Northeast
Nuclear Energy

Rope Ferry Rd. (Route 156), Waterford, CT 06385

Millstone Nuclear Power Station
Northeast Nuclear Energy Company
P.O. Box 128
Waterford, CT 06385-0128
(203) 444-4300
Fax (203) 444-4277

The Northeast Utilities System

Donald B. Miller Jr.,
Senior Vice President - Millstone

January 10, 1996
B15505
Re: 10CFR50.73(a)(2)(iv)

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

Reference: Facility Operating License No. NPF-49
Docket No. 50-423
Licensee Event Report 95-022-00

This letter forwards Licensee Event Report 95-022-00 required to be submitted within thirty (30) days pursuant to 10CFR50.73(a)(2)(iv).

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY

D B Miller

Donald B. Miller, Jr.
Senior Vice President - Millstone Station

DBM/RLM:ljs

Attachment: LER 95-022-00

cc: T. T. Martin, Region I Administrator
P. D. Swetland, Senior Resident Inspector, Millstone Unit Nos. 1, 2, and 3
V. L. Rooney, NRC Project Manager, Millstone Unit No. 3

IE22
1/1

NRC Form 366 (4-95) U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

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

APPROVED BY OMB NO. 3150-0104
EXPIRES: 04/30/98

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
Millstone Nuclear Power Station Unit 3	05000423	1 OF 7

TITLE (4): Engineered Safety Features Actuation of the Auxiliary Feedwater System Due to Equipment Failure

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	DOCKET NUMBER
12	14	95	95	– 022 –	00	01	10	96		05000
										05000

OPERATING MODE (9): 3

POWER LEVEL (10): 0

THIS REPORT IS BEING SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)

	20.2201(b)		20.2203(a)(2)(v)		50.73(a)(2)(i)		50.73(a)(2)(viii)
	20.2203(a)(1)		20.2203(a)(3)(i)		50.73(a)(2)(ii)		50.73(a)(2)(x)
	20.2203(a)(2)(i)		20.2203(a)(3)(ii)		50.73(a)(2)(iii)		73.71
	20.2203(a)(2)(ii)		20.2203(a)(4)	X	50.73(a)(2)(iv)		OTHER
	20.2203(a)(2)(iii)		50.36(c)(1)		50.73(a)(2)(v)		Specify in Abstract below or in NRC Form 366A
	20.2203(a)(2)(iv)		50.36(c)(2)		50.73(a)(2)(vii)		

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER (Include Area Code)
Robert L. McGuinness, Senior Engineer	(203) 447-1791 Ext. 6855

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

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 15 single-spaced typewritten lines) (16)

On December 14, 1995 at 0735 while in Mode 3, an Engineered Safety Features (ESF) actuation occurred due to a low-low level in the 'C' steam generator. The ESF signal actuated the auxiliary feedwater system 'A' and 'B' motor driven pumps to restore the steam generator level.

At the time of the event the operators were stabilizing the reactor coolant temperature after a plant heatup by opening the main steam isolation valve bypass valves and the main steam atmospheric dump valves. Upon the 'B' steam generator level dropping to 55-percent operators set the demand of the atmospheric dump valves to zero. However, the 'C' dump valve did not close fully, and the 'C' steam generator level continued to drop to the low level alarm. Operators attempted to restore the steam generator level by feeding approximately 100 gpm of auxiliary feedwater to each of the 'B', 'C' and 'D' steam generators. Upon continued decreasing level in the 'C' steam generator, all four main steam isolation valve bypass valves were closed and the 'C' atmospheric dump valve isolation valve was closed. This isolation caused a steam generator pressure increase which shrunk the steam generator level and resulted in the auxiliary feedwater automatic initiation. The low-low level trip signal did not generate a reactor trip, because the reactor trip breakers were already open while the plant was heating up in Mode 3. All equipment operated as designed in response to the event and no other safety related equipment actuated or was required.

