gainesville area, the weather predictions were for 1–2 inches of rain. In addition, the University of Florida was shut down for the last half of August 13, 2004 in expectation of possible tropical storm effects. Although not required, it was decided to implement the flooding procedure and insert one hurricane rod into the center vertical port per SOP-B.4. This insertion was accomplished at 1130 hours on August 13, 2004. Fortunately, Hurricane Charley changed its course and the Gainesville area received few effects of this hurricane. Subsequently, on August 16, 2004, at 0715 hours, the flooding condition was terminated. The hurricane rod was then removed on August 17, 2004 and returned to its storage location after assuring it was not contaminated with the facility returned to normal operation with no 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 2003–4 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

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. There had been no further need for replacement until completion of the full S-7 Surveillance on November 7, 2003. Subsequently, the 4 volt rechargeable batteries were replaced again on December 11, 2003.

The 4 volt rechargeable batteries were replaced again on January 22, 2004 with another full S-7 Surveillance conducted on April 7, 2004. Subsequently, the 4 volt rechargeable batteries were replaced again on May 6, 2004 and on July 14, 2004.

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. Modification/Upgrade of Chilled Water System for Reactor Building – Pipe Supports/Wall Anchors (Permanent – Open Item)

(Modification 04-01 Evaluation Completed 5 August 2004)

For some time, plans had been made to conduct work in the west lot for the Weil Replacement Chill Water project including meetings, discussions and visits for measurements by and for various personnel including UF PPD Project Manager, PPI supervisor, Matt Seales of Perry Construction and foreman Jimbo Williams of WW Gay. Initial work began under MWO #0674958 on August 5, 2004 with temporary movement of the north section of the west lot fence to allow clearing room for pipes under supervision of WW Gay foreman Jimbo Williams. No further work was accomplished inside the fenced area until August 18, 2004. Subsequently, holes were drilled in the reactor cell west wall under 10 CFR 50.59 Evaluation and Determination Number 04-01 (Modification/Upgrade of Chilled Water System for Reactor Building – Pipe Supports/Wall Anchors) to provide anchoring for the chill water line pipe supports on August 19, 2004. The minutes of the August 19, 2004 meeting of the RSRS Executive Committee which reviewed and approved these anchors is Attachment II to the August 2004 monthly report. With installation of the main chill water pipes below ground leading into the west lot, the west lot fence was restored to its original location in improved condition on August 20, 2004 as Tom Quarles of Florida

Enterprise Corporation replaced the barbed wire as well. At year's end the main piping is in place and efforts involving daily access are underway to complete the pipe installation.

Controlling Documents: Maintenance Work Order #0674958 (remains open)
10 CFR 50.59 Evaluation and Determination Number 04-01

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 for an overall availability of 67.81%. 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 for a total of 46.75 days unavailability and an overall availability of 87.23%. 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 for a total of 37.63 days unavailability and an overall availability of 89.69%. 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 for a total unavailability of 89 days. 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%

days forced unavailability, 14½ days planned unavailability and 8¼ 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 128⅝ days forced unavailability, 15¼ days planned unavailability and 7 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%.

For the 2003–4 reporting year there was no reactor manager with one part-time SRO who served occasionally as Acting Manager in the Director's absence plus the Director for the entire year. This part-time SRO resigned after graduation in April 2004 and effective May 28, 2004 but continued to be employed for the remainder of the reporting year. After the extended forced outage rate in the previous two reporting years, the 2003–4 reporting year saw a return to relatively high availability with only three forced outages exceeding 1 day including 3⅜ days in October 2003 to repair the secondary cooling flow meter, 5⅝ days in April 2004 to repair the log channel on the two pen recorder and 14⅜ days in July–August 2004 to correct the problem of a sticking S-2 control blade. The only other equipment-related lengthy outage was for 10⅝ days planned unavailability to make adjustments and perform the annual calibration of nuclear instruments (A-2 Surveillance). The 2003–4 overall availability was at 85.01% with overall unavailability at 14.99% (54⅞ days) with only 26⅜ days forced unavailability, 13 days planned unavailability and a relatively high administrative unavailability of 15½ days primarily for vacations and holidays. Certainly the 85.01% availability in the 2003–4 reporting year is far better than the 36.5% in the 2002–3 reporting year or the 34.2% in the 2001–2 reporting year.

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 2002–3 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. The second of the three entries (MLP #96-30 to control repair and upgrade of the security system) was opened during the 1996–97 reporting year while the third entry (MLP #02-26 to control repair of nimbin modules) was opened during the 2002–3 reporting year.

Similarly, six Maintenance Log Pages remain open at the end of the current 2003–4 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 all remain open from the previous year. It is expected that MLP #94-14, MLP #96-30 and MLP #02-26 will be open for some time as implementation of the new area radiation monitoring system is a major modification, upgrade of the security system will be time consuming and expensive and repair of the nimbin modules requires specialized expertise and will be expensive so it is not a high priority. The other three maintenance items remaining open include a PPD maintenance work order MWO #0674958 to address the so-called Weil Replacement Chill Water Project to reroute chill water lines through the west lot, another PPD MWO #0812197 to address preventive replacement of worn stack dilute fan drive motor fan belts plus MLP #04-18 to address repairs of the facility gas flow proportional counter. All three of these maintenance items were opened in August 2004 and are expected to be closed out relatively early in the next reporting year.

TABLE V-1

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

Date		Surveillance/Check/Test Description
1-30 Sep 03	B-4	Evaluation of UFTR Standard Operating Procedures (Partial – 0 and A Series Changes Approved, C, D, E, and Some F Series Evaluated with Changes in Progress) (Due 30 April 2003).
19 Sep 03	Q-4	Radiological Survey of Unrestricted Areas (Due 30 September 2003).
19 Sep 03	Q-5	Radiological Survey of Restricted Areas (Due 30 September 2003).
25 Sep 03	Q-7	Check of UFTR Building Fire Alarm System (Zone 3 Upstairs Labs and Offices) (Due 13 September 2003).
1-31 Oct 03	B-4	Evaluation of UFTR Standard Operating Procedures (Completion) (Due 30 April 2003).
11-13 Oct 03	S-3	Semiannual Inventory of Special Nuclear Material (Due 1 October 2003).
13 Oct 03	Q-6	Check of Posting Requirements (Partial to Post Updated RSRS Membership Memorandum) (Not Due).
14 Oct 03	Q-8	Quarterly Report of Safeguards Events (Due 1 October 2003)
15 Oct 03	Q-9	Calibration Check of AIM3BL Air Particulate Detector (Due 10 October 2003).
15Oct 03	Q-10	Temperature Monitor/Recorder Data Transfer for Storage (Due 1 October 2003).
15 Oct 03	Q-2	Calibration Check of Area and Stack Radiation Monitors (Due 23 October 2003).
15/16 Oct 03	S-6	UFTR Semiannual Security Plan Key Inventory (Due 1 October 2003).
16 Oct 03	Q-9	Calibration Check of AMS4 Air Particulate Detector (Due 29 October 2003).
30 Oct 03	Q-3	Radiological Emergency Evacuation Drill (Due 30 September 2003).
30 Oct 03	A-5	Update of UFTR Decommissioning Cost Estimate (Due 31 July 2003).

