December 20, 2007

Mr. Robert E. Brown
Senior Vice President, Regulatory Affairs
GE-Hitachi Nuclear Energy Americas, LLC
3901 Castle Hayne Road MC A-45
Wilmington, NC 28401

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 126 RELATED TO ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Brown:

By letter dated August 24, 2005, GE-Hitachi Nuclear Energy Americas, LLC (GEH) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter. The attached list of RAIs include some specific RAIs that address issues related to consistency, format, content, and verbage. The staff requests that GEH review these specific comments for generic applicability to the other ITAAC included in the Tier 1 document and revise them accordingly. In particular, GEH should focus attention on the comment associated with a definition for ASME Code report.

To support the review schedule, you are requested to provide the requested additional information within 45 days of the date of this letter.

If you have any questions or comments concerning this matter, you may contact me at 301-415-3863 or mmc1@nrc.gov or you may contact Eric Oesterle at (301) 415-1365 or ero1@nrc.gov.

Sincerely,

/RA/

Manny M. Comar, Project Manager
ESBWR/ABWR Projects Branch 1
Division of New Reactor Licensing
Office of New Reactors

Docket No. 52-010

Enclosure: Request for Additional Information

cc: See next page

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Requests for Additional Information (RAIs)
ESBWR Design Control Document (DCD), Revision 4

RAI Number	Reviewer	Question Summary	Full Text
14.2-90	Dehmel JC	Provide complete description of criteria for radioactivity present in gaseous and liquid." effluents	DCD Tier 2, Revision 4, Section 14.2.8.2.1 provides an incomplete description of criteria for radioactivity present in gaseous and liquid effluents. Specifically, Section 14.2.8.2.1 limits the criteria to "license limitations," and does not include NRC effluent concentration limits of Table 2 of Appendix B to Part 20. Accordingly, revise DCD Tier 2, Section 14.2.8.2.1 (Criteria) to include Table 2 of Appendix B to Part 20 as one set of criteria, and revise "license limitations" to read "license conditionshis RAI also applies to the criteria identified for the Offgas System Test (DCD Tier 2, Section 14.2.8.2.29 Criteria) and the Liquid Radwaste System Performance Test (DCD Tier 2, Section 14.2.8.2.32, Criteria). Revise these sections of the DCD accordingly.
14.2-91	Dehmel JC	Address inconsistency in the scope of the test matrix assigned during power ascension for the liquid radwaste system.	A review of DCD Tier 2, Revision 4, Section 14.2.9 and Table 14.2-1 reveals an inconsistency in the scope of the test matrix assigned during power ascension for the liquid radwaste system. Specifically, Table 14.2-1 does not include mid-power as a testing plateau in confirming the performance of the liquid radwaste system. This omission is inconsistent with the design objective of the liquid radwaste processing system of DCD Tier 2, Revision 4, Section 11.2, which states that the system is designed to control, collect, process, handle, store, and dispose of liquid wastes generated during normal operation and anticipated occurrences without making any distinctions among various phases of power ascension or operation. Accordingly, revise DCD Tier 2, Table 14.2-1 to include mid-power as a testing phase during reactor power ascension. This change to the LWMS test matrix would make it consistent with the text matrix assigned for the GWMS/OGS.
14.2-92	Hinson C	List the area radiation monitors which have system trips associated with them and describe the trip function	In DCD Tier 2, Revision 4, Section 14.2.8.1.17 (Area Radiation Monitoring System Preoperational Test), the third bullet under General Test Methods and Acceptance Criteria states "Proper system trips in response to high radiation and downscale/inoperative conditions." State which of the area radiation monitors listed in DCD Tier 1, Revision 4, Table 2.3.2-1 have associated system trips and, for each radiation monitor which has an associated system trip, describe the purpose/function of the associated system trip.
14.2-93	Hinson C	Describe the system trip associated with the	In DCD Tier 2, Revision 4, Section 14.2.8.1.18 (Containment Monitoring System Preoperational Test), , the third bullet under General Test Methods and

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		subsystem of the Containment Monitoring System which monitors radiation levels in containment.	Acceptance Criteria states "Proper system trips in response to high radiation and downscale/inoperative conditions." Describe the purpose/function of the system trip associated with the subsystem of the Containment Monitoring System which monitors radiation levels in containment.
14.2-94	Hinson C	Reinsert the word "all" where it was removed in DCD Revision 4. Also, surveying should be performed in all potentially very high radiation areas.	DCD Tier 2, Revision 4, Section 14.2.8.2.2 (Radiation Measurements Test) describes the test descriptions for radiation measurements tests. In order to verify that the established radiation zones (which determine plant area accessibility) are accurate, radiation surveys should be performed throughout the plant for all accessible areas, including all potentially high and very high radiation areas. Therefore, the words "all" (which were deleted in Revision 4) should be reinserted prior to the words "potentially high radiation areas" (line 5 under the heading Description), prior to the words "Accessible areas" (second bullet under the heading Description), and prior to the words "accessible floor areas" (third bullet under the heading Description). In addition, the words "and very high" should be inserted between the words "high" and "radiation" in line 5 under the heading Description to ensure that surveying is performed in all potentially high and very high areas.
14.2-95	Talbot F	First-of-a-kind tests	Regulatory Guide (RG) 1.68, Revision 2, states, in part, that "if new, unique, or first-of-a-kind principal design features will be used in the facility, the in-plant functional testing requirements necessary to verify their performance need to be identified at an early date to permit these test requirements to be appropriately accounted for in the final design." The staff determined that GEH did not identify any first-of-a-kind tests in the ESBWR DCD Section 14.2, Initial Test Program. The staff requests additional information on ESBWR preoperational, startup and power ascension tests that are first-of-a-kind tests for the ESBWR design.
14.3-155	Dehmel JC	Descriptions and scope of operational tests do not define "simulated radiation signal" used in confirming the operational functions of the PRMS	In DCD Tier 2, Revision 4, Sections 14.2.2.2, 14.2.8.1.16, 14.2.8.2.1, and DCD Tier 1, Revision 4, Sections 1.1.1, 2.3.1, and 3.5, the descriptions and scope of operational tests do not define "simulated radiation signal" used in confirming the operational functions of the process radiation monitoring system (PRMS). There are many ways in generating a simulated radiation signal, such as using a simple jumper wire to using a pulse generator. In both instances, the simulated

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			signal does not include a functional test of the radiation detector, which is the essential component of the PRMS that responds to radiation or radioactivity. For example, the use of a jumper wire simply trips the circuit logic and the use of a simulated signal does ensure that the artificial pulse matches that of the output of the detector, e.g., such as proper pulse height and duration. It can be shown that a pulse generator might generate a signal that would trip a response (e.g., at control panel alarms and system isolation) of a PRMS subsystem, and yet be inconsistent with the pulse produced by the radiation detector. The use of a simulated radiation signal might not necessarily confirm the proper response from a PRMS subsystem, taking into account various as built conditions, such as actual cabling configuration, onsite power, containment penetrations and connections, signal conversions to/from fiber optic output, ambient background count-rates, etc. While it is recognized that the PRMS will be supplied with vendor quality assurance test certifications, such certifications do not confirm that PRMS equipment has not been damaged during shipment from the vendor to the construction site, proper installation, and validity of post-construction tests. In the context of the operational testing of the PRMS, the design commitment described in DCD Tier 1, Section 2.3.1 should use the same types of radioactive calibration sources that are called for in DCD Tier 2, Revision 4, Section 14.2.8.1.16, in demonstrating compliance with PRMS ITAACs. This approach would confirm that the PRMS is designed and operates in accordance with design commitments and would provide reasonable assurance in complying with (a) Part 52.47(b)(1); (b) Part 20, Appendix B, Table 2 effluent concentrations limits; (c) Part 20.1301 and 20.1302 dose limits to members of the public; and (d) limiting conditions for operation of Section IV of Appendix I to Part 50. Accordingly, update the scope of the operational tests described in DCD Tier 2, Section 14.2.8.1.16 and design descriptions and commitments of DCD Tier 1, Section 2.3.1 and Table 2.3.1-2 to confirm that the implementation of PRMS ITAACs will ensure compliance with NRC regulatory requirements.

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14.3-156	Dehmel JC	Address inconsistencies in design descriptions and commitments for two radiation monitor subsystems of the PRMS.	In DCD Tier 2, Revision 4, Sections 14.2.8.1.16, 14.2.8.1.40, and 14.2.8.1.48, and DCD Tier 1, Revision 4, Sections 2.3.1, 2.10.1 and 2.10.3, there are inconsistencies in the design descriptions and commitments for two PRMS radiation monitor subsystems. Specifically, address the following: a. In DCD Tier 1, Revision 4, Section 2.3.1 and Table 2.3.1-1, the ITAAC for this PRMS radiation monitor requires that its presence be confirmed by inspection; however, an ITAAC is included for it in DCD Tier 1, Revision 4, Section 2.10.1 and Table 2.10.1-2 for the liquid waste management system (LWMS). The PRMS liquid radwaste discharge radiation monitor trips an isolation function of the LWMS discharge valve upon detecting high levels of radioactivity in this effluent stream. Given that the liquid radwaste discharge radiation monitor is part of the PRMS and not part of the LWMS, the design descriptions and commitments given in DCD Tier 1, Revision 4, Section 2.3.1 and Table 2.3.1-1 should identify an operational interface with the ITAACs identified in DCD Tier 1, Section 2.10.1 for the LWMS. b. A similar operational system interface should be identified for the OGS post-treatment radiation monitor listed in DCD Tier 1, Revision 4, Section 2.3.1, Table 2.3.1-1 with design descriptions and commitments identified for the OGS described in DCD Tier 1, Section 2.10.3. The offgas system (OGS) Post-treatment radiation monitor trips an isolation function of the OGS isolation valve upon detecting high levels of radioactivity in this process gas stream. Given that this radiation monitor is part of the PRMS and not part of the OGS, the design descriptions and commitments given in DCD Tier 1, Revision 4, Section 2.3.1 and Table 2.3.1-1 should identify an operational interface with the ITAACs identified in DCD Tier 1, Section 2.10.3 for the gaseous waste management system (GWMS)/OGS. Accordingly, identify all applicable PRMS operational system interfaces and revise the scope of design descriptions and commitments of DCD Tier 1, Section 2.3.1 for consistency with that of DCD Tier 1, Sections 2.10.1 and 2.10.3.

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14.3-157	Dehmel JC	Address inconsistency in the descriptions of acceptance criteria	A review of DCD Tier 2, Revision 4, Sections 14.2.8.1.48 against DCD Tier 1, Revision 4, Section 2.10.3, and DCD Tier 2, Revision 4, Section 11.5.3.2.2 reveals an inconsistency in the descriptions of acceptance criteria. Specifically, the test methods and acceptance criteria do not identify a test to demonstrate the proper closure of the isolation valve on high radioactivity levels. Accordingly, revise the acceptance criteria listed in DCD Tier 2, Revision 4, Section 14.2.8.1.48, to include a confirmation of system isolation on high radioactivity level signals.
14.3-158	Dehmel JC	Address inconsistency in the descriptions of the design description	A review of DCD Tier 1, Revision 4, Section 2.3.1 against DCD Tier 2, Revision 4, Sections 11.5 and 14.2.8.1.16 reveals an inconsistency in design descriptions. Specifically, the design description of DCD Tier 1, Section 2.3.1(4) does not list valve actuation and/or termination of releases on high radiation signals. Accordingly, revise the design description listed in DCD Tier 1, Section 2.3.1(4) to include confirmation of system isolation or termination of release on high radioactivity level signals.
14.3-159	Dehmel JC	Address inconsistency in the ITAAC applicability matrix and design description	A review of DCD Tier 1, Revision 4, Section 2.2.15 and Table 2.2.15-1 against DCD Tier 2, Revision 4, Sections 11.5 and 14.2.8.1.16 reveals an inconsistency in the ITAAC applicability matrix and design description. Specifically, Table 2.2.15-1 does not include IEEE Std 603 Criteria 6.1 and 7.1 for the PRMS as an applicable Tier 1 system. Criteria 6.1 and 7.1 address automatic controls, such as valve actuation and/or termination of releases on high radiation signals, required for safety-related equipment or in complying with Part 20 effluent concentration limits. Accordingly, revise DCD Tier 1, Table 2.2.15-1 to include Criteria 6.1 and 7.1 as being applicable to the PRMS system.

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14.3-160	Dehmel JC	Provide ITAAC to verify presence of steel liners in tank cubicles to preclude accidental releases of radioactivity to the environment	DCD Tier 2, Revision 4, Section 11.2.1 provides a commitment to install steel liners to preclude accidental releases of radioactivity to the environment, but DCD Tier 1, Revision 4, Section 2.16.9 does not include an ITAAC to confirm the installation of steel liners in tank cubicles. GEH committed to install steel liners (MFN 06-226, Supplement 1) in complying with effluent concentration limits of Part 20, Appendix B, Table 2 in the event of a LWMS component failure. The lack of an ITAAC is not consistent with the criteria and application process described in DCD Tier 2, Revision 4, Section 14.3.7.3 on design features used to comply with NRC regulations. Accordingly, revise DCD Tier 1, Section 2.16.9 to include the appropriate ITAAC to confirm the installation of steel liners in LWMS tank cubicles located in the Radwaste Building.
14.3.-161	Dehmel JC	Provide ITAACs for PRMS subsystems that are used to comply with Part 20 Appendix B, Table 2 liquid and gaseous effluent concentration limits.	DCD Tier 1, Revision 4, Section 2.3.1 does not include ITAACs assigned to PRMS subsystems that are used to monitor compliance with Part 20, Appendix B, Table 2 liquid and gaseous effluent concentration limits. The lack of ITAACs for non safety-related, but yet essential subsystems used in demonstrating compliance with Part 20 is not consistent with the criteria and application process described in DCD Tier 2, Revision 4, Section 14.3.7.3 on design features used to comply with NRC regulations. Accordingly, revise DCD Tier 1, Section 2.3.1 to include the necessary ITAACs for all PRMS subsystems that are used to monitor, control, and terminate radioactive effluent releases to the environment.
14.3-162	Eagle E	Update Tier 1 Table 2.2.2-2	DCD Tier 1, Table 2.2.2-2 shows the control rod drive (CRD) maximum allowable scram times for vessel bottom pressure below 1085 psig. The table implies that during a reactor scram a fully withdrawn control rod starts from non-motion, accelerates during insertion, and reaches 100% inserted in less than two and a quarter seconds. The table shows a 60 and 100 percent insertion value, but no 90 percent insertion as in the current BWR 4 nuclear power plants. The 90 percent insertion point was important because the control rod going in at a high rate of speed required a deceleration zone from 90 to 100 percent. Why is there not an entry in Table 2.2.2-2 for a value between 60 and 100 percent insertion that would reflect the approximate location where the control rod would start to decelerate?

