



Callaway Plant

November 7, 2019

ULNRC-06509

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555-0001

10 CFR 50.48

Ladies and Gentlemen:

**DOCKET NUMBER 50-483**  
**CALLAWAY PLANT UNIT 1**  
**UNION ELECTRIC CO.**  
**RENEWED FACILITY OPERATING LICENSE NPF-30**  
**PERFORMANCE BASED METHOD ALTERNATIVE FOR THERMAL INSULATION**  
**MATERIAL (LDCN 19-0012)**

References:

1. ULNRC-05781, "Request for License Amendment to Adopt NFPA 805, 'Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)'," dated August 29, 2011 (ADAMS Accession No. ML112420022)
2. Letter dated January 13, 2014 from Carl Lyon, USNRC, to Adam Heflin, Union Electric Company, "Callaway Plant, Unit 1 - Issuance of Amendment Regarding Transition to a Risk-Informed, Performance-Based Fire Protection Program in Accordance with 10 CFR 50.48(c)" (ADAMS Accession No. ML13274A596)

In accordance with 10 CFR 50.48(c)(2)(vii), Ameren Missouri is submitting this License Amendment Request (LAR) for approval to modify the NFPA 805-based fire protection program that was approved for the Callaway Plant per Reference 2. The change would allow, as a performance-based method, use of closed cell foam thermal insulation materials in limited applications subject to appropriate engineering reviews and controls. Such use is a deviation from National Fire Protection Association (NFPA) 805 Chapter 3, Section 3.3, "Prevention."

Attachment 1 to this letter provides the technical basis for this request. Attachment 2 provides a mark-up of the affected page from NEI 04-02 Table B-1, "Transition of Fundamental Fire Protection Program and Design Elements," as completed for Callaway and provided as Attachment A of Enclosure 1 to the Reference 1 LAR. Attachment 3 provides the "clean" table page reflecting the

proposed fire protection program change, i.e., incorporation of the Attachment 2 mark-up (if approved). Attachment 4 provides a table identifying the major applications of the closed cell foam thermal insulation materials in the Callaway Plant.

It has been determined that this amendment application does not involve a significant hazard consideration as determined per 10 CFR 50.92, "Issuance of amendment." Pursuant to 10 CFR 51.22, "Criterion for categorical exclusion; identification of licensing and regulatory actions eligible for categorical exclusion or otherwise not requiring environmental review," section (b), no environmental impact statement or environmental assessment needs to be prepared in connection with the issuance of this amendment.

In accordance with 10 CFR 50.91, "Notice for public comment; State consultation," section (b)(1), a copy of this amendment application (including Attachments 1 through 4) is being provided to the designated Missouri State official.

This amendment application was reviewed by the Onsite Review Committee. This submittal does not contain new commitments.

Ameren Missouri requests approval of this LAR prior to November 7, 2020. It is anticipated that the license amendment, as approved, will be effective upon issuance and will be implemented within 90 days from the date of issuance.

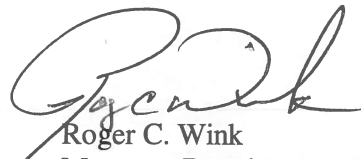
If you have any questions concerning this matter, please contact me at 573-310-7025 or Mr. Tom Elwood at 314-225-1905.

I declare under penalty of perjury that the foregoing is true and correct.

Sincerely,

Executed on:

November 7, 2019

  
Roger C. Wink  
Manager, Regulatory Affairs

Attachments:

1. Evaluation of the Proposed Change
2. NEI 04-02 Table B-1, "Transition of Fundamental Fire Protection Program and Design Elements" – Marked-Up Page
3. NEI 04-02 Table B-1, "Transition of Fundamental Fire Protection Program and Design Elements" – Clean Page
4. Major Applications Table

ULNRC-06509  
November 7, 2019  
Page 3 of 4

cc: Mr. Scott A. Morris  
Regional Administrator  
U. S. Nuclear Regulatory Commission  
Region IV  
1600 East Lamar Boulevard  
Arlington, TX 76011-4511

Senior Resident Inspector  
Callaway Resident Office  
U.S. Nuclear Regulatory Commission  
8201 NRC Road  
Steedman, MO 65077

Mr. L. John Klos  
Project Manager, Callaway Plant  
Office of Nuclear Reactor Regulation  
U. S. Nuclear Regulatory Commission  
Mail Stop O9E3  
Washington, DC 20555-0001

**Index and send hardcopy to QA File A160.0761**

**Hardcopy:**

Certrec Corporation  
6100 Western Place, Suite 1050  
Fort Worth, TX 76107  
(Certrec receives ALL attachments as long as they are non-safeguards and may be publicly disclosed.)

