



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

September 6, 2018

MEMORANDUM TO: Michael X. Franovich, Director
Division of Risk Assessment
Office of Nuclear Reactor Regulation

FROM: Stacey L. Rosenberg, Chief */RA/*
Probabilistic Safety Assessment Branch
Division of Risk Assessment
Office of Nuclear Reactor Regulation

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION REPORT ON
OBSERVATIONS OF IMPLEMENTATION OF THE INDUSTRY
INDEPENDENT ASSESSMENT TEAM CLOSE-OUT OF FACTS
AND OBSERVATIONS

Regulatory Guide 1.200 (RG 1.200), "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities," describes one acceptable approach for determining whether the technical adequacy of the Probabilistic Risk Assessment (PRA) can be used in regulatory decision-making for light-water reactors. RG 1.200 endorses, with clarifications, technical requirements described in the American Society of Mechanical Engineers (ASME) and the American Nuclear Society (ANS) ASME/ANS RA-Sa-2009, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications" (ASME/ANS Standard).

Section 1-6 in the ASME/ANS Standard provides requirements for a peer review of a PRA. The industry peer review guidance in NEI 05-04, NEI 07-12 and NEI 12-16 indicates that the peer review assessment is done against the technical requirements for Capability Category (CC) II in the ASME/ANS Standard. The documentation of differences or deficiencies that do not allow a CC II to be assigned are generally labeled facts and observations (F&Os) in the industry peer review guidance documents.

By letter dated February 21, 2017 (Agencywide Documents Access and Management System Accession Number Package: ML17086A450), the Nuclear Energy Institute (NEI), submitted to the U.S. Nuclear Regulatory Commission (NRC) Appendix X to NEI 05-04, NEI 07-12 and NEI 12-16, "Close-out of Facts and Observations (F&Os)." By letter dated May 3, 2017, the NRC accepted this F&O closure review process described in Appendix X with certain conditions of acceptance. In the acceptance letter, the NRC clarified that the NRC would observe several Appendix X F&O closure reviews, and may audit the process when used to support license amendment requests. The observations and audits are to provide continued monitoring and oversight of PRA acceptability

CONTACT: Stephen C. Dinsmore, NRR/DRA
301-415-8482

The NRC has previously observed on-site implementation of the independent assessment (IA) teams F&O closure reviews on July 18, 2017 and August 23-25, 2017, and observed one webinar on August 31, 2017. The on-site observations were performed by different teams of NRC staff and one contractor. The NRC documented these observations in attachments to an email dated December 20, 2017 (ML17356A055).

This memo documents the NRC observations of the March 19-23, 2018, IA team F&O closure review at Dominion headquarters in Richmond, VA. The review was performed by ten contractors in an EPM lead team at Dominion headquarters. All reviewers remained on site all week and there were no remote reviewers. The IA team reviewed supporting requirements (SR) dispositions for the Millstone and Surry sites. Millstone was reviewed on March 19-21 2018, and Surry was reviewed on March 20-22, 2018, with a summarization and close-out on March 23, 2018. The observations discussed below are general to the review of both plants although some may be applicable to one plant and others to the other plant.

The full-scope peer review for Millstone's PRA was done in 2000, using a common (BWROG, CEOG, and WOG) industry, pre-NEI 00-02 checklist. The full scope peer review for Surry's PRA was done in 1998, using a WOG, pre-NEI 00-02 check list. The licensee relied on gap assessments and several subsequent focused scope peer reviews to convert the results of these full scope peer reviews from an evaluation against the earlier checklists to an evaluation against the ASME/ANS RA-Sb-2005 Standard (ASME 2005 Standard) and then against the ASME/ANS-RA-Sa-2009 Standard (ASME 2009 Standard).

The gap assessment in Appendix B of RG 1.200 describes a self-assessment to convert the results of a review using NEI 00-02 to results consistent with the ASME/ANS RA-Sb-2005 Standard. NRC staff discussions with Dominion staff during this IA team observation indicate that there are only a few differences between the checklists used for the peer reviews and NEI 00-02. NRC staff did not observe any discussion of these differences between the IA team and Dominion but, as discussed further below, NRC staff only observed a sampling of discussions. The IA team evaluated each F&O resolution against the ASME 2009 Standard's SRs, consistent with the Appendix X guidance so the team conclusions should be consistent with the ASME 2009 Standard. Any 2009 Standard SRs that might not have been in the original checklists and not reviewed during any follow-up focused-scope peer review will not have been addressed by the peer reviews nor this F&O closure review. This issue is, however, not addressed by Appendix X. The applicability of peer reviews performed using superseded documents is evaluated based on the reported history of peer reviews in any license amendment request and then resolved with requests for additional information as appropriate.

Based on information provided to NRC staff during the observation, the Millstone PRA had one focused-scope peer review and the Surry PRA had four focused-scope peer reviews after the original peer reviews. The IA team was provided with all F&Os, including those from the original peer reviews, the gap assessment, and the focused-scope peer reviews. Each F&O provided by the licensee included cross-references to all associated 2009 Standard SRs. The F&Os from the original 1998 and 2000 peer reviews are sometimes linked to 12 or more SRs in the 2009 ASME Standard. Consistent with the limited changes between the 2005 Standard and the 2009 Standard, however, post-2005 focused-scope peer reviews were generally linked to a single 2009 Standard SR unless the F&O itself was related to more than one SR.

