

LICENSEE EVENT REPORT (LER)

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|---|---|-----------------------------|
| FACILITY NAME (1) Turkey Point Unit 3 | DOCKET NUMBER (2) 0 5 0 0 0 2 5 0 | PAGE (3) 1 OF 0 3 |
|---|---|-----------------------------|

TITLE (4)
Auxiliary Feedwater System - Steam Supply Stop Check Valves

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | | |
|----------------|-----|------|----------------|-------------------|-----------------|-----------------|-----|------|-------------------------------|--|-------------------|
| MONTH | DAY | YEAR | YEAR | SEQUEN-IAL NUMBER | REVISION NUMBER | MONTH | DAY | YEAR | FACILITY NAMES | | DOCKET NUMBER(S) |
| 0 1 | 0 7 | 8 6 | 8 6 | 0 0 1 | 0 0 0 | 2 1 | 4 8 | 6 | Turkey Point Unit 4 | | 0 5 0 0 0 2 5 1 1 |
| | | | | | | | | | N/A | | 0 5 0 0 0 |

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|----------------------------------|---|--|------------------|------------------|--|-----------------|----------------------|--|--|--|--|--|
| OPERATING MODE (9) 1 | THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following) (11) | | | | | | | | | | | |
| POWER LEVEL (10) 1 0 0 | 20.402(b) | | | 20.405(c) | | | 50.72(a)(2)(iv) | | | 73.71(b) | | |
| | 20.405(a)(1)(i) | | | 50.38(c)(1) | | | 50.73(a)(2)(iv) | | | 73.71(c) | | |
| | 20.405(a)(1)(iii) | | | 50.38(c)(2) | | | X 50.73(a)(2)(viii) | | | OTHER (Specify in Abstract below and in Text, NRC Form 366A) | | |
| | 20.405(a)(1)(iii) | | | 50.73(a)(2)(i) | | | 50.73(a)(2)(viii)(A) | | | | | |
| | 20.405(a)(1)(iv) | | | 50.73(a)(2)(iii) | | | 50.73(a)(2)(viii)(B) | | | | | |
| 20.405(a)(1)(v) | | | 50.73(a)(2)(iii) | | | 50.73(a)(2)(ix) | | | | | | |

| LICENSEE CONTACT FOR THIS LER (12) | | | | | | | | | |
|---|--|--|--|--|--|--|------------------------------|--|--|
| NAME Jesus Arias, Jr., Regulation and Compliance Supervisor | | | | | | | TELEPHONE NUMBER | | |
| | | | | | | | AREA CODE | | |
| | | | | | | | 3 0 5 2 4 5 - 2 9 1 0 | | |

| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | | |
|--|--------|-----------|--------------|-------------------|-------|--------|-----------|--------------|-------------------|--|
| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO NRC | |
| B | B | A I S V | P 0 3 2 | Y | | | | | | |
| | | | | | | | | | | |

| SUPPLEMENTAL REPORT EXPECTED (14) | | | | EXPECTED SUBMISSION DATE (15) | MONTH | DAY | YEAR |
|---|--|--|--|-------------------------------|-------|-----|------|
| <input type="checkbox"/> YES (i.e., complete EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO | | | | | | | |

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

Event: On January 7, 1986, while Unit 3 and Unit 4 were at 100% power, auxiliary feedwater (AFW) system steam supply stop check valves 3-10-119, 3-10-219, and 4-10-319 were declared out of service. This was based on an additional review of radiographs which had been taken on January 2, 1986, of the AFW system steam supply stop check valves. This review identified that the guide studs for the valves mentioned above were broken and resting in the seat ring guide hole. Discussions between our Engineering Department and the valve manufacturer indicated that the stop check valves could not be confirmed as being capable of performing their design functions. Plant Management shut down Unit 3 for further inspections and repairs. Unit 4 was placed in a 72-hour limiting condition for operation. Subsequently, on January 10, 1986, a shutdown of Unit 4 was commenced for further inspections, repairs, and to begin a scheduled refueling outage for Unit 4.