**Electronic distribution for the following can be made via Tech Spec ULNRC Distribution:**

F. M. Diya  
T. E. Herrmann  
B. L. Cox  
S. P. Banker  
F. J. Bianco  
S. G. Kovaleski  
L. H. Kanuckel  
R. C. Wink  
T. B. Elwood  
J. C. Pitts  
M. K. Fletcher  
NSRB Secretary  
STARS Regulatory Affairs  
Mr. Jay Silberg (Pillsbury Winthrop Shaw Pittman LLP)  
Missouri Public Service Commission  
Katie Jo Wheeler (DNR)  
Mr. Steve Feeler (DNR)

## **Attachment 1**

### **Evaluation of the Proposed Change**

**14 Pages**

## EVALUATION OF THE PROPOSED CHANGE

<b>1.0</b>	<b>SUMMARY DESCRIPTION.....</b>	<b>Page 2</b>
<b>2.0</b>	<b>DETAILED DESCRIPTION.....</b>	<b>Page 2</b>
2.1	Proposed Changes.....	Page 2
<b>3.0</b>	<b>TECHNICAL EVALUATION.....</b>	<b>Page 3</b>
3.1	Technical Basis for the Request.....	Page 3
3.2	Nuclear Safety and Radiological Release Performance Criteria.....	Page 4
3.3	Defense-in-Depth.....	Page 5
3.4	Nuclear Safety and Radiological Release Performance Criteria.....	Page 6
3.5	Future Installations.....	Page 7
3.6	Conclusions.....	Page 7
<b>4.0</b>	<b>REGULATORY EVALUATION.....</b>	<b>Page 8</b>
4.1	Applicable Regulatory Requirements/Criteria.....	Page 8
4.2	No Significant Hazards Consideration Determination.....	Page 11
4.3	Conclusion.....	Page 13
<b>5.0</b>	<b>ENVIRONMENTAL CONSIDERATION.....</b>	<b>Page 13</b>
<b>6.0</b>	<b>REFERENCES.....</b>	<b>Page 14</b>

## **1.0 SUMMARY DESCRIPTION**

By letter dated January 13, 2014, the NRC issued License Amendment 206 for the Callaway Plant, approving the transition of the fire protection licensing basis for Callaway to NFPA Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition)," dated August 29, 2011, and its supplements. The NFPA 805-based fire protection program for Callaway and its conformance to 10 CFR 50.48 is recognized and addressed in paragraph 2.C.(5) of the Callaway Operating License. Provisions for changes to the fire protection program are specified in license condition 2.C.(5) "except where NRC approval for changes or deviations is required by 10 CFR 50.48(c)," as noted in the license condition.

In accordance with 10 CFR 50.48(c)(2)(vii), Ameren Missouri is requesting approval to modify the approved fire protection program for Callaway. The change would allow, as a performance-based method, use of closed cell foam thermal insulation materials in limited applications subject to appropriate engineering reviews and controls.

In several fire areas at Callaway, exposed thermal insulation materials are installed on various sections of heating, ventilation, and air conditioning (HVAC) system piping to prevent sweating. Although these materials comply with the flame spreading rating of 25 or less, they do not meet the definition of a limited combustible due to their heat value exceeding 3,500 BTU/lb. NRC approval is requested to allow, as a performance-based method, these currently installed thermal insulation materials to be retained, as well as to allow the future use of these insulation materials in limited applications. The use of such materials, which is a deviation from NFPA 805 Chapter 3, Section 3.3, "Prevention," will be subject to appropriate engineering reviews and controls.

## **2.0 DETAILED DESCRIPTION**

### **2.1 Proposed Changes**

To reflect the proposed change regarding use of the noted thermal insulation materials, a fire protection program document would be revised that was provided as part of the LAR originally submitted for adoption of the NFPA Standard 805, i.e., Ameren Missouri letter ULNRC-05781, "Request for License Amendment to Adopt NFPA 805, 'Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition),' dated August 29, 2011. The affected table was contained in Attachment A included as part of the Callaway Plant NFPA 805 Transition Report (Enclosure 1 to the noted letter), specifically, NEI 04-02 Table B-1, "Transition of Fundamental Fire Protection Program & Design Elements." A markup and clean copy of the affected page from Table B-1 is provided in Attachments 2 and 3 of this submittal, respectively.

