UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
245 PEACHTREE CENTER AVENUE NE, SUITE 1200
ATLANTA, GEORGIA 30303-1257

November 1, 2012

Mr. George T. Hamrick
Vice President
Shearon Harris Nuclear Power Plant
Carolina Power and Light Company
P.O. Box 165, Mail Code: Zone 1
New Hill, NC 27562-0165

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INSPECTION REPORT 05000400/2012009

Dear Mr. Hamrick:

On October 5, 2012, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection of the circumstances surrounding the failure of two safety-related main steam isolation valves (MSIVs) to close which occurred on April 21, 2012, at your Shearon Harris reactor facility Unit 1. The enclosed inspection report documents the inspection results which were discussed on October 25, 2012, with you and other members of your staff. Clarifying information was provided to Mr. John Caves of your staff on October 31, 2012.

The inspection examined activities conducted under your licensee as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

One NRC identified finding of very low safety significance (Green) was identified during this inspection. This finding was determined to involve a violation of NRC requirements. The NRC is treating this violation as non-cited violation (NCV) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001; with copies to the Regional Administrator, Region I]; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Shearon Harris facility.
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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's Agencywide Document Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Randall A. Musser, Chief
Reactor Projects Branch 4
Division of Reactor Projects

Docket No.: 50-400
License No.: NPF-63

Enclosure: NRC Inspection Report 05000400/2012009
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Letter to George T. Hamrick from Randall A. Musser dated November 1, 2012

SUBJECT: SHEARON HARRIS NUCLEAR POWER PLANT - NRC INSPECTION REPORT 05000400/2012009

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket No.	50-400
License No.	NPF-63
Report No.	05000400/2012009
Licensee:	Carolina Power and Light Company
Facility:	Shearon Harris Nuclear Power Plant, Unit 1
Location:	5413 Shearon Harris Road New Hill, NC 27562
Dates:	July 17 – 19, 2012, and August 14 – October 5, 2012
Inspectors:	J. Zeiler, Senior Resident Inspector, McGuire G. MacDonald, Senior Reactor Analyst
Approved by:	Randall A. Musser, Chief Reactor Projects Branch 4 Division of Reactor Projects

Enclosure

SUMMARY OF FINDINGS

IR 05000400/2012009; 07/17/2012-10/05/2012; Shearon Harris Nuclear Power Plant, Unit 1; Other Activities.

This report documents a follow-up to an NRC Special Inspection and an in-office review conducted by a senior resident inspector and senior reactor analyst to investigate the failure of two Main Steam Isolation Valves (MSIVs) to close during surveillance testing on April 21, 2012. One NRC identified finding of very low safety significance (Green) was identified. The significance of findings is indicated by their color (Green, White, Yellow, Red) using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process". Cross-cutting aspects are determined using IMC 0310, "Components Within The Cross-Cutting Areas". Findings for which the SDP does not apply may be Green or be assigned a severity level after NRC management review.

A. NRC-Identified and Self-Revealing Findings

Cornerstone: Mitigating Systems

- Green. The inspectors identified a non-cited violation of Technical Specification (TS) 3.7.1.5, Main Steam Line Isolation Valves, due to one or more MSIVs being inoperable for a time greater than the allowed outage time and a plant shutdown was not completed in accordance with the action statement of TS 3.7.1.5. MSIV diagnostic testing in accordance with EGR-NGGC-0205, Air Operated Valve (AOV) Reliability Program, had not been conducted by the licensee. This contributed to the licensee not identifying long-term corrosion/oxidation of the valve piston rings that resulted in the "B" and "C" MSIV failure to initially close during stroke time testing on April 21, 2012. The licensee conducted repairs of all three MSIVs and restored them to an operable condition prior to entering Mode 4 following the completion of an ongoing refueling outage. The licensee entered this condition into their corrective action program (CAP) as Nuclear Condition Report (NCR) 531773.