The cause of the event was a failure of the 'C' steam generator atmospheric dump valve to close.

The steam dump valve was declared inoperable because of its failure to close from a partially open position. Disabling the valve in the closed position does not affect the accident analysis because the main steam safety valves provide the safety related heat removal capability. The main steam atmospheric dump valve is not relied upon for safety grade cold shutdown. The remaining main steam atmospheric dump valves are operable because of surveillance testing, valve diagnostic testing by Fisher Controls, and successful valve operation.

The corrective action, and action to prevent a recurrence will include installing new piston rings at the next cold shutdown, and conducting operator training on the event. Additional corrective actions are being considered to restore the valve to an operable condition and to prevent a recurrence of the event. These include inservice testing, a better design for the valve position indication, and additional surveillance. These actions, alone or in combination, are expected to enable NNECO to determine when the main steam atmospheric dump valve can be restored to an operable status.

I. Description of Event

On December 14, 1995, at 0735 while in Mode 3, Hot Standby, an Engineered Safety Features (ESF) actuation occurred due to a low–low level in the 'C' steam generator. The ESF signal actuated the auxiliary feedwater system 'A' and 'B' motor driven pumps to restore steam generator level.

At the time of the event plant operators were stabilizing the reactor coolant temperature after a plant heatup to Hot Standby conditions, following a several week outage. The initial plant steam generator levels were: 'A' 54 percent, 'B' 58 percent, 'C' 64 percent, and 'D' 57 percent. Instrumentation and Controls (I&C) personnel had removed all of the narrow range Reactor Coolant System (RCS) loop temperature detectors (RTDs) from service to perform cross calibrations. This was required due to the failure of one T_{COLD} wide range RTD. The narrow range RTDs provide an input to the reactor coolant T_{AVG} which is required for ESF actuation in accordance with Technical Specification 3.3.2. In Modes 1–3, three channels of T_{AVG} are required to be operable to generate a Low–Low T_{AVG} signal. The operating shift was instructed by the previous shift to remain below 553°F until the RTDs were returned, to remain within technical specifications.

During a typical plant heatup sequence the Main Steam Isolation Valves (MSIVs) are open and the steam is dumped to the condenser in the pressure control mode to limit the RCS heatup to 557°F, Normal Operating Temperature (NOT). The reactor coolant pumps continue to put heat into the RCS and as the plant approaches the condenser steam dump set pressure, the steam dump valves modulate and automatically limit the RCS heatup.

The operations shift needed to limit the RCS temperature to 553°F due to technical specification requirements, until the narrow range RTDs were returned by I&C. The plant heatup was to be controlled by manually modulating the atmospheric steam dump valves. This manual approach is more labor intensive for the operators. The activities to stabilize the RCS temperature started during a shift change. The unit's goal in the plant startup sequence was to get to normal operating pressure and temperature (NOP/NOT) to start the inservice leak tests.

At 0707, the RCS temperature reached 553°F. The operators stopped the reactor coolant heatup by opening the main steam isolation bypass valves and the main steam atmospheric dump valves at 0710 and 0713, respectively. Upon the 'B' steam generator level dropping to 55–percent at 0718 hours, the operators set the demand of the atmospheric dump valves to zero. At that time, the 'C' generator atmospheric dump valve did not close fully, and the 'C' steam generator level continued to drop to the low steam generator level alarm (45–percent level) at 0722. Operators then attempted to restore the steam generator level by feeding approximately 100 gpm of auxiliary feedwater to each of the 'B', 'C' and 'D' steam generators by opening the auxiliary feedwater cross tie valves at 0723 and starting the 'A' motor driven auxiliary feedwater pump at 0725. The steam generator level for the 'A', 'B', and 'D' steam generators stabilized at 0727, while the 'C' steam generator level continued to fall. At 0728, the Main Steam Relief Valve Not Closed Annunciator came in. At that time, the controllers for the atmospheric dump valves A–D were put into the closed detent position. Upon continued decreasing level in the 'C' steam generator, all four main steam isolation valve bypass valves were closed at 0729 and the 'C' atmospheric dump valve isolation valve was closed at 0733. When the 'C' atmospheric dump valve isolation valve was closed the steam generator pressure increased, shrinking the steam generator level and resulting in an auxiliary feedwater automatic initiation on low–low level in the 'C' steam generator. The low–low level trip signal did not generate a reactor trip, because the reactor trip breakers were already open while the plant was heating up in Mode 3. All equipment operated as designed in response to the event and no other safety related equipment actuated or was required.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Millstone Nuclear Power Station Unit 3	05000423	95	– 022 –	00	03 OF 07

