UNION ELECTRIC COMPANY (dba AMEREN MISSOURI)

CALLAWAY PLANT

DOCKET NOS. 50-483 AND 72-1045

10 CFR 50.59 and 10 CFR 72.48 SUMMARY REPORT

Report Period: June 16, 2021 to November 23, 2022

EXECUTIVE SUMMARY

In accordance with 10 CFR 50.59(d)(2) and 10 CFR 72.48(d)(2), a summary report has been prepared which provides summaries of the 10 CFR 50.59 and 10 CFR 72.48 evaluations of changes, tests, and experiments approved and implemented for activities at Callaway Plant.

This report covers all 10 CFR 50.59 evaluations for changes that were implemented from June 16, 2021 to November 23, 2022. During this period there were two changes implemented that required a 10 CFR 50.59 evaluation. In addition to those, one change that was omitted from the previous 10 CFR 50.59(d)(2) and 10 CFR 72.48(d)(2) summary report (submitted via Ameren Missouri letter ULNRC-06677 dated June 22, 2021), i.e., Evaluation No. 20-04, has been added to this report. For each of these changes, it was determined per 10 CFR 50.59(c)(1) that NRC approval is not required, and therefore, a summary of each 10 CFR 50.59 evaluation is hereby provided.

Additionally, this report is intended to cover all 10 CFR 72.48 evaluations for changes that were implemented during the identified reporting period for the independent spent fuel storage installation (ISFSI) at the Callaway site. However, from June 16, 2021 to November 23, 2022, there were no changes implemented that required a 10 CFR 72.48 evaluation.

10 CFR 50.59 EVALUATIONS:

Evaluation Number:	**Activity:**
20-04	MP 19-0088, Atmospheric Steam Dump Valves Environmental Qualification
21-01	RFR 170223, Gas Void in CTMT Spray Pump Suction from Emergency Recirculation Sump
22-01	MP 20-0012, Instrument Tunnel Sump Transmitter

10 CFR 72.48 EVALUATIONS:

Evaluation Number:	**Activity:**
None	

MP = Modification Package

10 CFR 50.59 Evaluation 20-04: MP 19-0088, Atmospheric Steam Dump Valves Environmental Qualification

Activity Description:

Upon determining that several of the atmospheric steam dump (ASD) valve subcomponents (I/P transducer, positioner, etc.) were not qualified for the environmental conditions in the area where these subcomponents are located following a Main Steam Line Break (MSLB) outside containment, MP 19-0088 was developed and implemented to replace the actuators on all of the ASD valves with an equivalent air operator that has manual operation capability (i.e., a handwheel mechanism). Analysis performed in support of the modification showed that plant operators have the ability to manually operate the ASDs locally following a postulated MSLB, once the area is accessible, without relying on the pneumatic subcomponents to remotely operate the valves from the control room. (Thus, the pneumatic subcomponents are no longer be required to meet the EQ requirements associated with a postulated pipe break.). In connection with MP 19-0088, the Emergency Operating Procedures were updated to implement the newly installed local manual operation capability.

Summary of Evaluation:

Plant cooldown by operation of the ASDs is already considered a "manual" action in that operator action must be taken to reduce steam generator pressure. When being controlled remotely (from the main control room) operators must manually adjust the steam generator pressure setpoint using the pressure controller. Alternatively, operators may switch the pressure controller to "manual" mode and manually control ASD valve position from the control room, or they may locally operate the ASD(s) using the installed handwheel. Local-manual operation requires coordination between the main control room and the operator in the field, but the process of plant cooldown is largely unchanged by such operation.

Habitability calculations performed in support of the plant modification show that even under worst case conditions following a MSLB (which bounds a feedwater line break), the ASDs will be accessible sufficiently early such that plant cooldown and transition to the residual heat removal (RHR) system can be accomplished within the timeframe assumed in the FSAR.

The inadvertent opening of an ASD is one of the accidents postulated in the plant's safety analysis (in FSAR Chapter 15). However, the addition of the safety-related handwheel assembly will not result in more than a minimal increase in the frequency of occurrence of such an event because the handwheel and gearing are designed as safety-related components consistent with original design requirements, the ASDs are located in a low-traffic area of the plant such that inadvertent mispositioning of the handwheel mechanism is considered extremely unlikely, and the ASD handwheels are controlled as locked components, which further decreases the likelihood of inadvertent operation of an ASD by local manipulation of the handwheel.

