



PECO NUCLEAR

A Unit of PECO Energy

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10CFR50.73

March 3, 2000
Docket No. 50-353
License No. NPF-85

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

SUBJECT: Licensee Event Report
Limerick Generating Station (LGS) - Unit 2

This LER addresses the unavailability of both trains of the Automatic Depressurization System (ADS) long term nitrogen gas supply due to two mispositioned manual valves. The ADS long term cooling support function was inoperable for a period of nine months.

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| Reference: | Docket No. 50-353 |
| Report Number: | 2-00-002 |
| Revision Number: | 00 |
| Event Date: | May 22, 1999 |
| Discovered Date: | February 2, 2000 |
| Report Date: | March 3, 2000 |
| Facility: | Limerick Generating Station P.O. Box 2300, Sanatoga, PA. 19464-2300 |

This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(ii), 10CFR50.73(a)(2)(v) and 10CFR50.73(a)(2)(vii).

Very truly yours,

cc: H. J. Miller, Administrator Region I, USNRC
A. L. Burritt, USNRC Senior Resident Inspector, LGS

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| NRC FORM 366 U.S. NUCLEAR REGULATORY COMMISSION (6-1998) | APPROVED BY OMB NO. 3150-0104 EXPIRES 06/30/2001 Estimated burden per response to comply with this mandatory information collection request: 50 hrs. Reported lessons learned are incorporated into the licensing process and fed back to industry. Forward comments regarding burden estimate to the 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. If an 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) | |

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|-----------------------------------------------------------------|--------------------------------------|---------------------------|
| FACILITY NAME (1) Limerick Generating Station, Unit 2 | DOCKET NUMBER (2) 05000353 | PAGE (3) 1 OF 4 |
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TITLE (4)
 Automatic Depressurization System (ADS) long term gas supply valve mispositioning

| 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 |
| 02 | 02 | 2000 | 2000 | -- 002 | -- 00 | 03 | 03 | 2000 | FACILITY NAME | DOCKET NUMBER |
| | | | | | | | | | | 05000 |
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|---------------------------|-----|----------------------------------------------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------|-----------------------------------------------|--|--|--|--|--|
| OPERATING MODE (9) | 1 | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more) (11) | | | | | | | | |
| | | <input type="checkbox"/> 20.2201(b) | <input type="checkbox"/> 20.2203(a)(2)(v) | <input type="checkbox"/> 50.73(a)(2)(i) | <input type="checkbox"/> 50.73(a)(2)(viii) | | | | | |
| POWER LEVEL (10) | 100 | <input type="checkbox"/> 20.2203(a)(1) | <input type="checkbox"/> 20.2203(a)(3)(i) | <input checked="" type="checkbox"/> 50.73(a)(2)(ii) | <input type="checkbox"/> 50.73(a)(2)(x) | | | | | |
| | | <input type="checkbox"/> 20.2203(a)(2)(i) | <input type="checkbox"/> 20.2203(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(iii) | <input type="checkbox"/> 73.71 | | | | | |
| | | <input type="checkbox"/> 20.2203(a)(2)(ii) | <input type="checkbox"/> 20.2203(a)(4) | <input type="checkbox"/> 50.73(a)(2)(iv) | <input type="checkbox"/> OTHER | | | | | |
| | | <input type="checkbox"/> 20.2203(a)(2)(iii) | <input checked="" type="checkbox"/> 50.36(c)(1) | <input checked="" type="checkbox"/> 50.73(a)(2)(v) | Specify in Abstract below or in NRC Form 366A | | | | | |
| | | <input type="checkbox"/> 20.2203(a)(2)(iv) | <input checked="" type="checkbox"/> 50.36(c)(2) | <input checked="" type="checkbox"/> 50.73(a)(2)(vii) | | | | | | |

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| LICENSEE CONTACT FOR THIS LER (12) | |
| NAME K. P. Bersticker, Manager - Experience Assessment | TELEPHONE NUMBER (Include Area Code) (610) 718-3400 |

| 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 |
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| SUPPLEMENTAL REPORT EXPECTED (14) | | | | EXPECTED SUBMISSION DATE (15) | | |
| <input type="checkbox"/> YES | (If yes, complete EXPECTED SUBMISSION DATE). | | <input checked="" type="checkbox"/> NO | | | |
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ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines) (16)

On 02/02/00 at 21:05 hours, an Operations Supervisor discovered the manual shutoff valve on the 2A Automatic Depressurization System (ADS) long term gas supply was in the closed position. At 21:19 hours, the manual shutoff valve on the 2B ADS long term gas supply was determined to be in the closed position. At 21:25 hours, both valves were restored to the open position as required.