The changes to be made to Table B-1, if approved, are for NFPA 805 Chapter 3 Element 3.3.4, "Insulation Materials," as described below.

- The compliance statement in the "Compliance Basis" column is being changed from "No Additional Clarification" to "Applicable to thermal insulation materials,

radiation shielding materials, ventilation duct materials, and soundproofing materials."

- In the second row under Element 3.3.4, under the "Compliance Statement" column, the statement "Complies by NRC approval" is being added.
- Under the column labeled "Compliance Basis," "Closed Cell Foam Thermal Insulation Materials" is being added.
- In the second row in the column "Reference Document," "License Amendment No. \_\_\_\_ for 'Performance Based Method Alternative for Thermal Insulation Material' (as requested per Ameren Missouri letter ULNRC-06509)" is being added.

### 3.0 TECHNICAL EVALUATION

#### 3.1 Technical Basis for the Request

NFPA Standard 805, Section 3.3.4, states:

Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.

NFPA 805 Section 1.6.36 has the following definition of a limited combustible material:

Material that, in the form in which it is used, has a potential heat value not exceeding 3500 BTU/lb (8141 kJ/kg) and either has a structural base of noncombustible material with a surfacing not exceeding a thickness of 1/8 in. (3.2 mm) that has a flame spread rating not greater than 50, or has another material having neither a flame spread rating greater than 25 nor evidence of continued progressive combustion, even on surfaces exposed by cutting through the material on any plane.

As can be seen from the above, the definition of a limited combustible in NFPA 805 includes the requirement for thermal insulation materials to have a heat of combustion of less than or equal to 3,500 BTU/lb.

There are specifically identified locations within Callaway where closed cell foam thermal insulation material is used as thermal insulation on system piping/equipment for the purpose of maintaining system efficiency and/or preventing pipe sweat. These thermal insulation materials meet requirements for a flame spread rating of 25 or less, as measured using the test method of ASTM E-84, but they do not meet the current heat value content requirement based on the definition of a limited combustible, due to the heat value of these materials exceeding 3,500 BTU/lb. The heat contribution values of the closed cell foam thermal insulation materials installed at Callaway range from approximately 9,000 to 11,000 BTU/lb. However, they are not considered to contribute appreciably to the spread of fire nor represent a secondary combustible beyond those currently analyzed in the Fire Probabilistic Risk Analysis (PRA), due to their limited



applications.

The noted closed cell foam thermal insulation materials are located in the Auxiliary Building, Control Building, and Turbine Building on equipment associated with heating, ventilation and air conditioning systems installed in Power Block structures. Attachment 4 lists the major applications where the closed cell foam thermal insulation materials are installed.

The closed cell foam material is also used in limited cases for personnel safety applications. The safety applications are small quantities of material, and these personnel safety applications of the closed cell foam material are not considered within the scope of the criteria specified in NFPA 805 Section 3.3.4 because they are not installed as thermal insulation material, radiation shielding materials, ventilation duct materials, or soundproofing materials.

The following methods are in place to ensure the closed cell foam thermal insulation material is adequately evaluated:

- The closed cell foam thermal insulation materials installed have flame spread and smoke developed ratings of 25 and 50 per ASTM E-84, respectively. Although the thermal insulation materials exceed the NFPA 805 heat value of 3,500 BTU/lb, these closed cell foam thermal insulation materials (i.e., polyisocyanurate/foam insulation) will not contribute significantly to fire per ASTM E-84.
- The existing installations were evaluated against the fire scenarios supporting the Fire PRA. In all instances, the supporting analyses and existing fire scenarios were found to be bounding such that the presence of the material has no impact on the results of the analysis.
- The closed cell foam thermal insulation material applications are identified and configuration controlled using the plant design control process.
- Future applications of the closed cell foam thermal insulation material would be subject to engineering evaluation using the plant design change control process before such material is installed. The required engineering evaluation would include screening and review for FP program impact, including impacts on existing fire scenarios as applicable.

### 3.2 Nuclear Safety and Radiological Release Performance Criteria

The use of the thermal insulation material other than non-combustible and more than limited combustible in the plant does not affect nuclear safety. The limited applications of exposed thermal insulation materials do not compromise post-fire safe shutdown capability as previously designed, reviewed, and considered. Essential safety functions are maintained and remain capable of being performed.