TABLE V-1

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

Date		Surveillance/Check/Test Description
3 Nov 03	Q-1	Check of Scram Functions (Due 3 October 2003).
4 Nov 03	S-8	Leak Check of Neutron Sources (Due 31 October 2003).
7 Nov 03	S-7	Semiannual Check (Replacement) of Security System Batteries (Due 25 October 2003).
11 Dec 03	S-7	Semiannual Check (Replacement) of Security System Batteries (Not Due – Partial to Change Out 4 Volt Rechargeable Batteries Due to Low Voltage).
16 Dec 03	Q-7	Check of UFTR Building Fire Alarm System (Zone 4 – Reactor Annex) (Due 25 December 2003).
16 Dec 03	Q-6	Check of Posting Requirements (Due 30 November 2003).
17 Dec 03	Q-3	Radiological Emergency Evacuation Drill (Large Annual Drill Involving Outside Agencies) (Due 31 December 2003).
17 Dec 03	S-1	Measurement of Control Blade Drop Times (Due 20 December 2003).
17 Dec 03	S-5	Measurement of Control Blade Controlled Insertion Times (Due 20 December 2003).
17 Dec 03	S-11	Replacement of Control Blade Clutch Current Light Bulbs (Due 20 December 2003).
22–31 Dec 03	S-10	Check and Update of Emergency Call Lists (Due 20 December 2003).
23 Dec 03	Q-6	Check of Posting Requirements (Not Due – Partial to Post Updated Memo on Authorization to Carry Cell Keys).
29 Dec 03	B-1	Biennial Check to Assure Negative UFTR Void Coefficient of Reactivity (Due 1 July 2003).
6 Jan 04	S-9	Replacement of Deep Well Secondary Pump Fuses (Due 31 December 2003).
9 Jan 04	Q-4	Radiological Survey of Unrestricted Areas (Due 19 December 2003).
9 Jan 04	Q-5	Radiological Survey of Restricted Areas (Due 19 December 2003).
11 Jan 04	Q-8	Quarterly Report of Safeguards Events (Due 1 January 2004).
13 Jan 04	Q-1	Check of Scram Functions (Due 31 December 2003).

TABLE V-1

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

Date		Surveillance/Check/Test Description
14 Jan 04	Q-6	Check of Posting Requirements (Not Due – Partial to Post Current Gainesville and University Campus Phone Directories).
15 Jan 04	Q-2	Calibration Check of Area and Stack Radiation Monitors (Due 15 January 2004).
15 Jan 04	Q-9	Calibration Check of Air Particulate Detector (AIM3BL) (Due 15 January 2004).
22 Jan 04	Q-9	Calibration Check of Air Particulate Detector (AMS4) (Due 16 January 2004).
22 Jan 04	S 7	Semiannual Check (Replacement) of Security System Batteries (Not Due – Partial to Change Out 4 Volt Rechargeable Batteries Due to Low Voltage).
28 Jan 04	Q-10	Temperature Monitor/Recorder Data Transfer for Storage (Due 1 January 2004).
9–26 Feb 04	S-2	Annual Reactivity Measurements (Worth of Control Blades, Total Excess Reactivity, Reactivity Insertion Rate and Shutdown Margin) (Partial – Completion of Blade Drops and Work on Documentation and Reactivity Calculations) (Due 13 February 2004).
16–27 Feb 04	B-3	Review of UFTR Standard Operating Procedure Manuals for Completeness (Partial – Generation of Review Standard for Transmission to Manual Holders (Due 30 September 2003).
26 Feb 04	Q-6	Check of Posting Requirements (Due 29 February 2004).
26 Feb 04	S-4	Measurement of Argon-41 Stack Concentration (Includes Measurement of Dilution Air Flow Rate) (Partial – Samples Taken and Counted) (Due 24 February 2004).

TABLE V-1

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

Date		Surveillance/Check/Test Description
1 Mar 04	S-12	Review of Requalification Training Program Binders (Due 1 January 2004).
1–2 Mar 04	B-3	Review of UFTR Standard Operating Procedure Manuals for Completeness (Completion of Review of All 6 Controlled Copies and 5 of 9 Information Copies to Meet Surveillance Requirements) (Due 30 September 2003).
2–5 Mar 04	S-4	Measurement of Argon-41 Stack Concentration (Includes Measurement of Dilution Air Flow Rate) (Completion of Analysis and Documentation) (Due 24 February 2004).
3–11 Mar 04	S-2	Annual Reactivity Measurements (Worth of Control Blades, Total Excess Reactivity, Reactivity Insertion Rate and Shutdown Margin) (Verification Run and Completion of Documentation) (Due 13 February 2004).
5 Mar 04	Q-4	Radiological Survey of Unrestricted Areas (Due 31 March 2004).
8–22 Mar 04	A-2	UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance (Due 24 February 2004).
15 Mar 04	S-7	Semiannual Check (Replacement) of Security System Batteries (Partial to Replace Certain Alarm Batteries) (Not Due).
17 Mar 04	Q-6	Check of Posting Requirements (Partial to Post Updated Energy Generation Memorandum and Updated Blade Worth Curves (Not Due).
22 Mar 04	A-4	Check/Replacement of Fire Alarm System Monitoring Station Batteries (Due 31 March 2004).
22 Mar 04	A-7	Visual Inspection of Emergency SCBA MSA Model 401 Tanks (Due 6 January 2004).
22 Mar 04	Q-7	Check of UFTR Building Fire Alarm System (Zone 1 – Reactor Cell and Control Room) (Due 16 March 2004).
22 Mar 04	Q-5	Radiological Survey of Restricted Areas (Due 31 March 2004).
25 Mar 04	Q-1	Check of Scram Functions (Due 31 March 2004).

TABLE V-1

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

Date		Surveillance/Check/Test Description
6 Apr 04	A-3	Annual Measurement of UFTR Temperature Coefficient of Reactivity (Failed Due to Trip) (Due 3 March 2004).
7 Apr 04	S-7	Semiannual Check (Replacement) of Security System Batteries (Due 30 April 2004).
7–8 Apr 04	S-3	Semiannual Inventory of Special Nuclear Material (Due 1 April 2004).
9 Apr 04	S-6	UFTR Semiannual Security Plan Key Inventory (Due 1 April 2004).
12 Apr 04	Q-8	Quarterly Report of Safeguards Events (Due 1 April 2004).
14 Apr 04	Q-3	Radiological Emergency Evacuation Drill (Due 17 March 2004).
14 Apr 04	B-3	Review of UFTR Standard Operating Procedure Manuals for Completeness (Completion of Review of Information Copy #3 for RSRS Chair – Regenerated) (Due 30 September 2003).
29 Apr 04	Q-2	Calibration Check of Area and Stack Radiation Monitors (Due 15 April 2004).
29 Apr 04	Q-9	Calibration Check of Air Particulate Detector (AIM3BL) (Due 15 April 2004).
30 Apr 04	A-6	Physical Inventory for Security-Related Locks/Cores (Due 31 March 2004).
3 May 04	Q-10	Temperature Monitor/Recorder Data Transfer for Storage (Due 1 April 2004).
3 May 04	A-3	Annual Measurement of UFTR Temperature Coefficient of Reactivity (Due 3 March 2004).
5–31 May 04	A-1	Instrument and Test Equipment Calibration (Sent Out FLUKE Multimeter 87-III, OMEGA Thermocouple Reader and Kurz Minianemometer with Return of First Two) (Due 31 January 2004).
6 May 04	S-7	Semiannual Check (Replacement) of Security System Batteries (Not Due – Partial to Change Out 4 Volt Rechargeable Batteries Due to Low Voltage).

