UNIVERSITY OF FLORIDA

Nuclear Facilities
Department of Nuclear and Radiological Engineering

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

September 17, 2004

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

Amendment 24 (Draft)
UFTR Technical Specifications

UNIVERSITY OF FLORIDA TRAINING REACTOR
FACILITY LICENSE: R-56, DOCKET NO. 50-83
REQUEST FOR CHANGE IN TECHNICAL SPECIFICATIONS

A proposed amendment to the UFTR Technical Specifications (R-56 License) affecting pages 19 and 21 of the approved Tech Specs is attached. The proposed changes are considered to be minor and will constitute Amendment 24 to the UFTR R-56 License as noted on the text pages. The changes are marked with the usual vertical line(s) in the right-hand margin indicating all amendments to date on these two Tech Spec pages.

The **first change** is on page 19 in Tech Spec Section 4.2.2, "Reactor Control and Safety System Surveillance," in Paragraph (4) which currently reads as follows:

> (4) The mechanical integrity of the control blades and drive system shall be inspected during each incore inspection but shall be fully checked at least once every 5 years at intervals not to exceed 6 years.

The request is that this paragraph be changed to read as follows to match a similar requested change for Tech Spec Section 4.2.7(1) regarding incore fuel element inspections:

> (4) The mechanical integrity of the control blades and drive system shall be inspected during each incore inspection but shall be fully checked at least once every 10 years at intervals not to exceed 12 years.

As noted, the control blades and drive system will continue to be subject to a requirement in Tech Spec 4.2.2(4) to be fully checked, but now at least once every 10 years. The difference between conducting an inspection and a full check of the control blades and drive system requires clarification. First, the inspection for mechanical integrity of the control blades and drive system that has occurred with each incore fuel inspection is a visual inspection only of the

A020
A001

incore parts of the system; however, additional measurements of the control blade drop times (S-1 semiannual surveillance), controlled insertion times (S-5 semiannual surveillance), withdrawal times (weekly surveillance) are also conducted to assure the core and shielding have been returned to proper operability. These latter surveillances are also performed at their respective required intervals but are considered necessary here to assure that entry to the core area has not affected system operability before returning the reactor to normal operations. On the other hand, a full check of the control blades and drive system includes the same checks as above to include a visual only incore check, the S-1, S-5 and weekly checks plus partial disassembly of the drive train components/gear boxes external to the reactor biological shielding to inspect for buildup of hardened grease, oil level, foreign matter and basic wear. This series of checks is the only difference between the incore inspection for mechanical integrity and the full check performed every 5 years. The reason or basis for requiring the full check at least once every 10 years is simply to perform these checks outside the biological shielding as well which can provide useful information and prevent buildup of hardened grease and oil deposits without a significant dose commitment or shielding removal.

The justification for dropping the inspection requirement and only needing to perform a so-called full check every 10 years is twofold. First, the incore inspection is only visual and this is all that is done on any of the incore inspections. Second, these incore visual inspections have never provided any indications of a problem. Again, as for the fuel inspections, nothing is learned by the more frequent incore inspection. Therefore, in the interest of dose commitment (ALARA), physical safety, fuel security and facility availability, the elimination of the inspection of the mechanical integrity of the control blades and drive system in Tech Spec 4.2.2(4) that occurs during fuel inspections under the 5-year fuel inspection interval is supported for removal.

The **second change** is on page 21 in Tech Spec Section 4.2.7, "Surveillances Pertaining to Fuel," Paragraph (1), which currently reads as follows:

> (1) The incore reactor fuel elements shall be inspected every 5 years at intervals not to exceed 6 years, in a randomly chosen pattern, as deemed necessary. At least 4 elements will be inspected.

The request is that this paragraph be changed to read as follows:

> (1) The incore reactor fuel elements shall be inspected every 10 years at intervals not to exceed 12 years, in a randomly chosen pattern, as deemed necessary. At least 8 elements will be inspected.

