



Omaha Public Power District

1623 HARNEY ■ OMAHA, NEBRASKA 68102 ■ TELEPHONE 536-4000 AREA CODE 402

September 9, 1982

LIC-82-297

Mr. Robert A. Clark, Chief
U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
Division of Licensing
Operating Reactors Branch No. 3
Washington, D.C. 20555

Reference: Docket No. 50-285

Dear Mr. Clark:

Environmental Qualification of Safety-Related Electrical Equipment Located in a Harsh Environment

Enclosure 13 to the Omaha Public Power District's letter to the Commission, dated May 3, 1982, identified the outstanding items that remain to be completed prior to closing the subject issue for the Fort Calhoun Station. The majority of these outstanding items had completion dates of June 30, 1982, which was based on the schedule required by the Commission's Order for Modification of License dated October 24, 1980. Since the June 30, 1982 completion date has been suspended pending issuance of a final rule by the Commission, the District has updated the completion schedule for several of these items based upon a best estimate of the work that remains to be completed. Attachment 1 details these outstanding items and the revised schedule. The District believes the revised completion dates are justified and consistent with outage schedules and equipment qualification testing and analyses that still must be completed by the District and/or its vendors/consultants. Attachment 2 details those outstanding items that have been completed since the District's last update (District's letter dated May 3, 1982) regarding these items.

The District would like to point out one outstanding item that requires Commission approval prior to closing the item. Item 7 of Enclosure 13 to the District's letter dated August 26, 1981 requested the Commission's

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concurrency on the District's use of the DOR guidelines to establish containment radiation doses for evaluation of equipment radiation effects. To date, the District has not received the Commission's decision regarding this request. This item will continue to remain open pending receipt of this approval.

Sincerely,



W. C. Jones
Division Manager
Production Operations

WCJ/TLP:jmm

Attachments

cc: LeBoeuf, Lamb, Leiby & MacRae
1333 New Hampshire Avenue, N.W.
Washington, D.C. 20036

Mr. Lawrence A. Yandell, NRC
Senior Resident Inspector

OUTSTANDING ITEMS

- 1) An aging and qualified life maintenance program will be fully implemented.

Reference:

Item 1 of Enclosure 13 to the District's letter dated May 3, 1982.

Revised Completion Date:

July 1, 1983.

Status:

The aging and qualified life maintenance program and implementing procedures have been developed and are presently being reviewed by the plant staff. The replacement parts program will be formulated following issuance of the final rule by the Commission because of the uncertainty regarding the final requirements. Although these programs will not be fully implemented until July 1, 1983, the District has identified the electrical equipment for which qualified life preventive maintenance is scheduled to be completed during the upcoming refueling outage, scheduled for early 1983.

- 2) Qualification testing of the Conax electrical containment penetrations will be conducted.

Reference:

Item 3 of Enclosure 13 to the District's letter dated May 3, 1982.

Revised Completion Date:

Testing is expected to be completed by January 1, 1983, and if qualification problems should be encountered, corrective action(s) will be completed by the end of the 1984 refueling outage.

Status:

The District has contracted Wyle Laboratories to conduct the qualification testing of the electrical penetrations to ensure their qualification is in strict accordance with the specifications of IE Bulletin 79-01B. Testing of sample penetrations is scheduled to commence in the next few weeks.

- 3) The District re-evaluated the effect of submergence on several containment solenoid valves, limit switches, and flow transmitters located below the containment flood level. This equipment includes:

<u>Limit Switches and Solenoids</u>	<u>Limit Switches Only</u>	<u>Flow Transmitters</u>
HCV-467A	HCV-238	FT-313
HCV-467C	HCV-239	FT-316
HCV-438A		FT-319
HCV-438C		FT-322
HCV-1387A		FT-328
HCV-1388C		FT-330
		FT-332
		FT-334

The District's letter dated March 25, 1982 stated that as a result of the above described submergence evaluation, the District intended to move the subject equipment above the accident flood level. The flow transmitters will be moved above this level during the 1983 refueling outage. The District is also presently completing an evaluation to determine the most effective means of relocating the solenoids above the submergence level and still ensure valve operability. The District now expects to move the solenoids during the 1984 refueling outage. However, a problem has recently been encountered regarding the movement of the subject limit switches above the submergence level.

The District initially decided to move the subject limit switches as an additional protective measure. As a result of further investigation, the District discovered that these limit switches cannot be physically removed from the valve, located separately above the flood level, and still perform their design function. Therefore, either the associated valves must be physically moved or the limit switches will have to remain at their present locations. Considering that these NAMCO limit switches (1) are IEEE 323-1974 qualified, (2) are sealed units which have been successfully tested to 70 psig, (3) have interconnecting signal cables, splices, and connectors which are environmentally qualified, and (4) provide only valve position indication and as such are not required for valve operability, the District believes they will operate as required in an accident environment and thus movement above the submergence level is not necessary nor is it planned.

