AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

April 18, 2008

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555-0001

ULNRC-05497

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
10 CFR 50.55a REQUEST: PROPOSED ALTERNATIVE TO ASME CLASS 1 REQUIREMENTS FOR ITEMS CONNECTED TO THE UPPER PORTION (VAPOR SPACE) OF THE PRESSURIZER

Pursuant to 10 CFR 50.55a(a)(3)(ii), Union Electric Company (AmerenUE) requests approval of an alternative to certain ASME Boiler and Pressure Vessel Code, Section III requirements applicable to portions of the reactor coolant pressure boundary connected to the upper portion (steam side) of the pressurizer at Callaway Plant. The proposed alternative is to allow certain piping and instrument lines, valves and supports to remain as designed and constructed to ASME Code Class 2 requirements, in lieu of upgrading the current design and replacing these items with items constructed to ASME Section III Subsection NB, Code Class 1 requirements.

Westinghouse Nuclear Safety Advisory Letter (NSAL), NSAL-00-006, "Pressurizer Upper Level Instrument Line Safety Classification," and NSAL-07-9, "Safety Classification of Small Lines Connected to the Pressurizer Steam Space," identified issues regarding the safety classification of the pressurizer upper level instrument lines. Per the NSALs, the Westinghouse position is that since a break in an instrument line connected to the pressurizer may result in ECCS actuation, such piping should be classified as Safety Class 1 in accordance with ANSI N18.2 and 10 CFR 50.55a(c). NSAL-07-9 expanded the scope of NSAL-00-006 to include not only instrument lines but all lines connected to the upper level of the pressurizer (steam side).

AmerenUE has determined, however, that the reclassification of the affected piping and components is unnecessary. The replacement of the affected piping, tubing, valves and supports to ASME Boiler and Pressure Vessel Code, Section III, Class 1 requirements would be a hardship or unusual difficulty because it would require substantial time and resources to upgrade the plant design and perform all of the required modifications. AmerenUE believes that upgrading the plant design and replacing all of the affected items would provide minimal safety benefit. Additionally, a modification of this type would be costly in time, materials, personnel

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radiation exposure, and radioactive waste, and would not result in a compensating increase in the level of quality or safety.

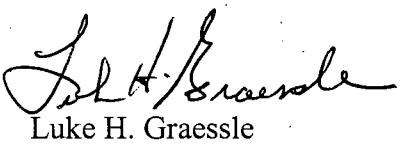
The basis supporting this 10 CFR 50.55a request is provided in the Attachment to this submittal. In the Attachment, it is concluded for the affected piping, tubing, and valves, including their supports, that the technical, quality, and administrative differences between the Section III requirements for Class 1 and Class 2 construction are not significant and that upgrading to Class 1 would not provide any greater assurance of the capability of the affected components to perform their intended safety function.

Therefore, in accordance with 10 CFR 50.55a(a)(3)(ii), and as demonstrated in the Attachment, upgrading the current design and replacing the affected piping, tubing, valves and supports with items fully meeting Class 1, in accordance with Section III, Subsection NB, would be a hardship or unusual difficulty providing minimal quality and safety benefit.

No commitments are identified in this submittal.

If you have any questions concerning this matter, please contact Scott A. Maglio at 573-676-8719 or Thomas B. Elwood at 573-676-6479.

Sincerely,



Luke H. Graessle
Manager, Regulatory Affairs

KRG/nls

Attachment:

1. 10 CFR 50.55a Request: Proposed Alternative to ASME Class 1 Requirements for Items Connected to the Upper Portion (Vapor Space) of the Pressurizer

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Attachment 1 to
ULNRC-05497

10 CFR 50.55a REQUEST: PROPOSED ALTERNATIVE TO ASME CLASS 1 REQUIREMENTS FOR ITEMS CONNECTED TO THE UPPER PORTION (VAPOR SPACE) OF THE PRESSURIZER

10 CFR 50.55a REQUEST: PROPOSED ALTERNATIVE TO ASME CLASS 1 REQUIREMENTS FOR ITEMS CONNECTED TO THE UPPER PORTION (VAPOR SPACE) OF THE PRESSURIZER