The most significant accident previously evaluated in the FSAR that would be potentially affected by this change is a postulated MSLB since this is the accident that could require local manual

operation of the ASDs (via the installed handwheels). However, calculations show that the area temperature reduces to habitable conditions in the main steam tunnel within approximately one hour of the worst case MSLB. Therefore, there is sufficient time for operators to access and operate the ASDs such that the RHR system can be started within the eight-hour time period assumed in the existing radiological consequence analysis. The credited operator action thus involves no change in the consequences of an accident (MSLB) previously evaluated in the FSAR.

The presence and use of a local handwheel to manually operate an ASD does not involve a more than a minimal increase in the likelihood of malfunction or introduce a malfunction with a different result since use of the handwheel is not an initiator of any new malfunction and failure of an ASD to open or to become stuck open is a failure mode(s) already described in the FSAR. Manually operating the valves using the handwheels in lieu of operating the valves from the control room using their pneumatic controllers does not appreciably change either of the failure modes (whether due to a power loss or air loss to the valve's pneumatic operator or due to a mispositioned handwheel operator), including their likelihood of occurrence.

In summary, the addition of a local handwheel for each of the ASDs, including reliance on local-manual operation of the ASDs following a postulated pipe break (MSLB), does not involve more than a minimal increase in the frequency of occurrence or the consequences of such an accident. No new malfunctions or failure modes are introduced, nor does the change involve more than a minimal increase the likelihood of occurrence of a malfunction. Therefore, this change was implemented without NRC approval.

---

10 CFR 50.59 Evaluation 21-01: RFR 170223, Gas Void in CTMT Spray Pump Suction from Emergency Recirculation Sump

Activity Description:

Request for Resolution (RFR) 170223 revised the Callaway design bases to permanently accept potential voids of a limited volume in specific pipe locations within the Containment Spray system (CSS) where the piping cannot be vented:

1. The sloped piping between ENHV0001 (highpoint) and the downstream vent valve ENV0131. (A Train)

2. The sloped piping between ENHV0007 (highpoint) and the downstream vent valve ENV0134. (B Train)

Due to the physical configuration of the piping within the valve encapsulations at the above locations, it was recognized that it is not feasible to add a vent to remove any gas that may accumulate at the local high point. In addition, sweeping the gas out of these locations is not practical because the containment sump would need to be filled to provide a sufficient volume of water to operate the pumps with these lines in the suction flow path. Thus, calculations and evaluations were performed to accept the potential voids (of a limited size) as a permanent feature of the Callaway design, in lieu of fully water-filled piping for the affected sections.

Summary of Evaluation:

The CSS, in conjunction with the containment fan cooling system and the emergency core cooling system, is designed to be capable of removing sufficient heat and subsequent decay heat from the containment atmosphere following the hypothesized Loss of Coolant Accident (LOCA) or Main Steam Line Break (MSLB) accident to maintain the containment pressure below the containment design pressure.

The gas voids being added to the CSS design bases meet NEI 09-10 and WCAP-17276-P acceptance criteria for precluding pump damage. This approach has been endorsed by the NRC via a final safety evaluation (TAC No. ME5291) which is contained in NEI 09-10 Rev, la-A. The approach contained in NEI 09-10 Rev, la-A is intended to ensure that the fluid systems susceptible to gas accumulation are operated and maintained within their design bases and remain ready to perform their intended design function when required. Programmatic and procedural instructions are in place to ensure that the gas voids remain within the size limits allowed. Based on this approach, the presence of the design-basis void in the suction line of each train does not introduce the possibility of a new malfunction

In regard to a postulated LOCA, the containment spray pumps are credited for both containment pressure and temperature reduction as well as radioactive iodine removal from the containment atmosphere. There is no impact to the containment spray flowrate credited in these analyses and no impact to the dissolution of the trisodium phosphate dodecahydrate inside containment. As a result,

there is no impact to core cooling, containment cooling, and the LOCA and/or MSLB analyses. The CSS remains capable of performing its safety function of lowering the containment temperature and pressure following a LOCA or MSLB accident. Additionally, it remains capable of performing its safety functions to remove iodine from the containment atmosphere and reduce the pressure differential between the containment atmosphere and the external environment as discussed in Technical Specification Bases Section 3.6.6 and FSAR SP Sections 6.2.2 and 6.5.2. The calculated doses for these accidents are thus unaffected, and therefore, the change does not involve more than minimal increase in the consequences of an accident previously evaluated in the FSAR.

