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January 5, 1981

Mr. James G. Keppler
Director, Region III
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, IL 60137

Dear Mr. Keppler:

PRAIRIE ISLAND NUCLEAR GENERATING PLANT
Docket Nos. 50-282 and 50-306

In response to IE Bulletin No. 80-24, the following is offered. The response is numbered to correspond to Bulletin numbering.

1.a. Cooling water use within containment is limited to the Fan Coil Units and the Control Rod Drive mechanism shroud cooling coils. Four fan coil units and two CRDM Fans for each generating unit provide the necessary heat removal for normal operation. During accident conditions the cooling water is isolated to the CRDM Fans and flows only to the FCU's. The redundancy requirement for this safeguards equipment is met in that there are two trains of cooling water for each containment vessel.

The design flow through the fan coil units during normal operation is 450 gpm. The inlet and outlet flows are monitored in the control room for each fan coil unit, with an alarm for low flow. Inlet and outlet flows for the CRDM shroud cooling coils are monitored in conjunction with the #13 and #14 (#23 and #24 for unit 2) FCU cooling water flow because the supply and return lines for each CRDM cooling coil ties into the respective FCU header.

For compliance with Technical Specification 4.1, the aforementioned equipment is checked monthly in the <u>Post-Accident Monitoring Instruments Monthly Check</u>, SP 1045 and SP 2045 for Units 1 and 2, respectively. The acceptance criterion for the flow indicators is such that the inlet and outlet flows of each fan coil unit are to be within 150 gpm of each other. If inlet and outlet flows are found to differ by more than 150 gpm, steps are taken to determine the discrepancy. The necessary steps taken are:

1) Each containment Sump A pump (two per containment) elapsed time indicator is checked to determine if there has been an increase in pumping time.

2) Containment humidity indication is checked to determine if there has been an increase in containment humidity.

3) The fan coil unit condensate flow instrumentation is checked for an increase in flow rate, and

4) Fan coil unit outlet pressure indicators are compared with each other to determine any inconsistencies. After these actions are taken, calibration is mandated and performed as necessary.

Containment fan coil condensate collection tanks exist for each of the fan coil units. The collection tanks measure the flow rate of condensate and leakage (if any) from the containment fan coil cooling coils. Any flow present will flow into the inlet chamber of the tank and spill through the "V" notch in the partition into the outlet chamber. Because of the restriction of the weir notch the water level in the inlet chamber will rise above the bottom of the notch and stabilize at some level dependent upon the flow-rate of the leakage. Therefore, the water level is utilized as a measure of the flow-rate. Each weir tank is capable of measuring flow up to 30 gpm. An alarm in the control room will annunciate when the flow exceeds ½ gpm (18 percent level indication). Operating procedure C19.3 Leakage Within Containment describes how to verify proper operation of the containment fan coil unit collection tanks. In addition to this procedure, the collection tank level indicators are recalibrated at each refueling outage. The fan coil unit condensate collection tank levels are normally logged every 4 hours to insure that the level is known.

Leaks within the CRDM shroud cooling coil will leak to the refueling cavity and in time to containment Sump B through the refueling cavity drain. Containment Sump B has two high level alarms for detection of leaks. Sump B overflows into containment Sump A and is then pumped out of containment. Due to TMI Lessons Learned, additional level indication is being added to Sump B. From this it is determined that this kind of leak cannot go undetected.

In addition to the aforementioned operating mode, there is presently under construction a closed chilled water system for the containment vessels and the auxiliary building. The system is designed for normal operation and will not operate during accident situations. The plant will have the capability of monitoring a fixed volume, detecting leakage by an inventory decrease.

The cooling water system response (in containment) to a LOCA is essentially the same as in normal operations. The major difference is that the flow through each fan coil unit is increased to approximately 900 gpm by the automatic opening of the valves on the discharge of the fan coil units in the header for each train of cooling water.

Radiation monitors R-16 and R-38 monitor the containment fan coil cooling water following a loss of coolant accident for radiation indicative of a leak from the containment atmosphere into the cooling water system.

R-16 monitors #12, #14, #22, and #24 fan coil unit flow while R-38 monitors #11, #13, #23, and #21 fan coil unit flow. Upon indication of high radiation level, the affected fan coil units may be individually taken out of service to determine which unit is leaking. Solenoid valves located in the sampling lines to monitors R-16 and R-38 are normally closed. Solenoid valves for the affected unit open automatically on a safety injection signal, allowing cooling water samples to pass through the monitor and discharge to the Auxiliary Building standpipe.

1.b. The source of water for the cooling water system is the Mississippi River Water. A typical chemical content analysis of the water is shown below.

Analysis in ppm

Solids	Total	320
	Dissolved	300
	Suspended	20
Hardness	Total, $CaCO_3$	204
	Calcium, $CaCO_3$	136
	Magnesium, $CaCO_3$	68
Alkalinity	Total, $CaCO_3$	155
	Phenolphthalein, $CaCO_3$	0
Gases	Free Carbon Dioxide, CO_2	N/A
	Dissolved Oxygen, O_2	12.8
	Ammonia Nitrogen, N	0.61
Anions	Carbonate, CO_3	0
	Bicarbonate, HCO_3	189
	Hydroxide, OH	N/A
	Chloride, Cl	15
	Fluoride, F	N/A
	Nitrate Nitrogen, N	1.10
	Sulfate, SO_4	60
	Total Soluble Phosphorus, P	0.112
	Orthophosphate, PO_4	N/A
	Polyphosphate, PO_4	N/A
	Silica, SiO_2	14.0
Cations	Calcium, Ca	54.5
	Magnesium, Mg	16.5
	Sodium, Na	12.5
	Potassium, K	3.5
	Total Iron, Fe	.43
	Total Manganese, Mn	N/A
Miscellaneous	Color, APHA Units	60
	Biochemical Oxygen Demand, BOD	1.1
	Temperature, C	0.0
	Turbidity, NTU	2.6
	Ryznar Index @ 25 C	7.0
	Conductivity, umhos/cm @ 25 C	444
	pH	8.0

1.c. The cooling water system component materials are as follows:

1) Fan Coil Units:

Tubes: Copper ASTM B-280
Fins: Copper ASTM B-152
Coil Header: ASTM A53 schedule 40
Tube to Header Bond: High Temperature Braze
Fin to Tube Bond: Mechanical Expansion

2) Piping:

2" nominal and smaller: ASTM A-106 Grade B Schedule 80
2½" nominal to 10" nominal: ASTM A-106 Grade B Schedule 40
12" to 24" nominal: ASTM A-106 Grade B Standard 3/8" wall
All pipe is seamless

3) Fittings:

2" nominal and smaller: ASTM A-181 Grade 1 or A-105 Grade 2
2½" nominal and larger: ASTM A-234 Grade WPB

4) Valves:

2½" and larger: ASTM A-216 Grade WCB
2" and smaller: ASTM A-105 Grade 2

1.d. There have been only two cases of leaks on the cooling water system within containment, both of which were small. The first instance was located during a routine containment entry in March, 1975. The leak was detected on #12 Fan Coil Unit in a tube end plug fitting. The fitting leak was caused by overtightening of the end plug at the manufacturer's shop which in turn cracked the fitting. This was a very minor leak and the repair was performed during the April, 1975 refueling outage.

The second cooling water leak was on #13 Fan Coil Unit Cooling Water Relief Valve CL-57-5, occurring in February, 1978. Again, this leak was found during a routine containment entry. Again, the leak was very minor, in that the valve leaked slightly by the seat. The repair was performed during the March, 1978 refueling outage.

1.e. These two leaks in the cooling water system were repaired as follows:

For the cracked fitting, the fan coil unit was isolated and the cracked fitting removed. A new fitting was brazed in place and the plug re-inserted to the proper depth. The fitting was then pressure tested and found satisfactory.

For the leaking relief valve, the valve was rebuilt and the valve seats lapped. The valve was then set to 150 psi and bench tested to this value. The pressure test results were satisfactory.

1.f. It is possible to isolate cooling water to each fan coil unit individually. The supply to each fan coil unit has an isolation valve and a redundant isolation valve which would isolate that entire train of cooling water. The discharge lines of each fan coil unit contain redundant isolation capabilities.

1.g. Cooling water penetration for Unit 1 and Unit 2 meet the requirements of 10CFR50 Appendix J for testing containment isolation valves. However, it is not common practice to test these valves because:

1) The system is normally filled with water and operates under post-accident conditions, and
2) The Technical Specification designations for these penetrations are "sealed"; that is, the pipes are sealed by water in the space between the isolation barriers.

1.h. The instrumentation to detect leakage consists of the following:

1) Containment fan coil unit flow in (1 for each FCU)
2) Containment fan coil unit flow out (1 for each FCU)
3) Containment fan coil unit low flow alarm (100 gpm) (1 for each FCU)
4) Containment humidity indicator (1 for each unit)
5) Containment fan coil unit pressure out (1 for each FCU)
6) Containment fan coil unit temperature out (1 for each FCU)
7) Containment Sump A pump run time (1 for each pump)
8) Containment fan coil unit condensate collection tank level alarm (18 percent level - ½ gpm leakage)
9) Containment activity monitors
10) Cooling water activity after an accident R-16 and R-38, and
11) Waste holdup tank level to account for water.

Procedures for detecting leakage are part of the Post Accident Monitoring Instrument Monthly Check, the operating procedure C19.3, and the Monthly Containment Fan Coil Unit Check. Logs are provided for daily checks and four times daily checks. These log entries are incorporated into the operator's routine operation schedule.

1.i. As stated previously, radiation monitors R-16 and R-38 provide the necessary detection of contamination in the cooling water discharge from both containment vessels. These two monitors function during accident conditions only.

It is felt that continuous monitoring of the containment cooling water discharge is not needed during normal operation because a leak in containment coinciding with high containment activity would be necessary for contamination of the water. Also, the Prairie Island cooling water system would need leaks in two heat exchangers at the same time to allow for contamination to enter the system. This is considered a nonplausible event without detection by another means.

2.a. Of the three sumps in containment, all are equipped with level alarms. Sump A has a level alarm which annunciates in the control room. Sump B has two redundant level alarms which are powered by separate electrical power supplies. Each level alarm has two status lights each for hi-hi and lo-lo level of Sump B in the control room. The train B level alarm of Sump B will alarm in the control room. Sump C, which is below the thimble chase area (reactor vessel pit), is equipped with a level alarm that will alarm in the control room.

2.b. Presently Sump A is the only sump to be pumped out of containment. Sump C pumps its contents to Sump A. Sump B is where the RHR pumps take suction for long-term recirculation following a LOCA. There are no flow indicating elements located on Sump A's lines out of containment, but there are timers on the Sump A pump breakers. The timer readings are logged daily by plant operators. This gives a good indication of the amount of water coming out of containment, since when the pumps run, they run at full capacity and when multiplied by the running time of the pump give the daily flow from containment. Containment Sump A pumps into the waste holdup tank which has a level recorder. The operators monitor the waste holdup tank recorder frequently for unusual level changes.

2.c. Water level indication instruments are not used in any of the sumps; only level alarms are used. Sumps A and C have only one level alarm each. Plans are in motion to add a second level alarm to both sumps. The final design would be for Sump A and B to each have two level switches connected to one annunciator in the control room. Sumps A and B are each equipped with two pumps while Sump C has a single pump. (Note: the two RHR pumps can take suction from Sump B and in this case are counted as "Sump B's pumps".) It is not intended at this time to put another pump in Sump C. In the event the Sump C pump fails to run, a portable pump can be inserted into the thimble chase area from above.

The monthly surveillance procedures will consist of testing contaminated sump pumps and Sump C by use of local test buttons or moving the level alarms and switches and seeing that their individual contact functions perform as they should (i.e., that lifting a level switch will start a pump and that moving a level alarm will set off an annunciator in the control room).

NOTE: The local test push button for the Sump C pump is located in an area that is not accessible to plant personnel while the unit is at power. A local test button will have to be moved to allow personnel access. A test design for the alarm will be developed and installed in upcoming refueling outages. In the interim, the routine containment inspection will verify no water on the Sump C floor.

2.d. The monitoring of containment for water leakage during plant operation is as follows:

The Sump A pumps each have their own separate running timer. The readings from the timer are logged daily by plant operators. This gives an indication of the amount of water pumped out of containment, since when the pumps run, they run at full capacity.

Monthly a containment entry is normally made into each unit for inspection and routine maintenance. Among the things checked are: fan coil units for leakage, fan coil relief valves, local verification of sump operation. The thimble chase area (Sump C) will be checked for water on future entries.

During refueling outages, Sumps A, B, and C's level switches are tested and calibrated using SP 1030.

The fan coil collection, which measure condensate and leakage flow from the fan coil cooling coils, have an annunciator in the control room which will alarm when the flow to the pots exceeds ½ gpm. The pot levels are normally recorded every four hours.

The containment atmosphere is monitored by radiation monitors R11/12, R-2, and R-7. If a leak from a radioactive system occurs, an increase in readings in the above monitors will be observed and appropriate measures will be initiated to find the leak. The humidity in containment is measured by various instruments that will pick up an increase in humidity which would be caused by a water leak in containment.

Underneath the reactor in the incore seal area a leakage detection system is provided to detect leakage into the ten-path transfer units. Ten-path transfer units drain to a drain header. On high pressure in the drain header a switch actuates an alarm in the control room and also opens a solenoid valve so the liquid can drain to Sump C.

2.e. Periodic containment inspections at power have been done since plant startup.

2.f. Procedures for notification of NRC of cooling water system leaks within containment are in place.

The closed cooling water system inside containment which is now under construction shares the cooling water piping in containment. Therefore, leakage experience is as described in paragraph 1.d.

About 120 manhours were expended in review and preparation of the response. Another 500 manhours will be required for implementation of corrective action.

Yours truly,

D E Gilberts

D. E. Gilberts
Senior Vice President
Power Supply

cc: Mr. G. Charnoff
Mr. C. D. Feierabend
Director, U. S. Nuclear Regulatory Commission
Office of Inspection and Enforcement
Washington, D. C. 20555

Enclosure

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UNITED STATES NUCLEAR REGULATORY COMMISSION

NORTHERN STATES POWER COMPANY

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

Docket Nos. 50-282 and 50-306

LETTER DATED JANUARY 5, 1981
RESPONDING TO NRC REQUEST
FOR INFORMATION IN IE BULLETIN NO. 80-24

Northern States Power Company, a Minnesota corporation, by this letter dated January 5, 1981, hereby submits information in response to NRC request for information concerning IE Bulletin No. 80-24.

This request contains no restricted or other defense information.

NORTHERN STATES POWER COMPANY

By: D E Gilberts
D. E. Gilberts
Senior Vice President
Power Supply

On this 5th day of January, 1981, before me a notary public in and for said County, personally appeared D. E. Gilberts, Senior Vice President Power Supply, and being first duly sworn acknowledged that he is authorized to execute this document on behalf of Northern States Power Company, that he knows the contents thereof, and that to the best of his knowledge, information and belief, the statements made in it are true and that it is not interposed for delay.

Jeanne M Hacker

JEANNE M. H[illegible]KER
NOTARY PUBLIC - MINNESOTA
HENNEPIN COUNTY
My Com[illegible]ssion Expires May [illegible] 198[illegible]