AmerenUE
Callaway Plant

PO Box 620
Fulton, MO 65251

August 30, 2007

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

ULNRC-05434

Ameren UE

Ladies and Gentlemen:

DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
10CFR50.55a REQUEST: PROPOSED ALTERNATIVE TO ASME SECTION XI REQUIREMENTS FOR REPLACEMENT OF CLASS 3 BURIED PIPING

Pursuant to 10CFR50.55a(a)(3)(i), Union Electric Company (AmerenUE) hereby requests NRC approval of attached Relief Request I3R-10 regarding paragraph IWA-4221(b) of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. The Code Edition applicable to the current 10-year Inservice Inspection interval for Callaway Plant is the 1998 Edition (up to and including the 2000 Addenda).

The requested relief is needed to support planned replacement of buried steel piping in Callaway's essential service water (ESW) system with polyethylene (PE) piping. For this repair/replacement activity, IWA-4221(b) would require the new/replacement piping to meet the original Construction Code requirements for the ESW piping. The applicable Construction Code (ASME Section III), however, does not provide rules for the design, fabrication, installation, examination and testing of PE piping. ASME Code Case N-755, however, provides conditions under which PE material may be used for ASME Section III, Class 3 buried piping systems. AmerenUE therefore requests relief from the noted Code requirements in order to utilize the provision of Code Case N-755 with the exceptions identified in the attached relief request.

Replacement of the current ESW steel piping with PE piping would provide an overall benefit to plant safety since PE piping is much more resistant to fouling and microbiologically induced corrosion, thus assuring improved long-term reliability of the risk-significant ESW system.

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NRR

To provide sufficient time for planning of the ESW piping replacement and provide assurance of the planned approach, AmerenUE respectfully requests NRC review and approval of the attached relief request by May 31, 2008.

It may be noted that no new regulatory commitments have been made or identified in this letter or its attachment. Please contact Scott A. Maglio at 573-676-8719 for any questions you may have regarding this relief request.

Sincerely,

Mark McLachlan

for
L. H. Graessle
Manager, Regulatory Affairs

LHG/TBE/slk
Attachment

cc: Mr. Bruce S. Mallett
Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4005

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

Mr. Jack N. Donohew (2 copies)
Licensing Project Manager, Callaway Plant
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-7D1
Washington, DC 20555-2738

Missouri Public Service Commission
Governor Office Building
200 Madison Street
PO Box 360
Jefferson City, MO 65102-0360

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4200 South Hulen, Suite 422
Fort Worth, TX 76109
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C. D. Naslund
A. C. Heflin
T. E. Herrmann
L. H. Graessle
G. A. Hughes
S. A. Maglio
S. L. Abel
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M. D. Brandes
S. L. Gallagher
L. M. Belsky (NSRB)
T. B. Elwood

Ms. Diane M. Hooper
Supervisor, Licensing
WCNOC
P.O. Box 411
Burlington, KS 66839

Mr. Dennis Buschbaum
TXU Power
Comanche Peak SES
P.O. Box 1002
Glen Rose, TX 76043

Mr. Scott Bauer
Regulatory Affairs
Palo Verde NGS
P.O. Box 52034,
Mail Station 7636
Phoenix, AZ 85072-2034

Mr. Stan Ketelsen
Manager, Regulatory Services
Pacific Gas & Electric
Mail Stop 104/5/536
P.O. Box 56
Avila Beach, CA 93424

Mr. Scott Head
Supervisor, Licensing
South Texas Project NOC
Mail Code N5014
P.O. Box 289
Wadsworth, TX 77483

Mr. John O'Neill
Pillsbury Winthrop Shaw Pittman LLP
2300 N. Street N.W.
Washington, DC 20037

AmerenUE

Callaway Nuclear Plant

10 CFR 50.55a Request Number I3R-10

Proposed Alternative to ASME Section XI Requirements for Replacement of Class 3 Buried Piping in Accordance with 10 CFR 50.55a(a)(3)(i)

Description of Proposed Alternative

ASME Code Case N-755 provides the requirements for the design, fabrication, installation, examination and testing of polyethylene material for use in ASME Section III, Division 1, Class 3 buried piping systems.

Specific sections of ASME Code Case N-755 that provide requirements for key aspects of the piping replacement, along with identification of any exceptions to the Code Case, are identified below.

Procurement

The procurement of the polyethylene piping shall be in accordance with Sections -1200 and -2000 of ASME Code Case N-755.

Material

The polyethylene piping material shall be in accordance with Section -2000 of ASME Code Case N-755, with the following exceptions:

- Section -2000 references Supplement 2 of the Code Case for acceptable polyethylene material standards. In lieu of the revisions identified in Supplement 2, the latest revisions of the material standards may be utilized and will be reconciled as necessary.
- In lieu of PE material with a cell classification of 445474C specified in Section -2110 of the Code Case, PE material with a cell classification of 445574C will be utilized. The 445574C PE material has a higher tensile strength than the 445474C PE material.
- Section -3001 of the Code Case specifies that all mitered elbows will be three or five-joint mitered elbows. In addition to 90-degree mitered elbows, 45-degree and 22.5-degree mitered elbows may be utilized. Mitered elbows of less than 90 degrees may have less than three joints.
- Damage to polyethylene piping under scope of this relief request will be addressed by:
  (1) Either cutting out and replacing the damaged section of pipe or
  (2) Removing scratches or damage by blending and then verifying that the remaining material thickness meets all design requirements. Any piping section with any damage exceeding 10% of the nominal wall thickness shall be cut out and replaced.

