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April 1, 2015

Docket No.: 50-366

NL-15-0585

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Edwin I. Hatch Nuclear Plant
Licensee Event Report 2015-001-00
Main Steam Isolation Valves (MSIVs) Fail to Meet Surveillance Requirements

Ladies and Gentlemen:

In accordance with the requirements of 10 CFR 50.73(a)(2)(i)(B), Southern Nuclear Operating Company hereby submits the enclosed Licensee Event Report.

This letter contains no NRC commitments. If you have any questions, please contact Greg Johnson at (912) 537-5874.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "David R. Vineyard", written in a cursive style.

D. R. Vineyard
Vice President – Hatch

DRV/jcm

Enclosures: LER 2015-001-00

cc: Southern Nuclear Operating Company
Mr. S. E. Kuczynski, Chairman, President & CEO
Mr. D. G. Bost, Executive Vice President & Chief Nuclear Officer
Mr. D. R. Vineyard, Vice President – Hatch
Mr. M. D. Meier, Vice President – Regulatory Affairs
Mr. D. R. Madison, Vice President – Fleet Operations
Mr. B. J. Adams, Vice President – Engineering
Mr. G. L. Johnson, Regulatory Affairs Manager – Hatch
Mr. M. A. Dowd, Operating Experience Coordinator - Hatch
RTYPE: CHA02.004

U. S. Nuclear Regulatory Commission
Mr. V. M. McCree, Regional Administrator
Mr. R. E. Martin, NRR Senior Project Manager - Hatch
Mr. D. H. Hardage, Senior Resident Inspector – Hatch

Edwin I. Hatch Nuclear Plant

Licensee Event Report 2015-001-00

Main Steam Isolation Valves (MSIVs) Fail to Meet Surveillance Requirements



LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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.

| | | |
|---|-------------------------------|-------------------|
| 1. FACILITY NAME Edwin I. Hatch Nuclear Plant Unit 2 | 2. DOCKET NUMBER 05000 366 | 3. PAGE 1 OF 4 |
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4. TITLE
Main Steam Isolation Valves (MSIVs) Fail to Meet Surveillance Requirements

| 5. EVENT DATE | | | 6. LER NUMBER | | | 7. REPORT DATE | | | 8. OTHER FACILITIES INVOLVED | |
|---------------|-----|------|---------------|-------------------|---------|----------------|-----|------|------------------------------|---------------|
| MONTH | DAY | YEAR | YEAR | SEQUENTIAL NUMBER | REV NO. | MONTH | DAY | YEAR | FACILITY NAME | DOCKET NUMBER |
| 02 | 09 | 2015 | 2015 | - 001 - | 00 | 04 | 02 | 2015 | FACILITY NAME | DOCKET NUMBER |

| | | | | |
|------------------------|---|---|---|---|
| 9. OPERATING MODE 3 | 11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply) | | | |
| | <input type="checkbox"/> 20.2201(b) | <input type="checkbox"/> 20.2203(a)(3)(i) | <input type="checkbox"/> 50.73(a)(2)(i)(C) | <input type="checkbox"/> 50.73(a)(2)(vii) |
| | <input type="checkbox"/> 20.2201(d) | <input type="checkbox"/> 20.2203(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(ii)(A) | <input type="checkbox"/> 50.73(a)(2)(viii)(A) |
| | <input type="checkbox"/> 20.2203(a)(1) | <input type="checkbox"/> 20.2203(a)(4) | <input type="checkbox"/> 50.73(a)(2)(ii)(B) | <input type="checkbox"/> 50.73(a)(2)(viii)(B) |
| | <input type="checkbox"/> 20.2203(a)(2)(i) | <input type="checkbox"/> 50.36(c)(1)(i)(A) | <input type="checkbox"/> 50.73(a)(2)(iii) | <input type="checkbox"/> 50.73(a)(2)(ix)(A) |
| 10. POWER LEVEL 0 | <input type="checkbox"/> 20.2203(a)(2)(ii) | <input type="checkbox"/> 50.36(c)(1)(ii)(A) | <input type="checkbox"/> 50.73(a)(2)(iv)(A) | <input type="checkbox"/> 50.73(a)(2)(x) |
| | <input type="checkbox"/> 20.2203(a)(2)(iii) | <input type="checkbox"/> 50.36(c)(2) | <input type="checkbox"/> 50.73(a)(2)(v)(A) | <input type="checkbox"/> 73.71(a)(4) |
| | <input type="checkbox"/> 20.2203(a)(2)(iv) | <input type="checkbox"/> 50.46(a)(3)(ii) | <input type="checkbox"/> 50.73(a)(2)(v)(B) | <input type="checkbox"/> 73.71(a)(5) |
| | <input type="checkbox"/> 20.2203(a)(2)(v) | <input type="checkbox"/> 50.73(a)(2)(i)(A) | <input type="checkbox"/> 50.73(a)(2)(v)(C) | <input type="checkbox"/> OTHER |
| | <input type="checkbox"/> 20.2203(a)(2)(vi) | <input checked="" type="checkbox"/> 50.73(a)(2)(i)(B) | <input type="checkbox"/> 50.73(a)(2)(v)(D) | Specify in Abstract below or in NRC Form 366A |

