EPR™
by AREVA

U.S. EPR™ Proposed Path Forward for Addressing Fukushima Lessons-Learned

U.S. EPR™ Design Centered Working Group
28 February 2012

AREVA

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UniStar NUCLEAR

Objective

- **Reach agreement on the proposed path forward for addressing Fukushima lessons-learned for the U.S. EPR™ design for the design certification review and the COLA reviews**

Agenda

- **NRC feedback**
  - On the Dec. 7, 2011 DCWG meeting
  - On evolution of industry-NRC activities since Dec. 7 meeting
    - Review of regulatory developments and implications for new plants
- **Proposed U.S. EPR™ path forward**
  - Scope of submittals
  - Timeline for activities and interactions

NRC Feedback

- **Dec. 7, 2011 DCWG meeting**
- **Evolution of industry-NRC activities since Dec. 7 meeting**
  - Review of regulatory developments and implications for new plants

Proposed U.S. EPR™ Path Forward

- **Scope: Key issues considering SECY 11-0137 and SECY 12-0025 as applicable to the U.S. EPR™**
- **Proposed submittals**
- **Timeline**

Interwoven in the proposed path forward is an on-going dialogue with NRC staff regarding expectations and rulemaking activities relative to new plants.

Proposed Submittals

- **Five (5) position papers will be submitted**
  - Recommendations 4.1 & 4.2: Mitigation Strategies for Beyond Design Basis External Events
    - Coping capability with installed equipment and resources (AREVA lead)
    - FLEX-type approach with on-site, portable equipment (UniStar/PPL lead)
  - Recommendation 7: Spent fuel pool cooling and instrumentation (AREVA lead)
  - Recommendation 8: Emergency response (EOPs, SAMGs, EDMGs) (UniStar/PPL lead)
  - Recommendation 9.3: Emergency Preparedness (UniStar/PPL lead)
- **Purpose of submittals are to establish licensing positions prior to implementation of proposed design changes**
  - Goal is to reach agreement on acceptable positions prior to update of licensing basis documentation (e.g., FSAR, COLAs)

Scope of Position Papers

Paper	Topic	Lead	Submittal Date	Approach	Rec. #
Coping Capability for Beyond Design Basis External Events					
A	Demonstrate that adequate cooling of the core and spent fuel pools, and integrity of the reactor coolant system (RCS) and the containment will be maintained following a range of external events that go beyond those considered in the design basis. The demonstration will use installed equipment and resources to maintain or restore the safety functions.	AREVA	30 Sept 12	Describe U.S EPR robustness against such events and explain any physical modifications to enhance the design.	4.1 / 4.2 Initial phase
Mitigation Strategies for Beyond Design Basis External Events					
B	Describe the high level strategy to maintain or restore the key safety functions (core cooling, containment and SFP cooling capability) for Beyond Design Basis External Events that could challenge these functions beyond the installed coping capability. The strategy will determine the use of portable onsite equipment if needed for the transition phase and the level of reasonable protection. The strategy will also determine the scope of the sufficient offsite resources for the final phase.	COLA	30 Sept 12	Adopt FLEX-type for the transition phase with respect to the U.S EPR design features and site specific attributes.	4.1 / 4.2 Transi-tion phase Final phase

Scope of Position Papers

Paper	Topic	Lead	Submittal Date	Approach	Rec. #
Enhance Spent Fuel Cooling (makeup capability and instrumentation)					
C	Provide reliable instrumentation to monitor key spent fuel pool parameters (i.e., water level, temperature, area radiation) from MCR. Revise Technical Specifications to require one train of on-site emergency AC power to be operable for spent fuel pool makeup and instrumentation whenever irradiated spent fuel is in the pool. Install seismically qualified means to spray or makeup water into the spent fuel pool, including easily accessible connection to water supply at grade level outside of the building.	AREVA	31 Aug 12	Describe any physical modifications to enhance the design.	7.1 7.3 7.4

Scope of Position Papers

Paper	Topic	Lead	Submittal Date	Approach	Rec. #
Strengthen and Integrate Onsite Emergency Response Capabilities such as EOPs, SAMGs, and EDMGs					
D	Modify the EOP technical guidelines to: (1) include EOPs, SAMGs, and MAPs/EDMGs in an integrated manner, (2) specify clear command and control strategies for their implementation, and (3) stipulate appropriate qualification and training for those who make decisions during emergencies.	COLA	31 July 12	Strategy is to conform to NRC recommendation. Explain and expand on recommendation.	8.1 8.2 8.4
Emergency Preparedness					
E	Facility's emergency plan must address prolonged SBO and multiunit events (EP staffing). Provision will be made to ensure that a prolonged SBO affecting the plant does not impair communication between the onsite emergency facilities and the EOF.	COLA	31 July 12	Strategy is to conform to NRC recommendation. Explain and expand on recommendation. Explain any physical modifications and staff assessment.	9.3

