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W3F1-2001-0026
A4.05
PR

March 29, 2001

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Subject: Waterford 3 SES
Docket No. 50-382
License No. NPF-38
Reporting of Licensee Event Report

Gentlemen:

Attached is Licensee Event Report (LER) 01-002-00 for Waterford Steam Electric Station Unit 3. This report provides details of a failure of Pressurizer steam space sample line inside and outside Containment isolation valves to close when their respective Control Room control switches were placed in the "Close" position. This condition is being reported pursuant to 10CFR50.73(a)(2)(v) based on the potential for the condition to have prevented the fulfillment of the safety function of valves which are needed to control the release of radioactive material under accident conditions. The condition is also reportable pursuant to 10CFR50.73(a)(2)(vii)(C) based on the single condition causing two independent trains to become inoperable in a single system designed to control the release of radioactive material. The condition has also been referred to the vendor (Flowserve Engineering) for consideration for reporting under 10CFR21 regulatory requirements. The vendor agreed that the failures meet the criteria for 10CFR21 reporting and further has agreed to file the required report.

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There are no commitments contained in this submittal. Actions described herein are controlled and tracked via the Waterford 3 Corrective Action Program.

Very truly yours,

A handwritten signature in cursive script, appearing to read "Alan J. Harris".

Alan J. Harris
Director,
Nuclear Safety Assurance

AJH/OPP/cbh
Attachment

cc: E.W. Merschoff, (NRC Region IV), N. Kalyanam, (NRC-NRR),
A.L. Garibaldi, lerevents@inpo.org - INPO Records Center,
J. Smith, N.S. Reynolds, NRC Resident Inspectors Office,
Louisiana DEQ/Surveillance Division

Estimated burden per response to comply with this mandatory information collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bis1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202 (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See reverse for required number of digits/characters for each block)

FACILITY NAME (1)

Waterford Steam Electric Station, Unit 3

DOCKET NUMBER (2)

05000-382

PAGE (3)

1 OF 7

TITLE (4)

Common Mode Failure of Containment Isolation Valves Due To Design Deficiency.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MO	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MO	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
01	28	01	01	- 002 -	00	03	29	01	N/A	05000
									FACILITY NAME	DOCKET NUMBER
									N/A	05000
OPERATING MODE (9)		1	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) (11)							
POWER LEVEL (10)		100	20.2201(b)			20.2203(a)(3)(ii)			50.73(a)(2)(ii)(B)	50.73(a)(2)(ix)(A)
			20.2201(d)			20.2203(a)(4)			50.73(a)(2)(iii)	50.73(a)(2)(x)
			20.2203(a)(1)			50.36(c)(1)(i)(A)			50.73(a)(2)(iv)(A)	73.71(a)(4)
			20.2203(a)(2)(i)			50.36(c)(1)(ii)(A)			50.73(a)(2)(v)(A)	73.71(a)(5)
			20.2203(a)(2)(ii)			50.36(c)(2)			50.73(a)(2)(v)(B)	OTHER
			20.2203(a)(2)(iii)			50.46(a)(3)(ii)		X	50.73(a)(2)(v)(C)	Specify in Abstract below or in NRC Form 366A
			20.2203(a)(2)(iv)			50.73(a)(2)(i)(A)			50.73(a)(2)(v)(D)	
			20.2203(a)(2)(v)			50.73(a)(2)(i)(B)		X	50.73(a)(2)(vii)	
			20.2203(a)(2)(vi)			50.73(a)(2)(i)(C)			50.73(a)(2)(viii)(A)	
			20.2203(a)(3)(i)			50.73(a)(2)(ii)(A)			50.73(a)(2)(viii)(B)	

LICENSEE CONTACT FOR THIS LER (12)

NAME

Oscar P. Pipkins / Senior Licensing Engineer

TELEPHONE NUMBER (Include Area Code)

(504) 739-6707**COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)**

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

SUPPLEMENTAL REPORT EXPECTED (14)

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

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

On January 28, 2001 at 2245, with the plant operating in Mode 1 at 100% reactor power, both the inside (PSL-303) and outside (PSL-304) Containment isolation valves for the Pressurizer steam space sample line failed to close when attempted from the Control Room. The valves had been open since 1455 that same day to perform degassing of the Pressurizer. The valves were immediately declared inoperable. The outside Containment isolation valve was manually closed using a gagging device and its breaker was opened to comply with Technical Specification actions. The breaker was danger tagged to ensure compliance was maintained. Inspections and tests were performed. Evidence of internal binding (galling) was found. The root cause was determined to be inadequate design clearances to allow for thermal growth of internal valve components. The vendor (Flowserve Engineering) has been contacted for review of the failures for 10CFR21 reporting considerations and agreed that the failures meet the criteria for 10CFR21 reporting. They have agreed to file the required report. The condition is herein being reported pursuant to 10CFR 50.73(a)(2)(v) and 10CFR 50.73(a)(2)(vii)(C). The inability of the valves to close was determined to have low safety significance due to other available valves, operator actions credited, a closed system, and available thermal margin. The condition did not compromise the health and safety of the general public. The current licensing and design bases remained bounding. This event is considered a Safety System Functional Failure (SSFF).