12. LICENSEE CONTACT FOR THIS LER

| | |
|--|--|
| LICENSEE CONTACT Edwin I. Hatch / Steven Tipps – Licensing Supervisor | TELEPHONE NUMBER (Include Area Code) 912-537-5880 |
|--|--|

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

| CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANUFACTURER | REPORTABLE TO EPIX |
|-------|--------|-----------|--------------|--------------------|-------|--------|-----------|--------------|--------------------|
| B | SB | ISV | H198 | Y | | | | | |

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

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On 02/09/2015 at approximately 0504 EDT, with Unit 2 in Mode 3 at zero percent power due to a scheduled refueling outage, the Unit 2 "A" and "C" outboard main steam isolation valves (MSIVs) failed to close in the required fast stroke time requirements of 3 to 5 seconds. The "2A" outboard isolation valve closed in 6.8 seconds and the "2C" outboard isolation valve closed in 10.3 seconds. The surveillance tests were declared unsatisfactory and the affected Unit 2 "A" and "C" main steam lines were maintained in an isolated configuration as all the MSIVs remained closed.

The cause of the unsatisfactory surveillance testing on the "2A" and "2C" outboard MSIVs was determined to be excess lubrication on the pistons and springs of the 2-way and 4-way valves of the pneumatic manifold assembly of the MSIV actuator. The excess super o-lube applied to the valve internals had become tacky, causing a delay in the opening of the air supply and exhaust paths for the air operator cylinder of the MSIV actuator. As part of a broadness review, additional MSIV actuators on Unit 2 were determined to be susceptible to excess lubrication. All of the associated 2-way, 3-way, and 4-way valves of the pneumatic manifold assemblies were replaced or inspected, cleaned, and re-lubricated. The MSIVs were then reassembled and functionality tested to ensure the isolation valves were capable of meeting their stroke time of 3 to 5 seconds. The associated surveillance tests were satisfactorily completed and the MSIVs were returned to service in concurrence with the startup of Unit 2.



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

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose 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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NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

General Electric – Boiling Water Reactor
Energy Industry Identification System codes appear in the text as (EIS Code XXX)

DESCRIPTION OF EVENT

On 02/09/2015, at approximately 0504 EDT, with Unit 2 operating at approximately zero percent rated thermal power in hot shutdown (Mode 3) as part of a scheduled refueling outage, the "A" and "C" outboard main steam isolation valves (MSIV) (EIS Code ISV) failed to close within the required isolation time of 3 to 5 seconds. The "A" outboard MSIV closed in 6.8 seconds, while the "C" outboard MSIV closed in 10.3 seconds. The surveillance tests for the remaining Unit 2 MSIVs were successfully completed with each valve meeting the surveillance acceptance criteria by closing within the required isolation time of 3 to 5 seconds.

There are two isolation valves, one on each side of the primary containment barrier, on each main steam line. The "outboard" MSIVs are located just outside of the primary containment barrier, while the "inboard" MSIVs are located inside the primary containment boundary. The MSIVs are relied upon to assure the integrity of the reactor coolant pressure boundary by closing off the main steam lines within a time frame of 3 to 5 seconds established by design basis accident (DBA) analysis to limit the release of reactor coolant or radioactive material. Due to the excessive stroke times, the fast closure tests for the "A" and "C" outboard MSIV were declared unsatisfactory and the affected main steam lines were maintained in an isolated configuration as all the MSIVs remained closed.

CAUSE OF EVENT

The 2, 3, & 4-way valves on the pneumatic assemblies of the Unit 2 MSIV actuators are supplied to Ralph A. Hiller from Norgren. As part of the troubleshooting process, Engineering learned that during internal validation testing of the pneumatic valves by Ralph A. Hiller in 2012, shattering was witnessed in the Norgren 2-way and 3-way valves. This resulted in a delay in the valves' stroke times. The corresponding valves were disassembled and excess super o-lube, along with minor foreign material (FM), was observed throughout the valve internals. The valves were then cleaned, and lubricated appropriately with a thin layer of super o-lube and reassembled. After this action was completed, the actuator functioned appropriately with no degradation in performance. Engineering learned that excess lubrication applied to valve internals can plasticize and become tacky over time. The tacky substance can hinder the smooth operation of the valve internals, causing it to stick or delay in shuttling.

