

CALLAWAY PLANT UNIT 1  
LICENSE RENEWAL APPLICATION

REQUEST FOR ADDITIONAL INFORMATION (RAI) SET #24 RESPONSE

**RAI 2.3.3.20-1a**

Background:

In its response to the staff's RAI 2.3.3.20-1, dated July 2, 2012, the applicant provided additional information related to whether the following systems and components are within the scope of license renewal: fire suppression systems associated with the auxiliary boiler room, turbine building north area below turbine (El. 2000'-0"), north area below turbine (El. 2033'-0"), south area below turbine (El. 2000'-0"), and south area below turbine (El. 2033'-0"), turbine generator bearing, condenser pit, and hydrogen seal oil unit. For the auxiliary boiler room fire suppression system, the applicant stated that the auxiliary boiler room is separated from adjoining safe-shutdown areas by 3-hour-rated fire barriers and contain no post-fire safe-shutdown equipment, circuits, or safety-related equipment; therefore, the fire water suppression system for the auxiliary boiler room is not within the scope of license renewal and is not subject to an AMR. For the turbine building north area below turbine (El. 2000'-0"), north area below turbine (El. 2033'-0"), south area below turbine (El. 2000'-0"), and south area below turbine (El. 2033'-0"), the applicant stated that there is no post-fire safe-shutdown or safety-related equipment in the turbine building. The applicant also stated that the fire water suppression systems for the turbine building locations above are for loss prevention and property protection only and are not required to meet the fire protection criteria of 10 CFR 50.48, "Fire protection." Therefore, the applicant stated, the fire water suppression systems for these areas of the turbine building are not in scope for license renewal and are not subject to an AMR. For the turbine generator bearing, condenser pit, and hydrogen seal oil unit fire suppression systems, the applicant stated that these areas are separated from the adjacent auxiliary building by 3-hour-rated fire barrier walls. The applicant also stated that fire suppression systems and components in question are not within the scope of license renewal and subject to an AMR because these areas do not contain post-fire safe-shutdown equipment and a fire in this area will not prevent safe-shutdown.

Issue:

The staff finds that the applicant's analysis of fire protection regulations does not completely capture the fire protection systems, structures, and components (SSCs) required for compliance with 10 CFR 50.48. The applicant indicated that the fire suppression systems in question perform no intended function in support of the plant license renewal and, therefore, are excluded from the scope of license renewal and are not subject to an AMR. The staff finds this contrary to the Callaway FSAR which includes the original Callaway fire protection Safety Evaluation, NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No.1," dated October 1981, as part of the current licensing basis.

The staff therefore, does not agree with the applicant's proposed change to exclude the above fire suppression SSCs from the scope of license renewal. The staff finds that the above fire suppression SSCs should be within the scope of license renewal in accordance with 10 CFR 54.4(a)(3) because they are required for compliance with 10 CFR 50.48, requirements of Appendix A to Branch Technical Position Auxiliary and Power Conversion Systems Branch 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants, Docketed Prior to July 1, 1976," Regulatory Positions C.3.a and C.3.d. Additional information is needed on the basis of the applicant to exclude the above fire suppression SSCs from the scope of license renewal.

Request:

The staff requests the applicant to provide additional information on its basis to exclude from the scope of license renewal those SSCs in the fire suppression systems associated with the auxiliary boiler room, turbine building north area below turbine (El. 2000'-0"), north area below turbine (El. 2033'-0"), south area below turbine (El. 2000'-0"), and south area below turbine (El. 2033'-0"), turbine generator bearing, condenser pit, and hydrogen seal oil unit. If these fire suppression SSCs are within the scope of license renewal please revise the LRA and boundary drawings accordingly.

**Callaway Response**

RAI 2.3.3.20-1a references Appendix A to Branch Technical Position Auxiliary and Power Conversion Systems Branch 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants, Docketed Prior to July 1, 1976," Regulatory Positions E.3.a and E.3.d. Reference to Regulatory Positions E.3.a and E.3.d is different than the reference in the issue statement but was verified by the NRC Project Manager to be correct.