Cause of Event: The cause of the broken guide studs was due to insufficiently rugged disc studs to resist high cycle fatigue induced by low steam flow through the stop check valve.

- Corrective Actions:**
- 1) The six (6) Unit 3 AFW stop check valves were disassembled, as found condition documented, and repaired. This repair increased the strength of the guide stud to have a calculated infinite life against high cycle fatigue.
 - 2) The AFW system was satisfactorily tested for operability as per applicable plant procedures on January 15, 1986.
 - 3) The stop check valves on Unit 3 will undergo radiographic examinations once per week for the first six weeks of operation, following refurbishment. For the next two months, the valves will be radiographed once every two weeks. The valves will then be radiographed once per month for the remainder of the fuel cycle.
 - 4) Further corrective actions are discussed in the text of this report.

LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

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| FACILITY NAME (1) Turkey Point Unit 3 | DOCKET NUMBER (2) 0 5 0 0 0 2 5 0 | LER NUMBER (6) | | | PAGE (3) | | |
| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | | |
| | | 8 6 | - 0 0 1 | - 0 0 0 | 2 | OF | 0 3 |

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

Event:

On January 7, 1986, while Unit 3 and Unit 4 were at 100% power, auxiliary feedwater (AFW) system steam supply stop check valves 3-10-119, 3-10-219, and 4-10-319 were declared out of service (OOS) due to broken guide studs. A Unit 3 shutdown was commenced at 1830 to repair the valves. On January 2, 1986, radiography of 11 AFW stop check valves were conducted. The results of the radiographs indicated that valves 3-10-119, 3-10-219, and 4-10-319 were unacceptable due to bent guide studs. At this time, Engineering judgement concluded that no operability concerns existed.

On January 7, 1986, the radiographs were reviewed by Engineering and a NRC Region II inspector. Engineering review identified that the bent guide studs were in fact broken and resting in the seat ring guide hole. Discussions between Power Plant Engineering and the valve manufacturer indicated that the stop check valves could not be confirmed as being capable of performing their design functions within a short time frame. Plant Management decided to immediately initiate Unit 3 shutdown at 1830 and place Unit 4 in a 72-hour limiting condition for operation (LCO).

At 0600 on January 10, 1986, a shutdown of Unit 4 was commenced to repair 4-10-319 and begin a scheduled refueling outage for Unit 4. The unit was taken off the line at 0907 and preparations were begun for the refueling outage.

Cause of Event:

The cause of the broken guide studs was insufficient guide stud strength to resist high cycle fatigue induced by low steam flow through the stop check valve. This failure mechanism has been identified metallurgically and confirmed through analytical methods.

Analysis of Event:

Engineering reviews in conjunction with written evaluation from the valve vendor (Pacific) shows that with the disc studs broken, the stop check valves would open and provide full flow through them and the guide studs are only provided to insure positive seating of disc and seat ring of the stop check function during the closing cycle. A difficulty could arise from the discs not seating properly while closing the valves. This function is required to prevent backflow from an intact steam generator to a faulted steam generator. Also, manual isolation capability is required in the event of steam generator tube rupture and Emergency Operating Procedure (EOP) describes *-120, *-220, and *-320 (downstream) as the required isolation valves. Since another set of stop check valves is provided to isolate the motor operated valves (MOVs), these stop check valves can be considered as redundant to provide the required manual isolation function, and the prevention of backflow. The visual inspection of these redundant valves on January 8, 1986, verified that they were in good condition.

During this event, Unit 4 was at 100% power with two (2) fully operable steam supply flowpaths available to start the AFW pumps. Unit 3 was at 100% power with one (1) fully operable steam supply flowpath available to start the AFW pumps.