The limited configurations in which the thermal insulation material is used, including consideration of the design conditions assumed for the areas of these locations, are

applications that meet the intent of the limited combustible material definition because the materials used at Callaway have a flame spread rating of 25 or less and will not support continued progressive combustion. The selection and application of thermal insulation material is controlled per the Callaway piping and equipment thermal insulation specification. The Fire PRA development requires the inclusion of the effects of intervening or secondary combustibles to be documented and included in the analysis where such materials are determined to have fire effects, as part of the performance-based approach. Procedures that govern the Engineering Change Process are in place to ensure assessment of future installation impacts to the Fire Protection Program and Fire PRA, which would result in updates to the applicable analyses and calculations as required.

Plant walk-downs concluded that there are no installations of thermal insulation in the plant that impact the currently analyzed fire scenario zones of influence, nor any that result in a new or expanded zone of influence that impacts additional Fire PRA targets.

The use of insulation material other than non-combustible and more than limited combustible has no impact on the radiological release performance criteria. The radiological release review performed for the NFPA 805-based fire protection program was performed based on manual fire suppression activities in areas containing or potentially containing radioactive materials and not on the type of thermal insulation material.

The insulation material, regardless of the heat contribution value, does not change the radiological release evaluation that was performed for Callaway's NFPA 805-based fire protection program for ensuring that potentially contaminated water is contained and smoke is monitored. The insulation materials do not add additional radiological materials to the area or challenge system boundaries.

### 3.3 Defense-in-Depth

The three echelons of defense-in-depth from NFPA 805 Section 1.2 are:

- Prevent fires from starting (i.e., combustible/hot work controls);
- Rapidly detect, control, and extinguish fires that do occur, thereby limiting damage (i.e., fire detection systems, automatic fire suppression, manual fire suppression, pre-fire plans); and,
- Provide adequate level of fire protection for structures, systems and components so that a fire that is not promptly extinguished will not prevent essential safety functions from being performed.

The use of insulation material that exceeds the NFPA 805 definition of limited combustible (i.e., exceeds the NFPA 805 heat value of 3,500 BTU/lb) does not affect Echelons 1, 2, or 3. Use of the insulation material, despite the increase in heat contribution but in light of the material's limited applications, does not exceed the design bases of installed fire protection systems, does not compromise manual fire suppression functions, and does not adversely impact fire barrier features or post-fire safe shutdown

capability as previously designed, reviewed, and considered.

#### Echelon 1: Prevent Fires from Starting

The thermal insulation does not introduce new ignition sources and does not present a significant hazard in terms of secondary or intervening combustibles. The selection and application of thermal insulation material is controlled per the Callaway design change process. Callaway procedures that govern plant modifications and the Engineering Change Control process are in place to ensure the assessment of future installation impacts to the Fire Protection Program, which would result in updates to the applicable analyses and calculations as required.

#### Echelon 2: Rapidly Detect, Control, and Extinguish Fires that do Occur, Thereby Limiting Damage

The limited applications of exposed thermal insulation materials on plant equipment do not result in increased combustible loading that would challenge the design bases of the installed fire protection systems. The presence of the thermal insulation in limited applications does not affect the ability of the automatic suppression and detection systems to perform credited functions. Portable fire extinguishers and hose stations are available for manual firefighting activities by the site fire brigade. Therefore, if a fire were to occur, damage would be limited.

#### Echelon 3: Provide Adequate Level of Fire Protection for Structures, Systems, and Components so that a Fire that is not Promptly Extinguished Will not Prevent Essential Safety Functions from Being Performed

The limited applications of exposed thermal insulation materials on plant equipment do not adversely affect the installed fire protection systems. Essential fire barrier features are maintained, and essential safety functions continue to be capable of being performed. The insulation material does not compromise post-fire safe shutdown capability as previously designed, reviewed, and considered. Callaway procedures that govern plant modifications and the Engineering Change Control process are in place to ensure the proper assessment of future installation impacts to the Fire Protection Program and Fire PRA, which would result in updates to the applicable analyses and calculations as required.

### 3.4 Nuclear Safety and Radiological Release Performance Criteria

The described use of closed cell foam insulation material does not affect nuclear safety. The limited applications of exposed thermal insulation materials do not compromise post-fire safe shutdown capability as previously designed, reviewed, and considered. Essential safety functions remain capable of being performed.

The limited configurations in which the thermal insulation material is used, including consideration of the design conditions assumed for the areas of these locations, are applications that meet the intent of the limited combustible material definition because

the materials used have a flame spread rating of 25 or less and will not support continued progressive combustion.

