Maine Yankee
RELIABLE ELECTRICITY FOR MAINE SINCE 1972

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January 4, 1991
MN-91-06 SEN-91-07

UNITED STATES NUCLEAR REGULATORY COMMISSION
Attention: Document Control Desk
Washington, DC 20555

References: (a) License No. DPR-36 (Docket No. 50-309)
(b) MYAPCo Letter to USNRC dated December 28, 1990 (MN-90-127)
(c) MYAPCo Letter to USNRC dated December 31, 1990 (MN-90-131)

Subject: Steam Generator Tube Leak Administrative Controls

Gentlemen:

During a conference call on January 3, 1991, members of the NRC staff requested Maine Yankee document the modified administrative controls being implemented to govern actions in the event of a steam generator tube leak. The attached administrative controls are based on the lessons learned from Maine Yankee's December 17 tube leak. Procedure changes including the attached will be implemented prior to startup which is scheduled for January 7, 1991. These procedure steps will be subject to change as conditions or experience warrant.

We trust this information is satisfactory. Please contact us should you have any questions regarding this matter.

Very truly yours,

SENichols

S. E. Nichols, Manager
Nuclear Engineering & Licensing

SEN/s

Attachment

c: Mr. Thomas T. Martin
Mr. Charles S. Marschall
Mr. E. H. Trottier

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DRAFT SECTIONS FOR AOP'S 2-10/2-25

5.5 RCS LEAKAGE INTO A STEAM GENERATOR

5.5.1 IF the following radiation monitoring system alarms are activated or one or more increasing, THEN this is indicative of a RCS leak from the steam generator tubes to the secondary side of the steam generator. The air ejector monitor should respond long before the other monitors as it provides the earliest warning of developing primary to secondary leakage

a. Air ejector monitor RI-1801.

b. Steam generator blowdown monitor (any one) RI-2601, 2602, 2603.

c. Main steam line radiation monitors (any one) RM-901-A, B, C.

5.5.2 Perform the following to identify the leaking steam generator. Changes in these parameters will not be evident for very small leak rates.

a. Check steam generator narrow range levels for a level increase.

b. Check for a charging/letdown flow mismatch.

c. Check for a decreasing PZR level.

d. Check for a steam flow/feed flow mismatch

5.5.3 Dispatch an operator to monitor the main steam lines near the feed reg. valves locally with a portable radiation detector. This may aid in providing early indication of a large leak. If a contact reading at a main steam line regulator valve indicates the presence of noticeable activity (i.e., greater than 2 mR/hr) then the leakage should be assumed to be greater than .07 gpm and a 50%/hour load reduction is warranted.

5.5.4 If the air ejector monitor alarms (external setpoint) immediately request a Chemistry sample, notify the Manager, Operations and Assistant Manager, Operations and increase air ejector grab sample frequency to shiftly to confirm and quantify primary to secondary leak rate. Raise the external air ejector RMS setpoint to 2 times the new RMS reading and log the alarm in the shift logs. Shiftly samples should continue to be taken to verify the leak rate is stable until the Plant Manager concurs with returning to daily sample frequency.

NOTE

The formula at Attachment A provides a good estimate of leak rate only at stable full power operation.

5.5.5 Estimate the primary to secondary leakage by measuring the total air ejector off-gas flow, requesting an isotopic analysis of the air ejector effluent and reactor coolant and determining the leak rate by the calculations at Attachment A.

NOTE

If the estimated leak rate is on the order of 0.002 gpm or less, activity in steam line or steam generator blowdown may be below detectable concentrations.

5.5.6 Request isotopic grab samples from each steam generator blowdown and from the main steam lines to attempt to determine the leaking generator and better quantify leak rate based on steam generator activity trends.

5.5.7 Determine leak rate by a charging/LD mismatch or per Procedure 3.1.19, REACTOR COOLANT SYSTEM LEAKAGE EVALUATION.

NOTE

The amount of early warning provided by the air ejector RMS is highly dependent on the activity of the primary coolant. Leaking fuel will cause the RMS to respond earlier to smaller tube leaks than if the primary coolant has relatively low activity. This is a key factor which must be considered while diagnosing and determining the course of action in response to increasing primary to secondary leakage.

