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United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Subject: Licensee Event Report (LER) 454-2003-002-00, "Two Main Steam Safety Valves Lift Setpoints Found Out of Tolerance During Testing Due to Unknown Causes"

Byron Station, Unit 1
Facility Operating License No. NPF-37
NRC Docket No. STN 50-454

Enclosed is an LER involving the February 16, 2003, event involving two Main Steam Safety Valves found out of tolerance during testing. This condition is reportable to the NRC in accordance with 10 CFR50.73 (a) (2) (i) (B).

Should you have any questions concerning this matter, please contact Mr. William Grundmann, Regulatory Assurance Manager, at (815) 234-5441, extension 2800.

Respectfully,

Richard L. Lopriore
Site Vice President
Byron Nuclear Generating Station

Attachment LER 454-2003-002-00

cc: Regional Administrator, Region III, NRC
NRC Senior Resident Inspector– Byron Station

IE22

NRC FORM 366 (7-2001) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Byron, Unit 1	STN 05000454	1 of 4

4. TITLE
Two Main Steam Safety Valves Lift Setpoints Found Out of Tolerance During Testing Due to Unknown Causes

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MO	DAY	YEAR	YEA	SEQUENTIAL NUMBER	REV NO	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
02	16	2003	2003	-002-	00	04	14	2003	FACILITY NAME N/A	DOCKET NUMBER N/A

9. OPERATING MODE	1
10. POWER LEVEL	94

11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)

☐ 20 2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
☐ 20 2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
☐ 20 2203(a)(1)	☐ 20 2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 73.73(a)(2)(viii)(B)
☐ 20 2203(a)(2)(i)	☐ 50 36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 73.73(a)(2)(ix)(A)
☐ 20 2203(a)(2)(ii)	☐ 50 36(c)(1)(ii)(A)	☐ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
☐ 20 2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
☐ 20 2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
☐ 20 2203(a)(2)(vi)	☒ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A
☐	☐	☐	

12. LICENSEE CONTACT FOR THIS LER

NAME	TELEPHONE NUMBER (Include Area Code)
William Grundmann, Regulatory Assurance Manager	(815) 406-2800

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

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO epix		CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX
X	SB	SV	C568	Yes						

14. SUPPLEMENTAL REPORT EXPECTED				15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
X	Yes (If yes, complete EXPECTED SUBMISSION DATE).		NO		07	30	2003

16. ABSTRACT (Limit to 1400 spaces, i e , approximately 15 single-spaced typewritten lines)

During mid-cycle testing of six Unit 1 Main Steam Safety Valves (MSSV's) on February 16, 2003, two valves failed to meet the Technical Specification 3.7.1 as found plus or minus 3% tolerance of nominal setpoint requirement. Operations entered the applicable Technical Specification Action Condition until each valve was re-adjusted and tested satisfactorily. The initial lift setpoint for the 1MS015B valve was measured at 1166.7 psig; which is approximately 3.2% below the 1205 psig nominal setpoint. The initial lift setpoint for the 1MS013A valve was measured at 1190 psig; which is approximately 3.6% below the 1235 psig nominal setpoint. The cause of the two valves failing their setpoint test is currently unknown. All valves were reset to within plus or minus 1% of the nominal setpoint as required by Technical Specifications. An engineering evaluation concluded that the as found condition of these two valves was still bounded by the design basis analysis. This event is reportable under 10CFR 50.73(a)(2)(i)(B).

A. Plant Operating Conditions Before The Event:

Unit: 1 Event Date: 2/16/2003 Event Time: 1303

MODE: 1 Reactor Power: 94 percent

Reactor Coolant System (RCS) [AB] Normal Operating Temperature and Pressure.

No structures, systems, or components were inoperable at the start of the event that contributed to the event.

B. Description of Event:

Byron Station, Unit 1 is configured with four steam generators. Each steam generator has five Main Steam Safety Valves (MSSV) [SB], which provide overpressure protection. On February 16, 2003, Unit 1 MSSV mid-cycle setpoint testing was being performed on six MSSV's in order to gain performance information for the X-750 Inconel discs installed in these valves. This testing is a corrective action from previous concerns with the X-750 Inconel disc material being susceptible to disc bonding. Five of the valves (i.e., 1MS013A, 1MS014C, 1MS014D, 1MS015B, and 1MS016C) selected were refurbished with X-750 Inconel material during the last refueling outage (B1R11) in March 2002. The remaining valve selected (i.e., 1MS015C), was refurbished with X-750 Inconel material during the outage previous to B1R11 (i.e., B1R10) in October 2000. This valve was selected to be in the test population because it lifted out of tolerance on the high side during B1R11. There are three additional MSSV's on Unit 1 with X-750 Inconel disc material installed during B1R10, however, those three valves were satisfactorily tested in B1R11 after a long continuous run of over 500 days. Therefore, they were not selected for mid-cycle testing because they are not considered to be susceptible to disc bonding.

