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

October 12, 2018

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

FROM: Stacey L. Rosenberg, Chief ***/RA/***
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SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION REPORT ON OBSERVATIONS OF IMPLEMENTATION OF AN INDUSTRY INDEPENDENT ASSESSMENT TEAM CLOSE-OUT OF FACTS AND OBSERVATIONS FOR THE HOPE CREEK GENERATING STATION, UNIT 1, FIRE PROBABLISTIC RISK ASSESSMENT

Regulatory Guide (RG) 1.200, Revision (Rev.) 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities" (Agencywide Documents Access and Management System (ADAMS) Accession Number (No.) ML090410014) describes one acceptable approach for determining whether a Probabilistic Risk Assessment (PRA) is acceptable for use in regulatory decision-making for light-water reactors. RG 1.200, Rev. 2, 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 PRA Standard).

Section 1-6 of the ASME/ANS PRA Standard provides requirements for peer review of a PRA. The industry peer review guidance in Nuclear Energy Institute (NEI) 05-04, NEI 07-12 and NEI 12-13 indicates that the peer review assessment is done against the technical requirements for Capability Category (CC) II in the ASME/ANS PRA Standard. The documentation of differences or deficiencies that do not allow a CC II to be assigned are generally labeled facts and observation (F&Os) in the industry peer review guidance documents.

By letter dated February 21, 2017 (ADAMS Accession Package No. ML17086A431), the NEI submitted Appendix X to NEI 05-04, NEI 07-12, and NEI 12-13, "*Close-out of Facts and Observations*" to the U.S. Nuclear Regulatory Commission (NRC). Appendix X describes the use of an industry independent assessment (IA) team to close out Facts and Observations (F&Os) from previous full- or focused-scope peer reviews of PRAs.

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By letter dated May 3, 2017 (ADAMS Accession Package No. ML17079A427), the NRC accepted the process described in Appendix X with limitations and clarifications. In the acceptance letter, NRC stated that "in order for the NRC to consider the F&Os closed so that they need not be provided in submissions of future risk-informed licensing applications, the licensee should adhere to the guidance in Appendix X in its entirety." The letter also clarified that additional observation of Appendix X F&O closure reviews, and audits to support licensing actions, may be performed to provide continued monitoring and oversight of PRA acceptability.

The enclosure to this memorandum documents NRC observations of the implementation of the IA team F&O closure process for the Hope Creek Generating Station, Unit 1 (Hope Creek), fire PRA which occurred September 17-21, 2018, at the Jensen Hughes Office in West Chester, Pennsylvania.

While NRC staff sought broad observations of the Appendix X implementation, specific attention was devoted to issues highlighted by previous observations as potential areas of concern to the NRC (e.g., assessment of PRA upgrades vs. maintenance, independence of members of the IA team, IA team interactions, and review of underlying supporting requirements).

Enclosure:
As stated

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION REPORT ON OBSERVATIONS OF IMPLEMENTATION OF AN INDUSTRY INDEPENDENT ASSESSMENT TEAM CLOSE-OUT OF FACTS AND OBSERVATIONS FOR THE HOPE CREEK GENERATING STATION, UNIT 1, FIRE PROBABLISTIC RISK ASSESSMENT

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U.S. NUCLEAR REGULATORY COMMISSION OBSERVATIONS
OF AN INDUSTRY INDEPENDENT ASSESSMENT TEAM CLOSE-OUT
OF FACTS AND OBSERVATIONS FOR THE
HOPE CREEK GENERATING STATION, UNIT 1,
FIRE PROBABILISTIC RISK ASSESSMENT

DATE: September 17, 2018 – September 21, 2018

LOCATION: Jensen Hughes Office, West Chester, Pennsylvania (PA)

NRC STAFF OBSERVERS:

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BACKGROUND:

By letter dated February 21, 2017 (Agencywide Documents Access and Management System (ADAMS) Accession Package No. ML17086A431), the Nuclear Energy Institute (NEI) submitted Appendix X to NEI 05-04, NEI 07-12, and NEI 12-13, "*Close-out of Facts and Observations,*" to the U.S. Nuclear Regulatory Commission (NRC). Appendix X allows for the use of an industry independent assessment (IA) team to close out Facts and Observations (F&Os)[1] from previous full- or focused-scope peer reviews of probabilistic risk assessments (PRAs). Appendix X addresses items such as the selection of IA team members, the scope of IA team review, pre-review preparation activities, the conduct of the on-site review including the treatment of new methods and the use of remote reviewers, and post-review activities including the development of the F&O closure final report.