  The failure to properly classify the MSIVs as risk significant and implement MSIV diagnostic testing in accordance with the AOV program procedure EGR-NGGC-0205 was a performance deficiency (PD). The PD is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objectives of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding is also associated with the containment isolation barrier performance attribute of the Barrier Integrity cornerstone and affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to conduct periodic diagnostic testing that would have identified long-term internal valve degradation due to unexpected corrosion/oxidation of the valve piston rings in all three MSIVs resulted in two MSIVs failing to initially close during TS stroke time testing on April 21, 2012, and excessive internal friction in all three MSIVs such that they may not have been capable of performing their safety-related closure function during certain design basis events. Using IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power," the inspectors determined there was an actual loss of safety function greater

than the TS allowed outage time associated with the finding which required a more detailed risk evaluation. A detailed risk evaluation was performed by a regional senior reactor analyst. The result of the analysis of the risk of the PD was a delta core damage frequency (CDF) of <1E-6/year and a delta Large Early Release Fraction (LERF) of <1E-7/year, a GREEN finding. No cross-cutting aspect was assigned to this finding because licensee decisions made in regard to classifying the MSIVs in the AOV program were made more than three years ago and therefore, not reflective of current plant performance. (Section 4OA5.2)

B. Licensee Identified Violations

None.

REPORT DETAILS

4. OTHER ACTIVITIES

4OA5 Other Activities

.1 Review of Licensee Root Cause Analysis of Main Steam Isolation Valve Failures

a. Inspection Scope

The NRC previously conducted a Special Inspection to evaluate the circumstances surrounding the April 21, 2012, failure of two MSIVs to close during stroke time testing. The results of this inspection were documented in NRC Inspection Report 05000400/2012008 at which time several deficiencies were identified in the licensee's MSIV maintenance and testing program that may have contributed to the failures. At the conclusion of the Special Inspection, the licensee had not completed their Root Cause Evaluation (RCE) for the MSIV failures; therefore, these deficiencies remained unresolved pending NRC review of the licensee's completed RCE. During this inspection, the inspectors evaluated the licensee's completed root cause analysis, completed and planned corrective actions, extent of condition reviews, and metallurgical analysis report associated with the MSIV failures. The inspectors also interviewed the licensee lead evaluator associated with the RCE investigation team, as well as the primary metallurgical specialist involved with the investigation.

b. Observations

Results of Licensee Root Cause Evaluation

The licensee's root cause analysis was documented in the RCE Report associated with NCR 531773. The RCE identified the root cause for the MSIV failures to be the long-term corrosion/oxidation of the valve piston rings which are contained in pairs within two groves around the top of the upper structure of the valve piston disc-assembly. The metallurgical evaluation determined that the piston rings were made of "gray" (graphite impregnated) cast iron and corrosion/oxidation of the metal at the graphite to metal interfaces caused the piston ring material to swell resulting in them becoming locked tight in their mating groves and expanding outward against the valve body bore. This created high internal valve friction at the interface of the rings and valve body bore which was greater than the force of the actuator springs to initially overcome for the "B" and "C" MSIV. The constant force of the actuator springs eventually overcame the friction force of the rings against the valve body bore allowing freedom of movement for the piston-disc assembly to close the valves. Since the piston rings on the "A" MSIV had slightly less evidence of corrosion/oxidation than the other two valves and one of its four piston rings was slightly less tight within its mating grove, it was believed that this explained why the valve was able to stroke close on April 21, 2012. The piston rings on each MSIV were original equipment and had not been replaced since plant initial commercial operation (approximately 26 years ago). In the 1980's, the valve vendor developed a

more corrosion resistant piston ring, and currently uses the new piston rings in new or refurbished valves, as well as the replacement part if piston rings are ordered by its valve users. However, the vendor had not previously required or recommended valve users to replace the original rings with the newer rings. Neither the licensee nor the NRC inspectors identified any previous industry operating experience regarding degraded MSIVs attributable to piston ring corrosion that would have provided a direct opportunity for the licensee to have anticipated the phenomenon.

