



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
WASHINGTON, D.C. 20555-0001

August 21, 2018

**LICENSEE:** Union Electric Company

**FACILITY:** Callaway Plant, Unit 1

**SUBJECT:** SUMMARY OF JUNE 14, 2018, PRE-SUBMITTAL MEETING WITH UNION ELECTRIC COMPANY, TO DISCUSS AN ALTERNATIVE SOURCE TERM LICENSE AMENDMENT REQUEST FOR CALLAWAY PLANT, UNIT NO. 1 (EPID L-2018-LRM-0033)

On June 14, 2018, a Category 1 public meeting was held between the U.S. Nuclear Regulatory Commission (NRC) and representatives of Union Electric Company, dba Ameren Missouri (the licensee) at NRC Headquarters, One White Flint North, 11555 Rockville Pike, Rockville, Maryland. The purpose of the meeting was to discuss a planned license amendment request (LAR) submittal regarding Alternative Source Term (AST) for the Callaway Plant, Unit No. 1 (Callaway). The meeting notice and agenda, dated May 30, 2018, are available in the Agencywide Documents Access and Management System (ADAMS) at Accession No. ML18150A384. Enclosed is a list of attendees at the meeting.

During the meeting, the licensee presented information, which is available in ADAMS at Accession No. ML18158A553. The licensee's presentation outlined the licensing and technical aspects of the upcoming submittal including the scope of work, key features, and the intended schedule plan for the amendment.

The NRC staff and the licensee discussed numerous sufficiency items that should be a part of the upcoming LAR submittal, which are listed below.

1. Title 10 of the *Code of Federal Regulations* paragraph 50.67(b)(2)(iii) requires that adequate radiation protection is provided to permit access to and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem (roentgen equivalent man) total effective dose equivalent for the duration of the accident. Therefore, the upcoming LAR must address the "permit access to" in addition to the "occupancy" dose of the control room personnel. Additionally, the LAR should address radiological dose received from the site boundary to the control room entry point and account for multiple trips for the duration of the accident.
2. Callaway's Technical Specification (TS) 3.9.4, "Containment Penetrations," allows multiple configurations of the containment equipment hatch and personnel airlocks. Fuel handling analysis should summarize the configurations and analyze all pathways possible in the LAR.
3. For TS systems credited in the current radiological consequence analyses, if they have a note that allows the boundary to be open intermittently under administrative controls, then either the system should not be credited in the AST analysis, or the TS note must

be revised to be consistent with the AST radiological consequence analyses. TS 3.7.13, "Emergency Exhaust System," is an example of such an issue.

4. It was noted that the letdown line-break accident is not specifically covered in the appendices of Regulatory Guide (RG) 1.183, "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," dated July 2000 (ADAMS Accession No. ML003716792), and that some other AST LAR submittals have chosen to use other guidance that is not applicable or appropriate for their specific application/case. The RG 1.183 Appendix that most closely matches the accident presented in the upcoming LAR should be used as a guide relative to the substance provided in the amendment.
5. The NRC staff recommended that the control room and control building ventilation system be described in detail in the LAR. For this LAR, Callaway's design may, or may not, require a shine analysis from the control building to the control room. In either case, the LAR should discuss the applicability of this analysis.
6. The NRC staff performs independent confirmation calculations using the RADTRAD computer code. The licensee may submit the input and output files for the RADTRAD NAI code, which would then allow the NRC staff to independently confirm that the computer code was used correctly, and not have to recreate the models in the same code to verify the analysis.
7. The NRC staff stated in the meeting that the AST is a large amendment request usually with multiple tables that contain overlapping information, and that some requests for additional information can be avoided by making sure that the overlapping information is consistent between the various tables.
8. The LAR should specifically and clearly address each of the limitations and conditions on the use of RETRAN-3D.
9. The submittal should also clearly state how the fuel will meet RG's 1.183, Footnote 11 (on page 1.183-14), and the applicability limits related to future core designs.
10. The licensee should also include any calculation inputs and assumptions that was part of the previously approved amendment that allowed the switch to trisodium phosphate for its pH buffer. This would allow the NRC staff to verify the results of that calculation.
11. The submittal should discuss the computer codes used in the analyses and present fully the acceptability of those codes in the LAR while considering those codes listed in Section 5.0, "Administrative Controls," of the Callaway TSs.
12. The licensee should list and justify the nonsafety grade structures, systems, or components credited in the analyses, and also present if any nonsafety-related systems or components that could impact safety-related electrical equipment have been used for the AST analyses.
13. The LAR should discuss and justify the methodologies applied in the analysis while considering those codes listed in Section 5.0 of the Callaway TSs.