Basic Format and Content of Position Papers

EPR™ by AREVA

EXECUTIVE SUMMARY

1.0 INTRODUCTION
- 1.1 Purpose
- 1.2 Scope
- 1.3 Issues for Licensing Resolution
  - 1.3.1 Topics for Discussion
  - 1.3.2 Interfacing Reports

2.0 BACKGROUND
- 2.1 U.S. EPR™ Structure, System, Component
- 2.2 Design Requirement and Bases
- 2.3 Site Specific Information

3.0 REGULATORY FOUNDATION
- 3.1 NRC Regulations
- 3.2 SECY Papers and Staff Requirements Recommendations (SRMs)
- 3.3 NRC Guidance
- 3.4 Other References

4.0 APPROACH
- 4.1 U.S. EPR™ Approach
- 4.2 Licensing Basis
- 4.3 Proposed Modifications

5.0 CONCLUSIONS

6.0 REFERENCES

APPENDICES

Sequence of Activities for Each Submittal

- **Pre-submittal meeting**
- **Submittal**
- **Post-submittal meeting**
- **RAIs**
- **Resolution of licensing position**
- **Implementation of changes**
  - Complete engineering activities associated with implementation of licensing positions
  - Prepare FSAR and/or COLA markups

2012 Submittal Schedule

Next Steps

- Confirm agreement on path forward
- Follow up discussion and progress report – April DCWG meeting
- Preparation of submittals

Emerging regulatory positions and industry guidance may necessitate adjustments to the presented plan. Ability to adapt and keep moving forward is essential.

2/28/2012

EPR DC COL Information Item Wording Problem

Issue: Wording of some EPR DC COL I/I's is such that: 1) the COLA is asked to provide information to address the COL I/I where it is clearly known upfront that the COLA will be unable to provide the information. (e.g. the reconciliation of as-built Information); 2) wording of some COL Information Items overlap w/ existing ITAAC, this redundancy could cause confusion in the closure process.

Examples:

- Attached RAI 533 Question 03.06.01-13
- Attached portion of Tier 2 Table 1.8-2

Example Potential Rewording Solution:

Current COL I/I 3.9-3 - "A COL applicant that references the U.S. EPR design certification will examine the feedwater line welds after hot function testing prior the fuel loading...."

Revised Wording "A COL applicant.....will address examination of ....."

New Chapter 1RAI: New RAI asking applicant to address wording problems.

RAI

This Site: RAI

Questions : U. S. EPR Standard Design Certification - 03.06.01 - Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment - Question 23011

New Item | Edit Item | Delete Item | Alert Me | Version History

Title	U. S. EPR Standard Design Certification - 03.06.01 - Plant Design for Protection Against Postulated Piping Failures in Fluid Systems Outside Containment - Question 23011
RAI ID	6224
Status	Issued/Open Action Applicant
Reason	
Acceptance Criteria	SRP 3.6.1 and 3.6.2
Question Type	Std. Design
Description	Open Item In response to RAI 354, Question 03.06.02-42, Part C, the applicant proposed to revise U.S. EPR FSAR Tier 2, Table 1.8-2, COL Item 3.6-1 and Item 3.6-2, to specify reconciliation of the as-designed pipe break hazards analysis. The staff review the applicant's response and found it to be inadequate. The staff determined that the resulting COL Information Item can not be addressed by the COL applicant within the review phase. The staff requests the applicant to revise U.S. EPR FSAR Tier 2, Table 1.8-2, COL Item 3.6-1 and Item 3.6-2, to remove the reference to the reconciliation of deviations between the as-built configuration and the as-design analysis.
Relates to Question	U. S. EPR Standard Design Certification - 03.06.02 - Determination of Rupture Locations and Dynamic Effects Associated with the Postulated Rupture of Piping - Question 16205
Question Number	03.06.01-13
Answer	
Official Response Date	
Response Accession #	
Attachments	View Attachments
Approval Action	

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- U.S. EPR interface: Assumptions made for the U.S. EPR design that must be verified during the coordination effort between the designer of the U.S. EPR and the COL applicant.

- Site Parameters: Site-related parameters upon which the U.S. EPR design is based.

The classification of SSC is further described in Section 3.2. The representative conceptual designs for the portions of the plant that are not submitted for certification are described in the FSAR to satisfy the requirement of 10 CFR 52.47(a)(24).