Reference:

Item 4 of Enclosure 13 to the District's letter dated May 3, 1982.

Scheduled Completion Date:

Flow transmitters - 1983 refueling outage. Solenoids - 1984 refueling outage.

Status:

See discussion above.

- 4) The qualification criteria for chemical spray is the Fort Calhoun Station's USAR value of 1700 ppm boron in a boric acid solution. Applicable safety-related electrical equipment is qualified to this boron concentration. However, the safety injection and refueling water tank borated water is maintained at concentrations of up to 2500 ppm boron. This higher concentration is not expected to affect the qualification of the subject equipment, but an evaluation to verify this conclusion is being conducted.

Reference:

Item 6 of Enclosure 13 to the District's letter dated May 3, 1982.

Revised Completion Date:

1984 refueling outage, if modifications are required.

Status:

The District is conducting the 2500 ppm boron spray qualification verification for all applicable electrical equipment. Evaluation results demonstrate that the equipment reviewed to date is qualified at the higher boron concentration. The District anticipates no qualification problems for the remaining electrical equipment.

- 5) The District's initial qualification assessment of component cooling water (CCW) flow transmitters FT-416, 417, 418, and 419 identified no immediate safety problems. However, these transmitters can potentially be subjected to high radiation during CCW recirculation and documentation to verify the complete environmental qualification of the present transmitters is not available. Therefore, the District has decided to replace these flow transmitters with a Foxboro model that has complete qualification documentation.

Reference:

Item 9 of Enclosure 13 to the District's letter dated May 3, 1982.

Scheduled Completion Date:

1983 refueling outage.

Status:

See discussion and scheduled completion date above.

- 6) Radiation qualification verification testing of the Fisher 304 limit switches will be conducted.

Reference:

Item 10 of Enclosure 13 to the District's letter dated May 3, 1982.

Revised Completion Date:

Testing of these limit switches will be completed by the 1984 refueling outage.

Status:

The necessary qualification, analysis, and testing of these limit switches will be conducted by a District contractor.

- 7) Based on service information provided by the manufacturer, the District believes thermistor elements TE-866 and TE-867 in the charcoal filter trays of the containment air recirculation and iodine removal system will function properly in a LOCA environment. However, to eliminate the concern that complete qualification documentation is not available for the installed thermistors, the District intended to replace them with equipment that has complete documentation. The District has been unable to locate a replacement system that is qualified and also compatible for installation at the Fort Calhoun Station. Therefore, the District is conducting an evaluation to determine if a procedural revision or hardware modification can be completed to further ensure that charcoal bed temperatures can be monitored and/or maintained at appropriate levels during a LOCA.

Reference:

Item 13 of Enclosure 13 to the District's letter dated May 3, 1982.

Revised Completion Date:

The evaluation will be completed by July 1, 1983.

Status:

See discussion provided above.

- 8) The District will verify the 100 day radiation dose qualification for the containment hydrogen monitor installed as a requirement of NUREG-0737. Testing has determined that this monitor is qualified to a total integrated dose (TID) of 1.0×10^6 RADS for 100 days, and the District will verify the 100 day TID exposure resulting from a LOCA is less than this value.

Reference:

Item 15 of Enclosure 13 to the District's letter dated May 3, 1982.

Scheduled Completion Date:

October 1, 1982.

Status:

The District is presently conducting the necessary radiation calculations to determine the TID received by the monitor subsequent to a LOCA event.

- 9) Limit switches for HCV-1107B and 1108B will be replaced with fully qualified NAMCO limit switches. The HCV-1107B and 1108B limit switch change-outs were inadvertently omitted from the replacement list during the 1981 refueling outage and will be replaced during the upcoming 1983 outage. (NOTE: The District's letter dated April 2, 1982, with attached SCEWS page 6-120E, detailed that these limit switches had been replaced with NAMCO limit switches. Upon completion of the above described limit switch change-outs, the subject SCEW sheet will then be fully applicable.)

Solenoid valves HCV-2908, 2918, 2928, 2937, and 2947 will be replaced with environmentally qualified solenoids. The subject solenoid valves are required to operate under high differential pressure conditions due to their location near instrument air booster pumps. Presently, available qualified solenoid valves are not designed to operate at such a high differential pressure. Therefore, the District must conduct an evaluation and complete a modification which will allow the District to replace these solenoid valves with qualified equipment.

Reference:

Item 12 of Enclosure 13 to the District's letter dated August 26, 1981.

Scheduled Completion Date:

Limit switches for HCV-1107B and 1108B - 1983 refueling outage. The subject evaluation, resultant modification, and solenoid valve change-out will be completed by the end of the 1984 refueling outage.

Status:

See discussion and scheduled completion dates above.