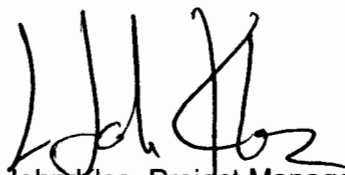
14. The submittal should fully discuss the analysis of the steam releases for cooldown to residual heat removal non-loss-of-coolant accident transient, and justify the calculated cooldown time in accordance with NUREG-0800, "Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants," Section 5.4.7, "Residual Heat Removal (RHR) System," Revision 5, dated May 2010 (ADAMS Accession No. ML100680577), and the TS requirements for emergency cooldown which results in the maximum dose release.
15. The licensee should discuss and fully justify the methods related to the determination of break flow and flashing in the steam generator tube rupture analysis.
16. The LAR should discuss, in full, the operator actions and associated action times credited in the analyses and justify their acceptability.
17. The following items should be considered related to drawings submitted as part of the LAR:
  - a. Be presented to scale.
  - b. Any maps submitted should show the plant with the potential accident release points and exclusion area boundaries, as well as low population zones in all directions.
  - c. The site plan should present the offset between Plant North and True North identified.
  - d. Any plot plan submitted should also show the offset between Plant North and True North identified, and include the locations of all potential accident release points as well as the locations of all main and emergency air intakes and unfiltered inleakage pathways that supply air to the control room and, if onsite for Callaway, the Technical Support Center (TSC). (Understanding Plant North / True North offset is critical because wind direction measurements are typically referenced to True North and for the dispersion model input needs to be correctly accounted for.)
18. The LAR should clearly describe in detail if the TSC is located onsite and if it shares the same control room envelope as the control room.
19. The submittal should properly characterize the release of contaminated steam to atmosphere, and all other accident release points with the full details that documents:
  - a. The elevation of each release point.
  - b. The specific type of release, including ground level, vent, or stack consistent with applicable regulatory guidance.
  - c. If any release(s) are from a stack, please provide elevation of all adjacent buildings, which will allow NRC staff to properly apply the model(s) for release considering a stack versus an elevated source release.

- d. The complete release characteristics that stipulate orientation (if not vertical), and documents, as applicable, the presence of a rain cap or other obstruction to exhaust flow, exit velocity, exit flow rate, stack radius, and exit temperature.
  - e. Elevation of all main and emergency air intakes and any unfiltered inleakage pathways that supply air to control room and the TSC.
20. The LAR's submittal presenting and documenting Meteorological (MET) data should:
- a. State whether the basis for the MET monitoring program is consistent with RG 1.23, "Safety Guide 23 Onsite Meteorological Programs," dated February 1972 (ADAMS Accession No. ML020360030) or RG 1.23, Revision 1, "Meteorological Monitoring Programs for Nuclear Power Plants" (ADAMS Accession No. ML070350028).
  - b. Provide data recovery statistics for wind speed, wind direction, and atmospheric stability at all applicable measurement levels for each of these individual parameters and for the joint recovery of all three of these parameters, by year (2013 through 2016), as well as for the composite period of record (POR).
  - c. Provide sequential hourly (ASCII-character) data files for each year in accordance with the format in Appendix A of RG 1.23, Revision 1 including respective units of measure. If a different submission is made, please explain the data format provided.
  - d. Provide sequential hourly (ASCII-character) data files in format, required for input to ARCON96 including respective units of measure.
  - e. Document the joint frequency distributions of wind speed and wind direction by atmospheric stability class by year (2013 through 2016) and for composite POR data consistent with Table 3 of RG 1.23, Revision 1, including units of measure for wind speed and delta-temperature.
  - f. Document the type of wind instrumentation (e.g., cup and vane, or sonic anemometer), and if a calm threshold is presented for cup and vane type, as well as for the sonic anemometer instrumentation. If the sonic anemometer is used for this application, the submittal needs to identify whether wind directions represent scalar- or vector-averaged values, which could be different for wind direction, and could result in different impact locations. The licensee's submittal should consider that current American National Standards Institute standards on MET monitoring specifies the use of scalar averaging for wind direction and wind speed measurements for MET model applications like PAVAN.
21. The LAR's submittal concerning PAVAN-NAI modeling for MET data should be consistent with RG 1.145, "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants," Revision 1, dated November 1982 (ADAMS Accession No. ML003740205), and any variance from that guide should be discussed and documented to include, but not limited to:
- a. If the code input is integrated as part of a larger modeling platform, or not.