1. ASME Code Component(s) Affected:

This request is for installed ASME Boiler and Pressure Vessel Code, Section III, Class 2 portions of the Reactor Coolant System (BB) and the Nuclear Sampling System (SJ), including piping and instrument lines, valves and supports, connected to the pressurizer above the normal water level in the pressurizer. These piping and instrument lines and valves are shown on Piping and Instrumentation Drawing (P&ID) M-22BB02 (Final Safety Analysis Report (FSAR) Figure 5.1-1, Sheet 2), for the Reactor Coolant System (RCS), and on P&ID M-22SJ01 (FSAR Figure 9.3-2, Sheet 1), for the Nuclear Sampling System. The items affected include: 1) several hundred feet of small bore piping and instrument tubing, 2) over 100 piping and tubing supports, and 3) over 20 valves. The instruments connected beyond the instrument manifold valves are not within the scope of the ASME Boiler and Pressure Vessel Code, Section III, rules as specified in Section III, paragraph NA-1130(c) and, therefore, are not included in the scope of this request.

The piping and instrument lines affected are described and listed below: Piping from the three pressurizer upper instrumentation taps to the root valves, boundary valves, and tubing downstream to the instrument manifold valves. (M-22BB02, Location D-7, C-7, C-6) The pressurizer safety valve loop seal drain lines up to each boundary valve. (M-22BB02, Location G-7, G-6, G-5) The piping from the tap in the pressurizer relief line BB-082-BCA-6", to the boundary valve in the pressurizer high point vent line (M-22BB02, Location E-7), and line BB-083-BCB-3/4" to pressurizer fill and vent valve BBV0085 (M-22BB02, Location F-7). It also includes the branch from BB-083-BCB-3/4" to the Nuclear Sampling System shown on drawing M-22SJ01 at Location G-7. This branch line extends to and includes the containment isolation valves for the pressurizer steam space sample line.

The lines and valves discussed above are tabulated below. The instrument manifold valve located at each instrument does not actually have an assigned number and is identified in the table by the associated instrument identification number.

P&ID Drawing: M-22BB02			
Drawing Location	Proposed Line(s) Classification	Root Valve	Boundary Valves & Instrument manifold Valves
D-7	BB-111-BCB-3/4" (piping) with 1-1/2" x 3/4" Reducer insert, Condensate pot and 3/8" tubing (0.065" thickness)	BB-V0099*	BB-V0100 BB-PT0455 BB-LT0459
C-7	BB-112-BCB-3/4" (piping) with 1-1/2" x 3/4" Reducer insert, Condensate Pot and 3/8" tubing (0.065" thickness)	BB-V0102*	BB-V0103 BB-PT0456 BB-LT0460
C-6	BB-115-BCB-3/4" (piping) with 1-1/2" x 3/4" Reducer insert, Condensate Pot and 3/8" tubing (0.065" thickness)	BB-V0108*	BB-V0110 BB-PT0457 BB-PT0458 BB-LT0461 BB-LT0462
G-7	BB-088-BCB-3/4" (piping)	BB-V0087	N/A
G-6	BB-090-BCB-3/4" (piping)	BB-V0088	N/A
G-5	BB-092-BCB-3/4" (piping)	BB-V0089	N/A
E-7	BB-082-BCB-3/4" (piping)	BB-V0295	N/A
F-7	BB-083-BCB-3/4" (piping)	BB-V0085	N/A
F-7	BB-098-BCB-3/4" (piping)	BB-V0086	N/A

* Valve Internals removed and replaced with stainless steel plug. Valve transformed into 90° elbow.

P&ID Drawing: M-22SJ01			
Drawing Location	Proposed Line(s) Classification	Root Valve	Boundary Valves & Instrument Manifold Valves
G-7 thru E-7	3/8" tubing (0.065" thickness) SJ-002-BCB-1" (piping)	BB-V0086	SJ-V0009 SJ-V0071 SJ-HV0013

2. Applicable Code Edition and Addenda

The piping, tubing, valves and supports identified in Part 1 of this request were designed, constructed and installed to a variety of editions and addenda of the ASME Boiler and Pressure Vessel Code, Section III (referred to as Section III throughout the remainder of this request), depending on the applicable governing Design Specification. These editions and addenda range from the 1974 Edition with the Winter 1974 Addenda through the 1977 Edition. Additional specific provisions from later editions and addenda are also used as specified in the applicable Design Specification. Piping and tubing stress analysis performed by the site architectural engineer (Bechtel) was primarily to the 1974 Edition with Winter 1974 Addenda while the piping analysis performed by the NSSS designer (Westinghouse) was primarily to the 1974 Edition with the Winter 1975 Addenda. Site installation of these items was primarily to the 1974 Edition with Summer 1975 Addenda.