TABLE V-1

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

Date		Surveillance/Check/Test Description
20 May 04	Q-9	Calibration Check of Air Particulate Detector (AMS4) (Due 22 April 2004).
26 May 04	S-8	Leak Check of PuBe/SbBe Neutron Sources (Due 30 April 2004).
27 May 04	B-3	Review of UFTR Standard Operating Procedure Manuals for Completeness (Completion of Review of Information Copies #4 and #7) (Due 30 September 2003).
10 Jun 04	S-10	Check and Update of Emergency Call Lists (Partial to Post Call Lists #1, #2 and #3, Updated to Reflect Reactor Cell Personnel Access) (Not Due).
18 Jun 04	Q-7	Check of UFTR Building Fire Alarm System (Zone 2 – Downstairs Offices and Laboratories) (Due 22 June 2003).
20 Jun 04	Q-6	Check of Posting Requirements (Due 23 May 2004).
22 Jun 04	A-1	Instrument and Test Equipment Calibration (Kurz Minianemometer Returned and Surveillance Closed Out) (Due 31 January 2004).20 June 03 S-5 Measurement of Control Blade Controlled Insertion Times (Done Early – Not Due Until August 11, 2003).
1 Jul 04	Q-1	Check of Scram Functions (Due 25 June 2004).
2 Jul 04	Q-4	Radiological Survey of Unrestricted Areas (Due 5 June 2004).
2 Jul 04	Q-5	Radiological Survey of Restricted Areas (Due 22 June 2004).
13 Jul 04	Q-8	Quarterly Report of Safeguards Events (Due 1 July 2004).
14 Jul 04	S-7	Semiannual Check (Replacement) of Security System Batteries (Partial to Replace 4 Volt Rechargeable Batteries (Not Due).
26 Jul 04	S-9	Replacement of Deep Well Secondary Pump Fuses (Due 30 June 2004).
27 Jul 04	Q-3	Radiological Emergency Evacuation Drill (Due 30 June 2004).
27 Jul 04	S-1	Measurement of Control Blade Drop Times (S-2 Blade Not Measured Due to Sticking) (Due 17 June 2004).
27 Jul 04	S-5	Measurement of Control Blade Controlled Insertion Times (Due 17 June 2004).

TABLE V-1

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

Date		Surveillance/Check/Test Description
27 Jul 04	S-11	Replacement of Control Blade Clutch Current Light Bulbs (Due 17 June 2004).
27 Jul 04	Q-2	Calibration Check of Area and Stack Radiation Monitors (Due 29 July 2004).
28 Jul 04	Q-10	Temperature Monitor/Recorder Data Transfer for Storage (Due 1 July 2004).
28 Jul 04	Q-9	Calibration Check of Air Particulate Detector (AIM3BL) (Due 29 July 2004).
28 Jul 04	Q-9	Calibration Check of Air Particulate Detector (AMS4) (Due 31 July 2004).
6 Aug 04	S-1	Measurement of Control Blade Drop Times (S-2 Blade Measured Due to Sticking) (Due 17 June 2004).
6 Aug 04	S-5	Measurement of Control Blade Controlled Insertion Times (S-2 Blade Measured Due to Sticking) (Not Due).
20/22 Aug 04	S-10	Check and Update of Emergency Call Lists (Due 22 June 2004).

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

Note: Required UFTR surveillances, checks and tests are up to date at the end of the reporting year. In some years, surveillances have been carried over to the new year within the allowable interval; such is the case this year for the Q-6, S-4, S-12, A-5, V-1 and V-2 surveillances, all of which were subsequently completed within the required interval or with the case of V-1 and V-2 surveillances, the UFTR Tech Specs were changed to extend the interval so they became X-1 and X-2 surveillances.

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
16 Mar 1994	After the new area radiation monitoring system including a 19-inch rack, recorder, computer console, battery backup, probes, attachments, cabling and hardware was received, MLP #94-14 was used to control setup of the new ARM system including connecting the battery power supply and the recording module. During April 1994, the new detectors were also mounted. During May 1994, electrical cables were run from the detectors to the control room monitors. Actual on-line installation of the new system will require a modification package which is partially prepared. No work has been accomplished since May 1994, again primarily because of relatively trouble-free operation though the recent problems with the North ARM under MLP #03-06 and the East ARM under MLP #03-25 may indicate a need to reconsider as some time was spent in June 2003 performing bench top checks of the new B-91-9111 Microdata Logger system. (MLP #94-14 remains open.)
11 Nov 1996	Following one spurious security alarm on November 10 and two alarms on November 11, 1996, the security system batteries were checked and replaced (S-7 Surveillance). Under MLP #96-30 the rechargeable batteries were found to be low and were recharged. Subsequently, 10 CFR 50.59 Evaluation Number 96-13 was developed to allow modification and replacement of the power pack to prevent recurrence of the problem of spurious alarms due to low voltage. Measurements were made and security system circuits checked and verified. In addition, the 6 volt batteries were recharged in mid-month. At the end of November 1996, design and development of a new power pack per 10 CFR 50.59 Evaluation Number 96-13 were in progress. At the end of December 1996, the 10 CFR 50.59 Evaluation is complete as is the design. On January 7, 1997, the new power supply was installed 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 driver 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,

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	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.
	The 4 volt rechargeable batteries were replaced 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.
	The 4 volt rechargeable batteries were replaced again on 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 and November 5, 1999, while a full S-7 Surveillance without replacement of the 4 volt batteries was conducted on November 11, 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

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	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. There had been no further need for replacement until completion of the full S-7 Surveillance on November 7, 2003. Subsequently, the 4 volt rechargeable batteries were replaced again on December 11, 2003. The 4 volt rechargeable batteries were replaced again on January 22, 2004 with another full S-7 Surveillance conducted on April 7, 2004. Subsequently, the 4 volt rechargeable batteries were replaced again on May 6, 2004 and on July 14, 2004. (MLP #96 30 remains open.)
14 Oct 02	During some counting checks, the single channel analyzer (SCA) and timer/counter modules on the counting experiment equipment rack were noted to be giving spurious counting results. Under MLP #02-26, the portable bin SCA and timer/counter modules were transferred to the NRE electronics engineer under an NRE work request for troubleshooting and repair with no results to date as the modules were returned with no work performed before the electronics engineer's last workday on January 31, 2003. (MLP #02-26 remains open.)
3 Sep 03	During the daily preoperational check, the Safety Channel 1 high power trip was noted to have moved down (conservative) from 125% to 120% power. Under MLP #03-36, the Safety Channel 1 Trip Adjust was reset to 125% power and confirmed in a subsequent daily preoperational check with no further problems noted. (On 3 September 2003, MLP #03-36 was closed.)
4 Sep 03	During a preoperational check the AMS^4 recorder was noted to be giving no response. Under MLP #03-37, the recorder was disassembled and the striker was glued back together but upon reassembly was found to be too short. Parts were obtained and the striker reglued on the assembly and resistors were replaced to give proper response. [Two strikers and a new Model 288 Rustrak recorder were also ordered for future use.] The striker unit was then soldered and the recorder reassembled and reconnected to the AMS^4. Inputs and outputs were verified to be satisfactory as the striker was verified to follow a known input with no further problems noted. (On 10 September 2003, MLP #03-37 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
4 Sep 03	During utilization of the demineralized water from the city water line, the resistivity was noted to be dropping near the acceptable limit. Under MLP #03-38, the city water demineralizer resins were replaced to restore the reactor cell source of high resistivity water with no further problems noted. (On 4 September 2003, MLP #03-38 was closed.)
5 Sep 03	A reactor building stairwell light was noted to be out so the outage was called in and determined to be previously reported by Building Services under MWO #685779 on September 5. After calling it in again on September 15, PPD technician Chris West and an assistant finally made repairs and replaced the light on September 17 with no problems noted. (On 17 September 2003, MWO #685779 was closed.)
8 Sep 03	Following a violent storm, two PPD technicians visited and checked the reactor cell roof to note a broken seam on a cap. Under MWO #684566, called in on September 8, two other PPD technicians visited on September 9 and located a loose solder joint. They resoldered the joint in several locations to correct the problem before leakage would develop with no further problems noted. (On 9 September 2003, MWO #684566 was closed.)
10 Sep 03	At approximately 1538 hours on September 10, a power outage occurred on the UF campus involving many buildings to the north and west of the reactor resulting in loss of normal building electrical power during a daily preoperational check which was canceled and a security alarm which was transmitted to UPD dispatch. As usual, the diesel generator actuated to restore power to much of the building with the security alarm cleared at about 1550 hours and the facility assured okay. At about 1600 hours, as a student tour was being conducted in the classroom a small fire was noted in the power transfer timer coil for the diesel generator in the power transfer box at the back of the laboratory in the northwest corner which was extinguished as the coil burned up, apparently due to non-switching from diesel generator power back to normal A/C power as normal power returned following the outage. The tour was concluded by SRO W.G. Vernetson and the incident investigated initially by SRO B. Shea. The result was a loss of power to the control room and another security alarm. PPD dispatch was contacted and under MWO #684945 and MLP #03-39, first one evaluator and then another PPD technician (Roderick Jones) visited. Subsequently, dispatch and the PPD director's office was contacted to indicate the problem required immediate attention. Finally, PPD assistant director Woody Bradshaw and electrician Mike Williams arrived to remove the diesel generator input and restore normal A/C power to