By letter dated May 3, 2017 (ADAMS Accession Package No. ML17079A427), the NRC accepted the process described in Appendix X with limitations and clarifications. In this letter the NRC stated that "in order for the NRC to consider the F&Os closed so that they need not be provided in submissions of future risk-informed licensing applications, the licensee should adhere to the guidance in Appendix X in its entirety." The letter also stated that additional observation of Appendix X F&O closure reviews, and audits to support licensing actions, may be performed to provide continued monitoring and oversight of PRA acceptability.

Previous NRC staff observations related to the development and implementation of the Appendix X process are documented in memoranda dated May 1, 2017, and September 6, 2018 (ADAMS Accession Nos. ML17095A252 and ML18095A990, respectively).

[1] Industry PRA peer-reviews are performed against Capability Category (CC) II of 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." The documentation of differences or deficiencies that do not allow a CC II to be assigned are generally identified as facts and observations, or F&Os.

These observations highlighted aspects such as the assessment of PRA upgrades vs. maintenance, independence of IA team members, IA team member interactions, and review of underlying PRA standard supporting requirements (SRs).

OBSERVATIONS:

The Hope Creek Generating Station, Unit 1 (Hope Creek), Fire PRA (FPRA) IA F&O closure review was performed by six contractors primarily comprised of staff from Jensen Hughes. All IA team members remained on-site at the Jensen Hughes Office in West Chester, PA during the review, and there were no remote reviewers. A focused-scope peer review was also performed by the same individuals comprising the IA F&O closure team.

The full-scope peer review for the Hope Creek FPRA was done in 2010, against the American Society of Mechanical Engineers (ASME)/American Nuclear Society (ANS)-RA-Sa-2009 Standard (2009 ASME/ANS PRA Standard) which is endorsed, with clarifications, by the NRC in Regulatory Guide (RG) 1.200, Revision (Rev.) 2, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities" (ADAMS Accession No. ML090410014). After the 2010 full-scope peer review, the host utility performed a self-assessment against the ASME/ANS-RA-Sb-2013 Standard which is not currently endorsed by the NRC. However, since the 2010 FPRA full-scope peer review and the current F&O closure and focused-scope peer review were performed against the 2009 ASME/ANS PRA Standard, the host utility self-assessment using the 2013 ASME/ANS PRA Standard did not impact the use of an NRC endorsed standard and was therefore consistent with Appendix X guidance.

The IA team was provided with all F&Os from the 2010 full-scope peer review along with affected 2009 ASME/ANS PRA Standard SRs, the host utility's dispositioning of F&Os, and an assessment of whether resolution of F&Os was considered to be PRA maintenance or upgrade. While a substantial fraction of F&Os were associated with PRA maintenance activities, a large number of F&Os were associated with PRA upgrades and were addressed as part of the focused-scope peer review. The focused-scope peer review covered topics such as human reliability analysis, PRA treatment of control room abandonment scenarios, and fire modeling methodology changes. New F&Os were generated as a result of the focused-scope peer review; however, these F&Os were not eligible for closure by the assembled IA team. The NRC staff noted that in some cases clarifications to the 2009 ASME/ANS PRA Standard from RG 1.200, Revision 2, were not considered during F&O closure evaluation or evaluation of the Hope Creek FPRA for conformance with PRA technical elements. Subsequently, the IA team explicitly considered the clarifications during consensus sessions.

Although the results and formal documentation of the IA F&O closure team were not complete, a presentation during the IA team and host utility exit meeting indicated that of the 76 F&Os provided to the IA team, 18 F&Os were identified as resolved (i.e., closed), 33 were closed and superseded due to being addressed as part of the focused-scope peer review, 16 were open, and 9 were partially resolved or partially resolved with open documentation. The Appendix X guidance recognizes that F&Os may be closed between the end of the on-site review and issuance of the final report. An additional remote consensus session was tentatively planned to address forthcoming information provided by the host utility to address outstanding documentation issues.

