

**From:** Ron Young  
**To:** Jonathan Rowley  
**Date:** 09/10/2007 5:07:08 PM  
**Subject:** VY License Renewal SER Input from SBPB (As of Today)

Jonathan,

Per our earlier conversation, attached is the subject item. Though not within the review responsibility of SBPB, I will also e-mail Section 2.3.3.13XX "Hydrogen Water Chemistry." as prepared by PNNL. Perhaps, this draft HWC section will be helpful to Legin or the technical review branch that does have responsibility for its review. Though not numbered, the SBPB SER input pages number 43; changes have yellow highlighting in the WordPerfect text when viewed on the monitor.

Recall also that there may be changes from Donnie Harrison's review of the SBPB SER input attached. As noted in our earlier conversation, I am reviewing a couple of paragraphs to be used in SER Section 2.2 and the introduction of Section 2.3, which summarize VY's addition of 12 new in-scope systems and associated components types.

Ron

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**From:** Ron Young  
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MESSAGE	1880	09/10/2007 5:06:56 PM
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### **2.3 Scoping and Screening Results: Mechanical Systems**

This section documents the staff's review of the applicant's scoping and screening results for mechanical systems. Specifically, this section discusses:

- reactor coolant system
- engineered safety features
- auxiliary systems
- steam and power conversion systems

In accordance with the requirements of 10 CFR 54.21(a)(1), the applicant's IPA must list passive, long-lived SCs within the scope of license renewal and subject to an AMR. To verify that the applicant properly implemented its methodology, the staff's review focused on the implementation results. This focus allowed the staff to confirm that there were no omissions of mechanical system components that meet the scoping criteria and are subject to an AMR.

The staff's evaluation of the information in the LRA was the same for all mechanical systems. The objective was to determine whether the applicant has identified, in accordance with 10 CFR 54.4, components and supporting structures for specific mechanical systems that appear to meet the license renewal scoping criteria. Similarly, the staff evaluated the applicant's screening results to verify that all passive, long-lived components were subject to an AMR in accordance with 10 CFR 54.21(a)(1).

In its scoping evaluation, the staff reviewed the applicable LRA sections and component drawings, focusing on components that have not been identified as within the scope of license renewal. The staff reviewed relevant licensing basis documents, including the UFSAR, for each mechanical system to determine whether the applicant has omitted from the scope of license renewal components with intended functions as required by 10 CFR 54.4(a). The staff also reviewed the licensing basis documents to determine whether the LRA specified all intended functions as required by 10 CFR 54.4(a). The staff requested additional information to resolve any omissions or discrepancies identified.

After its review of the scoping results, the staff evaluated the applicant's screening results. For those SCs with intended functions, the staff sought to determine whether: (1) the functions are performed with moving parts or a change in configuration or properties or (2) the SCs are subject to replacement after a qualified life or specified time period, as required by 10 CFR 54.21(a)(1). For those meeting neither of these criteria, the staff sought to confirm that these SCs were subject to an AMR, as required by 10 CFR 54.21(a)(1). The staff requested additional information to resolve any omissions or discrepancies identified.

#### **Two-Tier Scoping Review Process for Balance of Plant (BOP) Systems**

Of the 78 mechanical systems in the LRA, 44 are BOP systems which include most of the auxiliary systems and all of the steam and power conversion systems. The staff performed a two-tier scoping review for these BOP systems.

The two-tier scoping review process consists of the Tier-1 and Tier-2 scoping reviews. The

staff reviewed the LRA and UFSAR descriptions focusing on the system intended function to screen all the BOP systems into two groups based on the following screening criteria:

- safety importance/risk significance
- potential for system failure to cause failure of redundant safety system trains
- operating experience indicating likely passive failures
- systems subject to omissions based on previous LRA reviews

Examples of the safety important/risk significant systems are the instrument air (IA) system, the diesel generator (DG) and support systems, and the SW system, based on the results of the individual plant examination for VYNPS. An example of a system whose failure could result in common cause failure of redundant trains is a drain system providing flood protection.

Examples of systems with operating experience indicating likely passive failures include MS system, feedwater system, and SW system. Examples of systems with identified omissions in previous LRA reviews include spent fuel cooling system and makeup water sources to safety systems.

From the 44 BOP systems, the staff selected 23 systems for a detailed Tier-2 scoping review as described above. For the remaining 21 BOP systems, the staff performed a Tier-1 scoping review of the LRA (which may have not included detailed boundary drawings) and UFSAR that would identify apparent missing components for an AMR. The following is a list of these 21 systems:

- service air (SA)
- SA and IA instruments
- condensate demineralizer
- RWCU filter demineralizer
- motor generator lube oil (MGLO)
- potable water
- equipment RIP
- stator cooling
- main steam, extraction steam and auxiliary steam instruments
- heater drain and heater vent (HD and HV) instruments
- air evacuation
- building (drainage system components)
- circulating water priming
- extraction steam
- heater drain
- heater vent
- make-up demineralizer
- seal oil
- turbine building closed cooling water
- main turbine generator
- turbine lube oil

The staff examined the applicant's environmental report, Appendix E, Attachment E.1, "Evaluation of Probabilistic Safety Analysis Model," to verify that there is no risk significant system on the above list. None of the 21 systems is a dominant contributor to the risk reduction worth rankings to core damage frequency or involved in the dominant initiating events.

### Systems Identified for Inspection

The staff used an inspection to verify 10 CFR 54.4(a)(2) scoping results. The staff identified several systems for the regional inspection team to include in its scoping and screening inspection. These systems had been included as within the scope of license renewal by the applicant as a result of the 10 CFR 54.4(a)(2) review. The staff requested that the inspection include a sampling review of the engineering report (if available), plant layout drawings and other documentation, and walk-downs of the plant areas that contain these systems and associated components. The systems identified for inspection include:

- augmented off-gas system
- circulating water system
- reactor water clean-up system

### 2.3.3.2 Service Water

#### 2.3.3.2.1 Summary of Technical Information in the Application

LRA Section 2.3.3.2 describes the SW system and the RHRSW system. The purpose of the SW system is to provide cooling water to various normal and emergency operating loads. The SW system consists of two parallel headers which supply cooling water to the following turbine and reactor auxiliary equipment: a reactor building closed cooling water (RBCCW) heat exchanger, RHR corner room ventilation coolers, a DG cooler, and an RHR heat exchanger (via the RHRSW pumps and piping). Each header is supplied by two pumps. The standby fuel pool cooling (SBFPC) system normally is supplied from the SW Train B header. The header and cross tie can be configured to be fed from the A header with B secured. Other turbine and reactor auxiliary equipment is supplied from a line tied into both headers. The purpose of the RHRSW system is to transfer heat from the RHR system during normal operation and accident conditions. The RHRSW system consists of four RHRSW pumps, two RHR heat exchangers and piping, valves, and instrumentation necessary to ensure system operation. The RHRSW pumps are supplied from the SW system. The cooling water then is pumped through the RHR heat exchangers and returned to the SW system.

The SW and RHRSW systems have safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the systems perform functions that support fire protection.

LRA Tables 2.3.3-2, 2.3.3-13-34, and 2.3.3-13-42 identify the following SW and RHRSW system component types within the scope of license renewal and subject to an AMR:

- bolting
- coil
- expansion joint
- fan housing
- heat exchanger (bonnet)
- heat exchanger (shell)
- heat exchanger (tubes)
- heat exchanger (tubesheets)
- indicator
- orifice
- piping
- pump casing
- strainer
- strainer housing
- suction barrel
- thermowell
- tubing
- valve body

The component intended functions within the scope of license renewal include the following:

- flow control

- filtration
- heat transfer
- pressure boundary
- structural or functional support for safety-related equipment

#### 2.3.3.2.2 Staff Evaluation

The staff reviewed LRA Sections 2.3.3.2 and 2.3.3.13, and UFSAR Sections 10.6, 10.7, and 10.8 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.3.3.2 identified areas in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAIs as discussed below.

