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U. S. Nuclear Regulatory Commission
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Subject: Duke Energy Carolinas, LLC (Duke Energy)
McGuire Nuclear Station, Units 1 and 2
Docket Nos. 50-369 and 50-370
Snubber Program Plan for the Fourth Ten-Year Inservice Testing (IST) Interval

In accordance with the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code), Subparagraph ISTA-3200(a), McGuire Nuclear Station is submitting for your information a copy of McGuire Administrative Procedure AD-EG-MNS-1618, "McGuire Nuclear Station Snubber Program Plan." The fourth ten-year IST interval for Units 1 and 2 started on March 1, 2014.

In accordance with Title 10 of Code of Federal Regulations, Part 50, Section 55a(b)(3)(v)(B), the program was developed to satisfy the snubber preservice and inservice testing and examination requirements of the ASME OM Code 2004 Edition through 2006 Addenda.

There are no regulatory commitments contained in this letter or its attachment. Questions regarding this submittal should be directed to P. T. Vu, McGuire Regulatory Affairs at (980) 875-4302.

Very truly yours,

Steven D. Capps

Attachment

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ATTACHMENT

MCGUIRE ADMINISTRATIVE PROCEDURE AD-EG-MNS-1618
MCGUIRE NUCLEAR STATION SNUBBER PROGRAM PLAN
REVISION 001



Information Use

MCGUIRE UNIT 0
ADMINISTRATIVE PROCEDURE

AD-EG-MNS-1618

**MCGUIRE NUCLEAR STATION
SNUBBER PROGRAM PLAN**

REVISION 001

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REVISION SUMMARY
PRR 02077257
DESCRIPTION
<p>The following changes were incorporated:</p> <ul style="list-style-type: none"> • Replaced reference to 10 CFR 50.71(e) with 10 CFR 50.59, per NTM 2076379. • Added information to Section 5.7.2.c pertaining to the service life extension of mechanical snubbers beyond the OEM recommendation of 40 years. • Added Reference 18 for <u>CSD-EG-MNS-1618</u>. Added reference to CSD throughout document, as required. • Corrected reference to Model Work Order # 396293 in Attachment 1. • Deleted Attachments 2 and 3; snubber lists for Units 1 and 2 were moved to <u>CSD-EG-MNS-1618</u>. • Added References 7.3.8 and 7.3.9 for PSA Mechanical snubber documents DR 1319 and DR 3020 pertaining to the OEM recommendations for service life extension of mechanical snubbers. • Other minor writers manual changes.

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1.0 PURPOSE

Purpose of Snubber Program Plan is to define methods used to develop, administer, and implement Snubber Program at McGuire Nuclear Station (MNS) Units 1 and 2. This document provides a systematic approach for implementing visual examinations, operability testing, and service life monitoring for snubber population at MNS, as well as general guidelines for executing program responsibilities, corrective actions, and record keeping, for compliance with regulatory requirements.

2.0 SCOPE

1. NRC endorses ASME Code for Operation and Maintenance of Nuclear Power Plants (i.e., ASME OM Code, 2004 Edition through 2006 Addenda) for inspection and testing of snubbers, as stipulated in 10CFR50.55a and NUREG-1482. Specifically, ASME OM Code Subsections ISTA and ISTD govern snubber examination and testing activities for MNS. This is effective for the fourth 10-year IST interval for Units 1 & 2, which had a start date of March 1, 2014.
2. This program envelopes scope described in ASME OM Code, 2004 edition through 2006 addenda, Subsection ISTA, Article ISTA-1100, which is defined as the following:
 - a. Snubbers used in systems that perform a specific function in shutting down a reactor to the safe shutdown condition.
 - b. Snubbers used to maintain the safe shutdown condition.
 - c. Snubbers employed to mitigate the consequences of an accident.
 - d. Snubbers used to ensure the integrity of reactor coolant pressure boundary.
3. MNS Snubber Program Plan also applies to snubbers addressed in MNS Selected Licensee Commitment (SLC) 16.9.15. MNS SLC 16.9.15 addresses all snubbers except those installed on Non-Safety Related systems, which may be excluded provided their failure or failure of system on which they are installed would not have an adverse effect on any Safety Related system. Based upon design criteria referenced in Design Specification MCS-1144.30-00-0001, all snubbers falling within MNS SLC scope are enveloped by either QA Condition 1 or 4 classifications. MNS SLC scope conservatively includes all QA Condition 1 and 4 snubbers, including Seismic Category II snubbers classified as QA Condition 4 which may be excluded on basis of having no adverse effect on Safety Related systems. Any such exclusions from MNS SLC activities shall be documented on a case by case basis.

