TEXAS A&M ENGINEERING EXPERIMENT STATION

NUCLEAR SCIENCE CENTER

TEXAS A&M UNIVERSITY

Dr. Sean M. McDeavitt
Director, TEES Nuclear Science Center
Texas A&M University
Texas A&M Engineering Experiment Station
1095 Nuclear Science Road, 3575 TAMU
College Station, TX 77843-3575

October 8, 2015 2015-0040

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

SUBJECT: Response to Apparent Violations; EA-14-230

Dear Nuclear Regulatory Commission:

I am writing in response to the recent letter dated September 11, 2015 received by the TEES Nuclear Science Center (NSC) entitled TEXAS A&M NUCLEAR SCIENCE CENTER – NUCLEAR REGULATORY COMMISSION INSPECTION REPORT 50-128/2015-202 AND OFFICE OF INVESTIGATIONS REPORT NO. 4-2014-010. The September 11, 2015 letter presented a brief description of events that occurred at the NSC in May 2013 and the outcome of an Office of Investigations (OI) investigation that created the basis for two apparent violations (AVs) of NRC requirements.

The objective of this letter is to acknowledge the accuracy of the OI report and provide a discussion of notable changes to the NSC culture, organization and procedures that may be appropriate to consider when promulgating the AV enforcement decisions. As the new Director of the NSC[1], I want to affirm that the events from May 2013 (and related follow-on events) were serious and required diligent corrective action. We have not been complacent since the events occurred.

Before discussing the AVs in detail, it is appropriate to highlight the following points:

1. Texas A&M Engineering Experiment Station (TEES) and Texas A&M University (TAMU) leadership are committed to the continued operation of the NSC TRIGA Reactor (NSCR) with a commitment to safety, excellence, and attention to detail.
2. An internal compliance review has been completed with internal and external expert review panelists to consider all aspects of the NSC. The recommendations are being implemented with a positive impact on the NSC.[2]

[1] I was named Interim Director on July 2, 2014 and was formally named as the NSC Director in December 2014.

[2] In August 2014, TEES requested that the Texas A&M System Ethics and Compliance Office form a team of experts to conduct a comprehensive compliance review of nuclear reactor operations. The team included experts from MIT, the National Institute of Standards and Technology, the University of Missouri, and Oregon State University. The review was completed and a report of findings and recommendations was provided to TEES in December 2014. TEES has implemented or is implementing those recommendations.

3. Significant changes have been implemented to the NSC organization, including my appointment as the Director, the appointment of an Assistant Director over the entire organization, creation of the NSC Safety Office (upgraded from the Radiation Safety Office), creation of an engineering department to manage maintenance, systems, and reactor experiments, and streamlining of the operations department to focus only on reactor operations.
4. The culture of the NSC has been transformed to more effectively empower the requisite safety culture for a nuclear facility with regular safety briefings, training on stop-work authority, ongoing procedure reviews, and similar activities.
5. Significant changes to policies regarding signature authorizations and completion protocols for daily checklists were implemented (see details below).
6. The most recent inspection report from the NRC highlighted much improvement in the overall performance of the NSC.
7. While it does not diminish the serious nature of the AVs, it is notable that all of the individuals who participated directly in the AV events are no longer employees of the NSC.

The following discussions provide more specific information regarding the perspective of the NSC with respect to the AVs. The comments follow the format requested in the AV notification letter: "(1) the reason for the AV or, if contested, the basis for disputing the AV; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved.

AV 50-128/2015-202-01, Failure to Maintain an Accurate Reactor Operations Log Shutdown Checklist

(1) The reason for the AV

This AV involves the reactor operations manager's willful failure to comply with Technical Specifications (TS), Appendix A, to License No. R-83, Sections 1.23 and 1.27. Specifically, he certified (on a later date) on the Daily Reactor Shutdown Checkoff section of the reactor operations log for May 14, 2013 that the shutdown procedures had been completed when they had not in fact been completed.

(2) The corrective steps that have been taken and the results achieved

The NSC has taken corrective steps since this incident to minimize the likelihood of reoccurrence. It should be noted that these corrective steps are included in a broader effort to implement best practices as revealed by interaction with other research reactors, internal, and external reviews. These corrective steps are part of a shift in culture from thinking that meeting the bare minimum of requirements is good enough, to thinking that we will always improve and must strive for excellence. Specifically in this case, our corrective steps follow two paths. The first was to restore the proper emphasis on the purpose of checkoffs, checklists, and procedures. The second was to reform our internal audit system.

The referenced event provides evidence that understanding among our operating staff of the purpose for checkoffs, checklists, and procedures had degraded. These tools exist to reduce the probability of human failure. Their use must be enthusiastically supported and required by management. EA-14-230 notes, "[w]hen interviewed by OI, the SRO and RO did not recall

Nuclear Science Center
1095 Nuclear Science Road, 3575 TAMU
College Station, TX 77843-3575
Tel. (979) 845-7551

completing the reactor operations log shutdown checklist for the May 14, 2013 shift." This entire event may have been avoided had they attempted to complete the checkoff with its written requirement to, "[v]isually check all rods down."