The licensee identified two contributing causes for the failures as follows:

- The MSIVs were inappropriately categorized in the AOV program as Category 2 versus Category 1. If they had been properly classified as Category 1, they would have been required to be diagnostically tested periodically which would have identified the higher than expected internal valve friction.
- There were several missed opportunities to have identified the valve degradation prior to the April 21, 2012 failures, including: 1) minor changes in MSIV actuator hydraulic speed control settings which were not perceived as significant, and 2) a stroke time failure of the "B" MSIV that occurred in September 2007 that mainly focused on the lack of intervention (i.e., not increasing the actuator hydraulic speed) after the valve nearly failed its stroke time in the previous stroke test in May 2006.

The licensee's corrective actions to address the root and contributing causes included the following:

- Replacement of the valve piston rings for all three MSIVs using the more corrosion resistant piston rings currently supplied by the valve vendor.
- Implementation of initial and periodic MSIV diagnostic testing and reclassification of the MSIVs in the AOV program as Category 1.
- Review of all other AOV program Category 1 and Category 2 valves to ensure no other valves were misclassified and/or not being diagnostically tested that should be.
- Review of all other AOV program Category 1 and Category 2 valves to determine if cast iron piston rings are used, and if so, evaluate their susceptible to a similar corrosion problem.
- Revision of the MSIV equipment monitoring plan to include detailed monitoring of the actuator hydraulic flow control valve adjustments.
- Creation of new MSIV preventive maintenance activities including periodic internal valve inspections and replacement of the valve piston rings every 10 years.

The inspectors determined the licensee's corrective actions for the MSIV failures appeared to be adequate to address the root and contributing causes. Immediate corrective actions to repair and restore the MSIVs to an operable condition prior to reactor startup from the refueling outage were appropriate.

Evaluation of Consequences of MSIV Degradation

The inspectors reviewed the licensee's as-found diagnostic test results of each MSIV following the April 21, 2012, stroke time failures. The licensee plotted the as-found closing forces against the dynamic forces expected during worst case design basis accident conditions (i.e., during a main steam line break (MSLB)). The test results indicated that there was high internal friction in all three valves that could have challenged their capability of closing under accident conditions against steam pressure differentials. It was also noteworthy that even in their degraded condition, the MSIVs demonstrated that they could still stroke close within 5 seconds during subsequent testing. With respect to the "A" and "C" MSIVs, the diagnostic traces indicated there was unacceptably high friction forces such that there was not adequate actuator force to overcome the dynamic loads throughout the full travel of the valves. Based on this, it was determined that the "A" and "C" MSIVs would not have been capable of performing their safety-related closure function under design basis accident conditions. Due to the long-term nature of the piston ring degradation, the licensee could not determine the exact time when the valves became inoperable; however, it was speculated that since there had been a gradual increase in the "B" MSIV valve stroke times since 2005, the degradation was underway at that time and the stroke time increase was a result of the degradation process.

TS 3.7.1.5 requires that each MSIV shall be operable when operating in Modes 1, 2, 3, and 4. With one MSIV open and inoperable, operation may continue provided the inoperable MSIV is either closed (applicable in Modes 2, 3, or 4) or restored to an operable condition within 4 hours (applicable in Mode 1), otherwise be in Hot Standby within the next 6 hours and in Hot Shutdown within the following 6 hours. Based on the long-term nature of the degradation and the results of the licensee's as-found diagnostic test data, the inspectors determined that there was reasonable justification to conclude that one or more MSIVs had been inoperable for greater than the allowed outage time of TS 3.7.1.5.

.2 (Closed) Unresolved Item (URI) 05000400/2012008-01, "B" and "C" MSIVs Fail to Close During Surveillance Testing

a. Inspection Scope

The NRC Special Inspection of the circumstances associated with the April 21, 2012, "B" and "C" MSIV stroke time failures identified several issues with the licensee's MSIV maintenance and testing practices that could have contributed to the incident. These issues included the following:

- In the last two refueling intervals, maintenance was making minor adjustments to the actuator hydraulic speed control system to decrease the time needed to shut the valves as a result of increasing stroke test closure time results.
- Beginning in 2001, work deficiency documents were initiated due to the MSIVs experiencing difficulty in opening during refueling outage cycling.