The staff noted that license renewal drawing LRA-G-191159-SH-01-0, at location H-12, depicts pipe section 2"-SW- 566C within the scope of license renewal. Upstream from where 2"-SW-566C enters the reactor building from the outside, there is no drawing continuation to depict the license renewal boundary. In RAI 2.3.3.2a-1 dated August 16, 2006, the staff requested that the applicant provide information for the continuation of 2"-SW-566C to the license renewal boundary and justify the boundary locations with respect to the applicable requirements of 10 CFR 54.4(a).

In its response dated September 20, 2006, the applicant stated that pipe section 2"-SW-566C contains vacuum breakers to prevent water-hammer in the nonsafety-related portion of the SW system. The portion of this piping outside of the reactor building wall ends at this point. There is no continuation of this portion of the piping.

Based on its review, the staff found the applicant response to RAI 2.3.3.2a-1 acceptable because the applicant confirmed this section of piping ends outside the reactor building wall and does not continue on another drawing. This is a section of piping open to atmosphere immediately outside of the reactor building to allow air flow to the vacuum breakers depicted on pipe section 2"-SW-566C. Therefore, the staff concern described in RAI 2.3.3.2a-1 is resolved.

The staff noted that license renewal drawing LRA-G-191159-SH-01-0, at location H-11, drawing note 16 indicates pipe section 4"-SW-567 and its supports on the reactor building alternate cooling supply piping (where the vacuum breakers tie in) are seismic Class II for structural integrity. This pipe section from valve 23D through valves RBAC-1A, 1B, 1C and 1D is not shown within the scope of license renewal. Failure of this pipe could have an adverse effect on the intended pressure boundary function for the service water piping. In RAI 2.3.3.2a-2 dated August 16, 2006, the staff requested that the applicant provide additional information about why this section of pipe and components are not shown within the scope of license renewal and justify the boundary locations with respect to the applicable requirements of 10 CFR 54.4(a).

In its response dated September 20, 2006, the applicant stated that this portion of piping is included for 10 CFR 54.4(a)(2) since it provides structural support for the safety-related portion of the system. As described in LRA Section 2.1.2.1.3, portions of systems included as required by 10 CFR 54.4(a)(2) are not shown on license renewal drawings. However, as discussed in LRA Table 2.3.3.1 3-8 for the SW system, the components outside the safety class pressure boundary, while relied upon to provide structural/seismic support for the pressure boundary are in-scope and subject to an AMR. This includes the portion of line 4"-SW-567 required to provide structural support for the vacuum breakers. In addition, this piping and associated valves are included as required by 10 CFR 54.4(a)(2) due to spatial interaction from spray or leakage since the line is in the reactor building.

Based on its review, the staff found the applicant response to RAI 2.3.3.2a-2 acceptable because the applicant acknowledged this section of piping 4" SW-567 from valve 23D to RBAC-1A, 1B, 1C, and 1D is within the scope of license renewal. As described in LRA Section 2.1.2.1.3, portions of systems included for 10 CFR 54.4(a)(2) are not shown on LRA drawings. Although the applicant did not identify this section of piping within the boundary of license renewal on the drawing, the applicant confirmed it is within the scope based on the potential for physical interaction with safety-related systems in accordance with 10 CFR 54.4(a)(2). Therefore, the staff concern described in RAI 2.3.3.2a-2 is resolved.

The staff noted license renewal drawing LRA-G-191159-SH-01-0, at location D-5, depicts the license renewal boundary on the downstream side of flow control valve (FCV)-104-17A. The pipe section from FCV-104-17A to the safety class boundary designation flag located at valve 171A and to the intake screens is not shown within the scope of license renewal. Similarly, the pipe section from FCV-104-17 B, C, D, and E to valves 17B, C, D and E and to the intake screens is also not shown within the scope of license renewal. Failure of these sections of pipe could have an adverse effect on the intended pressure boundary function for the service water piping. In RAI 2.3.3.2a-3 dated August 16, 2006, the staff requested that the applicant provide additional information about why these sections of piping and components are not shown within the scope of license renewal and justify the boundary locations with respect to the applicable requirements of 10 CFR 54.4(a).

In its response dated September 20, 2006, the applicant stated that the license drawings only show the portions of the system with intended functions that meet the requirements of 10 CFR 54.4(a)(1) or (a)(3). As described in LRA Section 2.1.2.1.3, portions of systems included as required by 10 CFR 54.4(a)(2) are not shown on license renewal drawings. Valves FCV-104-17A/B/C/D and E are normally closed valves that are only open when the traveling screens are being washed. Providing water to clean the screens is not a function that meets the requirements of 10 CFR 54.4(a)(1) or (a)(3). These valves fail to a closed position such that failure of the piping downstream of these valves would not affect the ability of the SW system to perform its functions as required by 10 CFR 54.4(a)(1) or (a)(3). However, as described in LRA Table 2.3.3.13-B, the portion of the SW system in the intake structure near the SW pumps and the components outside the safety class pressure boundary, while relied upon to provide structural/seismic support for the pressure boundary are in-scope and subject to an AMR as required by 10 CFR 54.4(a)(2). This includes the portion of lines downstream of FCV-104-17A/B/C/D and E that provide structural support.

Based on its review, the staff found the applicant response to RAI 2.3.3.2a-3 acceptable because the applicant acknowledged these sections of piping are within the scope of license

renewal. As described in LRA Section 2.1.2.1.3, portions of systems included for 10 CFR 54.4(a)(2) are not shown on LRA drawings. Although the applicant did not identify these sections of piping as being within the boundary of license renewal on the drawing, the applicant confirmed they are within the scope based on the potential for physical interaction with safety-related systems in accordance with 10 CFR 54.4(a)(2). Therefore, the staff concern described in RAI 2.3.3.2a-3 is resolved.

The staff noted that license renewal drawing LRA-G-191159-SH-02-0, at location G-6, depicts a license renewal boundary flag at the tee of pipe sections 2"-SW-566D and 8"-SW-34. There are no highlighted pipes or components on 2"-SW-566D or 8"-SW-34. In RAI 2.3.3.2a-4 dated August 16, 2006, the staff requested that the applicant clarify which portions of pipe and components are and are not bounded by the aforementioned boundary flag and justify the boundary locations with respect to the applicable requirements of 10 CFR 54.4(a).

In its response dated September 20, 2006, the applicant stated license renewal drawings only show the portions of the system with intended functions that meet the requirements of 10 CFR 54.4(a)(1) or (a)(3). As described in LRA Section 2.1.2.1.3, portions of systems included as required by 10 CFR 54.4(a)(2) are not shown on license renewal drawings. The piping and valves on line 2"-SW-566D are safety-related, since they have a safety function to break vacuum and prevent water hammer in the SW system. As a result, a system intended function boundary flag is provided that points towards and includes all the components on line 2"-SW-566D. The reason these components are not highlighted as subject to an AMR is that they perform their system intended function through the active function of the valves opening and breaking vacuum. In accordance with 10 CFR 54.21 (a)(1)(I), components that perform their intended functions with moving parts or a change in configuration are not subject to an AMR. These components do not have a passive intended function of pressure boundary as required by 10 CFR 54.4(a)(1) or (a)(3), since this portion of the system is isolated when aligned to the ultimate heat sink. However, as described in LRA Table 2.3.3.13-6, the portion of the SW system inside the reactor building and the components outside the safety class pressure boundary, while relied upon to provide structural/seismic support for the pressure boundary are in-scope and subject to an AMR as required by 10 CFR 54.4(a)(2). This includes line 2-SW-566D and portions of lines connected to this line that provide structural support and have the potential to affect safety-related components due to spray or leakage.

Based on its review, the staff found the applicant response to acceptable because the applicant acknowledged that service water pipe 2" SW-566D is within the scope of license renewal and subject to an AMR based on the potential for physical interaction with safety-related systems in accordance with 10 CFR 54.4(a)(2). As described in LRA Section 2.1.2.1.3, portions of systems included for 10 CFR 54.4(a)(2) are not shown on LRA drawings. Therefore, the staff concern described in RAI 2.3.3.2a-4 is resolved.