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

II. Cause of Event

The root cause of the event was a failure of the 'C' steam generator atmospheric dump valve (3MSS*PV20C) to close upon demand. However, the cause of the valve failing to close could not be conclusively determined. In addition to the valve failure, there were several areas of improvement that were identified for operations personnel, and there were several potential design improvements that were identified.

The 'C' atmospheric dump valve, 3MSS*PV20C, while being used to maintain steam generator pressure, was placed at approximately the 15-percent open position. When the valve demand was returned to 0-percent, the valve did not close as expected. A sequence of events led to an ESF actuation of the Auxiliary Feedwater system which restored steam generator level.

The Operating shift could have better anticipated the need for temperature stabilization and anticipated the confusion that could occur given that the evolution would occur at shift turnover. A better preparation for stabilizing plant conditions and the anticipation of shift turnover may have resulted in better Operations control during the event. In this regard a condition that contributed to operator workload was that the narrow range Reactor Coolant System (RCS) loop temperature detectors (RTDs) were not returned by Instrumentation & Controls to Operations until 0720 during the event. An earlier return of the RTDs would have resulted in Operations having a higher target temperature for RCS temperature stabilization. The atmospheric dump valves controller setpoint could have been adjusted to 1092 psig and the controller placed in automatic per procedure (OP3201). The automatic control would have maintained the RCS temperature instead of requiring manual control of the atmospheric dump valves to control the RCS temperature.

During the event more auxiliary feedwater flow should have been provided. The 'A' auxiliary feedwater pump was not started until 0725, which was approximately 15 minutes after opening the main steam bypass valves and 12 minutes after opening the atmospheric dump valves. The auxiliary feedwater pumps could have been started prior to the initiation of the cooldown. The availability of auxiliary feedwater earlier in the event would have allowed for additional makeup to the steam generator and prevented a low-low steam generator level. Also, the Operating shift could have provided more auxiliary feedwater to match outflow of the 'C' steam generator. A 15-percent open bypass valve passes approximately 150,000 lb/hr, while 100 gpm auxiliary feedwater flowrate is approximately 50,000 lb/hr.

Although an analysis of the event determined that design features did not cause the event, several potential design improvements were identified, as described in the Corrective Actions section. The atmospheric dump valve piston rings are planned to be replaced during the next cold shutdown with metal rings having better tolerances for valve operation. Also, NNECO will investigate the possibility of providing a better design for the atmospheric dump valve position indication.

In summary, the cause of the event was a failure of the 'C' steam generator atmospheric dump valve (3MSS*PV20C) to close upon demand. In addition to the valve failure there were several areas for improvement identified for operations personnel and in the design of the system.

III. Analysis of Event

The event had low safety significance. The low-low level in the 'C' steam generator caused an automatic initiation of the two motor driven auxiliary feedwater pumps. The low-low level trip signal did not generate a reactor trip, because the reactor trip breakers were already open while the plant was heating up in Mode 3. All equipment operated as designed in response to the event and no other safety related equipment actuated or was required. There were no adverse safety consequences due to the event. Investigations were conducted in a number of areas to evaluate the event and to determine the cause, the corrective actions, and the actions to prevent a recurrence.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Millstone Nuclear Power Station Unit 3	05000423	95	– 022 –	00	04 OF 07

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

An investigation was conducted to determine the affect of feedwater flow on the event. Auxiliary feedwater was supplied to three of the steam generators at a rate of approximately 100 GPM each. A subsequent engineering review found that with an atmospheric dump valve at 15-percent open, approximately 300 gpm is necessary to maintain steam generator level and match the outflow. It was not possible for Operations to quantify the amount of feedwater required to maintain stable reactor coolant temperatures due to variables such as the amount of decay heat and the plant heatup rate.

