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October 2, 2015

ATTN: Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555-0001

Re: Docket 50-83, (TAC NO.ME3482), **RAI Response in Support of License  
Amendment Request 27**

Please find attached response to the RAI dated September 3, 2015.

This transmittal has been reviewed and approved by UFTR management and by the  
Executive Committee of the Reactor Safety Review Subcommittee.

I declare under penalty of perjury that the foregoing is true and correct to my knowledge.

Executed on October 2, 2015.

A handwritten signature in cursive script that reads 'Brian Shea'.

Brian Shea  
Reactor Manager, University of Florida Training Reactor

AD 20  
NRR

RAI Response:

Following completion of our conversion to low enriched fuel in 2006, the UFTR is licensed to receive, possess, and use non-exempt special nuclear material (SNM) of: up to 5.0 kilograms of contained U-235 of enrichment of less than 20 percent in the form of MTR-type fuel; and, up to 0.2 kilograms of contained U-235 of any enrichment in any form. These license limits are well below an amount of SNM considered to be of moderate strategic significance.

To estimate the aggregate SNM quantities for the facility end-of-life (EOL) condition, the UFTR performed depletion calculations using the Monte Carlo N-Particle Transport Code (MCNP). The following assumptions were made:

1. For conservatism and ease of modeling, at the beginning-of-life (BOL), the UFTR is assumed to possess slightly more non-exempt SNM than allowed by license, as follows:
  - a. 5.075 kilograms of contained uranium-235 enriched to less than 20 percent in the form of material test reactor (MTR)-type reactor fuel; and
  - b. 0.2 kilograms of contained U-235 enriched to greater than 20%.
2. Twenty-nine (29) assemblies of MTR-type fuel, enriched to 19.75%, are available for depletion [5,075 grams x (1 plate/12.5 grams) x (1 assembly/14 plates) = 29 assemblies]
3. EOL is defined here as the point in core life when the UFTR can no longer achieve criticality with all control blades fully withdrawn. In other words, following simulated depletion of an initial full-core load of fresh fuel (24 assemblies), the 5 remaining fresh assemblies are loaded in place of the same number of depleted assemblies and then further depleted to EOL. The final EOL inventory estimate includes the inventories of the 5 discharged assemblies in addition to the 24 assemblies located in-core at the EOL.

The assumed BOL inventory and calculated EOL inventory are shown in the table below. The existing UFTR SNM possession limits imposed by license condition, and the existing 10 Part 73 SNM threshold limits, have the combined effect of legally mandating that the UFTR remain “low strategic significance” for all times in facility life. The MCNP depletion results provide analytical evidence indicating the aggregate quantity of SNM will indeed remain well below an amount of SNM considered to be of moderate strategic significance for all times in facility life.

Material	Enrichment	Assumed BOL Inventory	Conservative EOL Inventory
Plutonium	--	0 grams	27 grams
Uranium-235	20% or more in U-235 isotope	200 grams	200 grams
	10% or more but less than 20% in U-235 isotope	5,075 grams	4,688 grams
	Above natural but less than 10%	0 grams	0 grams
Uranium-233	--	0 grams	2.17E-5 grams
Uranium-235, uranium-233, and plutonium in combination	U-235 portion enriched to 20% or more	(200 grams + 0 grams + 0 grams) = 200 grams	(200 grams + 2.17E-5 grams + 27 grams) = 227 grams