

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) Oconee Nuclear Station, Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 2 6 1 9	PAGE (3) 1 OF 04
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TITLE (4)  
Unit 1 Reactor Trip on Loss of Main Feedwater

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 NAMES		DOCKET NUMBER(S)
1	2	03	8	4	007	0	1	02			0 5 0 0 0
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THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

OPERATING MODE (9)	20.402(b)	20.402(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)
	20.406(a)(1)(i)	50.38(c)(1)	<input type="checkbox"/>	50.73(a)(2)(v)	73.71(e)
	20.406(a)(1)(ii)	50.38(c)(2)	<input type="checkbox"/>	50.73(a)(2)(vii)	<input checked="" type="checkbox"/> OTHER (Specify in Abstract below and in Text, NRC Form 386A)
	20.406(a)(1)(iii)	50.73(a)(2)(ii)	<input type="checkbox"/>	50.73(a)(2)(viii)(A)	
	20.406(a)(1)(iv)	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(viii)(B)	
	20.406(a)(1)(v)	50.73(a)(2)(iii)	<input type="checkbox"/>	50.73(a)(2)(ix)	

POWER LEVEL (10) 15 17

50.72(b)(2)(ii)

LICENSEE CONTACT FOR THIS LER (12)

NAME Richard F. Haynes, Licensing	TELEPHONE NUMBER 7 0 4 3 7 3 - 7 1 2 9
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COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS
X	SIL	PI	DIO	Y					

SUPPLEMENTAL REPORT EXPECTED (14)

YES (If yes, complete EXPECTED SUBMISSION DATE)  NO

EXPECTED SUBMISSION DATE (15)

MONTH	DAY	YEAR

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

On December 3, 1984 at 2206 hours, the Unit 1 reactor experienced an anticipatory trip from 57% of full power. The trip occurred when the 1B Main Feedwater Pump Turbine (MFWPT) Auxiliary Oil Pump (AOP) was switched off and the corresponding Shaft-driven Oil Pump (SOP) failed to supply the required oil pressure as it should have when the AOP was secured. The resulting low oil pressure indication caused a trip of the 1B MFWPT. Since the 1A MFWPT was out of service for maintenance, the loss of the 1B MFWPT caused an anticipatory trip signal to be generated for the Unit 1 reactor, based on loss of both Main Feedwater Pumps (MFWPs).

The unit was brought to a hot shutdown condition. The AOP was subsequently restarted allowing the 1B MFWPT (and therefore the 1B MFWP) to be restarted. Unit 1 was back on line by 0901 hours on December 4, 1984. The cause of the failure of the 1B SOP to supply the necessary oil pressure is currently unknown.

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		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		

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

Description of Occurrence:

On December 3, 1984, with Unit 1 at 57% of full power, the 1A MFWPT was out of service for maintenance and the 1B MFWPT was operating at approximately 4100 RPM. The operators elected to secure the auxiliary oil pump. This decision was supported by procedure and by operating experience.

When the AOP was removed from service, the SOP failed to provide the expected level of oil pressure. The low oil pressure indication should have caused the AOP to restart since the control switch was left in the "AUTO" position. Restart of the AOP did not occur, however, and the 1B MFWPT tripped on low oil pressure. With the 1A MFWPT not running, the loss of the 1B MFWPT generated a signal which initiated an anticipatory reactor trip on loss of both MFWPTs.

During the ensuing transient, the emergency feedwater (EFW) level control system did not properly maintain the Once Through Steam Generator (OTSG) level at the desired 25 inch level, instead allowing level to increase to a maximum of 50 inches. This situation required the operators to remove the EFW control valves (1FDW-315 and 1FDW-316) from the automatic mode and manually return OTSG level to 25 inches.

During the trip recovery phase, the main steam relief valves (MSTVs) #2 and #10 did not reseal properly after lifting. MSRVs #2 and #10 are corresponding valves (lift setpoint of 1065+1% psig) on the two main steam lines between the OTSGs and the turbine. A manual reduction in main steam pressure was necessary to reseal the valves. Also, MSRV #4 relifted on increasing main steam pressure, following the resealing of MSRVs #2 and #10. Main steam pressure was reduced somewhat, once again, and MSRV #4 resealed properly.

Secondary side pressure was increased to near normal and the Unit 1 reactor stabilized at hot shutdown. The trip recovery continued in a normal fashion. The AOP was put back into operation, allowing the 1B MFWPT to be restarted. At 0901, Unit 1 was back on line.

Cause of Occurrence:

It is currently unknown why the SOP failed to provide adequate oil pressure to the turbine. Since the SOP is internal to the MFWPT, its inspection requires disassembly of the turbine. There exists a recent history of problems encountered with these pumps on Units 2 and 3. Some modifications have been incorporated into the SOPs in the past, in order to increase their output at slower turbine speeds, thereby compensating for low discharge oil pressure.