In addition to the F&O text and the cross-reference to the 2009 ASME Standard's SRs, the licensee provided a discussion and determination about whether each resolution was an upgrade or maintenance. During the F&O closure, the IA team reviewed each of these

discussions and provided its assessment of the licensee evaluations. The IA team performed four additional focused-scope peer reviews on upgrades. These focused-scope peer reviews covered inclusion of FLEX equipment, convolution of offsite power recovery, Anticipated Transient Without Scram modelling, and the entire quantification element for one of the plants.

Some specific observations were:

- 1) There were 105 Millstone and 61 Surry F&Os provided to the F&O team. As in all previous F&O closure observations, the IA team checked that both the PRA model and the documentation reflected the proposed resolution when evaluating whether the resolution was implemented into the PRA model of record.
- 2) This IA team often checked the proposed F&O resolution against the new ASME Standard SR requirements. This is consistent with the Appendix X guidance to ensure that the aspects of the underlying SR that were previously not met, or met at CCI, are now met, or met at CCII. This activity can compensate for the use of pre-ASME Standard checklists although it would not identify any weakness that would be associated with tasks not included in the full scope peer review checklists or the focused scope peer reviews.
- 3) The licensee provided an explanation on why each F&O was determined to be an upgrade or maintenance, consistent with the guidance in Appendix X. The IA team reviewed each of these discussions also consistent with the guidance in Appendix X. The IA team generally accepted the licensee's determination and performed four focused scope peer reviews that addressed all upgrades.
- 4) The licensee provided the team with all past F&Os, even F&Os that had been addressed by previous focused scope peer reviews and upgrade F&Os that would not normally be part of an F&O closure review. Consequently, the team had to develop dispositions not foreseen in Appendix X, e.g., how to disposition maintenance F&Os and upgrade F&Os that had been addressed in previous peer reviews. The team addressed these on a case-by-case basis, sometimes relabeling F&Os from upgrade to maintenance and sometimes resolving the F&O as not applicable. The team appeared to verify that every reported resolution had been incorporated into the PRA regardless of the formal disposition.
- 5) The ten member team was larger than the minimum full-scope peer review team of five members suggested by the ASME Standard. The pre-, on-site-, and post-review activities were consistent with the ASME Standard and with Appendix X. Even this large team was challenged to complete the tasks given the complex information provided, the number and the variety of F&Os, and the two different plants.
- 6) Numerous licensee PRA personnel supported the effort. There were many break-out sessions and discussions in different rooms which prevented the two NRC staff from observing many of the evaluations, but was consistent with the scope of work that was performed.
- 7) The results of the review were the F&O tables to which the IA team had added its determination about upgrade/maintenance and whether the proposed resolution was implemented and now met, or met a CC II, the SR. Formal summarizing information was not available at the end of the week because the IA team was finalizing the

documentation for each individual F&O. Furthermore the inclusion of the four focused-scope peer reviews which addressed the upgrades (and resulted in at least two new F&Os) complicated summarizing the results of the review by the end of the week.

- 8) Although the results and formal documentation was not complete, presentations during the final consensus discussions indicated that 85 of the Millstone F&Os were closed, five remained open, and the rest were partially open with the opportunity for the licensee to complete any missing work before the final report. All the Surry F&Os were closed with a few being closed on the expectation that the licensee would complete some missing documentation before the final report. Appendix X guidance recognizes that F&Os may be closed between the end of the on-site review and issuing the final report.

This was the first observed F&O review that devoted the expected attention and effort to the upgrade/maintenance issue as summarized in Appendix X. This was the first observed F&O review that devoted the expected attention and effort to confirming that the resolved F&Os now met the SR, or met the SR at CC II as summarized in Appendix X.

According to Appendix X the team should have received a list of unclosed but resolved F&Os that the licensee proposed to be closed, but this licensee provided the team with every F&O. The team addressed this issue by evaluating each F&O using a complicated historical cross reference to the latest ASME Standard. The IA team appeared to overcome this challenge due to the number and expertise of the review team which exceeded the ASME Standard's proposed full-scope peer review team. These additional resources were needed to address the complex, interrelated information that the team was provided for review, and to address all issues related to reviewing two different plants.

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION REPORT ON OBSERVATIONS OF
IMPLEMENTATION OF THE INDUSTRY INDEPENDENT ASSESSMENT TEAM
CLOSE-OUT OF FACTS AND OBSERVATIONS DATED: 9/06/2018

DISTRIBUTION:

PUBLIC

MLevine, NRR

SDinsmore, NRR

SRosenberg, NRR

RidsNrrDra Resource

ADAMS Accession No. ML18095A990

NRR-106

OFFICE	DRA/APLA	DRA/APLA	APLA
NAME	MLevine	SDinsmore	SRosenberg
DATE	4/08/2018	4/09/2018	9/06/2018

OFFICIAL RECORD COPY