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FACIL:50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana M 05000316
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WEBER,G.A. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
BLIND,A.A. Indiana Michigan Power Co. (formerly Indiana & Michigan Ele
RECIP.NAME RECIPIENT AFFILIATION

SUBJECT: LER 94-007-01:on 940909,accumulated leakage for Type B & C leakage tests on containment penetrations & isolation valves exceeded.Caused by failure to meet TS limit.Valves replaced & re-oriented.w/941222 ltr.

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TITLE: 50.73/50.9 Licensee Event Report (LER), Incident Rpt, etc.

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December 22, 1994

United States Nuclear Regulatory Commission
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Operating Licenses DPR-74
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

94-007-01

Sincerely,

A. A. Blind
Plant Manager

/sb
Attachment

c: J. B. Martin, Region III
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IE22

NRC FORM 366 (5-92)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB NO. 3150-0104
EXPIRES 5/31/95

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE INFORMATION AND RECORDS MANAGEMENT BRANCH (MNBB 7714), 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.

# LICENSEE EVENT REPORT (LER)

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

| FACILITY NAME (1) | DOCKET NUMBER (2) | PAGE (3) |
|---|---|---|
| D. C. COOK NUCLEAR PLANT - UNIT 2 | 05000 316 | 1 OF 4 |

TITLE (4) CONTAINMENT TYPE B AND C LEAKAGE EXCEEDS LCO VALUE DUE TO LEAKAGE OF POST ACCIDENT SAMPLE LINE CHECK VALVE

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT NUMBER (7) | | | OTHER FACILITIES INVOLVED (8) | |
|---|---|---|---|---|---|---|---|---|---|---|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 09 | 09 | 94 | 94 | -- 007 -- | 01 | 12 | 22 | 94 | COOK PLANT UNIT 1 | 05000 315 |
| | | | | | | | | | FACILITY NAME | DOCKET NUMBER 05000 |

| OPERATING MODE (9) | 6 |
|---|---|
| POWER LEVEL (10) | 00 |

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

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 20.402(b) | | 20.405(c) | | 50.73(a)(2)(iv) | | 73.71(b) |
| | 20.405(a)(1)(i) | | 50.36(c)(1) | | 50.73(a)(2)(v) | | 73.71(c) |
| | 20.405(a)(1)(ii) | | 50.36(c)(2) | | 50.73(a)(2)(vii) | | OTHER |
| | 20.405(a)(1)(iii) | X | 50.73(a)(2)(i) | | 50.73(a)(2)(viii)(A) | | (Specify in Abstract below and in Text, NRC Form 366A) |
| | 20.405(a)(1)(iv) | | 50.73(a)(2)(ii) | | 50.73(a)(2)(viii)(B) | | |
| | 20.405(a)(1)(v) | | 50.73(a)(2)(iii) | | 50.73(a)(2)(x) | | |

LICENSEE CONTACT FOR THIS LER (12)

| NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| G. A. WEBER - PLANT ENGINEERING SUPERINTENDENT | 616-465-5901 |

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 |
|---|---|---|---|---|---|---|---|---|---|---|
| B | BD | ISV | A200 | Y | | | | | | |
| B | BD | ISV | A200 | Y | | | | | | |

| 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)

This supplemental report provides additional information regarding the Type B and C Leakrate Testing results reported on September 9, 1994. On September 9, 1994, with Unit 2 in Mode 6 (Refueling) the accumulated leakage for the Type B and C Leakrate Tests on Containment penetrations and isolation valves exceeded the Technical Specification L.C.O. value of 0.60 La. At 1525 hours a four hour phone report was made to the NRC, as required by 10CFR50.72(b)(2). The total as-found Type B and C leakrate was 15.96 La. (The calculated leakrate of 2-NS-357 was determined to be 15.49 La, while the measured leakrate for all other penetrations was only 0.476La.) 2-NS-357 is a 0.5 inch diameter bonnet hung swing type check valve which serves as the Post Accident RCS Sampling Station Sample Waste Return Line Isolation Valve. During troubleshooting, the valve leakrate could be reduced by tapping the valve body. Upon disassembly and inspection, no conditions were found which would account for this inconsistent behavior. The valve was replaced and re-oriented to position the valve in a vertical line. Subsequent testing was unacceptable. Therefore, the original swing check valve was replaced with a spring loaded piston check valve. It was determined that the original valve may not be well suited for this specific application. The as-left Type B and C leakrate was 0.143 La. The leakage of valve 2-NS-357 would not have put the Plant in an unsafe condition, as the sample line is designed with redundant isolation valves. This event did not have a significant impact on public health and safety.

This supplemental report is being submitted to provide additional information regarding the Type B and C Leakrate Testing reported on September 9, 1994.

Conditions Prior to Occurrence:

Unit 2 in Mode 5 (Cold Shutdown)

Event Description:

The total measured leakage for the Type B and C Leakrate Tests on Containment penetrations and isolation valves exceeded the Technical Specification L.C.O. value (0.60 La). The total as-found leakrate was determined to be 15.96 La. The total as-found leakrate is a sum of the calculated leakrate (15.49 La) from 2-NS-357 (EIIS:ISV/BD) and the measured leakrate (0.476) for all other penetrations. Testing the valve determined that 2-NS-357 would not seat tightly and could not be pressurized to the required test pressure of 12 psig. The leakrate that the valve would experience at 12 psig was extrapolated from test data obtained at a lower pressure.