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2.0 SCOPE (continued)

4. In keeping with good engineering practice and to provide reasonable assurance of structural reliability, any remaining snubbers not identified above (i.e., Non-Safety Related) may be included and inspected/monitored as part of MNS Snubber Program.

3.0 DEFINITIONS

1. **Acceptable:** A snubber that has been examined or tested, and is shown to meet examination or testing acceptance criteria.
2. **Accessible:** Snubbers that can be readily examined or tested during normal plant operations without exposing plant personnel to undue hazards or dose, or placing operating equipment at risk.
3. **Defined Test Plan Group (DTPG):** A population of snubbers selected for testing in accordance with the snubber testing sample plan.
4. **Degraded:** Any snubber that has an examination or testing parameter that is approaching, but has not exceeded the limits of the acceptance criteria.
5. **Failure Mode Group (FMG):** A group of snubbers that have failed and those other snubbers that have similar potential for similar failure.
6. **Inaccessible:** Snubbers that are located in environments which make it impractical for the snubbers to be examined under normal plant operations without exposing plant personnel to undue hazards (e.g., radiation or extreme heat) or putting plant equipment at risk.
7. **Safety-Significant Snubbers:** Snubbers designated as Non-Safety Related but determined that their failure or the failure of the system on which they are installed would have an adverse effect on any safety-related system.
8. **Service Life:** The period of time a snubber is expected to meet the operational readiness requirements without maintenance.

3.0 DEFINITIONS (continued)

9. **Transient Dynamic Event:** An unexpected or potentially damaging occurrence, which was determined from reviews of operating data or during a visual inspection/examination such as a water/steam hammer, earthquake or similar event.
10. **Unacceptable:** Snubbers that do not meet examination or testing acceptance criteria.

4.0 RESPONSIBILITIES

NOTE

The general roles and responsibilities for the execution of Nuclear Generation Department (NGD) Engineering Programs are outlined in AD-EG-ALL-1600, Engineering Programs and PD-EG-ALL-1618, Snubber Program.

Specific activities and responsibilities for those organizations and individuals that are involved with the implementation of the Snubber Program at MNS are outlined below.

4.1 Plant Engineering Supervisor

1. Ensures that Snubber Programs are effectively managed and implemented to meet regulatory, process, and procedure requirements.

4.2 Fleet Snubber Program Manager

1. Provides governance and oversight of the site Snubber Programs.
2. Provides strategic and technical direction to the site Snubber Program Managers.
3. Develops fleet Snubber Program Health Report.
4. Reviews site Snubber Program Health Reports.

4.3 Plant Snubber Program Manager

1. Maintains qualifications in accordance with MNS training program requirements.
2. Establishes, prepares, and maintains snubber testing and examination Program Plans, implementing procedures, and schedules.

4.3 Plant Snubber Program Manager (continued)

3. Assigns examination and testing requirements for snubbers, as identified in the MNS Snubber Program Plan.
4. Maintains the IDDEAL Software Suite Database (SnubbWorks®) for snubbers.
5. Coordinates the performance of scheduled and non-scheduled snubber examination and testing activities, as well as preventive maintenance and condition monitoring activities.
6. Selects and identifies snubbers for examination, testing, and service life activities.
7. Reviews test and examination results for acceptability.
8. Evaluates results of examinations and tests which fail to meet acceptance criteria.
9. Performs operability/functionality evaluations for snubbers, as required.
10. Generates corrective actions:
 - a. Action Requests (ARs)
 - b. Nuclear Condition Reports (NCRs)
 - c. Work Requests (WRs) in support of Program activities
11. Determines the extent of additional examinations, tests, or repairs which may be required following the discovery of an unacceptable snubber condition.
12. Establishes, monitors, and tracks the service life of installed snubbers through the Service Life Monitoring Program.
13. Prepares the scope lists for snubber functional testing and visual examination activities.
14. Provides pertinent information to the implementing work groups.
15. Selects the snubber populations to be examined and tested.
16. Identifies the applicable procedures required to satisfy the examination or testing requirements, per the MNS Snubber Program Plan.

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4.3 Plant Snubber Program Manager (continued)

17. Submits the required snubber work scope to the On-Line work management, Outage work management, and Planning work groups.
18. Manages the scope, including content, additions, deletions, expansions, and corrections of the snubber work scope.
19. Compares current recorded results with the prior or expected results to determine snubber continued service and/or corrective actions.
20. Identifies Licensing or Code requirements which cannot be achieved due to impracticality or hardship and initiates actions (i.e., Relief Request) necessary to notify the Nuclear Regulatory Commission (NRC).
21. Establishes industry contacts with ASME OM Code committee representatives, peers at other nuclear utilities, and outside consultants to ensure that the Snubber Program effectively utilizes external Operating Experience (OE).
22. Reviews plant design changes and revises the MNS Snubber Program Plan, as required.
23. Performs functionality evaluations for snubbers, as required.