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	the control room and clear the security alarm to restore the reactor to normal condition. Since no claim is made for the diesel generator in any safety analysis, it is not required and was so evaluated with all systems responding normally at 1730 hours. Subsequently, the security event was reviewed as minor with compensation implemented. On September 12, electrician supervisor Mike Thomas and electrician Mike Flinchum visited to identify parts to be replaced to restore the diesel generator backup power source. Subsequently, on September 19, electrician Mike Williams replaced the contactor and timing coil for the transfer switch, first with one rated incorrectly at 110 volts which began to overheat and then with a properly rated one at 220 volts, to restore the diesel generator backup power transfer with no further problems noted to close out this maintenance issue and with no impact on facility safety or the health and safety of reactor personnel or the public. (On 19 September 2003, MLP #03-39 and MWO #684945 were closed.)
9 Oct 03	During a walk through, the secondary flow meter was noted to give no movement or indication. Under MLP #03-40, the meter was disassembled and checked with debris removed from the magnet and waterproof sealant applied. Subsequently, on October 10, 2003, the magnet was noted to be out of position so a replacement magnet was reapplied. On October 11, the meter was reassembled and functionally tested to be operating satisfactorily. Close out was delayed since the reactor was not needed to be run with no further problems noted. (On 15 October 2003, MLP 03-40 was closed.)
9 Oct 03	During a walk through, the east area radiation monitor recorder was noted to give no response to the check source. Under MLP #03-41, the east and north recorders were temporarily switched with the recorder continuing to give no response indicating a problem in the recorder itself. Subsequently, on October 10, 2003, a broken terminal was found on the recorder. The terminal was replaced and the recorder reinstalled into the system and verified to be responding properly on October 10 with no further problems noted. Since the reactor was not needed, closeout was delayed to verify no problems would recur. (On 15 October 2003, MLP #03-41 was closed.)
27 Oct 03	During the weekly checkout, the primary coolant storage tank level was noted to be nearing replacement level. Under MLP #03-42, 41 gallons of demineralized water was added to the tank to raise the level from 20⅛" to 26¾" to restore proper level with no problems noted. (On 27 October 2003, MLP #03-42 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
9 Dec 03	During the weekly checkout, it was noted that the resins in the city water demineralizer were becoming depleted. Under MLP #03-43, the resins were replaced to restore the source of high resistivity makeup water for the facility with no problems noted. (On 9 December 2003, MLP #03-43 was closed.)
19 Jan 04	During the weekly checkout, the primary coolant storage tank level was noted to be nearing replacement level. Under MLP #04-01, 46 gallons of demineralized water was added to the tank to raise the level from 20¼" to 26⅞" to restore proper level with no problems noted. (On 19 January 2004, MLP #04-01 was closed.)
22 Jan 04	During performance of the daily operational checks, the east area radiation monitor recorder was noted to be acceptable but the striker was not recording on all motions. Under MLP #04-02, the striker mechanism was disassembled, adjusted, reassembled and verified to be tracking properly with no further problems noted as it was returned to service. (On 22 January 2004, MLP #04-02 was closed.)
9 Feb 04	For some time the reactor cell control lock on the west NAA Laboratory access door had been failing. This problem was called into Work Management on February 9, 2004. Under MWO #706382 on February 20, 2004, a PPD locksmith replaced part of the lock mechanism, not the core, to restore proper operation of the access control lock with no further problems noted. (On 10 February 2004, MWO #706382 was closed.)
24 Feb 04	For some time the L-3/165828 handheld survey meter was failed, apparently due to a failed GM probe. A duplicate replacement probe was obtained and, under MLP #04-03, it was installed on the detector on February 24, 2004 to restore operation. The detector was then transferred to the radiation control technician for a calibration check to assure proper operation with the detector not yet returned at month's end. Upon return on March 11, 2004, the survey meter was returned to service with no further problems noted. (On 11 March 2004, MLP #04-03 was closed.)
2 Mar 04	For some time the cell overhead lighting was in need of having some bulbs replaced. Originally called in under MWO #684938 on September 10, 2003, both PPD and UFTR conflicts delayed this work. Under MLP #04-04/MWO #684938, all burned out ceiling lights and one ballast were replaced by two PPD electricians assisted by a PPD electrician-trainee to restore high level cell lighting with no further problems noted. (On 2 March 2004, MLP #04-04/MWO #684938 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
8 Mar 04	During the weekly checkout, the shield tank filter demineralizer cartridge was noted to need replacement. Under MLP #04-05, the cartridge was replaced, a small leak was sealed and the demineralizer system returned to service with no further problems noted. (On 8 March 2004, MLP #04-05 was closed.)
9 Mar 04	During performance of the pre-calorimetric portion of the A-2 Surveillance (UFTR Nuclear Instrumentation Calibration Check and Calorimetric Heat Balance), certain voltages and setpoints were noted to require minor adjustments as expected. Under MLP #04-06, various voltages and setpoints were adjusted to assure proper nuclear instrumentation calibration with no further changes needed at the conclusion of the post-calorimetric checks. (19 March 2004, MLP #04-06 was closed.)
26 Mar 04	For some time the door lock from the upstairs door between the Nuclear Sciences Center and the Reactor Building was becoming progressively more difficult to operate. Under MWO #713189, on March 26, 2004, a locksmith from the PPD key shop examined the lock and determined it needed replacement. Subsequently, on March 29, 2004, the cylinder was replaced with the only apparent problem being that the lock was sometimes difficult to operate with the Director's master key but no other problems were noted. (On 29 March 2004, MWO #713189 was closed)
5 Apr 04	On April 5, 2004, the PPD key shop was notified through Work Management that the Facility Director's master key was only working intermittently in the new lock installed in the upstairs south door entrance from the Nuclear Science Building. Under MWO #714605, the PPD locksmith returned came by to examine the key and suggested a replacement. Within a few minutes, a new master key was received, tested and exchanged for the old key with no further problems noted. (On 5 April 2004, MWO #714605 was closed.)
6 Apr 04	On April 6, 2004, the reactor commenced startup at 1331 hours for measurement of the temperature coefficient of reactivity (A-3 Surveillance) completing two hours at full power at 1557 hours. As power was lowered to secure the secondary cooling below 1 kW, the secondary pump was secured at ~>300 watts at 1559 hours, a process scram (SEC PRESS) trip occurred inserting all control blades after the 10 second delay. The reactor was secured at 1600 hours with all safety and control systems noted to respond properly with some review of schematics and trip evaluation undertaken. Subsequently, under MLP #04-07 opened on April 7, 2004, schematics of the scram logic and bistable trip circuits were reviewed. A test of the K22 relay operability was

