

February 3, 2010

Alireza Haghighat, PhD
FPL Endowed Term Professor
Director of UFTR
Nuclear & Radiological Engineering Department
202 Nuclear Sciences Building
University of Florida
Gainesville, FL 32611-8300

SUBJECT: UNIVERSITY OF FLORIDA - REQUEST FOR ADDITIONAL INFORMATION
REGARDING THE UNIVERSITY OF FLORIDA TRAINING REACTOR LICENSE
RENEWAL (TAC NO. ME 1586)

Dear Dr. Haghighat:

The U.S. Nuclear Regulatory Commission (NRC) is continuing our review of your application for renewal of Facility Operating License No. R-56 for the University of Florida Training Reactor which you submitted on July 18, 2002, as supplemented by letters dated July 25, 2002, July 29, 2002, April 7, 2002, November 26, 2008, September 28, 2009, October 13, 2009 and October 30, 2009. During our review of your renewal request, questions have arisen for which we require additional information and clarification. Please provide responses to the enclosed request for additional information no later than February 26, 2010. In accordance with Title 10 of the *Code of Federal Regulations* Part 50.30(b), your response must be executed in a signed original under oath or affirmation. Please send the original copy of your correspondence to the NRC Document Control Desk. Following receipt of the additional information, we will continue our evaluation of your license renewal request.

If you have any questions regarding this review, please contact me at (301) 415-3724 or by electronic mail at duane.hardesty@nrc.gov.

Sincerely,

/RA By Alexander Adams Jr. For/
Duane A. Hardesty, Project Manager
Research and Test Reactors Branch A
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

Docket No. 50-83

Enclosure: As stated
cc: See next page

University of Florida Docket No. 50-83

cc:

Administrator
Department of Environmental Regulation
Power Plant of Siting Section
State of Florida
2600 Blair Stone Road
Tallahassee, FL 32301

State Planning and Development Clearinghouse
Office of Planning and Budgeting
Executive Office of the Governor
The Capitol Building
Tallahassee, FL 32301

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

Brian Shea
Reactor Manager
University of Florida
Department of Nuclear and
Radiological Engineering
202 Nuclear Sciences Center
P.O. Box 118300
Gainesville, FL 32611-8300

Test, Research and Training
Reactor Newsletter
Director of Nuclear Facilities
University of Florida
202 Nuclear Science Building
Gainesville, FL 32611-8300

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OFFICE OF NUCLEAR REACTOR REGULATION
REQUEST FOR ADDITIONAL INFORMATION
REGARDING LICENSE RENEWAL FOR THE
UNIVERSITY OF FLORIDA TRAINING REACTOR

LICENSE NO. R-56

DOCKET NO. 50-83

The U.S. Nuclear Regulatory Commission (NRC) is continuing our review of your application for renewal of Facility Operating License No. R-56 for the University of Florida Training Reactor which you submitted on July 18, 2002, as supplemented by letters dated July 25, 2002, July 29, 2002, April 7, 2002, November 26, 2008, September 28, 2009, October 13, 2009 and October 30, 2009. During our review of your renewal request, questions have arisen for which we require additional information and clarification. Please provide responses to the following request for additional information no later than February 26, 2010.