  The requirements of this provision are consistent with requirements of ASME B&PV Code paragraph ND-2558 for metallic materials and will be as follows:
  (1) Surface defects shall be removed by grinding or machining in accordance with the following requirements:

(a) The depression after defect elimination is blended uniformly into the surrounding surface with a maximum taper not to exceed 3:1 (ratio of width to height).
(b) After defect elimination, the area will be examined by visual examination to ensure that the defect has been removed.
(c) If the elimination of the defect reduces the thickness of the section below the minimum required design thickness, the section of piping containing the defect shall be cut out and replaced.

Design

The design of the polyethylene piping shall be in accordance with Section -3000 of ASME Code Case N-755 with the exception of the design pressure and temperature limitations of 150 psig at 140°F identified in Section -1100. The design pressures and temperatures of the various lines to be replaced will be 165 psig at 95°F, 160 psig at 95°F, or 45 psig at 180°F, as applicable to the specific line. For design temperatures less than or equal to 140°F, allowable stress values and moduli of elasticity will be in accordance with Tables 3021-1, 3031-3 and 3035-3 of the Code Case. Design pressures greater than 150 psig will be justified by analysis using the design provisions of ASME Code Case N-755. For design temperatures greater than 140°F, allowable stress values and moduli of elasticity will be determined through material testing.

It should be noted that the design temperature of 180°F is selected to bound the peak post-LOCA discharge line operating temperature. The peak post-LOCA temperature will be short-lived. The long-term post-LOCA discharge temperature, as well as the discharge temperature during normal operation and normal shutdown, will be significantly lower than the 140°F Code Case temperature limitation. This piping is not isolable and is an open ended return line discharging to the UHS Cooling Tower basin via the tower spray headers or the spray header bypass.

Fabrication and Installation

The fabrication and installation of the polyethylene piping will be in accordance with Section -4000 of ASME Code Case N-755.

Examination

The examination of the polyethylene piping will be in accordance with Section -5000 of ASME Code Case N-755.

Pressure Testing

The testing of the polyethylene piping will be in accordance with Section -6000 of ASME Code Case N-755.

Basis for Use of Proposed Alternative

The Callaway ESW system was originally designed with unlined carbon steel piping. Plant specific and industry operating experience has shown that carbon steel piping is susceptible to fouling, corrosion, and microbiologically induced corrosion (MIC) for raw water applications.

The use of corrosion resistant steel piping provides added resistance to these problems, but does not eliminate susceptibility. Alternatively, the use of internal linings or coatings in carbon steel piping provides resistance to these problems. However, degradation of and/or damage to the linings and coatings can cause exposure of the carbon steel piping to the raw water, resulting in piping degradation. Additionally, the linings and coatings can pose a potential foreign material concern if they are released from the piping wall as a result of the degradation or damage.

Polyethylene piping pipe will not rust, rot, pit, corrode, tuberculate or support biological growth. The use of polyethylene piping in raw water applications will thus ensure long term reliability from a structural integrity and flow standpoint.

Callaway has recently installed approximately 600 linear feet of 36-inch diameter buried polyethylene piping in a non-safety related blowdown application and has not experienced any significant problems. On a larger scale, Duke Power Company has installed 20,000 linear feet of polyethylene piping at Catawba Nuclear Station in non-safety related raw water applications. Since the installations began in 1998, Duke Power Company has reported that the material has had an excellent service history and has not experienced fouling or corrosion.

The use of polyethylene piping in accordance with ASME Code Case N-755, with exceptions as noted in Section 5 of this request, will result in improved system performance and enhanced system reliability, and will provide an acceptable level of quality and safety.

6. Duration of Proposed Alternative

The use of the proposed alternative is requested for the third ten-year inservice inspection interval for Callaway, during which the ASME Boiler and Pressure Vessel Code, Section XI, 1998 Edition with the 2000 Addenda is used for repair/replacement activities.

The Callaway third ten-year inservice inspection interval is currently scheduled to end on December 18, 2014.

7. References

ASME Code Case N-755, "Use of Polyethylene (PE) Plastic Pipe for Section III, Division 1, Construction and Section XI Repair/Replacement Activities," as approved by BPV Standards Committee 02/02/2007.

Regulatory Guide 1.84, Revision 33, "Design, Fabrication, and Materials Code Case Acceptability, ASME Section III."

Regulatory Guide 1.147, Revision 14, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1."

The Plastics Pipe Institute, Inc. "Handbook of Polyethylene Pipe"