

SAFETY EVALUATION FOR TOPICAL REPORT APR1400-K-Q-TR-11005-NP, REVISIONS 4, “KHNP QUALITY ASSURANCE PROGRAM DESCRIPTION (QAPD) FOR THE APR1400 DESIGN CERTIFICATION” (RQ4804)

1.0 INTRODUCTION

By letter dated October 28, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13302A142), Korea Hydro and Nuclear Power Co., Ltd (KHNP) submitted Topical Report (TR) APR1400-K-Q-TR-11005-NP entitled “KHNP Quality Assurance Program Description (QAPD) for the APR1400 Design Certification,” Revision 3, to the U.S. Nuclear Regulatory Commission (NRC) staff. TR APR1400-K-Q-TR-11005-NP, Revision 3, addresses KHNP’s inauguration of the new Chief Executive Officer (CEO), the reporting responsibilities among senior managers, and controls implemented for testing activities.

On January 06, 2014, the NRC staff requested additional information regarding KHNP’s intentions of Section 10, “Inspection,” in TR Revision 3 (ADAMS Accession No. ML14083A610). KHNP responded to the NRC’s request for additional information with (RAI) letter dated March 26, 2014 (ADAMS Accession No. ML14085A096), and submitted TR APR1400-K-Q-TR-11005-NP, “KHNP Quality Assurance Program Description (QAPD) for the APR1400 Design Certification,” Revision 4, to the NRC staff for review. TR Revision 4, provides clarifications regarding KHNP’s intentions in Section 10, “Inspection,” that KHNP does not intend to procure items during the design certification (DC) application phase to be used in construction of an advanced power reactor (APR) 1400. Furthermore, any items procured during the DC application phase will be used for testing purposes only.

2.0 REGULATORY EVALUATION

The Commission’s regulatory requirements related to quality assurance programs (QAPs) for standard design certifications are set forth in Title 10 of the *Code of Federal Regulations* (10 CFR) 52.47(a)(19) and Appendix B to 10 CFR Part 50 (Appendix B).

The regulations in 10 CFR 52.47(a) requires that a DC application contain the technically relevant information in a final safety analysis report (FSAR) that describes the facility, presents the design bases and the limits on its operation, and presents a safety analysis of the structures, systems, and components (SSCs) and of the facility as a whole. 10 CFR 52.47(a)(19) of states that the FSAR must include a description of the QAP to be applied to the design of the SSCs of the facility. 10 CFR 52.47(a)(19) further requires that the description of the QAP for a nuclear power plant include a discussion of how the applicable requirements of Appendix B will be satisfied.

Appendix B establishes quality assurance (QA) requirements for the design, fabrication, construction, and testing of SSCs for the facility. The pertinent requirements of Appendix B apply to all activities affecting the safety-related functions of those SSCs and include designing, purchasing, fabricating, handling, shipping, storing, cleaning, erecting, installing, inspecting, testing, operating, maintaining, repairing, refueling, and modifying SSCs.

3.0 EVALUATION

In evaluating the adequacy of KHNP's TR, the NRC staff utilized the guidance contained in NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 17.5, "Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applicants," dated March 2007 (ADAMS Accession No. ML063190019) (SRP) which provides acceptance criteria for design certification, early site permit, combined license, construction permit, and operating license applicants. The NRC staff also utilized the guidance in SRP Section 17.5 for development of the safety evaluation for Revision 2 of KHNP's TR. KHNP's TR aligns with Section 17.5 of the SRP, which is based on the American Society of Mechanical Engineers (ASME) NQA-1 Standard. The NQA-1 Standard is endorsed by NRC Regulatory Guide (RG) 1.28.

3.1 Format and Content of the Quality Assurance Topical Report

The format used for the following evaluation follows the sequence of the 18 criteria of Appendix B to 10 CFR Part 50 and the acceptance criteria of SRP Section 17.5.

3.1.1 Organization

In establishing its organizational structure, TR APR1400-K-Q-TR-11005-NP, Section 1, Organization commits to compliance with Appendix B to 10 CFR Part 50, Criterion I and ASME NQA-1 2008 with the QA organization independently reporting to the KHNP's President and CEO.

The Organization section contained the following minor revisions:

TR APR1400-K-Q-TR-11005-NP, Revision 3, Section 1, added the following requirement:

The Director General (DG) of KHNP Central Research Institute (CRI) to direct the Deputy Director General of Advanced Reactor Development Laboratory (DDG) in addition to the current duties and requires the Director of APR1400 Licensing Team reports to KHNP's DG and the DDG.

TR APR1400-K-Q-TR-11005-NP, Revision 4, Section 1, changed the following title:

The Executive Vice President's title changed from "Safety & Technology Division (EVPSTD)" to "Planning & Community Cooperation Division (EVPPCC)."