The staff's review of LRA Section 2.3.3.2 identified areas in which information provided in the LRA needed to be confirmed by the NRC Regional Inspection Team to complete the review of the applicant's scoping and screening results.

#### **Inspection Item 2.3.3.2a-1**

License renewal drawing LRA-G-191159-SH-01-0, at location H-11, depicts pipe section 2"-SW-566C as within the scope of license renewal. The license renewal boundary flag for 2"-SW-566C is located on an unisolable section of pipe. The actual location of the license

renewal scope boundary for this pipe section is not clear. The staff requested that the NRC Regional Inspection Team perform an inspection to ensure that the license renewal scope boundaries for these components meet the requirements of 10 CFR 54.4(a)(2).

In Inspection Report 05000271/2007006, Vermont Yankee Nuclear Power Station - NRC License Renewal Inspection Report, dated June 4, 2007, Attachment, Review of Safety Evaluation Report Confirmatory Items, the regional inspection team stated in part that the applicant has included in-scope for spatial interaction the portion of the SW system in the service water pump area of the intake structure and the reactor building. Pipe section 2" SW-566C is in the reactor building and is therefore in-scope for spatial interaction. As described in LRA Section 2.1.2.1.3, portions of systems included for 10 CFR 54.4(a)(2) are not shown on LRA drawings. Further, the applicant's letter to the NRC dated July 3, 2007, License Renewal Application, Amendment 27, Attachment 2 indicates that pipe section 4"SW-567 which attaches to pipe section 2" SW-566C is in-scope for spatial interaction.

Based on its review, the staff found the above response acceptable because the inspection team and the applicant acknowledged that service water pipe 2" SW-566C is within the scope of license renewal and subject to an AMR based on the potential for physical interaction with safety-related systems in accordance with 10 CFR 54.4(a)(2). Therefore, the staff concern described in Inspection Item 2.3.3.2a-1 is resolved.

#### **Inspection Item 2.3.3.2a-2**

LRA Section 2.1.2.1.2 states in part that nonsafety-related piping systems connected to safety-related systems were included up to the structural boundary or to a point that includes an adequate portion of the nonsafety-related piping run to conservatively include the first seismic or equivalent anchor. In addition, if isometric drawings were not readily available to identify the structural boundary, connected lines were included to a point beyond the safety/nonsafety interface, like a base-mounted component, flexible connection, or the end of a piping run (i.e., a drain line).

The staff cannot determine whether all the nonsafety-related piping systems were included up to the structural boundary or to a point that includes an adequate portion of the nonsafety-related piping run to include the first seismic or equivalent anchor. The staff requested that the NRC Regional Inspection Team perform an inspection to ensure that the license renewal scope boundaries for these components satisfy the requirements of 10 CFR 54.4(a)(2).

In Inspection Report 05000271/2007006, Vermont Yankee Nuclear Power Station - NRC License Renewal Inspection Report, dated June 4, 2007, Attachment, Review of Safety Evaluation Report Confirmatory Items, the NRC Regional Inspection Team stated in part that for structural support considerations, the applicant has included components outside the safety class pressure boundary, yet relied upon to provide structural/seismic support for the pressure boundary. The application describes the types of components which are included in the scope of license renewal for 10 CFR 54.4(a)(2) and subject to an AMR in the service water system in LRA Table 2.3.3-13-42. This table was developed by including all nonsafety-related portions of fluid systems which are located within a building containing safety-related components and all nonsafety-related piping connected to safety-related systems back to the structural boundary using an isometric drawing. In cases where an isometric drawing which depicts the structural boundary is not readily available, connected lines were included back to a point beyond the

safety/nonsafety interface to a base-mounted component, flexible connection, or the end of a piping run (such as a drain line) in accordance with the response to RAI 2.1-2. As described in LRA Section 2.1.2.1.3, portions of systems included for 10 CFR 54.4(a)(2) are not shown on LRA drawings.

Further, the applicant's letter to the NRC dated July 3, 2007, License Renewal Application, Amendment 27, Attachment 2 states that there are no nonsafety-related systems for which the applicant has not identified the nonsafety-related portions of systems which are attached to safety-related systems and required to be in the scope of license renewal in accordance with 10 CFR 54.4(a)(2). However, as a result of discussions with the staff during the Region I inspection (February 2007), the applicant determined that some safety-related SSCs in the VY turbine building required consideration for potential spatial impacts from nonsafety-related SSCs based on 10 CFR 54.4(a)(2). Therefore, an expanded review for SSCs in the turbine building determined that additional components required an AMR. Those additional component types have been added to LRA Table 2.3.3-13-42, as addressed in the applicant's letters to the NRC dated July 30, 2007 and August 16, 2007.

Based on its review, the staff found the above response acceptable because the applicant stated that there are no nonsafety-related portions of systems which are attached to safety-related systems that are not within the scope of license renewal in accordance with 10 CFR 54.4(a)(2), but that there were spatial impact concerns from nonsafety-related SSCs in the turbine building. The additional component types have been added to LRA Table 2.3.3-13-42. Therefore, the staff concern described in Inspection Item 2.3.3.2a-2 is resolved.

#### 2.3.3.2.3 Conclusion

The staff reviewed the LRA, accompanying license renewal drawings, and RAI and inspection item responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the SW and RHRSW system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.4 Emergency Diesel Generator

##### 2.3.3.4.1 Summary of Technical Information in the Application

LRA Section 2.3.3.4 describes the EDG and the diesel lube oil (DLO) systems. The purpose of the DG system is to provide Class 1E electrical power to the emergency buses in a loss of normal power condition or a LOCA coincident with loss of normal power or degraded grid voltage at the emergency buses and is available to provide Class 1E electrical power to the emergency buses in a LOCA with normal power available. The DG and auxiliary systems will start and be in standby during a LOCA. The purpose of the DLO system is to provide for DLO storage and provide for pre-lube of the DGs. The DLO system consists of two lube oil day tanks and pre-lube oil pumps only. The DLO system in the component database has only these four components. The remaining components supplying lube oil required during EDG operation are in the DG system.

The DG and DLO systems have safety-related components relied upon to remain functional

during and following DBEs. The failure of nonsafety-related SSCs in the system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the systems perform functions that support fire protection.

LRA Tables 2.3.3-4, 2.3.3-13-10, and 2.3.3-13-11 identify the following EDG system, DG and auxiliaries system, and DLO system component types within the scope of license renewal and subject to an AMR:

- bolting
- compressor housing
- expansion joint
- filter housing
- heat exchanger (bonnet)
- heat exchanger (fins)
- heat exchanger (shell)
- heat exchanger (tubes)
- heat exchanger (tubesheets)
- heater housing
- orifice
- piping
- pump casing
- sight glass
- silencer
- strainer
- strainer housing
- tank
- thermowell
- tubing
- turbocharger
- valve body

The component intended functions within the scope of license renewal include the following:

- flow control
- filtration
- heat transfer
- pressure boundary

#### 2.3.3.4.2 Staff Evaluation

The staff reviewed LRA Sections 2.3.3.4 and 2.3.3.13, and UFSAR Section 8.5 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed

those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

In letters to the NRC dated July 30, 2007 and August 16, 2007, the applicant reported the deletion of DG compressor housing from LRA Table 2.3.3-13-10 as a component type subject to an AMR. The applicant stated that since the compressor housing will not contain liquid, it should not be subject to an AMR for potential spatial interaction. The staff has reviewed this component type deletion and concurs that the deletion of the DG compressor housing is acceptable.