4.4 Plant Maintenance

1. Ensures that snubber functional testing is performed in accordance with the applicable station procedures.
2. Records the results of the snubber tests, examinations, and as-found or as-left conditions of the snubber, in accordance with the appropriate station procedures.
3. Reports findings on the appropriate data sheet(s) and notifies the Snubber Program Manager.
4. Repairs, rebuilds, or replaces snubbers, as required by the Snubber Program.

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4.5 Plant Design Engineering

1. Performs operability/functionality evaluations on piping systems or components.
2. Notifies Snubber Program Manager of plant design changes that may impact the Snubber Program.

4.6 Plant Regulatory Affairs

1. Provides licensing support of the Snubber Program.
2. Processes relief requests.
3. Submits Snubber Program Plan documents to Regulatory Authorities.

5.0 INSTRUCTIONS

5.1 General

1. For the purposes of this procedure, Snubber Program Manager refers to a (qualified) designee or other person assigned to complete any procedural requirement identified herein. Snubber Program Managers shall be qualified in accordance with applicable MNS Program Engineering requirements. [Ref. ISTA-1500(e)]
2. ASME OM Code requirements are identified and administered by the implementation of this document.
3. This document (i.e., MNS Snubber Program Plan) contains the overall details and implementation requirements for examination, testing, and service life monitoring of snubbers. The plan details the appropriate snubber categorization, the examination and test plan(s) required to be performed each refueling cycle, and service life monitoring of all plant installed snubbers.
4. During the 10-year interval between required program updates, the MNS Snubber Program Plan may periodically be subject to revision. Reasons for revision include, but are not limited to:
 - a. Incorporation of Relief Requests
 - b. Incorporation of Code Cases
 - c. NRC Regulatory Guides, Notices, and Bulletins
 - d. Augmented examinations
 - e. Organizational/Responsibility changes
 - f. Plant License changes
 - g. Snubber replacements
 - h. Snubber Service Life Monitoring updates
 - i. Modifications to the plant that impact the Snubber Program

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5.1 General (continued)

5. Generation and revision to MNS Snubber Program Plan shall be made in accordance with applicable corporate and MNS site procedures.
 - a. MNS Snubber Program Plan is incorporated by reference into SLC 16.9.15 and is therefore subject to the control of 10 CFR 50.59.

5.2 Snubber Program Plan

1. Each NGD site is responsible for generation and maintenance of the Snubber Program Plan, herein referred to as the Program.
2. MNS Snubber Program Plan is developed and maintained in accordance with AD-DC-ALL-0201, Development and Maintenance of Controlled Procedure Manual Procedures.
3. During the implementation of the MNS Snubber Program Plan, and generally within six months of completing a refueling outage, the MNS Snubber Program Plan and/or respective Controlled Supporting Documents (CSDs) shall be revised, as applicable. All updates shall be documented in the MNS Snubber Program Plan or CSD Revision History.
4. 10-Year Updates:
 - a. Once every 10 years, Snubber Program shall be updated to comply with edition and addenda specified in 10CFR50.55a.
 - b. Snubber program intervals are concurrent with ASME Section XI 10-year intervals. Fourth interval for Units 1 & 2 began on March 1, 2014, at which time program and this document was updated to incorporate 2004 edition through 2006 addenda of ASME OM Code as governing commitment.
 - c. Snubber Program Plans for each 10 year interval shall be filed with regulatory authorities in accordance with ASME OM Code requirements. Submittal shall consist of latest revision to this document (i.e., AD-EG-MNS-1618), as required by ASME OM Code, Article ISTA-3200. Other pertinent articles of ASME OM Code, Subsection ISTA, include 1300, 3110, 9220, and 9230.
5. Changes to program testing or inspection methodologies may require MNS Snubber Program Plan to be re-submitted to regulatory authorities.