This condition resulted in both trains of the ADS long term gas supply being inoperable. ADS ECCS operability was not affected. The last known correct alignment of these valves was determined to be during the previous refueling outage (2R05) in May 1999.

This condition was discovered during performance of the ADS long term gas supply low pressure alarm calibration surveillance test (ST-2-059-400-2). A licensed operator's observation of loss of header pressure during this test led to the discovery of two valve mispositionings during the subsequent troubleshooting activity.

One similar event was reported in LER 1-99-004 regarding two occasions when one train of the ADS long term gas supply was removed from service to perform maintenance. Retraction of this prior LER will be evaluated due to the conclusions of this event investigation.

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TEXT CONTINUATION

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| Limerick Generating Station Unit 2 | 05000 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 2 OF |
| | -353 | 2000 | 002 | 00 | 4 |

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

Unit Conditions Prior to the Event

Unit 2 was in Operational Condition (OPCON) 1 (Power Operation) at 100% power level. There were no structures, systems, or components out of service which contributed to this event.

Description of the Event

On 02/02/00 at 16:30 hours, I&C personnel were performing a calibration surveillance test on the 2A ADS long term gas supply low pressure alarm (EIS:ALM) [ST-2-059-400-2, ECCS ADS Accumulator Backup Compressed Gas Low Pressure Calibration / Functional Test (PT-59-252A, PISL-59-252A, PSHL-59-253A)]. A loss of header pressure was observed following the automatic alignment to the emergency gas supply. The Main Control Room (MCR) operators declared ADS valves (EIS:RV) S, H & M inoperable and entered TS 3.5.1 action d.2 (ECCS - Operating, ADS).

At 20:41 hours, troubleshooting was initiated using plant procedures. At 21:05 hours, an Operations Shift Supervisor performed a walkdown of the 2A ADS long term gas supply train and discovered valve (EIS:V) 059-2139 closed. At 21:14 hours, valve 059-2139 was reopened. At 21:19 hours, the Operations Shift Supervisor performed a walkdown of the 2B ADS long term gas supply train and discovered valve 059-2121 closed. At 21:25 hours, valve 059-2121 was reopened. All ADS long term gas supply valves on Units 1 & 2 were verified to be correctly positioned at 21:45 hours. At 23:00 hours, Operations declared all ADS valves operable and exited the TS 3.5.1 action statement.

At 23:00 hours, Operations determined this event was reportable as a condition outside the plant design bases. At 23:50 hours, a one hour ENS NRC notification was performed per 10CFR50.72(b)(1)(ii)(B).

On 02/06/00 at 08:15 hours, an extent of condition investigation determined that valve 059-2007A (2A Instrument Gas Supply to the Drywell) was mispositioned in the closed position. This valve was reopened at 08:34 hours. The 2B Instrument Gas Supply to the Drywell provided operating gas to the auctioneered loads on the instrument gas headers inside the drywell during the period when the 2A gas header was isolated. The extent of condition investigation was then completed without discovery of any additional deficiencies. The Unit 1 extent of condition investigation consisted of a review of the last performed ILRT documentation. All documented "as left" valve positions were verified as being correctly restored.

The five (5) ADS valves are designed to function using an accumulator (EIS:ACC) installed at each valve for the first six (6) hours following an accident. The non-safety grade instrument gas system is assumed to be unavailable during an accident scenario. Additional methods of reactor pressure vessel (RPV) depressurization are directed by trip procedures if ADS fails. The ADS long term gas supply uses compressed nitrogen gas cylinders to supply gas for the following seven (7) days. An additional gas supply, provided by an external connection , supplies operating gas for a period of 100 days following an accident. The 6 hour gas supply supports the ADS function of RPV depressurization to allow low pressure ECCS injection. The 7 day and 100 day gas supplies both support the ADS long term cooling support function.