#### 2.3.3.4.3 Conclusion

The staff reviewed the LRA, accompanying license renewal drawings, and RAI responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the EDG system, DG and auxiliaries system, and DLO system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.6 Fuel Oil

##### 2.3.3.6.1 Summary of Technical Information in the Application

LRA Section 2.3.3.6 describes the fuel oil (FO) system, which supplies FO to the EDGs as well as the nonsafety-related diesel-driven fire pump, John Deere diesel (JDD), and house HB. The portion of the system related to the EDGs consists of a day tank and fuel transfer pump for each diesel, the FO storage tank, valves, and piping. The diesel fire pump FO day tank, JDD day tank, and house HB FO storage tank are not connected to the FO storage tank. Normal makeup to the house HB FO storage tank is by tanker truck. Normal makeup to the diesel fire pump FO day tank and JDD day tank is from a 500-gallon portable tank filled from the FO storage tank.

The FO system has safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the FO system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the FO system performs functions that support fire protection.

LRA Tables 2.3.3-6 and 2.3.3-13-14 identify the following FO system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- flame arrestor
- flex hose
- injector housing
- piping

- pump casing
- sight glass
- strainer housing
- tank
- thermowell
- tubing
- valve body
- strainer housing

The FO system component intended functions within the scope of license renewal include the following:

- flow control
- pressure boundary

#### 2.3.3.6.2 Staff Evaluation

The staff reviewed LRA Sections 2.3.3.6 and 2.3.3.13, and UFSAR Section 8.5.4 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.3.3.6 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

The staff noted that license renewal drawing LRA-G-191162, Sheet 2, provides information about the EDGs, diesel-driven fire pump, and house HB systems, supported by the FO system. However, the drawing does not provide sufficient information about the JDD system, also supported by the FO system. For example, more information is required regarding the transfer system between the 75,000-gallon FO storage tank, the day tanks for the two JDDs, and single fire pump diesel, which is necessary to provide an intended function in accordance with 10 CFR 54.4 (a)(3) in support of the fire protection regulation requirements (10 CFR 50.48). The LRA text states only that a 500-gallon portable tank is used to transport FO to the diesel day tanks. Typical components subject to an AMR for diesels like the day tank, strainer, etc., for the JDDs are not covered. In RAI 2.3.3.6-1 dated August 16, 2006, the staff requested that the applicant provide FO system drawings and describe the JDD system. The staff also requested that the applicant explain the relationship between the JDD and the FO systems and clarify what the AMR tables should include in both Sections 2.3.3.6 and 2.3.3.12. The staff further requested that the applicant also provide information for the license renewal boundary that justifies its location with respect to the applicable requirements of 10 CFR 54.4(a).

In its response dated September 20, 2006, the applicant stated that the 350-gallon diesel fire

pump FO day tank and 550-gallon fiberglass underground storage tank for the JDD are filled with FO from the FO storage tank. The FO is pumped from the FO storage tank drain line into a portable 500-gallon tank. The portable tank is then moved to the intake structure or JDD building by a fork lift. A 12VDC pump on the portable tank then pumps the FO into the diesel fire pump FO day tank or the fiberglass underground storage tank for the JDD. Since the portable tank and pump are not part of the FO system pressure boundary and since levels in the diesel fire pump FO day tank and underground storage tank for the JDD are maintained, the portable tank and pump do not perform a component intended function and are not subject to an AMR. A dedicated 550-gallon fiberglass underground storage tank provides fuel to the JDD engine. As the JDD is required for compliance with the staff's regulations concerning fire protection (10 CFR 50.48), providing FO for the engine is an intended function of the FO system in accordance with 10 CFR 54.4 (a)(3). Therefore, the storage tank and associated piping and components that supply FO to the diesel engine injectors are within the scope of license renewal and subject to an AMR. JDD FO components are included in LRA Tables 2.3.3.6 and 3.3.2-6. As the JDD is required for compliance with the staff's regulations concerning fire protection (10 CFR 50.48), it is within the scope of license renewal and subject to an AMR in accordance with 10 CFR 54.4 (a)(3). The passive mechanical components of the diesel subject to an AMR that were confirmed by walkdown are included in LRA Tables 2.3.3-12 and 3.3.2-12.

Based on its review, the staff found the applicant response to RAI 2.3.3.6-1 acceptable because the applicant explained that the 550-gal fiberglass underground storage tank and associated piping and components that supply FO to the diesel engine injectors are within the scope of license renewal and an AMR. The applicant stated that flow diagrams are not available for this skid-mounted diesel, or its FO system, and only a few components are represented in the equipment database. The applicant, however, has verified by walkdown of the system that these passive components are identified in AMR Tables 2.3.3-12 and 3.3.2-12. Therefore, the staff concern described in RAI 2.3.3.6-1 is resolved.

### 2.3.3.6.3 Conclusion

The staff reviewed the LRA, accompanying license renewal drawings, and RAI response to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the FO system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

### 2.3.3.7 Instrument Air

#### 2.3.3.7.1 Summary of Technical Information in the Application

LRA Section 2.3.3.7 describes the IA, SA, 105 (IA and SA instruments), and nitrogen (N<sub>2</sub>) supply systems. The purpose of the IA system is to provide the station continuously with dry, oil-free air for pneumatic instruments and controls through a dual header system. The IA system includes the containment N<sub>2</sub> supply described in the UFSAR as a separate N<sub>2</sub> subsystem also known as containment air. The purpose of containment N<sub>2</sub> is to provide pneumatically operated components in the drywell with N<sub>2</sub> when the primary containment is inerted so any component leakage will not dilute the N<sub>2</sub> atmosphere. This N<sub>2</sub> source can be from either the N<sub>2</sub> system

(normal supply) or the containment air compressor (automatic backup supply). When neither N<sub>2</sub> supply is available or when the containment is not inerted, IA may be lined up manually as a secondary backup for the containment N<sub>2</sub>. When the containment is not inerted, IA will be lined up as the primary source of pneumatic pressure.

The purpose of the SA system is to provide the station with the compressed air requirements for pneumatic instruments and controls and general station services. The IA system also supports this function. The purpose of the 105 system is to provide indication, alarm, and control functions for associated systems. This code is used in the component database for various instrumentation components related to IA and SA. Although the 105 system consists mainly of EIC components, certain IA instrumentation mechanical components are included as well. The purpose of the N<sub>2</sub> system is to provide N<sub>2</sub> gas to the primary containment atmospheric control (PCAC) system to satisfy the primary containment purge and normal make-up requirements.

The IA, SA, 105, and N<sub>2</sub> systems have safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the IA and N<sub>2</sub> system potentially could prevent the satisfactory accomplishment of a safety-related function. In addition, the IA system performs functions that support fire protection and SBO.

LRA Tables 2.3.3-7, 2.3.3-13-54, 2.3.3-13-22, and 2.3.3-13-24 identify the following IA, SA and N<sub>2</sub> system component types within the scope of license renewal and subject to an AMR:

- bolting
- compressor housing
- piping
- strainer housing
- tank
- trap
- tubing
- valve body

The IA, SA and N<sub>2</sub> system component intended function within the scope of license renewal is to provide a pressure boundary.

#### AA2.3.3.7.2 Staff Evaluation

The staff reviewed LRA Sections 2.3.3.7 and 2.3.3.13, and UFSAR Section 10.14 using the Tier-2 evaluation methodology, for IA and N<sub>2</sub>, and the Tier-1 methodology, for SA and 105 systems, described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

In letters to the NRC dated July 30, 2007 and August 16, 2007, the applicant reported the

deletion of IA compressor housing from LRA Table 2.3.3-13-22 as a component type subject to an AMR. The applicant stated that since the compressor housing will not contain liquid, it should not be subject to an AMR for potential spatial interaction. The staff has reviewed this component type deletion and concurs that the deletion of the IA compressor housing is acceptable.

#### 2.3.3.7.3 Conclusion

The staff reviewed the LRA and accompanying license renewal drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the IA and N<sub>2</sub> systems components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.12 John Deere Diesel

##### 2.3.3.12.1 Summary of Technical Information in the Application

LRA Section 2.3.3.12 describes the JDD as a nonsafety-related skid-mounted engine powering a generator that supplies back-up electric power to plant lighting. It is located in a separate structure, the JDD building. The diesel is started electrically with batteries and does not require cooling water from other plant systems. Its license renewal purpose is to provide power to lighting panels credited as emergency lighting in the Appendix R safe shutdown capability analysis.