LICENSEE EVENT REPORT (LER)

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			01	-- 002	-- 00		

NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

REPORTABLE OCCURRENCE

On January 28, 2001, the inside (PSL-303) and outside (PSL-304) Containment isolation valves on the Pressurizer steam space primary sample line failed to close when attempts were made from the Control Room at their respective control switches. These valves are required to automatically close upon receipt of a Containment Isolation Actuation Signal (CIAS). Failure of both valves constituted a loss of safety function. This condition is being reported pursuant to 10CFR50.73(a)(2)(v) based on potential for the condition to have prevented the fulfillment of the safety function of valves which are needed to control the release of radioactive material under accident conditions. The condition is also reportable pursuant to 10CFR50.73(a)(2)(vii)(C) based on the single condition causing two independent trains to become inoperable in a single system designed to control the release of radioactive material. The condition was also referred to the vendor on Friday, March 16, 2001 for consideration for reporting under 10CFR21 in keeping with guidance provided in NUREG-0302. The vendor (Flowserve Engineering) has agreed that this condition is reportable under 10CFR21 and will initiate the required report.

INITIAL CONDITIONS

Just prior to the event, Waterford 3 was operating in Mode 1 at 100% Reactor power. The subject valves (PSL-303 and PSL-304) had been open for approximately eight hours while degassing the Pressurizer.

EVENT DESCRIPTION

On January 28, 2001 at 2245, it was discovered that PSL-303 and PSL-304, Pressurizer steam space sample inside and outside Containment isolation valves [JM] would not close when their respective control switches at Control Panel CP-8 in the Control Room were taken to the "Close" position. The valves had been open since 1455 that same day to perform degassing of the Pressurizer. The Nuclear Plant Operator first took the switch for PSL-304 to the "Close" position and observed that the valve continued to indicate "Open". He then took the switch for PSL-303 to the "Close" position, and observed that the position of PSL-303 also continued to indicate "Open".

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Technical Specification 3.0.3, Technical Specification 3.6.3, and Technical Specification 3.6.1.1 were entered upon discovering that the valves did not close. A Nuclear Auxiliary Operator was dispatched to verify the position of PSL-304 locally. PSL-304 was found to be in the open position and the on-shift Chemistry Technician confirmed that there were still indications of flow through the sample line. Another attempt to close PSL-304 was made using the switch on CP-8 in the Control Room. The Nuclear Auxiliary Operator observed that the valve moved approximately one quarter-inch in the closed direction. At 2257 PSL-304 was closed using the valve manual gagging device. At 2310 PSL-304 was de-energized to comply with the action requirements of Technical Specification 3.6.3.b. At 0007 on January 29, 2001, another attempt was made to close PSL-303 using the control switch at CP-8. This attempt was successful.

Initial corrective actions modified the valve actuators to increase their closing thrust. These actions were inadequate and the valves failed to close on February 21, 2001 during post maintenance testing. A formalized root cause determination was conducted.

The subject valves are ½ inch, 2500 lb, WKM model 70-18-9 DRTS cage-guided globe valves.

CAUSAL FACTORS

The root cause was determined to be inadequate design clearances to allow for thermal growth of internal valve components. Several tests and internal inspections identified evidence of valve binding. Scarring (galling) marks were found on the valve plug. This was evidence of binding between the plug and the cage. Testing and evaluations results indicate that the valve binding occurred at temperatures in the range of >600 ° F, thus constituting thermal binding. It was determined that the valve was assembled correctly and passed post maintenance testing. While in service, heating occurred from the pressurizer such that the internal valve parts expanded proportionally to their thermal coefficient of expansion. The resulting expansion of the parts caused valve binding. The as found clearances were marginally within the lower end of the (valve specification) allowable clearance range. The temperature range wherein binding is believed to have occurred was within the range specified in the valve specification.

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CORRECTIVE ACTIONS

Immediate actions included declaring the failed valves (PSL-303 and PSL-304) inoperable. PSL-304 (outside Containment isolation valve) was manually closed using its gagging device and its breaker was opened to comply with the action requirements of Technical Specification 3.6.3.b. The breaker was danger tagged to ensure Technical Specification compliance was maintained. The failures were entered into the plant Corrective Actions Program, where testing and evaluations were conducted. This included studying and evaluating the subject valve maintenance histories. The Kepner-Tregoe problem solving methodology was utilized to determine the root cause.

Independent evaluations were performed by an external engineering company (Kalsi Engineering).

The valves were disassembled and inspected and internal measurements were taken. New parts were installed, with wider tolerances provided by the vendor (Flowserve Engineering). Retests were performed and the valves passed the tests.

Other safety related applications of WKM caged globe valves have been tested to determine if they are subject to thermal binding under flow conditions. They were found not to bind. A generic review of other safety related cage globe valves is in progress.

Procedures are being reviewed and will be addressed appropriately.

These corrective actions have been entered, and are being tracked, in the plant's corrective action program.