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14.3-163	Ashcraft J	Clarify RPS functional arrangement	DCD Tier 1, Table 2.2.7-1 (same concern applies to Tables 2.2.13-1 & 2.2.14-1) reactor protection system (RPS) Functional Arrangement stated that RPS logic is designed to provide a trip initiation by requiring a coincident trip of at least two divisions to cause a trip output. This design is to prevent inadvertent trip. However, if the system digressed to a level that only one division functional, would this statement preclude the system from tripping one out of one?
14.3-164	Ashcraft J	Editorial comment	DCD Tier 1, Table 2.2.3-1 should be labeled “***FWCS Functional Arrangement***”~~. Feedwater Control Modes.~~
14.3-165	Ashcraft J	Tier 2 Section 7.7.3.2 needs to be updated to support Tier 1 statement	DCD Tier 1, Table 2.2.3-2 has listed functions “Reduce speed of other FW pumps” when FW flow High, and “Perform FW Runback” when FW temperature Low. These two functions are not addressed in Tier 2 DCD. DCD Tier 2 should be updated to support the information provided in Tier 1.
14.3-166	Ashcraft J	Editorial comment	DCD Tier 1, Table 2.2.5-4 Item 4 should read “The ***NMS*** ~~SLC~~ system….”
14.3-167	Li H	Editorial comment	DCD Tier 1, Table 2.2.7-2 Item 11 should read “RPV reactor level ~~low~~ ***high*** (level 8)”
14.3-168	Li H	Editorial comment	Functional Arrangement Item (2) should state as “RC&IS is divided into major functional groups as defined in Tier 1 Table 2.2.1-2***, and shown in Figure 2.2.1 1***.”
14.3-169	Li H	Editorial comment	Functional Requirement Item (13) should state as “Conformance with IEEE Std. 603 requirements by the safety-related control system structure, systems, and components defined in Tier 1 Tables 2.2.2-1 and 2.2.2-6, ~~2.2.2-7~~ is addressed in Subsection 2.2.15.”
14.3-170	Li H	Editorial comment	3.2 Software Development is in DAC process, the ITAAC table should be labeled {DAC}.
14.3-171	Li H	Editorial comment	3.3 Human Factor Engineering is in DAC process, the ITAAC table should be labeled {DAC}.

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14.3-172	Li H	Update Tier 1, Section 3.3 to include "Minimum Inventory"	DCD Tier 1, Table 2.2.3-4 Item 4 stated that feedwater control system (FWCS) minimum inventory of alarms, displays, and status indications in the main control room are addressed in Section 3.3. However, there is no discussion on minimum inventory in Tier 1 Section 3.3. Update Tier 1 Section 3.3 to include verification of "minimum inventory" or provide correct cross-reference in DCD Tier 1 Table 2.2.3 4.
14.3-173	Li H	Update Tier 1 Table 2.2.13-1 SSLC/ESF Functional Arrangement to include safety-related VDU test	In the October 18, 2007, NRC-GEH public meeting on ESBWR DCD Revision 4, Tier 1 changes, the staff commented that DCD Tier 1, Table 2.2.13-1, SSLC/ESF Functional Arrangement, should include an item related to safety-related Video Display Unit (VDU) tests. The VDU tests involve the hardware/software qualification and the human factor engineering evaluation aspects of the VDU design. Update Tier 1 Table 2.2.13-1 SSLC/ESF Functional Arrangement to include safety-related VDU test

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14.3-174	Hinson C	Provide ITAAC for the in-plant airborne radioactivity monitoring system, including a description of system sensitivity and provision of local alarms	Although DCD Tier 1, Revision 4, Table 3.4-1 is entitled “ITAAC for Ventilation and Airborne Monitoring and Shielding,” the ITAAC for airborne radioactivity monitoring has been removed from Table 3.4-1. Provide ITAAC for the in-plant airborne radioactivity monitoring system that state that airborne radioactivity monitoring is provided for those normally occupied areas of the plant in which there exists a significant potential for airborne contamination. The airborne radioactivity monitoring system should have the capability of detecting the time integrated concentrations of the most limiting internal dose particulate and iodine radionuclides in each area equivalent to the occupational concentration limits in 10 CFR 20, Appendix B for 10 hours. The airborne radioactivity monitoring system should also provide local audible alarms (visual alarms in high noise areas) with variable alarm set points, and readout/annunciation capability.
14.3-175	Hinson C	Modify DCD Tier 1, Revision 4, Table 2.3.2-1 to provide a listing of each individual ARM so that the table is consistent with the ITAAC in Table 2.3.2-2	In DCD Tier 1, Revision 4, Table 2.3.2-1 (ARM Locations) was modified to delete the elevation of each ARM and to no longer list the number of individual area radiation monitors (ARMs) located in each location (e.g., Revision 4 lists a single listing for the ARMs in the Instrument Rack Area in the Reactor Building while Revision 3 had eight separate listings (numbered 1-8) for ARMs in the Instrument Rack Area in the Reactor Building). This modification to the data in Table 2.3.2-1 makes this table inconsistent with the ITAAC for the Area Radiation Monitoring System shown in DCD Tier 1, Revision 4, Table 2.3.2-2, since the ITAAC is based on inspections, tests, and analysis being performed on <u>each</u> ARM channel and Table 2.3.2-1 in DCD Tier 1, Revision 4, no longer lists each individual ARM location (as was indicated in the Revision 3 version of Tier 1, Table 2.3.2-1). In order to make the ITAAC consistent with the table, modify Table 2.3.2-1 to provide a listing for each individual ARM.
14.3-176	Makar G	Turbine Missile Probability	In Revision 4 to the ESBWR DCD, the ITAAC to provide an analysis of the probability of missile generation was deleted. In order for the staff to conclude that GDC 4 is satisfied, the DCD should be revised to reinstate ITAAC No. 5 from Tier 1 Table 2.11.4-1 in Revision 3 regarding the probability of external turbine missiles (P_1) is $< 1 \times 10^{-4}$ per turbine year.
14.3-177	Shum D	The ITAACS for the diesel generator support systems are incomplete	In GEH’s January 30, 2007, response to RAI 19.1.0-2 regarding RTNSS, GEH included the diesel generator (DG) units as RTNSS systems. In its response, dated August 2, 2007, to RAI 22.5.4, GEH stated that the following subsections of Chapter 9 would be revised to identify the standby DG support systems as

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			RTNSS in the DCD Tier 2, Revision 4: 9.5.4 Diesel Generator Fuel Oil Storage and Transfer System 9.5.5 Diesel Generator Jacket Cooling Water System 9.5.6 Diesel Generator Starting Air System 9.5.7 Diesel Generator Lubrication System 9.5.8 Diesel Generator Combustion Air Intake and Exhaust System The staff has reviewed the Tier 1 ITAACs in ESBWR DCD Revision 4 and GEH's response (dated August 17, 2007) to supplemental RAI 14.3-151 S01 regarding DG supporting systems. The staff found that ITAAC were provided for only the DG fuel oil storage and transfer system and the DG starting air system. Because all the above cited standby DG support systems have RTNSS functions and also to be consistent with DCD Tier 2, Section 14.3.7.3, which indicates that RTNSS systems shall have Tier 1 inputs that include design descriptions and ITAACs, the staff determines that DCD Tier 1, Revision 4, Section 2.0, “Design Descriptions and ITAAC,” should include each of the above standby DG support systems. Please update DCD Tier 1 accordingly.

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14.3-178	Jeng D	Clarify intent of verification for diaphragm floor and vent wall structures	Section 2.15.3 of DCD Tier 1, Revision 4 (page 2.15-24) states, in part, that: "(5) The diaphragm floor and vent wall structures that separate the DW and WW retain their integrity when subject to pressure at or above design pressure." The staff is not clear as to the exact meaning and intent of the phrase: "…when subject to pressure at or **above design pressure**." Specifically, GEH should clearly define the meaning of the term 'above design pressure' and justify its use of the same.
14.3-179	Jeng D	Ambiguous statement related to decay of fission products in RB	DCD Tier 1, Revision 4, Section 2.16.5, Reactor Building, states, in part, that "(4) The RB offers some holdup and decay of fission products that may leak from the containment after an accident. Assuming a LOCA, the offsite dose limits and the control room dose limits are met based on a 50 wt% per day leakage rate from the RB." "The RB offers **some holdup and decay of fission products** …" in the above statement is ambiguous. Please provide clarification on item (4) above.
14.3-180	Sekerak P Thomas G	Chimney, Dryer, Separator	DCD Tier 1, Revision 4, Section 2.1.1, Reactor Pressure Vessel System In Table 2.1.1-1, ASME Code applicability for the following components are not specified: a. Chimney and Partitions b. Chimney head and Steam Separator Assembly c. Steam Dryer Assembly The ASME Code, Section III (ASME III), Subsection NG-1122, specifies provisions for construction of reactor pressure vessel (RPV) internal structures, i.e., all structures within the RPV other than core support structures, fuel, control assemblies, and instrumentation. ASME III indicates that although the complete construction of RPV internal structures need not comply with the rules of Subsection NG as applied to safety-related core support structures, NG-1122(c) specifies that the Certificate Holder shall certify that the construction of internal

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			structures is such as not to effect adversely the integrity of the core support structures. In consideration of this ASME III certification requirement for internal structures, please add the following to the DCD sections referenced: 1) A statement in DCD/Tier 1 Section 2.1.1 indicating that the RPV internal structure listed in Table 2.1.1-1 (chimney and partitions, chimney head and steam separators assembly, and steam dryer assembly) must meet the limited provisions of ASME III regarding certification that these components maintain structural integrity so as not to adversely affect RPV core support structure. 2) A footnote, or other appropriate identifier, in column 1, rows 3, 4 and 5 of Table 2.1.1-1 indicating that the chimney and partitions, the chimney head and steam separators assembly, and the steam dryer assembly are subject to the ASME III certification requirement specified in ASME III, Subsection NG-1122(c). 3. An ITAAC description to be included in DCD Table 2.1.1-3 which references as acceptance criteria the appropriate ASME Code Data Report Form, or suitable alternative report by the ASME Certificate Holder, providing the certification required by ASME III, NG-1122(c) for RPV internal structures.
14.3-181	Thomas G	Loss of Motive Power Position	DCD Tier 1, Revision 4, Section 2.1.2, Nuclear Boiler System, Table 2.1.2-1 Nuclear Boiler System Mechanical Equipment SRV position during Loss of Motive Power Position is shown as “closed for relief mode”. Clarification is needed. The safety relief valves (SRVs) are normally closed and when the power supply to the Solenoid valve is lost, what happens to the valve?
14.3-182	Thomas G	DPV Test	DCD Tier 1, Revision 4, Section 2.1.2 Nuclear Boiler System, Table 2.1.2-1, ITAAC # 24 The test pressure is given as “ 1000 psig or greater.” Please justify the use of “greater” in this acceptance criteria.

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14.3-183	Thomas G	Vacuum Breakers at SRV Discharge	DCD Tier 1, Section 2.1.2 Nuclear Boiler System, Table 2.1.2-1 SRV Vacuum Breakers capacity and set point limits (Item #17) are deleted in DCD Revision 4. GEH claims that it is covered by the "functional arrangement verification." But the functional arrangement verification does not include valve capacity or set point verification. This item should be reinstated in DCD Revision 5.
14.3-184	Thomas G	RPV Level Instrumentation	In DCD Tier 1, Revision 4, Section 2.1.2 Nuclear Boiler System, Table 2.1.2.1, ITAAC # 22 is deleted. In the list of changes, GEH states: "----is now addressed by the design." RPV Level instrumentation is safety significant and hence this item should be in Tier 1. Provide ITAAC to verify design features to preclude accumulation of non-condensable gases in the instrument lines. Identify the Tier 1 Section where this will be included.
14.3-185	Thomas G	ASME	DCD Tier 1, Revision 4, Section 2.1.2 Nuclear Boiler System, Table 2.1.2-3, ITAAC 2a and 2b Change the following in the Design Commitment: " ..designed and constructed" to "designed, fabricated, installed, and inspected—"similar to GDCS ITAAC # 2a, b. They should be consistent.
14.3-186	Thomas G	SRV Opening delay time	DCD Tier 1, Revision 4, Section 2.1.2 Nuclear Boiler System, Table 2.1.2-3 DCD Tier 2 Table 15.2-1 includes SRV Safety function delay time of 0.2 seconds. This delay time is a critical parameter in TRACG calculations and hence should be included in the ITAAC Table 2.1.2-3. Please update DCD Tier 1 accordingly.
14.3-187	Thomas G	SRV Vacuum Breaker	DCD Tier 1, Table 2.1.2-2 The SRV discharge vacuum breaker ITAAC is deleted in DCD Revision 4. The list of DCD changes provided by GEH indicates that the capacity and setpoint will be verified after fuel loading, as appropriate. Clarify why shop tests or type tests can not be performed to verify the capacity and set point.

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14.3-188	Thomas G	ADS Inhibit	DCD Tier 1, Revision 3, Section 2.1.2 Nuclear Boiler System, Table 2.1.2-1 ITAACs 19, 20 and 21 for ADS auto-inhibit, manual inhibit and manual operation are deleted in DCD Revision 4. The list of DCD changes provided by GEH indicates that they are relocated to I&C ITTAC. Please provide specific reference.
14.3-189	Thomas G	ITAAC verification of key TRACG analysis input assumptions	Please explain how certain key TRACG analysis assumptions listed below will be verified to be consistent with the as-built facility through the ITAAC. (A) The pressure loss coefficients for the following components: 1. Steam Separator 2. Fuel bundle 3. Fuel support orifice 4. Control rod guide tubes 5. Shroud support guide tube (B) Free Volumes for the following components: 1. RPV 2. Downcomer 3. Core 4. Chimney 5. Separator/dryer (C) Hydraulic Diameter and Heated Diameter of the core
14.3-190	Thomas G	CRD Insert line Quality	DCD Tier 1, Table 2.2.2.5 shows that the scram inlet piping required for scram is not ASME Code Section III. According to Figure 2.2.2-1, the scram insert line from the isolation valve to CRD is Quality Group B. A note may be added to the table to reflect this feature.
14.3-191	Thomas G	CRD Electro-mechanical Brake	DCD Tier 1, Section 2.2.2, CRD System, Table 2.2.2-1 Item # 6, the CRD Electro-mechanical brake torque verification, is deleted in Revision 4. This is an important parameter and should be verified by ITAAC. Please update DCD Tier 1 accordingly.