NSC management does now enthusiastically support and *require* proper use of checkoffs, checklists, and procedures. Operating staff understand that these tools are not administrative formalities. Operating staff understand that these tools are a crucial part of their high-level performance of maintaining safety.

The referenced event also provides evidence that our internal audit system was in need of reform. Our internal audit system had degraded to the point that it seemed appropriate to our reactor operations manager, in this case, to fill in the blanks on the Daily Reactor Shutdown Checkoff when he came across them in his audit. Audits were on an irregular schedule, and frequently had a significant period between them. This is an unacceptable practice.

This system is changed. Checkoffs and checklists are internally audited at the end of every operating day as they are completed, and the audit is reviewed at the beginning of the next operating day to verify conformance. Reactor operations logbooks are audited again when each book is complete (approximately quarterly). Deviations are intensely investigated and documented by a memo attached to the original document that explains what the deviation is and what effect it has. Deviations are also brought to the attention of management, outside of the operations department, in a timely manner. Deviations, and the results of investigations into them, are also widely shared in a timely manner site-wide to allow us all to incorporate the lessons learned in our behavior.

These corrective steps have yielded positive results. Through proper understanding of the true importance of checkoffs, checklists, and procedures, and robust internal auditing with management involvement, occurrence of deviations has plummeted and those few that do occur are well-documented, understood, and openly known.

(3) The corrective steps that will be taken

There are several corrective steps that either will be taken, are in progress, or are ongoing. As the vast majority of our operating staff are students, we are always training new operators. The training modules that explain our checkoffs, checklists, and procedures have not yet been updated to explicitly state the importance of and reasoning behind those tools. The training modules will be updated to do so. We have had the chance to audit two reactor operations logbooks using our new audit scheme with positive results. We are in process of evaluating the new audit method to see if it is functioning as well as our standards demand. We are increasing our dialog and interactions with other research reactors and have performed management reviews of regulations to benchmark ourselves and discern areas for improvement.

(4) the date when full compliance will be achieved

We believe that we are presently in full compliance with our procedures, our TS, and the CFR. That said, and as referenced in the previous section, we have not yet completed everything we are implementing to improve our performance in this area. The next cohort of potential student operators (trainees) will be hired in early October and will begin their operator training by mid-October. We are committed to completing the update of the training modules before they start their training. Our evaluation of the new internal audit method of the reactor operations logbooks will be complete by the middle of October 2015 with the results ready to be incorporated into the next audit.

Nuclear Science Center
1095 Nuclear Science Road, 3575 TAMU
College Station, TX 77843-3575
Tel. (979) 845-7551

Our ongoing interaction with other research reactors and benchmarking is and will continue to be ongoing. As an example, I have recently become a member of the USGS Reactor Operation Committee; this provides direct interaction with another TRIGA facility and a means for discussion of best practices. Further, members of the NSC staff have visited the TRIGA reactor at the University of Texas, and we plan to visit other research reactors across the country. Finally, I participated in the 2014 TRTR meeting and more of the NSC staff will attend in 2015; I am convinced that that meeting is an invaluable event for the NSC, TEES and TAMU.

AV 50-128/2015-202-02, Failure to Maintain the Technical Specifications Minimum Facility Complex Staffing

(1) The reason for the AV

On May 14, 2013, the facility complex did not maintain minimum staffing requirements and failed to have an SRO and either a licensed RO or operator trainee on duty when the reactor was not secured.

(2) The corrective steps that have been taken and the results achieved

The Nuclear Science Center has taken corrective steps since this incident to minimize the likelihood of reoccurrence. It should be noted that these corrective steps are included in a broader effort to implement best practices as revealed by interaction with other research reactors, internal, and external reviews. One of the completed corrective steps is identical to one of those described above in our response to AV 50-128, 2015-202-01, Failure to Maintain an Accurate Reactor Operations Log Shutdown Checklist. We have restored the proper emphasis on the purpose of checkoffs, checklists, and procedures. There is also an update to the facility staffing procedures underway to emphasize the need for a responsible operating team to have definite knowledge that they are meeting the TS staffing requirement.

As noted in the opening comments of this letter, a significant reorganization of the NSC management structure has been implemented to empower personnel toward improved performance. The previous improper culture was established over a long time as practices degraded to the level that led to this incident. At this time, the NSC's entire on-site management staff has been replaced, or duties significantly changed. The top goal of our management staff is to create and maintain a healthy nuclear safety culture. Part of this has involved teaching the operations staff that procedures exist as a valuable tool to reduce the probability of human failure. Operating staff now understand that these tools are not administrative formalities. They now understand that these tools are a crucial part of their high-level performance of maintaining safety.