- There had not been any corrective maintenance conducted requiring valve internal disassembly and the licensee had not developed any periodic preventive maintenance to visually inspect the condition of valve internals.
- The valve vendor manual recommended weekly valve partial exercising ten percent of its total stroke in order to assure that the actuator and valve was properly functioning. Prior to 2000, this partial exercising was being performed quarterly. In 2000, the licensee revised their Inservice valve test program requirements to discontinue quarterly exercising in lieu of the 18-month cold shutdown stroke testing that was currently being conducted.
- Prior to the current MSIV failures, the MSIVs had never been diagnostically tested as part of the licensee's AOV program.

The inspectors reviewed the licensee's completed RCE report of the MSIV stroke test failures and evaluated how each of the above items may have contributed to the incident.

b. Findings

Introduction: The inspectors identified a Green NCV of TS 3.7.1.5, Main Steam Line Isolation Valves, due to one or more MSIVs being inoperable for a time greater than the allowed outage time and a plant shutdown was not completed in accordance with the action statement of TS 3.7.1.5. MSIV diagnostic testing in accordance with EGR-NGGC-0205, Air Operated Valve Reliability Program, had not been conducted by the licensee. This contributed to the licensee not identifying long-term corrosion/oxidation of the valve piston rings that resulted in the "B" and "C" MSIV failure to initially close during stroke time testing on April 21, 2012, challenging the capability of the valves to perform their required closure function during certain design basis events.

Description: During the previous NRC Special Inspection, the inspectors noted that the MSIVs had never been tested as part of the licensee's AOV program prior to the April 21, 2012, stroke time failures. Based on review of the AOV program document, EGR-NGGC-0205, "Air Operated Valve Reliability Program," Revision 7, the inspectors determined that the valves met the definition for Category 1; however, they were classified as Category 2. Unlike Category 1 classified AOVs, Category 2 does not require periodic diagnostic testing or a setpoint calculation performed. The procedure defined a Category 1 AOV as those valves that perform an active safety-related Maintenance Rule function and have high safety significance. The inspectors' determined that the MSIVs were classified as safety-related active components and the licensee's Maintenance Rule program designated them as having a high safety significant function. The licensee initiated NCR 536078 to address the inspectors' concern over the AOV categorization of the MSIVs at the time of the previous inspection.

The licensee's RCE determined that the MSIVs were inappropriately categorized in the AOV program as Category 2 versus Category 1. In 2001, the MSIVs were initially classified as Category 2 by the Maintenance Rule Expert Panel based on Probabilistic Safety Analysis (PSA) Model input at the time that considered only the containment

isolation function of the valves for external radiological release mitigation. As such, the MSIVs were designated, along with all other containment isolation valves, as non-risk significant for CDF. In 2003, the PSA Model was updated, at which time it was recognized that the MSIVs performed not only a containment isolation function, but were important in the mitigation of Steam Generator Tube Rupture (SGTR) and MSLB design basis events. While this update concluded that the MSIVs were risk significant for CDF, the AOV program was not updated to reflect the change, which would have required the valves to be classified as Category 1. If the MSIVs had been classified as Category 1, they would have been required to be diagnostically tested every three refueling outages. The inspectors concluded that had the MSIVs been properly re-classified in the AOV program in 2003 the high internal valve friction from the corrosion/oxidation phenomenon would have been identified via the periodic diagnostic testing in time for corrective action to have been taken prior to the April 21, 2012, stroke time failures.

Analysis: The failure to properly classify the MSIVs as risk significant and implement MSIV diagnostic testing in accordance with the AOV program procedure EGR-NGGC-0205 was a PD. The PD is more than minor because it is associated with the equipment performance attribute of the Mitigating Systems cornerstone and affected the cornerstone objectives of ensuring the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. The finding is also associated with the containment isolation barrier performance attribute of the Barrier Integrity cornerstone and affected the cornerstone objective of providing reasonable assurance that physical design barriers protect the public from radionuclide releases caused by accidents or events. Specifically, the failure to conduct periodic diagnostic testing that would have identified long-term internal valve degradation due to unexpected corrosion/oxidation of the valve piston rings in all three MSIVs resulted in two MSIVs failing to initially close during TS stroke time testing on April 21, 2012, and excessive internal friction in all three MSIVs such that they may not have been capable of performing their safety-related closure function during certain design basis events.