1.8.1 COL Information Items

Table 1.8-2—U.S. EPR Combined License Information Items, lists the COL information items and the section where the information is discussed. A COL applicant that references the U. S. EPR design certification will identify the FSAR section, or provide a list, that demonstrates how the COL information items have been addressed. The applicable FSAR sections and Table 1.8-2 also identify when an activity required by a COL information item requires as-built information or other conditions that are not available when the COL application is submitted. These activities are completed prior to fuel load.

1.8.2 Departures

A COL applicant that references the U. S. EPR design certification will provide a list of any departures from the FSAR in the COL FSAR.

Table 1.8-2—U.S. EPR Combined License Information Items
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Item No.	Description	Section
3.3-3	A COL applicant that references the U.S. EPR design certification will demonstrate that failure of site-specific structures or components not included in the U.S. EPR standard plant design, and not designed for tornado loads, will not affect the ability of other structures to perform their intended safety functions.	3.3.2
3.4-1	A COL applicant that references the U.S. EPR design certification will confirm the potential site specific external flooding events are bounded by the U.S. EPR design basis flood values or otherwise demonstrate that the design is acceptable.	3.4.3.2
3.4-2	A COL applicant that references the U.S. EPR design certification will perform a flooding analysis for the ultimate heat sink makeup water intake structure based on the site-specific design of the structures and the flood protection concepts provided herein.	3.4.3.10
3.4-3	A COL applicant that references the U.S. EPR design certification will define the need for a site-specific permanent dewatering system.	3.4.3.11
3.4-4	A COL applicant that references the U.S. EPR design certification will perform internal flooding analyses prior to fuel load for the Safeguard Buildings and Fuel Building to demonstrate that the impact of internal flooding is contained within the Safeguard Building or Fuel Building division of origin.	3.4.1
3.4-5	A COL applicant that references the U.S. EPR design certification will perform an internal flooding analysis prior to fuel load for the Reactor Building and Reactor Building Annulus to demonstrate that the essential equipment required for safe shutdown is located above the internal flood level.	3.4.1
3.4-6	A COL applicant that references the U.S. EPR design certification will include in its maintenance program appropriate watertight door preventive maintenance in accordance with manufacturer recommendations so that each Safeguards Building and Fuel Building watertight door above elevation +0 feet remains capable of performing its intended function.	3.4.1
3.4-7	A COL applicant that references the U.S. EPR design certification will design the watertight seal between the Access Building and the adjacent Category I access path to the Reactor Building Tendon Gallery. Watertight seal design will account for hydrostatic loads, lateral earth pressure loads, and other applicable loads.	3.4.2

Table 1.8-2—U.S. EPR Combined License Information Items
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Item No.	Description	Section
3.6-1	A COL applicant that references the U.S. EPR design certification will perform the pipe break hazards analysis and reconcile deviations in the as-built configuration to the as-designed analysis.	3.6.1
3.6-2	A COL applicant that references the U.S. EPR design certification will perform the pipe break hazards analysis and reconcile deviations in the as-built configuration to the as-designed analysis.	3.6.2.1
3.6-3	A COL applicant that references the U.S. EPR design certification will confirm that the design LBB analysis remains bounding for each piping system and provide a summary of the results of the actual as-built plant specific LBB analysis, including material properties of piping and welds, stress analyses, leakage detection capability, and degradation mechanisms.	3.6.3
3.6-4	A COL applicant that references the U.S. design certification will provide diagrams showing the final as-designed configurations, locations, and orientations of the pipe whip restraints in relation to break locations in each piping system.	3.6.2.5.1
3.6-5	A COL applicant that references the U.S. EPR design certification will implement the ISI program as augmented with NRC approved ASME Code cases that are developed and approved for augmented inspections of Alloy 690/152/52 material to address PWSCC concerns.	3.6.3.3.4.1
3.7-1	A COL applicant that references the U.S. EPR design certification will confirm that the site-specific seismic response is within the parameters of section 3.7 of the U.S. EPR standard design.	3.7.2
3.7-2	A COL applicant that references the US EPR design certification will provide the site-specific separation distances for the access building and turbine building.	3.7.2.8
3.7-3	A COL applicant that references the U.S. EPR design certification will provide a description of methods used for seismic analysis of site-specific Category I concrete dams, if applicable.	3.7.3.13
3.7-4	A COL applicant that references the U.S. EPR design certification will determine whether essentially the same seismic response from a given earthquake is expected at each of the units in a multi-unit site or instrument each unit. In the event that only one unit is instrumented, annunciation shall be provided to each control room.	3.7.4.2