An assumption in our ongoing training is that operating staff must have good procedures. As a result of our reviews following this incident, we identified a need to revise the entire second chapter of our facility procedures (SOP-II). Included in SOP-II is our facility staffing procedure. While, if followed, the previous procedure did ensure compliance with TS, we determined that it could be made more clear and modified to improve safety. Two primary improvements were 1) clarifying exactly who needs to be in the control room while the reactor is not secured, and 2) strengthening the definition of who qualifies as an "operator trainee."

The process of rewriting SOP-II is not yet complete (see Section 3) and formal submission of the revised SOP-II to the Reactor Safety Board is planned for this Fall. However, the NSC Director is empowered to make staffing requirement changes at will via administrative

Nuclear Science Center
1095 Nuclear Science Road, 3575 TAMU
College Station, TX 77843-3575
Tel. (979) 845-7551

procedure, so long as those changes comply with TS. Therefore, a new administrative staffing procedure was implemented at the NSC. This new procedure is being incorporated into the revision of SOP-II, but this will require review and approval by the TAMU Reactor Safety Board. In the meantime, we are already using the Director's administrative procedure.

This revised procedure calls for an SRO on Duty (SROD) and a second person, who is either a licensed Reactor Operator on Duty (ROD) or Plant Operator on Duty (POD), to be on site, and the ROD to be in the control room while the reactor is not secured. All people designated as POD are operator trainees, in compliance with TS.

The new procedure is stronger in two ways. First, the requirement to be internally designated as a Plant Operator (PO) is more rigorous than the requirement to be internally designated as an operator trainee. Second, the procedure has been strengthened to require that the person logged in as ROD must be in the control room.

To be designated as PO, one must demonstrate a basic level of understanding about operating the reactor and the ability to respond correctly in an emergency situation if the SROD is incapacitated. The determination is made by the person in charge of the operator training program via documented written and practical tests. This change strengthens the procedure by requiring the second person to have the knowledge to maintain the reactor in a safe configuration until help arrives if the SROD is incapacitated.

The second change emphasized the importance of requiring the staff on duty to be logged in the daily logbook while they fulfill the responsibilities of being on duty. In the past, it was common for a third licensed person to staff the control room, while the operators on duty worked in other parts of the site. The practice degraded the importance of the *on duty* operator being in the control room. The new procedure restores that importance, and makes it clear that the licensed operator in the control room needs to be the person who understands the condition of the entire site. Any mid-day changes in staffing are now logged appropriately.

(3) The corrective steps that will be taken

There is a corrective step that is in progress, and one that is ongoing. As referenced in Part 2 above, the re-write of SOP-II is still in progress. Administrative changes have been implemented pending final SOP-II approval. We are communicating and visiting with other research reactors and performing management review of regulations to benchmark ourselves and discern areas for improvement.

The re-write of SOP-II is essential for giving our operating staff a strong procedure to use while operating safely. The re-write includes procedures for *operations records*, *reactor startup*, *steady state mode operation*, *pulsing operation*, *reactor shutdown and secure*, and *reactor bridge movement*. Other procedures currently in SOP-II are being moved to either SOP-I (*Policy and Admin Procedures*) or SOP-III (*Reactor Maintenance and Surveillance*). The new procedures are designed to be clear, complete, and comply with all TS and CFR.

(4) The date when full compliance will be achieved

We believe that we are presently in full compliance with our procedures, our TS, and the CFR. That said, and as referenced in the previous section, we have not yet completed everything we are implementing to improve our performance in this area.

Nuclear Science Center
1095 Nuclear Science Road, 3575 TAMU
College Station, TX 77843-3575
Tel. (979) 845-7551

It is not possible to project exactly when the re-write of SOP-II will be complete. We cannot, and should not, predict the Reactor Safety Board's review and approval process. However, we are committed to presenting the revised SOP to the Board this Fall.

Our ongoing interaction with other research reactors and benchmarking is and will continue to be ongoing. As noted above, this will include regular participation in TRTR meetings and site visits to other research reactors.

In closing, I want to reiterate the commitment of the NSC, TEES, and TAMU to the continued safe operations of the 1 MW TRIGA NSCR. We acknowledge that the previous culture of the NSC was degraded and contributed to the events that led to the AVs. We have been working diligently to eliminate the root causes of these past events and to transform the NSC into an exemplary nuclear reactor facility. We recognize that the actions we have taken, while effective thus far, require a long term commitment to continued improvement and that is the culture we are striving to create.

Finally, we recognize the subject AVs are serious and require enforcement decisions. We do not contest that. We affirm that we have already taken significant corrective actions, as described above, with the intent of transforming the NSC culture. We respectfully ask that these actions be considered when determining the nature and extent of the pending decisions.

I declare under penalty of perjury that the foregoing is true and correct. Executed on October 8, 2015.

Best Regards,

Sean M. McDeavitt

Dr. Sean M. McDeavitt
Director, TEES Nuclear Science Center

License No. R-83

Nuclear Science Center
1095 Nuclear Science Road, 3575 TAMU
College Station, TX 77843-3575
Tel. (979) 845-7551