1. Safety Analysis Report (SAR), Section 1.6, Compliance with the Nuclear Waste Policy Act of 1982. Please provide the contract number of your agreement with the Department of Energy for return of spent fuel and/or high level waste.
2. SAR, Section 2.3.1.2.2, Tornadoes. The probability of a tornado striking the University of Florida Training Reactor (UFTR) site is given as 1.9×10^{-3} per year. Please explain how this value was determined.
3. SAR, Section 5.3, Secondary Coolant System. In your response to Request for Additional Information (RAI) 2.b. dated November 26, 2008, you use the Title 10 *Code of Federal Regulations* (10 CFR) Part 20, Appendix B, Table 3 value of $5 \text{ E-4 } \mu\text{Ci/ml}$ as the monthly average concentration release limit. However, this value is applicable to release to the sanitary sewer while it appears that discharge from the secondary side of the heat exchanger goes to the storm sewer. Please explain.
4. SAR, Section 7.2.3.4.2, Secondary Coolant System. The SAR indicates that scram upon loss of secondary coolant flow when using city water is immediate. However, Technical Specification (TS) 5.6.2 discusses a 10 second delay upon first reaching 1 kW. Please clarify.
5. SAR, Section 9, Auxiliary Systems. The RAI 9-3 response, dated November 26, 2008, stated that the area monitor system alarm set point is 10 mR/hr. However, TS Table 3-4 states monitor set point is 25 mR/hr. Please state if you are meeting compliance with 10 CFR 70.24 using 70.24 (a)(1) or (a)(2) and provide details as to how you are meeting the regulation.
6. In Appendix E of the UFTR responses to RAIs 11-1 and 11-2, dated November 6, 2008, the undiluted activity of Ar-41 from the reactor at 100 kW is given as $C = 8.147\text{E-4 Ci/m}^3$,

ENCLOSURE

the total stack flow rate for Ar-41 from the core vent and dilution fan is $f = 7.444 \text{ m}^3/\text{s}$, and the dilution factor is $DF = 0.0152168$. The resulting flow-diluted release concentration at the top of the stack prior to atmospheric discharge is $\psi = C \times DF = 1.24\text{E-}5 \text{ Ci}/\text{m}^3$. In Section 11.1.1.1, Airborne Radiations Sources of the SAR, UFTR applied a stack dilution factor of 0.0281 (i.e., 1/35.6) and $C = 6.7\text{E-}4 \text{ Ci}/\text{m}^3$ for full power operation to arrive at a stack concentration prior to discharge of $\psi = C \times DF = 1.88\text{E-}5 \text{ Ci}/\text{m}^3$. Section 11.1.1.1 of the UFTR SAR also provided the activity at the stack discharge as directly measured to be $\psi = 2.48\text{E-}5 \text{ Ci}/\text{m}^3$. What is the explanation for the differences between these calculated and measured values?

7. For the calculations presented in Table 9 of Appendix E of the UFTR responses to RAIs 11-1 and 11-2, dated November 6, 2008, our understanding is that the parameters for the Table 9 calculations are continuous Ar-41 release rate of $9.228\text{E-}5 \text{ Ci}/\text{s}$, stability class A, standard terrain, effective release height of 12.3 m, wind speed at the point of discharge of 3.99 m/s, and the downstream receptor at 0 m on the plume centerline. Using the input parameters with EPIcode 7.0, we calculated the Ar-41 activity concentrations and radiation doses as shown in Table 1 below which show some inconsistency. Please confirm the use of the parameters above. If incorrect, please provide correct values. Please describe how a wind velocity of 3.99 m/s was obtained at the stack discharge.

Table 1

Receptor Distance (m)	NRC: EPIcode Results		UFTR: STAC2.1 Results	
	Concentration ($\text{Ci}/\text{m}^3 \times 10^9$)	Dose (mrem/yr)	Concentration ($\text{Ci}/\text{m}^3 \times 10^9$)	Dose (mrem/yr)
20	3.7	19	0.71	4
40	32	160	27	133
63	26	130	29	145
91	16	80	20	98
133	8.5	43	11	55
137	8.1	41	10	52
160	6.1	31	7.9	39
183	4.8	24	5.8	31
190	4.4	22	6.2	29
200	4.0	20	5.2	26
229	3.1	16	4.0	20
250	2.6	13	3.4	17
251	2.6	13	3.4	17
274	2.2	11	2.9	14
298	1.9	10	2.4	12
309	1.7	9	2.3	11
320	1.6	8	2.1	11
331	1.5	8	2.0	10
343	1.4	7	1.9	9
411	1.0	5	1.3	6
417	0.97	5	1.3	6
463	0.79	4	1.0	5

