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December 19, 1986

Nuclear Regulatory Commission
Suite 2900
101 Marietta Street, N.W.
Atlanta, GA 30323

Attention: J. Nelson Grace
Regional Administrator, Region II

Re: University of Florida Training Reactor (UFTR)
Facility License R-56; Docket No. 50-83

Gentlemen:

On December 12, 1986 following discovery of the problem outlined in the scenario section below, Mr. Larry Meller of Region II was contacted and given a verbal description of events. In general, Mr. Meller agreed with the staff evaluation including the determination that the event is a potential violation of our Technical Specifications and hence a promptly reportable event as specified in the reporting requirement of paragraph 6.6.2(3) of the UFTR Technical Specifications. Mr. Meller recommended that all evaluations be performed as for a technical specification violation. Therefore, this report is being transmitted to meet the tech spec requirement for a final report closing out the occurrence.

SCENARIO

At 1037 hours on Thursday, 11 December 1986, the stack dilute fan and the core vent fan were secured by actuation of the evacuation alarm and the evacuation alarm/core vent system interlocks while the stack count rate was approximately 300 cps. The count rate was due to a normal Argon-41 vent and stack inventory buildup established by a prior run starting at 0923 and secured at 1018 (100 kWth operation from 0955 to 1016).

The automatic evacuation occurred as part of the Quarterly Evacuation Drill, (Surveillance Q-3) for which the scenario involved two area radiation monitors indicating radiation levels greater than the high level trip setpoint (10 mRem/hr). Establishment of the two area monitors at the high level trip setpoint initiated the core vent/diluting fan interlock with the evacuation alarm as required by Technical Specifications. However, UFTR Technical Specifications, Section 3.4.3, states:

3.4.3 Reactor Vent System

> The reactor vent system shall be operated at all times during reactor operation. In addition, the vent system shall be operated until the stack monitor indicates less than 10 counts per second (cps). Whenever the reactor vent system is operating, air drawn through the reactor vent system shall be continuously monitored for gross concentration of radioactive gases. The output of the monitor shall be indicated and recorded in the control room. The reactor vent system shall be immediately secured upon detection of: a failure in the monitoring system, a failure of the absolute filter, or an unanticipated high stack count rate.

EVALUATION

Subsequent discussions of the event when discovered in the afternoon (~1500 hours) indicated that the high count rate with the core vent system secured could constitute a violation of Technical Specifications. In assessing the consequences of a potential violation of Technical Specifications, the impact of the action on the premise or the bases of the Limiting Condition for Operation (LCO) must be considered. This LCO is unusual in two respects.

First, there is no indication of the bases for the LCO. Discussions with the UFTR Staff indicate that the LCO is based on the potential for activated Argon gas exfiltrating into static atmosphere of the UFTR cell as well as buildup of radon from natural causes within the cell. A review of the recorder charts for the Air Particulate Detector (also alarmed for this drill scenario) and for the Area Radiation Monitors traced during the conduct of the drill shows no effect upon radiological conditions of the UFTR.

The second unusual aspect of this LCO is that the required condition does not relate to operating the reactor, but is a requirement imposed during a shutdown condition. As such [illegible]ion of this LCO may not be a reportable occurrence as the reactor [illegible]ting. This LCO also appears to be in conflict with the requirements [illegible]acuation alarm automatically secure the core vent system, and th[illegible]vent system be secured on a loss of stack monitor or failure of the [illegible]nt absolute filter.

CONSEQUENCES

Argon-41 production cannot be increased through this action of securing the vent system, and the effluent concentration for the duration of this event actually had to decrease as the core vent damper closure that occurs with securing the core vent fan stops air flow from the reactor. The fact that no negative impact to radiological or reactor systems could or did occur from this event supports the evaluation that this event posed no potential for compromising reactor safety or the health and safety of the public.

These evaluations were reviewed individually with members of the Executive Committee of the Reactor Safety Review Subcommittee (RSRS) on December 12, 1986 prior to contacting Mr. Meller and then again in a formal meeting of the Executive Committee of the RSRS on December 12, 1986.

