



1901 Gratiot Street, St. Louis

Donald F. Schnell
Vice President

May 27, 1988

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

ULNRC-1779

DOCKET NUMBER 50-483
CALLAWAY PLANT
RESPONSE TO GENERIC LETTER 88-05
BORIC ACID CORROSION OF CARBON STEEL REACTOR
PRESSURE BOUNDARY COMPONENTS IN PWR PLANTS

Union Electric Company received the subject NRC Generic Letter 88-05 in April 1988. The Generic Letter requested that Union Electric provide assurances that a program has been implemented at the Callaway Plant to address the corrosive effects of boric acid corrosion and reactor coolant system leakage at less than technical specification limits. The Generic Letter provided insight into the phenomena related to boric acid corrosion of carbon steel components and identified systematic measures required in an acceptable program.

This submittal provides the requested information in accordance with 10CFR50.54(f). Union Electric responses provided in the Attachment to this letter address each element of an acceptable program as identified in the Generic Letter.

If additional information is required, please let us know.

Very truly yours,

for Donald F. Schnell

DJW/plh
Attachment

8806060110 880527
FOR ADOCK 05000483
F DCD

Mailing Address: P.O. Box 14, St. Louis, MO 63166

A001
11

STATE OF MISSOURI)
) S S
CITY OF ST. LOUIS)

Robert J. Schukai, of lawful age, being first duly sworn upon oath says that he is General Manager-Engineering (Nuclear) for Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By *Robert J. Schukai*
Robert J. Schukai
General Manager-Engineering
Nuclear

SUBSCRIBED and sworn to before me this *27th* day of *May*, 1988

Barbara J. Pfaff
BARBARA J. PFAFF
NOTARY PUBLIC, STATE OF MISSOURI
MY COMMISSION EXPIRES APRIL 22, 1989
ST. LOUIS COUNTY

UNION ELECTRIC RESPONSES TO PROGRAM
AREAS IDENTIFIED IN GENERIC LETTER 88-05

As requested Union Electric is providing the NRC with information concerning the Callaway program for addressing boric acid corrosion of carbon steel reactor pressure boundary components. As a result of this Generic Letter, planned additions to the program are also provided. Full program implementation, other than ongoing activities or as otherwise indicated, will occur on or before November 1, 1988. This date is prior to the next refueling outage.

Generic Letter Program Area 1

A determination of the principal locations where leaks that are smaller than the allowable technical specification limit can cause degradation of the primary pressure boundary by boric acid corrosion. Particular consideration should be given to identifying those locations where conditions exist that could cause high concentrations of boric acid on pressure boundary surfaces.

Union Electric Response

Union Electric Company will determine the principal locations where leaks that are smaller than the allowable technical specification limit can cause degradation of the primary pressure boundary by boric acid corrosion. A list will be developed to identify the locations that could be subjected to degradation from boric acid on the pressure boundary surfaces.

Generic Letter Program Area 2

Procedures for locating small coolant leaks (i.e., leakage rates at less than technical specification limits). It is important to establish the potential path of the leaking coolant and the reactor pressure boundary components it is likely to contact. This information is important in determining the interaction between the leaking coolant and reactor coolant pressure boundary materials.

Union Electric Response

The Callaway program presently has procedures and programs in effect to locate small coolant leaks.

- a) The PM program requires Operations personnel to inspect the inside of the containment building (once a month) and to identify and report any RCS leakage noticed from accessible areas. Areas inside the bioshield wall are not inspected during power operations.

- b) Operations procedure OSP-BB-00009, RCS Inventory Balance, is performed every 72 hours. This inventory balance ensures that unidentified leakage is less than 1gpm. The quantity of leakage calculated is reviewed to detect any abnormal changes or trends.
- c) Operations has the ability to trend the radiation monitors for the past 28 days. The radiation monitors are reviewed daily as part of the normal operations watch.
- d) The combination of (a), (b), and (c) has resulted in finding small leaks, less than the technical specification limit (1gpm), on several occasions. Examples of some of the leaks found are:

- Conoseal leak
- Leak on RTD Bypass Loop Isolation Valve (BB-V-8074A)
- Leaks on RCS flow transmitter manifolds
- Pressurizer PORV block valve packing leaks
- Pressurizer spray valve packing leaks

Determination of the potential flow path of leaking coolant and the reactor pressure boundary components it is likely to contact will be performed by the engineering evaluations addressed in items (a) and (b) of our response to the Generic Letter Program Area 3.

Generic Letter Program Area 3

Methods for conducting examinations and performing engineering evaluations to establish the impact on the reactor coolant pressure boundary when leakage is located. This should include procedures to promptly gather the necessary information for an engineering evaluation before the removal of evidence of leakage, such as boric acid crystal buildup.