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14.3-192	Gilmer J Thomas G	CRD Pumps start time	DCD Tier 2, Table 15.2-1, indicates maximum time delays from initiating signal (Pump 1 and 2) as 10 and 25 seconds. If off-site power is not available, the time delay is shown as 145 seconds. These parameters are critical parameters in TRACG analyses for Anticipated Operational Occurrences (AOOs). Add the CRD pump start times to the CRD ITAAC in Tier 1, Section 2.2.2.
14.3-193	Thomas G	SLCS Functional Arrangement	DCD Tier 1, Section 2.2.4 Standby Liquid Control System, Design Description, Functional Arrangements (1), Add Figure 2.2.4-1 in addition to Table 2.2.4-1 for Functional Arrangement.
14.3-194	Thomas G	Motor Operated Valve in the main flow path	DCD Tier 1, Revision 4, Section 2.2.4 Standby Liquid Control System It is our understanding that there is a motor operated valve at the downstream of the injection squib valves. This MOV is on the main flow path and hence should be shown in the Figure 2.2.4-1. Also add this MOV to Tables 2.2.4-4 and 2.2.4-5, Mechanical and Electrical Equipment Tables.
14.3-195	Thomas G	Hot shutdown Boron requirement	DCD Tier 1, Section 2.2.4, SLCS, Table 2.2.4-2 Why was ITAAC # 2b for verification of equivalent natural born concentration of 1600 ppm for hot shutdown deleted in DCD Revision 4? This item should be retained in the ITAAC. Please update DCD Tier 1 accordingly.
14.3-196	Thomas G	Boron enrichment	DCD Tier 1, Section 2.2.4, SLCS, Table 2.2.4 -2 Why was ITAAC # 2c, “Accumulator tank with at least 12.5 wt% solution of boron content enriched to 94% of the Boron-10 isotope” deleted in DCD Revision 4?. This item which verifies critical operating parameters of the system should be retained in the ITAAC. Please update DCD Tier 1 accordingly.

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14.3-197	Thomas G	SLCS response time	DCD Tier 1, Section 2.2.4, SLCS, Table 2.2.4-2 Why was ITAAC # 5, "Injection of boron into the reactor core begins within 5 seconds of reaching a system initiation parameter" deleted in DCD Revision 4? This parameter is an important parameter assumed in the analysis and hence should be kept in the ITAAC. Verify that this parameter is included in Tier 2 DCD Section 9.3.5.
14.3-198	Thomas G	ASME Section III	DCD Tier 1, Revision 4, Section 2.2.4 SLCS, Table 2.2.4-6, ITAAC # 10a and 10b Change the following in the Design Commitment: "–designed and constructed" to "designed, fabricated, installed, and inspected—"similar to GDCS ITAAC # 2a, b. They should be consistent.
14.3-199	Thomas G	ICS purge line	DCD Tier 1, Revision 4, Section 2.4.2 ICS, Add the cross-tie valves between the ICS/PCCS pools shown in Figure 2.4.1-1 to the list of ICS Mechanical Equipment provided in Table 2.4.1-1.
14.3-200	Hanry Wagage	IC/PCCS	The cross-tie valves between the ICS/PCCS pools shown in Figure 2.15.4-1 should be added to the list of PCCS Mechanical Equipment in Table 2.15.4-1.
14.3-201	Thomas G	ICS Steam supply line flow limiter	DCD Tier 1, Section 2.4.1, ICS, Table 2.4-1-1 ITAAC #2 for the steam supply line is deleted in DCD Revision 4. The DCD Revision 4 list of changes only states: "Deleted old item" with out any explanation. Since this flow limiter is not included in the table for Mechanical Equipment, how will the provision of the flow limiter be verified. This flow limiter is a critical assumption in the TRACG analysis and hence should be kept in the ITAAC. DCD Tier 2 does not discuss a flow limiter in the ICS condensate return line, is there one provided in the design? If so, please address the need for ITAAC.
14.3-202	Thomas G	ICS Condensate return valve opening time	DCD Tier 2, Section 2.4.1, ICS In DCD Tier 2, Table 15.2-1, the time to injection valve fully open is given as 31 seconds. This valve opening time is a critical parameter in TRACG analyses and hence the condensate return valves V5 and V6 opening time should be verified in the ITAAC. Please update DCD Tier 1 accordingly.

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14.3-203	Thomas G	GDCS Pool Injection line check valve	DCD Tier 1, Section 2.4.2, GDCS, Table 2.4.2-1, GDCS Mechanical Equipment It is shown that GDCS Pool injection check valve (V-1) is not remotely operated. It is our understanding that the check valve is a testable check valve and hence can be operated from control room for testing. Clarify how the testing is done.
14.3-204	Gilmer J Thomas G	Fuel Rods and Bundles, Fuel Channel Control Rod	DCD Tier 1 Sections 2.8.1 Fuel Rods and Bundles, 2.8.2 Fuel Channel, and 2.9 Control Rod The Tier 1 Design Descriptions that were included in DCD Revision 3 in these sections were deleted in DCD Revision 4. The Design Descriptions should be added back in DCD Revision 5. Please update DCD Tier 1 accordingly.
14.3-205	Thomas G	TRACG analyses input parameters for AOOs and IE analyses	DCD Tier 2, Revision 4, Table 15.2-1 lists the input parameters, initial conditions and assumptions used in AOO and infrequent event analyses. Please describe how the following parameters are verified in Tier 1: a. Total Delay Time from TSV or TCV to the start of BPV Main Disc Motion (0.02s) b. Total Delay Time from TSV or TCV to 80% of Total Capacity (0.17) c. TSV Closure Scram Position of 2 or more TSV, % open (85%)Trip Time delay (0.06s) d. TCV fast closure scram trip (0.08s) e. Assumed slow closure analysis value 2.5s f. APRM simulated thermal power trip time constant 7 s

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14.3-206	Amar Pal Scarborough T	Non-inclusion of equipment in ITACC as required by 10 CFR 50.49 (b)(2) and (b)(3)	GEH added ITAAC for Environmental Qualification of Mechanical and Electrical Equipment in DCD Tier 1 Section 3.8. ITAAC includes safety-related mechanical, electrical and digital I&C equipment. In DCD, Tier 2, Section 3.11.1, GEH stated that electrical equipment within the scope of this section includes all three categories of 10 CFR 50.49(b). The ITAAC did not include 10 CFR 50.49 (b)(2) and (b)(3) equipment. Please include 10 CFR 50.49(b)(2) and (b)(3) equipment in the ITAAC or provide justification for not including those equipment in ITAAC.
14.3-207	Lee J	Section 2.15.1 and Table 2.15.1-1 not revised as committed in the response to RAI	In response to RAI 15.4-14 (MFN 07-199 dated May 2, 2007), GEH stated that: "DCD, Tier 1, Revision 3, Subsection 2.15.1 and Table 2.15.1-1 will be revised to include an ITAAC item for exposed cable mass as indicated on the attached markups,"and that "DCD, Tier 1, Subsection 2.15.1 and Table 2.15.1-1, Revision 4 will include an ITAAC item for exposed cable mass as indicated on the attached markup." Contrary to this response, the staff finds that GEH did not revise DCD Tier 1, Section 2.15.1 and Table 2.15.1-1 in DCD as stated in the RAI response. Please revise DCD Tier 1 accordingly.
14.3-208	Radlinski R	Fire barrier penetration acceptance criterion should be that the penetration seals provide fire resistance ratings at least equal to that of the fire barriers (DCD Tier 1, Table 2.16.3.1-1, Item 2)	The Revision 4 change to Item 2 of DCD Tier 1, Table 2.16.3.1-1 eliminated the requirement to verify that penetration seals in fire barriers separating redundant trains are rated in accordance with the fire barrier in which they are installed. The revised criterion requires only that the penetrations be sealed or closed, without reference to a required rating. In accordance with Regulatory Guide 1.189, Regulatory Position 4.2.1.4, openings through fire barriers should be sealed or closed to provide a fire resistance rating at least equal to that required of the barrier itself. The acceptance criterion should be revised accordingly to ensure the integrity of the fire barrier.
14.3-209	Radlinski R	Manual fire suppression capability should be provided for the containment. (DCD Tier 1, Section 2.16.3, Item (3))	The revised text in Item (3) of DCD Tier 1 Section 2.16.3 specifically excludes the containment from the commitment to provided manual fire suppression capability to plant areas containing safety-related equipment. In accordance with 10 CFR 50, Appendix A, General Design Criterion (GDC) 3, Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems and components important to safety. Section 9.5.1 of Tier 2 includes the design commitment to

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			provide manual suppression capability for all plant areas and Tier 2, Appendix 9A describes manual hose station coverage for the containment and drywell area via the containment hatches. Tier 1, Section 2.16.3 of the DCD should be revised to describe the design commitment for fire fighting capability inside the containment in accordance with GDC 3 and consistent with the design commitments in Tier 2.
14.3-210	Bongarra J Li H Hsu R	Provide schedule for DAC closure	RG 1.206 Section C.III.5.1, "Detailed Design Information and the Combined License Application,"states that "the NRC staff recommends, to the greatest extent practicable, that the COL applicant include detailed design information in the areas where design acceptance criteria (DAC) were used during the design certification. The applicant should submit this information early enough in the process to allow the NRC staff sufficient time to review it and determine compliance with the DAC and associated ITAAC. Early submission of such information should help avoid potential impacts on the licensee's plans and schedules for loading fuel. The COL applicant should identify those design areas where detailed information cannot be provided and should supply the NRC with a schedule for completion of detailed engineering, procurement, fabrication, installation, and testing information. The applicant should similarly do this in a manner to support timely NRC inspection of DAC information." In accordance with RG 1.206 guidance, the staff requests GEH to add a COL information item to the DCD for the applicant to identify those design areas where detailed information cannot be provided and should supply the NRC with a schedule for completion of detailed engineering supporting implementation of the Design Acceptance Criteria (DAC) in the areas that DAC was approved for the ESBWR design certification.
14.3-211	Bongarra J	Correct Design Commitment of DCD Tier 1, Table 3.3-1	ITAAC Table 3.3-1 contains 11 items, one for each element of NUREG-0711 and the corresponding ESBWR element implementation plan. However, the Design Commitment column for each element refers to the overall MMIS and HFE Implementation Plan rather than the specific pertinent elements implementation plan. Please update the 11 Design Descriptions to refer to the applicable implementation plans.
14.3-212	Li R	Provide the technical	The COL Information Item 3.6.5 requires that the COL applicant provide details of

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		basis and the justification for changing the COL Information Item 3.6.5 to ITAAC 3.1 -1 Item 3	pipe break analysis results and protection methods. In DCD Revision 4 Sections 3.6.2.5 and 3.6.5-1-A, the applicant revised the sections and simply moved the task to ITAAC 3.1-1 Item 3. That ITAAC item requires inspection of the as-built pipe break analysis. The intent of the COL Information Item was to make available the detailed design information prior to implementation/installation. The staff continues to believe that the design information should be made available prior to implementation/installation. RG 1.206, Section C.III.4.3, allows the applicant to propose an alternative to the COL Information Item. Since the ITAAC 3.1-1 Item 3 does not cover the level of detail described in RG 1.206 C.III.4.3, a different alternative is needed along with the described justification.
14.3-213	Davis R	Table 2.1.2-3 acceptance criteria	The staff recommends the following changes to DCD Tier 1, Table 2.1.2-3, "ITAAC For Nuclear Boiler System," in order to provide clarification. Since ITAACs 2, 3, and 4 apply to all systems that contain ASME Code Class 1, 2, or 3 components, the staff also requests that the applicant review ITAAC for ALL Class 1, 2, and 3 systems and verify that they are consistent with the Nuclear Boiler System ITAAC where applicable. ASME Code Section III ITA 2(a) states: "Inspection will be conducted of the as-built components as documented in the ASME design reports." The staff requests that the applicant modify ITA 2(a) as follows: "Inspection of certified documents for as-built components will be conducted." Pressure Boundary Welds ITA 3(a) states: "Pressure boundary welds in components identified in Table 2.1.2-1a as ASME Code Section III meet ASME Code Section III requirements." The staff requests that the applicant modify ITA 3(a) as follows: "Inspection of the as-built pressure boundary welds will be performed in accordance with the ASME Code Section III."