Specific observations are described below:

1. Compared to other F&O closure assessments observed by NRC staff, the IA reviewers conducted their individual assessment of F&Os with significant collaboration. Each reviewer, even if not assigned, generally contributed to consensus discussions. During non-consensus sessions, teams of reviewers (i.e., at least two reviewers assigned per technical element) had different approaches to assessing F&Os. For example, some teams initially split-up F&Os while other teams worked collaboratively for the duration of the review.

2. The host utility provided a written assessment and justification of whether each F&O constituted a PRA upgrade or maintenance update as defined in the 2009 ASME/ANS PRA Standard. Using this information as a starting point, the IA team discussed whether it agreed or disagreed with the host utility assessment and provided the bases for its determinations.

3. A large number of upgrades were identified by the host-utility and therefore, a substantial portion of the on-site review was devoted to a focused-scope peer review. The IA team generally accepted the licensee's determination that an F&O resolution constituted an upgrade. The scope of the upgrades was greater than anticipated. Due to the large number of upgrades identified, the IA team planned to complete a consensus session remotely following the on-site review.

4. The host utility generally identified and documented the SR(s) impacted by the subject F&O to ensure that the aspects of the underlying SR(s) that were previously not met, or met at CC I, are now met at CC II. During the consensus sessions, the IA team considered whether the underlying aspects of the SR(s) associated with each F&O were met at CC II. 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.

5. The IA team requested comments, questions, and concurrence from each of the reviewers participating in the review on each F&O. While the IA team did not encounter a situation that warranted documenting a dissenting opinion, there were discussions involving differing opinions that were resolved through additional IA team discussion or host utility interaction.

6. In a number of cases, the IA team found that documentation was incomplete, concluding that the F&O was "partially resolved with open documentation." There was discussion amongst the IA team and the host utility regarding final steps for ensuring updated documentation was complete. Specifically, it was not readily apparent if final utility processing (i.e., signatures only) was required to close-out partially resolved F&Os with only open documentation. The IA team pointed out that if it could confirm that the content of the documentation was properly updated, the basis for the F&O closure could be documented. The IA team and the host utility acknowledged that if changes to documentation forming the basis for the F&O closure were made subsequent to F&O closure, subject F&Os would remain open. The NRC commented that if the host utility changed a document supporting an F&O closure, the F&O would remain open and should be submitted to the NRC in risk-informed licensing applications.

7. There were a number of cases where F&Os eligible for closure were superseded by the focused-scope peer review. In these cases, the NRC staff confirmed that the IA team was still considering the technical basis for the existing F&O even though the F&O was superseded by a focused-scope peer review.

8. The IA team discussed the time frame from the on-site portion of the review and completion of final documentation. There is no specific guidance provided in Appendix X regarding this duration. The IA team and the host utility aligned that the timing would be consistent with previous F&O closures and focused-scope peer reviews. An approximately 4 week time period was discussed for the host utility to address outstanding items with additional time allotted thereafter for the IA team to complete a final consensus session and documentation.

9. Evaluation of several F&Os involved confirmation of plant equipment configuration or construction layout. In lieu of the IA team physically performing walk downs at Hope Creek, the host utility furnished a detailed electronic photo and mapping tool. This tool proved adequate for evaluating pertinent F&Os.

10. The IA team was organized into sub teams such that the review of F&Os was based on technical elements, therefore the focused-scope peer review and F&O closure processes were performed in conjunction. This approach appeared to work well.

11. The IA and host utility teams were primarily composed of staff from one contractor, Jensen Hughes. The NRC staff questioned the host utility regarding the selection of IA team members and how independence, as defined in Section 1.6 of the 2009 ASME/ANS Standard was confirmed. The host utility identified that careful attention was paid to selecting independent reviewers which involved ensuring that no IA team members had previously worked on the host utility PRA.

12. The six member IA team met the requirements for both an IA F&O closure and focused-scope peer review team composition as detailed in Appendix X and the 2009 ASME/ANS PRA Standard; however, due to the large scope of the review the team was challenged to complete both the F&O closure and the focused-scope peer review in the time allotted.

13. The IA team identified general trends in host utility documentation. In these cases there was open dialogue between the IA team and the host utility during daily debriefs. In general IA team and host utility interactions were frequent and productive.