This second change is the driving concern for this amendment request to increase the time between such inspections. Though not specifically stated in the Technical Specifications, the basis for the existing surveillance would be to avoid operation with failed fuel. Tech Specs already require continuous monitoring of the primary coolant resistivity which would indicate fuel failure if such were to occur and weekly checks for radioactivity which would also provide more specific evidence of fuel failure. The existing surveillance requirement every 5 years is

considered at least partially redundant. This is especially applicable since the UFTR is not allowed to operate with leaking fuel per Tech Spec 3.7(4) which states the reactor shall not be operated if there is evidence of fuel element failure, as well as Tech Spec 3.7(3) which requires that failed fuel shall be removed from the reactor.

Based on these Tech Spec considerations, the requirement of fuel inspection every five years is considered to involve unnecessary redundancy in that little new information is obtained despite the excessive effort required to inspect fuel. This fuel inspection surveillance activity typically commits at least two weeks of facility effort to allow cooling time for activity reduction, unstacking of core shielding, movement of fuel for inspection, replacement of fuel back in the core where close tolerances represent a significant challenge to avoid mechanical fuel damage followed by restacking of shielding and control of contamination. The unnecessary surveillance work performed in the core area plus the unstacking and restacking of shielding is responsible for a large fraction of all dose committed for this facility.

In terms of history of the fuel, the dozen or so fuel inspections performed over the past 33 years have only uncovered one potential issue which upon further review was found not to be safety significant. In addition, the inspection is a visual inspection which is no more likely to reveal a likely pinhole leak than the existing weekly analysis of a water sample or even the continuous monitoring of primary water resistivity.

By making the requested change to allow a 10-year surveillance interval on the fuel, the required interval for the surveillance on the fuel per Tech Spec 4.2.7(1) will match the requested interval for the surveillance on the reactor control and safety system per Tech Spec 4.4.2(4). As a further benefit to reducing dose commitment, these changes will mean these two surveillances can be performed together, further reducing the number of times the core region needs to be entered. Therefore, this change is well considered to reduce fuel handling and attendant hazards, to reduce the potential for mechanical damage in returning fuel to the core, to reduce the time when the incore fuel is less well protected, and to minimize dose commitment for ALARA considerations—all while optimizing facility utilization and availability.

One final point to note is that the rate of burnup/energy generation on the existing UFTR fuel load has decreased significantly over the past twenty years as usage has depended less on lengthy full-power irradiations. For the past twenty reporting years (September through August), the energy generation for each five-year period has been as follows:

1984 – 1989	146,792 kW-hrs
1989 – 1994	126,864 kW-hrs
1994 – 1999	80,894 kW-hrs
1999 – 2004	77,601 kW-hrs

Such energy generation trends indicate a significant decrease in demands on the fuel further justifying a decreased inspection interval.

Since the UFTR facility is in line for Department of Energy supported conversion from high enriched uranium (HEU) to low enriched uranium (LEU) fuel, going to a 10-year inspection interval for the fuel and mechanical integrity check on the reactor control and safety system is expected to have little effect on this core. In effect, this change is expected to permit the core entry for the two surveillances to be delayed until the fuel conversion is made. At that point, the existing HEU fuel will be removed and fresh LEU fuel added. With removal of all fuel for conversion, the inspection of the control blades and drive systems inside the biological shielding will be facilitated with much reduced dose commitment. Subsequently, following addition of the fresh LEU fuel, the need for inspection of incore fuel elements will be even less justified.

This change as requested is considered to have minor safety significance but large significance for protecting fuel integrity and consistency with ALARA considerations. This change has been reviewed by UFTR management and by the Reactor Safety Review Subcommittee both of whom concur on this evaluation.

This entire submittal consists of one signed original letter of transmittal with the two pages (19 and 21) containing the proposed changes comprising the requested Amendment 24 to the UFTR Technical Specifications plus thirteen additional photocopied sets.