The JDD performs functions that support fire protection.

LRA Table 2.3.3-12 identifies the following JDD component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- filter housing
- heat exchanger (radiator)
- heat exchanger (shell)
- heat exchanger (tubes)
- heater housing
- piping
- pump casing
- silencer
- tubing
- turbocharger

The JDD component intended functions within the scope of license renewal include the following:

- heat transfer
- pressure boundary

### 2.3.3.12.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.12 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.3.3.12 identified areas in which information provided in the LRA needed to be confirmed by the NRC Regional Inspection Team to complete the review of the applicant's scoping and screening results.

#### **Inspection Item 2.3.3.12-1**

LRA Section 2.3.3.12 indicates that the John Deere Diesel (JDD) is installed in compliance with 10 CFR 50, Appendix R, requirements. However, due to a lack of available drawings and/or detailed description of the diesel equipment listed in LRA Table 2.3.3-12, it is difficult to determine if any AMR category components may have been omitted from the table. It is recommended that the JDD be inspected to assure all AMR category components are included in the list of LRA Table 2.3.3-12. The staff requested that the NRC Regional Inspection Team perform an inspection to ensure that the license renewal scope boundaries for these components satisfy the requirements of 10 CFR 54.4(a)(3).

In Inspection Report 05000271/2007006, Vermont Yankee Nuclear Power Station - NRC License Renewal Inspection Report, dated June 4, 2007, Attachment, Review of Safety Evaluation Report Confirmatory Items, the NRC Regional Inspection Team stated that the John Deere diesel system components are listed in LRA Table 2.3.3-12 and the supporting fuel oil day tank, fiberglass underground storage tank, and supply lines are listed in LRA Table 2.3.3-6, "Fuel Oil System."

Based on its review, the staff found the above response acceptable because the NRC Regional Inspection Team verified that all components subject to an AMR are included in LRA Table 2.3.3-12 and LRA Table 2.3.3-6 and confirmed that no other portions of the John Deere diesel system should have been included within scope based on 10 CFR 54.4(a)(3). Therefore, the staff concern described in Inspection Item 2.3.3.12-1 is resolved.

### 2.3.3.12.3 Conclusion

The staff reviewed the LRA, accompanying license renewal drawings and Inspection Item response to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the JDD components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.13A Augmented Off-gas**

#### **2.3.3.13A.1 Summary of Technical Information in the Application**

LRA Section 2.3.3.13.1 describes the AOG system whose purpose is to collect, process, and discharge radioactive gaseous wastes to the atmosphere through the plant stack during normal operation. The system reduces the released quantities of gaseous and particulate radioactive material from the site to levels as low as practical during normal operation. The AOG system has subsystems that dispose of gases from the main condenser air ejectors, the start-up vacuum pump, and the gland seal condenser. The various subsystems are monitored continuously for radiation.

The failure of nonsafety-related SSCs in the AOG system could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3.13-1 identifies the following AOG system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- piping
- tank
- tubing
- valve body
- steam trap

The AOG system component intended function within the scope of license renewal is to provide a pressure boundary.

#### **2.3.3.13A.2 Staff Evaluation**

The staff reviewed LRA Section 2.3.3.13.1 and UFSAR Section 9.4 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.3.3.13.1 identified areas in which information provided in the LRA needed to be confirmed by the NRC Regional Inspection Team to complete the review of the applicant's scoping and screening results.

#### **Inspection Item 2.3.3.13a-1**

The LRA states that the AOG system is within the scope of license renewal based on

requirements of 10 CFR 54.4(a)(2) because of the potential for physical interaction with safety-related components described in LRA Table 2.3.3.13-A. The determination of whether a component meets the requirements of 10 CFR 54.4(a)(2) for physical interactions is based on where it is located in a building and its proximity to safety-related equipment or where a structural/seismic boundary exists. This information is not provided on license renewal drawings nor was a detailed description provided in the LRA. Consequently, any omission of AOG components subject to an AMR cannot be determined. The staff requested that the NRC Regional Inspection Team perform an inspection to ensure that the license renewal scope boundaries for these components meet the requirements of 10 CFR 54.4(a)(2) and all the components subject to an AMR are included in LRA Table 2.3.3-13-1.

In Inspection Report 05000271/2007006, Vermont Yankee Nuclear Power Station - NRC License Renewal Inspection Report, dated June 4, 2007, Attachment, Review of Safety Evaluation Report Confirmatory Items, the NRC Regional Inspection Team noted LRA Table 2.3.3.13-B states that the portion of the AOG system associated with the plant stack loop seal is subject to an AMR based on 10 CFR 54.4(a)(2) for physical interactions. Since the boundaries for the portion of the system as described in LRA Table 2.3.3.13-B were not well defined, the applicant committed to amend the table to read "portion of the system inside the plant stack." The inspector walked down the remainder of the system and confirmed that no other portions of the system should have been included based on 10 CFR 54.4(a)(2).

Based on its review, the staff found the above response acceptable because the applicant committed to amend LRA Table 2.3.3.13-B as appropriate and the NRC regional inspector walked down the remainder of the AOG system outside the plant stack and confirmed that no other portions of the system should have been included within scope based on 10 CFR 54.4(a)(2). Therefore, the staff concern described in Inspection Item 2.3.3.13a-1 is resolved.

#### 2.3.3.13A.3 Conclusion

The staff reviewed the LRA, accompanying license renewal drawings and inspection item response to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the AOG system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13B Sampling

##### 2.3.3.13B.1 Summary of Technical Information in the Application

LRA Section 2.3.3.13.1 describes the sampling system whose purpose is to provide a means for sampling and testing various process fluids in the station in centralized locations. Fluids and gases are sampled continuously or periodically from equipment or systems reflecting station performance.

The failure of nonsafety-related SSCs in the sampling system could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3.13-41 identifies the following sampling system component types within the

scope of license renewal and subject to an AMR:

- bolting
- piping
- tubing
- valve body
- strainer housing

The sampling system component intended function within the scope of license renewal is to provide a pressure boundary.

#### 2.3.3.13B.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.1 and UFSAR Section 10.17 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

The staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13B.3 Conclusion

The staff reviewed the LRA and accompanying license renewal drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the sampling system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13C Condensate Demineralizer

##### 2.3.3.13C.1 Summary of Technical Information in the Application

LRA Section 2.3.3.13.2 describes the condensate demineralizer (CD) system which maintains the required purity of feedwater supplied to the reactor. The system minimizes corrosion product in the nuclear system so it does not affect fuel performance, nuclear system component accessibility, or the capacity required of the RWCU system. The CD system protects the nuclear system against the entry of foreign material due to condenser leaks. The system uses finely ground, mixed ion exchange resins deposited upon the tubular elements of pressure precoat type filters (the filter-demineralizer units). The CD consist of five filter-demineralizer units (including an installed spare) operating in parallel. All are normally operated but sized so four units can support operation.

The failure of nonsafety-related SSCs in the CD system potentially could prevent the

satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-4 identifies the following CD system component types within the scope of license renewal and subject to an AMR:

- piping
- strainer housing
- valve body
- bolting
- filter housing
- pump casing
- tank
- tubing

The CD system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13C.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.7 using the evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13C.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the CD system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13E Circulating Water

##### 2.3.3.13E.1 Summary of Technical Information in the Application

The circulating water (CW) system is a heat sink for steam condensation for the main condensers. Heat removal in the condensers is accomplished by a continuous supply of cooling water pumped from and returned to the Connecticut River or by recirculation flow pumped through cooling towers by three vertical circulating water pumps in the intake structure. Trash racks and traveling water screens protect the circulating water pumps from debris. During cold weather, recirculation of water from the discharge structure to the intake structure prevents icing at the screens and intakes. Two cooling towers have the capacity to remove the total heat

load from the circulating water. Three vertical circulating water booster pumps provide the necessary head for cooling tower operation and the recirculation mode.