8. SAR Section 11.2.2.1 Gaseous Waste Management and Table 11-4, indicates that the limit on operations of 235 hours/month is intended to satisfy the 10 CFR 20.1302 dose limit of 50 mrem/yr. Provisions in 10 CFR 20.1101(d) require that a total effective dose equivalent to the maximally-exposed member of the public should not exceed 10 mrem/yr for purposes of As Low As Reasonably Achievable (ALARA); if this dose constraint is exceeded, the licensee shall report this to NRC and take appropriate corrective action to ensure against recurrence. How does UFTR ensure compliance with the provisions of radiation protection programs of 10 CFR 20.1101?
9. SAR Section 11.2.2.1, Gaseous Waste Management (p.11-23), it is indicated that if the activity level in the reactor vent discharge system exceeds 4000 cps, a monitor will actuate a warning light and an audible alarm in the reactor control room. The relationship between this count rate alarm and the allowed activity discharge limit is unclear.
 - a) Explain the relationship between the 4000 cps measurement by the stack monitoring system and the stack-diluted discharge concentration. Assuming 235 effective full-power hours of operation per month, would this maximum Ar-41 concentration and radiation doses for members of the public be below $1.00E-8 \mu\text{Ci}/\text{ml}^3$ (Appendix B to 10 CFR Part 20) and 50 mrem/yr (10 CFR 20.1302)?
 - b) Is there a relationship between Ar-41 activity and the 4000 cps measurement that ensures that the highest dose to the public is limited to 10 mrem/yr (10 CFR 20.1101)?
10. The Environmental Dosimetry results for the UFTR (reference facility annual report for 2005-2006, 2006-2007 and 2007-2008) for dosimeters 3, 4, 6, 8, 9, 10 and 11 document the same results in each of these years for all four categories and dosimeters 5 and 12 only differ on one. In contrast, the reports of previous years indicate the max environmental result was in single-digit millirem, while these later reports document readings in the 100's of millirem with the stack at 1700+ mrem. Please validate the high level of agreement for the readings in the annual reports for 2005-2006, 2006-2007 and 2007-2008 and explain the significant change in later reports.
11. In a supplement to the application dated October 13, 2009, University of Florida (UF) indicated that the cost for decommissioning the UFTR was \$2.7 million in 2009 dollars, with the cost being adjusted for inflation using the Consumer Price Index (CPI) (CPI for all urban consumers, US city average, all items (Base 1982)) and the Low Level Waste Disposal Adjustment Factor. In order for the NRC staff to complete its review of the UFTR decommissioning cost estimate, please provide the following additional information:
 - a) Documentation supporting the basis for the Waste Burial Adjustment Factor (F_B) for the Adjusting Base from 1986 to 1982 as was documented in the October 13, 2009 supplement to the application.
 - b) The specific line items on Table II of the October 13, 2009 supplement to the application identifying the \$118,000 Radioactive Waste disposal cost.

- c) Clarify whether a 25 percent contingency factor is included in the updated 2009 decommissioning cost estimate provided in the October 13, 2009 supplement to the application.
12. The July 18, 2002 application, and the October 13, 2009 supplement to the application, includes a statement of intent (SOI) as the method to provide decommissioning funding assurance for the UFTR as provided for by 10 CFR 50.75(e)(1)(iv). Where UF intends to use a SOI, the NRC staff must find that the applicant "is a Federal, State, or local government licensee." The application indicates that the applicant is a State government organization and that the decommissioning funding obligations of the applicant are backed by the State government. However, corroborating documentation must also be provided. Further, the applicant must provide documentation verifying that the signator of the SOI is authorized to execute said document that binds the University. This document may be a governing body resolution, management directives, or other form that provides an equivalent level of assurance. As the application does not provide all of the above information, please submit the following:
- a) An updated SOI which includes the current (2010 dollars) cost estimate for decommissioning, a statement that funds for decommissioning will be obtained when necessary, and the signator's oath or affirmation attesting to the information. (Refer to Section 16.4 of Appendix A of NUREG-1757, Vol. 3, "Consolidated NMSS Decommissioning Guidance.")
13. Please provide an update to SAR Section 5 and other sections of the SAR as applicable with the description of the replacement primary piping and any changes to instrumentation types or sensing locations.