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January 27, 1997

Regional Administrator, Region II
U.S. Nuclear Regulatory Commission
101 Marietta Street, N.W., Suite 2900
Atlanta, GA 30323

14 Day Report:
Potential Tech Spec Violation—
Improper Stack Monitor Calibration

Dear Sir:

Re: University of Florida Training Reactor
Facility License: R-56, Docket No. 50-83

Pursuant to the reporting requirements of paragraph 6.6.2(g) of the UFTR Technical Specifications, a description of what is considered to be a potential violation of the technical specifications was reported by telephone and fax (Attachment I) on January 14, 1997 with a follow-up conversation on January 15, 1997. The required 14 day written report is submitted with this letter including occurrence scenario, NRC notification, evaluation of consequences, corrective action and current status. The potentially promptly reportable occurrence involved the improper calibration of the stack radiation monitor.

Scenario

During reactor operation on January 10, 1997 at full power, it was noted that the adjustable stack monitor was reading approximately 1000 cps higher than the fixed stack monitor. The fixed stack monitor was reading approximately 2800 cps which was consistent with recent previous runs at full power and thus was considered normal. The Reactor Manager and Facility Director concurred that the requirements of Table 3.3 in the Technical Specifications (see attached) were still being met. However, the decision was made to open a Maintenance Log Page (MLP) on the next working day and perform the stack monitor portion of the Q-2 surveillance to include calibration of the adjustable stack meter.

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On January 13, 1997, review and comparison of the Stack Monitor Calibration procedure (on the Q-2 Surveillance Data Sheet) and the Radiation Control Technique (RCT) #37 procedure showed inconsistencies between the two and neither included a step to match calibration of the adjustable stack meter with the fixed stack monitor. Additionally, the following discrepancies/items were noted:

- No predicted stack count data sheet for the Cs-137 calibration source was included in RCT #37.
- Instructions on the Q-2 surveillance data sheet were incorrect. They were apparently not updated when the RCT was changed in April 1990 to change from the tedious and subject-to-error process of moving the Cs-137 calibration source to the proper decay-corrected position within the base of the stack each time the monitor was calibration checked to moving the Cs-137 source to the same position each time and simply decay correcting the Cs-137 source-produced count rate.
- Review of the Q-2 surveillance data sheets completed since March 1990 seems to indicate that the "Expected Results" portion of the procedure has continued to be performed as it was done prior to the RCT revision in April 1990. Instead of determining the predicted decay corrected count rate at the fixed "4000 cps position" and the fixed "100 cps position," a more difficult approach of empirically determining the distance, from the stack detector, necessary to get approximately 4000 cps and 100 cps was used.

After Reactor Manager discussions with the Radiation Control Officer and Facility Director about the calibration procedure to be performed, MLP #97-01 was opened and the Reactor Manager, an SRO-trainee, and a radiation control technician walked through and then calibrated the fixed and adjustable stack monitors making necessary changes to assure a proper Q-2 surveillance sheet as they proceeded. It should be noted that only minor adjustments were needed in the calibration performed on January 13, 1997.

A meeting was convened with the Reactor Safety Review Subcommittee (RSRS) Executive Committee later on January 13, 1997 to present and discuss the problem. The determination was made that this was a potentially reportable event. Some of the items discussed during the meeting included the fact that Argon-41 releases, as indicated by a minimum of three semiannual stack grab samples, have been normal over the entire period in question. Probable causes for why this problem may have existed for so long prior to discovery include the fact that two people are required to perform this procedure with communications between the base of the stack and the control room by hand-held radios; although each had their own copy of the procedure, both procedures were from different references and both procedures were flawed. The RSRS Executive Committee also considered whether the stack readings were conservative or nonconservative over

the period in question. Scenarios that would support both arguments were possible and were discussed; however, it was generally agreed that only a correct calibration of the stack monitor and follow-up operational test would provide real evidence. Therefore, the RSRS Executive Committee recommended contacting the NRC concerning a possible violation of Technical Specifications and that a one-hour operation at full power be conducted to determine how the stack monitor indication had changed following correcting the calibration.

The situation to this point concerning the improperly calibrated stack monitor including the plan for a one-hour run and the conclusion that the failure to properly calibrate the stack radiation monitor was a potentially reportable occurrence per UFTR Technical Specifications Section 6.6.2 was communicated by telephone to Mr. Ed. McAlpine of NRC Region II on January 14, 1997. Subsequently, the full-power reactor run on January 14 as authorized by the RSRS Executive Committee showed that recent stack monitor indications prior to January 13 were conservative, as expected since only minor adjustments were needed in the calibration performed on January 13, 1997. As a result, the approximate full-power steady-state stack monitor reading is now ~2200-2300 cps versus ~2700-2800 cps on previous recent full-power steady-state operations. The adjustable stack monitor meter also matches the fixed stack monitor indication. The fact that recent indicating values were conservative was conveyed to Mr. McAlpine in a following conversation on January 15, 1997 along with iterating that all stack grab samples to measure Argon-41 levels have been normal over this entire period.