The CW system has safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the CW system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-9 identifies the following CW system component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- piping
- pump casing
- tubing
- valve body
- tank

The CWS system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13.E.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2, and UFSAR Sections 10.8, 11.6, and 11.9 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.3.3.13 identified areas in which information provided in the LRA needed to be confirmed by the NRC Regional Inspection Team to complete the review of the applicant's scoping and screening results.

#### **Inspection Item 2.3.3.13e-1**

The LRA states that the circulating water system is within the scope of license renewal based on the potential for physical interaction with safety-related components as required by 10 CFR 54.4(a)(2) and described in LRA Table 2.3.3.13-A. The applicant did not provide drawings highlighting in-scope components required by 10 CFR 54.4(a)(2), stating that the drawings would not provide significant additional information because they do not indicate proximity of components to safety-related equipment and do not identify structural/seismic boundaries. Without license renewal drawings and/or detailed description of the circulating water system, the omission of components subject to an AMR cannot be determined (see LRA Table 2.3.3-13-9). The staff requested that the NRC Regional Inspection Team perform an

inspection to ensure that the license renewal scope boundaries for these components satisfy the requirements of 10 CFR 54.4(a)(2) and all the components subject to an AMR are included in LRA Table 2.3.3-13-9.

In Inspection Report 05000271/2007006, Vermont Yankee Nuclear Power Station - NRC License Renewal Inspection Report, dated June 4, 2007, Attachment, Review of Safety Evaluation Report Confirmatory Items, the NRC Regional Inspection Team stated that if any nonsafety-related portion of a fluid system is located within a building containing safety-related components, the components within the system are within the license renewal scope. Further, applicant's letter to the NRC dated July 3, 2007, License Renewal Application, Amendment 27, Attachment 2 states that there are no nonsafety-related systems for which the applicant has not identified the nonsafety-related portions of systems which are attached to safety-related systems and required to be in the scope of license renewal in accordance with 10 CFR 54.4(a)(2). However, as a result of discussions with the staff during the Region I inspection (February 2007), the applicant determined that some safety-related SSCs in the VY turbine building required consideration for potential spatial impacts from nonsafety-related SSCs in accordance with 10 CFR 54.4(a)(2). Therefore, an expanded review for SSCs in the turbine building determined that additional components required an AMR. Those additional component types were added to LRA Table 2.3.3-13-9, as addressed in the applicant's letters to the NRC dated July 30, 2007 and August 16, 2007.

Based on its review, the staff found the above response acceptable because the applicant stated that if any nonsafety-related portion of a fluid system is located within a building containing safety-related components, the components within the system are within the license renewal scope in accordance with 10 CFR 54.4(a)(2) but that there were spatial impact concerns from nonsafety-related SSCs in the turbine building. The additional component types have been added to LRA Table 2.3.3-13-9. Therefore, the staff concern regarding components of the CW system described in Inspection Item 2.3.3.13e-1 is resolved.

#### **2.3.3.13E.3 Conclusion**

The staff reviewed the LRA, accompanying license renewal drawings and Inspection Item response to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the CW system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.3.13G Feedwater**

##### **2.3.3.13G.1 Summary of Technical Information in the Application**

The feedwater (FW) system provides demineralized water from the condensate system to the reactor vessel at a rate sufficient to maintain adequate reactor vessel water level. The FW system consists of three reactor feedwater pumps, four high-pressure feedwater heaters (two per train), valves, and piping.

The failure of nonsafety-related SSCs in the FW system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-13 identifies the following FW system component types within the scope of license renewal and subject to an AMR:

- bolting
- heat exchanger (shell)
- orifice
- piping
- pump casing
- strainer housing
- tubing
- valve body

The FW system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13G.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.8 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

The staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13G.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the FW system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13J Potable Water

##### 2.3.3.13J.1 Summary of Technical Information in the Application

The potable water (PW) system supplies treated water suitable for drinking and for sanitary purposes to lavatories, service sinks, combination emergency showers and eyewashes, kitchen sinks, bench sinks, showers, and wall hydrants.

The failure of nonsafety-related SSCs in the PW system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-29 identifies the following PW system component types within the scope of license renewal and subject to an AMR:

- bolting
- piping
- filter housing
- strainer housing
- tank
- valve body

The PW system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13J.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 10.15 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13J.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the PW system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13M Reactor Water Clean-Up

##### 2.3.3.13M.1 Summary of Technical Information in the Application

The RWCU system maintains high reactor water purity to limit chemical and corrosive action, to remove corrosion products, and to limit impurities that would activate neutron flux. The RWCU system purifies the reactor coolant water by continuously removing a portion of the reactor recirculation flow from the suction side of a recirculation pump, sending the removed flow through filter-demineralizer units to undergo mechanical filtration and ion exchange processes, and returning the processed fluid back to the reactor via the feedwater line.

The RWCU system has safety-related components relied upon to remain functional during and following DBEs. The failure of nonsafety-related SSCs in the RWCU system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-36 identifies the following RWCU system component types within the scope

of license renewal and subject to an AMR:

- bolting
- filter housing
- heat exchanger (shell)
- orifice
- piping
- pump casing
- strainer housing
- tank
- tubing
- valve body

The RWCU system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13M.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 4.9 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

The staff's review of LRA Section 2.3.3.13.2 identified an area in which additional information was necessary to complete the review of the applicant's scoping and screening results. The applicant responded to the staff's RAI as discussed below.

The staff stated that license renewal drawing LRA-G-191178-SH-01-0, at location D-4, shows the common elbow differential flow element upstream piping and high side instrument lines connected to flow transmitters FT-12-1A and FT-12-1 B as not within the scope of license renewal. A failure of the flow element upstream RWCU piping or common high side instrument line could prevent the flow transmitters from detecting a high flow condition and the subsequent auto isolation of the RWCU isolation valves. The UFSAR states that the high flow auto closure of the RWCU isolation valves prevents excessive loss of reactor coolant and reduces the amount of radioactive material released from the nuclear system caused by an RWCU line break. In RAI 2.3.3.13k-1 dated August 16, 2006, the staff requested that the applicant confirm whether the RWCU high flow auto isolation will occur when negative differential pressure is caused by either failure of the flow element upstream piping or the common high side instrument line. If not, explain why the flow element upstream piping and the common high side instrument lines are not shown to be within the scope of license renewal.

In its response dated September 20, 2006, the applicant stated that the flow element upstream piping and the common high side instrument lines are within the scope of license renewal based on the requirements of 10 CFR 54.4(a)(2) and thus are not shown as highlighted on the drawing. As stated in LRA Table 2.3.3.1B, "Description of Nonsafety-Related System

Components Subject to Aging Management Review Based on 10 CFR 54.4(a)(2) for Physical Interactions," the nonsafety-related portion of the RWCU system located inside the reactor building is within the scope of license renewal and subject to an AMR. The common elbow differential flow element upstream piping and high side instrument lines connected to flow transmitters FT-12-1A and FT-12-1B are located inside the reactor building and are included in Table 2.3.3-13-36, "Reactor Water Clean-Up (RWCU) System Nonsafety-Related Systems and Components Affecting Safety-Related Systems Components Subject to Aging Management Review." They are listed as component types of piping, tubing and valve body. As discussed in LRA Section 2.1.2.1.3, "Mechanical System Drawings," in-scope components required by 10 CFR 54.4(a)(2) are not highlighted on the drawings.

Based on its review, the staff found the applicant response to RAI 2.3.3.13k-1 acceptable because the applicant acknowledged that the flow element upstream piping and the common high side instrument lines connected to flow transmitters FT-12-1A and FT-12-1B are within the scope of license renewal and subject to an AMR, based on the potential for physical interaction with safety-related systems in accordance with 10 CFR 54.4(a)(2). Therefore, the staff concern described in RAI 2.3.3.13k-1 is resolved.

The staff's review of LRA Section 2.3.3.13.2 identified areas in which information provided in the LRA needed to be confirmed by the NRC Regional Inspection Team to complete the review of the applicant's scoping and screening results.