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5.3 IDDEAL Software Suite

1. IDDEAL Software Suite is a non-QA software program that is governed in accordance with AD-IT-ALL-0002, Software Quality Assurance (SQA) Program Administration.
2. IDDEAL Software is used to:
 - a. Store component information, examination and testing history, and examination and testing schedules.
 - b. Administer and implement Inservice Inspection (ISI), Inservice Testing (IST), Snubber, and Balance of Plant (BOP) Programs.
3. SnubbWorks® (one of the IDDEAL applications) is a Microsoft® Access based computer program used as a tool to manage Snubber Program information. This software program is used to organize pertinent data and records to assist with snubber examination, testing, and service life monitoring purposes. Information contained in SnubbWorks® is not QA, but can be used to produce documents or lists which, when verified, can be used as QA records.
4. Examination and test reports may be generated by SnubbWorks® software to document examination and test results.

5.4 Test and Examination Scheduling

1. Test and examination scheduling routinely coincides with refueling outages. Performing testing and examinations during refueling outages allows for improved accessibility, environmental conditions conducive for examination methods, and reduced exposure (ALARA).
2. Examinations and functional testing may be performed during plant operation or during refueling outages, as conditions allow. Functional testing for test plan credit may begin no earlier than 60 days prior to scheduled start of a refueling outage.
3. Snubber examination and testing activities at MNS are scheduled via predefined model Work Orders. Attachment 1 provides information regarding definitions and scheduling of snubber examination Work Orders.

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5.5 Snubber Categorization

1. Snubbers at MNS are considered a single population (for each unit) for examination intervals outlined in ASME OM Code, Subsection ISTD, Table 4252-1. In accordance with ASME OM Code, Article ISTD-4220, snubbers are categorized as accessible or inaccessible for workload reduction during outages.
 - a. Decision to examine all snubbers as a single population or as separate categories shall be clearly documented prior to start of scheduled examination, and may not be changed during examination.
 - b. When recombining categories into one population, shorter interval of categories shall be used.
 - c. Categorization is in accordance with ASME OM Code, Article ISTD-4220.

5.6 Visual Examination

1. Visual examinations shall be performed in accordance with ASME OM Code, Subsection ISTD, to verify that no visible indications of damage or impaired functionality exist and attachments to foundation or support structure are secure.
2. Visual examinations and minor maintenance activities for snubbers shall be conducted in accordance with MNS Procedure PT/O/A/4200/006, Inservice Visual Inspection and Minor Maintenance of Safety Related Snubbers, which meets requirements outlined in ASME OM Code, Subsection ISTD.
3. Visual examinations are currently performed during every other outage for inaccessible snubbers, and just prior to corresponding outage for accessible snubbers.
4. Visual examination of as-found conditions shall be performed prior to disconnecting or removing any snubber, to determine presence of visible damage or impaired functional ability due to physical damage, leakage, corrosion, or degradation from environmental exposure or operating conditions, and to document position of snubber with respect to compression/extension.

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5.6 Visual Examination (continued)

5. Snubbers with unacceptable visual examination results may be evaluated by performing operational readiness testing (i.e., functional testing) in as-found condition. In accordance with ASME OM Code, Article ISTD-4240, snubbers satisfying operational readiness testing acceptance criteria may be reclassified as acceptable visual examinations.
6. Hydraulic snubbers found with fluid port uncovered, and all hydraulic snubbers found connected to a non-functional common reservoir, shall be classified as unacceptable and may be reclassified acceptable by functionally testing each snubber starting with piston in as-found setting, extending piston rod in tension direction.
7. In accordance with ASME OM Code, Subsection ISTD, Articles 4270 and 4280, Snubber Program Manager (or designated individual knowledgeable in snubber operability requirements) shall perform an evaluation for any snubber identified as not meeting acceptance criteria.
 - a. An evaluation shall be performed to determine type and cause of visual examination discrepancy and effect on operability of snubber and related components.
 - b. If unacceptable condition is determined to be generic, then additional examinations may be required, or a Work Request may be generated to correct any discrepancies found, as appropriate.
 - c. For any snubber determined to be unacceptable or unsatisfactory, Snubber Program Manager or designee shall initiate a NCR.
8. Following completion of each visual examination interval, results shall be reviewed for compliance with ASME OM Code, Subsection ISTD, Table 4252-1 to verify that interval duration is acceptable.
 - a. All snubbers identified during visual examination interval which do not meet specified acceptance criteria shall be considered in this review.
 - b. Appropriate corrective actions shall be taken if examination results dictate truncation of an extended interval.

5.6 Visual Examination (continued)

9. An augmented scope is invoked in cases where a visual examination is to be performed as a supplemental scope, outside of program requirements.
10. ASME OM Code Case OMN-13, Requirements for Extending Snubber Inservice Visual Examination Interval at LWR Power Plants, hereafter referred to as OMN-13, allows extension of visual examination interval beyond maximum allowed by ASME OM Code, Subsection ISTD. MNS Snubber Program Plan does not currently utilize OMN-13. When OMN-13 is implemented for snubber population at MNS, this document (AD-EG-ALL-1618) shall be revised to document program provisions.

