

EXPIRES 04/30/99

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-6 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 3		DOCKET NUMBER (2) 05000423	PAGE (3) 1 OF 4
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TITLE (4)
Failure of Both Reactor Plant Aerated Drains Safety-Related Air Driven Sump Pumps During a Technical Requirements Manual Surveillance

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
05	16	99	99	-- 006 --	00	06	15	99	FACILITY NAME	DOCKET NUMBER

OPERATING MODE (9) 6	THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR 5: (Check one or more) (11)									
POWER LEVEL (10) 000	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)	X 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 Voluntary						
	20.2203(a)(2)(iii)	50.36(c)(1)	50.73(a)(2)(v)	Specify in Abstract below 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 David W. Dodson, Supervisor, Unit 3 Regulatory Compliance	TELEPHONE NUMBER (Include Area Code) (860) 447-1791, ext. 2346
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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 May 16, 1999, with the Unit in Mode 6, the Reactor Plant Aerated Drains (DAS) air driven sump pumps, 3DAS*P15A and *P15B, located in the Engineering Safeguards Building Features Containment Recirculation Cubicle Sumps, failed to pump water during the performance of a Technical Requirements Manual Surveillance. On May 20, 1999, pumps 3DAS*P15A and *P15B were declared inoperable when they were still unable to pump water after a revision was made to the surveillance to increase the air pressure to the pumps. This condition was reported per 10CFR50.72(b)(2)(i) on May 20, 1999 at 10:23.

The root cause of the equipment failure was determined to be an inadequate preventive maintenance program design in that the vendor technical manual and qualification testing requirements were not adequately incorporated during the procurement nor design change processes for pumps 3DAS*P15A and *P15B. Additionally, the root cause evaluation concluded that for both pumps the Hylum blades in the sump pump air motor became affixed to the inner liner of the air motor housing following design change testing on June 29, 1998 and before the initial preventive maintenance was performed on September 29, 1998.

This condition is reportable pursuant to 10 CFR 50.73(a)(2)(ii)(B) as any event or condition that resulted in the nuclear plant being in a condition that was outside the design basis of the plant.

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

I. Description of Event

On May 16, 1999 at 17:30, the Reactor Plant Aerated Drains air driven sump pumps, 3DAS*P15A and *P15B, in the Engineering Safeguards Features Building Containment Recirculation Cubicle Sumps (3DAS*SUMP7A/B), failed to pump water during the performance of Technical Requirements Manual Surveillance Procedure (SP 3635B.2). The air driven sump pumps had last demonstrated their ability to pump water during design change testing on June 29, 1998 (SPROC EN98-3-2).

On May 17, 1999, engineering investigators observed a second attempt to pump water in accordance with SP 3635B.2. The engineering investigators believed it likely that the air driven sump pumps were oil bound based upon observed conditions and discussions with operators and design engineering personnel. The engineering investigators believed the specified method for periodic lubrication could cause the sump pump air motor to collect approximately one ounce of oil every month and eventually became oil bound.

This initial assumption of oil binding of the pumps was reinforced on 5/17/98, when sump pump 3DAS*P15B was removed for delivery to a vendor for tear down and evaluation of the as found conditions. During removal of the sump pump, maintenance personnel identified that the air motor was found to be full of oil. Pump 3DAS*P15A remained installed and further testing was performed in an attempt to restore the pump to service. This approach was adopted to ensure identification and full assessment of all potential failure mechanisms of the sump pump.

On May 19, 1999, SP 3635B.2, Rev. 0, Change OT2 (one time change), was issued for the purpose of removing the residual oil believed to be collected in the air motor of pump 3DAS*P15A. Engineering investigators believed that by clearing the oil, the sump pump's functionality would be restored. Using the one-time procedure change to SP 3635B.2, the compressed air supply pressure was increased in 5 psig increments from 80 psig to 100 psig. The procedure was performed until May 20, 1999 and successfully discharged a quantity of oil from the air motor of 3DAS*P15A. However, no water was discharged from the Containment Recirculation Cubicle Sumps into a test tank. On May 20, 1999, at 10:23, the Shift Manager declared sump pumps 3DAS*P15A and *P15B to be inoperable.

This condition was determined to be reportable pursuant to 10CFR50.72(b)(2)(i) and 10 CFR 50.73(a)(2)(ii)(B) as any event or condition that resulted in the nuclear plant being in a condition that was outside the design basis of the plant.

II. Cause of Event

The root cause of the equipment failure was determined to be an inadequate preventive maintenance program design in that the vendor technical manual and qualification testing requirements were not adequately incorporated during the procurement nor design change processes for pumps 3DAS*P15A and *P15B. Although the vendor technical manual and the qualification testing report contained adequate recommendations for equipment preventive maintenance, the implementation of the vendor recommended preventive maintenance program was inadequate and was not performed in a timely manner, including:

- Vendor tested pumps were shipped to Millstone Nuclear Power Station which were not oiled in accordance with manufacturers recommendations.
- Vendor technical manual requirements were inadequately incorporated into the design change test procedure.
- Written communications were inadequate for the development of the preventive maintenance procedures.