NRC Notification

After the RSRS Executive Committee meeting on January 14, 1997, NRC Region II was informed of this event per a telephone conversation on January 14 with Mr. Ed McAlpine relative to the improper stack monitor calibration. At this time the potential tech spec violation was described and the key tech spec sections were reviewed. There was also agreement to treat the event as promptly reportable. Since it was late in the day and a one-hour full-power run was planned to determine whether the stack monitor had been indicating conservatively or nonconservatively, Mr. McAlpine agreed that the prompt one-day report confirming the telephone conversation could be delayed until January 15, 1997.

In a subsequent conversation on January 15, 1997, Mr. McAlpine of Region II was updated on the results of the full-power operation indicating that at least the most recent stack monitor indications had been conservative but that the status of stack monitor indications in the past could not be verified to be necessarily conservative. Subsequently, these communications were confirmed in a following fax and one-page letter to complete the prompt notification on January 15, 1997 (see Attachment I).

Evaluation/Corrective Action

Essentially, the effort implemented in 1990 to have the Cs-137 monitor calibration source always placed consistently in the same position and be decay corrected versus trying to move the source for each quarterly calibration check of the stack monitor led to the problem as the new technique was not followed properly at some point. Essentially, it appears that the Cs-137 source was not decay corrected despite the fact that such decay corrections are, were and continue to be made consistently for the calibration checks of the reactor cell area radiation monitors which constitutes the first part of the Q-2 Surveillance (Quarterly Calibration Check of Area and Stack Radiation Monitors).

The UFTR Technical Specifications require calibration checks of the stack radiation monitor on a quarterly basis. Although always performed in a timely manner, the use of a flawed procedure that failed to correct for the decay of the Cs-137 calibration source led to a monitoring system that was not properly calibrated, at least for some periods of time including recently prior to January 13, 1997. The applicable section of the UFTR Technical Specifications requiring the quarterly calibration is Section 4.2.4(1) with the requirement for the monitor being in Table 3.3 in Section 3.4.2 of the Technical Specifications.

Some data gleaned from operations logs since 1990 show the operator-recorded stack count rate on the fixed monitor was recorded as varying somewhat for full-power runs of two hours or more after each calibration check of the stack monitor. Though the trend upward is clear in later years, it is not so in earlier years. In addition, there is some room for operator judgment in reading the meter since four orders of magnitude fit into little more than one inch of meter face. This situation (failure to properly calibrate the stack monitor) probably applied at least periodically since about mid-1990, though this is impossible to determine. Investigations of the operations logs for the period from early 1988 to the present generally show steady-state stack monitor count rates recorded at ~2000 cps for the first several years until September 1990 just after the new calibration procedure was implemented. From this point forward the full power equilibrium stack count rate varies from ~2000 cps to as high as 2700 cps but with most readings recorded at ~2000-2200 cps until mid-1992, with high values 2500-2800 cps in mid-1992 and most values since that time in the range 2100-2300 cps until the gradual rise over the past half year to the high rates noted earlier at 2600-2800 cps. Since Cs-137 has a 30.17 year half-life, discrepancies from failure to correct for decay would have occurred slowly over time. This means that improper calibrations would have only a small (~3%) effect per year which is part of the reason why the improper calibration was not noted earlier, though some jumps in the steady-state count rates are noted in the operations logs especially after the calibrations performed in August, 1992 as noted above. It is also possible that the decay corrections were made in the earlier years from mid-1990 because such corrections would be clearly needed and only later were consistently overlooked until the calibration check on January 13, 1997.

Other contributing factors to this failure to calibrate the stack monitor properly are the fact that there were two procedures in existence. A full Radiation Control Technique (RCT #37) developed by the Radiation Control Officer and a Surveillance Data Sheet (Q-2 Surveillance) with mini-procedure used to record the results of the Q-2 Surveillance at the UFTR facility certainly contributed to the problem, especially with one individual (typically a radiation control technician) performing the stack portion of the surveillance and a second individual (typically a reactor operator) performing the control room part of the surveillance and using the two procedures.

The full-power reactor run on January 14 authorized by the Reactor Safety Review Subcommittee showed at least recent stack monitor indications were conservative as only minor adjustments were needed in the calibration performed on January 13, 1997 and the approximate full-power steady-state stack monitor reading is now ~2200-2300 cps versus ~2700-2800 cps on previous recent full-power steady-state operations. Operations log values of the steady-state stack monitor indications recorded were typically ~2000-2100 cps prior to 1990. Then in later years there was a gradual increase leading to the 2700-2800 cps values recorded in early January 1997. Therefore, it is possible that earlier calibrations since mid-1990 were not all conservative though it is also felt that the stack detector system is also gradually aging and hence changing, though slowly, with time since the proper steady-state full-power count rate in 1990 was ~2000 cps but today it is in the ~2200-2300 cps range, still with a constant Argon-4 level within detection and measurement limits.