5.7 Service Life Monitoring**NOTE**

MNS Snubber Program Plan includes a Service Life Monitoring component which addresses requirements outlined in ASME OM Code, Article ISTD-6000.

1. An estimated service life has been established for each installed snubber within program scope.
 - a. Snubber service life shall be reviewed by Snubber Program Manager prior to each fuel cycle.
 - b. Snubbers that will reach end of service life during upcoming cycle shall be identified for replacement or refurbishment.
2. Previously established service life durations for installed snubbers shall be evaluated prior to each fuel cycle for continued applicability. Snubber listing shall be updated to reflect evaluation results, and evaluation methodology / basis for conclusions shall be clearly documented in an outage summary NCR.
 - a. For hydraulic snubbers, estimated seal life is generally governing factor for overall service life. Seal life is based on Original Equipment Manufacturer (OEM) recommendations, actual experience, or seal life studies. A 25 year seal life is generically assumed for hydraulic snubbers, with certain exceptions as noted in listing due to actual experience under severe conditions.

5.7 Service Life Monitoring (continued)

- b. A projected seal life of 41.6 years was established for Steam Generator (SG) snubbers, based on a study of Lisega Model 314807 snubbers installed on SGs at MNS Unit 2. This study is documented in CNC-1232.00-00-0151, Attachment 1.
- c. For mechanical snubbers, an initial generic service life of 40 years from date of manufacture was assumed as a baseline, per OEM recommendations.
 - (1) PSA mechanical snubbers have an original manufacturer recommended service life of 40 years. However, data is insufficient to accurately predict an exact end of service life for mechanical snubbers. As such, MNS periodically hand strokes mechanical snubbers to ensure freedom of movement and identify degradation (reference MNS Procedure PT/0/A/4200/035).

Using MNS Procedure PT/0/A/4200/035, the entire mechanical snubber population at MNS is hand stroked over a period of two cycles (Unit 1) and four cycles (Unit 2), and results are evaluated to validate suitability for the next two/four cycle period. As a result of hand stroking, any snubbers considered to be degraded are subsequently scheduled for replacement with an equivalent capacity hydraulic snubber, where practicable.

The practice of regularly hand stroking mechanical snubbers ensures that the installed population remains functional. Hand stroking also serves to distribute internal lubricant of mechanical snubbers, thus extending service life. With consideration to the hand stroking frequency at MNS and replacement of degraded mechanical snubbers, service life for the remaining mechanical snubber population is generically assumed to be 60 years in Snubbworks, while the actual acceptability of service life extension is established through the hand stroking program.

- (2) Snubbers in severe (i.e., high vibration) applications have previously been replaced with hydraulic snubbers, and this will continue to be the practice where applicable.

5.7 Service Life Monitoring (continued)

- d. Historical data should be reviewed to identify any trends regarding service life values.
3. If service life of any snubbers will be exceeded prior to next scheduled system or plant outage, one of the following actions shall be taken:
 - a. Snubbers shall be replaced with a snubber for which service life will not be exceeded before next scheduled system or plant outage.
 - b. Technical justification shall be documented for extending service life to or beyond next scheduled system or plant outage.
 - c. Snubbers shall be reconditioned such that service life will be extended to or beyond next scheduled system or plant outage.
 4. Each outage summary shall address service life for all applicable snubbers, including those scheduled for replacement / service life extension and those whose service life will not be exceeded prior to either next refueling outage or next scheduled maintenance activity.

5.8 Operational Readiness Testing

1. Safety Related snubber population shall be tested for operational readiness during each fuel cycle, to verify that:
 - a. Activation (restraining action) is achieved within specified range in both tension and compression, except that inertia-dependent acceleration-limiting mechanical snubbers may be tested to verify only that activation takes place in both directions of travel.
 - b. Snubber bleed or release rate, where required, is present in both tension and compression, within specified range.
 - c. Where required, force required to initiate or maintain motion of snubber is within specified range in both directions of travel.
 - d. For snubbers specifically required not to displace under continuous load, ability of snubber to withstand load without displacement.