CORRECTIVE ACTION/RECOMMENDATION

Since this event represents a potential violation of Technical Specifications, the RSRS recommended that this event be reported to the NRC as was done on December 12 and finalized with this report. Corrective action for the specific problem of securing the vent at >10 cps on the stack monitor during a drill will be assured by requiring that all drills be conducted prior to running the UFTR at power levels above 500 watts on the day of the drill and/or assuring the stack monitor is reading below 10 cps prior to drill initiation with a checkoff on the drill scenario card which will be added to Standard Operating

Procedure O.5 as an additional part of the Q-3 drill form. This corrective action will be implemented prior to the next quarterly radiological emergency drill due in March, 1987.

The RSRS at its regular meeting on December 19 required a proposed Tech Spec change to be developed on the requirement for core vent system operation with stack monitor count rate above 10 cps; after re-evaluation and with support on a technical basis, Section 3.4.3 will be modified so that the requirement for not securing the reactor vent system above 10 cps can be modified, perhaps with only a recommendation that it not be secured above 10 cps. This change will be based upon the lack of safety and/or radiological effects from securing the reactor vent system for short periods of time or even with a higher stack count rate. This tech spec change will eliminate the conflict involved in securing the vent fan system for an actual emergency following a reactor run should such occur; this work will be completed by May 30, 1987; a subsequent request for a tech spec change will then be submitted.

FINAL NOTE

The RSRS Executive Committee members were contacted on December 12, 1986 relative to the securing of the reactor vent system. The members of the RSRS Executive Committee all agreed that the incident had no impact on reactor safety or the health and safety of the public. Therefore, the UFTR was granted permission to commence normal operations as of December 12, 1986. A formal meeting of the Executive Committee was convened to document this permission.

As a further note, the full RSRS met at its regularly scheduled meeting on December 19, 1986 and unanimously supported the additional check on the drill scenario card and the proposed change in the tech specs required as corrective action by the RSRS Executive Committee and the UFTR staff and included in this report.

With this report this incident is considered closed with corrective action to be implemented as noted above.

Sincerely,

William G. Vernetson

William G. Vernetson
Director of Nuclear Facilities

WGV/ps

cc: Reactor Safety Review Subcommittee
P.M. Whaley, Acting Reactor Manager

ATTACHMENT IV

1. Dimensions and free air space:

   a. Cell Volume: $60' \times 30' \times 29' = 5.22 \text{ E } 5 \text{ ft}^3$

   b. Control Room Volume not accounted for:

   $14' \times 9' \times 8' = 1.0 \text{ E } 3 \text{ ft}^3$

   c. Pit Volume: $5'3" \times 13'6" \times 6' = 425 \text{ ft}^3$

   d. Reactor volume

      1. Elongated octagon = ellipse

         Major axis 20'4", minor axis 15'6", height 11'10.5"

         Reactor Volume: 2993 ft^3

      2. Rectangular parallelapiped, same dimensions

      Reactor Volume: 3742 ft^3 - more conservative

2. Total Free Cell Volume: 1a + 1b + 1c - 1d(2) = $5.2 \times 10^5 \text{ ft}^3$

3. Free volume in reactor (void spaces) is estimated at 1% effectively - considered conservative: 38 ft^3

4. Dilution factor for concentration in void spaces:

$$\text{Dilution Factor} = \frac{\text{Free Reactor Volume}}{\text{Total Free Cell Volume}} = \frac{\text{Item 3}}{\text{Item 2}} = 7.3 \times 10^{-5}$$

5. Normal (full power) average concentrations in void spaces implied from core vent effluent at 12×10^{-4} µCi/ml.

6. Therefore, the cell avereage concentration would be:

$$12 \times 10^{-4} \text{ µCi/ml} \times \text{Dilution Factor} = 8.8 \times 10^{-8} \text{ µCi/ml}$$

where a major conservatism is the assumption that all the radioactive Argon-41 gas is immediately released into the free cell volume with no delay and no decay.