In response to RAI 2.3.3.20-1a, Callaway has added the fire suppression systems in the following locations to the scope of license renewal:

Boundary Drawing LR-CW-KC-M-22KC02

- Auxiliary boiler room

Boundary Drawing LR-CW-KC-M-22KC01

- Turbine building north area below turbine (El. 2000'-0"),
- Turbine building north area below turbine (El. 2033'-0"),
- Turbine building south area below turbine (El. 2000'-0"),
- Turbine building south area below turbine (El. 2033'-0"),
- Turbine generator bearings,
- Turbine building condenser pit, and
- Turbine building hydrogen seal oil unit

Boundary Drawing LR-CW-KC-M-22KC03

- Updated deluge valve applicability list

Boundary Drawing LR-CW-KC-M-22KC08

- Sprinkler header updates consistent with boundary drawings LR-CW-KC-M-22KC01 and LR-CW-KC-M-22KC02

Boundary Drawing LR-CW-KC-M-22KC09

- Added turbine bearing deluge valve

LRA Section 2.3.3.20 has been revised as shown in LRA Amendment 24 in Enclosure 2 to add a new boundary drawing for the fire protection system located in the Turbine Building. LRA Section 3.3.2.1.20 and Table 3.3.2-20 have been revised as shown in LRA Amendment 24 in Enclosure 2 to add the following:

- Selective leaching as an aging effect for copper alloy fire protection system components with greater than 15 percent zinc.

- Aging management of copper alloy fire protection system components with greater than 15 percent zinc by the Selective Leaching program (B2.1.19) and Fire Water System program (B2.1.14)
- Aging management of carbon steel flow orifices

The above fire suppression SSCs are not required to achieve and maintain safe shutdown in the event of a fire (refer to FSAR Section 9.5.1 and Appendix 9.5B Fire Hazards Analysis). However, they are being added to the scope of license renewal due to the fact that they are discussed in NUREG-0830, "Safety Evaluation Report related to the operation of Callaway Plant, Unit No.1," dated October 1981.

As noted by the Staff in RAI 2.3.3.20-3, Callaway has submitted a License Amendment Request (LAR) to transition to a fire protection program based on 10 CFR 50.48(c), which incorporates, by reference, NFPA 805, with exceptions. The fire protection program based on NFPA 805 replaces the commitments to BTP APCSB 9.5-1, Appendix A, and 10 CFR 50, Appendix R. Callaway has developed a preliminary gap analysis comparing the two programs with respect to License Renewal to 1) identify equipment required by the NFPA 805 program which is not currently within the scope of License Renewal, and 2) identify components within the scope of License Renewal for fire protection but which are not required by the NFPA 805 program. With exception of the fire suppression system for the auxiliary boiler room, the fire suppression system for turbine building fire areas noted above will be required by the NFPA 805 Nuclear Safety Capability Analysis and therefore would have been added to the scope of license renewal following approval of the NFPA 805 LAR.

The auxiliary boiler room contains no equipment required by the NFPA 805 Nuclear Safety Capability Analysis for safe shutdown. The walls of the auxiliary boiler room are credited as fire barriers, and there are no requirements for fire suppression in the auxiliary boiler room by the NFPA 805 program. As part of the transition to the NFPA 805 fire protection program, the fire suppression system for the auxiliary boiler room will be removed from the scope of License Renewal following approval of the NFPA 805 LAR.

### **Corresponding Amendment Changes**

Refer to the Enclosure 2 Summary Table "Amendment 24, LRA Changes from RAI Response," for a description of LRA changes with this response.

## **Amendment 24, LRA Changes from RAI Response**

### **Enclosure 2 Summary Table**

<b><u>Affected LRA Section</u></b>	<b><u>LRA Page</u></b>
Section 2.3.3.20	2.3-63
Section 3.3.2.1.20	3.3-24
Table 3.3.2-20	3.3-206, 3.3-210, 3.3-212, and 3.3-215

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**Section 2.3.3.20 (page 2.3-63) is revised as follows (new text shown underlined)**

halon 1301 storage cylinders, distribution piping and discharge nozzles. The safety-related components at the containment penetration are included in this system.