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5.8 Operational Readiness Testing (continued)

2. Non-Safety Related snubbers may be tested at discretion of Snubber Program Manager.
3. Operational readiness testing shall be performed in accordance with testing sample plans defined in Section 5.9.
4. Test scheduling shall be established in accordance with Section 5.4. In accordance with ASME OM Code, Article ISTD-5240, snubber testing may begin no earlier than 60 days before a scheduled refueling outage.
5. Snubbers shall be tested in their as-found condition regarding parameters to be tested to fullest extent practicable.
 - a. Test methods shall not alter condition of a snubber to extent that results do not represent as-found snubber condition.
 - b. Pipe snubbers shall be removed from field installation and bench tested in accordance with MNS Procedure MP/0/A/7650/232 or MP/0/A/7650/228, as applicable.
 - c. Snubbers shall not be subjected to prior preventive or corrective maintenance (i.e., pre-conditioning) specifically for purpose of meeting applicable examination or testing requirements. Verification of freedom of motion upon snubber removal is not considered to be pre-conditioning.
6. Large Bore SG snubbers shall be tested by removing control valves per Procedure MP/0/A/7650/190, which are then bench tested in a surrogate snubber using Procedure MP/0/A/7650/228. Correlation of surrogate test data to actual service criteria is performed in accordance with site specifications and OEM recommendations.
7. Snubbers that are maintained or repaired by removing/adjusting a part that can affect results of applicable tests required by this program, shall be examined/tested before returning to service. Applicable installation requirements shall also be met. Requirements selected shall ensure that affected parameters are verified to be acceptable through examination/testing.
8. Applicable site maintenance procedures shall govern removal and reinstallation of plant installed snubbers. MNS Procedure MP/0/A/7650/051 is governing procedure for all support/restraint removal/restoration activities.

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5.8 Operational Readiness Testing (continued)

9. Each snubber shall have an as-found visual examination performed prior to removal activities and an as-left visual examination following reinstallation, in accordance with MNS Procedure MP/0/A/4200/006.
10. For each Safety Related snubber determined to be unacceptable by operational readiness testing, additional snubbers shall be tested in accordance with ASME OM Code, Article ISTD-5270. Number of additional snubbers tested is dependent upon testing sample plan being utilized.
 - a. Unacceptable (i.e., failed) snubbers shall be evaluated and documented in accordance with Corrective Action Program (NCR).
 - b. An engineering evaluation shall be performed on System, Structure, or Component (SSC) to which unacceptable snubbers are attached.
 - (1) Engineering evaluation is performed to determine whether SSC to which inoperable snubbers are attached was adversely affected by inoperability of snubbers, to ensure that SSC remains capable of meeting designed service.
11. If a snubber selected for functional testing either fails to activate or fails to move (i.e., frozen-in-place), cause shall be evaluated and, if caused by manufacturer or design deficiency, all snubbers of same type and subject to same defect shall be evaluated to ensure functionality.
12. For Non-Safety Related snubbers determined to be unacceptable by operational readiness testing, additional tests may be required to address extent of condition and service life concerns in accordance with Corrective Action Program. Requirement for additional testing shall be determined by Snubber Program Manager.
13. Degraded snubbers should be replaced with new snubbers as a preventive maintenance action. Scope expansion is not required for degraded snubbers unless deemed necessary to address extent of condition concerns. Additional snubbers may be tested or replaced at discretion of Snubber Program Manager, based on cause of degradation and potential impact on service life assumptions. Information gathered from degraded snubbers shall be considered in service life monitoring program, as applicable.

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5.8 Operational Readiness Testing (continued)

14. Test equipment failure during functional testing may invalidate all testing performed during respective day, unless it can be determined exactly when failure occurred and which snubbers were affected. Failed testing equipment shall be repaired or replaced.
15. Initial test performed for an inservice snubber test shall be maintained as as-found test of record. If multiple tests are performed for any reason, all test results shall be saved and documented. Copies of all tests shall be included with test procedure records, and reason for performing multiple tests shall be documented. Snubber Program Manager may provide additional comments or justification as an attachment to procedure, as required.
16. Test results shall be reviewed for adverse trends, to help establish service life for specific snubbers or locations.
17. Snubbers placed in same locations as snubbers which failed previous functional test shall be retested at time of next scheduled functional test, unless cause of failure is clearly established and corrected. Such snubbers shall not be considered as part of functional testing sample.
18. Each snubber in a parallel or multiple-snubber installation shall be identified and counted individually.
19. Fractional sample sizes shall be rounded up to next integer.

5.9 Defined Test Plan Group (DTPG)

1. DTPGs shall include all Safety Related (QA Condition 1 or 4) snubbers, with exception of replacement snubbers and snubbers repaired/adjusted as a result of not meeting acceptance requirements, which shall be exempt for concurrent test interval.
2. Total Safety Related snubber population for each unit is divided into two DTPGs. All mechanical and hydraulic snubbers belong to a single DTPG, with exception of large bore Lisega SG snubbers, which are tested as a separate DTPG.