Fire PRA development requires the effect of intervening or secondary combustibles to be documented and included in the analysis where applicable as part of the performance based approach. Callaway procedures that govern the Engineering Change Process are in place to ensure the proper assessment of future installation impacts to the Fire Protection Program and Fire PRA, which would result in updates to the applicable analyses and calculations as required.

The use of closed cell foam insulation material has no impact on the radiological release performance criteria. The radiological release review that was performed for Callaway's NFPA 805-based fire protection program was based on the manual fire suppression activities in areas containing or potentially containing radioactive materials. On that basis, the review was not dependent on the type of thermal insulation material.

The insulation material, regardless of heat contribution value, does not change the radiological release evaluation performed for Callaway's NFPA 805-based fire protection program, including requirements for ensuring that potentially contaminated water is contained and that smoke is monitored. The insulation materials do not add additional radiological materials to the area or challenge systems boundaries.

### 3.5 Future Installations

Future installations of insulation materials are controlled by the plant modification and Engineering Change Control processes, which require the performance of an NFPA 805 Fire Protection Program Change Impact Screening. This screening process includes a screening requirement for insulation material to be noncombustible or limited combustible material. Insulation materials that do not meet this screening criteria require a Fire Protection Program Change Evaluation.

### 3.6 Conclusion

In accordance with the provisions of 10 CFR 50.48(c)(2)(vii), approval is being requested for the continued use of closed cell foam thermal insulation materials that do not meet the limited combustible criteria of NFPA 805. Callaway has determined that the approach satisfies the following criteria:

- Meets the performance goals, performance objectives, and performance criteria specified in NFPA 805 related to nuclear safety and radiological release;
- Maintains safety margin; and,
- Maintains fire protection defense-in-depth (i.e., fire prevention, fire detection, fire suppression, mitigation, and post-fire safe shutdown capability).

The proposed change would allow acceptance of the currently installed closed cell foam thermal insulation materials in the plant, based on use of engineering reviews and the

controls placed on closed cell foam thermal insulation materials.

#### 4.0 REGULATORY EVALUATION

This section addresses the standards of 10 CFR 50.92 as well as the applicable regulatory requirements and acceptance criteria, in regard to the proposed change.

The proposed change will allow certain closed cell foam thermal insulation materials currently installed on plant piping at Callaway to be retained, and it will allow the future use of these thermal insulation materials to be subject to appropriate engineering reviews and controls. An evaluation of these materials has determined that they do not contribute appreciably to the spread of fire or represent a secondary combustible beyond those currently analyzed in the Fire Probabilistic Risk Analysis (FPRA), due to the limited applications where these materials are installed. Callaway is requesting this license amendment pursuant to 10 CFR 50.48(c)(2)(vii) and 10 CFR 50.90.

##### 4.1 Applicable Regulatory Requirements/Criteria

The following regulations address fire protection:

- Appendix A to 10 CFR Part 50, General Design Criterion (GDC) 3, states that:

Structures, systems, and components important to safety shall be designed and located to minimize, consistent with other safety requirements, the probability and effect of fires and explosions. Noncombustible and heat resistant materials shall be used wherever practical throughout the unit, particularly in locations such as the containment and control room. Fire detection and fighting systems of appropriate capacity and capability shall be provided and designed to minimize the adverse effects of fires on structures, systems, and components important to safety. Firefighting systems are designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of these structures, systems, and components.
- Section 50.48, "Fire protection," of 10 CFR, provides the NRC requirements for nuclear power plant fire protection. The NRC regulations include specific requirements for requesting approval for a risk-informed/performance-based fire protection program (RI/PB FPP) based on the provisions of NFPA 805.
- Section 50.48(a)(1) of 10 CFR requires that each holder of an operating license have a fire protection plan that satisfies GDC 3, "Fire Protection," of Appendix A to 10 CFR Part 50, "General Design Criteria for Nuclear Power Plants."
- Section 50.48(c) of 10 CFR incorporates NFPA 805 (2001 Edition) by reference, with certain exceptions, modifications, and supplementation. This regulation establishes the requirements for using a RI/PB FPP in conformance with NFPA 805 as an alternative to the requirements associated with 10 CFR 50.48(b) and Appendix R, "Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," to 10 CFR

Part 50, or the specific plant fire protection license condition. The regulation also includes specific requirements for requesting approval for an RI/PB FPP based on the provisions of NFPA 805.

#### Callaway Operating License (OL) Provisions

By letter dated January 13, 2014, the NRC issued Amendment 206 to Callaway's Renewed Operating License, thereby approving the transition of the fire protection licensing basis for Callaway to NFPA Standard 805. The amendment included provisions that allow Ameren Missouri to make risk-informed changes to the Fire Protection Program, provided the changes have no more than minimal impact. The ability to make these risk-informed changes to the fire protection program is stipulated by OL paragraph 2.C.(5) for Callaway.