3. Applicable Code Requirement

10 CFR 50.55a(c) states, in part:

"(c) Reactor coolant pressure boundary.

(1) Components which are part of the reactor coolant pressure boundary must meet the requirements for Class 1 components in Section III of the ASME Boiler and Pressure Vessel Code, except as provided in paragraphs (c)(2), (c)(3), and (c)(4) of this section.

(2) Components which are connected to the reactor coolant system and are part of the reactor coolant pressure boundary as defined in §50.2 need not meet the requirements of paragraph (c)(1) of this section, *Provided:*

(i) In the event of postulated failure of the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system; or"

Section III paragraph NA-2110(c) requires that the Owner of a nuclear power plant, or his agent, shall be responsible for applying system safety criteria to classify the equipment in the nuclear power plant to be constructed in accordance with the rules of NA-2120 and NA-2130.

Section III paragraph NA-2120 states:

> "Construction rules are specified for items which are designated Code Classes 1, 2, 3, CS, and MC. These Code classes are intended to be applied to the classification of items of a nuclear power system and containment system. Within these systems the Code recognizes the different levels of importance associated with the function of each item as

related to the safe operation of the nuclear power plant. The Code classes allow a choice of rules that provide assurance of structural integrity and quality commensurate with the relative importance assigned to the individual items of the nuclear power plant."

Section III paragraph NA-2131 requires that Class 1 items be constructed in accordance with the rules of Subsection NB.

4. Reason for Request

Westinghouse Nuclear Safety Advisory Letter (NSAL), NSAL-00-006, "Pressurizer Upper Level Instrument Line Safety Classification," was issued April 3, 2000. This letter identified an issue where a break in an instrument line connected to the upper portion (steam side) of the pressurizer may result in a rapid depressurization of the RCS sufficient to cause an Emergency Core Cooling System (ECCS) actuation based on low pressurizer pressure. This condition is inconsistent with the existing classification of the line as Safety Class 2. Westinghouse's position is that for an instrument line connected to the pressurizer, in which a break in the line may result in ECCS actuation, the line should be classified as Safety Class 1 in accordance with ANSI N18.2 and 10 CFR 50.55a(c).

This safety classification conflicts with the Class 2 classification of the pressurizer 1" and less diameter lines originally provided by Westinghouse at the time of original design and licensing. This situation is the result of a change in Westinghouse design.

In earlier Westinghouse designs, ECCS actuation would only occur with coincident low pressurizer level and low pressurizer pressure. Post Three Mile Island requirements only require low pressurizer pressure for ECCS actuation. The effect of this change was not addressed when Westinghouse made the change in the Reactor Protection System.

NSAL-07-9, "Safety Classification of Small Lines Connected to the Pressurizer Steam Space," expanded the scope of NSAL-00-006 to include not only instrument lines but all lines connected to the upper level of the pressurizer (steam space).

The affected piping, tubing, valves and supports at Callaway Nuclear Plant in Part 1 of this request, were designed and constructed as Class 2 in accordance with the rules of ASME Section III, Subsection NC. Replacing the affected piping, tubing, valves and supports to fully comply with ASME Section III Class 1 requirements would be a hardship or unusual difficulty because implementing such a change, in light of the scope of affected piping, etc. as described above, would require substantial time and resources. Similarly designed Westinghouse Pressurized Water Reactor Nuclear Power Plants estimated time for the potential removal and re-installation of several hundred feet of small bore piping and instrument tubing, associated valves, and over 100 piping and tubing supports at approximately 11,000 man-hours. This estimate

does not include the considerable material cost associated with replacing ASME Class 2 components and materials with ASME Class 1 components and materials nor does it consider the additional radiation exposure that would be experienced during this process. Because of the location of the piping, tubing, valves and supports, the work could only be done during refueling outages.

Therefore, upgrading the current design configuration and replacing piping, tubing, valves and supports would be a hardship or unusual difficulty. Further, as concluded below, replacing the affected items would not result in a compensating increase in the level of quality or safety.

