

July 28, 2004

U.S. Nuclear Regulatory Commission
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DOCKET NUMBER 50-483
CALLAWAY PLANT UNIT 1
UNION ELECTRIC CO.
FACILITY OPERATING LICENSE NPF-30
SPECIAL REPORT
METEOROLOGICAL TOWER 10M – 60M ΔT WIND DIRECTION
INDICATION INOPERABLE

Ladies and Gentlemen:

Enclosed is a Special Report documenting the Inoperability of 10 Meter - 60 Meter Meteorological Monitoring Instrumentation on the Primary Meteorological Tower in accordance with Final Safety Analysis Report 16.3.3.3, and the actions taken to restore this circuitry to an Operable status.

If you have any questions or require additional information, please contact Mr. Mark Reidmeyer, Supervisor, Regional Regulatory Affairs at (573) 676-4306.

Sincerely,

A handwritten signature in cursive script that reads "Keith D. Young".

Keith D. Young
Manager
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Enclosure

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ENCLOSURE

Special Report

The Meteorological Instrumentation Limiting Condition For Operation (LCO) (Section 16.3.3.3 of FSAR) specifies the meteorological monitoring instrumentation channels required to be operable at all times. This includes the ambient air temperature difference between the 60 meter and 10 meter levels of the tower, 60-10 DT. With one or more required meteorological monitoring channels inoperable for more than 7 days, LCO Action 'a' requires a Special Report to be submitted to the Commission within the next 10 days outlining the cause of the malfunction and the plans for restoring the channel(s) to an operable status. In addition to the technical specification required 60-10 DT instrument, Callaway has a 90-10 DT instrument as well.

In early May 2004, Callaway contracted a meteorologist to review Callaway's meteorological data more frequently than it had been. As a result of these reviews, the meteorologist identified an anomaly in the 60-10 DT and 90-10 DT data. The temperatures rose unexpectedly during periods of precipitation or heavy fog, and returned to normal soon after the precipitation ceased. The inaccurate readings ranged from a few tenths of a degree Celsius high, to several degrees high relative to the expected values. The precipitation inconsistently affected the instruments with no known or detectable clear faults, e.g. shorts or grounds. The anomaly was not detectable by site personnel.

Based on recommendations and operating experience from the meteorologist, the 60 meter aspirator cable was replaced on June 3. However, further precipitation on June 8th and 9th demonstrated that this had not corrected the 60-10 DT data anomaly. The 60 meter and 90 meter aspirator terminal strips were then cleaned and the connectors used on the thermistor leads were sealed with self-sealing tape. This initially appeared effective at correcting the 60-10 DT precipitation affects, but not the 90-10 DT, based on the few periods of light rain that occurred during the next few weeks. A plant work document was generated to continue troubleshooting the 90 meter instruments. Meteorologist review of data after a period of precipitation on July 2 and 3, provided evidence that the 60-10 DT was still being affected by the precipitation and fog. Subsequently, the 60 meter aspirator and all three temperature sensors were replaced on July 7th and 8th. Further precipitation on July 12th provided evidence that the 60-10 DT instruments were still being affected.

Post maintenance testing was performed after each maintenance and equipment activity described above. For the work which was performed reasonable and appropriate post maintenance tests would consist of sensor channel checks. Instrument loop calibrations were performed in addition to sensor channel checks. In order to determine if the anomaly was present, precipitation was required. It was not practical to simulate atmospheric conditions present during precipitation events or safe to perform post maintenance testing on the tower during precipitation events.

On July 17th and 18th, the 10, 60 and 90m aspirators and cable sets were replaced on the tower. All three temperature sensors had already been replaced on July 8. The tower terminal boxes were also cleaned and inspected as part of the cable replacements. This ensured all temperature instrumentation and equipment exposed to the weather was new back to the tower terminal boxes. The temperature instrumentation was conservatively not declared operable until this repair was demonstrated to have been effective during an extended period of precipitation on July 24 and 25. Following review of the data by the contract meteorologist, the 60-10 DT instrument was declared operable on July 26, 2004.

The bases for the specification states:

The OPERABILITY of the meteorological instrumentation ensures that sufficient meteorological data are available for estimating potential radiation doses to the public as a result of routine or accidental release of radioactive materials to the atmosphere. This capability is required to evaluate the need for initiating protective measures to protect the health and safety of the public and is consistent with the recommendations of Regulatory Guide 1.23, "Onsite Meteorological Programs," February 1972.

The 60-10 DT instrument channel is used as a measure of atmospheric stability for dose projections. As indicated above, the 60-10 DT instrument showed unnaturally high readings when it was raining. As a result, the instrument could not meet the tight tolerance required by Regulatory Guide 1.23 for DT instruments. However, most of the time it was not raining and the instrument was not affected. Therefore the instrument was available for use to determine an atmospheric stability class most of the time. Also, Callaway has a diverse method of determining the atmospheric stability class using any of four calculated sigma theta values derived from the wind direction instruments. Therefore, alternate methods were available to fulfill this function when the 60-10 DT or 90-10 DT instrument channels were out of service. Callaway maintained the capability to perform dose projections throughout this period.

Plans for restoration to Operable status:

The 60-10 DT instrument was repaired on July 18, 2004 and was declared operable on July 26, 2004 once the repair had been demonstrated to be effective.

Cause of the malfunction:

The malfunction was subtle. It occurred during periods of rain or high humidity. The vendor believes the cause of the problem was long term deterioration of the equipment. The sensitivity of the temperature sensors is such that a relatively high resistance leakage path in parallel with the sensor leads can theoretically cause this type of unnatural rise in temperature. When moisture is absorbed into degraded or dirty materials in the aspirator, e.g. terminal strips or connectors, it can create a leakage path across the sensor leads and result in this type of precipitation affect.