CENTRAL FILES

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January 2, 1981

Mr. Boyce H. Grier, Director
Office Of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
Region 1
631 Park Avenue
King of Prussia, Pennsylvania 19406

Dear Mr. Grier:

NRC IE BULLETIN NO. 80-24
PREVENTION OF DAMAGE DUE TO WATER LEAKAGE
INSIDE CONTAINMENT (OCTOBER 17, 1980 INDIAN POINT 2 EVENT)
SALEM GENERATING STATION
UNITS NO. 1 AND 2
DOCKET NOS. 50-272 AND 50-311

In response to your letter of November 21, 1980, transmitting NRC IE Bulletin 80-24, the attached response is hereby submitted for your review.

Approximately ninety-eight (98) manhours were expended on this bulletin's review.

If you have any further questions, we will be pleased to discuss them with you.

Sincerely,

F W Schneider

CC Director
Nuclear Regulatory Commission
Office of Inspection and Enforcement
Washington, D. C. 20555

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The following response corresponds to the Item Nos. of NRC Bulletin 80-24.

1. The only open cooling water system present inside of Salem Units 1 and 2 containment is the containment fan cooling system. The following information provides a summary description of the system.

   a) The mode of operation of the fan cooler is different during normal reactor operation and during a response to a LOCA. During normal reactor operation, two to four of the five fan coil units are running depending on seasonal conditions and reactor power. The remaining units are in a standby condition and are ready for service. During a LOCA, the following three different operating modes would be possible:

      1. All five containment fan coil units and no containment spray,
      2. Two containment spray trains and no fan coil units, or
      3. Three fan coil units and one containment spray train.

      The service water system flows to the operating and standby fan coil units.

   b) The source of water to the fan coil units is service water. Its typical chemical content is:

Item	Minimum	Average	Maximum
Conductivity, micro-ohms	250.0	8,500.00	18,000.0
pH	6.2	7.1	9.0
Total dissolved solids, ppm	139.0	5,890.0	13,689.0
Suspended matter, ppm	5.0	135.0	694.0
Sulfides, ppm as H_2S	0.0	0.04	.48
Chlorides, ppm as NaCl	20.6	5,300.0	11,080.0
Dissolved oxygen, ppm	3.28	7.9	17.39
Chemical oxygen demand, ppm	0.0	84.5	594.0
Total ammonia, ppm	0.025	.32	2.33
Sulfates, ppm as SO_4	5.0	474.0	1,050.0
Free carbon dioxide, ppm	0.0	3.6	26.2

c) The piping and cooler tubes used in the fan cooling system are made of corrosion resistant materials. The piping to the coolers is cement lined carbon steel. The high erosion piping sections are currently being replaced with 316 stainless steel piping. The cooler tubes are currently 90/10 CuNi, and these will be replaced with AL6X tubing.

d) Experience with system leakage is documented in the response to item 1(e).

e) The following list is a history of the type of repairs done on the fan cooler system:

Work Order No.	Description	Date
MD-2162	11 FCU Motor Cooler Replacement	10/24/77
OD-6092	14 FCU Motor Cooler Repair	10/24/77
MD-2319	13 FCU Motor Cooler Repair	10/31/77
OP-0146	15 FCU Motor Cooler Repair	11/03/77
MD-2315	13 FCU Motor Cooler Repair	11/03/77
MD-2895	11 FCU Motor Cooler Repair	8/04/78
MD-2948 & OD-10060 & MD-2949 & OP-90396	11 through 15 FCU Replace Spool	8/23/78
OD-10158	14 FCU Motor Cooler Replace/Repair	8/30/78
MD-0353 & MD-903366	12 FCU Motor Cooler Replace/Repair	3/31/79
MD-905965	13 FCU Repaired Flange Leak	79
OD-916898	11 FCU Motor Cooler Replace/Repair	9/05/79
OD-915491	13 FCU Motor Cooler Replace/Repair	10/23/79
OD-932346	15 FCU Motor Cooler Replace/Repair	80
	11 FCU Motor Cooler Replace/Repair	6/11/80
MD-912685	11 FCU Primary Cooler Coil Replace	7/08/80
	11 FCU Motor Cooler Replace/Repair	9/03/80
	11 FCU Primary Cooler Coil Replace	9/11/80
MD-910204	12 FCU Primary Cooler Coil Replace	9/11/80
	12 FCU Motor Cooler Replace/Repair	8/02/80
MD-936319	14 FCU Primary Cooler Coil Replace	8/08/80
MD-936324	14 FCU Secondary Cooler Coil Replace	8/11/80
	15 FCU Secondary Cooler Coil Replace	9/09/80

