



Carolina Power & Light Company
Harris Nuclear Plant
PO Box 165
New Hill NC 27562

APR 25 2001

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

Serial: HNP-01-167
10CFR50.73

SHEARON HARRIS NUCLEAR POWER PLANT UNIT 1
DOCKET NO. 50-400
LICENSE NO. NPF-63
LICENSEE EVENT REPORT 2001-001-00

Sir or Madam:

In accordance with 10CFR50.73, the enclosed Voluntary Licensee Event Report is submitted. This report describes a nonconforming condition with respect to Emergency Core Cooling System throttle valves

Sincerely,

R. J. Duncan II
General Manager
Harris Plant

MSE/mse

Enclosure

c: Mr. J. B. Brady (HNP Senior NRC Resident)
Mr. R. J. Laufer (NRC-NRR Project Manager)
Mr. L. A. Reyes (NRC Regional Administrator, Region II)

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|---|---|--|
| NRC FORM 366 (MM-YYYY) LICENSEE EVENT REPORT (LER) (See reverse for required number of digits/characters for each block) | U.S. NUCLEAR REGULATORY COMMISSION | Estimated burden per response to comply with this mandatory information collection request: 5 0 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. |
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| FACILITY NAME (1) Harris Nuclear Plant | DOCKET NUMBER (2) 05000400 | PAGE (3) 1 OF 3 |
|--|--------------------------------------|---------------------------|

TITLE (4) Emergency Core Cooling Throttle Valves Nonconforming Condition

| EVENT DATE (5) | | | LER NUMBER (6) | | | REPORT DATE (7) | | | OTHER FACILITIES INVOLVED (8) | |
|----------------|-----|------|----------------|--------------------------|-----------|-----------------|-----|------|-------------------------------|---------------|
| MO | DAY | YEAR | YEAR | SEQUENT IAL NUMBER | REV NO | MO | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 12 | 5 | 00 | 2001 | - 01 | - 00 | 04 | 25 | 2001 | | 05000 |
| | | | | | | | | | 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 all that apply) (11) | | | |
| | | 20.2201(b) | 20.2203(a)(3)(i) | 50.73(a)(2)(i)(C) | 50.73(a)(2)(vii) |
| POWER LEVEL (10) | 100 | 20.2201(d) | 20.2203(a)(3)(ii) | 50.73(a)(2)(ii)(A) | 50.73(a)(2)(viii)(A) |
| | | 20.2203(a)(1) | 20.2203(a)(4) | 50.73(a)(2)(ii)(B) | 50.73(a)(2)(viii)(B) |
| | | 20.2203(a)(2)(i) | 50.36(c)(1)(i)(A) | 50.73(a)(2)(iii) | 50.73(a)(2)(ix)(A) |
| | | 20.2203(a)(2)(ii) | 50.36(c)(1)(ii)(A) | 50.73(a)(2)(iv)(A) | 50.73(a)(2)(x) |
| | | 20.2203(a)(2)(iii) | 50.36(c)(2) | 50.73(a)(2)(v)(A) | 73.71(a)(4) |
| | | 20.2203(a)(2)(iv) | 50.46(a)(3)(ii) | 50.73(a)(2)(v)(B) | 73.71(a)(5) |
| | | 20.2203(a)(2)(v) | 50.73(a)(2)(i)(A) | 50.73(a)(2)(v)(C) | <input checked="" type="checkbox"/> OTHER |
| | | 20.2203(a)(2)(vi) | 50.73(a)(2)(i)(B) | 50.73(a)(2)(v)(D) | Specify in Abstract below or in NRC Form 366A Part 21 |

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| LICENSEE CONTACT FOR THIS LER (12) | |
| NAME Mark Ellington, Project Analyst - Licensing | TELEPHONE NUMBER (Include Area Code) (919) 362-2057 |

| COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13) | | | | | | | | | | |
|--|--------|-----------|---------------|--------------------|-------|-------------------------------|-----------|---------------|--------------------|------|
| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | |
| | | | | | | | | | | |
| SUPPLEMENTAL REPORT EXPECTED (14) | | | | | | EXPECTED SUBMISSION DATE (15) | | MO | 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 12/5/00, with Harris Nuclear Plant (HNP) in Mode 1 at 100% power, Engineering analytically determined that the Emergency Core Cooling System (ECCS) throttle valves were further shut than previously determined. The valve openings were determined to be less than the containment sump screen minimum opening, creating the potential for clogging of the high head safety injection lines during the recirculation phase of a design basis LOCA. HNP determined that the ECCS remained operable. HNP is reporting this condition as a voluntary LER due to this issue having a potential safety significance.

Cause of this event: The original design of the HNP High Head Safety Injection lines did not adequately consider the potential for the throttle valves to become clogged due to flow clearances being less than the containment sump screen openings. The condition was not identified earlier due to an error in the vendor drawing for the ECCS throttle valves. **Corrective actions:** Complete the ECCS throttle valve modification to ensure that ECCS throttle valve openings are greater than the containment sump screen openings. Correct applicable drawings and documents associated with ECCS throttle valves.

**LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION**

| FACILITY NAME (1) | DOCKET | LER NUMBER (6) | | | PAGE (3) |
|------------------------------|----------|----------------|----------------------|--------------------|----------|
| Harris Nuclear Plant, Unit 1 | 05000400 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 2 OF 3 |
| | | 2001 | - 001 | - 00 | |

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

I. DESCRIPTION OF EVENT

On 12/5/00, with Harris Nuclear Plant (HNP) in Mode 1 at 100% reactor power, Engineering analytically determined that the Emergency Core Cooling System (ECCS) throttle valves (EIIS BQ FCV) were further shut than previously determined. The valve openings were determined to be less than the containment sump screen (EIIS BP SCN) minimum opening, creating the potential for clogging of the high head safety injection lines during the recirculation phase of a design basis LOCA. Currently, the containment sump screens would not restrict particles of sufficient size to cause blockage of the ECCS throttle valves. However, an HNP analysis showed that any particle making it by the inner screen edge would still settle to the floor of the screen structure prior to passing through the entire screen depth, and even if these particles were capable of being transported along the sump floor, they would be captured by the 1-1/2" x 1" inner screen structural backstop angle at the back of the inner screen. Therefore, HNP determined that the ECCS remained operable. HNP is reporting this condition as a voluntary LER due to this issue having a potential safety significance.

Prior to 12/5/00, the throttle valve openings were known to be slightly less than the sump screen openings, but the difference in size had been determined to be very small and was evaluated to have an insignificant potential for impact on the ECCS function. This determination was in the form of a HNP response to an Operating Experience (OE) notification, which identified the throttle valve openings as a potential clogging point during the post-LOCA recirculation mode (from Diablo Canyon Nuclear Station). Although the evaluation determined there was no immediate impact at HNP, it did refer to a modification already proposed to either replace the valves or install flow orifices in the lines, due to a cavitation-erosion concern, and recommended this modification as a long-term action. It was during development of such an ESR that the discovery was made on 12/5/00 that the throttle valve openings were smaller than previously determined.

Modification ESR 99-00407 is being developed for Refueling Outage 10 to address ECCS throttle valve erosion, flow balancing, and potential clogging. As part of this development, a spare ECCS throttle valve was tested by Wyle laboratories for a Cv curve determination and to quantify vibration and cavitation. The testing revealed that the valve needed ten turns of the handwheel to go from full shut to full open. Information from Yarway (vendor) indicated that the valve needed only eight turns to go from full shut to full open. Wyle measured the stem lift from full shut to full open as 1 5/8". This information from Wyle conflicted with information that was used in response to the OE. Subsequently, a carbon steel valve, of the same design as the installed valves and the spare valve, was located in the warehouse, and the values noted by Wyle were confirmed. The error in the drawings has been discussed with the vendor.

The Cv curve determined by Wyle was entered into a model of the ECCS, and the model showed throttle valve 1SI-6 to be the furthest shut throttle valve at 6.7% open. Research was done to determine if the actual throttled positions of the installed valves was documented. No such information was located. Additionally, one of the startup test engineers for this system (still at HNP) stated that this information was not recorded. The 6.7% value takes into account the full ten turns required to go from fully shut to fully open.

The response to the OE was reviewed to determine the methodology used to evaluate the throttle valve openings. The OE response determined that this clearance was acceptable. However, analysis based on the new information discussed above results in a clearance of 0.054 inches between the plug and seat. This clearance is significantly less than what was previously determined. Therefore, the potential for clogging of these throttle valves required evaluation.

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| Harris Nuclear Plant, Unit 1 | 05000400 | YEAR | SEQUENTIAL NUMBER | REVISION NUMBER | 3 OF 3 |
| | | 2001 | -- 001 | -- 00 | |

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

II. CAUSE OF THE EVENT

The original design of the HNP High Head Safety Injection lines did not adequately consider the potential for the throttle valves to become clogged due to flow clearances being less than the containment sump screen openings. The condition was not identified earlier due to an error in the vendor drawing for the ECCS throttle valves.

III. SAFETY SIGNIFICANCE

There were no actual safety consequences as a result of this issue. The HNP Final Safety Analysis Report states that containment sump screen size is smaller than any opening of systems served by the containment sump. Currently, the containment sump screens would not restrict particles of sufficient size to cause blockage of the ECCS throttle valves. However, an HNP analysis showed that any particle making it by the inner screen edge would still settle to the floor of the screen structure prior to passing through the entire screen depth, and even if these particles were capable of being transported along the sump floor, they would be captured by the 1-1/2" x 1" inner screen structural backstop angle at the back of the inner screen. Therefore, the ECCS throttle valves would not become clogged during the recirculation phase of a LOCA. This report is being submitted as a voluntary LER.

IV. CORRECTIVE ACTIONS

Complete the applicable ECCS throttle valve modification to ensure that ECCS throttle valve openings are greater than the containment sump screen openings. Correct applicable drawings and documents associated with ECCS throttle valves.

V. SIMILAR EVENTS

NRC Information Notice 96-27 describes similar events that occurred at Millstone Unit 2 and Diablo Canyon nuclear power plants. HNP discovered this condition as a result of investigating this OE. The condition was not identified earlier due to an error in the vendor drawing for the ECCS throttle valves.