



Consumers  
Power

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MICHIGAN'S PROGRESS**

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Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

DOCKET 50-155 - LICENSE DPR-6 - BIG ROCK POINT PLANT -  
LICENSEE EVENT REPORT 89-009 - INFORMATIONAL LER -  
GARLOCK STYLE #938 PACKING PROBLEMS

Licensee Event Report (LER) 89-009 (Informational LER - Garlock Style #938 Packing Problems) is attached. This information does not meet the criterion presented in 10CFR50.73, however, due to the nature of this subject, a voluntary report is being submitted.

*J. Daniel Eddy*

J Daniel Eddy  
Plant Licensing Engineer

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

Attachment

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PDR ADOCK 05000155  
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LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) **Big Rock Point Plant** DOCKET NUMBER (2) **0 5 0 0 0 1 5 5 1** PAGES (3) **1 OF 0 3**

TITLE (4) **Informational LER - Garlock Style #938 Packing Problems**

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 NAME(S)	DOCKET NUMBER(S)		
10	27	89	89	009	00				N/A	0 5 0 0 0		
										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) <b>0 3 1</b>	20.402(b)	20.400(a)	00.730(a)(2)(iv)	73.71(b)
	20.400(a)(1)(i)	00.20(a)(1)	00.730(a)(2)(v)	73.71(a)
	20.400(a)(1)(ii)	00.20(a)(2)	00.730(a)(2)(vi)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text NRC Form 305A)
	20.400(a)(1)(iii)	00.730(a)(2)(i)	00.730(a)(2)(vii)(A)	
	20.400(a)(1)(iv)	00.730(a)(2)(ii)	00.730(a)(2)(vii)(B)	
	20.400(a)(1)(v)	00.730(a)(2)(iii)	00.730(a)(2)(viii)	

LICENSEE CONTACT FOR THIS LER (12)

NAME **JJPopa, Maintenance Engineer** TELEPHONE NUMBER **612 654 7116 5137**

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

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPROS		
B	J	I	S	E	A	L	G	O	4	O	N

SUPPLEMENTAL REPORT EXPECTED (14)  YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15) MONTH **10** DAY **27** YEAR **89**

ABSTRACT (Limit to 1,000 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On October 27, 1989 at 0315 hours, the Turbine Bypass Valve would not open when given an open signal. Subsequent troubleshooting determined that the problem was not in the controls and the valve was isolated for further maintenance. The valve operator applied over 25,000 pounds of force, but the valve would not open. During further maintenance it was apparent that the "packing" was severely hardened and bound to the stem, preventing valve operation. After the packing was removed, the valve operated freely.

Cause of the failure is attributed to the characteristics of the Garlock Style #938 which seems to harden when subjected to heat and pressure.

This valve and three others were repacked and functioned properly after maintenance.

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		8 9	0 1 0 9	0 0	0 2	OF	0 3

TEXT (If more space is required, use additional NRC Form 285A's) (17)

Description

On October 27, 1989 at 0315 hours, power escalation was in progress following turbine maintenance. At that time, while attempting to control steam flow and reactor pressure, plant operators discovered that the Turbine Bypass (JI) Valve (FCV) would not open when given an open signal. Subsequent troubleshooting determined that the problem was not in the controls and the valve was isolated. At 1600 hours, reactor shutdown commenced to perform further maintenance. The valve operator is hydraulic, and by temporarily increasing the fluid pressure, over 25,000 pounds of force was applied to the valve and the valve would not open. Following further maintenance it was apparent that the packing was severely hardened and was bound to the stem, preventing valve operation. Conventional methods for removing the packing would not work. A high pressure water extraction tool did not work either. The packing was eventually removed by drilling and use of a chisel which took three and one half days to complete. After the packing material was removed, the valve operated freely.

On October 31, 1989, the nearby Turbine Bypass Isolation Valve (MOV), containing the same packing, was tested and it also failed to stroke. This packing was also hardened and bound to the stem. On November 1, 1989, following a review of all remaining valves, the plant was then taken to cold shutdown to allow repacking of two motor-operated Core Spray System (BM) valves which were determined to have the same packing scheme. These two valves had not experienced a failure, but the packing was hardened and difficult to remove. Although these two valves had not experienced problems, it was considered prudent from a safety standpoint to replace the packing. Following completion of repairs to the Turbine Bypass Valve, Isolation Valve, and two Core Spray Valves, reactor start-up commenced on November 3, 1989 at 2248 hours.

Cause of Failures

During the 1989 Refueling Outage, these valves were repacked using Garlock Style #938 (G040) as a bushing/spacer to reduce the depth of the valve stuffing box. This was based on recommendations from Garlock as described in the product data sheet and review of product specifications which concluded them acceptable for our range of application. Style #938 had been in use for about 40 years as a "severe use" packing and has been used as a "spacer" for the past two years.

After the failures, further investigations were conducted. Off-the-shelf, the Style #938 is flexible, made up of tinsel strands and easy to install. However, Style #938 is fabricated to the same dimensions and tolerances as packing, and therefore when used as a bushing, contributes to the friction on the stem. Once the packing material is subjected to heat and pressure, the



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TEXT (If more space is required, use additional NRC Form 3054's) (17)

material hardens, turns brittle, and has a ceramic-like finish. In this state it has no flexibility and prevented valve stem movement.

Garlock was concerned that material was ordered to the wrong dimensions, however, remeasurements confirmed that the correct sizes were used.

Following meetings at the plant site, Garlock representatives still support that Style #938 is acceptable as a spacer material. Consumers Power personnel do not support this conclusion, based upon the recommendations contained in EPRI Report NP 5697 dated May, 1988, "Valve Stem Packing Improvements."

Corrective Actions Taken

Following identification of the problem and after review of the EPRI document recommendations, the four valves were repacked utilizing carbon spacers and graphite packing and tested satisfactory.

Recommendations

Style #938 will no longer be utilized as a bushing material in valves at Big Rock Point. Reasons are as follows:

- ° Spacer material is made to same size as packing dimensions and contributes to packing friction following exposure to heat and pressure. This is in contrast to EPRI recommendations that spacers should be made with sufficient wall and stem clearance to reduce friction.
- ° As experienced, the material is very difficult to remove following hardening. This can cause delays in performing plant maintenance, and can contribute to personnel exposure in high radiation areas.
- ° Material becomes brittle and pieces of tinsel may break off and enter fluid system.

Big Rock Point plans to return all remaining Style #938 packing to the manufacturer and based upon limited use to date feels that further testing by Garlock is needed prior to reconsideration.

Note

This event and associated failures did not result in a substantial safety hazard thus reporting under 10 CFR 21 was not required. However, depending on application in different plant systems, similar failures could result in safety system inoperability.