During troubleshooting, it was noted that the valve leakrate could be reduced by tapping the valve body. Upon disassembly and inspection, no conditions could be found which would account for this inconsistent behavior. The valve was replaced. The replacement valve leaked at a lower rate, but was still unacceptable. The sample line was then modified to reorient the valve from horizontal to vertical. When the valves continued to perform unacceptably it was replaced with a spring loaded piston check valve. Testing of this valve determined it to be acceptable for service.

The use of the original valve model, an ALOYCO 374 bonnet hung swing check valve, for this particular application was questioned when new in-stock replacement valves were tested, and also found to have higher than desired leakrates. A vendor technical representative was contacted concerning this issue. The technical representative informed the Plant that metal seated swing check valves may not consistently obtain tight shut-off at relatively low differential pressures (i.e...12 psi). It was thus concluded that the valve may not be the optimal design for Containment isolation service. In addition, the Model 374 is a bonnet hung valve; that is, the hanger-disc assembly is attached directly to the bonnet rather than the valve body. Thus, the bonnet hung arrangement makes seating performance sensitive to the alignment of the bonnet. Maintenance on the valve seat can be difficult on such a small (0.5 inch) valve. Proper alignment of the disc and the results of any work performed on the valve seat must be verified by Leakrate Testing since the blue test, which is the typical means for verifying proper seating, is not possible on a bonnet hung valve without disturbing the orientation of the disc relative to the seat.

Other Containment Isolation Valves that exhibited excessive leakrates were repaired and retested. The as-left Type B and C leakrate was 0.143 La.

Cause of Event:

The failure to meet the Technical Specification Limit is attributed to the failure of 2-NS-357, which accounted for 97 percent of the total Type B and C leakrate. It was determined that valve 2-NS-357 may not be the optimal design for use in low differential pressure applications, and the bonnet hung design complicates disc alignment to assume tight seating. The valve originally installed was an ALOYCO, Model 374 swing check valve with a metal seat and disc. The valve did not provide consistent seating when tested with a test pressure of 12 psig. The ALOYCO, Model 374 valves perform best with a higher delta-P across the valve disc.

Analysis of Event:

The Type B and C leakrate exceeded the Technical Specification 3.6.1.2 Limit of 0.6 La on September 9, 1994. A four hour phone report was made to the NRC as required by 10CFR50.72(b)(2), at 1525 hours on September 9, 1994. This event is reportable per 10CFR50.73(a)(2)(i)(B).

The total as-found leakrate, excluding the leakage from 2-NS-357, was calculated to be 51,997 sccm (0.476 La). A technical evaluation has determined that the 2-NS-357 deficiency would not have resulted in any additional leakage from Containment.

The as-found leakage of 2-NS-357 was calculated to be 60.3 scfm (15.49 La), which exceeds the Technical Specification allowable leak rate of 0.6 La established by 10CFR50, Appendix J. This is a post accident sample return line which is designated as a Class D line. It is designed with double isolation valves. Type C test results of the second connected series Isolation Valves was found to be 0 sccm.

As a result, the isolation of this line was available and failure of 2-NS-357 alone would not have jeopardized Containment Integrity. The total as-found leak rate, excluding the leakage from 2-NS-357, was 51,997.3 sccm (0.47 La). As mentioned above, the isolation capability of the affected penetration would have been provided by Secondary Isolation Valves, which had a leakage of 0 sccm. Therefore, the as-found condition of the Containment Isolation Valves would not have put the plant in an unsafe condition. This event did not have a significant impact on the health and safety of the public.

Corrective Actions:

Originally, valve 2-NS-357 was replaced and re-oriented to position the valve in a vertical line instead of a horizontal line. The re-orientation effort was unsuccessful as retests indicated that excessive leakrates still existed. After discussions with the manufacturer, valve 2-NS-357 was replaced with a spring type piston check valve and installed in the valve's original horizontal orientation.

The equipment history for the identical valve in Unit 1 was also reviewed. valve 1-NS-357 (EIIS:ISV/BD) has also had a poor performance record. A Design Change has been approved to replace 1-NS-357. This activity is being scheduled for the 1995 Refueling Outage.

Corrective Actions continued:

A review of the other check valves, included in the Type B and C Leakrate Testing, revealed that this model of ALOYCO check valve is used in two additional Containment penetrations. The performance records for the additional valves, in both Units 1 and 2, is better than that of the Unit 1 and 2 NS-357 valves. The use of the ALOYCO, Model 374 valves, in the other applications will be evaluated to determine if they should also be replaced. In addition, the other containment isolation valves that exhibited excessive leakrates were repaired and retested. The as-left Type B and C leakrate was 0.143 La.

Failed Component Identification:

Component Name: Post Accident Sampling Station Sample Waste Return Check Valve (2-NS-357)
Manufacturer: ALOYCO
Model: 374
EIIS Code: ISV/BD

Component Name: Post Accident Sampling Station Sample Waste Return Check Valve (1-NS-357)
Manufacturer: ALOYCO
Model: 374
EIIS Code: ISV/BD

Previous Similar Events:

Previous Licensee Event Reports submitted for excessive Type B and C Leakrate Test results include:

| | |
|---|---|
| 050-315/79-34 | 050-316/79-20 |
| 050-315/81-11 | 050-316/79-53 |
| 050-315/81-25 | 050-316/81-18 |
| 050-315/82-58 | 050-316/83-16 |
| 050-315/83-72 | 050-316/84-05 |
| 050-315/85-17 | 050-316/86-09 |
| 050-315/87-12 | 050-316/89-05 |
| 050-315/89-04 | 050-316/90-07 |
| 050-315/92-07 | |