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	verified satisfactory at 1 kW, a check of the secondary flow bistable functionality was verified satisfactory. The K22 relay was noted to energize at about 800 watts and deenergize at about 400 watts due to hysteris built into the bistable card. After consultation with electronics engineer D. Ekdahl, the decision was made to monitor for any change in hysteris over time; if significant change is found then the bistable would need to be repaired, probably involving check of the feedback resistor in the circuit. As it is, the system is somewhat more conservative than necessary, but it was evaluated as acceptable with the maintenance checks and evaluation concluded on April 7 with successful completion of the daily preoperational checks. Completed UFTR Form SOP-0.6A (Unscheduled Reactor Trip Review and Evaluation) approving restart was completed on April 7 and is Attachment I to April 2004 monthly report. Because this trip was from a known cause with all safety systems responding properly and the trip conservative anyway, this event is not considered promptly reportable. This occurrence is evaluated to have had minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with no further problems noted. (On 7 April 2004, MLP #04-07 was closed.)
23 April 04	During performance of the daily preoperational checkout on April 23, 2004, near completion, the log (green) pen of the two-pen recorder was noted to be unresponsive and later to be alternately sluggish or non-responsive. Since this failure was discovered during checkout and previous operations showed proper response, this occurrence was not reportable and did not challenge any operations. Under MLP #04-08 opened on April 23, 2004, a pinched wire leading to the log pen was repaired but had no effect as the green pen was noted to be erratic regardless of signal input indicating a probable faulty component—either the pen motor or the card. Subsequently, on April 24, the wide range drawer signal to the green pen was verified; the power signal from the transformer card was also verified good. An oscilloscope connected to the signal to the motor showed a spurious signal regardless of change to the input signal from the wide range drawer which isolated the problem to a faulty L708.5 card for the green pen. After some discussions and verification that in-house repairs were not advised, a L708.5 card was ordered from Linseis on April 26 with the module replaced on April 28 and proper operation verified on April 29 with operation to full power to confirm green pen response over its full range with no further problems noted as the maintenance was closed out and normal operations resumed after the verification run on April 29, 2004. This occurrence is evaluated to have minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with no further problems noted. (On 29 April 2004, MLP #04-08 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
3 May 04	During the weekly checkout, the primary coolant storage tank level was noted to be nearing replacement level. Under MLP #04-09, 48 gallons of demineralized water were added to the tank to raise the level from 20" to 27" to restore proper level with no problems noted as confirmed with a PPD electrician. (On 3 May 2004, MLP #04-09 was closed.)
5 May 04	During a walk-through on May 4, 2004, the floodlights for the west fenced lot were noted to be burned out. Since these are handled by Physical Plant Division personnel, MWO #718738 was called in on May 5, 2004. Subsequently, the floodlights were noted to be replaced in a walk-through on May 7, 2004 with no further problems noted. (On 7 May 2004, MWO #718738 was closed.)
18 May 04	On May 17, 2004, water on the downstairs hallway floor outside the restroom seemed to be coming from the floor. This was confirmed on May 18, 2004 so MWO #720895 was called in. Subsequently, the PPD plumbing supervisor determined this was not a pipe problem but was due to leakage from the air-handling unit. After several different personnel checked the air handler, it was finally decided by the maintenance superintendent that the air handler simply needed to be cleaned. The system was steam cleaned on May 25, 2004 by of Keith Smith AC Cleaning Services to correct the leakage problem as confirmed by a PPD HVAC technician on May 26 and separately by the PPD maintenance superintendent on May 26 and May 27, 2004. In parallel with maintenance efforts, PPD personnel removed all the damaged tile and received approval to replace it. Replacement of the tile was begun on June 1 and completed on June 3, 2004 with no further problems noted. (On 3 June 2004, MWO #720895 was closed.)
27 May 04	On May 27, 2004, during the daily preoperational checkout, the Safety 1 high power scram was noted to be giving a blade drop with no scram annunciator indicating blade drop. Under MLP #04-10, this malfunction was verified several times for several blades as the preliminary diagnosis was that the Safety 1 high power bistable was misaligned or the scram relay was malfunctioning. After checking system diagrams, it was decided that the applicable K3 relay mechanical behavior was simply losing effectiveness. After replacing the K3 relay, there was a marked improvement in the Safety Channel 1 annunciator and blade drop behavior. This behavior is noted to be a limitation of the mechanical relay system and can be improved by using relays with less wear as was accomplished here. The proper trip behavior was tested several times to

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	conclude the daily checkout with a subsequent daily checkout on May 28 also showing proper behavior. Since this occurrence was discovered during a preoperational check and corrected, it is not considered to be promptly reportable. This occurrence is also evaluated to have minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with no further problems noted. (On 27 May 2004, MLP #04-10 was closed.)
4 Jun 04	Late in the afternoon on June 4, 2004, as materials were being moved for storage in the reactor support facility shop, the key broke off in the lock. Under MWO #800560, PPD locksmith Mike Mikulski removed the broken key on June 4 and returned with a replacement key verified to work properly on June 7, 2004 with no further problems noted. (On 7 June 2004, MWO #800560 was closed.)
30 Jun 04	Upon completion of the daily checkout at 1315 hours in preparation for a possible reactor operation later in the afternoon, the operator removed the key, inadvertently moving it back to operate, closing the already opened dump valve resulting in a broken rupture disk at 1315 hours with the reactor secured. The RCO was informed of the break at 1325 hours. Under MLP #04-11, opened to address this breakage, the radiation levels in the pit were verified to be low at ~1.0 foot above the pit floor using the E140/1048 meter at ~1600 hours at <0.01 mR/hr everywhere except on the side nearest the demineralizer resin where 0.02 mR/hr was measured. With low radiation levels, a hose was lowered and the primary coolant in the pit sampled and verified to have low radioactivity content with ~50 gallons pumped to a holdup tank. On July 1, 2004, the pit was verified not to be contaminated and the rupture disk was replaced under a Radiation Work Permit (RWP #04-01-II) with the loop verified leak tight following completion of rupture disk replacement. The Maintenance Log Page and Radiation Work Permit were closed on July 1 though housekeeping and documentation efforts continued to July 2, 2004. This occurrence was caused by operator error and is not considered to be promptly reportable as all safety systems responded properly. This occurrence is evaluated to have had minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff with all systems responding as designed. (On 1 July 2004, MLP #04-11 was closed.)
1 Jul 04	During a weekly checkout in late June, the primary coolant storage tank level was noted to be nearing replacement level. After replacement of the broken rupture disk on July 1, the level was below the allowed level. Under MLP #04-12, 68 gallons of demineralized water were added to the tank to raise the level from 16" to 24¾" to