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14.3-214	Davis R	Missing line items in Tier 1, Table 2.6.1-2	DCD Tier 1, Table 2.6.1-2 "ITAAC For The Reactor Water Cleanup/Shutdown Cooling System" appears to be missing some line items including ITAAC to verify design and construction to ASME Code Section III and ITAAC for pressure boundary welds. Please update DCD Tier 1 accordingly.
14.3-215	Davis R	Missing line items in Tier 1, Table 2.2.4-4	DCD Tier 1, Table 2.2.4-4 "SLC System Mechanical Equipment" appears to be missing some line items. The staff could not find items such as SLC accumulators and piping in Table 2.2.4-4. The staff request that the applicant verify the all ASME Code Class 1, 2, and 3 components and piping in the SLC system are listed in Table 2.2.4-4. In addition, the staff also requests that the applicant review all Tier 1 ITAAC and verify that all Class 1, 2, and 3 components and piping have been listed in the appropriate ITAAC system tables for all systems containing ASME Code Class 1, 2 or 3 components and piping.
14.3-216	Haider S	EFUs Efficiency and Redundancy	(A) DCD Tier 1, Table 2.16.2-6, Item 7 establishes an ITAAC for in-place leakage testing of the emergency filter units (EFUs) per ASME AG-1 and RG 1.52. Please modify the ITAAC to also include verification of the filter efficiencies for the carbon and HEPA filters. (B) DCD Tier 2, Section 9.4.1.2 states that the operating EFU is isolated and the standby EFU is automatically started on a low flow signal from the operating EFU. Please provide an ITAAC to ensure that the standby EFU starts on a low flow signal from the operating EFU.
14.3-217	Haider S	Fresh air supply to Control Room Habitability Area (CRHA)	DCD Tier 1, Table 2.16.2-6, Item 5 identifies an ITAAC to ensure that the EFUs would maintain the Control Room Habitability Area (CRHA) at a positive pressure greater than 31 Pa (0.125 inch H_2O gauge) with respect to the adjacent areas, while supplying the required 424 CFM outdoor air flow. (A) DCD Tier 1, Section 2.16.2, Figure 2.16.2-4 does not show any air exhaust path out of the CRHA. Please describe how the 424 CFM supply would be balanced with a 424 CFM release from the CRHA. (B) DCD Tier 2, Table 9.4-1 does not provide information regarding any maximum CRHA pressurization that would not be exceeded while maintaining the fresh

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			air supply of 424 CFM. Please provide the information. (C) Please provide an ITAAC to ensure that the fresh air supply will not be reduced below the required 424 CFM due to the CRHA pressurization exceeding the minimum required 31 Pa?
14.3-218	Haider S	CRHA in a Winter DBA Condition	DCD Tier 1, Table 2.16.2-4, Item 4 identifies an ITAAC to ensure that the control room habitability area bulk air temperature will be maintained within the given habitable temperature range. However, the ITAAC addresses only the loss of cooling during the summer conditions, as it focuses on the maximum CRHA air temperature rise that would result from the loss of normal cooling. The ITAAC does not cover a loss of heating during cold weather. (A) DCD Tier 2, Table 9.4-1 does not report the maximum CRHA (station blackout) temperature drop below normal operating temperatures, during a winter situation. Please provide the CRHA temperature drop limit. (B) Please provide an ITAAC to cover the loss of normal heating during a winter DBA condition, and to ensure that the CRHA bulk air temperatures is acceptable.
14.3-219	Haider S	Portable AC Generators for the CRHA EFU Fan System	DCD Tier 1, Section 2.16.2.3 describes the dedicated portable AC generators, available on site to provide post 72-hour power to the EFU fan system, which is a safety related system. Please provide an ITAAC to verify the generator performance capabilities.
14.3-220	Forrest E	Isolation of RB systems and volumes	DCD Tier 1, Table 2.16.2-1 does not list safety-related dampers for supply inlet, exhaust outlet and smoke purge outlets of the Reactor Building Clean Area HVAC Subsystem (CLAVS). The description states that the CLAVS area is “non-radiologically controlled.” The staff needs additional information on how the Reactor Building Contaminated Area HVAC Subsystem (CONAVS) volumes and Reactor Building Refueling and Pool Area HVAC Subsystem (REPAVS) volumes which are isolated by SR dampers are sealed from the CLAVS clean area volume during an accident when the negative pressure differentials between volumes are not maintained. Since there are no safety-related dampers to assure CLAVS

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			isolation post accident, the CLAVS volume may be considered part of the external environment. As such, all releases to the CLAVS by way of the CONAVS or REPAVS volumes must be considered as exfiltration from the RB. Has the volume used in the design basis analysis for the reactor building been reduced by the volume of the non-radiologically controlled CLAVS volume which is not isolated by safety-related dampers? If the CLAVS area is credited as a radiation control area, please revise the description and add the CLAVS dampers to the list of safety-related components in Tier 1 Table 2.16.2-1. The CLAVS area is stated as being a non-radiological control area which may mean that no credit is given to these non-safety-related dampers and that the CLAVS area is effectively open to the environment. In the testing of RBVS isolation dampers per Table 2.16.2-2, Item 2, are the CLAVS exhaust and supply dampers which are not listed as safety related in Table 2.16.2-1 tested for isolation?
14.3-221	Forrest E	Post 72 hour operating requirements of RBVS	Regarding the Design Description in Tier 1 Section 2.16.2.1, how does the Reactor Building HVAC System (RBVS) maintain isolation and control of releases post accident as in item 2 (The RBVS isolation dampers automatically close upon receipt of a high radiation signal or loss of AC power) if it operates to provide post 72-hour cooling as in Item 7 (The RBVS provides post 72-hour cooling for DCIS, CRD and RWCU pump rooms...)? What parts of the RBVS are operating and does it exhaust from the building? Does it provide for either cooling or control of hydrogen in safety-related battery rooms? In testing the RB for leak tightness as per Tier 1 Table 2.16.5-2, item 4, does the test have to consider the RBVS running in the 72 hour post accident cooling mode? What portions of the RBVS system are classified as RTNSS? Is the CLAVS area of the RB considered as part of the RB for testing?

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			How is the RTNSS qualification demonstrated and verified? Can the releases be demonstrated to be less than the 50% mass per day leakage rate assumed in the design basis analysis? What cooling systems (chilled water, component cooling water, etc.) are required to support the RBVS cooling functions? What source of power is supplied to these systems? Are the supporting cooling systems classified as RTNSS? Has the 72-hour post accident RBVS operation requirements been evaluated for winter and summer design temperature conditions?
14.3-222	Forrest E	Post accident migration of contamination to clean areas	In the Design Description in Tier 1 Section 2.16.2.1, in items (5) and (6) both the CONAVS and REPAVS maintain negative pressures when operation with respect to adjoining clean areas. During an accident both of these systems are isolated. What prevents the contamination in the CONAVS and REPAVS areas from migrating to the clean areas of the building and ultimately escape the building to the environment? If there are barriers that would prevent this, are these barriers tested and controlled by surveillance? Please provide an ITAAC to confirm these barriers, if applicable.
14.3-223	Forrest E	Post accident hydrogen control in Battery Rooms	Tier 1 Table 2.16.2-2 Item 4 does not provide for verification that the hydrogen concentration levels in the battery rooms can be maintained less than 2% by volume for post accident conditions when the RBVS is shut down (and temperatures could be very high) or when only the RTNSS portions of the RBVS are operational post 72 hours after accident. Please provide an addition to the ITAAC that verifies design features to control hydrogen levels under all conditions of operation or provide a justification as to why hydrogen levels do not need to be controlled post accident..
14.3-224	Forrest E	Temperature control in general area of control building for SR DCIS	In the Design Description provided in Tier 1 Section 2.16.2.2, it is stated that mechanical cooling of the Control Building General Areas and the CRHA is not provided as a safety-related function during CRHA boundary isolation. The

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		equipment	Control Building General Area contains safety-related equipment such as Division I, II, III, and IV DCIS equipment located in the rooms directly below the CRHA. Each division room has a heat load from 3080 watts to 5720 watts during a 72 hour isolation of the CRHA. Please provide an ITAAC that demonstrates that adequate cooling exist to prevent equipment qualification temperatures and environmental temperatures for safety-related equipment in the Control Building General Area from being exceeded. Please consider the presence of these SR DCIS heat loads as an input to the CRHA in determining the passive cooling capability of the CRHA.
14.3-225	Forrest E	Post 72 hour temperature control	In DCD Tier 1, Table 2.16.2-4, Item 4a, the confirmation of temperature rise is for a 72-hour duration. Please identify the systems that are required to assure that temperature rise does not exceed 15 degrees after 72. Please establish an ITAAC to verify this capability.
14.3-226	Forrest E	Heat sink performance and surveillance requirements	DCD Tier 1, Table 2.16.2-4, Item 4b, verifies heat sink performance based on CRHA air temperature. Heat sink performance is also affected by the temperature of air or soil on the outside of the concrete being used as a heat sink. In particular, the DCIS rooms below the CRHA have significant heat loads and may be at a higher temperature than the CRHA in which case the concrete could become a CRHA heat source. Please explain how the ITAAC demonstrates that heat will flow from the CRHA to the heat sink if CRHA air temperature increases.
14.3-227	Forrest E	Addition to EFU code and seismic table	Table 2.16.2-5, the outside air intake louvers for the EFU and the duct connecting EFU components should also be listed as seismic category I and safety related. Please correct the table to include these components.

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14.3-228	Wagage H	Need to add design basis LOCA loads	Item 3 of DCD Tier 1, Revision 4, Section 2.15.3 states that the "Containment Internal Structures identified in Table 2.15.3-1 conform to Seismic Category I requirements and can withstand seismic design basis loads and suppression pool hydrodynamic loads without loss of structural integrity and safety function." Please add also the design basis loss-of-coolant-accident generated loads because the containment internal structures should be designed to stand such loads. Also, please add the same information to the acceptance criteria for item 3(i) of DCD Tier 1, Table 2.15.3-2.
14.3-229	Wagage H	Drywell to wetwell bypass leakage capacity needs to be verified	Drywell to wetwell bypass leakage capacity is an important assumption used in the containment analyses and needs to be verified. Please add (1) an item to DCD Tier 1, Section 2.15.3 giving the drywell to wetwell bypass leakage capacity and (2) add an ITAAC to DCD Tier 1, Table 2.15.3-2 to verify this value.
14.3-230	Wagage H	Information important for addressing containment debris issue should be included in Tier 1	The staff considered the following in evaluating the effect of loss-of-coolant accident generated and latent debris effects on decay heat removal and containment cooling. (a) The GDCS pool consists of a stainless steel liner (DCD Tier 2, Revision 4, Table 6.1-1) (b) The suppression pool consists of a stainless steel liner (DCD Tier 2, Revision 4, Table 6.1-1) (c) "Suppression pool equalization lines have an intake strainer to prevent the entry of debris material into the system that might be carried into the pool during a large break LOCA." (DCD Tier 2, Revision 4, Section 6.2.2.7.2) (d) "The GDCS pool airspace opening to the DW will be covered by a perforated steel plate to prevent debris from entering pool and potentially blocking the coolant flow through the fuel." (DCD Tier 2, Revision 4, Section 6.2.2.7.2) (e) "The Passive Containment Cooling System (PCCS) heat exchanger inlet pipe is provided with a debris filter with holes no greater than 25 mm (1 inch) to prevent entrance of missiles into the pipe and protection from fluid jets during a loss-of-coolant accident (LOCA) condition." (GEH

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			response to NRC RAI 6.3-42, MFN 07-069, January 30, 2007) Please add these to DCD Tier 1, Table 2.15.3-1 and identify them in DCD Tier 1, Figure 2.15-1.
14.3-231	Wagage H	Component important for containment analyses should be included in Tier 1	The following components are important for containment analyses, and therefore, needs to be listed in DCD Tier 1, Table 2.15.3-1: (a) Vacuum breakers (b) Safety relief value discharge quenchers
14.3-232	Wagage H	Verify that the reactor vessel shield wall can withstand the design pressure	Please add an ITAAC to DCD Tier 1, Table 2.15.3-2 to verify that the reactor vessel shield wall is able to withstand the design differential pressure between the reactor vessel annulus and the drywell.
14.3-233	Wagage H	Vacuum breaker proximity sensor should detect vacuum breaker open	The acceptance criteria for Item 8 of DCD Tier 1, Revision 4, Table 2.15.3-2 states that "[t]est report(s) demonstrate that each as-built vacuum breaker proximity sensor indicates an open position with the vacuum breaker fully open and indicates a closed position when the vacuum breaker is in the fully closed position." DCD Tier 2, Revision 4, Section 6.2.1.1.2, states that "[t]he vacuum breaker is provided with redundant proximity sensors to detect its closed position." Therefore, the proximity sensor should identify when the vacuum breaker is open causing drywell to wetwell bypass leakage that exceeds the design capacity. That is, the proximity sensor should be able to identify the vacuum breaker open position before it is "fully open." Please correct DCD Tier 1, Table 2.15.3-2.
14.3-234	Wagage H	Information important for containment analyses should be included in Tier 1	Please provide the following information in DCD Tier 1, Figure 2.15.3-1, to verify aspects of the containment analyses: (a) Vacuum breaker area in legend Item 11 (b) Total number of vertical vents in legend Item 12 (c) Relative elevation of spillover holes in legend Item 14.
14.3-235	Wagage H	PCCS is entirely passive	DCD Tier 1, Revision 4, Section 2.15.4, states that the passive containment

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		only for 72 hours after a LOCA	cooling system "is entirely passive, with no moving parts." However, GEH has informed the staff that the PCCS is to be supplemented with a drywell gas recirculation system (DGRS) after 72 hours following a LOCA. When the DGRS system design is submitted for staff review, provide an update to DCD Tier 1 to indicate that the DGRS is an active system .
14.3-236	Wagage H	PCCS safety function continues beyond 72 hours after a LOCA	DCD Tier 1, Revision 4, Section 2.15.4, states that the passive containment cooling system "together with the pressure suppression containment system will limit containment pressure to less than its design pressure for 72 hours after a LOCA." The PCCS with other systems (fuel and auxiliary pool cooling system, drywell gas recirculation system, etc.) continues to remove heat from the containment to limit containment pressure to less than its design pressure beyond 72 hours after a LOCA. Please update DCD Tier 1 (in Section 2.15.4 and Item 7 of Table 2.15.4-2) to identify these additional systems and to recognize that limiting containment pressure to less than its design pressure is required even beyond 72 hours after a LOCA.
14.3-237	Wagage H	Discrepancy in PCCS design pressure given in DCD Tier 1 and Tier 2	DCD Tier 1, Revision 4, Table 2.15.4-2 states that "[t]he pressure boundary of the PCCS retains its integrity under the design pressure of 310 kPa gauge (45 psig)." However, DCD Tier 2, Revision 4, Table 6.2-10 states that the PCCS design pressure as 758.5 kPa gauge (110 psig). Please correct this apparent discrepancy.
14.3-238	Wagage H	PCCS design parameters should to be verified	DCD Tier 2, Revision 4, Table 6.2-10 gives PCCS design parameters. Please explain how the ITAAC in DCD Tier 1, Revision 4, Table 2.15.4-2 demonstrates that: (a) The heat removal capacity for each loops is 11 MWt nominal for pure saturated steam at a pressure of 308 kPa (absolute) (45 psia) and temperature of 134 °C (273.2 °F) condensing inside tubes with an outside pool water temperature of 102 °C (b) The system design temperature is 171°C (340°F).
14.3-239	Wagage H	Suppression pool	NRC RAI 6.2-164 - Supplement 1 states the following:

RAI Number	Reviewer	Question Summary	Full Text
		hydrodynamic loads on as built submerged structures should be verified	In response to RAI 6.2-164, GEH provided reference to structures response to containment loads. The staff, however, cannot find details of the analysis for the submerged structures. In particular, the staff is concerned with the ability of the PCCS vent pipe to withstand postulated hydrodynamic loads and maintain its submergence depth, which is an essential condition for the long term containment cooling. Please indicated if such an analysis was performed and provide an appropriate reference Please add an item to DCD Tier 1, Revision 4, Table 2.15.4-2 providing an ITAAC to verify such suppression pool hydrodynamic loads on as-built submerged structures.
14.3-240	Wagage H	PCCS vent line submersion should to be verified by ITAAC	The PCCS vent line submersion is an important dimension that affects the PCCS performance and needs to be verified. Please update DCD Tier 1, Figure 2.15.4-1 to provide this information and add an ITAAC to DCD Tier 1, Table 2.15.4-2 to verify.
14.3-241	Beacom R	X-walk between Chapter 2.2 ITAAC and Chapter 3 ITAAC	At the recent software audit, the GEH representatives identified that x-walk will be incorporated in Chapter 2.2 ITAAC (I&C) and the Chapter 3 Software Program ITAAC
14.3-242	Beacom R	Deviation from the 10 CFR 50.55; IEEE-603 1991 definition	The definition for the word "division" is inconsistent from that identified in 10 CFR 50.55a which references standard IEEE-603.
14.3-243	Beacom R	EMI qualification not in ITAAC	The ITAAC should address EMI susceptibility and emissions qualifications.
14.3-244	Beacom R	ITAAC in electrical distribution systems should state the use of digital equipment	The I&C ITAAC Per NRC guidance NUREG-0800, Section 14.3, it is stated that "Since there is some of this type equipment (i.e. Digital) which may be utilized in the electrical distribution systems, the I&C ITAAC should cover this."
14.3-245	Talbot F	The staff requests that GEH add the COL holder information back into Tier 1 DCD Section 3.6,	In RAI 14.3-26, the staff request that "an example non-system based D-RAP ITAAC requirement can be found in AP1000 Tier 1 Design Certification Document (DCD) Section 3, Non-System Based Design Description & ITAAC, Section 3.7, Design Reliability Assurance Program. GE should add a non-system based

RAI Number	Reviewer	Question Summary	Full Text
		"Design- reliability Assurance Program."	Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) requirement for Design RAP (D-RAP) to Tier 1 DCD Section 3.0 and Tier 2 DCD Section 14.3." Table 3.6-1 specifies the inspections, tests, analyses, and associated acceptance criteria for the DRAP. However, in DCD Tier 1, Section 3.6, Revision 4, GEH removed the following information The D-RAP provides reasonable assurance that the design of risk-significant SSCs is consistent with their risk analysis assumptions. The D-RAP identifies relevant aspects of plant operation, maintenance and performance monitoring of important plant SSCs for the COL holder consideration in assuring safety of the equipment and limiting risk to the public. A preliminary list of risk-significant SSCs within the scope of the D-RAP will be developed by the COL applicant/holder in the plant-specific design phase. The COL holder is expected to augment the design certification information to include any site-specific changes and/or additions, to generate the complete list of the risk significant SSCs. The staff request that GEH add the COL holder information back into Tier 1 DCD Section 3.6, Design Reliability Assurance Program.
14.3-246	Beacom R	No NBS control room alarms displays or controls listed	Add a list of Alarm with transmitters in Table 2.1.2-2 . Identify the location of the transmitters and alarm.
14.3-247	Beacom R	Physical separation acceptance criteria should be identified	Specify that the physical separation criteria should meet the criteria identified in IEEE-384 (Examples: Table 2.2.4-6, SLC; Table 2.3.2-2; PRM; Table 2.4.1-3 ICS).
14.3-248	Beacom R	Environmental qualification level of electrical equipment (including I&C)	Per NRC guidance NUREG-0800, Section 14.3, it is stated that "Tier 1 should only deal with electrical equipment in harsh environments" Therefore it should be identified that the field equipment listed here should be harsh environmentally qualified.
14.3-249	Beacom R	Clarify category	In Table 2.2.2.1, should the CRDHS FMCRD purge water header, be classified as

RAI Number	Reviewer	Question Summary	Full Text
			safety related.
14.3-250	Beacom R	Figure to display instrumentation	Display controls in figure 2.2.2-1 listed in the table.
14.3-251	Beacom R	Table 2.2.3-1, Feedwater Control Modes description is not sufficient	Use information in Table 2.2.3-3, to describe the functional arrangement in Table 2.2.3-1 for FWCS Controls.
14.3-252	Beacom R	If necessary, add a control parameter for three channel redundancy	If the redundant nature of the FWCS is being taken credit for in any analysis, then an adequate description of the type of redundancy (parts of, such as processor only, or complete three channel design etc.) and a specific ITAAC should be created to confirm with loss of one, and two, channels FWCS output is maintained.
14.3-253	Beacom R	Monitoring, alarming and process variables have been removed	The functional description of SLC system no longer identifies: 1. Monitoring or alarming of accumulator pressure or level. 2. If the alarms are set to provide adequate time for recharging of the accumulator 3. Measurement of Boron concentration Please provide this information provided in Revision 3.
14.3-254	Beacom R	Providing plant power and power distribution information is no longer identified	Provide the plant power and power distribution information provided in Revision 3 to the operator and other plant control systems.
14.3-255	Beacom R	NMS Preamplifiers are no longer identified	NMS Preamplifiers are identified in Tier 1, Revision 3. These need to be provided in Revision 4.
14.3-256	Beacom R	Editorial	Design Commitment 4 references SLC system minimum inventory. This should be the NMS system.
14.3-257	Beacom R	Commitment 2 appears to conflict with Commitment 3	Commitment 2 defines the limited list of controls as listed in Table 2.2.6-1. Commitment 3 refers to the DAC related ITAAC which should identify what additional manual controls and VDU controls are forthcoming. Commitment No. 2 should be deleted.
14.3-258	Beacom R	Functions of the RPS were removed	Add the following two statements missing in Table 2.2.7.1

RAI Number	Reviewer	Question Summary	Full Text
			1) The primary function of the RPS is to achieve reactor shutdown before fuel damage occurs 2) The automatic and manual scram initiation logic systems are independent of each other
14.3-259	Beacom R	Reinsert Figure 2.2.7-1 from Revision 3	Explain why the basic configuration drawing of the RPS has been deleted. With lack of text and figures describing the signal path from sensors to scram pilot solenoids, the Tier 1 portion, which should be a subset of Tier 2 of the RPS, has insufficient information to make a reasonable determination on how the system is to operate.
14.3-260	Beacom R	Reinsert Figure 2.2.9-1 from Revision 3	Without an adequate description to make a reasonable regulatory determination of "triple redundant", the interfacing systems, power or gateways, Figure 2.2.9-1, Simplified Block Diagram, which was in Revision 3, should be reinserted. Also, to what credit is the "triple redundancy' used for? Simply stating it has no regulatory significance. If there is any credit taken then the test to specifically confirm with loss of one, and two, channels SB&PC output is maintained. (As was done in Revision 3).
14.3-261	Beacom R	Add functional description and Interface Diagram	The following functions were removed from Revision4 of the functional description in Revision3. These along with the interface diagram needs to be added to make a safety evaluation. 1) Processing of manual demands for nuclear system isolation 2) The logic functions of ECCS, CRHS, LDIS and the ICS.
14.3-262	Beacom R	Several functional requirements need clarification.	Clarify the following functional requirements in Section 2.2.14 including the bracketed information at the end. (6) The containment isolation components that correspond to the isolation functions defined in Table 2.2.14-2 are addressed in Subsection 2.15.1. [TCF510] (8) Confirmatory analyses to support and validate the DPS design scope. [SMK511] (9) Failure Modes and Effects Analysis (FMEA) per NUREG/CR-6303 of safety-related protection system platforms (RPS and SSLC/ESF) completed to validate the DPS diverse protection function. [SMK512]
14.3-263	Beacom R	Please provide this figure	This figure 2.2.14-1, DICS Diagram is not in the DCD as referenced
14.3-264	Beacom R	Information is insufficient in Table 2.2.14-1 the	At a minimum the following is information that is no longer in the functional requirements should be added to prepare safety evaluation.

RAI Number	Reviewer	Question Summary	Full Text
		DICS Functional arrangement	1) the no of channels in DPS 2) Reactor scram signals 3) Separate DPS sensors 4) Diverse hardware and software from RPS and SSLC/ESF The applicant is requested to review Revision 3 and include the functional requirements from that revision as applicable and provide reasons for the differences
14.3-265	Beacom R	Applicablility Matrix should be completed For Table 2.2.15-1, ITAAC Applicability Matrix (to IEEE 603)	The applicant has presented a Applicability Matrix showing only certain sections of IEEE-603 (the particular version not stated) applicable to certain systems. However, if the intent is to the substantiate conformance to IEEE-603, ALL sections of this standard must be addressed and the table completed. It should be identified why certain sections do not require ITAAC, and how compliance is substantiated or links could be provided to existing non system based ITAAC. As an example, this could be ITAAC for IEEE Sections 5.4 Equipment Qualification or Section 5.3 Quality.
14.3-266	Beacom R	ITAAC referencing SLDs, Simplified Logic Diagrams, should state “current revision”	ITAAC referencing SLDs, Simplified Logic Diagrams, should state “current revision”. This would be ITAAC in Table 2.2.15-2, Nos 2, 4a, 6a, 7a, 8a, 9a
14.3-267	Hardin L	IEEE 603 Compliance	Please provide justification where analysis is used in lieu of test to show compliance with IEEE Std. 603-1991, 5.4 Equipment Qualification.
14.3-268	Hardin L	ITAAC for Main Control Room Panels	1. Table 2.7.1-1 3a. Column 2 (Inspections, Tests, Analyses) specifies "checking for voltage in all divisions". Column 3 (Acceptance Criteria) refers to "test signal". Please clarify and confirm what is being checked for in Column 2 and what is being used for acceptance.
14.3-269	Hardin L	ITAAC for Software Development.	1. Please properly identify which ITAAC under this section are DAC. 2. There are multiple ITAAC/DAC plans listed. However, based on submitted Topical Reports, there will be three umbrella plans (SMP, SQAP and Cyber Security), which will provide guidance for the application specific implementation plans detailed in the ITAAC/DAC. Three of the umbrella plans have the same name as the plans to be developed and listed as per the

RAI Number	Reviewer	Question Summary	Full Text
			ITAAC/DAC. Please clarify the naming convention for the umbrella/template versus application specific implementation plans and explain the expected hierarchy of the plans. For example, the currently submitted high level umbrella/template SMP shows several of the other listed plans as actually being its components. It is somewhat unclear which plans are to be standalone and which are subparts of other plans. And please confirm Staff understanding of the utilization of the umbrella/template plan versus application specific implementation plans as discussed here.
14.3-97 S01	Jeng D	Inconsistency and omission of ITAAC 12 and 13 in Revision 4 as agreed to in the RAI response	In response to RAI 14.3-97 (MFN 07-23, dated April 30, 2007) GEH states, in part, that Type B and C local Leak rate testing as required by 10 CFR 50, Appendix J, will be added to Table 2.15.1-1 in DCD Tier 1, Revision 4, as ITAAC Items 12 and 13, respectively. Review of Tables 2.15.1-1 and 2.15.1-2 of DCD Tier 1, Revision 4, did not identified ITAAC Items 12 and 13 as were indicated in the response. However, the staff noted that ITAAC Item 7 of Table 2.15.1-2 appears to be intended for addressing the same issue discussed in the GEH response to the RAI. Please clarify and resolve the above noted inconsistency and omission of ITAAC Items 12 and 13 in Table 2.15.1-2 DCD Tier 1, Revision 4, and as appropriate, affirm GEH's intent with respect to its inclusion of ITAAC Item 7 in Table 2.15.1-2.

RAI Number	Reviewer	Question Summary	Full Text
14.3-270	Hsu R	Editorial comment	ITAAC related to the Piping DAC should be labeled as {DAC}
14.3-271	Bongara J	Clarify ITAAC for HFE	Update ITAAC Columns 2 and 3 - Tier 1 Table 3.3-1 Column 2 (Inspections, Tests, Analyses) and Column 3 (Acceptance Criteria) should be revised for each Design Commitment to ensure that they accurately reflect the methodology described in the final versions of the implementation plans following revisions to address the staff's RAIs identified in Chapter 18 of the SER. In addition, please review all of the items in the acceptance criteria column to ensure that the text is complete. For example Table 3.3-1 item 1, the Acceptance criteria states: Summary reports document that: a. The OER team members and backgrounds. b. The scope of the OER. c. The sources of the operating experience reviewed and documented results. d. The Process for issue analysis, tracking and review." This is not complete and does not provide an acceptable acceptance criterion.
14.3-272	Thomas G	ADS Timer delay time	DCD Tier 1, Section 2.1.2 Nuclear Boiler System In table 2.1.2-2 ITTAC #12 was deleted in DCD Revision 4. The list of changes provided by GEH indicates that it is relocated to I&C ITAAC. The staff reviewed 2.2.13, Engineered Safety Features SSLC, and there is not verification of the ADS timers provided. This items should be included in the ITACC. Please update DCD Tier 1 accordingly.

RAI Number	Reviewer	Question Summary	Full Text
14.3-273	Oesterle E	ALARA acronym	Page xi: revise acronym definition for ALARA to “As Low As Is Reasonably Achievable” for consistency with Part 20 rule language
14.3-274	Oesterle E	DICS acronym	Page xiv: Capitalize “instrumentation”
14.3-275	Oesterle E	OBCV acronym	Clarify “Overboard” control valve
14.3-276	Oesterle E	Definition of equipment qualification	In Section 1.1.1, Definitions, Equipment Qualification, the applicant should ensure that the definition for equipment qualification provided for ITAAC does not establish requirements that are different than those for 10 CFR 50.49. If the definition is intended to be more generic or expansive than qualification or electrical equipment per 10 CFR 50.49 it should be so stated. In the first paragraph of definition (pg 1.1-1) consider inserting “during and following the conditions” after “…for the time needed…” In the second full paragraph on pg 1.2-1, replace “requirements” with “conditions” in second sentence.
14.3-277	Oesterle E	Definition of ASME Code Report	In Section 1.1.1, Definitions, for clarification purposes, the applicant should add a definition for ASME Code Report which describes that it is a report required by the ASME Code and whose content requirements are stipulated by the ASME Code. The ITAAC definition does not add to or detract from the requirements of the ASME Code for the existence of and content requirements of this report. The staff believes that having a definition for ASME Code Report will help with clarification of ITAAC that specify various portions of an ASME Code Report as part of the acceptance criteria.