Also considered was the potential for fragmented pieces from the studs entering the AFW pump turbines and/or being trapped in the trip and throttle (T&T) and governor valves. Extensive conversations with AFW pump turbine manufacturer indicated that neither the rugged design of the turbine internals nor the configuration of the T&T valve design would allow fragments to impair the capability of either component to perform its intended function. The remote event in which a fragment from a stud could enter and plug one of the steam admission jets (nozzles) to the turbines, additional jets (nozzles) are available to provide sufficient steam flow to allow the turbine to rotate at the required speed to provide sufficient water flow to meet design basis requirements.

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| | | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | | | |
| | | 8 6 | 0 0 1 | 0 0 0 | 3 | OF | 0 3 |

TEXT (if more space is required, use additional NRC Form 366A's) (17)
Analysis of Event: (continued)

AFW system operability tests were performed on Unit 4 per operating surveillance procedures (OSP) 4-OSP-75.1, Auxiliary Feedwater Train 1 Operability Verification, and 4-OSP-75.2, Auxiliary Feedwater Train 2 Operability Verification, and successfully completed on January 2, 1986, at 1708. Since it was later determined that 4-10-319 had a broken guide stud at this time, these tests support the evaluation that both Unit 3 and Unit 4 operability of AFW were unaffected by the broken guide studs.

Based on the above, conclusions are that AFW system remained operable from January 2, 1986 through January 7, 1986 and that the health and safety of the public were not affected.

Corrective Actions:

- 1) After Unit 3 was placed in cold shutdown, the six (6) Unit 3 AFW stop check valves were disassembled, as found condition documented, and repaired in accordance with the Engineering disposition of non-conformance report (NCR) 86-009. The two Unit 3 broken guide studs were found retained in the stop check valves.
- 2) The AFW pump turbine trip and throttle valve strainers were inspected. The missing parts from November 1985 stop check valve failures were found in the "A" and "C" strainers and were removed.
- 3) The AFW system was tested for operability as per 3-OSP-075.1 and 3-OSP-075.2 and satisfactorily completed at 1820 on January 15, 1986. The unit was placed on the line at 2141 on January 15, 1986.
- 4) Procedure changes to Administrative Procedure (AP) 0190.12, Non-conforming Material, Parts, or Components, are being made to enhance administrative controls in the handling of NCRs for component/system operability concerns.
- 5) A final metallurgical report on the stop check valve failures issued on January 24, 1986 verified the preliminary results of January 12, 1986, in that the cause of failure was high cycle fatigue initiated at the change in cross section between the disc and guide stem.
- 6) The stop check valves on Unit 3 will undergo radiographic examinations once per week for the first six weeks of operation, following refurbishment. For the next two months, the valves will be radiographed once every two weeks. The valves will then be radiographed once per month for the remainder of the fuel cycle.
- 7) The AFW system steam supply stop check valves for Unit 4 will be inspected and repairs made as necessary during the current Unit 4 Refueling Outage.
- 8) Modifications as appropriate, to correct steam supply MOVs will be performed on Unit 4 during the current refueling outage.
- 9) Similar modifications are scheduled for Unit 3 during an outage of sufficient duration pending on availability of parts and finalization of design package.
- 10) Engineering was requested to evaluate the applicability of 10 CFR Part 21 to the stop check valve failures.
- 11) The Event Response Team formal procedure issuance has been accelerated to enhance root cause determination processes.

Additional Information:

The valve is manufactured by Pacific Valves, model 3"-6605-7-WE(80)-X, 600 pound carbon steel stop check valve.

Similar occurrences: LER 251-86-001

FEB 14 1988
L-86-54

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D. C. 20555

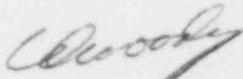
Gentlemen:

Re: Reportable Event 85-01
Turkey Point Unit 3
Date of Event: January 7, 1986
Steam Supply Stop Check Valves

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR to provide notification of the subject event.

The submittal date for this report was rescheduled as discussed in our letter, L-86-57, dated February 7, 1986.

Very truly yours,



C. O. Woody
Group Vice president
Nuclear Energy

COW/PLP:am

Attachment

cc: Dr. J. Nelson Grace, Region II, USNRC
Harold F. Reis, Esquire
PNS-LI-86-40

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