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	restore proper level with no problems noted. (On 1 July 2004, MLP #04-12 was closed.)
23 Jul 04	After a walk-through revealed no apparent problems, reactor startup commenced at 1045 hours on July 23, 2004 and 100 kW was reached at 1107 hours in preparation to irradiate samples via the rabbit system. The rabbit system was energized at 1117 hours and a test capsule inserted at 1120 hours to verify operation. Reactivity effects indicated the capsule entered the core and left the core but did not return to the receiving station. After three unsuccessful efforts to return the test capsule, an unscheduled shutdown was commenced at 1122 hours with the reactor shutdown and secured at 1124 hours. A subsequent walk-down revealed a partial break in the rabbit exhaust line preventing completion of capsule return. Under MLP #04-13, swipes were taken around the cracked line and revealed no contamination on the line or other nearby areas. The broken line was repaired using duct tape as a temporary fix. With SRO Vernetson observing the line, the rabbit system capsule return was activated and the test capsule returned without being seen by the observer in the cell indicating the capsule was apparently returned to the wall before losing momentum. The rabbit system was then purged, secured and deenergized with the valves closed at 1141. Subsequently, additional duct tape was used to improve the integrity of the polyethylene purge line with two tests conducted with the reactor secured to prove proper operation with the temporary fix and the system approved for operation by the Facility Director and the Radiation Control Officer. Subsequently, on July 23, the system was utilized with no problems. However, on July 26, 2004, the crack was noted to be shear through wall so another better temporary fix was implemented under MLP #04-13 to provide better support for the two ends of the break which are under considerable stress. Again the system was declared operable and utilized without any problem. Nevertheless, the intent was to implement a permanent repair in the near future. Subsequently, on August 5, 2004, tubing was cut to assure proper pressure fitting with pressure fitting applied and the rabbit system leak tested satisfactorily after several adjustments to implement the necessary permanent vent line repair with no further problems noted. Based upon the completed unscheduled shutdown evaluation, this occurrence is evaluated to have minimal impact on reactor safety and no impact on the health and safety of the public or reactor staff. The completed UFTR Form SOP-0.6B (Unscheduled Shutdown Review and Evaluation) is Attachment I to the July 2004 monthly report. (On 23 July 2004, 26 July 2004, and 5 August 2004, MLP #04-13 was closed.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
27 Jul 04	During performance of the control blade drop time measurements (S-1 Surveillance), the Safety-2 blade was noted not to drop from above about 900 units. Under MLP #04-14 on July 27, 2004, various checks showed drops at 200, 500 and 800 units, among other values, to be normal and the blade was able to be driven in but was delayed from near 900 units and above. In addition, the controlled insertion time (S-5 Surveillance) was normal as was the weekly removal time. On July 28, 2004, the Safety-2 blade was removed to full withdrawal and dropped to the sticking point at ~900 units. Following a very slight tap on the control blade through the right angle gear box, the blade dropped, though it seemed to exceed the requisite <1 sec time. This response and past experience was evaluated to indicate that a slight change in the external shimming for this blade could restore the proper drop time. At the end of July 2004, plans were being formulated for addressing the Safety-2 blade failure to drop, dependent on personnel availability. The S-2 control blade behaved similarly in June 2003, where the problem was determined to be the clutch and it was promptly replaced. It was decided to begin troubleshooting with an evaluation of the gearing and bearing systems associated with the S-2 blade. Both the in-core blade and blade drive mechanisms are considered well protected from outside mechanical contamination, 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, the decision was made on August 5, 2004 to disassemble and evaluate the control drive mechanism. No obvious signs of mechanical binding could be seen. The mechanism was partially assembled to allow for an alignment of the main control blade shaft and the drive mechanism to ensure the linkage was able to move freely over the entire range necessary for reactor operations. With the alignment complete (a small change in shimming), the S-2 control blade was fully withdrawn and subsequently successfully dropped by removing clutch current 25 times. An unofficial drop time was recorded and was within the technical specifications requirement of less than 1 second. Subsequently, on August 6, 2004, the weekly checkout removal time was measured to be normal (107 seconds); the controlled insertion time (S-5 surveillance) was also measured to be normal (105 seconds). The official drop time (S-1 Surveillance) for full out was measured to be improved from 0.88 sec on December 17, 2003 to 0.77 sec on August 6, 2004.

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
	With successful completion of all checks and surveillance activities, a start up to one watt was authorized and conducted on August 10, 2004. All systems were noted to respond properly with the critical position for the control blades (S-1/ S-2/S-3/RB) established at 800/800/800/357 and noted to be essentially unchanged from the previously established position (800/800/800/356) from April 1, 2004. Subsequently the reactor was returned to normal operations on August 10, 2004 with concurrence of the Facility Director with no further problems noted. A memorandum summarizing this failure to drop and subsequent corrective action is Attachment I to the August 2004 monthly report. The net result is that this occurrence (failure to drop and reshimming) was evaluated to have had minimal impact on reactor safety and no impact on the health and safety of the public. (On 10 August 2004, MLP #04-14 was closed.)
28 Jul 04	During the weekly checkout on July 26, 2004, the resistivity level of the makeup water provided by the demineralizer system for the city water was noted to be indicating near end of life for the resins. Under MLP #04-15, the resins were replaced to restore the source of high resistivity makeup water for the reactor facility with no problems noted. (On 28 July 2004, MLP #04-15 was closed.)
5 Aug 04	For some time, plans had been made to conduct work in the west lot for the Weil Replacement Chill Water project including meetings, discussions and visits for measurements by and for various personnel including UF PPD Project Manager Jeff Bair, PPI supervisor Troy Lauramore, Matt Seales of Perry Construction and foreman Jimbo Williams of WW Gay. Initial work began under MWO #0674958 on August 5, 2004 with temporary movement of the north section of the west lot fence to allow clearing room for pipes under supervision of WW Gay foreman Jimbo Williams. No further work was accomplished inside the fenced area until August 18, 2004. Subsequently, holes were drilled in the reactor cell west wall under 10 CFR 50.59 Evaluation and Determination Number 04-01 (Modification/Upgrade of Chilled Water System for Reactor Building – Pipe Supports/Wall Anchors) to provide anchoring for the chill water line pipe supports on August 19, 2004. The minutes of the August 19, 2004 meeting of the RSRS Executive Committee which reviewed and approved these anchors is Attachment II to the August 2004 monthly report. With installation of the main chill water pipes below ground leading into the west lot, the west lot fence was restored to its original location in improved condition on August 20, 2004 as Tom Quarles of Florida Enterprise Corporation replaced the barbed wire as well. At year's end the main piping is in place and efforts involving daily access are underway to complete the pipe installation (MWO #0674958 remains open).

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
24 Aug 04	During the weekly checkout on August 23, 2004, the primary coolant storage tank level was noted to be nearing replacement level as it had not been completely filled after replacement of the broken rupture disk on July 1. Under MLP #04-16, 34 gallons of demineralized water were added to the tank to raise the level from 21¼" to 26" to restore proper level with no problems noted. (On 24 August 2004, MLP #04-16 was closed.)
24 Aug 04	During performance of the preoperational checks, the log (green) pen in the wide range drawer was noted not to be responding. Under MLP #04-17 the problem was isolated to the two-pen recorder with the O/M switch then noted to be out of position. After returning the O/M switch to proper position, the system was verified to be operating properly with no further problems noted. (On 24 August 2004, MLP #04-17 was closed.)
25 Aug 04	For several weeks the facility gas flow proportional counter system (PCC 11T/7508) was noted to be out of order due to a failed voltage adjustment potentiometer. Under MLP #04-18, the failed voltage adjustment potentiometer was replaced with an on-hand spare removed from another nonworking system. At year's end, the facility gas flow proportional counter system appears to be operable but awaits proper calibration prior to use. (MLP #04-18 remains open.)
25 Aug 04	On August 24, 2004, a small hot water/steam line leak was noted to be continuing above the downstairs rabbit system area from the overhead air handler unit for the upstairs offices. This small leak had been seen previously but was now verified to be continuing so MWO #0812045 was called in to Physical Plant Division with visits by a number of PPD personnel on August 24 to plan work. Subsequently, under MLP #04-19/MWO #0812045, on August 25, 2004, the leak was repaired with Zone 2 of the fire alarm monitoring system bypassed and properly compensated for a number of hours while welding was occurring. Subsequently, after completion of repairs, the fire alarm monitoring system was returned to normal with no further problems noted. (On 25 August 2004, MLP #04-19/MWO #0812045 were closed out.)

TABLE V-2

CHRONOLOGICAL TABULATION OF UFTR PREVENTIVE/CORRECTIVE MAINTENANCE

Date	Maintenance Description
25 Aug 04	After noting some small decrease in the stack dilute fan rpm indication, MWO #0812197 was opened with two PPD mechanical technicians (Ross Henderson and Jesse Fleming) visiting on August 26 and returning on August 27, 2004 to replace filters on stack dilute fan intake room and to identify and order the proper replacement belts for the dilute fan drive motor. At year's end, PPD awaits delivery of the replacement belts. (MWO #0812197 remains open.)

MLP #94-14 remains open from 16 March 1994 (Replacement ARM System).
MLP #96-30 remains open from 11 November 1996 (Rechargeable Batteries).
MLP #02-26 remains open from 14 October 2002 (Portable Nimbin SCA and Timer/Counter Modules).
MWO #0674958 remains open from 5 August 2004 (Weil Replacement Chill Water Project).
MLP #04-18 remains open from 25 August 2004 (Gas Flow Proportional Counter).
MWO #0812197 remains open from 25 August 2004 (Replacement of Stack Dilute Fan Drive Motor Fan Belts).