All repairs were done by welding of copper nickel to carbon steel.

f) The service water system to the fan coolers is provided with isolation valves. Each fan cooler unit has an inlet and outlet isolation valve located outside containment. Isolation of the individual cooler can be accomplished by remote air operated valves from the control room or local manual operation. The pilot solenoid valves are the same power channel as the power feed to the respective fan cooler. Loss of power or air will cause the isolation valves to fail open (due to safety function design of the fan coolers). Redundant air is supplied to each valve to minimize probability of failure to close when needed. The fail safe condition for the valves must be open due to safety function conditions. This arrangement negates the vulnerability of this system to single failure.

g) There are no provisions for testing the isolation valves in accordance with Appendix J to 10CFR50. This procedure is not required because the isolation valves do not meet the criteria of II. H1 through 4 of Appendix J to 10CFR50.

h) The following instrumentation is in place to detect leakage:

Service Water Flow - Each containment fan coil has an individual flow indicator on the control console. In addition, a differential service water flow inlet to outlet will cause a bezel alarm on the control console.

Containment Fan Coil Leak Detector - The condensate from the fan coil drain pans is collected and funneled into a standpipe which has a high alarm and a high-high alarm which are located on the overhead annunciator. Also a selectable level indicator is located on the control console.

Dewpoint - A dewpoint measuring system is installed to continuously monitor inlet dew temperature of each fan coil unit and recorded on panel 1RP1.

Radiation Detection - A radiation detector is installed in the service water outlet piping of each containment fan coil. Upon initiation of a high radiation level a bezel alarm is actuated and the coil is isolated by procedure.

Containment Sump Level Indication- On the control console two channels of analog level indication are installed on Unit 1 and are now being installed on Unit 2 as per post TMI requirements. Also included is a containment sump overflow alarm on the overhead annunciator.

Procedures are in place to detect leakage in the containment building utilizing both the reactor coolant leak detection procedure OI II-1.3.5 and reactor coolant leak rate computation procedure SP(O)4.4.6.2(d).

i) Radiation monitors are provided to minotor fan cooler service water discharge and provide alarms and indication to operators. Grab sample analysis capability is also provided. No automatic isolation of fan cooler service water is initiated upon radiation alarms. The fan coolers are a safeguards system and perform an accident mitigation function.

2. The following actions and verifications were accomplished at our Salem plant.

a) A redundant means exists to detect and alert control room operators of a significant accumulation of water in the containment sump. There are two channels of level indications on the control console. Also included is a containment sump overflow alarm on the overhead annunciator. The reactor sump has sump pump start-stop times and the sump high level alarm indicated on the auxiliary alarm printer.

b) A positive means exists to determine flow from the containment sump. Observation of containment sump pump start and stop times are indicated on the auxiliary alarm printer. Utilizing the standard plant operating instruction OI-1.3.5, the operator can thus determine leak rate into the sump. A similar arrangement is provided for the reactor sump pump.

c) Whenever a containment fan coil leak detection high alarm is received, shift routine requires that the total fan coil unit leak rate be determined in accordance with OI II-1.3.5 (Reactor Coolant Leak Detection). In addition, it is required that an auxiliary annunciator alarm summary be initiated and evaluated at least once per shift, indicating sump pump operation and unusual alarms. These two shift procedures assure that the plant operators have at least two methods of determining water level in each location and at least one pump available to remove water from each sump location.

d) A review of the present leak detection systems and procedures indicates they provide adequate means and measures to promptly detect, verify and isolate leaking components or systems within the containment building.

e) All measures described in a) through d) above are implemented; consequently, no interim surveillance measures have been undertaken.

f) Procedures, as per the station's standard administrative procedures, have been established to notify the NRC of any service water system leaks within containment via a special license event report as a degradation of a containment boundary.

3. Portions of the component cooling system, a closed cooling system, are inside the containment. To date the units have not experienced any significant amount of component cooling water leakage into the containment.

4. This letter serves as a written report in response to your items listed in IE Bulletin 80-24. The attached letter of affirmation is provided.

State of New Jersey)
) SS:
County of Essex)

Frederick W. Schneider, being duly sworn according to law deposes and says:

I am a Vice President of Public Service Electric and Gas Company and as such, I find the matters set forth in our response dated January 2, 1981, to all items of Bulletin No. 80-24 "Prevention Of Damage Due To Water Leakage Inside Containment" are true to the best of my knowledge, information, and belief.

Frederick W. Schneider
Frederick W. Schneider

Subscribed and sworn to before me
this 2nd day of January, 1981

Joanne C. Maccioccia
Notary Public of New Jersey

My commission expires on October 1, 1983.