Using IMC 0609, Appendix A, “The Significance Determination Process for Findings At Power,” the inspectors determined that there was an actual loss of safety function greater than the TS allowed outage time associated with the finding which required a more detailed risk evaluation. A detailed SDP phase 3 risk evaluation was performed by a regional senior reactor analyst in accordance with the guidance of IMC 0609 Appendix A, using the latest NRC Shearon Harris Standardized Plant Analysis Risk (SPAR) model and the Saphire 8 risk analysis code. The fire risk was estimated using input from the licensee’s Fire Probabilistic Risk Assessment (PRA) model. The major assumptions in the analysis included:

1. An exposure period of 265 days which utilized a T/2 exposure determination due to the long term nature of the degradation and the fact that the exact time of MSIV inoperability was indeterminate.
2. Licensee re-analysis of the likelihood of Pressurized Thermal Shock failure of the reactor vessel given the PD produced results which were approximately three

orders of magnitude less than the risk of SGTR and was not a significant contributor to the risk of the PD.

3. Fire scenarios which could result in spurious opening of multiple atmospheric or condenser steam dump valves were quantified.
4. Seismic and Tornado/High wind scenarios were considered potential MSLB initiators however the resultant risk was a small contributor to the risk of the PD.
5. The risk analysis assumed an industry average MSLB frequency of 8.07E-3/year. This included MSLB inside and outside of containment.
6. MSLB was considered to result in a consequential SGTR with a likelihood of 5E-2.
7. For the SGTR sequences, steam line isolation downstream of the MSIVs was procedurally directed and was incorporated into the PD modeling with a failure probability of 1E-1.
8. For the MSLB sequences, no isolation downstream of the MSIVs was credited and the turbine driven auxiliary feedwater pump was considered unavailable.
9. The Refueling Water Storage Tank (RWST) and the Reactor Makeup Water Storage Tank refill function were modeled as Human Error Probability (HEP) events with low dependency for an overall failure probability of 1.1E-4 which was equivalent to the value used in the licensee's PRA.
10. The SGTR sequence which is a late failure of High Pressure Injection (HPI) following depletion of the RWST and failure to refill is not considered a LERF sequence as the timing of core damage is significantly longer than the time to evacuate the emergency planning zone under worse case conditions.

The dominant CDF sequence was a MSLB resulting in a consequential SGTR with success of reactor trip, feedwater, early HPI, and failure of steam generator isolation due to the PD and failure of downstream isolation with late HPI failure after RWST depletion and failure to refill the RWST. The dominant LERF sequence was a MSLB resulting in a consequential SGTR with success of reactor trip and early HPI with failure of feedwater leading to core damage and failure of steam generator isolation due to the PD resulting in a large early release. The risk was mitigated by several factors. Licensee's procedures incorporated specific guidance for steam line isolation downstream of the MSIVs given MSIV failure. Also the RWST is very robust with a large volume, many cues are available to direct the operators to refill if necessary, and procedural guidance exists to reduce safety injection flow which prolongs the need to refill the RWST for many hours. These factors all taken together reduce the likelihood that the operators would fail to refill the RWST to continue cooling the reactor using feed and bleed. The result of the analysis of the risk of the PD was a delta CDF of <1E-6/year and a delta LERF of <1E-7/year, a GREEN finding.

No cross-cutting aspect was assigned to this finding because licensee decisions made in regard to classifying the MSIVs in the AOV program were made more than three years ago and therefore, not reflective of current plant performance.