- 10) Provide environmental qualification test reports to Franklin Research Center (FRC) for the following items:
- a) Foxboro transmitters installed on the AFW safety-grade indication and automatic initiation, pressurizer level indication, and containment wide-range pressure monitor systems.
 - b) GEM's transmitters installed on the containment sump water level and safety injection pump leakage detection modifications.

Reference:

The District's letter dated May 18, 1982.

*Scheduled Completion Date:

The District will provide FRC with these test reports upon receipt of the documentation from our vendors.

Status

Wyle Laboratories is completing the final qualification testing of the Foxboro and GEM's transmitters. Testing completed to date indicates these transmitters are qualified to IEEE 323-1974 standards.

- 11) Wyle Laboratories has completed the final testing and analysis of the electrical penetration cable splices located inside containment (except for original double heat shrink and penetration lead wire splices which interface with Teflon insulated cables. Wyle is continuing to test the qualification of these interface splices, but expects no qualification problems). The cable splice final report concluded that the subject splices can operate during and after postulated accident conditions based on sound engineering judgement and splice material analysis. However, the report also concluded that insufficient accident test data is available to demonstrate strict DOR guidelines qualification for the splices identified below. Therefore, to eliminate this identified concern, the District intends to replace the following cable splices with fully qualified splice kits (except as noted below):

- Cable splices at solenoid valves HCV-1107A and 1108A, which are in containment.
- Cable splices on HPSI loop flow, pressurizer pressure, and steam generator pressure transmitters, as identified in Licensee Event Report 80-006. The District expects to replace these transmitters with a newer Foxboro model that utilizes a fully qualified terminal block, instead of a splice.
- Containment ventilation fan motor (VA-3A, 3B, 7C, 7D) lead wire splices and penetration splices are covered with RTV-3144 or 3145 (clear) adhesive/sealant which provides for full environmental qualification. This item is considered complete and no further action is planned. Please refer to Item 4) of Attachment 2.

Until the splice kit and transmitter change-outs are completed, the LOCA qualified RTV adhesive/sealant that has been applied to the transmitter cable splices, and the fact that the subject solenoid valves fail open (which is their accident position), provides justification for interim continued operation.

Reference:

The District's letter dated May 18, 1982.

Scheduled Completion Date:

Depending on parts delivery schedules, the District may be able to complete part of the modifications detailed above during the 1983 refueling outage. The remaining work will then be completed by or during the 1984 refueling outage.

Status:

See discussion provided above. As detailed in the District's letter dated May 18, 1982, the final test report for the penetration cable splices will be forwarded to Franklin Research Center, but under separate cover.

- 12) Based on the Commission's meeting with utilities on July 7-10, 1981, regarding the environmental qualification issue, the District re-reviewed the qualification criteria for electric/pneumatic (E/P) valve positioners at the Fort Calhoun Station. During this review, the District determined that four containment E/P's, PCV-2909, 2929, 2949, and 2969, are manufactured by Honeywell and the availability of qualification documentation for them is unknown. The District is presently conducting an industry-wide search to locate qualification information for these positioners. The remaining E/P's of qualification concern at the Fort Calhoun Station are Fisher Model No. 546 controllers, which have complete qualification documentation.

Reference:

NRC/utility meeting dated July 7-10, 1981 regarding electrical equipment qualification.

Scheduled Completion Date:

The qualification documentation search is expected to be completed by January 1, 1983.

Status:

See discussion and scheduled completion date above.

COMPLETED ITEMS

- 1) Control room panel switches and indicators for environmentally qualified safety-related electrical equipment have been identified and marked with an orange dot to enhance the operator's use of this pertinent information. Operator training regarding this qualified safety-related electrical equipment has also been conducted. As new safety-related electrical equipment is qualified, the applicable control room instrumentation will be identified with an orange dot.
- 2) The District has completed the re-evaluation of the radiation dose received by electrical equipment just above the containment submergence level (1009.9' elevation). The concern here was that following a LOCA, the radiation exposure due to the proximity of the contaminated water could result in a higher dose to the equipment than previously evaluated. Using TMI source terms, the radiation effect on equipment located both inside and outside of containment was evaluated and the District has concluded that the exposure to the subject equipment is within the equipment's radiation qualification limits.
- 3) Cable splices at solenoid valves HCV-238, 239, 240, 438A, 438C, 864, 865, 881, 882, and MS-291 and 292 were replaced with IEEE 323-1974 qualified Raychem splice kits during the 1981 refueling outage.
- 4) Wyle Laboratories Engineering Report 26333-26, regarding the environmental qualification of cable splices inside containment, concluded that RTV-3144 and 3145 provide complete splice protection during a design basis accident and have a normal service life of 120 years. Based on this qualification information and the District's engineering analysis, the containment ventilation fan motor lead wire and penetration cable splices, which have been coated with RTV-3145, are fully qualified for the remaining operating life of the Fort Calhoun Station.