Operating procedures (OP 3201) require that if at 500 psig in the steam generators and utilizing the condensate pumps to maintain SG level, then start either the motor driven feedwater pump (MDFW) pump or one of the motor driven auxiliary feedwater (MDAFW) pumps. Steam Generator level was stable or increasing during the heat up due to the MSIVs and MSIV bypass valves being closed. Operations was in the process of starting the MDFW pump, but this evolution required some time to complete. The 'A' MDAFW pump was lined up and checked for immediate start but was not running. Operations had been previously advised that there is less margin on the AFW pumps than on most other pumps; thus, the run times on these pumps should be minimized. Based on these conditions it was reasonable that no feedwater pumps were running until steam was released from the steam generator. It is the intent of OP3201 to have a feedwater source available and running to provide makeup to the steam generators prior to the start of any steam releases.

Once the atmospheric dump valves and bypass valves were opened, steam generator levels began to drop. As 3 of the 4 steam generators were above the high level annunciator setpoint (55-percent) there was no immediate concern for low steam generator level. Instead, due to the immediate concerns of stabilizing RCS temperature and stopping the pressurizer level decrease, feeding the steam generators was not immediately started and level decreased to the low level annunciator on the 'C' steam generator. At that point actions were initiated to start to feed the steam generators. A more prompt initiation of feedwater to the steam generators would have provided more margin to the time at which the low-low level in the 'C' steam generator occurred and may have prevented the ESF actuation.

An investigation was conducted to determine the affect of pressurizer level on the event. Once the initial cooldown of the steam generators was initiated, pressurizer level began to drop. Over a seven-minute period, pressurizer level dropped 10-percent, at which time the drop was terminated. The pressurizer drop was not observed over the seven-minute period; however, when noticed, the proper action was taken. Better communication between operators on the initiation of steaming the steam generators and the resultant effect on pressurizer level may have prevented the event, as the perturbation in pressurizer level could have been anticipated. When the shift was concerned about overcooling the steam generators and loosing pressurizer level, the investigation determined that greater feed to the steam generators would have been beneficial, while the pressurizer level was well under control with one charging pump. However, the pressurizer level should not have been allowed to get as low as it was.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
Millstone Nuclear Power Station Unit 3	05000423	95	- 022 -	00	05 OF 07

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

An investigation was conducted to establish the cause for the 3MSS*PV20C failure to stroke close on demand. The main steam atmospheric dump valves were partially open (10 to 15-percent). In the range of 0 to approximately 20-percent open, the limit switch does not disengage to indicate that the valve is partially open. This is a limitation of the current limit switch design. Therefore, because the valve demand was only 15-percent open, the operator did not have positive indication that the valve was partially opened or closed. Operators are aware that the 3MSS*PV20A-D valves do not indicate open until some amount of valve travel has occurred. According to electrical maintenance personnel, the best adjustable limit switch setting is 12-percent of the full closed/open position and can be as high as 20-percent of the full closed/open position. The limit switch for 3MSS*PV20C was set at approximately 20-percent. Therefore, the limit switches do not provide an accurate position indication when a valve is stroked partially open such as, in this case, 15-percent open. It was not known by the operators that these valves could be up to 20-percent open and not indicate open. As there is no direct feedback between the actual valve position and the controller, and the main board annunciator did not indicate that the valve was partly open, the only way to determine the valve position was to watch the effect of the valves' operation. This was the effect of the valve being open on steam generator level, as was observed. The characteristic of the valve limit switches that they do not actuate until 20-percent open was not a significant contributor to this event. Although, if the limit switches were capable of showing the valve open at 5 to 10-percent, or less, the stuck valve may have been identified sooner and the event may not have occurred.