Table 1.8-2—U.S. EPR Combined License Information Items
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Item No.	Description	Section
3.8-20	A COL applicant that references the U.S. EPR design certification will compare the ESWB site-specific predicted angular distortion to the angular distortion in the total differential settlement contours in Figure 3.8-136, using methods described in U.S. Army Engineering Manual 1110-1-1904, The comparison is made throughout the basemat in both the east-west and north-south directions. If the predicted angular distortion of the basemat of ESWB structures is less than the angular distortion shown, the site is considered acceptable. Otherwise, further analysis will be required to demonstrate that the structural design is adequate.	3.8.5.5.3
3.9-1	A COL applicant that references the U.S. EPR design certification will submit the results from the vibration assessment program for the U.S. EPR RPV internals and piping systems specified in U.S. EPR FSAR Tier 2, Section 3.9.2.1, in accordance with RG 1.20.	3.9.2.4
3.9-2	A COL applicant that references the U.S. EPR design certification will prepare the design specifications and design reports for ASME Class 1, 2, and 3 components, piping, supports and core support structures that comply with and are certified to the requirements of Section III of the ASME Code. The COL applicant will address the results and conclusions from the reactor internals material reliability programs applicable to the U.S. EPR reactor internals with regard to known aging degradation mechanisms such as irradiation-assisted stress corrosion cracking and void swelling.	3.9.3
3.9-3	A COL applicant that references the U.S. EPR design certification will examine the feedwater line welds after hot functional testing prior to fuel loading and at the first refueling outage, in accordance with NRC Bulletin 79-13. A COL applicant that references the U.S. EPR design certification will report the results of inspections to the NRC, in accordance with NRC Bulletin 79-13.	3.9.3.1.1
3.9-4	As noted in ANP-10264NP-A, a COL applicant that references the U.S. EPR design certification will confirm that thermal deflections do not create adverse conditions during hot functional testing.	3.9.3.1.1
3.9-5	As noted in ANP-10264NP-A, should a COL applicant that references the U.S. EPR design certification find it necessary to route Class 1, 2, and 3 piping not included in the U.S. EPR design certification so that it is exposed to wind and tornadoes, the design must withstand the plant design-basis loads for this event.	3.9.3.1.1
3.9-6	A COL applicant that references the US EPR design certification will identify any additional site-specific valves in Table 3.9.6-2 to be included within the scope of the IST program.	3.9.6.3

Table 1.8-2—U.S. EPR Combined License Information Items
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Item No.	Description	Section
3.9-13	A COL applicant that references the U.S. EPR design certification will identify the implementation milestones and applicable ASME OM Code for the preservice and inservice examination and testing programs. These programs will be consistent with the requirements in the latest edition and addenda of the OM Code incorporated by reference in 10 CFR 50.55a on the date 12 months before the date for initial fuel load.	3.9.6
3.9-14	A COL applicant that references the U.S. EPR design certification will provide a summary of reactor core support structure maximum total stress, deformation, and cumulative usage factor values for each component and each operating condition in conformance with ASME Section III Subsection NG.	3.9.5.2
3.10-1	A COL applicant that references the U.S. EPR design certification will create and maintain the SQDP file during the equipment selection and procurement phase.	3.10.4
3.10-2	A COL applicant that references the U.S. EPR design certification will identify any additional site specific components that need to be added to the equipment list in Table 3.10-1.	3.10.1.1
3.10-3	If the seismic and dynamic qualification testing is incomplete at the time of the COL application, a COL applicant that references the U.S. EPR design certification will submit an implementation program, including milestones and completion dates, for NRC review and approval prior to installation of the applicable equipment.	3.10.4
3.11-1	A COL applicant that references the U.S. EPR design certification will maintain the equipment qualification test results and qualification status file during the equipment selection, procurement phase and throughout the installed life in the plant.	3.11
3.11-2	A COL applicant that references the U.S. EPR design certification will identify additional site specific components that need to be added to the environmental qualification list in Table 3.11-1.	3.11.1.1.3
3.11-3	If the equipment qualification testing is incomplete at the time of the COL application, a COL applicant that references the U.S. EPR design certification will submit an implementation program, including milestones and completion dates, for NRC review and approval prior to installation of the applicable equipment.	3.11.3