Enforcement: TS 3.7.1.5 requires that each MSIV shall be operable when operating in Modes 1, 2, 3, and 4. With one MSIV open and inoperable, operation may continue provided the inoperable MSIV is either closed (applicable in Modes 2, 3, or 4) or restored to an operable condition within 4 hours (applicable in Mode 1), otherwise be in Hot Standby within the next 6 hours and in Hot Shutdown within the following 6 hours.

Contrary to the above, between November 8, 2010 through April 21, 2012 while operating in Modes 1, 2, 3, and 4, one or more MSIVs were inoperable for a time in excess of four hours, and a plant shutdown was not completed in accordance with the action statement of TS 3.7.1.5. Specifically, during TS required surveillance testing on April 21, 2012 while the unit was in a refueling outage, two MSIVs failed to initially close and excessive internal friction was found in all three MSIVs due to unexpected corrosion/oxidation of the valve piston rings. Based on this, the NRC concluded that the MSIVs were inoperable for at least a period of time in excess of the TS allowed outage time between November 8, 2010 through April 21, 2012. The licensee conducted repairs of all three MSIVs and restored them to an operable condition prior to entering Mode 4 following the completion of an ongoing refueling outage. Because this violation was of very low safety significance and it was entered into the licensee's CAP as NCRs 531773 and 536078, this violation is being treated as an NCV, consistent with Section 2.3.2 of the NRC Enforcement Policy (NCV 05000400/2012009-01), Technical Specification Inoperability of MSIVs Due to Failure to Conduct Diagnostic Testing.

4OA6 Management Meetings

Exit Meeting Summary

On October 25, 2012, the inspectors presented the inspection results to Mr. George Hamrick, and other members of the licensee staff via telecom. The inspectors confirmed that proprietary information was not provided or examined during the inspection period.

On October 31, 2012, the inspectors presented the final inspection results to Mr. John Caves by telecom.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee personnel

D. Corlett, Supervisor, Licensing/Regulatory Programs and Acting Manager, Support Services
J. Dufner, Director, Engineering
D. Griffith, Training Manager
G. Hamrick, Vice President Harris Plant
E. Kapopoulos, Plant General Manager
B. McCabe, Manager, Nuclear Oversight
K. Miller, Supervisor, Engineering Programs
M. Robinson, Superintendent, Environmental and Chemistry
J. Warner, Manager, Outage and Scheduling
F. Womack, Manager, Operations

NRC personnel

R. Musser, Chief, Reactor Projects Branch 4, Division of Reactor Projects, Region II
J. Austin, Senior Resident Inspector, Harris

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened and Closed		
05000400/2012009-01	NCV	Technical Specification Inoperability of MSIVs Due to Failure to Conduct Diagnostic Testing (4OA5.2)
Closed		
0500400/2012008-01	URI	"B" and "C" MSIVs Fail to Close During Surveillance Testing (4OA5.2)

LIST OF DOCUMENTS REVIEWED

Section 4OA5: Other Activities

Procedures

CAP-NGGC-0205, Condition Evaluation and Corrective Action Process, Rev. 15
CM-M0062, Main Steam Isolation Valve Operator, Rev. 14
CM-M0061, Main Steam Isolation Valve Disassembly and Maintenance, Rev. 10 and Rev. 11
EGR-NGGC-0205, Air Operated Valve Reliability Program, Rev. 7
OST-1018, Main Steam Isolation Valve Operability Test Quarterly Interval Mode 1, Rev. 10
PM-I0054, Air Operated Valve Diagnostic Testing, Rev. 1

Other Documents

VM-MEE, Actuators Vendor Manual, Rev. 22
VM-BKK, Valves, MSIV Vendor Manual, Rev. 13
Drawing 1364-002092, 32 Inch Main Steam Isolation Valve, Rev. 10
WO #1655708, 1MS-82 "B" MSIV Failed to Completely Close
WO #1543021, 1MS-82 Need to Adjust Hydraulic Controls per CM-M0062
WO #1543019, 1MS-80 Troubleshoot Failure to Stroke Open from the MCB
WO #1144188, 1MS-84 Increase Air Pressure to Actuator
WO #203491, "C" MSIV (1MS-84) Will Not Open, Investigate and Repair