This change is adding a new methodology to be described in the FSAR. This new methodology is contained in NEI 09-10 Rev, la-A. The methodology contained in NEI 09-10 Rev, la-A has been endorsed by the NRC via a final safety evaluation and has been shown to be acceptable for the current application. As a result, prior NRC approval is not required for implementation of this methodology (since the methodology change does not constitute a departure from a method of evaluation).

---

10 CFR 50.59 Evaluation 22-01: MP 20-0012, Instrument Tunnel Sump Transmitter

Activity Description:

Under MP 20-0012 the level transmitter for the instrument tunnel sump inside containment was replaced with a new level sensor element and a digital isolator signal conditioner. The previous transmitter had a visual range from 0 inches to 24 inches, and the new sensor has a visual range from 2 inches to 30 inches. To meet the Regulatory Guide 1.45 (Rev. 0) reactor coolant system (RCS) leakage detection and identification requirements, i.e., the capability to detect a change of one gpm within one hour, a minimum water level of 3% indicating must be maintained in the instrument tunnel sump to ensure the appropriate change in sump level can be detected using the new instrument sump level indicator. This requires manual addition of water to the sump pit when level indication decreases to a prescribed level. The digital isolator signal conditioner is required to convert a 0-24 VDC voltage signal from the new level sensor element to a 4-20 mA signal which is compatible with the existing card.

Summary of Evaluation:

The instrument tunnel sump sensor (in conjunction with other instruments/components) only performs a monitoring function. As such, it is used to detect and identify RCS leakage and is not needed to mitigate any accident described in the FSAR. The RCS leak detection function is considered important to safety, but it is not credited in any way in the plant's accident analyses. The instrument is one of the RCS leak detection instruments required to be Operable during Modes 1, 2, 3 and 4 per Technical Specification 3.4.15, "RCS Leak Detection Instrumentation."

The new digital portion of the instrument loop performs a singular function of converting the 0-24 VDC voltage signal from the new level sensor to a 4-20 mA signal for the existing card. This digital component can be tested, and its potential failure is bounded by the existing failures of the previous analog instrumentation loop.

Of main concern is the need to keep a minimum level of water (3% indicating) in the instrument tunnel sump pit for the new instrument, which was not needed for the previous instrument. This minimum required level allows the Regulatory Guide 1.45 minimum leakage rate to be detected (within one hour) by the new instrument sump level indicator with its new level sensor element and digital isolator signal conditioner in the instrument loop.

The instrument tunnel sump pit level is checked automatically every minute, additionally, updates to the Control Room Shift and Daily Log Readings procedure result in a significant amount of warning time from low sump water level alarms before the sump needs to be filled.

The requirement to maintain a minimal water level in the instrument tunnel sump pit and the addition of the digital signal isolator conditioner do not introduce a failure mode that is not bounded by the existing failure modes and effects analysis for this component. The effect for all potential failure modes is that the RCS leakage rate would not be calculated and indicated correctly. In this case, if the water level dropped below two inches on the new level sensor, the malfunction would

be the same as the previous transmitter showing an out of range or a signal quality of "bad" due to the sensor voltage not being at an expected level. These effects are already considered and would result in inoperability such that entry into the applicable Condition and Required Actions of TS 3.4.15 would be required. Therefore, in all, the instrument replacement does not involve more than a minimal increase in the likelihood of malfunction of equipment important to safety.

In summary, this change was implemented without obtaining a license amendment because it does not have any effect on the accidents evaluated in the FSAR and does not result in more than a minimal increase in the likelihood of malfunction of equipment important to safety, nor does it result in a malfunction with a different result.