The investigation of this condition identified additional contributing factors including inadequate initial design, ineffective corrective actions and inadequate organizational and programmatic support. These factors are described in the root cause investigation associated with this event.

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III. Analysis of Event

It was identified during the Millstone Unit 3 50.54(f) extended outage, that the containment basemat rubber membrane was breached and the existing non-safety-related sump system could not be credited with removing the groundwater accumulation following a Design Basis Accident (LOCA with Loss of Offsite Power). Thus, groundwater in-leakage could accumulate in each of the Containment Recirculation Cubicle Sumps which are connected to the drain lines under the containment basemat. If the sumps are not pumped out, the groundwater could eventually affect the containment liner structure / qualification and both trains of the Containment Recirculation Spray System. Therefore, to preclude events which are outside of the license basis and design basis, a design change was required to allow for the removal of groundwater. Under these conditions, the two air driven sump pumps, 3DAS*P15A and *P15B, are designed to support the removal of the groundwater seepage from within the Containment Recirculation Cubicle Sumps.

During an NRC review of the initial design modification in June 1998, a series of questions were raised. One of the questions regarded the assessment of vendor recommendations for performing oiling of the air motors during preventive maintenance and lay-up. The assessment and evaluation of this question failed to recognize that initial lay-up activities, as described in the vendor technical manual, were not performed by a vendor prior to shipment of the pumps to Millstone Nuclear Power Station, and were subsequently missed during the preparation and implementation of the design change test procedure. Although these investigations and the revision to the design change package which installed the pumps were performed, they were ineffective in preventing this event.

Due to the fact that the preventive maintenance oiling had not been performed following pump operational testing, the timing of the initial preventive maintenance was of critical importance. Although an assignment had been created to establish a repetitive preventive maintenance activity, departmental ownership to develop this procedure was lacking. Responsibility for the assignment was transferred between departments twice, adding to the delay of preventive maintenance performance. The delay in performing sump pump preventive maintenance was a major contributor to the occurrence of this condition. Specifically, the root cause evaluation concluded that for both pumps the Hylum blades in the sump pump air motor became affixed to the inner liner of the air motor housing following design change testing on June 29, 1998 and before the initial preventive maintenance was performance on September 29, 1998.

This condition is safety significant in the context of traditional deterministic analysis methodologies. Failure of both safety related sump pumps during a postulated Design Basis Accident (DBA) scenario (LOCA with Loss of Offsite Power) could potentially result in both trains of Containment Recirculation Spray System cooling being rendered inoperable with the consequential loss of long term core cooling. Northeast Nuclear Energy Company notes however that the outcomes predicted for DBA scenarios are based on conservative assumptions established for the purpose of defining bounding design parameters. A risk informed review of this event indicates that the DBA scenario outcome is unlikely because substantial time would be available (estimated to be 138 days based on an average ground water in-leakage of 617 gallons per day) for operator action prior to the loss of both Containment Recirculation Spray System trains. At the time the failure is detected, Engineering and Operations resources would be directed towards developing alternative means of removing groundwater from the Containment Recirculation Cubicle Sumps. Additionally, the non-safety related pumps may be available for groundwater removal following restoration of offsite power.

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At the time of this event, the reactor plant was shutdown and cooled down for Refueling Outage 06. In addition, the non-safety related sump pumps remained functional for removal of groundwater from the Containment Recirculation Cubicle Sumps so that no adverse hydrostatic forces would have affected the containment liner. There were no other tangible effects resulting from this event. Specifically, there was no personnel injury, radiation exposure, or offsite radiological release related to this event.

IV. Corrective Action

The following corrective actions will be performed:

1. Pumps 3DAS*P15A and 15B will be operable prior to Mode 4.
2. Surveillance Procedure SP 3635B.2 will be conducted monthly ($\pm 25\%$) on the air driven sump pumps 3DAS*P15A and *P15B beginning with the next performance of SP 3635B.2 currently scheduled for June 1999 and continuing until Refueling Outage 7.
3. The air driven sump pumps 3DAS*P15A and *P15B will be replaced with electric sump pumps prior to startup from Refueling Outage 7.

Other corrective actions associated with this event are identified and addressed in the Millstone Unit No. 3 Corrective Actions Program.

V. Additional Information

None

Similar Events

LER 97-046-00 Containment Recirculation Spray System Cubical Flood Protection

LER 98-036-00 Engineering Safety Features Building Sump Pump Design Deficiencies

Manufacturer Data

EIIS Codes Systems:

Equipment and Plant Drain System.....WK

EIIS Codes Components:

Pump.....P