We appreciate your consideration of this amendment. Please let us know if you need further information.

Sincerely,

William G. Vernetson
Director of Nuclear Facilities

WGV/dms
Enclosures (13 sets)

cc: Al Adams, NRC Project Manager
Craig Bassett, NRC Inspector
Reactor Safety Review Subcommittee
UFTR Reactor Manager

Sworn and subscribed this 17th day of September 2004.

Daniel J. Sanetz

Notary Public

Daniel J. Sanetz
MY COMMISSION # DD041176 EXPIRES
September 30, 2005
BONDED THRU TROY FAIN INSURANCE, INC.

Table 4.1 Control blade withdrawal inhibit interlocks operability tests

Inhibit	Limit	Frequency
Reactor period	≤10 sec	Daily checkout
Safety channels and wide range drawer not in OPERATE position	—	Daily checkout
Multiple blade withdrawal	Any 2 or more blades simultaneously in Manual	Daily checkout
	Any 2 safety blades in Automatic	Daily checkout
Source count rate	<2 cps	Verification only when count rate <2 cps during daily checkout

(4) The mechanical integrity of the control blades and drive system shall be inspected during each incore inspection but shall be fully checked at least once every 10 years at intervals not to exceed 12 years.

(5) Following maintenance or modification to the control blade system, an operability test and calibration of the affected portion of the system, including verification of control blade drive speed, shall be performed before the system is to be considered operable.

(6) The reactor shall not be started unless (a) the weekly checkout has been satisfactorily completed within 7 days prior to startup, (b) a daily checkout is satisfactorily completed within 8 hours prior to startup, and (c) no known condition exists that would prevent successful completion of a weekly or daily check.

(7) The limitations established under Paragraph 4.2.2(6)(a) and (b) can be deleted if a reactor startup is made within 6 hours of a normal reactor shutdown on any one calendar day.

(8) The following channels shall be calibrated annually, at intervals not to exceed 13 months, and any time a significant change in channel performance is noted:

(a) log N – period channel
(b) power level safety channels (2)
(c) linear power level channel

4.2.6 Reactor Building Evacuation Alarm Surveillance

(1) The coincidence automatic actuation of two area monitors and the manual actuation of the evacuation alarm shall be tested as part of the weekly checkout.

(2) The automatic shutoff of the air conditioning system and the reactor vent system shall be tested as part of the weekly checkout.

(3) Evacuation drills for facility personnel shall be conducted quarterly, at intervals not to exceed 4 months, to ensure that facility personnel are familiar with the emergency plan.

4.2.7 Surveillance Pertaining to Fuel

(1) The incore reactor fuel elements shall be inspected every 10 years at intervals not to exceed 12 years, in a randomly chosen pattern, as deemed necessary. At least 8 elements will be inspected.

(2) Fuel-handling tools and procedures shall be reviewed for adequacy before fuel loading operations. The assignment of responsibilities and training of the fuel-handling crew shall be performed according to written procedures.

4.2.8 Primary and Secondary Water Quality Surveillance

(1) The primary water resistivity shall be determined as follows:

(a) Primary water resistivity shall be measured during the weekly checkout by a portable Solu Bridge using approved procedures. The measured value shall be larger than 0.4 megohm-cm.

(b) Primary water resistivity shall be measured during the daily checkout at both the inlet and outlet of the demineralizers (DM). The measured value, determined by an online Solu Bridge alarming in the control room, shall be larger than 0.5 megohm-cm at the outlet of the DM.

(2) The primary water radioactivity shall be measured during the weekly checkout for gross β–γ and gross α activity.

(a) The measured α activity shall not exceed 50 dpm above background level.

(b) The measured β–γ activity shall not exceed 25% above mean normal activity level.

(3) The secondary water system shall be tested for radioactive contamination during the weekly checkout according to written procedures.