Table 1.8-2—U.S. EPR Combined License Information Items
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Item No.	Description	Section
6.6-1	A COL applicant that references the U.S. EPR design certification will identify the implementation milestones for the site-specific ASME Section XI preservice and inservice inspection program for the Class 2 and Class 3 components, consistent with the requirements of 10 CFR 50.55a (g). The program will identify the applicable edition and addenda of the ASME Code Section XI, and will identify additional relief requests and alternatives to Code requirements.	6.6
7.1-1	A COL applicant that references the U.S. EPR design certification will confirm the inventory list of PAM variables in Table 7.5-1—Inventory of Post-Accident Monitoring Variables upon completion of the emergency operating and abnormal operating procedures prior to fuel loading.	7.5.2.2.1
7.1-2	A COL applicant that references the U.S. EPR design certification will, following selection of the actual plant operating instrumentation and calculation of the instrumentation uncertainties of the operating plant parameters, prior to fuel load, calculate the primary power calorimetric uncertainty. The calculations will be completed using an NRC acceptable method and confirm that the safety analysis primary power calorimetric uncertainty bounds the calculated values.	7.7.2.3.5
8.1-1	A COL applicant that references the U.S. EPR design certification will provide site-specific information describing the interface between the offsite transmission system, and the nuclear unit, including switchyard interconnections.	8.1.1
8.1-2	A COL applicant that references the U.S. EPR design certification will identify site-specific loading differences that raise EDG or Class 1E battery loading, and demonstrate the electrical distribution system is adequately sized for the additional load.	8.1.3
8.2-1	A COL applicant that references the U.S. EPR design certification will provide site specific information regarding the offsite transmission system and their connections to the station SWYD.	8.2.1.1
8.2-2	A COL applicant that references the U.S. EPR design certification will provide site-specific information for the switchyard layout design.	8.2.1.2
8.2-3	A COL applicant that references the U.S. EPR design certification will provide site-specific information that identifies actions necessary to restore offsite power and use available nearby power sources when offsite power is unavailable.	8.2.2.7
8.2-4	A COL applicant that references the U.S. EPR design certification will provide a site-specific grid stability analysis.	8.2.2.4

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Item No.	Description	Section
9.5-10	A COL applicant that references the U.S. EPR design certification will submit site specific information to address the Regulatory Guide 1.189, Regulatory Position C.5.5.1, Safe-Shutdown Procedures.	Table 9.5.1-1 C.5.5.1
9.5-11	A COL applicant that references the U.S. EPR design certification will submit site specific information to address the Regulatory Guide 1.189, Regulatory Position C.5.5.2, Alternative/Dedicated Shutdown Procedures.	Table 9.5.1-1 C.5.5.2
9.5-12	A COL applicant that references the U.S. EPR design certification will submit site specific information to address the Regulatory Guide 1.189, Regulatory Position C.5.5.3, Repair Procedures.	Table 9.5.1-1 C.5.5.3
9.5-13	A COL applicant that references the U.S. EPR design certification will submit site specific information to address the Regulatory Guide 1.189, Regulatory Position C.6.2.4, Independent Spent Fuel Storage Areas.	Table 9.5.1-1, C.6.2.4
9.5-14	A COL applicant that references the U.S. EPR design certification will submit site specific information to address the Regulatory Guide 1.189, Regulatory Position C.6.2.6, Cooling Towers.	Table 9.5.1-1, C.6.2.6 9.5.1.2.1
9.5-15	A COL applicant that references the U.S. EPR design certification will submit site specific information to address Regulatory Guide 1.189, Regulatory Position C.7.6, Nearby Facilities.	Table 9.5.1-1, C.7.6
9.5-16	A COL applicant that references the U.S. EPR design certification will perform an as-built, post-fire Safe Shutdown Analysis, which includes final plant cable routing, fire barrier ratings, purchased equipment, equipment arrangement and includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The post-fire Safe Shutdown Analysis will demonstrate that safe shutdown performance objectives are met prior to fuel loading and will include a post-fire safe shutdown circuit analysis based on the methodology described in NEI 00-01, "Guidance for Post-Fire Safe-Shutdown Circuit Analysis."	9.5.1.2.1
9.5.17	A COL applicant that references the U.S. EPR design certification will evaluate the differences between the as-designed and as-built plant configuration to confirm the Fire Protection Analysis remains bounding. This evaluation will be performed prior to fuel loading and will consider the final plant cable routing, fire barrier ratings, combustible loading, ignition sources, purchased equipment, equipment arrangement and includes a review against the assumptions and requirements contained in the Fire Protection Analysis. The applicant will describe how this as-built evaluation will be performed and documented, and how the NRC will be made aware of deviations from the FSAR, if any.	9.5.1.3

