

EXPIRES 04/30/98

### LICENSEE EVENT REPORT (LER)

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

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS MANDATORY INFORMATION COLLECTION REQUEST: 50.0 HRS. REPORTED LESSONS LEARNED ARE INCORPORATED INTO THE LICENSING PROCESS AND FED BACK TO INDUSTRY. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (T-8 F33), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555-0001, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

Millstone Nuclear Power Station Unit 2

DOCKET NUMBER (2)

05000336

PAGE (3)

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TITLE (4)

Automatic Test Initiator Sends Repeated Trip Signals to the RSST Feeder Breaker Timing Circuit

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
04	22	97	97	-- 019	-- 00	05	22	97	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9)	POWER LEVEL (10)	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11)			
		20.2201(b)	20.2203(a)(2)(v)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)
N	000	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)	50.73(a)(2)(iv)	OTHER
		20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below of 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)
R. G. Joshi, MP2 Nuclear Licensing	(860) 440-2080

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)

YES (If yes, complete EXPECTED SUBMISSION DATE).	X NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On April 22, 1997, a review of a Reserve Station Service Transformer (RSST) Load Shed Time delay retest revealed that the load shed time delay would not meet a six to ten second window to comply with Technical Specification requirement Table 3.3-4, item 8b.

The cause of this condition is an unexpected interaction between unrelated signals in the upgraded RSST Load Shed Timer and the Automatic Testing Insertor circuitry.

Noise interaction will be isolated and corrected prior to entering Mode 4 from the current outage.

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

I. Description of Event

On April 22, 1997, a review of a Reserve Station Service Transformer (RSST) [EA] Load Shed Time delay retest revealed that the load shed time delay would not meet a six to ten second window to comply with Technical Specification requirement Table 3.3-4, item 8b. At the time of discovery of this condition, the unit was defueled.

On November 20, 1996, Instrument and Control Technicians were performing a routine, refueling outage frequency, calibration and functional test on the RSST Level Two Undervoltage circuitry in the Engineered Safety Features Actuation System (ESFAS) [JE] cabinets. The technicians involved were measuring the duration of the Load Shed time delay contained in the Sequencer module. The technicians noted that after the expected 8 second time delay had elapsed, the control relay energized, and then unexpectedly de-energized. The Level Two Undervoltage condition was still present when this occurred, and the relay should have remained energized. After a brief period, the control relay re-energized and then de-energized. This cycling continued as long as the Level Two Undervoltage signal was present.

This condition is inherent to the new sequencers installed in 1992. These sequencers use lower voltage electronic device to develop the timing. This lower voltage design has been a major factor in the ESFAS susceptibility to noise in the past. The load shed circuitry used prior to 1992 had a mechanical agastat timer that was less accurate but not as susceptible to noise.

This problem was discovered during performance of a refueling frequency surveillance procedure which tested the RSST Load Shed time delay. This procedure was recently revised to include a more thorough testing methodology. The time delay is now measured by a digital counter. The new procedure incorporates a test equipment setup that causes an increase in the time it takes to verify readings. Because of the increased time, the test button is held depressed for at least one complete cycle of the Automatic Testing Insertor (ATI) ( 27 sec.) almost assuring a timer reset will occur. The previous procedure simply used a stop watch and the audible sound of a relay picking up 8 seconds after a trip test button was depressed. Once the relay picked up the trip button was released. This did not allow for a complete cycle of the ATI, which greatly reduces the chance of a timer reset. This explains why this reset problem was not noticed before.

A retest of the RSST Undervoltage circuitry in the ESFAS cabinet was performed on April 22, 1997 which verified that the ATI sends repeated signal to the RSST Load Shed undervoltage timer to reset. The ESFAS Undervoltage time delay does not satisfy the requirements of Technical Specification LCO 3.3.2.1 that requires ESFAS instrumentation channels and bypasses shown in Table 3.3-3 to be OPERABLE with their trip setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-4.

This condition is being reported in accordance with 10 CFR 50.73(a)(2)(i)(B), any operation prohibited by the plant's Technical Specifications.

II. Cause of Event

The cause of this condition is an unexpected interaction between unrelated signals in the upgraded RSST Load Shed Timer and the Automatic Testing Insertor (ATI) circuitry.

III. Analysis of Event

The ESFAS detects accident conditions and initiates safety features systems. The system functions are implemented by means of redundant sensors, instrument loops, logic and actuation devices. The system is designed to permit ATI testing through to the actuation module outputs during power operation. The system is

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capable of being manually tested from bistable inputs through to the actuation module outputs. The system has an automatic testing system (ATI) which continuously validates operation of all two of four trip combinations, every 27 seconds.

A degraded voltage on the 4.16 kV emergency bus is detected through the potential transformers by the ESFAS low voltage Bistable Modules. The Bistable Module supplies an output to Isolation Module which in turn feeds the 2 out of 4 logic in the Actuation Module. The output of the Actuation Module is applied through an 8 second time delay that will trip the RSST breakers. If power is being supplied from the RSST, load shedding and sequencing are required for sequential loading of the diesel generators.

The condition in question appears to be related to electronic noise (EMI/RFI) that is generated by the ATI test signals. There is not a direct circuit connection between the ATI circuitry and the load shed timer circuitry. The noise event causes the 8 second RSST load shed timer to reset, and be re-triggered by the degraded voltage condition caused by the test. The cycle time for one ATI test is approximately 27 seconds, during which the Sequencer module is tested once. The initial timing of this interaction is random, as the ATI test and the Undervoltage test procedure are not synchronized. The 8 second timer may elapse normally, or be reset at any time during its eight second cycle. This could result in an additional RSST load shed time delay of between 0 and 8 seconds, with a total delay as high as 16 seconds. The allowable total value for the delay, per Technical Specification Table 3.3-4, item 8b, is 10 seconds. The interaction between the ATI and the RSST Load Shed circuitry is an unexpected condition.

The effects of the additional 8 second time delay are still being evaluated, and if necessary, a supplement to this LER will be submitted. Since the effects of 8 second time delay have not been fully evaluated, this condition is potentially safety significant.

#### IV. Corrective Action

Noise interaction will be isolated and corrected prior to entering Mode 4 from the current outage.

#### V. Additional Information

##### Similar Events

Previous LERs that involve an interaction between ESFAS components and LNP circuitry include:

- LER 92-012: A LNP occurred when an Operator secured power to the second of four ESAS sensor cabinets during the replacement of inverter. This satisfied the 2 out of 4 logic needed for ESAS actuation. This action isolated Vital AC Bus and generated a load shed signal. The EDG started and closed in on the vital bus, but was not able to provide power to the loads placed by the EDG sequencer.
- LER 88-005: A LNP occurred when a Operator was placing a breaker in its test configuration, inadvertently causing the auxiliary contact to be made up. Upon the loss of power to the vital bus the EDG started but did not sequence loads as expected due to a failed sequencer.
- LER 88-002: An undervoltage condition was caused when a DC/AC inverter, which was supplying power to 120 VAC instrument panel VA-10, tripped off due to a DC capacitor failure. This condition resulted in a loss of power to a vital bus and subsequent automatic start of a diesel generator.

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