#### **Inspection Item 2.3.3.13m-1**

The LRA states that the RWCU system is within the scope of license renewal in accordance with 10 CFR 54.4(a)(2) because of the potential for physical interaction with safety-related components as described in LRA Table 2.3.3.13-A. The determination of whether a component meets the requirements of 10 CFR 54.4(a)(2) for physical interactions is based on where it is located in a building and its proximity to safety-related equipment or where a structural/seismic boundary exists. This information is not provided on license renewal drawings nor was a detailed description provided in the LRA. Consequently, any omission of RWCU components subject to an AMR cannot be determined. The staff requested that the NRC Regional Inspection Team perform an inspection to ensure that the license renewal scope boundaries for these components satisfy the requirements of 10 CFR 54.4(a)(2) and all the components subject to an AMR are included in LRA Table 2.3.3-13-36.

In Inspection Report 05000271/2007006, Vermont Yankee Nuclear Power Station - NRC License Renewal Inspection Report, dated June 4, 2007, Attachment, Review of Safety Evaluation Report Confirmatory Items, the NRC Regional Inspection Team stated that if any nonsafety-related portion of a fluid system is located within a building containing safety-related components, the components within the system are within the license renewal scope. Further, the applicant's letter to the NRC dated July 3, 2007, License Renewal Application, Amendment 27, Attachment 2 states that there are no nonsafety-related systems for which the applicant has not identified the nonsafety-related portions of systems which are attached to safety-related systems and required to be in the scope of license renewal in accordance with 10 CFR 54.4(a)(2). The applicant also stated that there were no additional components that should be within scope based on 10 CFR 54.4(a) as identified during the NRC Regional Inspection and subsequent applicant reviews.

Based on its review, the staff found the above response acceptable because the applicant

stated that if any nonsafety-related portion of a fluid system is located within a building containing safety-related components, the components within the system are within the license renewal scope in accordance with 10 CFR 54.4(a)(2) and that there were no additional components identified that should be in-scope based on 10 CFR 54.4(a). Therefore, the staff concern regarding the components of the RWCU system described in Inspection Item 2.3.3.13m-1 is resolved.

#### 2.3.3.13M.3 Conclusion

The staff reviewed the LRA and RAI and inspection item responses to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the RWCU system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13N Stator Cooling

##### 2.3.3.13N.1 Summary of Technical Information in the Application

The stator cooling system cools the stator winding of the main generator. The system permits generator load changes with minimum variation of stator winding temperature. The stator copper is in direct contact with low conductivity water of automatically-controlled temperature and pressure; therefore, average copper temperature can be kept essentially constant, practically eliminating thermal stress cycling of the insulation.

The failure of nonsafety-related SSCs in the stator cooling system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-39 identifies the following stator cooling system component types within the scope of license renewal and subject to an AMR:

- cooler
- piping
- valve body
- bolting
- filter housing
- heat exchanger (shell)
- pump casing
- strainer housing
- tank
- tubing

The stator cooling system component intended function within the scope of license renewal is to provide pressure boundary.

##### 2.3.3.13N.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 8.2.3.11.2 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13N.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the stator cooling system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.13O HD and HV Instruments**

#### **2.3.3.13O.1 Summary of Technical Information in the Application**

The HD and HV Instruments system provides indication, alarm, and control functions for associated systems (heater drains and heater vents).

The failure of nonsafety-related SSCs in the HD and HV Instruments system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-43 identifies the following HD and HV Instruments system component types within the scope of license renewal and subject to an AMR:

- bolting
- piping
- tubing
- valve body

The HD and HV Instruments system component intended function within the scope of license renewal is to provide pressure boundary.

#### **2.3.3.13O.2 Staff Evaluation**

The staff reviewed LRA Section 2.3.3.13.2 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### **2.3.3.13O.3 Conclusion**

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the HD and HV instruments system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.13P Air Evacuation**

#### **2.3.3.13P.1 Summary of Technical Information in the Application**

The air evacuation system (AE) evacuates gases from the main turbine and main condenser during startup and maintains these systems free of noncondensable gases during operation.

The failure of nonsafety-related SSCs in the AE system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-44 identifies the following AE system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- heat exchanger (shell)
- piping
- pump casing
- rupture disk
- strainer housing
- trap
- tubing
- valve body

The AE component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13P.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.4 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13P.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the AE system components within the scope of license renewal, as required by 10 CFR 54.4(a); and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

### **2.3.3.13Q Building (Drainage System Components)**

#### 2.3.3.13Q.1 Summary of Technical Information in the Application

The building system includes floor drains and the site sewers. This system classification also includes buildings and structures which are evaluated in Section 2.4 of this SER. The drainage systems remove operational waste fluids from their points of origin in a controlled manner and deliver them to a suitable disposal system.

The failure of nonsafety-related SSCs in the building system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-46 identifies the following building system component types within the scope of license renewal and subject to an AMR:

- bolting
- piping

The building system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13Q.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 10.16 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13Q.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the building drainage system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13R Circulating Water Priming

##### 2.3.3.13R.1 Summary of Technical Information in the Application

The circulating water priming (CWP) system provides for air evacuation from the discharge side of the main condenser. The system ensures that air will not hinder circulating water flow by collecting in the upper portions of the condenser water boxes or in the upper portion of the circulating water discharge piping.

The failure of nonsafety-related SSCs in the CWP system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-47 identifies the following CWP system component types within the scope of license renewal and subject to an AMR:

- bolting
- piping
- pump casing
- tank
- trap
- tubing
- valve body

The CWP system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13R.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.6.3 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13R.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the CWP system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13S Extraction Steam

##### 2.3.3.13S.1 Summary of Technical Information in the Application

The extraction steam (ES) system supplies steam to the shell side of various feedwater heaters for condensate and feedwater heating. ES is piped from the main turbine casing and cross-around piping to the shells of two parallel strings of reactor feedwater heaters.

The failure of nonsafety-related SSCs in the ES system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-48 identifies the following ES system component types within the scope of license renewal and subject to an AMR:

- bolting
- expansion joint
- orifice

- piping
- tubing
- valve body

The ES system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13S.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.5.4.3 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13S.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the ES system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13T Heater Drain

##### 2.3.3.13T.1 Summary of Technical Information in the Application

The heater drain (HD) system provides proper level and control for the moisture separator and feedwater heaters by providing drain capability to the main condenser. Condensate drainage from the drain coolers of each feedwater heater flows to the next lower pressure heater by means of pressure differential between successive heaters. Condensate flow may be aided by a heater drain pump between the two lowest pressure heaters in each string.

The failure of nonsafety-related SSCs in the HD system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-49 identifies the following HD system component types within the scope of license renewal and subject to an AMR:

- bolting
- piping
- pump casing
- tank

- tubing
- valve body

The HD system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13T.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.8.3.2 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13T.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the HD system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13U Heater Vent

##### 2.3.3.13U.1 Summary of Technical Information in the Application

The heater vent (HV) system provides for venting of non-condensable gases back to the main condenser.

The failure of nonsafety-related SSCs in the HV system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-50 identifies the following HV system component types within the scope of license renewal and subject to an AMR:

- bolting
- orifice
- piping
- tank
- tubing
- valve body

The HV system component intended function within the scope of license renewal is to provide pressure boundary.

### 2.3.3.13U.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

### 2.3.3.13U.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the HV system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

### 2.3.3.13V Make-up Demineralizer

#### 2.3.3.13V.1 Summary of Technical Information in the Application

The make-up demineralizer (MUD) system provides a supply of treated water that may be used as makeup for the station and reactor cycles. The MUD system consists of one train that consists of a cation, anion, and a mixed bed ion exchanger.

The failure of nonsafety-related SSCs in the MUD system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-53 identifies the following MUD system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- piping
- pump casing
- tank
- tubing
- valve body

The MUD system component intended function within the scope of license renewal is to provide pressure boundary.