Subsequent disassembly and inspection of the 2-way and 4-way valves on both the Unit 2 "A" and "C" outboard MSIVs revealed excess lubrication on the pistons and springs that had become tacky. The resulting causal analysis for the unsatisfactory fast stroke times on the "A" and "C" outboard MSIVs concluded that the most probable cause was attributed to a delay in the opening of the air supply and exhaust paths for the air operator cylinder due to sticking in the 2-way and 4-way valves of the pneumatic manifold assembly of the MSIV actuator. This cause was confirmed by a bench test of the "C" outboard MSIV pneumatic assembly in which the valves would not shuttle appropriately when energized.

As a result of the observed "as-found" condition of the Norgren valves, on 11/01/2012 Ralph A. Hiller implemented procedures for inspection, cleaning, and lubrication for all incoming Norgren 2-way, 3-way, and 4-way valves. Per Ralph A. Hiller, because only one occurrence of the over-lubrication issue was identified during their internal testing process, it was treated statistically as an isolated occurrence.

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The pneumatic manifold assemblies installed on the Unit 1 MSIVs are designed and manufactured by Automatic Valve Corporation (AVCO) and do not contain Norgren valves. Additionally, AVCO was contacted to confirm that their nuclear products have had no history of failures or functionality issues caused by excess lubrication. This event is therefore isolated to Unit 2 only.

REPORTABILITY AND SAFETY ASSESSMENT

The event is reportable per 10 CFR 50.73(a)(2)(i)(B) due to an event occurring in which a Limiting Condition for Operation (LCO) existed for a time longer than permitted by the Technical Specifications (TS). Normally a discrepancy found during surveillance testing should be assumed to have occurred at the time of its discovery, unless there is firm evidence to indicate that the discrepancy existed previously. The excessive lubrication of the pneumatic manifold valves that led to excessive fast stroke times for the MSIVs existed while the MSIVs were in service. Therefore, since there is firm evidence that the discrepancy existed previously, this condition is reportable as it existed for a time frame that was greater than the TS Required Action Statement Completion Time.

The "as found" stroke times for the Unit 2 "A" and "C" inboard MSIVs met the required TS surveillance acceptance criteria which demonstrated their continuing operability. Therefore, primary containment isolation capability of the main steam lines remained operable which ensured the required isolation safety function was maintained. Based on this information this condition was determined to have a very low safety significance.

CORRECTIVE ACTIONS

The pneumatic valves for the "A" and "C" outboard MSIVs were inspected, cleaned, and re-lubricated per Ralph A. Hiller's improved procedures. The MSIVs were then reassembled and functionality tested to ensure they were capable of meeting their stroke time of 3 to 5 seconds. The surveillance tests were satisfactorily completed and no other corrective actions were necessary.

A broadness review was conducted to determine the manufacture and receipt date of pneumatic manifold assemblies supplied by Ralph A. Hiller to ensure all the corresponding 2-way, 3-way, and 4-way valves for the remaining Unit 2 MSIVs had been correctly lubricated under the vendor's improved procedural requirements that were implemented in November 2012. As a result of this review, the following additional Unit 2 MSIVs were determined to be susceptible to excess lubrication: Unit 2 "A", "B", "C", & "D" inboard MSIVs and the Unit 2 "D" outboard MSIV. The 2-way, 3-way, and 4-way valves that were determined to be susceptible to excess lubrication were replaced or inspected, cleaned, re-lubricated and reassembled in accordance with Ralph A. Hiller's procedures. The surveillance testing for the associated MSIVs was successfully performed and demonstrated operability such that the stroke time for these MSIVs satisfied the TS surveillance testing acceptance criteria.

As part of the broadness review, an item in the warehouse was also identified to be susceptible to excess lubrication. As a preventative measure a hold was placed on the item and a work order was generated to ensure the item is inspected, cleaned, re-lubricated, and returned to stock.

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ADDITIONAL INFORMATION

Other Systems Affected: None.

Failed Components Information:

Master Parts List Number: 2B21-F022 A, B, C, & D
2B21-F028 A, C, & D

Manufacturer: Ralph A. Hiller Company

Model Number: SA-A018

Type: Main Steam Isolation Valve

Manufacturer Code: H198

EIS System Code: SB

Reportable to EPIX: Y

Root Cause Code: B

EIS Component Code: ISV

Commitment Information: This report does not created any new licensing commitments.

Previous Similar Events: None.