Union Electric Response

Union Electric methods for conducting examinations, performing engineering evaluations, and procedures are as follows:

- a) Union Electric Nuclear Engineering will evaluate boric acid leaks in the reactor building and identify any carbon steel or low alloy steel that may have been affected. In most cases this will be done prior to any clean-up of the boric acid crystals. However, sometimes clean-up of the boric acid crystals is done to determine the location of an active leak or for ALARA purposes. If this is done prior to the engineering evaluation, the location and a description of the leakage will be identified. Engineering will make an evaluation of boric acid leaks on carbon steel or low alloy steel of the RCS pressure boundary. The Operations Preventative Maintenance program for containment inspections has been revised to include an engineering evaluation of all boric acid leakage identified.

- b) Procedures PDP-ZZ-00003, Work Request Processing, and ODP-ZZ-00019, Containment Access and Integrity, will be revised to require engineering evaluations of boric acid leaks on the reactor coolant system pressure boundary.
- c) Other procedures within our existing program will be reviewed for compatibility to the intent of Generic Letter 88-05. This includes the following procedures.
 - (1) QCP-ZZ-05041, Visual Examination to ASME VT-2
 - (2) QCP-ZZ-05040, Visual Examination to ASME VT-1
- d) Existing procedures APA-ZZ-00510, Nonconformance Control and Reporting, and EDP-ZZ-04004, Conduct of Engineering Evaluations, are adequate for reporting and evaluating any boric acid corrosion problems found on the RCS pressure boundary.

Generic Letter Program Area 4

Corrective actions to prevent recurrences of this type of corrosion. This should include any modifications to be introduced in the present design or operating procedures of the plant that (a) reduce the probability of primary coolant leaks at the locations where they may cause corrosion damage and (b) entail the use of suitable corrosion resistant materials or the application of protective coatings/claddings.

Union Electric Response

Several Union Electric programs or studies are being pursued as corrective actions to prevent or reduce recurrences of boric acid corrosion to carbon steel or low alloy steel within the reactor coolant system pressure boundary. These programs are currently ongoing and may not be completed by November 1, 1988. We anticipate that these types of evaluations will continue during the life of the plant as we identify opportunity for improvement to this program.

- a) Engineering is evaluating the purchase of stud tensioning equipment to tighten steam generator manway studs rather than torquing them. If implemented, this should decrease the probability of manway leakage which is a source of boric acid corrosion to carbon steel pressure boundaries.
- b) The Planning and Scheduling Department places special emphasis on potentially radioactive leaks. Leaks are tracked and a weekly report is published for management review on the status of radioactive leaks. A large percentage of these leaks have involved located systems. Special emphasis is placed on getting radioactive leak work requests scheduled and performed.

- c) Engineering has evaluated Callaway bolting practices. Areas included in these reviews are: bolt and stud strength and selection; bolting torque or tensioning requirements; post-tension testing or measuring for bolt tension relaxation; use of bolt extensometers to measure bolt elongation and tension; gasket material selection; and mating part alignment and surface preparation. Improvements in maintenance procedures and equipment have been made when needed. This is an ongoing activity.
- d) Callaway has implemented a live loaded valve packing program. Several valves have had their packing replaced with the live loaded packing arrangement. Other valves are being evaluated for future applications of live loaded packing. This ongoing activity should reduce packing gland leakage of borated systems.
- e) Actions have been initiated to change some carbon steel bolting to stainless steel bolts. For example carbon steel bolts have been replaced with stainless steel bolts in the Fuel Pool Cooling and Clean-up System in areas subject to boric acid contamination. A change from carbon steel nuts to an alloy nut less subject to boric acid corrosion in other plant applications is being reviewed and will be implemented on a case-by-case basis. This will be an ongoing activity.

cc: Gerald Charnoff, Esq.
Shaw, Pittman, Potts & Trowbridge
2300 N. Street, N.W.
Washington, D.C. 20037

Dr. J. O. Cermak
CFA, Inc.
4 Professional Drive (Suite 110)
Gaithersburg, MD 20879

R. C. Knop
Chief, Reactor Project Branch 1
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Bruce Little
Callaway Resident Office
U.S. Nuclear Regulatory Commission
RR#1
Steedman, Missouri 65077

Tom Alexion (2)
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Mail Stop 316
7920 Norfolk Avenue
Bethesda, MD 20014

Manager, Electric Department
Missouri Public Service Commission
P.O. Box 360
Jefferson City, MO 65102

bcc: D. Shafer/A160.761
/QA Record (CA-758)
Nuclear Date
DFS/Chrono
D. F. Schnell
J. E. Birk
J. F. McLaughlin
A. P. Neuhalfen
R. J. Schukai
M. A. Stiller
G. L. Randolph
R. J. Irwin
H. Wuertenbaecher
W. R. Campbell
A. C. Passwater
R. P. Wendling
D. E. Shafer
D. J. Walker
O. Maynard (WCNOC)
R. C. Slovic (Bechtel)
G56.37 (CA-460)
T. P. Sharkey
NSRB (Sandra Auston)