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

The reason for the failure of the EFW level control system to properly maintain OTSG level during the transient is currently unknown. Periodic testing of these valves ensures that they do open on demand. Investigation into the problem during this event is continuing.

The MSRV behavior observed in this event has also been observed in several previous trips. The cause of the delayed reseating is not fully known at this time but is under continuing evaluation. Possible contributors to this behavior are uncertainties in lift setpoint (lifting at low pressures) and blowdown setpoint settings, and the proximity of the reclose pressure and the post-trip turbine header pressure control setpoint. This behavior is being monitored and evaluated to identify needed corrective action. Improved MSRV lift setpoint adjustment procedures were recently implemented. Their effect on MSRV performance will be evaluated.

Analysis of Occurrence:

Initial reactor power prior to the trip was 57% of full power, and the unit was operating with all four reactor coolant pumps running. One MFWP and one makeup pump were operating, and the Integrated Control System (ICS) was in fully automatic mode.

The minimum pressurizer level, following the reactor trip, was approximately 90 inches, and the minimum Reactor Coolant System (RCS) pressure was approximately 1875 psig. The second makeup pump automatically started on low reactor coolant pump seal injection flow, injecting through the normal makeup (cooled) nozzles. The maximum pressurizer level, occurring shortly after the trip, was approximately 150 inches. The RCS pressure was subsequently controlled between 2100 and 2150 psig; the maximum RCS pressure during the event was 2150 psig. No actuation of the pressurizer code safety relief valves, or PORV, occurred during the course of this event.

The minimum primary coolant temperature during this transient was approximately 538°F, which indicates a slight overcooling resulting from the steam generator pressure response. The primary coolant temperature was later stabilized near 545°F.

The controlling variable in this event was the steam generator pressure. OTSG pressure peaked at about 1050 psig, as expected, immediately following the turbine trip. Pressure was later lowered to near 850 psig to ensure reseating of the MSRVs.

The emergency feedwater (EFW) was automatically initiated upon loss of the one operating MFWP. The minimum level in both OTSGs was a few inches below the control system setpoint of 25 inches, within normal response.

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TEXT (If more space is required, use additional NRC Form 365A's) (17)

The automatic OTSG level control system then allowed levels in both OTSGs to increase to approximately 50 inches, which is higher than expected. This was a contributing factor, together with the effect of the OTSG pressure, to the slight overcooling of the primary system. The operators appropriately transferred the OTSG level control to the manual mode and reduced the level in both OTSGs to the 25 inches setpoint.

No safety systems, other than EFW, were actuated during this event. Both motor-driven emergency feedwater pumps and the Unit 1 emergency feedwater turbine-driven pump actuated properly. The health and safety of the public were therefore not affected by this incident.

Corrective Action:

The immediate corrective action consisted of stabilizing the unit at hot shutdown. This action included manually controlling the OTSG level so as to maintain pressurizer level and limit cooldown, and reducing main steam pressure in order to reseal MSRVs #2 and #10. The subsequent corrective action included restarting AOP and the 1B MFWP, and the bringing of the unit back on line.

Several maintenance-related corrective action items are planned:

1. Determine reason for AOP not restarting and maintaining 1B MFWPT oil pressure upon failure of SOP, and correct as necessary;
2. Determine reason for SOP not functioning properly, and correct as necessary;
3. Perform functional test of auxiliary level control system during next Unit 1 refueling outage, evaluate results and repair as necessary to improve response;
4. Determine method for establishing operability of SOP prior to tripping AOP;
5. Disassemble, repair, and recalibrate MSRVs #2 and #10 during next Unit 1 refueling outage;
6. Evaluate need to repair MSRv #4, and take necessary action; and
7. Inspect AOP on 2A MFWPT during next Unit 2 refueling outage and evaluate effects of long-term use of this pump (based on this evaluation, will take appropriate action with regard to Unit 1 1B MFWPT AOP).

The behavior of MSRVs #2 and #10 is being monitored and evaluated to identify needed corrective action. Improved MSRv lift setpoint adjustment procedures were recently implemented. Their effect on MSRv performance will be evaluated.

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January 2, 1985

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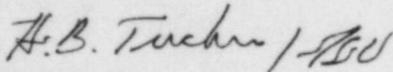
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Washington, D. C. 20555

Subject: Oconee Nuclear Station, Unit 1  
Docket No. 50-269  
LER 269/84-07

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a) (1) and (d), attached is Licensee Event Report 269/84-07 concerning an incident in which the Oconee 1 Reactor tripped upon the loss of the Main Feedwater Pumps; the report is submitted in accordance with §50.73 (a)(2)(iv) and §50.72 (b)(2)(ii). This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,



Hal B. Tucker

RFH:slb

Attachment

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