



Consumers
Power

**POWERING
MICHIGAN'S PROGRESS**

Big Rock Point Nuclear Plant, 10269 US-31 North, Charlevoix, MI 49720

Patrick M Donnelly
Plant Manager

January 28, 1997

Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

**DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT - 120 DAY RESPONSE TO
GENERIC LETTER 96-06: ASSURANCE OF EQUIPMENT OPERABILITY AND CONTAINMENT
INTEGRITY DURING DESIGN-BASIS ACCIDENT CONDITIONS**

On September 30, 1996, Consumers Power Company received U.S. Nuclear Regulatory Commission (USNRC) Generic Letter 96-06: Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions dated September 30, 1996. The NRC issued this generic letter to address the identification of several safety-significant issues that have generic implications.

Addressees have been requested to determine:

- (1) *if containment air cooler cooling water systems are susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions;*
- (2) *if piping systems that penetrate the containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur.*

In addition to the individual addressee's postulated accident conditions, these items should be reviewed with respect to the scenarios referenced in the generic letter.

If systems are found to be susceptible to the conditions discussed in the generic letter, addressees are expected to assess the operability of affected systems and take corrective action as appropriate in accordance the requirements stated in 10 CFR Part 50 Appendix B and as required by the plant Technical Specifications.

9702040173 970128
PDR ADOCK 05000155
P PDR

NUCLEAR REGULATORY COMMISSION
BIG ROCK POINT PLANT
REPLY TO GENERIC LETTER 96-06
January 28, 1997

2

Requested Information

Within 120 days of the date of this generic letter, addressees are requested to submit a written summary report stating actions taken in response to the requested actions noted above, conclusions that were reached relative to susceptibility for waterhammer and two-phase flow in the containment air cooler cooling water system and overpressurization of piping that penetrates containment, the basis for continued operability of affected systems and components as applicable, and corrective actions that were implemented or are planned to be implemented. If systems were found to be susceptible to the conditions that are discussed in this generic letter, identify the systems affected and describe the specific circumstances involved.

The Big Rock Point Staff has determined that:

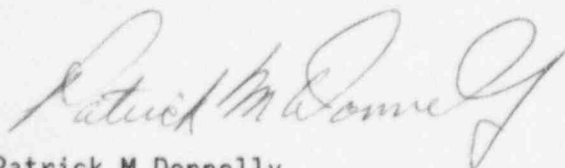
- (1) The containment air cooler cooling water systems are not susceptible to either waterhammer or two-phase flow conditions during postulated accident conditions; and
- (2) Two piping systems that penetrate the containment are susceptible to thermal expansion of fluid so that overpressurization of piping could occur.

These determinations were made with the benefit of the questions and answers from NEI/NRC meeting of October 29, 1996 that were forwarded by NRC Letter dated November 22, 1996, and a Memorandum to the Division of Reactor Safety (DRS) Division Directors dated January 24, 1997.

The Big Rock Point Staff will perform an operability assessment prior to plant startup from the current forced outage. The assessment is expected to conclude that the affected piping systems are operable, and the conditions identified above will not be in conflict with the Technical Specifications or the Updated Final Hazards Safety Analysis. Pending further evaluation, the issue will be resolved during the 1997 refueling outage.

A preliminary investigation has concluded that the plant may have been operated in a condition outside the design basis. This event is reportable pursuant to 10 CFR 50.72(b)(1)(ii).

The requested summary report is provided as an attachment to this letter.



Patrick M Donnelly
Plant Manager

CC: Administrator, Region III, USNRC
NRC Resident Inspector - Big Rock Point

Attachments

CONSUMERS POWER COMPANY

Big Rock Point Plant
Docket 50-155 License DPR-06

Response to Generic Letter No 96-06 dated January 28, 1997

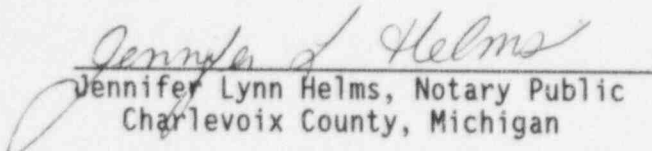
At the request of the Commission and pursuant to the Atomic Energy Act of 1954 and the Energy Reorganization Act of 1974, as amended, and the Commission's Rules and Regulations thereunder, Consumers Power Company submits our response to NRC letter dated September 30, 1996, entitled, "Assurance of Equipment Operability and Containment Integrity During Design-Basis Accident Conditions". Consumers Power Company's response is dated January 28, 1997.

CONSUMERS POWER COMPANY

To the best of my knowledge, information and belief, the contents of this submittal are truthful and complete.

By 
Patrick M Donnelly
Plant Manager

Sworn and subscribed to before me this 28th day of January 1997.


Jennifer Lynn Helms, Notary Public
Charlevoix County, Michigan

My commission expires August 29, 1999.

(SEAL)

ATTACHMENT 1

CONSUMERS POWER COMPANY
BIG ROCK POINT PLANT
DOCKET 50-155

SUMMARY REPORT
FOR

120 DAY RESPONSE TO GENERIC LETTER 96-06
ASSURANCE OF EQUIPMENT OPERABILITY AND CONTAINMENT
INTEGRITY DURING DESIGN-BASIS ACCIDENT CONDITIONS

Submitted January 28, 1997

Licensee Response

ACTIONS TAKEN TO RESPOND TO THE REQUESTED ACTION

The Updated Final Hazards Summary Report, Technical Specifications, Operating Procedures, equipment specifications and drawings were evaluated to determine if Big Rock Point's containment air cooler cooling water system is vulnerable to either waterhammer or two-phase flow conditions during any postulated design bases accident (DBA) conditions. This evaluation was based on the most limiting DBA for Big Rock Point, the Loss of Cooling Accident (LOCA) analysis, which includes break sizes up to and including the complete severance of the largest pipe in the system. Loss of offsite power, and the worst single failure of Emergency Core Cooling System (ECCS) Equipment (the emergency diesel generator (EDG)), was also assumed in the evaluation. The evaluation also considered a LOCA without a LOOP, and a LOCA with an automatic transfer of the 138kv line to the 46kv line.

Analyses/evaluations were also performed to identify those safety and nonsafety-related piping systems (Attachment 2) that penetrate containment which may be subject to overpressurization during the most limiting DBA, which in this case is a Main Steam Line Break (MSLB). To determine susceptibility, piping systems were considered to have sufficient protection against overpressurization if they contain air, gas or steam as the fluid, where pressure relief is provided either by relief valve or globe valve, where an expansion path (such as to a tank) is available, or where appropriate pressure locking and thermal binding modifications were made. In addition, a structural stress analysis was performed to demonstrate that overpressurization and failure of selected piping inside containment would not be credible. All nonsusceptible piping systems were verified to remain within limits allowed by Code.

CONCLUSIONS REACHED RELATIVE TO THE SUSCEPTIBILITY FOR WATERHAMMER AND TWO-PHASE FLOW IN THE CONTAINMENT AIR COOLER COOLING SYSTEM

Big Rock Point containment heat removal design differs from the licensees described in the GL. Containment heat removal following a postulated design bases accident is accomplished by the containment spray system. The Big Rock Point containment air coolers and the associated Service Water System (SWS), are classified as nonsafety-related. No credit is taken for the SWS for mitigating the consequences of a LOCA. Cooling and air conditioning components utilizing service water are not considered essential equipment in order to achieve safe shutdown following a LOCA, and are classified as functionally nonsafety-related with regard to containment cooling.

The SWS is not susceptible to either waterhammer or two-phase flow conditions during postulated design bases accident conditions because of the following:

- 1) The system is rendered inoperable during a loss of offsite power - no flow, no waterhammer, no two-phase flow; or
- 2) The system continues to operate during a LOCA if offsite power is not lost. Flow continues, no waterhammer, no two-phase flow; or
- 3) The system cycles on/off (SWS pumps deenergize, then autostart) during a LOCA following a 6 second automatic transfer between the two offsite power sources if one is compromised - flow is not suspended long enough to incur waterhammer or two-phase flow *.

- * The SWS feeds various equipment in parallel through 2, 4, 6 and 8 inch lines and drains to the lake discharge canal via a 12 inch line (the pumps are rated at 2100 gpm with a discharge pressure of 40 psig). When the service water pumps are not operating, a significant portion of the system drains to the lake. In addition, the low system pressure and large volume results in slow fill rates, precluding waterhammer events.

Although the SWS is the normal heat sink for Spent Fuel Pool (SFP) Cooling, this system is not relied upon for cooling following a DBA. As discussed in section 9.1.3 of the Updated Final Hazards Summary Report and section B(2)(a) of the Operating License, adequate SFP cooling is assured following a DBA via a SFP makeup line which provides flow to the SFP when the Core Spray Recirculation System is placed in service.

CONCLUSIONS REACHED RELATIVE TO THE SUSCEPTIBILITY FOR OVERPRESSURIZATION OF PIPING THAT PENETRATES CONTAINMENT

Big Rock Point's functionally nonsafety-related demineralized water and treated waste to spent fuel pool lines which penetrate containment were determined to be susceptible to overpressurization during a DBA. These systems are not safety-related and provide no function associated with LOCA mitigation. Actions to provide overpressurization protection are discussed under "Corrective Actions That Were Implemented or are Planned to be Implemented".

All other safety and nonsafety-related piping systems that penetrate the containment and are susceptible to thermal heating following a LOCA were considered to have adequate protection against overpressurization. The basis for this conclusion is that the lines contain air, gas, or steam as the fluid, pressure relief is provided either by relief valve or globe valve, an expansion path (such as to a tank) is available, or pressure locking and thermal binding modifications to compensate for this condition were made, were.

BASIS FOR CONTINUED OPERABILITY OF AFFECTED SYSTEMS AND COMPONENTS

The Big Rock Point Staff will perform an operability assessment prior to plant startup from the current forced outage. The assessment is expected to conclude that the affected piping systems are operable, and the conditions identified above will not be in conflict with the Technical Specifications or the Updated Final Hazards Safety Analysis. Pending further evaluation, the issue will be resolved during the 1997 refueling outage.

A preliminary investigation has concluded that the plant may have been operated in a condition outside the design basis. This event is reportable pursuant to 10 CFR 50.72(b)(1)(ii).

Discussion

I. Treated Waste to Spent Fuel Pool Line

Function

Treated waste is considered a normal spent fuel pool makeup supply and is only one of three independent sources of makeup. Other sources are demineralized water and safety-related fire water. The treated waste makeup function is,

therefore, nonsafety-related. However, the line does penetrate containment. The safety-related containment boundary is protected by isolation valve CV-4049, Treated Waste to Fuel Pit inboard containment isolation valve, which is controlled by the Containment Isolation System (CIS), and will automatically close the isolation valve in the event of an isolation scram or loss of power. The isolation valve supports the safety-related containment isolation function performed by the CIS and is, therefore, a safety-related interface.

Possible Failure Mechanisms

The functionally nonsafety-related treated waste line was determined to be susceptible to overpressurization during a DBA. A preliminary overpressurization stress analysis indicated that treated water pipe hoop stresses would exceed their ultimate value assuming the consequences of a 0.63 ft² main steam line break, solid pipe, and zero leakage of the valves.

Operability Determination

During a DBA, the treated waste to spent fuel pool line will be isolated by the automatic closure of CV-4049. This line is safety-related for containment integrity only; it is not essential for safe shutdown. Procedures will be revised to provide surge protection for this line during a postulated DBA prior to plant operation from the current forced outage.

Therefore, with the procedure changes discussed above, there is assurance that overpressurization of the piping during postulated DBA would not be credible. The treated waste to spent fuel pool line is operable.

II. Demineralized Water Line

Function

The Demineralized Water System (DWS) maintains an inventory in the demineralized water storage tank to provide makeup capability for the Nuclear Steam Supply System (NSSS) and reactor auxiliary equipment. Maintenance of the inventory is not considered a safety-related function; rather, loss of inventory degrades plant reliability. During a LOCA, Emergency Condenser makeup from the DWS is not required. Safety-related makeup is provided by the Fire Protection System (FPS). Therefore, the DWS is not required. However, a segment of the demineralized water line penetrates containment in two places. The safety-related containment boundary is protected by CV-4105, Demineralized Water Sphere Isolation Valve; which is normally open, and VMU-300, Demineralized Water Isolation Check Valve. CV-4105 will close as a result of a loss of power or loss of air supply. VMU-300 will close upon loss of inward propellant force (i.e., low demineralized water pressure). The other penetration is the demineralized water fill line in the shell of the emergency condenser. This short segment of piping contains CV-4028, Demineralized Water to Emergency Condenser valve, and its associated check valve, VEC-300, Demineralized Water Check valve.

Possible Failure Mechanisms

The functionally nonsafety-related demineralized water line was determined to be susceptible to overpressurization during a postulated DBA. A preliminary overpressurization stress analysis indicated that demineralized water pipe hoop stresses would exceed their ultimate value assuming the consequences of a 0.63 ft² main steam line break, solid pipe, and zero leakage of the valves.

Water will be trapped in a pipe segment between CV-4105 and VCU-300, and another segment of water will be trapped between CV-4028, and its associated check valve, VEC-300, Demineralized Water Check valve.

Operability Determination

This line is safety-related for containment integrity only; it is not essential for safe shutdown. To provide long term overpressurization protection for this line, further analysis is required. Additional time is required for engineering, procurement, planning, scheduling and implementation of design modifications if required. For the short term, the Big Rock Point staff believes that overpressurization protection for the demineralized water line is provided by known and quantifiable leakage of CV-4105. Leak rate trending indicates that some leakage below the allowable rate can be predicted. Leak testing of CV-4028 will be conducted to validate adequate seat leakage, or the valve will be adjusted to ensure seat leakage occurs prior to exceeding code allowable stress for faulted conditions as delineated in Appendix F of ASME Section III. This limited amount of leakage is adequate to prevent overpressurization. Therefore, based on the discussion above, there is reasonable assurance that overpressurization of the piping under a postulated DBA would not be credible.

Based on the discussion above, and the fact that the Demineralized Water System continues to satisfy the criteria as described in the Updated Final Hazards Summary Report (UFHSR 9.2.1.4.3; 9.2.3; and 10.4.5.3), the Demineralized Water System is operable. The issue of providing surge protection for this line will be resolved during the 1997 refueling outage. Plant startup from the current forced outage may commence.

CORRECTIVE ACTIONS THAT WERE IMPLEMENTED OR ARE PLANNED TO BE IMPLEMENTED

Subsequent to an extensive review by the Big Rock Point staff the following procedure/configuration control enhancements, procedure revisions and modification evaluation will be made to ensure that piping will have surge protection during operation:

Procedure/Configuration Control enhancements

- a. Standard Operating Procedure (SOP) 3, Reactor Cleanup System, will be enhanced to ensure that the resin disposal line is drained following resin transfer operations to preclude thermal expansion:
- b. SOP 25, Heating and Ventilation System, will be enhanced to ensure that the system is not isolated during power operation.
- c. SOP 28, Station Power, will be enhanced to ensure that the SWS service system is returned to operation in a manner to reduce the probability of a waterhammer.

Procedure revisions

- a. SOP 3, Reactor Cleanup System, SOP 9, Fuel Pool System, SOP 11, Radioactive Waste System - Liquid, and O-TGS-1, Master Checklist, will be revised. The revision will ensure that a section of piping will be vented prior during plant operation to provide a relief path for treated waste return line globe valve CV-4049 venting under postulated post accident conditions.

Plant modification evaluation

- a. A surge chamber may be installed on the demineralized water line to provide overpressurization protection, which would ultimately ensure containment integrity. However, additional time is required for engineering, procurement, planning, scheduling and implementation of design modifications if required.

IDENTIFICATION AND SPECIFIC CIRCUMSTANCES INVOLVED FOR THOSE SYSTEMS FOUND TO BE SUSCEPTIBLE

The functionally nonsafety-related demineralized water line and treated waste to the spent fuel pool lines were determined to be susceptible to overpressurization during a DBA. These lines are safety-related for containment integrity only; they are not essential for safe shutdown. The Big Rock Point staff has determined that the treated waste to the spent fuel pool line would have been able to perform its required safety function, specifically containment integrity, before overpressurization could occur. However, A preliminary overpressurization stress analysis indicated that demineralized water pipe hoop stresses would exceed their ultimate value assuming the consequences of a 0.63 ft² main steam line break, solid pipe, and zero leakage of the valves. Therefore a one hour non-emergency report was made to the NRC Operations Center pursuant to 10CFR50.72(b)(1)(ii)(B), Condition Outside Design Basis.

ATTACHMENT 2

CONSUMERS POWER COMPANY
BIG ROCK POINT PLANT
DOCKET 50-155

CONTAINMENT PIPING OVERPRESSURIZATION EVALUATION
(120 DAY RESPONSE TO GENERIC LETTER 96-06)

Submitted January 28, 1997

ATTACHMENT 2
CONTAINMENT PIPING OVERPRESSURIZATION EVALUATION

Page 1

PENETRATION #	DESCRIPTION	SERVICE/ TYPE FLUID	POTENTIAL TO OVERPRESSURIZE?	COMMENTS
1	12' Equipment Lock	Air Hydraulic Electrical	No	Hydraulic lines penetrate containment through the lock. The hydraulic fluid in these lines vent to the reservoir located inside the lock.
2	7'7" Personnel Lock	Air Hydraulic Electrical	No	Same as #1
3	5'6" Escape Lock	Air Electrical	No	Pressure should not exceed 23.5 psia (8.5 psig)
4	Manhole	None	No	No fluid present
5, 6	Eliminated (No Penetration)	None	N/A	N/A
7, 8	24" Ventilation Supply & Exhaust	Air	No	Maximum pressure following a DBA is less than 8.5 psig
9	14" Emergency Condenser Vent	Air Steam	No	This penetration does not isolate.
10	12" Main Steam	Steam	No	Fluid initial temperature greater than DBA temperature.
11	10" Reactor Feedwater	Water	No	Liquid is not trapped - discharges through check valves to steam drum.
12, 13	Service Water Return and Supply	Water	No	Liquid in the containment boundary piping is not trapped. There are no isolation valves.
14	4" Space Heating Supply	Steam	No	Steam temperature is greater than DBA temperature.
15	2" Enclosure Dirty Sump Discharge	Water	No	Containment isolation globe valve vents in direction of flow into an expandable volume of pipe, providing surge protection.

ATTACHMENT 2
CONTAINMENT PIPING OVERPRESSURIZATION EVALUATION

PENETRATION #	DESCRIPTION	SERVICE/ TYPE FLUID	POTENTIAL TO OVERPRESSURIZE?	COMMENTS
17	3" Treated Waste Return	Water	YES	Water can be trapped between inside containment isolation globe valve CV-4049 and a normally closed manual valve VRW-52 outside containment. Standard Operating Procedures SOP 9 and SOP 11 will be revised to ensure that a section of piping will be drained or vented to provide a vent path for CV-4049. This action will provide surge protection for this piping.
18	2" Demineralized Water Line	Water	YES	Water can be trapped between CV-4105 (outside containment) and normally closed system (inside containment). A surge chamber may be added to the piping to provide surge protection depending on evaluation.
19	3" Space Heating Return	Water	No	SOP 25 will be enhanced to ensure that the system is not isolated during power operation
20	2" Instrument Air	Air	No	Air in the portion of the piping which forms the containment boundary is not trapped. It will flow to the header outside containment. This header has relief valve protection.
21	2" Enclosure Clean Sump Discharge	Water	No	Containment isolation globe valve vents in direction of flow into an expandable volume of pipe, providing surge protection.
22	2" Reactor and Fuel Pit Drain	Water	No	Containment isolation globe valve vents in the direction of flow into an expandable volume (Radwaste).
23	2" Resin Sluice	Water	No	SOP 3 will be enhanced to ensure that the line is drained following resin transfer.
24	Spare	N/A	N/A	N/A
25	2" Service Air	Air	No	Pres. following a DBA will be < code allow.
26	Spare	N/A	N/A	N/A
27	Backup Post Incident	Water	N/A	Piping protected by RV-5077, RV-5078 and RV-5082.

ATTACHMENT 2
CONTAINMENT PIPING OVERPRESSURIZATION EVALUATION

PENETRATION #	DESCRIPTION	SERVICE/ TYPE FLUID	POTENTIAL TO OVERPRESSURIZE?	COMMENTS
28, 29	Core Spray Pump Suction	Water	No	Piping is open to containment atmosphere and has no potential to trap water.
30	Spare	N/A	N/A	N/A
31	Inhibitor Recirculation Line	Water	No	This line is no longer in service. Inside containment, it is sealed with a spectacle blind; outside containment, closed valve VEH-8 and a pipe cap seal the line. During performance of SC 96-04, which cut and capped a 4" branch from the 6" inhibitor recirc line, water was drained from the system to permit welding. This provides an air pocket which will prevent overpressurization.
32, 33, 34	Spares	N/A	N/A	N/A
35	CRD Supply	Water	No	CRD pump suction relief valves provide over pressure protection.
36	6" Post Incident and Fire Water Supply	Water	No	Same as penetration #27.
37	Main Steam Line Drain	Water Steam	No	This line has been removed from service, and is isolated on both sides of containment. This line was drained and has been isolated for over 30 years
38, 39	Spare	N/A	N/A	N/A

ATTACHMENT 2
CONTAINMENT PIPING OVERPRESSURIZATION EVALUATION

Page 4

PENETRATION #	DESCRIPTION	SERVICE/ TYPE FLUID	POTENTIAL TO OVERPRESSURIZE?	COMMENTS
40, 65 81, 83	Electrical	Nitrogen	No	RDS electrical penetrations are normally pressurized to 27 psig (28 psig maximum) and are sealed. In a DBA environment, the internal pressure could increase to 51 psig. (This assumes initial temperature is 0°F; if initial temperature is 60°F, pressure would increase to 43 psig). Per EEQ file 4.90, these penetrations are qualified to 180 psig.
41 thru 64, 66 thru 76	Electrical	No Fluid	No	These penetrations are sealed with potting compound.
77	ILRT (Blowdown)	Air	No	Cannot pressurize to greater than 8.5 psig.
78 thru 80, 82, 84 thru 87	Electrical	No Fluid	No	These penetrations are sealed with potting compound.
88	ILRT	Air	No	Same as penetration 77.
89	PS-7064A	Air	No	This penetration is open to containment atmosphere. There is no potential to trap fluid in the piping.
90	PS-7064B	Air	No	Same as penetration #89.
91	ILRT	Air	No	Same as penetration #77.
92	Nitrogen Supply To RDS Valves	Nitrogen	No	Piping is protected by RV-5092 and RV-5093 if CV-9472 is open. If CV-9472 fails closed, and assuming an initial temperature of 40°F, and initial pressure of 90 psig (maximum allowed by SOP-18), the maximum post-DBA pressure would be 136 psig. Per FC-572A which installed the containment boundary piping, the piping is rated for greater than 600 psig pressure.
93 thru 95	Spare	N/A	N/A	N/A
96	PT-173	Air	No	Same as penetration #89.

ATTACHMENT 2
CONTAINMENT PIPING OVERPRESSURIZATION EVALUATION

Page 5

PENETRATION #	DESCRIPTION	SERVICE/ TYPE FLUID	POTENTIAL TO OVERPRESSURIZE?	COMMENTS
97	Ventilation Probe	Air	No	Isolation valves SV-9155 and SV-9156 are both outside containment. Inside containment the line is open to containment atmosphere (via DPC-9071 which offers minimal resistance to pressure buildup).
98	PS-636, PS-665, PS-667, PT-174, PT-187	Air	No	Same as penetration #89.
99	PS-637 PS-664 PS-666	Air	No	Same as penetration #89.
100	Electrical (Lighting)	No Fluid	No	N/A
101	Telephone	No Fluid	No	N/A
102	Spare	N/A	N/A	N/A
103	Spare	N/A	N/A	N/A
104	Lighting	Electrical No Fluid	No	N/A
105	Telephone	No Fluid	No	No
106, 107	Spare	N/A	N/A	N/A
108	Lighting	No Fluid	No	N/A
109, 110, 111	Spare	N/A	N/A	N/A
112	2" Core Spray Pump Vent	Air Water	No	Line is open to containment.
113	4" Core Spray Pump Discharge	Water	No	Line is open to the spent fuel pool, and has same RV protection as penetration #27.
114	Manhole	None	No	N/A

[illegible]