In addition to the provisions of OL paragraph 2.C.(5) for making risk-informed changes to the fire protection program, paragraph (2) of 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805," describes exceptions and modifications to the NRC's requirements regarding use of NFPA 805. 10 CFR 50.48(c)(2)(vii) states that performance-based methods may be used for fire protection program elements and minimum design requirements, subject to being submitted to the NRC in the form of a LAR under 10 CFR 50.90. The change described in this LAR is being requested per the provisions of 10 CFR 50.48(c)(2)(vii) in lieu of the provisions for risk-informed changes per OL 2.C.(5).

#### NFPA 805 Requirements and Compliance

NFPA 805 Section 3.3.4 states:

Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.

NFPA 805 Section 1.6.36, "Limited Combustible," defines a limited combustible as follows:

Material that, in the form in which it is used, has a potential heat value not exceeding 3500 BTU/lb (8141 kJ/kg) and either has a structural base of noncombustible material with a surfacing not exceeding a thickness of 1/8 in. (3.2 mm) that has a flame spread rating not greater than 50, or has another material having neither a flame spread rating greater than 25 nor evidence of continued progressive combustion, even on surfaces exposed by cutting through the material on any plane.

In some fire areas at Callaway, exposed thermal insulation materials are installed on various HVAC system piping to prevent sweating. Although these thermal insulation materials comply with the flame spreading rating of 25 or less, they do not meet the

definition of a limited combustible due to the heat value exceeding 3,500 BTU/lb. Ameren Missouri is submitting this LAR pursuant to 10 CFR 50.48(c)(2)(vii) and 10 CFR 50.90 to request approval to use performance-based methods, specifically, to permit the use of closed cell foam thermal insulation materials that do not meet the definition of insulation materials.

The proposed change is consistent with the fact that 10 CFR 50.48(c) allows flexibility that was not included in the NFPA 805 standard. As noted in the regulation, licensees who choose to adopt 10 CFR 50.48(c) but wish to use the performance based methods permitted elsewhere in the standard to meet the fire protection requirements of NFPA 805, Chapter 3, "Fundamental Fire Protection Program and Design Elements," may do so by submitting a LAR, as specifically noted in 10 CFR 50.48(c)(2)(vii).

The purpose of the FPP established by NFPA 805 is to provide assurance, through a defense-in-depth philosophy, that the NRC's fire protection objectives are satisfied. NFPA 805 Section 1.2, "Defense-in-Depth," states that:

Protecting the safety of the public, the environment, and plant personnel from a plant fire and its potential effect on safe reactor operations is paramount to this standard. The fire protection standard shall be based on the concept of defense-in-depth. Defense-in-depth shall be achieved when an adequate balance of each of the following elements is provided:

- (1) Preventing fires from starting;
- (2) Rapidly detecting fires and controlling and extinguishing promptly those fires that do occur, thereby limiting fire damage; and
- (3) Providing an adequate level of fire protection for structures, systems and components important to safety, so that a fire that is not promptly extinguished will not prevent essential plant safety functions from being performed.

With respect to the above criteria, the proposed change to Callaway's FPP does not affect the program's conformance to the defense-in-depth objectives listed above, as further addressed in section 3.3 of this attachment.

#### Regulatory Guidance for Changes to Fire Protection

In addition to the conditions outlined by the rule that requires licensees to submit a LAR for NRC review and approval in order to adopt a RI/PB FPP, a licensee may submit additional elements of its FPP for which it wishes to receive specific NRC review and approval, as described in Regulatory Position 3.2.4 of Regulatory Guide (RG) 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants." Inclusion of such an element in the NFPA 805 LAR is meant to alleviate uncertainty in portions of the current FPP licensing bases as a result of the lack of specific NRC approval of these elements. Accordingly and consistent with the RG 1.205 guidance, any submittal addressing these additional FPP elements needs to include

sufficient detail to allow the NRC staff to assess whether the licensee's treatment of such an element meets the 10 CFR 50.48(c) requirements.

In summary, the proposed change is requested in accordance with the provisions of 10 CFR 50.48(c) and associated regulatory guidance. As such, the change will not affect compliance with these regulations or guidance and will ensure that required functional capabilities or performance levels of equipment required for safe operation continue to be met.