5. Proposed Alternative and Basis for Use

The proposed alternative is to allow the piping and instrument lines, valves and supports identified in Part 1 to remain as designed and constructed to ASME Code Class 2, in lieu of upgrading the current design configuration and replacing these items with items constructed to ASME Section III Subsection NB, Code Class 1 requirements. The basis for use of this proposed alternative in lieu of meeting ASME Section III, Subsection NB, Code Class 1 is presented in the following paragraphs.

The piping, tubing and valves listed in Part 1 of this request were constructed as Class 2 in accordance with the rules of ASME Section III, Subsection NC. Supports of the subject piping and tubing lines were constructed as Class 2 in accordance with the rules of ASME Section III, Subsection NF. Construction as used in Section III Division 1 included requirements for materials, design, fabrication, examination, testing, inspection, and certification required in the manufacture and installation of items.

Although the items listed in Part 1 do meet most of the Section III requirements for Class 1 items, they do not meet all Section III requirements for Class 1 items. Because compliance with 10 CFR 50.55a(c)(1) would require that the items meet all the requirements, these items cannot be upgraded to Class 1 as-is. For example, the valves do not meet the component certification requirements of Section III, which require that a valve be stamped by an appropriate ASME Certificate Holder with the Class 1 identification mark and be certified by an appropriate ASME Certificate Holder on the Section III Code Data Report (Form NPV-1) as being in full compliance with Class 1 requirements.

To justify the proposed alternative, a comparison was made between the Section III requirements in Subsection NB for Class 1 and Subsection NC for Class 2 for the applicable editions and addenda described in Part 2. The comparison looked at each Article of Subsections NB and NC (covering the areas of materials, design, fabrication and installation, examination, testing, protection against overpressure, and nameplates, stamping and reports) and determined whether the differences were technical, quality, or administrative requirements. Differences in Section III

administrative requirements, such as certification and stamping, furnishing of a Stress Report, marking of items, etc., although affecting literal compliance, were determined to not reduce the quality or safety of the items. There were few differences in quality requirements between Class 1 and Class 2 because most quality requirements are contained in the General Requirements Subsection NA and are equally applicable to both Class 1 and Class 2. No differences in quality requirements were identified that would reduce the quality or safety of the items.

For the items identified in Part 1 of this request, there were some differences in technical requirements between Class 1 and Class 2 in the areas of piping and tubing material examination (NB/NC-2510), valve design (NB/NC-3500), piping design (NB/NC-3600), examination of circumferential piping butt welds (NBINC-5220), and examination of springs in Class 1 component standard supports (NF-5410). However, replacing the affected items would provide a minimal increase in quality and safety as demonstrated in the discussion of technical requirement differences in Parts 6 thru 9 of this request.

6. Material Examinations and Piping Design

In the area of piping and tubing material examinations and piping design, the differences between the current installed Class 2 items and the Class 1 requirements could be eliminated by updating the applicable Design Specifications to include provisions from later editions and addenda of Section III that have been approved for use in 10 CFR 50.55a. For piping and tubing material examination, the later provisions of NB-2510(a) in the Summer 1983 Addenda exempted 1" and less seamless pipe, tubes and fittings from the examination requirements of NB-2500, thus making the Class 1 rules the same as Class 2 and eliminating the technical difference.

For piping design, there are considerable differences between Class 1 and Class 2 requirements but these differences were eliminated by the Summer 1975 Addenda change in NB-3630(d). This change allowed 1" and smaller Class 1 piping to be designed to NC-3600, thus making the Class 1 design rules the same as Class 2 and eliminating the technical differences. The NRC in 10 CFR 50.55a accepted the Summer 1983 Addenda containing these material examination provisions and the Summer 1975 Addenda containing these piping design provisions. If the design and construction had taken place at a later point in time, thus using the later NRC accepted addenda, the current Class 2 installed configuration would meet present-day Class 1 material examination and piping design requirements. No increase in quality or safety would be realized by updating these Design Specifications or in upgrading the design and replacing piping and tubing.

7. Valve Design

In the area of valve design, the requirements in NB-3500 are considerably different than the requirements in NC-3500. However, the small valves identified in Part 1 of

this request have been evaluated to the applicable requirements in NB-3500 and all the valves were found to meet the technical requirements of NB-3500 applicable to small valves. Therefore, there are no technical differences between the installed Class 2 valves and the requirements for Class 1 valves that would reduce the assurance that the valves will perform their intended safety function. No increase in quality and safety would be realized by replacing the valves with valves constructed to Class 1 requirements.