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 2003–4 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 or 2003–4 reporting years.

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. During the 2003–4 reporting year, in contrast to many earlier previous years, two new procedures were generated. These include titles as follows:

- UFTR SOP-0.9, "Handling Incoming Suspicious Mail (Letters/Packages) and Shipments" (REV 0, 3/04)
- UFTR SOP-F.9, "Control of UFTR Vehicular Access"

Both procedures were generated for better control of facility activities and are available for review as allowed, though SOP-F.9 is withheld from public disclosure.

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 (2002–3) 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 (2003–4) 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 were eight revisions 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 2003–4 reporting year, and, in some cases, simply to update the computer medium/format of storage for the procedure.

During the 2003–4 reporting year, a total of eight revisions were generated as follows:

- UFTR SOP-0.1, "Operating Document Controls" (REV 3, 9/03)
- UFTR SOP-0.2, "Control of Maintenance" (REV 5, 9/03)
- UFTR SOP-0.8, "Control and Documentation of Operator Licensing Requalification Training and Examinations" (REV 2, 9/03)
- UFTR SOP-A.6, "Operation of Secondary Cooling Water" (REV 4, 9/03)
- UFTR SOP-A.7, "Determination of Control Blade Integral or Differential Reactivity Worth" (REV 2, 9/03)
- UFTR SOP-D.2, "Radiation Work Permit" (REV 11, 10/03)
- UFTR SOP-E.6, "Argon-41 Concentration Measurement" (REV 10/03)
- UFTR SOP-E.7, "Measurement of Temperature Coefficient of Reactivity" (REV 1, 10/03)

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 2003–4 reporting year, and, in some cases, simply to update the computer medium/format of storage for the procedure.

In previous reporting years, 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, twenty in 2001–2, and four in 2002–3 to correct minor discrepancies or better express the unchanged intent of different procedures. In the 2003–4 reporting year, thirteen TCNs were issued for SOPs including SOP-0.3, SOP-0.4, SOP-0.5, SOP-0.7, SOP-A.1, SOP-A.3, SOP-A.5, SOP-A.8, SOP-C.4, SOP-D.6 and SOP-E.4, with SOP-0.5 having had three TCNs during this 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 or 2003–4 reporting years.

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 continue to be 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 the 2002–3 annual report along with the letter from NRC with no changes occurring during the 2003–4 reporting year.

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 2002–3 or 2003–4 reporting years.

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 or any subsequent 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.

On February 23, 2004, DOE informed the facility that there may be a further delay in UFTR HEU to LEU conversion as some other facilities are being pushed by NRC because of security concerns related to vulnerability assessments. As required, the 2004 updated proposal on the HEU-to-LEU conversion to meet requirements of 10 CFR 50.64(c)(2) was submitted to NRC on March 27 with a letter dated March 26, 2004. 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 2003 (Phase II) and they are not sure about 2004 as they had indicated plans to wait until the UFTR would submit a timely relicensing package for its R-56 license which was done by letter dated July 29, 2002. 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 noncommittal due to recent budget limitations. Nevertheless, we expect to complete a submission within two months of DOE indicating availability of support. The latest proposal cover letter and the updated schedule are Attachment I to the March 2004 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 2001–2 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 the 2002–3 annual report.

An NRC NMSS representative called on May 1 to say May 1, 2003 was the last day to apply for automatic extension and requested an email to confirm that he had called and we would not be allowed to perform the program activities after May 31, 2003. A copy of the confirming email is Attachment XI to the May 2003 monthly report. Subsequently, the NRC NMSS representative called again on October 3, 2003 and indicated the QA Program was not canceled; rather, NRC is waiting to renew it. The Facility Director indicated we were in no hurry and had no plans to use the Program and would have to amend it anyway since it was intended for controlling the SPERT fuel shipment which has been completed. The NRC NMSS representative indicated that if it is canceled, a lot of time and effort could be involved to renew it, so it would be better to renew it and then amend it as needed. He indicated a simple renewal letter was all that was needed and provided an email to that effect. After review of the renewal letter by the RSRS on October 23, the renewal request letter dated October 24, 2003 was submitted to NRC. The renewal submission with attached copy of QA Program Approval 0578, Revision 3 is Attachment II to the October 2003 monthly report. The official QA Program renewal dated November 12, 2003 was received on November 17, 2003; it is valid for five years from the previous date of expiration to May 31, 2008. The letter of notification and the enclosed QA Program Approval 0578, Revision 5 is contained in **Appendix A** of this 2003–4 annual report.

TABLE VI-1

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

0. ADMINISTRATIVE CONTROL PROCEDURES

0.1 Operating Document Controls (REV 2, 7/91)
0.2 Control of Maintenance (REV 4, 5/87)
0.3 Control and Documentation of UFTR Modifications (REV 1, 10/99)
0.4 10 CFR 50.59 Evaluation and Determination (REV 2, 7/00)
0.5 UFTR Quality Assurance Program (REV 3, 2/03)
0.6 Reactor Trip and Unscheduled Shutdown Review and Evaluation (REV 1, 4/02)
0.7 Control of NRC 10 CFR 50 Written Communications Requirements (REV 1, 12/97)
0.8 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, 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)
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, 2004)

0. ADMINISTRATIVE CONTROL PROCEDURES

0.1 Operating Document Controls (REV 3, 9/03)
0.2 Control of Maintenance (REV 5, 9/03)
0.3 Control and Documentation of UFTR Modifications (REV 1, 10/99)
0.4 10 CFR 50.59 Evaluation and Determination (REV 2, 7/00)
0.5 UFTR Quality Assurance Program (REV 3, 2/03)
0.6 Reactor Trip and Unscheduled Shutdown Review and Evaluation (REV 1, 4/02)
0.7 Control of NRC 10 CFR 50 Written Communications Requirements (REV 1, 12/97)
0.8 Operator Licensing Requalification Examination Controls (REV 2, 9/03)
0.9 Handling Incoming Suspicious Mail (Letters/Packages) and Shipments (REV 0, 3/04)

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 4, 9/03)
A.7 Determination of Control Blade Integral or Differential Reactivity Worth (REV 2, 9/03)
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, 2004)

D. RADIATION CONTROL PROCEDURES

D.1 UFTR Radiation Protection and Control (REV 5, 12/93)
D.2 Radiation Work Permit (REV 11, 10/03)
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, 10/03)
E.7 Measurement of Temperature Coefficient of Reactivity (REV 1, 10/03)
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)
F.9 Control of UFTR Vehicular Access (Confidential)

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 2003	2.7352×10^{6} μCi/Month	8.8715×10^{-10} μCi/ml
October 2003	1.6906×10^{6} μCi/Month	5.4832×10^{-10} μCi/ml
November 2003	2.5070×10^{6} μCi/Month	8.1310×10^{-10} μCi/ml
December 2003	7.1789×10^{6} μCi/Month	2.3284×10^{-9} μCi/ml
January 2004	7.0775×10^{6} μCi/Month	2.2955×10^{-9} μCi/ml
February 2004	3.2956×10^{6} μCi/Month	9.6775×10^{-10} μCi/ml
March 2004	7.8632×10^{6} μCi/Month	2.3090×10^{-9} μCi/ml
April 2004	3.4130×10^{6} μCi/Month	7.879×10^{-9} μCi/ml
May 2004	11.0225×10^{6} μCi/Month	3.2368×10^{-9} μCi/ml
June 2004	2.5886×10^{6} μCi/Month	7.6015×10^{-10} μCi/ml
July 2004	4.6819×10^{6} μCi/Month	1.3749×10^{-9} μCi/ml
August 2004	0.2852×10^{6} μCi/Month	8.3754×10^{-11} μCi/ml