The above changes were included in TR APR1400-K-Q-TR-11005-NP, Revision 4. The NRC staff determined that these minor organization changes are not reductions in commitment from TR APR1400-K-Q-TR-11005-NP, Revision 2 (ADAMS Accession No. ML13238A025), previously accepted by the NRC; and therefore are acceptable.

3.1.2 Quality Assurance Program

In APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 2, KHNP made no changes to the QAP controls for the QAPD.

3.1.3 Design Control

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 3, KHNP made no changes to the design controls for the QAPD.

3.1.4 Procurement Document Control

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 4, KHNP made no changes to the procurement document controls for the QAPD.

3.1.5 Instructions, Procedures, and Drawings

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 5, KHNP made no changes to the instructions, procedures, and drawings controls for the QAPD.

3.1.6 Document Control

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 6, KHNP made no changes to the document controls for the QAPD.

3.1.7 Control of Purchased Material, Equipment, and Services

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 7, KHNP made no changes to the purchase material, equipment, and services controls for the QAPD.

3.1.8 Identification and Control of Materials, Parts, and Components

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 8, KHNP made no changes to the identification of materials, parts, and components controls for the QAPD.

3.1.9 Control of Special Processes

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 9, KHNP made no changes to the special processes controls for the QAPD.

3.1.10 Inspection

The inspection section contained the following addition in TR APR1400-K-Q-TR-11005-NP, Revision 3, Section 10:

KHNP has established the necessary measures and governing procedures to implement inspections that assure items, services, and activities affecting safety meet established requirements and conform to applicable documented specifications, instructions, procedures, and design documents, in the course of purchasing the test facilities of Part II, Section 11 of this document. KHNP does

not plan to procure items of plants during the APR1400 DC application. KHNP may delegate inspection, if necessary, to the qualified Suppliers through the contracts in accordance with the requirements in Part II, Section 4 and 7, of this document. For the delegated tests to the Suppliers, the Suppliers shall provide the same level of inspection as KHNP does as described in the procurement documents.

TR APR1400-K-Q-TR-11005-NP, Revision 4, Section 10, was supplemented with the following:

KHNP has established the necessary measures and governing procedures to implement inspections necessary to support the purchase of a test facility and items to be tested in the test facility. The necessary measures and governing procedures developed by KHNP will assure that items, services, and activities affecting safety meet established requirements and conform to applicable documented specifications, instructions, procedures, and design documents. If KHNP delegates inspection to Suppliers, Suppliers shall establish the necessary measures and governing procedures to implement inspections that assure items, services, and activities affecting safety meet established requirements and conform to applicable documented specifications, instructions, procedures, and design documents.

The above change was included in TR APR1400-K-Q-TR-11005-NP, Revision 4. The NRC staff determined that this was a clarification and not a reduction in commitment based on the addition of inspection controls from TR APR1400-K-Q-TR-11005-NP, Revision 2, previously accepted by the NRC. The NRC staff also concludes that the addition meets Criterion X of Appendix B; and is therefore acceptable.

3.1.11 Test Control

The Test Control section contained the following changes in TR APR1400-K-Q-TR-11005-NP, Revision 2, Section 11:

KHNP does not directly perform test activities as part of developing the DC application except for computer software testing as noted in Part II, Section 11.2 of this document. Any testing that is required will be performed by suppliers. Suppliers that perform testing services will be required to have a test control program that ensures tests are performed according to applicable procedures that include....

TR APR1400-K-Q-TR-11005-NP, Revision 3, Section 11 , was changed to the following:

KHNP has established the necessary measures and governing procedures to demonstrate that tests required for design verification during DC application by regulations, codes, standards, or design requirements are implemented in accordance with testing requirements. These programs include criteria to demonstrate that performance of the test facility is in accordance with design. KHNP may delegate tests, if necessary, to the qualified Suppliers through the contracts in accordance with the requirements in Part II, Section 4 and 7, of this document. For the delegated tests to the Suppliers, the Suppliers shall provide the same level of test control as KHNP does as described in the procurement documents. Tests are performed according to applicable procedures that include....

The Revision 3 change above was included in TR APR1400-K-Q-TR-11005-NP, Revision 4. The NRC staff determined that this is not a reduction in commitment based on the addition of test activity controls from TR APR1400-K-Q-TR-11005-NP, Revision 2, previously accepted by the NRC. The NRC staff also concludes that the addition meets Criterion XI of Appendix B; and is therefore acceptable.