#### 4.2 No Significant Hazards Consideration Determination

Ameren Missouri has evaluated whether or not a significant hazards consideration is involved with the proposed amendment for Callaway by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as addressed below:

1. Does the proposed amendment involve a significant increase in the probability or consequences of an accident previously evaluated?

Response: No

The proposed change does not affect accident initiators or precursors, nor does it alter the design assumptions, conditions or configuration of the facility or the manner in which the plant is operated and maintained. In regard to the probability of a fire hazard, use of the noted thermal insulation does not introduce new ignition sources and does not present a significant hazard in terms of secondary or intervening combustibles.

The use of closed cell foam thermal insulation is not considered to contribute appreciably to the spread of fire nor represent a secondary combustible beyond what is currently analyzed in the Fire Probabilistic Risk Analysis (PRA), due to the limited applications of such insulation.

The limited installations of the thermal insulation materials do not compromise post-fire "safe-and-stable" capability as previously designed, reviewed and considered for the facility. Essential fire protection safety functions are unaffected by the proposed change such that their capability will continue to be maintained as required.

Based on the above, it is concluded that the proposed change does not involve a significant increase in the probability of consequences of an accident previously evaluated.

2. Does the proposed amendment create the possibility of a new or different kind of accident from any accident previously evaluated?

Response: No



With respect to a new or different kind of accident, there are no proposed design changes to the safety related plant SSCs, nor are there any changes in the method by which safety related plant SSCs perform their safety functions. The proposed change does not result in any new or different kinds of accidents from those previously evaluated because it does not change any plant equipment such that new failure modes or accidents precursors are introduced.

The proposed amendment will not affect the normal method of plant operation or revise any operating parameters. No new accident scenarios, transient precursors, failure mechanisms, or limiting single failures will be introduced as a result of this proposed change, and the failure modes and effects analyses of SSCs important to safety are not altered as a result of this proposed change. The proposed amendment does not alter the design or performance of the related SSCs.

No changes are being proposed to the procedures that operate the plant equipment, and the change does not have a detrimental impact on the manner in which plant equipment operates or responds to an actuation signal.

Based on the above, the proposed amendment will not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

Response: No

The closed cell foam thermal insulation materials installed exceed the NFPA 805 definition of limited combustible. Use of the insulation material, despite the increase in heat contribution, does not exceed the design bases of installed fire protection systems, does not compromise manual fire suppression functions, and does not adversely impact fire barrier features or post-fire safe shutdown capability as previously designed, reviewed, and considered.

With regard to the margin of safety related to the ability of the fission product barriers to perform their design functions during and following an accident (i.e., fuel cladding, the reactor coolant system, and the containment), there is no impact to such margins. Safety analysis limits established for reactor trip system and ESF actuation system instrumentation functions are unaffected. The proposed change does not alter the design of any of these protection systems; nor are there any changes in the method by which safety related SSCs perform their specified safety functions.

Based on the above, the proposed amendment does not involve a significant reduction in a margin of safety.

Based on the above evaluation, Ameren Missouri concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and accordingly, a finding of "no significant hazards consideration" is justified.

#### 4.3 Conclusions

In conclusion, based on the considerations discussed above, 1) there is a reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, 2) such activities will be conducted in compliance with the Commission's regulations, and 3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

### 5.0 ENVIRONMENTAL CONSIDERATION

Ameren Missouri has evaluated the proposed license amendment for Callaway and has determined that the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amount of effluent that may be released offsite, or (iii) a significant increase in the individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment should be required to be prepared in connection with the proposed amendment.

## 6.0 REFERENCES

- 6.1 National Fire Protection Association (NFPA) Standard 805, "Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants, 2001 Edition" (NFPA 805)
- 6.2 NRC Branch Technical Position CMEB 9.5-1, "Guidelines for Fire Protection for Nuclear Power Plants," dated July 1981
- 6.3 10 CFR 50.32, Elimination of repetition
- 6.4 10 CFR 50.48, Fire Protection
- 6.5 10 CFR 50.90, Application for amendment of license, construction permit...
- 6.6 10 CFR 50.92, Issuance of Amendment
- 6.7 ASTM E-84, Standard test method for surface burning characteristics of...
- 6.8 License Amendment 206
- 6.9 ULNRC-05781, "Request for License Amendment to Adopt NFPA 805, 'Performance-Based Standard for Fire Protection for Light Water Reactor Generating Plants (2001 Edition),' " dated August 29, 2011
- 6.10 Joseph M. Farley, Request for License Amendment for Performance-Based Fire Protection Alternative for Thermal Insulation Material," (ADAMS Accession No. ML18348A733)
- 6.11 Browns Ferry, Issuance of Amendment Nos. 306, 329, and 289 to Revise Approved NFPA 805 Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants - Revision to Attachment A, Table B-1 (ADAMS Accession No. ML18241A319)
- 6.12 Regulatory Guide 1.205, "Risk-Informed, Performance-Based Fire Protection for Existing Light-Water Nuclear Power Plants"