5.5.8 If the air ejector RMS reading continues to increase and again reaches the external alarm setpoint, readjust the setpoint to 2 times the new reading and notify the Manager, Operations and Assistant Manager, Operations and log receipt of the alarm in the shift log.

5.5.9 If the air ejector RMS reaches a reading equivalent to 10 x the pre-leakage reading or a reading of 25,000 cps or an estimated leak rate of .005 gpm based on isotopic analysis, then increase air ejector grab sample frequency to once per shift to provide increased trending of the leak rate.

5.5.10 If the air ejector RMS reaches a reading of 50,000 cps or the estimated leak rate reaches .0075 gpm based on isotopic analysis, then increase air ejector grab sample frequency to twice per shift.

5.5.11 If total confirmed primary to secondary leakage exceeds 15 gallons per day (0.01 gpm), or the air ejector RMS reading reaches about 75,000 cps, request a PORC meeting to review continued operation of the plant, and to plan for steam generator corrective maintenance. Continue air ejector sample frequency at twice per shift.

5.5.12 If total confirmed primary to secondary leakage exceeds 50 gallons per day (0.035 gpm), or the air ejector RMS exceeds 150,000 cps, commence a power reduction and plant shutdown per OP 1-4, OPERATIONS AT POWER at a rate of 15%/hour and be in hot shutdown in six hours and in cold shutdown in 24 hours. Refer to AOP 2-25, HIGH RADIATION LEVELS.

5.5.13 If a plant shutdown is warranted and the leaking generator is known based on sampling history or confirmed by a main steamline or blowdown RMS monitor then:

a. Secure blowdown of the suspect steam generator by shutting its blowdown metering valve:

BD-1 for S/G 1
BD-2 for S/G 2
BD-3 for S/G 3

b. Shut atmospheric steam dump isolation valve for suspect steam generators.

MS-59 for S/G 1
MS-79 for S/G 2
MS-99 for S/G 3

c. Secure flow to the blowdown monitor if it alarms by shutting the blowdown trip valve:

BD-T-12 for S/G 1
BD-T-22 for S/G 2
BD-T-32 for S/G 3

5.5.14 If total confirmed primary to secondary leakage exceeds 100 gallons per day (0.07 gpm), or the air ejector RMS exceeds 300,000 cps, commence an emergency power reduction per OP 1-4, OPERATIONS AT POWER at a rate of 50%/hour to shut down the plant.

5.5.15 IF leakage increases to 100 gpm or greater, trip the plant and initiate E-0, EMERGENCY S/D FROM POWER OR SAFETY INJECTION, and E-3, STEAM GENERATOR TUBE RUPTURE and exit this AOP.

5.5.16 Reference Emergency Implementing Procedure 2.50.0, DECLARATION AND CATEGORIZATION OF EMERGENCY CONDITIONS, to determine appropriate emergency action levels, and implement any required actions.

5.5.17 If the plant has been shutdown per normal operating procedures and not tripped, shut down the reactor per OP 1-6.

5.5.18 Determine the amount of boric acid to reach cold shutdown boron concentration plus 100 ppm per TDB Figure 1.1.2 series and add the boric acid to the reactor coolant system. Commence a cooldown and depressurization per OP 1-7 to 480°F and 1000 psig and isolate the secondary side of the leaking steam generator to minimize contamination of the secondary side of the plant. Do not continue with plant cooldown below 475°F until RCS Cb is confirmed at cold shutdown boron concentration by Chemistry sample.

5.5.19 Cooldown per OP 1-7 should be conducted with two RCPs running. The RCP associated with the leaking steam generator should be run along with one other until RHR entry conditions are reached. The RCP associated with the leaking steam generator should be run until after the reactor coolant system has been cooled to 150°F or below for at least three hours.

5.5.20 Final depressurization of the affected generator is to be accomplished by reestablishing blowdown of the generator to transfer the secondary side water to an aerated drain tank for processing. Lowering the level to expose the top of the tube bundle, which will [t 150°F, will condense the steam bubble and depressurize the steam generator.