In addition, it should be noted that the monitor is simply a monitor (fixed) with an adjustable monitor taken off the fixed one. The actual determination and measurement of effluent is based on the semiannual stack grab samples analyzed for Argon-41 releases which have been consistently normal within detection limits.

Current Status/Consequences

After the Reactor Manager discussions with the Radiation Control Officer and Facility Director about the calibration procedure to be performed, MLP #97-01 was opened on January 13, 1997 and the Reactor Manager together with an SRO-trainee and a radiation control technician then calibrated the fixed and adjustable stack monitors making necessary changes to assure a proper Q-2 Surveillance was performed and documented as they proceeded. Since that date, the stack monitor has been considered to be properly calibrated to meet technical specifications. A "Coversheet/Change Request Form" (UFTR Form SOP-0.1A) was submitted to the RSRS Executive Committee to correct/update the Q-2 Surveillance Form. Similarly, copies of the Stack Monitor Source Decay Printout for the Cs-137 Source were submitted to Radiation Control for inclusion into the approved RCT #37.

The revised Q-2 Surveillance Data Sheet was approved at the RSRS Executive Committee meeting on January 13, 1997 and is now installed in the applicable UFTR document manuals. The key change here is to call out that the expected results from the RCT #37 data sheet are to be used in calibrating/checking the fixed stack and the adjustable stack monitors. The change to RCT #37 will be implemented by January 31, 1997 as the RSRS Executive Committee agreed that this correction was needed as well.

As indicated, the RSRS Executive Committee met on January 13, 1997 to review this event. At that time, the Committee essentially agreed with actions taken and with the initial staff evaluation that the occurrence did represent a potential violation of the UFTR Technical Specifications and should be treated as promptly reportable. The RSRS Executive Committee also met on January 27, 1997 to review the report submitted to NRC on this event and concurs with its conclusion. Therefore, Reactor Management and the RSRS Executive Committee agree there has been no significant compromise to reactor safety in the occurrence and no impact on the health and safety of the public. Other than considering the event in the next regular RSRS meeting, this occurrence is now considered closed.

If further information is needed, please advise.

Sincerely,

William G. Vernetson
Director of Nuclear Facilities

WGV/dms
Attachment

Copies: U.S. NRC Document Control Desk
Ted S. Michaels, NRC Project Manager
Reactor Safety Review Subcommittee
D. Cronin, Reactor Manager

Sworn and subscribed this 28th day of January 1997.

Notary Public

JOAN MOREHOUSE
MY COMMISSION # CC302415 EXPIRES
August 27, 1997
BONDED THRU TROY FAIN INSURANCE, INC.

ATTACHMENT I

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January 15, 1997

Attn: Luis Reyes, Regional Administrator
U.S. Nuclear Regulatory Commission
Region II
101 Marietta Street NW, Suite 2900
Atlanta GA 30323

Potential Tech Spec Violation - Improper Stack Monitor Calibration

Re: University of Florida Training Reactor/Facility License R-56, Docket No. 50-83

As per a telephone conversation on January 14, 1997 with Mr. Ed McAlpine concerning an improperly calibrated stack radiation monitor, we have concluded that this failure to properly calibrate the stack radiation monitor is a potentially reportable occurrence per UFTR Technical Specifications Section 6.6.2 delineating requirements for special reports.

The UFTR Technical Specifications require calibration checks of the stack radiation monitor on a quarterly basis. Although always performed in a timely manner, the use of a flawed procedure that failed to correct for the decay of the Cs-137 calibration source since mid-1990 led to a monitoring system that was not properly calibrated. The applicable section of the UFTR Technical Specifications requiring the quarterly calibration is Section 4.2.4(1) with the requirement for the monitor being in Table 3.3 in Section 3.4.2 of the Technical Specifications.

A full-power reactor run on January 14 authorized by the Reactor Safety Review Subcommittee showed the recent stack monitor indications were conservative as only minor adjustments were needed in the calibration performed on January 13, 1997 and the approximate full-power steady-state stack monitor reading is now ~2200-2300 cps versus ~2700-2800 cps on previous recent

full-power steady-state operations. The fact that recent values were conservative was conveyed to Mr. McAlpine in a following conversation on January 15, 1997 along with iterating that all stack grab samples to measure Argon-41 levels have been normal over this entire period. As of the afternoon of January 13, 1997 this monitor is properly calibrated.

If further information is needed, please let me know.

Sincerely,

William G. Vernetson
Director of Nuclear Facilities

WGV/dms

Copies: D. Cronin
RSRS

Sworn and subscribed this 15th day of January, 1997.

Kathleen A. Wilson
Notary Public

KATHLEEN A. WILSON
MY COMMISSION # CC 453395
EXPIRES: April 17, 1999
Bonded Thru Notary Public Underwriters