The design of the main steam atmospheric dump valves is a cage type globe valve with piston rings for piston sealing. The condenser steam dump valves are of the same design and problems have been experienced with the condenser valve piston rings in the past. A previous NNECO evaluation had been performed on the inoperability of the condenser steam dump valves and their subsequent impact on the plant startup following the summer 1995 refueling outage. The condenser steam dump valve piston rings were replaced following the summer 1995 refueling outage, but the atmospheric dump valve piston rings did not need to be replaced at that time as there had been successful operation and testing that showed they were distinctly different from the condenser valves, and because they could be isolated at power if necessary. Subsequent valve testing performed by the vendor on December 21, 1995 showed that the rings had no effect on the operability of the valve. Therefore, the metal piston rings are not believed to have caused the valve to bind. The atmospheric dump valve piston rings are planned to be replaced during the next cold shutdown with metal rings having better tolerances for valve operation. The rings currently installed in the main steam atmospheric dump valves are considered acceptable because of smooth valve operation, no degradation of the valve closing time during the valve surveillances, and valve testing by the vendor, Fisher Controls.

A review of the surveillance testing was performed for 3MSS*PV20A-D. The valve closing times for each valve have been fairly consistent since the summer 1995 refueling outage. The 'C' valve closing time was between 23-25 seconds, the 'A' valve between 23-26 seconds, the 'B' valve between 23-30 seconds, and the 'D' valve between 24-31 seconds. Therefore, based on surveillance testing, no evidence of degradation is present.

Fisher Controls prepared a report on the Atmospheric Relief Valve performance based on testing performed on the valves following the summer 1995 refueling outage. The report was reviewed to identify any differences between the 'C' valve and the other three which operated as expected. The available seat load of the valve is of significant importance since it is used to overcome friction loads that are generated when the valve is at pressure, as was the case when the valve failed to close. Significant frictional loads are generated between the piston rings and the cage. These loads oppose valve movement and require that sufficient force be available to overcome them. For valve opening actuation, air pressure provides the motive force, and for the closing actuation, spring force does. Failure of a valve to close can be attributed to insufficient force margin between spring and frictional loads. The 'C' valve was determined to have a seat load of approximately 4000 lbs. This compares favorably to the seat loads for the 'A', 'B', and 'D' valves which were 3727 lbs, 3042 lbs, and 3761 lbs, respectively. Therefore, there was no significant difference between the seat forces on the four valves.

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

The Operational Surveillance testing performed on the valves in the past would not have identified the valve's inability to close from a partially open position because the valves, during surveillance testing, are stroked to and from the full open position. When the valves are opened to the full open position, the spring is compressed resulting in a larger available force to overcome static frictional forces. Once the valve starts to move, frictional forces are lower as dynamic friction is significantly smaller than static friction. However, when starting from a partially open position, the valve spring has a decreased actuating force available to overcome static frictional forces.

To address the concern of the spring load at partial strokes, a diagnostic valve test was performed by Fisher Controls on December 21, 1995. 3MSS*PV20C was stroked fully open, fully closed, and from approximately 15-percent open to fully closed. The tests were performed with the valve at normal operating temperature with no pressure. The results of the testing showed the valve stroked normally with no signs of galling or valve problems. The testing also showed that the seat load was approximately 4000 lbs which is the highest of the four atmospheric dump valves. Fisher Controls has concluded based upon the test results that the valve is operable and operating normally. However, NNECO is considering 3MSS*PV20C to be inoperable pending the additional corrective action that is described below.