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ADS operates in conjunction with the Core Spray System to remove RPV decay heat in the Alternate Shutdown Cooling Mode. Residual Heat Removal (RHR) Suppression Pool Cooling supports Alternate Shutdown Cooling Mode by removing decay heat from primary containment. Alternate Shutdown Cooling mode is the long term decay heat removal method used in the LGS safety analysis. Normal RHR Shutdown Cooling is not single failure proof, therefore no credit is taken in the safety analysis. However, the normal RHR Shutdown Cooling mode was unaffected by the loss of the ADS long term gas supply.

TS 3.5.1 ECCS - Operating, requires five (5) operable ADS valves in Operational Conditions 1, 2 (with RPV > 100 psig), and 3 (with RPV > 100 psig). With two or more of the required ADS valves inoperable, the plant is required to be in HOT SHUTDOWN within 12 hours and reduce reactor steam dome pressure to less than 100 psig within the next 24 hours.

It has been determined that the ADS long term gas supply is not required to support ADS ECCS operability. ADS ECCS operability relies on maintaining fully charged ADS valve accumulators. This permits ADS to function for 6 hours and depressurize the RPV to less than 100 psig. At less than 100 psig, ADS ECCS is not required per Tech Specs. ADS long term gas supply is required to support the ADS alternate shutdown cooling function.

This event resulted in a condition outside the design bases of the plant, a condition alone that could have prevented the fulfillment of a safety function, and two independent trains to become inoperable from a single condition. This LER is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(ii), 10CFR50.73(a)(2)(v) and 10CFR50.73(a)(2)(vii).

Analysis of the Event

There were no actual adverse consequences associated with the loss of the ADS long term gas supply. The potential consequences of the event were minimal. Five (5) ADS valves were capable of being cycled two (2) times at 70% of drywell design pressure, or five (5) times at normal drywell pressure, during the first six hours following an accident using their accumulator gas supply. This design assumes that the normal instrument gas supply to the ADS valves is lost at the time of the accident. Only one operation of the five ADS valves is required to depressurize the reactor and allow low pressure ECCS injection to assure core cooling. Normal RHR Shutdown Cooling would then be used to provide long term decay heat removal when RPV pressure is reduced to less than 75 psig.

If normal RHR Shutdown Cooling failed, operators would attempt to place Alternate Shutdown Cooling in service using procedure S41.7.B, Use of SRV's and Suppression Pool Cooling as an Alternate Shutdown Cooling Method. Assuming six hours had elapsed following the accident, the operator may not be able to open two ADS valves as the procedure directs. The procedure includes a step (4.1.18) that provides direction to perform S59.8.A, Placing Automatic depressurization System Backup Nitrogen Supply System in Operation, if the instrument gas header pressure falls below 85 psig. This procedure ensures the automatic alignment of the ADS backup gas supply has occurred and again verifies greater than 85 psig from the backup gas supply. This would ensure that troubleshooting the failure to establish 85 psig would occur when this step could not be successfully completed. This procedure also directs performing T-200 to align the external gas supply.

The event impact on the plant Probabilistic Safety Analysis (PSA) was not significant.

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

Cause of the Event

The most probable cause was improper documentation of the pre-test valve line-up for the primary containment Integrated Leak Rate Test (ILRT) in May 1999. A personnel error resulted in the valves being closed prior to documenting the "as found" open position in the test as required. The valves were then restored to the documented closed "as found" position rather than the actual open "as found" position.

Corrective Actions Completed

All three mispositioned valves were restored to the open position.
 A walkdown of accessible valves on the Unit 2 Instrument Gas system was performed and verified proper valve alignment in accordance with system check off list [2S59.1.A (COL-1)].
 A review of the Unit 2 ILRT procedure (ST-1-060-490-2 Appendix G) "as left" valve positions was performed to verify proper valve alignment. Unit 1 ILRT procedure "as left" positions were also reviewed and verified as properly restored.
 Station management has sponsored a procedure use and compliance program that is focused on improving procedure content and procedure use work practices.

Corrective Actions Planned

The plant integrated start-up procedure (GP-2) will be revised to include performance of a check off list (COL) to align critical manual valves that could impair system functionality by April 15, 2000.

Previous Similar Occurrences

Limerick Generating Station LER 1-99-004 reported two occurrences where one train of the backup gas supply was intentionally removed from service to perform maintenance for periods that exceeded the TS AOT for ECCS in regard to the ADS system. Retraction of this prior LER will be evaluated due to the conclusions of this event investigation.