## **Attachment 2**

### **NEI 04-02 Table B-1, "Transition of Fundamental Fire Protection Program and Design Elements" – Marked-Up Page**

**1 Page**

**Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)**  
**Table B-1 - NFPA 805 Ch. 3 Transition**

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.4 Insulation Materials	Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.	Complies	No Additional Clarification	FSAR SP, Rev. OL-14f / Section 9.5.1.2, Page 9.5-3, Paragraph 7; Section 9.5.1.2.2.5, Paragraphs 3 and 4  Specification 10466-M-160, "Specification for Thermal Insulation for Piping and Equipment Located Inside the Reactor Containment and Outside Containment Requiring ISI Examination for the Standardized Nuclear Unit Power Plant System," Rev. 19 / Section 5.5
3.3.5 Electrical	N/A	Complies by NRC approval.	Applicable to thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials.	N/A
		Closed Cell Foam Thermal Insulation Materials	N/A – General statement; No technical requirements	
		License Amendment No. ____ for "Performance Based Method Alternative for Thermal Insulation Material" (as requested per Ameren Missouri letter ULNRC-06509)		

## **Attachment 3**

**NEI 04-02 Table B-1, "Transition of Fundamental Fire Protection  
Program and Design Elements "- Clean Page**

**1 Page**

# Attachment A. NEI 04-02 Table B-1 - Transition of Fundamental FP Program and Design Elements (NFPA 805 Chapter 3)

## Table B-1 - NFPA 805 Ch. 3 Transition

NFPA 805 Ch. 3 Ref.	Requirements/Guidance	Compliance Statement	Compliance Basis	Reference Document
3.3.4 Insulation Materials	Thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials shall be noncombustible or limited combustible.	Complies	Applicable to thermal insulation materials, radiation shielding materials, ventilation duct materials, and soundproofing materials.	FSAR SP, Rev. OL-14f / Section 9.5.1.2, Page 9.5-3, Paragraph 7; Section 9.5.1.2.2.5, Paragraphs 3 and 4  Specification 10466-M-160, "Specification for Thermal Insulation for Piping and Equipment Located Inside the Reactor Containment and Outside Containment Requiring ISI Examination for the Standardized Nuclear Unit Power Plant System," Rev. 19 / Section 5.5
3.3.5 Electrical	N/A	Complies by NRC approval.	Closed Cell Foam Thermal Insulation Materials	License Amendment No. ____ for "Performance Based Method Alternative for Thermal Insulation Material" (as requested per Ameren Missouri letter ULNRC-06509)
		N/A	N/A - General statement; No technical requirements	N/A

## **Attachment 4**

### **Major Applications Table**

**1 Page**



**Table 1.** Major applications of the closed cell foam thermal insulation materials installed at the Callaway Plant.

<b>Equipment ID</b>	<b>Equipment Description</b>	<b>Fire Area/Zone</b>	<b>Zone Treatment</b>
SGB01A	Central Chilled Water System Chiller 'A'	TB-1/3304	Detailed Fire Modeling
SGB01B	Central Chilled Water System Chiller 'B'	TB-1/3304	Detailed Fire Modeling
SGK09	Count Room Backup Cooling Closed Conditioner Unit	TB-1/3402	Detailed Fire Modeling
EHC Room HVAC Piping	Electro-Hydraulic Control Room Heating, Venting, and Air Conditioning Piping	TB-1/4504	Whole Room Burn Up
SGK04A	Control Room Air Conditioning Unit 'A'	A-22/1512	Detailed Fire Modeling
SGK04B	Control Room Air Conditioning Unit 'B'	A-21/1501	Detailed Fire Modeling
SBG02	Chemical Volume and Control System Chiller Unit	A-1/1102	Detailed Fire Modeling
SGK05A	'A' Class IE Electrical Equipment Air Conditioning Unit	C-14/3416	Whole Room Burn Up
SGK05B	'A' Class IE Electrical Equipment Air Conditioning Unit	C-13/3415	Whole Room Burn Up

TB = Turbine Building

A = Auxiliary Building

C = Control Building