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5.10 Testing Sample Plans

1. Safety Related snubbers in each DTPG at MNS shall be tested in accordance with ASME OM Code, Subsection ISTD, as follows:
 - a. 37 testing sample plan for total snubber population, except for large bore Lisega snubbers on SGs.
 - b. 10% testing sample plan for large bore Lisega snubbers on SGs.

NOTE

If test plan selection is changed since Plan submittal to Regulatory Authorities, then it may be necessary that revised MNS Snubber Program Plan be re-submitted.

2. Initial sample selection shall be random, as described in ASME OM Code, Articles ISTD-5311 & 5411.
3. Test plans shall be selected for each DTPG before scheduled testing begins.
4. Test plan selected for a DTPG shall be used throughout refueling outage campaign for that DTPG and any Failure Mode Group (FMG) that is derived from it.
5. For unacceptable snubber(s), additional testing shall continue within DTPG or FMG, as described in Section 5.10.

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5.11 Sample Expansion

1. After determination that a snubber is unacceptable, an additional test plan sample shall be established. Additional test sample size shall be as required per ASME OM Code, Article ISTD-5270.
 - a. 37 Plan supplemental samples shall consist of either 18 or 19 snubbers, based on number of unacceptable snubbers and numerical expression provided in ASME OM Code, Article ISTD-5431, per ASME OM Code, Article ISTD-5412.
 - b. 10% Plan supplemental samples shall consist of an additional population of at least one-half size of initial sample from that DTPG population, per ASME OM Code, Article ISTD-5312.
2. In addition to required test plan sample expansion, a FMG test population may be established. In accordance with ASME OM Code, Articles ISTD-5272 & 5273, unacceptable snubbers may be categorized into a FMG containing all unacceptable snubbers with a given failure cause and all other snubbers vulnerable to same cause.

5.12 Snubber Replacement

1. Snubber replacement shall be performed in accordance with MNS Procedure MP/0/A/7650/051.
2. Any replacement or modified snubbers shall have a proven suitability for application and environment.
3. Replacement or modified snubbers shall be examined/tested prior to placing them into service. Test results shall be obtained from manufacturer for all new/rebuilt snubbers.

5.13 Snubber Deletion

1. Snubbers may be deleted from plant, based on analysis performed for affected piping system. When an unacceptable snubber is subsequently deleted prior to completion of test campaign, deleted snubber shall still be considered in its respective examination population, examination category, or FMG for determining corrective action.
2. Number of deleted snubbers failing/passing tests or examinations prior to being deleted shall be used in determining examination/testing frequencies.

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5.14 Transient Dynamic Events

1. During each outage, systems having potential to experience a severe dynamic event (specifically, main steam system (upstream of main steam isolation valves), main steam safety and power-operated relief valves and piping, auxiliary feedwater system, main steam supply to auxiliary feedwater pump turbine, and letdown and charging portion of NV system) shall be inspected to determine whether a severe dynamic event has occurred.
2. If an unanticipated dynamic event (e.g., water hammer, steam hammer, beyond Design Basis Event (DBE), etc.) occurs that may affect snubber operability, then affected snubbers and systems shall be reviewed and any appropriate corrective action taken. Event information, scope of review, and actions taken shall be documented in Corrective Action Program (NCR).
 - a. Program Manager shall notify System Engineer and/or Design Engineering to define extent of evaluation for affected system.
 - b. Snubbers within affected region shall be examined, stroked, or tested as deemed appropriate to address concern.
 - c. In many cases, condition monitoring stroke testing which has been planned/completed may sufficiently address concern.

6.0 RECORDS

1. Records of inspections, tests, repairs, and evaluations shall be maintained within appropriate Work Order. Work Orders are searchable in Consolidated Asset Suite (CAS) application by equipment number and/or PMID histories for appropriate unit.
2. Activity summaries and records of evaluations shall be documented in Corrective Action Program.

7.0 REFERENCES

7.1 Commitments

NOTE

Snubber program references for each applicable Plant/Unit are maintained in site specific Snubber Program Plans.