RAI Number	Reviewer	Question Summary	Full Text
14.3-278	Oesterle E	Definition of report	In Section 1.1.1, Definitions, for clarification purposes, the applicant should add a definition of report that distinguishes it as different from the ASME Code required report. The applicant should describe, in general, the expected contents of such a report (e.g., results of visual inspections, system walkdowns for functional arrangement, inspections of component installations, field measurements, reviews of design and construction documents, etc.). The staff believes that having a definition for report will help with clarification of ITAAC that specify the existence of a report as part of the acceptance criteria.
14.3-279	Oesterle E	Expand definition of "Inspect or Inspection"	In Section 1.1.1, Definitions, for clarification, the applicant should consider expanding the definition of "Inspect or Inspection" to include review of design and construction documents including drawings, calculations, analyses, test procedures and results, certificates of compliance, ASME Code reports, etc.
14.3-280	Oesterle E	Treatment of individual items	In Section 1.1.2.1, Treatment of Individual Items, the staff requests that the applicant clarify the third sentence by rewriting as follows: "…, unless it would prevent *another* item from performing its safety functions, *or impairing the performance of those safety functions*, as discussed or depicted…" (*italicized words* represent the suggested changes)
14.3-281	Oesterle E	Nonsystem-based ITAAC and notification	In Section 1.1.2.2, Implementation of ITAAC , the staff finds the discussion on pg 1.1-4 regarding "A report exists and concludes that…" provides clarification that could be suitable for inclusion in a definition of report as discussed in the comment above. The staff finds the discussion on pg 1.15 regarding "Inspection will be performed…" suitable for inclusion in a definition for report as discussed above and for expanding the definition of "Inspection" as discussed above. The staff appreciates the discussion of nonsystem-based ITAAC provided in the third paragraph on pg 1.1-5 and completion of ITAAC on a system-by-system basis even though the ITAAC is not worded to allow completion on this basis. From a practical standpoint, the staff understands that a system-by-system or some other type of completion basis may be necessary for COL holder to track the ITAAC to its full completion.

RAI Number	Reviewer	Question Summary	Full Text
			However, the staff requests that the applicant revise the following statement: "Notification to the NRC of completion of the nonsystem-based ITAAC also may be on a system basis throughout construction; however, a separate notification to the NRC will be made upon final completion of the nonsystem-based ITAAC for purposes of ensuring that the Acceptance Criteria have been met." Although it may be beneficial from an inspection schedule and resource loading perspective to be informed of incremental ITAAC completion steps, the staff suggests that to avoid the implication that every COL holder should do this, the statement should convey the notion that COL holders should discuss with NRC whether notification should be provided. In addition, since at this time the NRC process for performing verification activities related to ITAAC implementation and closeout has not yet been completely defined and approved, the staff suggests that the only action necessary for the staff to perform is upon receipt of notification of final ITAAC completion and not on completion of incremental or system-based steps.
14.3-282	Oesterle E	Compliance with ASME Code rather than conformance	In Table 2.1.1-3, ITAAC #5, the staff requests that the applicant replace "conform" with "comply". Generic – wherever the acceptance criteria specify compliance with regulatory requirements or ASME Code requirements, the staff requests the applicant to use the more appropriate terminology of "comply" rather than "conform"
14.3-283	Oesterle E	Design pressure vs. internal pressures experienced during service	In Section 2.1.2, Nuclear Boiler System, the Design Descriptions (4)a. and (4)b. are not consistent. (4)a. uses the terminology "retain their pressure boundary integrity at internal pressures that will be experienced during service" while (4)b. uses terminology "retains its pressure boundary integrity at its design pressure".

RAI Number	Reviewer	Question Summary	Full Text
			For clarity, the staff requests that the applicant justify the difference in terminology and how it complies with the ASME Code or use "design pressure" consistently.
14.3-284	Oesterle E	Each valve	Section 2.1.2, Nuclear Boiler System, Design Description (10): For clarity, the staff requests the applicant to reword to say "Each pneumatically operated valve…" rather than "The …valve(s)…" Clarify whether all valves fail at once if there are multiple valves?
14.3-285	Oesterle E	Design choke flow	Section 2.1.2, Nuclear Boiler System, Design Description (12): For clarity, the staff requests the applicant to specify the value for the design choke flow.
14.3-286	Oesterle E	Each MSL	Section 2.1.2, Nuclear Boiler System, Design Description (13): For clarity, the staff requests applicant to specify as "through each MSL" rather than "through the MSL."
14.3-287	Oesterle E	Combined steamline volume	Section 2.1.2, Nuclear Boiler System, Design Description (14): For clarity, the staff requests that the applicant provide a value for the combined steamline volume.
14.3-288	Oesterle E	Fast-closing	Section 2.1.2, Nuclear Boiler System, Design Description (15): For clarity, the staff requests that the applicant provided a definition (value) for "fast closing"
14.3-289	Oesterle E	Combined leakage through MSIVs	Section 2.1.2, Nuclear Boiler System, Design Description (16): For clarity, the staff requests that the applicant provide a value for the assumed design basis value for combined leakage through the MSIVs for all four main steam lines.
14.3-290	Oesterle E	Measured opening time	Section 2.1.2, Nuclear Boiler System, Design Description (18) & (21): For clarity, the staff requests that the design requirement clearly states that opening time is "measured" from when pressure exceeds the valve set pressure to when the valve is fully open.
14.3-291	Oesterle E	Discharge capacity	Section 2.1.2, Nuclear Boiler System, Design Description (19), (20) & (22): For clarity, the staff requests the applicant to indicate that "satisfies" means the discharge capacity "is greater than or equal to that set in the overpressure protection analysis"

RAI Number	Reviewer	Question Summary	Full Text
14.3-292	Oesterle E	DPV opening time	Section 2.1.2, Nuclear Boiler System, Design Description (24): The staff requests that the applicant consider clarifying statement to say "…, the booster assembly opens each DPV in *a time that is* less than or equal to the design opening time *under* design *basis* conditions".
14.3-293	Oesterle E	Rapid depressurization	Section 2.1.2, Nuclear Boiler System, Design Description (25): The staff requests that the applicant define "rapid depressurization".
14.3-294	Oesterle E	Table 2.1.2-1	In ITAAC Table 2.1.2-3, ITA 3.a, the staff requests that the applicant revise the reference to Table 2.1.2-1a to correct reference (i.e., Table 2.1.2-1?) Same comment for ITA 5.a
14.3-295	Oesterle E	Code components vs. piping	In ITAAC Table 2.1.2-3, DC 4a) and 4b) are inconsistent in that 4a) for ASME Code components specifies "pressure boundary integrity at internal pressures that will be experienced during service" whereas 4b) for ASME Code piping specifies "retains its pressure boundary integrity at its design pressure". The staff requests the applicant to justify the difference in design commitments and revise as necessary. See also comment on Design Descriptions 4a) and 4b).
14.3-296	Oesterle E	Nuclear Island	In ITAAC Table 2.1.2-3, the ITA i) for DC 5a). refers to "the Nuclear Island" which is not defined anywhere in the ITAAC. The staff requests the applicant to either provide a definition for Nuclear Island or revise it to refer to the Reactor Building or other seismic Category I structure, as applicable. This is typical throughout the ITAAC and the applicant should ensure that all other applicable ITAAC are appropriately revised.
14.3-297	Oesterle E	Seismic structure	In ITAAC Table 2.1.2-3, the AC i) for DC 5a). refers to "a seismic structure" which is not defined anywhere in the ITAAC. The staff requests that the applicant clarify the meaning of "a seismic structure" or refer to a specific building (e.g., the reactor building or other building, as appropriate, which has its own ITAAC to verify its seismic pedigree) in the acceptance criteria.
14.3-298	Oesterle E	Equipment analysis	In ITAAC Table 2.1.2-3, for clarity and consistency, the staff requests that ITA iii) and AC iii) for DC 5a) be rewritten. The staff requests the applicant to consider the following:

RAI Number	Reviewer	Question Summary	Full Text
			ITA iii) Analysis or type testing will be performed to verify that the loading on the equipment including associated anchorage falls within the design basis seismic load conditions. AC iii) A report exists and concludes that the loading on the as-installed equipment including associated anchorage falls within the design basis seismic load conditions used for type testing or analysis.
14.3-299	Oesterle E	"NBS System"	In ITAAC Table 2.1.2-3, the use of terminology "NBS System" is redundant. The staff suggests the applicant delete "System" (see ITAAC #1 DC and AC, ITAAC #4 ITA and AC, ITAAC #6 DC, ITAAC #8 DC and ITA)
14.3-300	Oesterle E	Functional capability	In ITAAC Table 2.1.2-3, ITAAC #5b), the staff requests the applicant to define the term functional capability (i.e., is it continued operability following a seismic event or does the system to have to retain its functional integrity following a seismic event?) and specify which lines in Table 2.1.2-1 are required to meet functional capability following a seismic event.
14.3-301	Oesterle E	Structural and/or fire barriers	In ITAAC Table 2.1.2-3, ITAAC #7, the staff requests that the applicant not use "and/or" in the acceptance criteria because it is vague. It should be one or the other term. Please review all ITAAC in the DCD and eliminate the use of "and/or." In addition, the staff requests that the term "physical separation" be defined. The usage of "physical separation" for this ITAAC implies that criteria for divisional separation to comply with single failure criterion are synonymous with separation criteria for fire hazards analysis. Also, the staff requests that the applicant revise the DC to clarify whether the design commitment is to comply with single failure criterion or separation criteria for fire hazards analysis.
14.3-302	Oesterle E	DC, ITA, and AC consistency	In ITAAC Table 2.1.2-3, ITAAC #8, the staff requests that the applicant specify in the ITA the signals that are provided in the DC and AC to test MSIV closure. In addition, the staff requests that the applicant specify: 1) that the closure signals are provided to the MSIV motor operators

RAI Number	Reviewer	Question Summary	Full Text
			2) whether the entire actuation circuit is tested or just the MSIV If the entire actuation circuit is being verified by this ITAAC, the DC, ITA, and AC should be revised to reflect that scope of testing and verification.
14.3-303	Oesterle E	Can be retrieved	In ITAAC Table 2.1.2-3, the staff requests that the applicant clarify the meaning of the phrase "can be verified" in the acceptance criteria for ITAAC #8. Usage of this phrase is awkward with respect to alarms, displays and controls. Also, the intent of "and/or" should be specified (i.e., is it "and" or "or", can't be both) and its specific usage terminated for ITAAC.
14.3-304	Oesterle E	Repositionable valves	In ITAAC Table 2.1.2-3, for clarity in ITAAC #9, the staff requests that the applicant specify which valves are repositionable. The referenced table (2.1.2-2) does not provide this information. The staff also suggests the following rewording for clarity: "…Repositionable valves ….have an active safety-related function to…" In addition, the staff suggests revising the ITA to include "…valves designated in Table 2.1.2-2 as repositionable" and AC to include "…each valve designated in Table 2.1.2-2 as repositionable…" Also, the staff requests the applicant to resolve the apparent inconsistency between the DC and ITA, where the DC refers to "design differential pressure, fluid flow, and temperature conditions" but the ITA refers to testing "under system preoperational differential pressure, fluid flow, and temperature conditions." It is not clear to the staff that system preoperational conditions will sufficiently verify functions at design conditions.
14.3-305	Oesterle E	Pneumatically operated valves	In ITAAC Table 2.1.2-3, for clarity in ITAAC #10, the staff requests that the applicant consider the following language for the DC: "Each pneumatically operated valve shown in Figure 2.1.2-2 closes or opens to its identified position if either electric power to the valve actuating solenoid is lost, or pneumatic pressure to the valve is lost." Likewise, the AC could be reworded to be consistent with the DC:

RAI Number	Reviewer	Question Summary	Full Text
			"Report(s) document that each pneumatically operated valve shown in Table 2.1.2-2 closes or opens to its identified position when either electric power to the valve actuating solenoid valve is lost, or pneumatic pressure to the valve is lost." Also, the staff requests clarification as to whether the report is required or its contents specified by an IEEE standard. If so, please identify. The staff requests that the ITA for this ITAAC include more specificity with respect to testing. Is it with actual signals, simulated signals, just the valves, the entire circuit, etc.?
14.3-306	Oesterle E	Pre-operational conditions	In ITAAC Table 2.1.2-3, for clarity in ITAAC #11, the staff requests that the applicant justify the acceptability of testing of installed check valves under pre-operational pressure, fluid flow, and temperature conditions. There is an inconsistency in the ITA in that it is not clear how testing at preoperational conditions will verify the DC which specifies check valve functioning under design conditions.
14.3-307	Oesterle E	MSL flow restrictor	In ITAAC Table 2.1.2-3, for clarity in ITAAC #12, the staff requests that the applicant specify that inspections of "each as-built MSL flow restrictor throat diameter will be performed."
14.3-308	Oesterle E	MSL flow restrictor instrument taps	In ITAAC Table 2.1.2-3, for clarity in ITAAC #13, the staff requests that the applicant specify the general locations of the instrument taps (i.e., they can't be on the same side of the MSL if they're going to measure flow via delta P)
14.3-309	Oesterle E	MSIV testing under pre-operational conditions	In ITAAC Table 2.1.2-3, for clarity in ITAAC #15, the staff requests that the applicant justify the acceptability of testing of as-built MSIVs under pre-operational conditions. There is an inconsistency in the ITA in that it is not clear how testing at preoperational conditions will verify the DC which specifies MSIV fast closing under design differential pressure, fluid flow and temperature conditions. In addition, the AC does not provide documenting the results of type testing, as allowed for in the ITA, if that is the method used for verification. The staff requests that the applicant modify the AC to include the results of type testing in the report.

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14.3-310	Oesterle E	MSIV leakage	In ITAAC Table 2.1.2-3, for clarity in ITAAC #16, the staff requests that the applicant specify "normal means" in the DC (i.e., the staff assumes this to be through use of safety related equipment rather than the normal operator air supply). In addition, the staff requests the applicant to justify the acceptability of testing under pre-operational conditions. Finally, the staff requests that the AC be consistent in verifying the DC (i.e., report should document the means by which MSIVs are closed and are consistent with the "normal means" specified).
14.3-311	Oesterle E	SRV lift setting	In ITAAC Table 2.1.2-3, for clarity in ITAAC #17, the staff requests that the AC be consistent in verifying the DC (i.e., report should document that setpoint testing or type testing verifies that SRVs lift at the mechanical lift nominal setpoint…)
14.3-312	Oesterle E	SRV open time	In ITAAC Table 2.1.2-3, for clarity in ITAAC #18, the staff requests that the applicant consider the following wording for the DC: "In the overpressure operation of self-actuated or mechanical lift mode, the time from when the pressure exceeds the SRV lift setting pressure to when the SRV is fully open shall be less than or equal to the design opening time." In addition, the AC would be more clear as follows: "Report(s) exist and conclude that tests and analyses demonstrate that opening time for the SRVs…."
14.3-313	Oesterle E	SRV discharge capacity	In ITAAC Table 2.1.2-3, the staff requests that the applicant provide a justification as to why there is a differentiation in the ITA for ITAAC #19 and #20 when there are apparent similarities in the valve certifications.
14.3-314	Oesterle E	DPV actuation	In ITAAC Table 2.1.2-3, for clarity in ITAAC #24, the staff recommends that the applicant consider the following reword of the DC: "When actuated by an initiator, the booster assembly opens each DPV under design basis conditions in less than or equal to the design opening time." Also, the applicant should clarify the meaning of "an initiator" (i.e., is at an initiation signal?). In addition, clarify what is meant by "the design opening time" (i.e., is this the time to fully open assumed in analyses?)