8. Examination of Circumferential Piping Butt Welds

In the area of examination of circumferential piping butt welds, NB-5220 requires radiograph and surface examination of circumferential piping butt welds. NC-5222 requires radiograph only of these welds. The radiographs and surface exams in Class 1 assure volumetric quality of the welds and surface quality of the welds. Surface quality of the welds in Class 1 is to be verified because of Class 1 fatigue considerations and the design by analysis approach in Class 1 that reduces the design factor from 4 to 3. Class 2 does not require the additional surface examinations of these welds because of its design by rule approach, which does not have specific fatigue requirements. Because NB-3630(d) allows 1" and less Class 1 piping and tubing to be designed to Class 2 rules, the reduced design factor of 3 is not used, fatigue evaluation is not required, and special concern with surface quality in addition to volumetric quality is essentially eliminated. Therefore, the Class 1 requirement for surface examination of these welds will provide a minimal increase in quality and safety. The use of Class 2 piping examination rules provide adequate assurance that these welds will perform their intended safety function of passive pressure boundary integrity.

9. Examination of Springs in Class 1 Supports

In the area of examination of springs in component standard supports, NF-5410 states that springs in Class 1 component standard supports shall be examined by a surface examination. No such examination requirement exists for Class 2 springs in component standard supports. For branch line BB-098-BCB-3/4" to the Nuclear Sampling System tubing before valve BB-V0086, there is a Subsection NF Class 2 constant support (BB13-H510) containing a spring. As a Class 2 support, this spring did not receive a surface examination. This is a technical difference between the installed Class 2 support and the Class 1 requirements. However, the maximum load on this constant support during any loading condition is only 42 pounds, while the constant support was load-rated by the manufacturer at 60-85 pounds for Callaway's design conditions in accordance with Subsection NF requirements. This provides considerable margin in the function of the support. Not having received the surface examination may result in a minimal reduction in the quality of the constant support; however, the support can be expected to perform its intended safety function based on the margin in available loading.

10. Conclusion

From the preceding discussions, it is concluded for the piping, tubing, and valves listed in Part 1 of this request, including their supports, that the technical, quality, and administrative differences between the Section III requirements for Class 1 and Class 2 construction would have minimal impact on the ability of these items to perform their intended safety function. Given the insignificant differences between present-day Class 1 requirements for these components and the Class 2 requirements already adhered to, upgrading to Class 1 would not provide any greater assurance with respect to the level of quality and safety. However, even if a break failure should occur, the consequences of such an event would be bounded by the design-basis small break loss-of-coolant accident event for Callaway Nuclear Plant, which would be mitigated by the ECCS.

Therefore, in accordance with 10 CFR 50.55a(a)(3)(ii), and as demonstrated in Part 4 of this request, upgrading the current design configuration and replacing the affected piping, tubing, valves and supports with items fully meeting Class 1, in accordance with Section III, Subsection NB, would be a hardship or unusual difficulty providing minimal quality and safety benefit.

11. Duration of Proposed Alternative

AmerenUE requests approval of the alternative proposed in Part 5 of this request for the life of the plant. No undue risk to the public health and safety is presented by this request.

12. Precedents

Comanche Peak Steam Electric Station Letter, dated September 30, 2002, to USNRC: Docket Nos. 50-445 and 50-446, "Relief Request A-2 for Unit 1 and A-9 for Unit 2 Relief from 10 CFR 50.55a Requirements for Class 1," and the associated NRC Safety Evaluation Report (SER) dated April 14, 2003.

Wolf Creek Nuclear Operating Company Letter, dated November 2, 2004, to USNRC: Docket Nos. 50-482: 10 CFR 50.55a Request for Alternative Requirements for ASME Class 1 Items Connected to the Upper Portion (Steam Side) of the Pressurizer," and the associated NRC Safety Evaluation Report (SER) dated May 31, 2005.

13. References

Westinghouse Nuclear Safety Advisory Letter (NSAL-00-006), "Pressurizer Upper Level Instrument Line Safety Classification," dated April 3, 2000.

Westinghouse Nuclear Safety Advisory Letter (NSAL-07-9), "Safety Classification of Small Lines Connected to the Pressurizer Steam Space," dated October 5, 2007.