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Item No.	Description	Section
10.2-7	A COL applicant that references the U.S. EPR design certification will provide the site-specific inservice inspection program, inspection intervals, and exercise intervals consistent with the turbine manufacturer's recommendations for the main steam stop and control valves, the reheat stop and intercept valves, and the extraction non-return valves.	10.2.2.12
10.3-1	A COL applicant that references the U.S. EPR design certification will identify the authority responsible for implementation and management of the secondary side water chemistry program.	10.3.5
10.3-2	A COL applicant that references the U.S. EPR design certification will develop and implement a FAC condition monitoring program that is consistent with Generic Letter 89-08 and NSAC-202L-R3 for the carbon steel portions of the steam and power conversion systems that contain water or wet steam prior to initial fuel loading.	10.3.6.3
10.4-1	A COL applicant that references the U.S. EPR design certification will describe the site-specific main condenser materials.	10.4.1.2
10.4-2	A COL applicant that references the U.S. EPR design certification will describe the site-specific design pressure and test pressure for the main condenser.	10.4.1.2
10.4-3	A COL applicant that references the U.S. EPR design certification will provide the description of the site-specific portions of the CWS.	10.4.5.2.1
10.4-4	A COL applicant that references the U.S. EPR design certification will provide the specific chemicals used within the chemical treatment system as determined by the site-specific water conditions.	10.4.5.2.2
10.4-5	A COL applicant that references the U.S. EPR design certification will provide the site-specific CWS piping design pressure.	10.4.5.2.2
10.4-6	If a vacuum priming system is required, a COL applicant that references the U.S. EPR design certification will provide the site-specific information.	10.4.5.2.2
10.4-7	A COL applicant that references the U.S. EPR design certification will provide information to address the potential for flooding of safety-related equipment due to failures of the site-specific CWS.	10.4.5.3
11.2-1	A COL applicant that references the U.S. EPR design certification will perform a site-specific liquid waste management system cost-benefit analysis.	11.2.4

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Item No.	Description	Section
14.2-2	A COL applicant that references the U.S. EPR certified design will develop a test program that considers the following guidance components: 1. The applicant should allow at least nine months to conduct preoperational testing. 2. The applicant should allow at least three months to conduct startup testing, including fuel loading, low power tests, and power ascension tests. 3. Plant safety will not be dependent on the performance of untested SSC during any phase of the startup test program. 4. Surveillance test requirements will be completed in accordance with plant Technical Specification requirements for SSC operability before changing plant modes. 5. Overlapping test program schedules (for multi-unit sites) should not result in significant divisions of responsibilities or dilutions of the staff provided to implement the test program. 6. The sequential schedule for individual startup tests should establish, insofar as practicable, that test requirements should be completed prior to exceeding 25 percent power for SSC that are relied upon to prevent, limit, or mitigate the consequences of postulated accidents. 7. Approved test procedures should be in a form suitable for review by regulatory inspectors at least 60 days prior to their intended use or at least 60 days prior to fuel loading for fuel loading and startup test procedures. 8. Identify and cross reference each test (or portion thereof) required to be completed before initial fuel loading and that is designed to satisfy the requirements for completing ITAAC.	14.2.11
14.2-3	A COL Applicant that references the US EPR design certification will provide site-specific information for review and approval of test procedures.	14.2.3
14.2-4	A COL Applicant that references the US EPR design certification will address the site-specific administrative procedures for review and approval of test results.	14.2.5
14.2-5	A COL applicant that references the U.S. EPR design certification will provide site-specific test abstract information for the circulating water supply system.	14.2.12.7.11
14.2-6	A COL applicant that references the U.S. EPR certified design will either perform the natural circulation test (Test #196) or provide justification for not performing the test. The need to perform the test will be based on evaluation of previous natural circulation test results and a comparison of reactor coolant system (RCS) hydraulic resistance coefficients applicable to normal flow conditions.	14.2.12
14.2-7	A COL applicant that references the U.S. EPR design certification will provide site-specific test abstract information for the cooling tower.	14.2.12.21.6