- b. If any departures from regulatory positions are made and include a full justification for these deviations.
  - c. A submittal of the text files of model input and output for all runs.
  - d. A list of all assumptions and a discussion that develops input to the model based on NUREG/CR-2858, "PAVAN: An Atmospheric-Dispersion Program for Evaluation Design-Basis Accidental Releases of Radioactive Materials from Nuclear Power Stations," and RG 1.145.
22. The LAR's submittal concerning ARCON96-NAI modeling for MET data should be consistent with RG 1.194, Revision 1, "Atmospheric Relative Concentrations for Control Room Radiological Habitability Assessments at Nuclear Power Plants," dated June 2003 (ADAMS Accession No. ML031530505), and any variance from that guide should be discussed and documented to include, but not limited to;
- a. If the code input is integrated as part of a larger modeling platform, or not.
  - b. If any departures from regulatory positions are made and include a full justification for these deviations.
  - c. A submittal of the text files of model input and output for all runs.
  - d. A list of all assumptions and a discussion that develops input to the model based on RG 1.194.
  - e. The orientation of receptors to release points with respect to True North and not from release points to receptors based on ARCON96 model input guidance.

For the sufficiency items noted above, the licensee acknowledges these items as valuable elements for the upcoming submittal and presented a discussion to the NRC staff of how these items would be considered and presented in the upcoming amendment.

Members of the public were in attendance at the meeting. Public Meeting Feedback forms were not received. Please direct any inquiries to me at 301-415-5136, or by e-mail at [John.Klos@nrc.gov](mailto:John.Klos@nrc.gov).



L. John Klos, Project Manager  
Plant Licensing Branch IV  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-483

Enclosures:  
List of Attendees

cc: Listserv

## LIST OF ATTENDEES

June 14, 2018, PRE-SUBMITTAL MEETING WITH UNION ELECTRIC COMPANY

REGARDING PROPOSED LICENSE AMENDMENT REQUEST TO

IMPLEMENT ALTERNATE SOURCE TERM

<u>NAME</u>	<u>ORGANIZATION</u>
Adakou Foli	NRC <sup>1</sup> (NRR <sup>2</sup> )
Alexander Chereskin	NRC (NRR)
Gursharan Singh	NRC (NRR)
Jerome Bettie,	NRC (NRR)
John Hughey	NRC (NRR)
John Klos	NRC (NRR)
Margaret Chernoff	NRC (NRR)
Matthew Yoder	NRC (NRR)
Reed Anzalone,	NRC (NRR)
Robert Pettis	NRC (NRR)
Summer Sun	NRC (NRR)
Brad Harvey	NRC (NRO <sup>3</sup> )
Michael Mazaika	NRC (NRO)
Roger Wink	Union Electric Company
Jonathan Cordz	Union Electric Company
Jim Little	Union Electric Company
Brian Richardson	Union Electric Company
Tom Elwood	Union Electric Company
Roger Gorman	Zachry Nuclear
Jim Harrell	Zachry Nuclear
James Metcalf	Member of the public
Justin Byard	Member of the public

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<sup>1</sup> U.S. Nuclear Regulatory Commission

<sup>2</sup> Office of Nuclear Reactor Regulation

<sup>3</sup> Office of New Reactors

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TWertz, NRR

MMazaika, NRO

RAnzalone, NRR

JBettle, NRR

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AFoli, NRR

ACHereskin, NRR

MYoder, NRR

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SSun, NRR

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JBowen, OEDO

LBurkhart, OEDO

**ADAMS Accession No. Meeting Notice ML18150A384 Meeting Summary ML18215A375**

OFFICE	NRR/DORL/LPL4/PM	NRR/DORL/LPL4/LA	NRR/DORL/LPL4/BC	NRR/DORL/LPL4/PM
NAME	JKlos	PBlechman	BPascarelli	JKlos
DATE	8/16/18	8/16/18	8/21/18	8/21/18

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