The fire detection and actuation portion of the system is evaluated as part of the electrical and instrumentation and control evaluations in [Section 2.5, Scoping and Screening Results: Electrical and Instrumentation and Control Systems](#). Except where specifically identified, fire dampers are evaluated as part of the assigned HVAC systems. Other passive fire barriers are screened as part of their associated structures in [Section 2.4, Scoping and Screening Results: Structures](#). Fire suppression piping components for the fuel building ventilation charcoal filter elements and control room ventilation charcoal filter elements are evaluated as part of their associated heating, ventilation and air conditioning systems. Containment penetrations are evaluated as part of the reactor building structure in [Section 2.4.1, Reactor Building](#).

**System Intended Functions**

The fire protection system provides containment isolation at a containment penetration. Therefore, the fire protection system is within the scope of license renewal based on the criteria of 10 CFR 54.4(a)(1).

Portions of the fire protection system are within the scope of license renewal as nonsafety-related affecting safety-related components based on the criterion of 10 CFR 54.4(a)(2) for structural integrity.

Portions of the fire protection system are within the scope of license renewal to support fire protection requirements and environmental qualification requirements based upon the criteria of 10 CFR 54.4(a)(3).

**Callaway FSAR References**

Additional details of the fire protection system are included in [FSAR Section 9.5.1 SP](#).

**License Renewal Boundary Drawings**

The license renewal boundary drawings for the fire protection system are listed below:

[LR-CW-KC-M-22KC01](#)  
[LR-CW-KC-M-22KC02](#)  
[LR-CW-KC-M-22KC03](#)  
[LR-CW-KC-M-22KC04](#)  
[LR-CW-KC-M-22KC05](#)  
[LR-CW-KC-M-22KC06](#)  
[LR-CW-KC-M-22KC07](#)  
[LR-CW-KC-M-22KC08](#)  
[LR-CW-KC-M-22KC09](#)

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**Section 3.3.2.1.20 (page 3.3-24) is revised as follows (new text shown underlined)**

**Aging Effects Requiring Management**

The following containment cooling system aging effects require management:

- Hardening and loss of strength
- Loss of material
- Loss of preload
- Reduction of heat transfer

**Aging Management Programs**

The following aging management programs manage the aging effects for the containment cooling system component types:

- Bolting Integrity ([B2.1.8](#))
- Boric Acid Corrosion ([B2.1.4](#))
- External Surfaces Monitoring of Mechanical Components ([B2.1.21](#))
- Inspection of Internal Surfaces in Miscellaneous Piping and Ducting Components ([B2.1.23](#))
- Open-Cycle Cooling Water System ([B2.1.10](#))

**3.3.2.1.20 Fire Protection System**

**Materials**

The materials of construction for the fire protection system component types are:

- Aluminum
- Carbon Steel
- Carbon Steel (Galvanized)
- Cast Iron (Gray Cast Iron)
- Copper Alloy
- Copper Alloy (>15% Zinc)
- Polyvinyl Chloride (PVC)
- Stainless Steel

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Corrected the material for flow orifices. No new Plant Notes are added.

Table 3.3.2-20, Fire Protection System (Page 3.3-206), is revised as follows (new text shown underlined and deleted text shown in strikethrough):

Table 3.3.2-20 Auxiliary Systems – Summary of Aging Management Evaluation – Fire Protection System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Flow Orifice	PB	<del>Copper Alloy</del> <u>Carbon Steel</u>	Plant Indoor Air (Ext)	<del>None</del> <u>Loss of material</u>	<del>None</del> <u>External Surfaces</u> <u>Monitoring of Mechanical</u> <u>Components (B2.1.21)</u>	<del>VII.J.AP-144</del> <u>VII.A-77</u>	<del>3.3.1.114</del> <u>3.3.1.078</u>	A
Flow Orifice	PB	<del>Copper Alloy</del> <u>Carbon Steel</u>	Raw Water (Int)	Loss of material	Fire Water System ( <u>B2.1.14</u> )	<del>VII.G.AP-197</del> <u>VII.G.A-33</u>	<u>3.3.1.064</u>	B



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Corrected the material for solenoid valves. No new Plant Notes are added.