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Item No.	Description	Section
18.1-1	A COL applicant that references the U.S. EPR design certification will execute the NRC approved HFE program as described in this section	1.8
18.1-2	A COL applicant that references the U.S. EPR design certification will be responsible for HFE design implementation for a new Emergency Operations Facility (EOF) or changes resulting from the addition of the U.S. EPR to an existing EOF.	18.1.1.3
18.5-1	A COL applicant that references the U.S. EPR design will confirm that actual staffing levels and qualifications of plant personnel specified in Section 13.1 of the COL application remain bounded by regulatory requirements and results of the staffing and qualifications analysis.	18.5
18.8-1	A COL applicant that references the U.S. EPR design certification will describe how HFE principles and criteria are incorporated into the development program for site procedures.	
18.9-1	A COL applicant that references the U.S. EPR design certification will describe how HFE principles and criteria are incorporated into the development of training program scope, structure, and methodology.	18.9
19.0-1	A COL applicant that references the U.S. EPR design certification will either confirm that the PRA in the design certification bounds the site-specific design information and any design changes or departures, or update the PRA to reflect the site-specific design information and any design changes or departures.	19.0
19.1-1	A COL applicant that references the U.S. EPR design certification will describe the uses of PRA in support of licensee programs and identify and describe risk-informed applications being implemented during the combined license application phase.	19.1.1.2
19.1-2	A COL applicant that references the U.S. EPR design certification will describe the uses of PRA in support of licensee programs and identify and describe risk-informed applications being implemented during the construction phase.	19.1.1.3
19.1-3	A COL applicant that references the U.S. EPR design certification will describe the uses of PRA in support of licensee programs and identify and describe any risk-informed applications being implemented during the operational phase.	19.1.1.4
19.1-4	A COL applicant that references the U.S. EPR design certification will conduct a peer review of the PRA relative to the ASME PRA Standard prior to use of the PRA to support risk-informed applications or before fuel load.	19.1.2.3

Table 1.8-2—U.S. EPR Combined License Information Items
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Item No.	Description	Section
19.1-5	A COL applicant that references the U.S. EPR design certification will describe the applicant's PRA maintenance and upgrade program.	19.1.2.4.1
19.1-6	A COL applicant that references the U.S. EPR design certification will confirm that the U.S. EPR PRA-based seismic margin assessment is bounding for their specific site, and will update it to include site-specific SSC and soil effects (including sliding, overturning liquefaction and slope failure).	19.1.5.1.2.4
19.1-7	A COL applicant that references the U.S. EPR design certification will perform the site-specific screening analysis and the site-specific risk analysis for external events applicable to their site.	19.1.5.4
19.1-8	A COL applicant that references the U.S. EPR design certification will describe the uses of PRA in support of site-specific design programs and processes during the design phase.	19.1.1.1
19.1-9	A COL applicant that references the U.S. EPR design certification will review as-designed and as-built information and conduct walk-downs as necessary to confirm that the assumptions used in the PRA (including PRA inputs to RAP and SAMDA) remain valid with respect to internal events, internal flood and fire events (routings and locations of pipe, cable and conduit), and HRA analyses (development of operating procedures, emergency operating procedures and severe accident management guidelines and training), external events including PRA-based seismic margins HCLPF fragilities, and LPSD procedures.	19.1.2.2
19.2-1	A COL applicant that references the U.S. EPR design certification will develop and implement severe accident management guidelines prior to fuel loading using the Operating Strategies for Severe Accidents (OSSA) methodology described in U.S. EPR FSAR Section 19.2.5.	19.2.5

Next File

License Conditions

DCWG agrees on the following License Conditions:

Before Fuel Load:

1.Before initial fuel loading into the reactor, the licensee shall perform an appropriate test and analysis that demonstrates that an identified NRC-approved cask can be safely connected to the spent fuel cask transfer facility (SFCTF) and the cask and its adapter meet the criteria specified in FSAR Table 9.1.4-1. This demonstration can be performed with a prototypical cask. Before initial fuel loading into the reactor, the licensee shall submit a report documenting the test and analysis required above and the results obtained to the Director of the Office of New Reactors or the Director's designee.

Before Initial SFCTF Use:

2.The licensee shall not use the spent fuel cask transfer facility (SFCTF) for initial cask loading operations until the licensee performs the tests identified in FSAR Section 14.2.12.3.17, verifies that the results of the tests fall within the acceptance criteria in FSAR Section 14.2.12.3.17, and submits a report documenting the performance of the test and the results to the Director of the Office of New Reactors or the Director's designee.

COL Item

A COL applicant that references the US EPR design certification will provide a spent fuel cask acceptable for use with the SFCTF prior to initial cask loading operations. The design of the spent fuel cask and its adapter must meet the interface requirements specified in Table 9.1.4-1.