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NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

SAFETY SIGNIFICANCE

The potential impact of concurrently having Containment isolation valves PSL-303 and PSL-304 not go closed upon receipt of a Containment Isolation signal during applicable plant events was reviewed and assessed. The loss of both valves constituted a loss of safety function. This constitutes a Safety System Functional Failure (SSFF). The potential safety significance of the component failures with respect to applicable events is discussed below.

Radiological Events

The inability of PSL 303/304 to close gives an additional potential radiological release pathway outside containment for all of the UFSAR dose events with the exception of the sample line break which will be discussed below. The PSL-303/304 valves are connected to the pressurizer steam space sample line. A simplified pathway description begins at the pressurizer and runs through RC-319 valve, PSL-301 valve, PSL-303 valve, containment, PSL-304 valve, PSL-306, sample cooler, then back to the Volume Control Tank (VCT). The VCT can be vented manually to the Gaseous Waste Management System or, if the VCT relief valve pressure is exceeded, to the hold up tanks. The potential radiological release into the sample line would be maintained within a closed system and would not be available to the environment prior to being filtered. Thus, the dose consequences would remain acceptable for an event that occurred while these valves were open. This analysis takes credit for a portion of Non-Nuclear Safety line that is assumed to remain intact for the duration of the event.

Sample Line Break Event

The inability of PSL 303/304 to close has the potential to release primary coolant outside of containment as a result of a sample line break. Sample line breaks are described in UFSAR Section 15.6.3.1.1 and the limiting sample or instrument line break is analyzed for the letdown line. The letdown line is a two-inch schedule 160 pipe and the pressurizer sample line is a 1/2-inch line with a flow-restricting orifice immediately off the pressurizer.

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During a sample line break, the failure of PSL 303/304 would allow sample line blowdown until operator action is taken to either close RC319 or PSL301. The two hour Exclusion Area Boundary (EAB) dose for the letdown line break will continue to bound the pressurizer steam space sample line break even with the valve failures because the overall primary mass release of the letdown line break exceeds that of the sample line.

The letdown line break duration Low Population Zone (LPZ) dose will also bound the sample line break provided that operator action isolates the break or depressurizes the unit to Mode 5 within a reasonable time frame (as described next). The design basis letdown line break dose calculation uses an RCS activity of 1 micro Ci/gm, atmospheric dispersion factors that are conservative 95% of the time, and no credit for activity plate-out, deposition, or decay. These factors when compared to normal operation would allow the operator response time to be approximately 30 hours and still maintain the radiological consequences within the current acceptance criteria.

Thus, the PSL 303/304 failure remains bounded by the letdown line break dose consequences.

Additional Event Criteria

The leakage could also cause additional depressurization during a transient, thus reducing the Departure from Nucleate Boiling Ratio (DNBR) for those DNBR events. This has the potential to increase fuel failure and/or push non-fuel failure events closer to their Specified Acceptable Fuel Design Limit (SAFDL). All of the fuel failure and DNBR events are analyzed with a 2% multiplier on power, with maximum 3-D peaking factors, and from a Power Operating Limit (POL). During the valves inoperable time, the plant power, peaking, and COLSS POL were conservative enough that sufficient thermal margin was available that all the DNBR events would remain bounded by the current analyses.

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Safety Significance Conclusion

Based on considerations described above, the inability of PSL 303/304 to close had a low safety significance due to the available valves, operator actions, closed system, and available thermal margin. The current licensing and design bases would have remained bounding.

10CFR Part 21 Considerations

Entergy has sent results of tests and evaluations (root cause analysis) associated with the subject valve failures to the vendor (Flowserve Engineering) for consideration for reporting under 10CFR21 regulatory requirements. The vendor agreed that the failures meet the criteria for 10CFR21 reporting and further has agreed to file the required report.

SIMILAR EVENTS

Record searches performed have identified no other Waterford 3 reported events involving WKM caged globe valve binding due to thermal expansion.

ADDITIONAL INFORMATION

Energy Industry Identification System (EIIS) codes are identified in the text within brackets [].

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An Exelon/British Energy Company

March 23, 2001
5928-01-20073

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

Dear Sir or Madam:

SUBJECT: THREE MILE ISLAND, UNIT 1 (TMI UNIT 1)
OPERATING LICENSE NO. DPR-50
DOCKET NO. 50-289
WITHDRAWAL OF LICENSE AMENDMENT REQUEST NO. 303

AmerGen Energy Company, LLC (AmerGen) requests that License Amendment Request No. 303 be withdrawn. License Amendment Request No. 303, which was submitted on January 15, 2001, proposed a revision to relocate RCS pressure-temperature safety limits from the Technical Specifications to the TMI Unit 1 Core Operating Limits Report. Based on technical issues associated with the proposed methodology discussed with NRC staff in the review of the proposed change, AmerGen has decided to request withdrawal of this TSCR from further consideration.

Very truly yours,



James A. Hutton
Director – Licensing
Mid-Atlantic Regional Operating Group

JAH/djd/dr

cc: H. J. Miller, USNRC Regional Administrator, Region I
T. G. Colburn, USNRC TMI Unit 1 Senior Project Manager
J. D. Orr, USNRC TMI Unit 1 Resident Inspector
File No. 00126