The Technical Specification 3.7.1, "Main Steam Safety Valves," allows a plus or minus 3% tolerance on the as found lift nominal setting and requires all tested valves to be set to a plus or minus 1% as left tolerance. The setpoint test determines each valve's actual lift setting using normal system pressure with assistance from a hydraulic testing device. The MSSV testing was performed in accordance with procedure BMP 3114-15, "Main Steam Safety Valve Verification of Lift Point Using Furmanite's Trevitest Equipment." The procedure's as left acceptance criteria require two consecutive lift tests within plus 0% or minus 1% of the valve's required lift nominal setpoint with no adjustments performed between these tests.

The six MSSV tests were initiated and completed on February 16, 2003. The MSSV tests, and any required valve adjustments, were performed on only one valve at a time. Valves not meeting acceptance criteria were adjusted and satisfactorily tested before proceeding to the next valve. The initial lift tests performed on two of the six MSSV valves (i.e., 1MS015B and 1MS013A) exceeded the plus or minus 3% Technical Specification as found limit (on the low - 3% side). These

valves required setpoint adjustment to leave them within the plus 0% or minus 1% as left criteria. The failed valves and their applicable Technical Specifications Action Condition entry and exit times were as follows:

Valve	Action Condition Entry	Action Condition Exit
1MS015B	02/16/03 at 09:48	02/16/03 at 10:00
1MS013A	02/16/03 at 13:03	02/16/03 at 13:26

The specified lift, initial, and as-left settings for each of the failed valves, the plus or minus 1% and plus or minus 3% Technical Specification limits, and the initial low lift tolerance percentage were as follows:

Valve	Tech Spec Setpt (psi)	+/-3% Tech Spec As-Found Limits (psi)	Initial Lift (psi)	Initial lift % Diff.	As-Left Lift (psi)	+/-1% Tech Spec As-Left Limits (psi)
1MS015B	1205	1169 – 1241	1167	-3.2%	1195	1193 – 1217
1MS013A	1235	1198 – 1272	1190	-3.6%	1227	1223 – 1247

This condition is reportable to the NRC in accordance with 10CFR 50.73 (a)(2)(i)(b), as a condition prohibited by Technical Specifications.

C. Cause of Event:

The cause of the two MSSV failures is unknown. Various factors were reviewed for potential to cause low lifts. These factors include individual valve performance history, calibration of test equipment, setpoint testing methodology, MSSV body temperature, and past unit operations during the cycle. No definitive link could be determined that would explain the low lifts experienced.

One possible cause will continued to be explored. The six MSSV's were mid-cycle tested online using the Furmanite Trevi-testing methodology. This equipment uses a hydraulic lift device to provide the motive force necessary to overcome the difference between steam line pressure and the setpoint of the valve. Both of the MSSV's that failed the as-found tolerance were previously tested by a test vendor after valve refurbishment using a steam boiler. Both Furmanite's and the test vendor's testing methodologies are fully certified to perform safety valve setpoint testing. A follow-up action is planned to evaluate the two test methodologies to determine if a difference in the test methodologies may account for the low lifts.

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D. Safety Consequences:

The primary purpose of the MSSVs is to provide overpressure protection for the secondary system. These valves also provide protection against over-pressurizing the Reactor Coolant pressure boundary by providing a heat sink for the removal of energy from the Reactor Coolant if the preferred heat sink provided by the condenser [SD] is not available. The MSSVs also serve as containment isolation valves.

An engineering evaluation was conducted to determine the effect of the two MSSV out of tolerance condition on the Chapter 15, "Accident Analyses," in the Updated Final Safety Analysis Report. This analysis concluded that considering the as-found MSSV setpoints, the conclusions of Chapter 15 analyses still remain valid. Therefore, the overall impact on plant safety due to the identified condition was minimal. In addition, a risk management review indicates that there was no impact on the Unit 1 online risk profile for the site due to the as found setpoints of the two MSSV's that were found at 3.2% and 3.6% below the nominal +/-3% setpoint of the valves. This condition is not a safety system functional failure.

E. Corrective Actions:

Maintenance immediately notified Operations after each of the initial MSSV lifts that exceeded the +/-3% Technical Specification limit and the appropriate LCO was entered. Following additional lifts on the 1MS015B and 1MS013A valves, the valves were adjusted and re-tested satisfactorily.

Compare and contrast the MSSV setpoint testing results and methodologies of Furmanite trevi-testing and the test vendor. Determine if additional actions are required based on the results of this evaluation. A supplement to this report will be issued to document the results of this evaluation.

F. Previous Occurrences:

During the previous 4 years there have been several LERs at Byron involving multiple MSSV lifting outside their acceptance criteria, however these events involve the MSSV lifting high and attributed to the disc bonding phenomena. No previous occurrences were found involving multiple valves lifting low.

G. Component Failure Data:

Manufacturer	Nomenclature	Model	Mfg. Part Number
Dresser	Main Steam Safety Valve (MSSV)	3707R	N/A