Table 9.1.4-1 – Spent Fuel Cask Interface Requirements

#	Type	Requirement
1	Dimensional Requirements	The dimension of the cask are less than the following: •Height 5820 mm •Diameter 2500 mm
2	Dose Requirements	Dose rates from a loaded cask during cask handling operations do not exceed those identified in FSAR Section 12.3.
3	Cooling Requirements	The cask shall be capable of dissipating the decay heat from fuel assemblies loaded in the cask without supplemental cooling.
4	Material Requirements	The materials of construction of the cask are compatible with the operating environment including radiation heat and borated water.
5	Support System Interface Requirements	The cask shall have provisions for connecting process lines for water *filling and draining, and drying of the cask.* The mating surface of the cask maintains a leak-tight connection with the penetration assembly when the cask is connected to the penetration. The piping/valves that connect to the cask and serve as a fluid boundary to the cask loading pit up to and including the first valve (if a normally closed valve), or up to and including a second isolation valve (if a normally open valve with auto close or remote close capability) shall be designed in accordance with Reference 4.
6	Seismic Requirements	The cask shall be designed to withstand a site-specific safe shutdown earthquake (SSE), with seismic response spectra bounded by the generic response spectra shown in FSAR Figures 3.7.2-110, -111 and -112.
7	Structural Interface Requirements	The loads transferred to the SFCTF components an FB structures under normal operating conditions are within the following: •Maximum weight of fully loaded cask, including spent fuel assemblies and water, is 115,000 kg. •Distributed loads on the walls of the loading hall do not exceed 25 psf during normal operation. •Distributed loads on the floor of the loading hall do not exceed 200 psf during normal operation. •Total dead weight load of the SFCTM and fully loaded cask on the floor of loading hall does not exceed 858 kips during normal operation. The loads transferred to the SFCTF components and FB structures under a site-specific SSE and postulated drop of a fuel assembly from the maximum handling height in the cask loading pit onto a connected cask, are within the load capacity of the components and structures, and meet the leakage, dose and cooling requirements listed above.

14.2.12.3.17 Spent Fuel Cask Transfer Facility (Test #047)

1.0 OBJECTIVE

1.1 To verify the proper operation of the spent fuel cask transfer facility (SFCTF).

2.0 PREREQUISITES

3.0 TEST METHOD

3.1 Perform the following tests to verify operation of the SFCTF:

3.1.1 Verify that geometrical dimensions, gaps and tolerances are within design limits.

3.1.2 Verify cabling controls are as designed.

- Power cabling and I&C including adjustments to external interlocking, sensors, and limit switches.
- Grounding.

3.1.3 Verify that security devices are ready to be correctly operated.

3.1.4 Verify the operation of the spent fuel cask transfer machine (SFCTM) inside and outside the FB with and without its coupling (when it is self-propelled or towed by the tractor).

3.1.5 Verify operation of each mechanism and of each operational sub-assembly.

3.1.6 Verify leak tightness of lower cover of the penetration under the water column pressure.

3.1.7 Verify leak tightness and perform hydrostatic test of the fluid circuits.

3.1.8 Verify penetration leak tightness with loading pit filled.

3.1.9 Verify opening/closing of the upper cover with loading pit filled.

3.1.10 Verify leak tightness of the upper cover with loading pit filled.

3.1.11 Load test of biological lid handling station and penetration upper cover hoist.

3.1.12 Verify the external interlock with the spent fuel machine loading pit gate, and loading hall door.

3.1.13 Check the sizing and ease to install adaptation parts (such as leaktightness flange, centering rings).

3.1.14 Verify the operation sequence and sequential interlocking without water.

3.1.15 Verify the operation sequence and sequential interlocking with dummy cask and dummy fuel assembly under water.

3.1.16 Verify the operational reversibility, i.e., return from the biological lid handling station to the loading penetration for re-docking, unloading of fuel assembly, and undocking, up to exit of the FB.

3.1.17 Verify operation of SFCTM when it is connected to the tractor.

4.0 4.0 DATA REQUIRED

5.0 ACCEPTANCE CRITERIA

5.1 The SFCTF meets design requirements (refer to Table 9.1.4-1):

5.1.1 Valves, brakes and screws function as designed.

5.1.2 Sensors operate in their electrical ranges.

5.1.3 Biological lid handling station functions as designed.

5.1.4 Docking mechanism functions as designed.

5.1.5 Upper cover maneuvering device and hoist function as designed.

5.1.6 Process systems for filling, draining and drying of the cask function as designed.

5.1.7 Leak tightness of double wall bellow, lower cover of penetration, upper cover of penetration, valve seals and penetration/cask interface is acceptable.

5.1.8 Hydrostatic test of the fluid circuits are acceptable.

5.1.9 Load limits setpoints are within design limits.

5.1.10 Interlocks function as designed.

5.1.11 Limit switches function as designed.

5.1.12 SFCTM functions as designed when connected to tractor.

Content of section 14.2.12.3.7

Cask Loading License Conditions

- Next Steps
  - AREVA provide response to RAI 525, Question 09.01.01-28 to revise the existing COL item to change "initial cask loading operations" to "initial fuel loading"
  - NRC issue RAI to COL applicants to address AREVA COL item in RAI 525, Question 09.01.01-28
  - COL applicants provide proposed license conditions to address COL item