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January 15, 1980

ELECTRIC ENGINEERING DEPARTMENT

Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attn: Mr. D. G. Eisenhut, Acting Director
Division of Operating Reactors

Subject: Calvert Cliffs Nuclear Power Plant
Units Nos. 1 & 2, Dockets Nos. 50-317 & 50-318
NRC Requirements for Aux Feed Systems

Reference: a) NRC letter dated 11/7/79 from Eisenhut to Lundvall, same subject.
b) BG&E letter dated 12/28/79 from Olson to Eisenhut, same subject.

Gentlemen:

Referemce (a) requested that we provide certain information concerning the Auxiliary Feedwater Systems at Calvert Cliffs an provide a schedule for submittal of certain other information on the same subject, including proposed Technical Specifications. In Reference (b) we stated that the proposed technical specifications and other information would be processed through inhouse reviews and submitted to NRC by January 15, 1980. Enclosed is the information on our existing auxiliary Feedwater systems requested in enclosure 2 of Reference (a). Our proposed Technical Specifications will be submitted to NRC by January , 1980.

We apologize for any inconvenience this new schedule may cause.

Very truly yours,

R. C. L. Olson
Senior Engineer

RCLO/smn

cc: J. A. Biddison, Esquire
G. F. Trowbridge, Esquire
Messrs. E. L. Conner, Jr.
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Auxiliary Feedwater Design Basis Information

1a. Identify the plant transient and accident conditions considered in establishing AFWS flow requirements.

Event (a) Loss of main feedwater
Main steam isolation valve closure } treated in FSAR as one analysis

Event (b) Plant cooldown

1b. Describe the plant protection acceptance criteria and corresponding technical basis used for each initiating event identified above.

Event (a) Criteria:

1. Maintain a DNB ratio above the DNB SAFDL limit based on TORC CE-1 correlation.

2. Restrict reactor coolant system (RCS) cooldown rate to a maximum of 100°F/hr.

3. Maintain steam generator inventory to allow 10 minutes for manual initiation of the auxiliary feedwater system.

4. RCS pressure is maintained under 110% of design pressure.

Event (b) Criteria:

1. Cool the primary system to 300°F.

2. Describe the analyses and assumptions and corresponding technical justification used with plant conditions considered in 1a above, including:

a. Maximum reactor power (including instrument error allowance) at the time of the initiating event or accident. Events (a) and (b): 2754 Mwt including 2% allowance for instrument error.

b. Time delay from initiating event to reactor trip. Event (a): 16.6 seconds.

c. Plant parameter(s) which initiates AWFS flow and time delay between initiating event and introduction of AFWS flow into steam generator(s). Events (a) and (b): AFWS is initiated manually. Procedures are written to notify operators to actuate AFWS upon receipt of steam generator low level alarm.

d. Nominal steam generator water level when initiating event occurs (See 2e).

e. Initial steam generator water inventory and depletion rate before and after AFWS flow commences identify reactor decay heat used. Events (a) and (b):

Steam Generator Inventory	Full Power
Liquid (lbm)	131,106
Steam (lbm)	9,486
Total (lbm)	140,592

Total decay heat - 4.8×10^8 BTU for the first 90 minutes after shutdown.

Steaming rate (auxiliary feedwater that is boiled off once it enters the ruptured steam generator) - 429 lbm/sec.

Maximum steam flow rate prior to initiating auxiliary feedwater occurs prior to the trip and is 9415 lbm/sec.

f. Maximum pressure at which steam is released from steam generator(s) and against which the AFW pump must develop sufficient head.
Event (a): 1026 psia; 24.5 seconds after the event.

g. Minimum number of steam generators that must receive AFW flow.
Event (a): 5% of full feedwater flow to both steam generators was assumed for the current analysis.

h. RC Flow Condition.
Event (a): Continued operation of RC pumps.

i. Maximum AFW inlet temperature.
Event (a) and (b): 90°F.

j. Following a postulated steam break, time delay assumed to isolate break and direct AFW flow to intact steam generator(s). AFW pump flow capacity allowance to accommodate the time delay and maintain minimum steam generator water level. Also identify credit taken for primary system heat removal due to blowdown:
Event (a): 1. Time delay assumed was 10 minutes.
2. No credit was taken for primary system heat removal due to blowdown.

k. Volume and maximum temperature of water in main feed lines between steam generator(s) and AFWS connection to main feed line. Not applicable.

l. Operating condition of steam generator normal blowdown following initiating event.
Events (a) and (b): Normal blowdown is 25 GPM following initiating event.

m. Primary and secondary system water and metal sensible heat used for cooldown and AFW flow sizing.

1.63×10^6 BTU/°F - See U1C2 submittal.

n. Time at hot standby and time to cooldown RCS to RHR system to cut in temperature to size AFW water source inventory. Adjusting the feedwater flow to the permissible cooldown rate of 100°F/hr., decay heat removal and cooldown if both units can be accomplished in six hours, with the minimum amount of water available (300,000 gallons). This amount of water is also adequate to remove decay heat from both units for more than ten hours after initiation of cooldown and still maintain normal no-load water level in the steam generators.

3. Verify that the AFW pumps in your plant will supply the necessary flow to the steam generator(s) as determined by items 1 and 2 above considering a single failure. Identify the margin in sizing the pump flow to allow for pump recirculation flow, seal leakage and pump wear.

The auxiliary feed pumps are rated at 700 gpm with a total dynamic head of 2490 feet. Fifty gallons per minute are required for continuous recirculation. Resistance for valves, nozzles and piping require a pump with a minimum head of 2360 feet.