TOTAL ARGON-41 Releases for the Reporting Year: 54.3392 Ci

YEARLY AVERAGE ARGON-41 Release Concentration: 1.9570×10^{-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 1.9570×10^{-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 79% of the allowable limit and the second highest is less than 32% 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. 2003 - Jan. 2004	3756.78 μCi/kW-hr	8.773×10^{-8} μCi/ml
Feb. 2004 - Aug. 2004	3726.41 μCi/kW-hr	7.879×10^{-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 7.91×10^{-8} μCi/ml (β-γ) and 4.60×10^{-9} μCi/ml (α) for this 2003-2004 reporting period. There were two discharges from the Wastewater Holdup Tank for this reporting period. On November 10, 2003, 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 3, 2004, a total of 3509 liters were discharged. The discharge contained less than 3.72×10^{-3} μCi of Total Activity, less than 7.37×10^{-3} μCi of Dissolved Activity, and less than 2.20×10^{-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 made 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 fourteen 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 (μ Ci)	Silver-110 Total Activity (μ Ci)
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, 2003 to August, 2004 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, 2003 TO AUGUST 31, 2004

TLD Designation	Total Exposure (mrem) [1]	Month(s) of Exposure
1	6	3/04, 6/04
2	21	12/03,1/04,3/04,4/04,5/04,6/04
3	M	--
4	M	--
5	2	6/04
6	M	--
7	4	12/03,6/04
8	M	--
9	M	--
10	M	--
11	2	6/04
12	2	6/04
13	3	6/04

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

TABLE VII-4B

LUXEL DOSIMETER
EXPOSURE RECORD BY MONTH OF EXPOSURE [1]

TLD Number	Sep 03 (mrem)	Oct 03 (mrem)	Nov 03 (mrem)	Dec 03 (mrem)	Jan 04 (mrem)	Feb 04 (mrem)	Mar 04 (mrem)	Apr 04 (mrem)	May 04 (mrem)	Jun 04 (mrem)	Jul 04 (mrem)	Aug 04 (mrem)
1	M	M	M	M	M	M	2	M	M	4	M	M
2	M	M	M	7	1	M	6	1	2	4	M	M
3	M	M	M	M	M	M	M	M	M	M	M	M
4	M	M	M	M	M	M	M	M	M	M	M	M
5	M	M	M	M	M	M	M	M	M	2	M	M
6	M	M	M	M	M	M	M	M	M	M	M	M
7	M	M	M	2	M	M	M	M	M	2	M	M
8	M	M	M	M	M	M	M	M	M	M	M	M
9	M	M	M	M	M	M	M	M	M	M	M	M
10	M	M	M	M	M	M	M	M	M	M	M	M
11	M	M	M	M	M	M	M	M	M	2	M	M
12	M	M	M	M	M	M	M	M	M	2	M	M
13	M	M	M	M	M	M	M	M	M	3	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	6
B. Shea	Senior Reactor Operator	M
M. Berglund	Reactor Operator Trainee	3
T. Sullivan	Reactor Operator Trainee	M
R. Leug	Reactor Operator Trainee (08/04)	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. Crawford (06/04-08/04)	NAA Lab/Reactor Facility Technician	1
J. Hurtado	NAA Lab/Reactor Facility Technician	M
G. Joseph (06/04-08/04)	NAA Lab/Reactor Facility Technician	2
G. Marinella	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 2003-2004 reporting year. Table VII-8 lists doses for RWP 04-01-II 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, 2003 TO AUGUST 31, 2004

Date	Serial Number	Job Description
07/01/2004	04-01-II	Rupture Disk Replacement

All personnel involved in the replacing of the rupture disk were monitored using prompt-reading dosimeters. During this project two different people received measurable exposures. The exposures are indicated in Table VII-8.

TABLE VII-8

RADIATION EXPOSURE ACQUIRED DURING THE RWP 04-01-II
RUPTURE DISK REPLACEMENT
JULY 2004

Name	Exposure
UFTR Personnel:	
B. Shea	1 mR (whole body)
M. Berglund	1 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
D. Shedlock	12/04/2003	5	Experimenter
M. Perrotti	04/01/2004	2	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

QA PROGRAM RENEWAL NOTIFICATION LETTER
AND
QA PROGRAM APPROVAL 0578, REVISION 5

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001
November 12, 2003

RECEIVED NOV 17 2003

Mr. W. G. Vernetson, Director of Nuclear Facilities
University of Florida
Department of Nuclear and Radiological Engineering
202 Nuclear Sciences Center
P.O. Box 118300
Gainesville, FL 32611-8300

SUBJECT: QUALITY ASSURANCE PROGRAM APPROVAL FOR RADIOACTIVE MATERIAL PACKAGES NO. 0578, REVISION 5

Dear Mr. Vernetson:

Enclosed is the Quality Assurance (QA) Program Approval for Radioactive Material Packages No. 0578, Revision No. 5. This Approval satisfies the requirements of 10 CFR 71.12(b) and 71.101(c) for a QA Program approved by the U. S. Nuclear Regulatory Commission.

This Approval will remain in effect until the expiration date, indicated in Block No. 3. Termination of your materials license does not cause this Approval to be automatically terminated. If you wish to renew, amend, or terminate this Approval, please request it in writing.

Sincerely,

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

NRC FORM 311
(5-2000)
10 CFR 71

U.S. NUCLEAR REGULATORY COMMISSION

QUALITY ASSURANCE PROGRAM APPROVAL
FOR RADIOACTIVE MATERIAL PACKAGES

1. APPROVAL NUMBER: 0578
REVISION NUMBER: 5

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and Title 10, Code of Federal Regulations, Chapter 1, Part 71, and in reliance on statements and representations heretofore made in Item 5 by the organization named in Item 2, the Quality Assurance Program identified in Item 5 is hereby approved. This approval is issued to satisfy the requirements of Section 71.101 of 10 CFR Part 71. This approval is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

2. NAME
University of Florida

STREET ADDRESS
202 Nuclear Sciences Center, P. O. Box 11830

CITY: Gainesville | STATE: FL | ZIP CODE: 32611-8300

3. EXPIRATION DATE: May 31, 2008

4. DOCKET NUMBER: 71-0578

5. QUALITY ASSURANCE PROGRAM APPLICATION DATE(S)
September 30, 1992, April 9, 1998, March 29, 1999, and October 24, 2003

6. CONDITIONS

1. Activities authorized by this approval: procurement, maintenance, repair, and use are to be executed with regard to transportation packagings. All other activities (i.e., design, fabrication, assembly, testing, and modification) shall be satisfied by obtaining certifications from packaging suppliers that these activities were conducted in accordance with an NRC-approved Quality Assurance Program. It shall remain the responsibility of the Quality Assurance Program holder that all transportation activities meet the requirements of 10 CFR 71.101.

2. Records shall be maintained in accordance with the provisions of 10 CFR Part 71. Specifically:

   a. Records of each shipment of licensed material shall be maintained for 3 years after that shipment [10 CFR 71.91(a)].

   b. Records providing evidence of packaging quality shall be maintained for 3 years after the life of the packaging [10 CFR 71.91(b)].

   c. Records describing activities affecting packaging quality shall be maintained for 3 years after this Quality Assurance Program approval is terminated [10 CFR 71.135].

3. Planned and periodic audits of all aspects of the Quality Assurance Program shall be conducted in accordance with written procedures or checklists, by appropriately trained personnel not having direct responsibility in the areas being audited, in accordance with 10 CFR 71.137.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

SIGNATURE: [signature]

DATE: 12 Nov. 2003

ROBERT J. LEWIS, CHIEF
TRANSPORTATION AND STORAGE SAFETY AND INSPECTION SECTION
SPENT FUEL PROJECT OFFICE
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS