Consumers Power

POWERING MICHIGAN'S PROGRESS

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

Patrick M Donnelly
Plant Manager

March 31, 1994

Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT - LICENSEE EVENT REPORT 94-001, REVISION 1; CONTAINMENT SUMP ISOLATION VALVE STROKE TIMES FAILED TO MEET ASME CODE TIMING CRITERIA.

LICENSEE EVENT REPORT 94-001, REVISION 1; CONTAINMENT SUMP ISOLATION VALVE STROKE TIMES FAILED TO MEET ASME CODE TIMING CRITERIA, is attached. This event was reportable to the Nuclear Regulatory Commission pursuant to 10 CFR 50.72(b)(2)(iii) and 10 CFR 50.73(a)(2)(v). The revisions are exhibited by the shading throughout the document.

Patrick M Donnelly

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Plant Manager

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

ATTACHMENT

IE22 1/1

NRC Form 366
(9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

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TITLE (4)
CONTAINMENT SUMP ISOLATION VALVE STROKE TIMES FAILED TO MEET ASME CODE TIMING CRITERIA

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	
									N/A	0 5 0 0 0
0 2	1 0	9 4	9 4 -	0 0 1 -	0 1	0 3	3 1	9 4	N/A	0 5 0 0 0

OPERATING MODE (9)	N	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
POWER LEVEL (10)	0 9 7	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(b)
		20.405(a)(1)(i)	50.36(c)(1)	X 50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
Michael D Bourassa, Senior Licensing Engineer	6 1 6 5 4 7 - 6 5 3 7

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	
B	W D	F S V	A 4 9 9	N							

SUPPLEMENTAL REPORT EXPECTED (14)

		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On February 10, 1994, three containment isolation valves failed to meet the stroke timing acceptance criteria required during the execution of a ninety day surveillance test. Two of the valves were in the enclosure dirty sump discharge line, and the other was in the enclosure clean sump discharge line. Both clean and dirty sump valves were immediately closed, and were only being operated to pump down their respective sumps.

The root cause has been attributed to solenoid valve resilient seats made of ethylene-propylene rubber (EPR). They were exposed by the return air from air operated control valves to a foreign, hydrocarbon material similar to oil or grease. The seat material is a distinguishing feature common to the three solenoids that failed, and is designed to operate in an "oil free" environment.

In addition to the affected solenoid valves, solenoid valves in similar applications were replaced using valves engineered with Viton and/or stainless steel seats before returning the facility to power operation. The manufacturer of the solenoid valves will continue to evaluate a returned valve by attempting to re-create the failure over a long period of time.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

IDENTIFICATION OF EVENT

I. Any event or condition that alone could have prevented the fulfillment of the safety function of structures or systems that are needed to:

(C) Control the release of radioactive material.

References

a. 10 CFR 50.72(b)(2)(iii), and

b. 10 CFR 50.73(a)(2)(v).

CONDITIONS PRIOR TO THE EVENT

Power operation - Reactor Power 97% - Unit load - 71.9 MWe.

Limiting Conditions of Operation:

a. Technical Specification 4.1.2.b - One loop (#2) of the Emergency Condenser was operable in a degraded condition. Motor operated outlet valve, MO 7053, would not close. This condition was allowed because the redundant loop (#1) was operable.

b. Canal sample pump lost prime. Effluent releases via this pathway may continue provided that, at least once per 24 hours, grab samples are collected and analyzed for gross radioactivity (beta or gamma) at a lower limit of detection of at least 1E-7 microcurie/ml.

DESCRIPTION OF THE EVENT

On February 10, 1993, (3) three containment isolation valves (NH;ISV) failed to meet the stroke timing acceptance criteria required during the execution of a ninety day surveillance test. The valves are designated as follows:

CV-4102; Enclosure Clean Sump Outer Isolation Valve (WD;ISV)
CV-4103; Enclosure Dirty Sump Outer Isolation Valve (WD;ISV)
CV-4025; Enclosure Dirty Sump Inboard Isolation Valve.(WD;ISV)

At 0621, CV-4102 was documented as requiring 31.7 seconds to close. (The acceptance criteria is less than or equal to 10 seconds). CV-4102 was then tested two more times, and only required 6.0 and 5.5 seconds respectively to close. CV-4031, the Enclosure Clean Inboard Isolation Valve, met the acceptance criteria.

At 0630, CV-4103 and CV-4025 were documented as not closing after 1.5 minutes had elapsed. (The acceptance criteria for these valves are 10 seconds and 3.4 seconds respectively). The valves were restroked, and CV-4025 closed in about 25 seconds, and CV-4103 closed after approximately 6 minutes.

At 0638, both CV-4103 and CV-4025 indicated closed, and containment integrity was declared for the Enclosure Dirty Sump line (WD).

By 0704, the Clean Sumps had been pumped down, and as an added precaution, CV-4102 and CV-4031 were closed to ensure containment integrity.