A review of historical adverse conditions (ACRs), plant incidents (PIRs), and maintenance work (AWOs) was conducted to determine any patterns of conditions that may have caused or contributed to this event. The results show a pattern of limit switches becoming loosened over time. A secondary equipment failure identified during the investigation but not contributing to this event was that the limit switch arm for 3MSS*PV20C was loose which may have provided erratic indication if the valve was open less than 20-percent. The physical construction of the limit switch mounting does not allow the limit switch arm to interfere with valve operation. Therefore, the possibility of the limit switch preventing the valve from closing was eliminated.

I&C checked the valve control loop to determine if the valve control resulted in the valve remaining open. It was determined that the instrument loop operated properly.

A review of past maintenance history of the atmospheric dump valves was performed and no history of the valves sticking was found.

A review was performed to determine whether foreign materials could have entered the main steam piping when breaking the vacuum on the steam generators. The main steam pressure relief bypass valves, 3MSS*MOV74A, B, and D were cycled to break the vacuum in their associated steam generators. 3MSS*MOV74C was not cycled. Therefore, foreign materials did not enter the 'C' main steam piping.

Therefore, the analysis of this event concludes that the cause of the valve not closing from the 15-percent open position is indeterminate. The valve is considered inoperable and will remain closed pending the additional corrective action that is described below.

IV. Corrective Action

The failed main steam atmospheric dump valve (3MSS*PV20C) was declared inoperable because of its failure to close from a partially open position. The valve shall remain inoperable and in the closed position until corrective action is completed and the valve can be returned to an operable status. Disabling the valve in the closed position does not effect the accident analysis because the main steam safety valves provide the safety related heat removal capability. For safety grade cold shutdown purposes, the main steam atmospheric dump valves are not used to release steam. The remaining main steam atmospheric dump valves (3MSS*PV20A, B, D) are operable because of surveillance testing, valve diagnostic testing by Fisher Controls, and successful valve operation.

The following corrective actions, and actions to prevent a recurrence will be taken:

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6) YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	PAGE (3)
Millstone Nuclear Power Station Unit 3	05000423	95	— 022 —	00	07 OF 07

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

- New piston rings for the atmospheric dump valves will be installed during the next cold shutdown. While the presently installed piston rings are not believed to be a contributor to this event, based upon valve diagnostic testing, it is prudent to replace the rings as planned to enhance the current design.

- Operations personnel will be trained in this event: stressing the importance of verifying that completed actions result in the proper plant response; emphasizing the importance of aggressive action in response to low steam generator levels; and making clear that the limit switches do not actuate to an intermediate position until the valve is approximately 12 to 20-percent open.

The following corrective actions are being considered to restore 3MSS*PV20C to an operable condition and to prevent a recurrence of the event:

- In the short term, develop an inservice test to perform a partial stroke test of the valve. The test would be performed at main steam operating pressure and temperature during a plant cooldown or heatup. The results of this test may determine if the valve can be returned to operable status.

- Investigate the possibility of providing a better design for the valve position indication.

- Investigate the possibility of developing a surveillance test for partial valve strokes at main steam pressure and temperature.

The success of these actions, alone or in combination, is expected to enable NNECO to determine when the main steam atmospheric dump valve 3MSS*PV20C can be restored to an operable status.

V. Additional Information

A similar event involving valve position indication, causing a steam generator low-low level trip was previously reported in LER 86-041-00. That LER describes a reactor trip on low-low steam generator level that occurred on July 24, 1986. The event was caused by drifting feedwater bypass valve limit switches, which resulted in full closed indications on the four valves, when in fact, the valves were 10 to 40-percent open. The unexpected feed flow resulted in a steam generator overfill, followed by a feedwater isolation, which caused a low-low steam generator level trip of the reactor. As corrective action the limit switches were adjusted and the positioners recalibrated. As action to prevent recurrence, the positioners were replaced with more reliable positioners.

EIIS Codes

Systems

Auxiliary Feedwater System - BA

Engineered Safety Features Actuation System - JE

Components

Relief Valve - RV