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			In the ITA, the staff requests the applicant to specify that type testing will demonstrate that DPVs open under design basis conditions. In addition, the staff requests the applicant to elaborate on when analysis in addition to type testing would be necessary. Delete "during factory tests" as this considered redundant with the definition of type test. For AC, consider "Report exists and concludes that tests and analyses demonstrate that…"
14.3-315	Oesterle E	TMSS functional arrangement	In Table 2.11.1-1, ITAAC #1 AC: The staff requests the applicant to use consistent terminology such as "A report exists and concludes…" (rather than confirms)
14.3-316	Oesterle E	TMSS seismic Cat. II qualification	In Table 2.11.1-1, ITAAC #5 AC: The staff requests the applicant to use more consistent terminology such as "A report exists and concludes that analyses demonstrate that…"
14.3-317	Oesterle E	TMSS turbine inlet throttle pressure	In Table 2.11.1-1, For ITAAC #7, AC and generic usage throughout the ITAAC: The staff requests that the applicant provide a discussion of their use of bracketed information? Is this information intended to be subject to revision by the COL holder based on procurement of equipment or is it meant to be a bounding value or Tech Spec value? See also Table 2.11.2-1, ITAAC #2, 3, and 4.
14.3-318	Oesterle E	Main turbine orientation	In Table 2.11.4-1, the staff requests the applicant to justify use of "most safety-related" SSCs as the AC (i.e., does that mean 51% of the SR SSCs are excluded from the low-trajectory hazard zone?)
14.3-319	Oesterle E	Valve closing times	In Table 2.11.4-1, for ITAAC # 3 and 4, the staff requests the applicant to justify why the DC, ITA, and AC are not identical with respect to closing times (i.e., control valves have closing times and stop valves have *nominal* closing times).
14.3-320	Oesterle E	Turbine Bypass System	In Section 2.11.6, Design Description, the acronym TBS has previously been defined as "Terminal Board Scram". Staff requests the applicant to mitigate dual-usage acronyms.
14.3-321	Oesterle E	TBV control	In Table 2.11.6-1, for clarity in ITAAC #2, because of the use of the term "signal(s)", the staff requests the applicant to discuss whether there are

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			multiple signals or multiple valves or both that will be tested. If there are multiple signals, the applicant should identify all the signals in the DC. ITA, and AC.
14.3-322	Oesterle E	TBV capacity	In Table 2.11.6-1, for clarity in ITAAC #3, the staff requests the applicant to clarify whether the analysis report in the AC includes review of TBV test data to confirm capacity is not greater than 15%. If so, the ITA should be revised to include testing or type testing (as applicable). The bracketed info should be explained.
14.3-323	Oesterle E	Main Condenser	In Section 2.11.7 Design Description, the acronym MC has previously been defined as "Motor Controllers". Staff requests the applicant to mitigate dual-usage acronyms.
14.3-324	Oesterle E	RCCWS minimum flow	In Section 2.12.3, Reactor Component Cooling Water System, the staff requests the applicant to provide a justification as to why there is no design basis minimum flow requirements associated with the RCCWS and verification of same? (i.e., see ITAAC #2 Acceptance Critieria)
14.3-325	Oesterle E	CWS minimum flow	In Section 2.12.5, Chilled Water System, the staff requests the applicant to provide a justification as to why there is no design basis minimum flow requirements associated with the CWS and verification of same? (i.e., see ITAAC #2 Acceptance Critieria)
14.3-326	Oesterle E	PSWS minimum flow	In Section 2.12.6, Plant Service Water System, the staff requests the applicant to provide a justification as to why there is no design basis minimum flow requirements associated with the PSWS and verification of same? (i.e., see ITAAC #2 Acceptance Critieria)
14.3-327	Oesterle E	PWS in MCR	In Table 2.12.6-1, the staff requests the applicant to include a DC for ITAAC #3 that is consistent with Item (3) in Design Description.
14.3-328	Oesterle E	Physical separation	In Table 2.13.1-2, the AC for ITAAC #3a does not provide clear criteria to evaluate whether the physical separation of the electrical components has been met. The staff requests that the applicant clearly specify the acceptance criteria (e.g., compliance with a specific IEEE standard) for physical separation of electrical components.
14.3-329	Oesterle E	Minimum set	In Table 2.13.1-2, ITAAC #7, the definition of minimum set has not been clearly specified in the DC, ITA, and AC. The staff requests the applicant provide a definition for "minimum set" and specify the "applicable codes and standards" in the AC.

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14.3-330	Oesterle E	Minimum set	In Table 2.13.3-3, ITAAC #10, the definition of minimum set has not been clearly specified in the DC, ITA, and AC. The staff requests the applicant provide a definition for “minimum set” and specify the “applicable codes and standards” in the AC.
14.3-331	Oesterle E	Minimum set	In Table 2.13.4-2, ITAAC #3, the definition of minimum set has not been clearly specified in the DC, ITA, and AC. The staff requests the applicant provide a definition for “minimum set” and specify the “applicable codes and standards” in the AC.
14.3-332	Oesterle E	Minimum set	In Table 2.13.5-2, ITAAC #7, the definition of minimum set has not been clearly specified in the DC, ITA, and AC. The staff requests the applicant provide a definition for “minimum set” and specify the “applicable codes and standards” in the AC.
14.3-333	Oesterle E	MCR Emergency Lighting	In Table 2.13.8-1, for clarity, the staff requests that the ITA for ITAAC #2 include inspection of as-built lighting system.
14.3-334	Oesterle E	Functional arrangement	In Table 2.15.1-2, for consistency, the AC for ITAAC #1 should include “conforms with the *functional arrangement* as described in Subsection 2.15.1…”
14.3-335	Oesterle E	Non-divisional cables	In Table 2.15.1-2, in the AC for ITAAC #6c. the staff requests that the applicant clarify what is meant by “non-division”.
14.3-336	Oesterle E	Containment isolation valve response times	In Table 2.15.1-2, ITAAC #9, there are no required response times provided for the valves. The staff requests that the applicant provide response times for the containment isolation valves listed in Table 2.1.15-1 as unambiguous acceptance criteria.
14.3-337	Oesterle E	Test pressure	In Table 2.15.3-2, The staff requests that the applicant provide clarification for the use of curly brackets in the ITA of ITAAC #5.
14.3-338	Oesterle E	Selection Methodology	In Section 14.3, for clarity, the staff suggests that the applicant revise the 6th bullet under Selection Methodology on page 14.3-6 to read as follows: “The basic configuration of the portions of the system that are safety significant, including any components located in that portion of the system (usually shown by means of a figure)”
14.3-339	Oesterle E	Selection Criteria	In Section 14.3, for clarity and consistency, the staff requests that the applicant update or revise as necessary item 5a) under Selection Criteria

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			on page 14.3-7 since Items (1) through (4) as discussed have been deleted from the discussion in Tier 1, Section 1.2.2, in Revision 4.
14.3-340	Oesterle E	Section 14.3.7 Evaluation Process for Updating Design Descriptions and ITAAC	In Section 14.3.7, this section and many of its subsections still refer to draft SRPs and DG-1145. The staff requests that the applicant revise this sections and its subsections, as applicable, to update references to the current version of the SRPs (i.e., March 2007) and to RG 1.206.
14.3-341	Herrity T	Hydrostatic pressure testing	For Table 2.1.1-3, Item 5, the staff requests that the DC reflect the design commitments for hydrostatic pressure testing per the ASME Code (i.e., the staff believes that the DC should refer to "design pressure" rather than “internal pressure that will be experienced during service”). The applicant should review its other ITAAC for similar inconsistencies (see also comment on Table 2.1.2-3, ITAAC #4)
14.3-342	Herrity T	ASME Piping and components	For ITAAC Table 2.1.2-3 Item 2b, the DC and AC refer to piping whereas the ITA refers to components. The staff requests that the applicant revise the ITA to be consistent with the DC and AC (i.e., refer to piping instead of components).
14.3-343	Herrity T	Containment of airborne radioactive materials	For ITAAC Table 3.4-1, Item 1, the DC addresses two functions for the system; “containment of airborne radioactive materials” and “maintain concentration of airborne radionuclides at levels consistent with personnel access needs”, however, the ITA and AC only verify the latter. The staff requests that the applicant include appropriate means to verify the “containment of airborne materials” in the ITA and associated acceptance criteria in the AC.
14.3-344	Herrity T	ASME Piping and components	For ITAAC Table 2.1.2-3 Item 4b, the DC refers to piping whereas the ITA and AC refer to components. The staff requests that the applicant revise the ITA and AC to be consistent with the DC (i.e., refer to piping instead of components). In addition, the staff requests that the applicant perform a comprehensive review of its ITAAC associated with ASME Code piping and components to ensure applicability and consistent use of terminology.
14.3-345	Herrity T	Separation criteria	For ITAAC Table 2.1.2-3 Item 6a, there is a reference to Table 2.1.2-2.

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			However, the divisions that are the subject of ITAAC verification are not clearly identified in Table 2.1.2-2 (i.e., there is no clear correlation between Table 2.1.2-1 and the ITAAC in Section 2.13). The staff requests that the applicant provide a clear identification of the divisions in Table 2.1.2-2 to facilitate completion of the ITAAC per Section 2.13. Also, there are no clear criteria provided for physical separation as discussed in Item 6b. and likewise, no such criteria provided in the Section 2.2.15 ITAAC to which this is referred. The staff requests the applicant to provide suitable justification for this approach or provide the necessary criteria.
14.3-346	Herrity T	MSIV testing	For ITAAC Table 2.1.2-3, Item 18, the operating modes specified in the DC are not consistent with those specified in the AC (i.e., the DC refers to overpressure operation of self-actuated or mechanical lift mode whereas the AC refers only to the overpressure operation mode). The staff requests that the applicant modify the AC for consistency with the operation modes specified in the DC.
14.3-347	Herrity T	Functional groups	For ITAAC Table 2.2.1-6 Item 2, the staff requests that the applicant modify the AC for consistency with the DC (i.e., "Test and inspection report(s) document that the as-built system is divided into major functional groups as defined Table 2.2.1-2). As written, the AC currently verifies the function of the major functional groups, however, this verification appears to be the subject of the other ITAAC in this table.
14.3-348	Herrity T	RCIS interfacing systems	For ITAAC Table 2.2.1-6 Item 3, the ITA & AC are not consistent with the DC regarding interfacing systems. The staff requests that the applicant modify the ITA and AC to include a verification of the associated interfacing systems specified in Table 2.2.1-3. In addition, the AC should include verification of that the list of systems identified as interfaces in Table 2.2.1-3 is a complete list. The applicant should confirm that there are other ITAAC to verify the functional performance of the associated interfacing systems.
14.3-349	Herrity T	CRDS	For ITAAC Table 2.2.2-7, Item 1, the ITA and AC are not consistent in that the AC as written does not account for the results of tests or type tests in the Inspection report. The staff requests that the applicant clarify the AC

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			and suggests the following: "A report exists that documents the results if inspections, test, and type tests that confirm the as-built CRD system conforms with the functional arrangement…"
14.3-350	Herrity T	CRDS interfacing systems	For ITAAC Table 2.2.2-7 Item 9, the ITA & AC are not consistent with the DC regarding associated interfacing systems. The staff requests that the applicant modify the ITA and AC to include a verification of the associated interfacing systems specified in Table 2.2.2-3. In addition, the AC should include verification of that the list of systems identified as interfaces in Table 2.2.2-3 is a complete list. The applicant should confirm that there are other ITAAC to verify the functional performance of the associated interfacing systems. In addition, the applicant should consider clarifying the DC such that it commits to the CRD system functioning as defined in Table 2.2.2-3 to be consistent with the ITA and AC. As written, it sounds more like verification of the functional arrangement of the system.
14.3-351	Herrity T	SLCS hydrostatic testing	For ITAAC Table 2.2.4-6 Item 12, the staff requests that applicant clarify the DC which states "components will retain their pressure boundary *at under* internal pressures that will be experienced during service." In addition, the staff requests that the applicant clarify an apparent inconsistency for hydrostatic testing of components and piping (i.e., component hydro is specified in the DC as internal pressures experienced during service whereas piping hydro is specified in the DC as design pressure).
14.3-352	Herrity T	SLCS component qualification	For ITAAC Table 2.2.4-6 Item 14, the staff requests that the applicant clarify which components in Table 2.2.4-4 are required to retain their functional capability and under what circumstances (i.e., is it only the Seismic Cat. I equipment).
14.3-353	Herrity T	ICS component qualification	For ITAAC Table 2.4.1-3 Item 5b, the staff requests that the applicant clarify which lines in Table 2.4.1-3 are required to retain their functional capability and under what circumstances (i.e., is it only the Seismic Cat. I equipment).
14.3-354	Herrity T	GDCS component	For ITAAC Table 2.4.2-3 Item 5b, the staff requests that the applicant

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		qualification	clarify which lines in Table 2.4.1-3 are required to retain their functional capability and under what circumstances (i.e., is it only the Seismic Cat. I equipment).
14.3-355	Herrity T	GDCS minimum set of displays	For ITAAC Table 2.4.2-3 Item 6, the staff requests that the applicant provide a clarification for how "minimum set of displays" is derived? What is the correlation between the "minimum set of displays" in the DC and their retrievability in the AC? The staff requests the applicant to clarify the statement "can be retrieved in the main control room" in the context used.
14.3-356	Herrity T	GDCS flow and water coverage	For ITAAC Table 2.4.2-3 Item 8, the staff requests that the applicant modify the ITA to include "analysis" and the AC should be modified to include test results in addition to analysis. In addition, the applicant should provide specific acceptance criteria to determine acceptability.
14.3-357	Herrity T	RB refueling machine seismic qualification	For ITAAC Table 2.5.5-1, Item 2, the staff requests that the applicant modify the ITA to clearly state that "inspections and analyses…will be performed."
14.3-358	Herrity T	RB refueling machine load capability	For ITAAC Table 2.5.5-1, Item 3, the staff requests that the applicant provide clear criteria for successful performance of a load test (i.e., is there an industry standard that provides such criteria?)
14.3-359	Herrity T	FB fuel handling machine seismic qualification	For ITAAC Table 2.5.5-1, Item 6, the staff requests the applicant to include a DC for seismic qualification of FB fuel handling machine. In addition, the staff requests that the applicant modify the ITA to clearly state that "inspections and analyses…will be performed."
14.3-360	Herrity T	FB fuel handling machine load capability	For ITAAC Table 2.5.5-1, Item 7, the staff requests that the applicant provide clear criteria for successful performance of a load test (i.e., is there an industry standard that provides such criteria?)
14.3-361	Herrity T	New fuel storage rack seismic qualification	For ITAAC Table 2.5.6-1, Item 1, for consistency, the staff requests that the applicant include "analysis" in the ITA, in addition to inspection, and modify the AC to refer to a "report(s) that document(s) inspection results and analysis results that demonstrate…"
14.3-362	Herrity T	Spent fuel storage rack seismic qualification	For ITAAC Table 2.5.6-1, Item 2, for consistency, the staff requests that the applicant include "analysis" in the ITA, in addition to inspection, and modify the AC to refer to a "report(s) that document(s) inspection results and