Table 3.3.2-20, Fire Protection System (Page 3.3-210), is revised as follows (new text shown underlined and deleted text shown in strikethrough):

*Table 3.3.2-20 Auxiliary Systems – Summary of Aging Management Evaluation – Fire Protection System*

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Solenoid Valve	PB	Copper Alloy ( <u>&gt; 15% Zinc</u> )	Plant Indoor Air (Ext)	None	None	VII.J.AP-144	<u>3.3.1.114</u>	A
Solenoid Valve	PB	Copper Alloy ( <u>&gt; 15% Zinc</u> )	Raw Water (Int)	Loss of material	Fire Water System (B2.1.14)	VII.G.AP-197	3.3.1.064	B
Solenoid Valve	PB	Copper Alloy ( <u>&gt; 15% Zinc</u> )	Raw Water (Int)	Loss of material	<del>Fire Water System (B2.1.14)</del> <u>Selective Leaching (B2.1.19)</u>	<del>VII.G.AP-197</del> <u>VII.G.A-47</u>	<del>3.3.1.064</del> <u>3.3.1.072</u>	B

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Corrected the material for strainers. No new Plant Notes are added.

Table 3.3.2-20, Fire Protection System (Page 3.3-212), is revised as follows (new text shown underlined and deleted text shown in strikethrough):

*Table 3.3.2-20 Auxiliary Systems – Summary of Aging Management Evaluation – Fire Protection System*

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
Strainer	PB	Copper Alloy ( <u>&gt; 15% Zinc</u> )	Plant Indoor Air (Ext)	None	None	VII.J.AP-144	<u>3.3.1.114</u>	A
Strainer	PB	Copper Alloy ( <u>&gt; 15% Zinc</u> )	Raw Water (Int)	Loss of material	Fire Water System (B2.1.14)	VII.G.AP-197	3.3.1.064	B
Strainer	PB	Copper Alloy ( <u>&gt; 15% Zinc</u> )	Raw Water (Int)	Loss of material	<del>Fire Water System (B2.1.14)</del> <u>Selective Leaching (B2.1.19)</u>	<del>VII.G.AP-197</del> <u>VII.G.A-47</u>	<del>3.3.1.064</del> <u>3.3.1.072</u>	B

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Added copper alloy (> 15% zinc) valves. No new Plant Notes are added.

Table 3.3.2-20, Fire Protection System (Page 3.3-215), is revised as follows (new text shown underlined):

Table 3.3.2-20 Auxiliary Systems – Summary of Aging Management Evaluation – Fire Protection System

Component Type	Intended Function	Material	Environment	Aging Effect Requiring Management	Aging Management Program	NUREG-1801 Item	Table 1 Item	Notes
<u>Valve</u>	<u>PB</u>	<u>Copper Alloy (&gt; 15% Zinc)</u>	<u>Plant Indoor Air (Ext)</u>	<u>None</u>	<u>None</u>	<u>VII.J.AP-144</u>	<u>3.3.1.114</u>	<u>A</u>
<u>Valve</u>	<u>PB</u>	<u>Copper Alloy (&gt; 15% Zinc)</u>	<u>Raw Water (Int)</u>	<u>Loss of material</u>	<u>Fire Water System (B2.1.14)</u>	<u>VII.G.AP-197</u>	<u>3.3.1.064</u>	<u>B</u>
<u>Valve</u>	<u>PB</u>	<u>Copper Alloy (&gt; 15% Zinc)</u>	<u>Raw Water (Int)</u>	<u>Loss of material</u>	<u>Selective Leaching (B2.1.19)</u>	<u>VII.G.A-47</u>	<u>3.3.1.072</u>	<u>B</u>