ROOT CAUSE ANALYSIS OF THE EVENT

The root cause of this event has been attributed to ASCO (A499) solenoid valve resilient seats made of ethylene-propylene rubber (EPR). They were exposed by the return air from air operated control valves to a foreign, hydrocarbon material similar to oil or grease. The foreign material on the lower seat caused the seat to swell and thus prevented disk movement. The seat material was a distinguishing feature common to the three failed solenoid valves. The solenoid valve that did not fail was constructed with a BUNA-N seat versus the EPR material.

The incompatibility of EPR seats and oil is known to the industry. nd Big Rock has experienced related failures during 1986 in tha Reactor Depressurization System that uses an oiler for lubrication of that systems' instrument air. Recent air system modifications have drastically reduced the percentage of oil in the system. This failure is not attributed to oil being present in the plant instrument air system [LD].

Discussion

An inspection and cleaning was performed on two isolation valve operators (CV-4103 and CV-4102) that failed to close during this event. The inspection disclosed no gross amounts of grease or oil contamination. Moderate amounts of an oil-like substance was discovered in CV-4103; and a small amount of white caulk was observed in both valves. The oily substance appeared to match the description of the substance found in the solenoid valves. However, the amount of contamination did not offer conclusive proof the isolation valves were the source of the foreign material.

ASCO disassembled and inspected two solenoid valves (SV-4891 and SV-4896, which served CV-4025 and CV-4103) that had been sent for evaluation. Smaller quantities of the same oily substance were discovered in the lower seat and core area of both valves. SV-4896 had been placed in service March 3, 1993, and SV-4891 had been in service since November 10, 1993, suggesting that the quantity of the contamination found is consistent with the time in service.

In conjunction with the actions described above, a new ASCO solenoid from Big Rock Point stock was also disassembled. The solenoid internals were clean, providing the Big Rock Point staff with the confidence that the solenoids were not coming from ASCO with the contamination already present.

CORRECTIVE ACTION TO PREVENT RECURRENCE

Immediate Corrective Action

1) From February 10, 1994, to March 2, 1994, the clean and dirty enclosure sump isolation valves were maintained in the closed position (normal position is open) to ensure that containment integrity was maintained. However, the valves required operation on a periodic basis to pump down the sumps. This evolution was controlled by an Operations' Daily Order that described the operator actions should the valves have failed to close within the stroke time acceptance criteria. These controls are no longer necessary since all the containment sump isolation solenoid valves were replaced on March 12 and 13 by valves with Viton and/or stainless steel seats. (The Viton and/or stainless steel material is suitable for service in petroleum based products with no adverse effects). The isolation valves are being operated in their normal configuration.

2) Six similar model 206-380-3RF ASCO solenoid valves installed on reverse acting isolation valve operators were replaced with the Viton and/or stainless steel seats before the facility was returned to power operation.

3) On March 22, 1994, the plant was returned to service. The containment sump isolation valves' surveillance test requirements are normally performed every 90 days; however, to ensure continued operability, the surveillance test frequency will be increased to every 30 days until it is deemed appropriate to return to the 90 day requirement.

   The first surveillance was performed on March 28, 1994. All four isolation valves met the stroke timing acceptarce criteria.

Long Term Corrective Action

ASCO will continue to research the problem by bench testing one of the returned solenoid valves (SV-4895, which served CV-4102) in an attempt to recreate the failure. This test is expected to take several months.

SAFETY SIGNIFICANCE

SYSTEM DESCRIPTION

The liquid waste management system consists of collection sumps, receiver tanks, hold-up tanks, tank mixing eductors, strainers, filters, a demineralizer, pumps, interconnecting piping and instrumentation. The system is designed to be capable (all pumps operating continuously), to process approximately 70,000 gallons per day.

Liquids to be processed are segregated based upon total solids content. Waste water which normally has a low solids content is collected in a "clean" sump in the containment building and routed to one or both of the 5000 gallon clean waste receiver tanks. Clean waste is almost always processed for reuse in

the plant although provisions exist to mix, sample, analyze and discharge the collected liquids. Waste water arising from sources in the containment which potentially has a high solids content is collected in a "dirty" sump. Provision exists to route water collected by these two sumps to either the "dirty" or "clean" waste receiver tanks. Normally, the liquids are of sufficiently high purity so that they can be routed to the clean waste receiver tanks.

Significance

The stroke times of these valves are trended to determine degradation and to identify when corrective action is required to ensure component operability. These are ASME code requirements, and are not directly related to the mitigation of nuclear accidents and transients. The safety function of these containment isolation valves is to close when required.

During this event, CV-4031, the clean sump isolation valve inside containment, did meet the procedural acceptance criteria to close, therefore the enclosure clean sump discharge line would have isolated quickly if required to do so. Even though CV-4102, the clean sump isolation valve outside containment closed 20 seconds greater than the code criteria, the required redundant safety function was performed within a reasonable time. The additional time for CV-4102 is of low safety significance since the inside valve had already closed.

CV-4025, the dirty sump isolation valve inside containment, closed in several minutes. This situation is not desirable, however the enclosure dirty sump discharge line would have isolated if required to do so, mitigating the consequences of a potential effluent release. CV-4103, the dirty sump isolation valve outside containment, closed after six minutes performing the

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required redundant safety function. Again, the additional time for CV-4103 is of low safety significance since the inside valve had already closed.