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			analysis results that demonstrate…”
14.3-363	Herrity T	Spent fuel storage rack qualification	For ITAAC Table 2.5.6-1, Item 6, the ITA refers to “allowable stress under maximum rack temperature” whereas the DC and AC refer to “design allowable under accident conditions”. The staff requests that the applicant ensure consistency between the ITA, DC, and AC (i.e., it is not apparent from the ITAAC that maximum rack temperature equates to the temperature during accident conditions).
14.3-364	Herrity T	Hydrostatic testing	For ITAAC Table 2.6.1-2 Item 3, the staff request that the DC be revised from "internal pressure that will be experienced during service" to "design pressure". (See also comment on Table 2.1.1-3, Item 5)
14.3-365	Herrity T	Main control room alarms	For ITAAC Table 2.6.1-2 Item 4, the staff requests that the applicant consider rewording DC from "Control room features" to "main control room alarms" for consistency with Table 2.6.1-1. The staff suggests reword of AC for consistency also.
14.3-366	Herrity T	FAPCS compliance with ASME Code requirements	For ITAAC Table 2.6.2-2, Item 2, the DC specifies design and construction in accordance with ASME Code Section III requirements, however, the AC only specifies a design report. The staff requests that the applicant expand the AC to include appropriate verification for the as-built system also. In addition, the ITA should be clarified as the as-built system is not expected to be documented in the design report. The applicant needs to ensure consistency between the associated DC, ITA, and AC.
14.3-367	Herrity T	Hydrostatic testing for FAPCS	For ITAAC Table 2.6.2-2, Item 4, the DC refers to piping and components, however the ITA and AC refer only to components. The staff requests that the applicant ensure consistency among the associated DC, ITA, and AC (i.e., modify ITA and AC to include piping). In addition, the staff requests clarification of “a hydrostatic or pressure test” phrase used in the ITA. The staff discerns no need for a distinction when ASME Code Section III requirements are applied. Likewise, use of the term “pressure test” in the AC should be clarified or modified to be consistent with the ITA.
14.3-368	Herrity T	FAPCS seismic Category I qualification	For ITAAC Table 2.6.2-2, Items 5i) and 5ii), there is inconsistency between DC, ITA, and AC in that the DC refers to “equipment and piping” and the ITA and AC refer only to “equipment.” The staff requests that the applicant revise the ITA and AC to be consistent with the DC. In addition, the ITA refers to “type tests and/or analyses” and the staff

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			requests that the applicant modify to “type tests and analyses”.
14.3-369	Herrity T	FAPCS suppression pool cooling mode	For ITAAC Table 2.6.2-2, Item 7a), the ITA specifies the performance of a test for the flow path, however, the AC is implies that capacity is confirmed. The staff requests that the applicant modify the ITA to include a confirmation of capacity and revise the AC to include the flow rate criteria for acceptance.
14.3-370	Herrity T	FAPCS external connections	For ITAAC Table 2.6.2-2, Item 7c), the ITA specifies the performance of a test for both the flow path and capacity while the AC only refers to flow path. The staff requests that the applicant modify the AC to include the flow rate criteria for acceptance.
14.3-371	Herrity T	Pressure boundary integrity for LWMS	For ITAAC Table 2.10.1-2 Item 2: The staff requests that the applicant revise the AC report to (1) identify the components omitted from the test including the reason why the component was omitted from testing, and (2) document the reason the component was omitted from hydrostatic testing (e.g., the test would damage or interfere with a system component) and whether an alternative test (alternative to hydrostatic testing) was conducted to verify pressure boundary integrity. Otherwise, some components will be excluded from verification that they retain pressure boundary integrity.
14.3-372	Herrity T	Treat mode alignment for LWMS	For ITAAC Table 2.10.3-1 Item 4b: The staff requests that the applicant modify the AC to specifically define that the "treat mode alignment" means activation of an MCR alarm and gas will flow through the charcoal beds. An alternative is to provide a definition of the “treat mode alignment” in the design description for LWMS.
14.3-373	Herrity T	MWS safety-related containment penetrations and isolation valves	For ITAAC Table 2.12.1-1 Item 1, refers to Subsection 2.15-1 for verification of the safety-related containment penetrations and isolation valves, however, no mention is made of these MWS components in Subsection 2.15.1. The staff requests that the applicant provides a list of the MWS penetrations and isolation valves for verification in Subsection 2.15.1 or provide a suitable justification for not including such a list.
14.3-374	Herrity T	PSWS design commitment	For ITAAC Table 2.12.7-1 Item 3, the staff requests that the applicant provide a suitable DC that is consistent with the ITA and AC.

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14.3-375	Herrity T	DC power supply functional arrangement	For ITAAC Table 2.13.3-3 Item 1, the staff requests that the applicant modify the AC to be consistent with the DC either by adding conformance to Table 2.13.3-1 in the AC or revising Table 2.1.13-1 to Section 2.13.3 in the DC (staff prefers the former).
14.3-376	Herrity T	DC power supply capacity	For ITAAC Table 2.13.3-3 Item 6, the staff requests that the applicant modify the AC to be consistent with the DC by specifically including in the test report a confirmation that the two safety-related 250 VDC batteries in each division are capable of supplying safety-related loads for 72 hours following a design basis accident.
14.3-377	Herrity T	Containment system design and construction	For ITAAC Table 2.15.1-2 Item 2, the DC, ITA, and AC appear to be inconsistent. The refers to design and construction in accordance with the ASME Code while the ITA and AC only verify that the as-built complies with the ASME Code requirements. The staff requests that the applicant modify the ITA and AC to also include the appropriate documentation to verify that the design complies with the ASME Code.
14.3-378	Herrity T	Containment system hydrostatic pressure testing	For ITAAC Table 2.15.1-2 Item 4i, the DC refers to components and piping while the ITA and AC refer only to components. The staff requests that the applicant make the DC, ITA, and AC consistent in scope. Also, the ITA refers to “a hydrostatic or pressure test” while the AC refers only to “pressure test”. The staff requests that the applicant ensure consistency between the ITA and AC and notes that this ITAAC involves ASME equipment where the hydrostatic test requirements (not pressure testing) would normally be the applicable requirement.
14.3-379	Herrity T	Divisional separation	For ITAAC Table 2.15.1-2 Item 6a, there is no clear correlation between the safety-related components and their power division in either Section 2.13 or in Table 2.15-1. The staff requests that the applicant provide this correlation.
14.3-380	Herrity T	Containment system pressure boundary	For ITAAC Table 2.15.1-2 Item 8, it appears that the applicant has interchanged the applicable content between the DC and AC. The staff requests that the applicant include the specific design pressure in the AC to demonstrate compliance with the ASME Code and requests that the DC include reference to design and construction to ASME Code Section III, Div. 2. requirements.

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14.3-381	Herrity T	Containment internal structures	For ITAAC Table 2.15.3-2 Item 2, the staff requests that the applicant provide reference to the Containment Internal Structures identified in Table 2.15.3-1. The applicant should consider "inspection and analyses will be performed" in the ITA and should delete the phrase "as documented in the design reports". In addition, the AC should be clarified to state that inspection reports and analyses document that the as-built components of the containment internal structures comply with ANSI/AISC N690 requirements.
14.3-382	Herrity T	Seismic category I analyses for containment internal structures	For ITAAC Table 2.15.3-2 Item 3i, the staff requests that the applicant provide reference to the Containment Internal Structures identified in Table 2.15.3-1 in the ITA and AC. In addition, the applicant should revise the ITA to identify that "analyses will be performed on the containment internal structures identified in Table 2.15.3-1 to ensure they meet seismic Category I requirements and can withstand seismic design basis loads and suppression pool hydrodynamic loads without loss of structural integrity and safety function."
14.3-383	Herrity T	Nuclear island definition	For ITAAC Table 2.15.4-2 Item 5a-i, the staff requests that the applicant either provides a definition for "Nuclear Island" or replaces it with a reference to the appropriate seismic Category I structure (e.g., the Reactor Bldg) for which another ITAAC is provided to verify its seismic pedigree.
14.3-384	Herrity T	PCCS functional capability	For ITAAC Table 2.15.4-2 Item 5b, the staff requests that the applicant clarify or indicate which lines in Table 2.15-4-1 are required for functional capability and to provide a definition for what is meant by functional capability and under which conditions.
14.3-385	Herrity T	Test unit of established performance capability	For ITAAC Table 2.15.4-2 Item 7, the staff requests that the applicant provide clarification for the terminology used in the ITA "similar or more conservative performance characteristic than those of a test unit of established performance capability". In addition, the staff suggests use of the phrase "A report exists and concludes that the…." in the AC.
14.3-386	Herrity T	Nuclear island definition	For ITAAC Table 2.15.7-2 Item 6i, the staff requests that the applicant either provides a definition for "Nuclear Island" or replaces it with a reference to the appropriate seismic Category I structure (e.g., the Reactor Bldg) for which another ITAAC is provided to verify its seismic pedigree.

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14.3-387	Herrity T	Reactor building HVAC seismic qualification	For ITAAC Table 2.16.2-2, Item 3b, the staff requests that the applicant clarify or clearly identify that in the ITA the “testing or analyzed conditions bound the design requirements” so that the AC as written is applicable (i.e., the AC acceptance criteria is to the tested or analyzed condition but there is no correlation or requirement for the tested or analyzed condition to bound the seismic Category I design requirements for the system).
14.3-388	Herrity T	Safety-related piping	For ITAAC Table 3.1-1 Item 1, the staff requests that the applicant provide a reference table that lists all of the safety related piping for which this ITAAC is applicable (i.e., it was not evident that ITAAC for the systems containing safety related piping refer to this ITAAC). Alternatively, the applicant could include reference to Table 3.1-1 in the ITAAC for each safety-related system, as applicable> In addition, the staff requests that the applicant clarify or provide a distinction between design commitment verification and as-built verification. The ASME Code Certified Stress Report is understood to provide verification for the design of the system only, so it is not clear if this is DAC. The applicant also needs to include an ITAAC for verification that the as-built system is in compliance with the ASME Code.
14.3-389	Oesterle E	MMIS/HFE Implementation Plan	For ITAAC Table 3.3-1, Item 1, the staff requests that the applicant clarify in the DC that the activities will be performed in accordance with the OER Implementation Plan.
14.3-390	Oesterle E	Definition of ASME Code Report	In Section 1.1.1, Definitions, for clarification purposes, the applicant should add a definition for ASME Code Report which describes that it is a report required by the ASME Code and whose content requirements are stipulated by the ASME Code. The definition should specify that each such ASME Code report is final and has been certified in accordance with the Code. The ITAAC definition does not add to or detract from the requirements of the ASME Code for the existence of and content requirements of this report. The staff believes that having a definition for ASME Code Report will help with clarification of ITAAC that specify various portions of an ASME Code Report as part of the acceptance criteria. The staff also understands that there various reports required by the ASME

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			Code to demonstrate, document, and certify compliance with the ASME Code requirements. These reports verify that the design complies with applicable ASME Code requirements, the as-built system meets the design and ASME Code requirements, the installation and construction of the system components and equipment complies with ASME Code requirements, design reconciliation for the as-built configuration has been performed in accordance with ASME Code requirements, the results of non-destructive examination of pressure boundary welds performed in accordance with ASME Code requirements have met ASME Code requirements, and the results of hydrostatic testing performed in accordance with ASME Code requirements have met ASME Code requirements. To ensure consistency of format and content in ITAAC included for ASME Code systems, the staff requests that applicant modify the acceptance criteria for all of their ITAAC for ASME Code systems to meet the following example for the Nuclear Boiler System: Table 2.1.2-3(1): An ASME Code report documents that the as-built NBS conforms to the functional arrangement described in the Design Description in Section 2.1.2, Tables 2.1.2-1 and 2.1.2-2, and Figures 2.1.2-1, 2.1.2-2, and 2.1.2-3. Table 2.1.2-3(2)(a): An ASME Code N-5 Data Report exists and concludes that installation or construction of the NBS components identified in Table 2.1.2-1 as ASME Code Section III has been completed in accordance with the ASME Code. Table 2.1.2-3(2)(b): An ASME Code design report exists and concludes that design reconciliation has been completed in accordance with the ASME Code for as-built reconciliation of the NBS components identified in Table 2.1.2-1 as ASME Code Section III. Table 2.1.2-3(3): An ASME Code report exists and concludes that the ASME Code Section III requirements are met for non-destructive examination of pressure boundary welds in the NBS.

RAI Number	Reviewer	Question Summary	Full Text
			Table 2.1.2-3(4): An ASME Code report exists and concludes that the results of the hydrostatic test of ASME Code components of the NBS comply with the requirements of the ASME Code Section III.
15.4-11 S01	Lee J	Table 2.15.4-1 not revised as committed in the response to RAI	GEH's response to RAI 15.4-11, dated May 2, 2007 (MFN 07-199), stated that: "Item 3 of DCD, Tier 1 Table 2.15.4-1, "ITAAC for the Passive Containment Cooling System," is being revised to reference the PCCS specific testing limit delineated in TS 5.5.9.d.1." Contrary to the response, the staff finds that Table 2.15.4-1 in DCD, Tier 1, Revision 4 has not been revised. Please revise it accordingly.
22.5-1 S01	Chang Li	Missing a drawing for RCCWS ITAAC	In DCD Tier 1, Revision 4, Table 2.12.3-1, Item 1 is not adequate because it does not have a figure to perform as-built system inspection. Provide a schematic of the RCCWS in Tier 1 Section 2.12.3.

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