3.1.12 Control of Measuring and Test Equipment

The control of measuring and test equipment section contained the changes in TR APR1400-K-Q-TR-11005-NP, Revision 2, Section 12:

KHNP does not directly perform this activity as part of developing the APR1400 DC application. If required, this activity will be performed by suppliers. Suppliers providing control of measuring and test equipment shall establish the necessary measures and governing procedures to control the calibration, maintenance, and use of measuring and test equipment (M&TE) that provides information important to safe plant operation.

TR APR1400-K-Q-TR-11005-NP, Revision 3, Section 12, was changed to the following:

KHNP has established the necessary measures and governing procedures to control the calibration, maintenance, and use of measuring and test equipment (M&TE) that provides information important to safe plant operation or that are necessary to perform the tests according to Part II, Section 11 of this document. KHNP may delegate control of M&TE, if necessary, to the qualified Suppliers through the contracts in accordance with the requirements in Part II, Section 4 and 7, of this document. For the delegated tests to the Suppliers, the Suppliers shall provide the same level of control of M&TE as KHNP does as described in the procurement documents.

The Revision 3 change above was included in TR APR1400-K-Q-TR-11005-NP, Revision 4. The NRC staff determined that this is not a reduction in commitment based on the addition of M&TE controls from TR APR1400-K-Q-TR-11005-NP, Revision 2, previously accepted by the NRC. The NRC staff also concludes that the change meets Criterion XII of Appendix B; and is therefore acceptable.

3.1.13 Handling, Storage, and Shipping

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 13, KHNP made no changes to the handling, storage, and shipping controls for the QAPD.

3.1.14 Inspection, Test, and Operating Status

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 14, KHNP made no changes to the inspection, test, and operating status controls for the QAPD.

3.1.15 Nonconforming Materials, Parts, or Components

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 15, KHNP made no changes to the nonconforming materials, parts, or components controls for the QAPD.

3.1.16 Corrective Action

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 16, KHNP made no changes to the corrective action controls for the QAPD.

3.1.17 Quality Assurance Records

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 17, KHNP made no changes to the QA records controls for the QAPD.

3.1.18 Audits

In TR APR1400-K-Q-TR-11005-NP, Revisions 3 and 4, Section 18, KHNP made no changes to the audits controls for the QAPD.

4.0 CONCLUSION

Based on the evaluation of TR APR1400-K-Q-TR-11005-NP, Revision 4, referenced correspondence, TR APR1400-K-Q-TR-11005-NP, Revision 3, and TR APR1400-K-Q-TR-11005-NP, Revision 2, the NRC staff concludes that the QAP described in KHNP's TR APR1400-K-Q-TR-11005-NP, Revision 4, satisfies the Commission's requirements for QAPs as established by Appendix B to 10 CFR Part 50. The program description adequately describes how the requirements of Appendix B will be implemented. Therefore, the staff concludes that the proposed QAPD continues to meet the 10 CFR Part 50 requirements for the QAP and is, therefore acceptable.

5.0 REFERENCES

1. Korea Hydro and Nuclear Power Co., Ltd. Topical Report APR1400-K-Q-TR-11005-NP, Revision 2, "KHNP Quality Assurance Program Description (QAPD) for the APR1400 Design Certification," issued August 21, 2013. (ADAMS Accession No. ML13238A025).
2. Korea Hydro and Nuclear Power Co., Ltd, Topical Report APR1400-K-Q-TR-11005-NP, Revision 3, "KHNP Quality Assurance Program Description (QAPD) for the APR1400 Design Certification," issued October 28, 2013. (ADAMS Accession No. ML13302A142).
3. Request for Additional Information on Topical Report APR100-K-Q-TR-11005-NP, Revision 3, "KHNP Quality Assurance Program Description (QAPD) for the APR1400 Design Certification and KHNP Response," issued January 6, 2014. (ADAMS Accession No. ML14083A610).
4. Korea Hydro and Nuclear Power Co., Ltd, Topical Report APR1400-K-Q-TR-11005-NP, Revision 4, KHNP Quality Assurance Program Description (QAPD) for the APR1400 Design Certification," issued March 26, 2014. (ADAMS Accession No. ML14085A096).
5. Safety Evaluation by the Office of New Reactors Regarding the Korea Hydro and Nuclear Power Co., Ltd, Topical Report APR1400-K-Q-TR-11005-NP, Revision 2,

"KHNP Quality Assurance Program Description (QAPD) for the APR1400 Design Certification." (ADAMS Accession No. ML13268A092).

6. NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 17.5, "Quality Assurance Program Description - Design Certification, Early Site Permit and New License Applicants," issued March 2007. (ADAMS Accession No. ML063190019).
7. RG 1.28, Revision 3, "Quality Assurance Program Requirements (Design and Construction)," issued August 1985. (ADAMS Accession No. ML03739981).