#### 2.3.3.13V.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 10.13 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13V.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the MUD system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13W Seal Oil

##### 2.3.3.13W.1 Summary of Technical Information in the Application

The seal oil (SO) system provides shaft sealing for the main generator.

The failure of nonsafety-related SSCs in the SO system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-55 identifies the following SO system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- piping
- pump casing
- sight glass
- tank
- tubing
- valve body

The SO system component intended function within the scope of license renewal is to provide pressure boundary.

##### 2.3.3.13W.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.2.3 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13W.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the SO system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13X Turbine Building Closed Cooling Water

##### 2.3.3.13X.1 Summary of Technical Information in the Application

The turbine building closed cooling water (TBCCW) system supplies demineralized water to cool various nonsafety-related auxiliary equipment located in the turbine building in support of power generation. The system consists of two pumps, two 100% capacity heat exchangers and the necessary controls, piping, and instrumentation. Station service water provides the cooling medium for the TBCCW heat exchangers, however it is automatically isolated if service water pressure drops to a preset value which could occur under a condition of concurrent loss-of-coolant accident and loss of off-site power. No essential equipment is cooled by the TBCCW system.

The failure of nonsafety-related SSCs in the TBCCW system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-56 identifies the following TBCCW system component types within the scope of license renewal and subject to an AMR:

- bolting
- heat exchanger (shell)
- piping
- pump casing
- tank
- tubing
- valve body

The TBCCW system component intended function within the scope of license renewal is to provide pressure boundary.

##### 2.3.3.13X.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 10.10 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13X.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the TBCCW system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13Y Main Turbine Generator

##### 2.3.3.13Y.1 Summary of Technical Information in the Application

The main turbine generator (TG) system converts the thermodynamic energy of steam into electrical energy for use on the transmission network and the station auxiliary busses.

The failure of nonsafety-related SSCs in the TG system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-57 identifies the following TG system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- piping
- pump casing
- turbine casing
- tubing
- valve body

The TG system component intended function within the scope of license renewal is to provide pressure boundary.

##### 2.3.3.13Y.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.2 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13Y.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the TG system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13Z Turbine Lube Oil

##### 2.3.3.13Z.1 Summary of Technical Information in the Application

The turbine lube oil (TLO) system provides lube oil for lubrication of the main turbine

The failure of nonsafety-related SSCs in the TLO system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.3-13-58 identifies the following TLO system component types within the scope of license renewal and subject to an AMR:

- bolting
- filter housing
- heat exchanger (shell)
- piping
- pump casing
- strainer housing
- tank
- tubing
- valve body

The TLO system component intended function within the scope of license renewal is to provide pressure boundary.

##### 2.3.3.13Z.2 Staff Evaluation

The staff reviewed LRA Section 2.3.3.13.2 and UFSAR Section 11.2.3 using the Tier-1 evaluation methodology described in SER Section 2.3 and the guidance described in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any

components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.3.13Z.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the TLO system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

### 2.3.4.1 Auxiliary Steam

#### 2.3.4.1.1 Summary of Technical Information in the Application

LRA Section 2.3.4.1 describes the auxiliary steam (AS) system, which provides steam from MS piping to the steam jet air ejector to maintain main condenser vacuum. The AS system consists of the steam jet air ejector and associated equipment.

The failure of nonsafety-related SSCs in the AS system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.4-1 and Table 2.3.3-13-45 identify the following AS system component types within the scope of license renewal and subject to an AMR:

- bolting
- condenser
- orifice
- expansion joint
- heat exchanger (shell)
- heat exchanger (tubes)
- piping
- strainer housing
- steam trap
- thermowell
- tubing
- valve body

The AS system component intended functions within the scope of license renewal include the following:

- pressure boundary
- holdup and plateout of fission products

#### 2.3.4.1.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.1 and UFSAR Section 11.4 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.4.1.3 Conclusion

The staff reviewed the LRA and accompanying license renewal drawings to determine whether

the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the AS system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.4.2 Condensate**

##### **2.3.4.2.1 Summary of Technical Information in the Application**

LRA Section 2.3.4.2 describes the condensate system, which receives condensed steam from the condenser and supplies it to the reactor feedwater system as well as such other components and systems as the air ejector condensers, steam packing exhausters, and CRD pumps. The condensate system consists of a single train with three parallel pumps drawing condensate from the two main condenser hotwells and includes the main condenser. During normal operation, all three pumps provide sufficient condensate flow capacity and net positive suction head to the reactor feedwater pumps during full power operation. Condensate flow to the reactor feed pumps passes through two parallel low-pressure feedwater heater strings, each with three heaters. Condensate flow exiting the low-pressure heaters is provided to a common reactor feed pump suction header.

The failure of nonsafety-related SSCs in the condensate system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Tables 2.3.4-1 and 2.3.3-13-2 identify the following condensate component types within the scope of license renewal and subject to an AMR:

- bolting
- condenser
- orifice
- expansion joint
- heat exchanger (shell)
- heat exchanger (tubes)
- orifice
- piping
- pump casing
- strainer housing
- thermowell
- steam trap
- tank
- tubing
- valve body

The condensate system component intended functions within the scope of license renewal include the following:

- pressure boundary

- holdup and plateout of fission products

#### 2.3.4.2.2 Staff Evaluation

The staff reviewed LRA Sections 2.3.4.2 and 2.3.3.13, and UFSAR Section 11.8 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

In conducting its review, the staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.4.2.3 Conclusion

The staff reviewed the LRA to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the condensate components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).

#### **2.3.4.3 Main Steam**

##### 2.3.4.3.1 Summary of Technical Information in the Application

LRA Section 2.3.4.3 describes the MS system, which completes the transmission of steam from the seismic Class I steam piping to the main turbine at a controlled pressure during normal operation. The MS system consists of nonsafety-related components. (The nuclear boiler system contains the seismic Class I portion of the MS system which extends from the reactor vessel to the restraint at the second MS isolation valve. The system consists of the non-seismic Class I components beyond this point.) The MS system includes the turbine stop and control valves. A low-point drain line is downstream of each turbine control valve continuously draining the steam line low points through an orificed header to the condenser hotwell. The MS system has the ability to bypass the turbine when necessary. The main turbine bypass system has two valve chests, each with five automatically operated regulating bypass valves proportionally controlled by the turbine pressure regulator and control system. The bypass system opens whenever the amount of steam admitted into the turbine is less than that generated by the reactor. The MS system provides main turbine sealing steam.

The failure of nonsafety-related SSCs in the MS system potentially could prevent the satisfactory accomplishment of a safety-related function.

LRA Table 2.3.4-1 and Table 2.3.3-13-52 identify the following MS system component types within the scope of license renewal and subject to an AMR:

- bolting

- condenser
- orifice
- expansion joint
- heat exchanger (tubes)
- heat exchanger (shell)
- piping
- strainer housing
- thermowell
- steam trap
- tubing
- valve body

The MS system component intended functions within the scope of license renewal include the following:

- pressure boundary
- holdup and plateout of fission products

#### 2.3.4.3.2 Staff Evaluation

The staff reviewed LRA Section 2.3.4.3 and UFSAR Sections 11.4 and 11.5 using the Tier-2 evaluation methodology described in SER Section 2.3 and the guidance in SRP-LR Section 2.3.

In conducting its review, staff evaluated the system functions described in the LRA and UFSAR to verify that the applicant has not omitted from the scope of license renewal any components with intended functions as required by 10 CFR 54.4(a). The staff then reviewed those components that the applicant has identified as within the scope of license renewal to verify that the applicant has not omitted any passive and long-lived components subject to an AMR as required by 10 CFR 54.21(a)(1).

#### 2.3.4.3.3 Conclusion

The staff reviewed the LRA and accompanying license renewal drawings to determine whether the applicant failed to identify any SSCs within the scope of license renewal or subject to an AMR. The staff finds no such omissions. On the basis of its review, the staff concludes that there is reasonable assurance that the applicant has adequately identified the MS system components within the scope of license renewal, as required by 10 CFR 54.4(a), and those subject to an AMR, as required by 10 CFR 54.21(a)(1).