1. Code of Federal Regulations: 10CFR50.55a, Codes and Standards
2. MNS UFSAR Section 3.9.3.2.9
3. MNS Technical Specification Section 3.0.8
4. MNS Selected Licensee Commitment SLC 16.9.15

7.2 Procedures

1. AD-DC-ALL-0201, Development and Maintenance of Controlled Procedure Manual Procedures
2. AD-EG-ALL-1000, Conduct of Engineering
3. AD-EG-ALL-1006, Conduct Of Fleet Programs Engineering
4. AD-EG-ALL-1600, Engineering Programs
5. AD-EG-ALL-1618, Snubber Program Plan
6. PD-EG-ALL-1618, Snubber Program Description
7. AD-EG-ALL-1450, Preconditioning of Structures, Systems And Components
8. AD-EG-ALL-1202, Preventive Maintenance and Surveillance Testing Administration
9. AD-IT-ALL-0002, Software Quality Assurance (SQA) Program Administration
10. MP/0/A/7650/046, Hydraulic Snubber Corrective Maintenance
11. MP/0/A/7650/051, Mechanical and Hydraulic Snubber Removal, Maintenance and Installation
12. MP/0/A/7650/190, Steam Generator Lisega Snubber Maintenance Activities

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7.2 Procedures (continued)

13. MP/0/A/7650/228, Operation Of Barker/Diacon S-2000 Snubber Test Machine
14. MP/0/A/7650/232, Operability Testing Of Hydraulic Snubbers
15. MP/0/A/7650/233, ITT Grinnell Model 5434-3 Snubber Test Bench Calibration
16. PT/0/A/4200/006, Inservice Visual Inspection and Minor Maintenance of Safety Related Snubbers
17. PT/0/A/4200/035, Inspecting Mechanical Snubbers (Freedom Of Motion)
18. CSD-EG-MNS-1618, MNS Installed Snubber Listing

7.3 Miscellaneous Documents

1. ASME OM Code, Code for Operation and Maintenance of Nuclear Power Plants
2. ASME Section XI Code, Rules for Inservice Inspection of Nuclear Power Plant Components
3. Regulatory Guide 1.192, Operation and Maintenance Code Case Applicability, ASME OM Code
4. Regulatory Guide 1.193, ASME Code Cases Not Approved for Use
5. INPO EPG-07, Engineering Program Guide - Snubbers
6. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants - Inservice Testing of Pumps and Valves and Inservice Examination and Testing of Dynamic Restraints (Snubbers) at Nuclear Power Plants
7. MCS-1206.12-02-0001, Procedures, Supplemental Requirements and Tolerances for Fabrication and Erection of Pipe Supports and Restraints
8. DR 1319, Basic-PSA, Mechanical Shock Arrestors Standard Design Specification
9. DR 3020, Basic-PSA, Mechanical Shock Arrestors Service Life Extension Program and Preventive Maintenance Recommendations

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ATTACHMENT 1

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<< Pre-Defined Model Work Order Descriptions >>

Unit 1

Innage Work Scope:

- Model Work Order 390476, Visual examination of all accessible snubbers
- Model Work Order 398699, Seal Life Evaluation for all hydraulic snubbers
- Model Work Order 396295, Freedom of Motion (FOM) testing for all accessible snubbers

Outage Related Work Scope:

- Model Work Order 396292, Visual examination of all inaccessible snubbers
- Model Work Order 390475, Operability testing of DTPGs for general population/SG snubbers
- Model Work Order 396295, Freedom of Motion (FOM) testing for all inaccessible snubbers

Unit 2

Innage Work Scope:

- Model Work Order 390516, Visual examination of all accessible snubbers
- Model Work Order 398700, Seal Life Evaluation for all hydraulic snubbers
- Model Work Order 396294, Freedom of Motion (FOM) testing for all accessible snubbers

Outage Related Work Scope:

- Model Work Order 396293, Visual examination of all inaccessible snubbers
- Model Work Order 390517, Operability testing of DTPGs for general population/SG snubbers
- Model Work Order 396294, Freedom of Motion (FOM) testing for all inaccessible snubbers

Frequency of visual examinations is dependent upon previous examination results. Seal life evaluations are performed every cycle, for entire population of snubbers. Operability testing is performed every cycle for a random selection of snubbers using DTPGs identified for general snubber population and SG snubbers.

For Unit 1, FOM (i.e., stroke testing) is performed every cycle for 50% of mechanical snubber population, and is split into two rotating test groups: 1st 50% & 2nd 50%. 1st 50% group was initially stroke tested in 1EOC23. For Unit 2, FOM (i.e., stroke testing) is performed every cycle for 25% of mechanical snubber population, and is split into four rotating test groups: 1st 25%, 2nd 25%, 3rd 25%, & 4th 25%. 1st 25% group was initially stroke tested in 2EOC21.

It is noted that Predefined Work Orders do not identify scope of work as related to particular snubbers and supports. Unique Work Orders generated from models must have actual scope identified by Responsible Engineer, based upon random sample plans and past history. Frequency of Visual Inspection predefined work orders is also updated by Responsible Engineer as needed, based on the results of each inspection.