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10 CFR 50.55a

United States Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

McGuire Nuclear Station, Unit Nos. 1 and 2
Docket Nos. 50-369 and 50-370 / Renewed License Nos. NPF-9 and NPF-17

SUBJECT: Snubber Program Plan Revision, AD-EG-MNS-1618, "McGuire Nuclear Station Snubber Program Plan"

Pursuant to 10 CFR 50.55a(f)(5)(i), and in accordance with 10 CFR 50.55a(f)(7), Duke Energy Carolinas, LLC (Duke Energy) is submitting the revised snubber program plan, AD-EG-MNS-1618, "McGuire Nuclear Station Snubber Program Plan," for McGuire Nuclear Station, Units 1 and 2 (MNS). Revision 004 of AD-EG-MNS-1618 adopted American Society of Mechanical Engineers Operation and Maintenance (ASME OM) Code 2020 Edition and Code Case OMN-13 Revision 3 and was issued on July 11, 2024, which is the beginning of the fifth 10-year snubber program interval. Revision 005 of AD-EG-MNS-1618 corrected an editorial error discovered in Revision 004 and was issued on August 6, 2024.

This submittal contains no regulatory commitments.

Should you have any questions concerning this letter, or require additional information, please contact Ryan Treadway – Director, Fleet Licensing, at (980) 373-5873.

Sincerely,

Edward R. Pigott
Site Vice President
McGuire Nuclear Station

Enclosure:
1. AD-EG-MNS-1618, "McGuire Nuclear Station Snubber Program Plan," Revision 004
2. AD-EG-MNS-1618, "McGuire Nuclear Station Snubber Program Plan," Revision 005

cc: (with enclosure)

J. Klos, NRC Project Manager, NRR
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U.S. Nuclear Regulatory Commission
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RA-24-0185

Enclosure 1
AD-EG-MNS-1618, "McGuire Nuclear Station Snubber Program Plan," Revision 004

(39 pages including this cover)

Information Use

MCGUIRE UNIT 0

ADMINISTRATIVE PROCEDURE

SAFETY RELATED

AD-EG-MNS-1618

MCGUIRE NUCLEAR STATION
SNUBBER PROGRAM PLAN

REVISION 004

REVISION SUMMARY

PRR 02502929

DESCRIPTION

Rev 004

1. PRR 02502929 the following changes incorporated:
   - Revised and reorganized format for consistency across the fleet.
   - Corrected typographical and grammatical errors.
   - Updated to change interval alignment from IST to ISI interval and updated code references.
   - Revised periodicity of plan updates to remove specific limits.
   - Added examples of changes requiring resubmittal to regulators.
   - Added reference to SNU-MNS-1618-01 which supersedes CSD-EG-MNS-1618.
   - Added detail to SG snubber service life description.
   - Incorporated Code Case OMN-13.

Rev 003

1. PRR 02380040 - Changes incorporated for correction of typographical errors, enhancements desired for fleet consistency, and updated program requirements, as per PRR markup. Also reformatted Attachment 1 to standards.

Rev 002

1. PRR 02290357 (controlling) and including PRR 02308806 - changes were incorporated minor revisions/enhancements per fleet assessment SAST 02242216 as per PRR markup.

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1.0 PURPOSE

The purpose of the 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 the 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 GOVERANANCE AND SCOPE

1. The NRC endorses the ASME Code for Operation and Maintenance of Nuclear Power Plants for inspection and testing of snubbers, as stipulated in 10CFR50.55a and NUREG-1482. Specifically, ASME OM Code (Operation and Maintenance of Nuclear Power Plants), 2004 Edition through 2006 Addenda is the effective edition/addenda for the fourth 10-year IST interval for Units 1 & 2, which had a start date of March 1, 2014 and is planned to be extended by one year to March 1, 2025. The fifth 10-year snubber program interval will begin on the date of issuance of revision 5 of this procedure and the effective Edition is the 2020 Edition (with the inclusion of Code Case OMN-13 Revision 3). Future MNS snubber program interval updates will be aligned with the Unit 2 ISI update interval (the fifth ISI interval is scheduled to end February 28, 2034). Specifically, ASME OM Code Subsections ISTA and ISTD govern snubber examination and testing activities.

2. The program envelopes the scope described in the ASME OM Code Subsection ISTA, Article ISTA-1100, which is defined as those Snubbers used in systems that perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, in mitigating the consequences of an accident, or to ensure the integrity of the reactor coolant pressure boundary.

3. This procedure 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 the failure of the 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 the SLC scope are enveloped by either QA Condition 1 or 4 classifications. The SLC scope conservatively includes all QA Condition 1 and 4 snubbers, including some Seismic Category II snubbers classified as QA Condition 4 which may potentially be excluded based on having no adverse effect on Safety Related systems. Any such exclusions from SLC activities will be documented on a case by case basis.

2.0 GOVERANANCE AND 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 in the 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 (e.g., radiation or extreme heat) or placing operating equipment at risk.

3. **Activation:** The change of condition from passive to active, in which the snubber resists rapid displacement of the attached pipe or component.

4. **Defined Test Plan Group (DTPG):** A population of snubbers selected for testing in accordance with the snubber testing sample plan.

5. **Degraded:** Any snubber that has an examination or testing parameter that is approaching but has not exceeded the limits of the acceptance criteria.

6. **Drag Force:** The force that will sustain low-velocity snubber movement without activation throughout the working range of the snubber stroke.

7. **Failure Mode Group (FMG):** A group of snubbers that have failed and those other snubbers that have similar potential for similar failure.

8. **Fuel Cycle:** Time period beginning with the start of the reactor until the completion of the next refuel outage and subsequent restart.

9. **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.

10. **Release Rate:** The rate of the axial snubber movement under a specified load after activation of the snubber takes place.

3.0 DEFINITIONS (continued)

11. **Safety-Significant Snubbers:** Snubbers designated as Non-Safety Related but it is determined that their failure or the failure of the system on which they are installed would have an adverse effect on a Safety Related system.

12. **Service Life:** The period of time a snubber is expected to meet the operational readiness requirements at its installed location without maintenance.

13. **Snubber**: Dynamic restraints that are utilized to allow slow, constant movement of an attached component while providing rigid restraint against rapid motion due to dynamic loads.

14. **Test Campaign:** The series of actions required to complete the testing of DTPG samples for a specific cycle.

15. **Test Interval:** The period between completed test campaigns for a given DTPG.

16. **Unacceptable:** Snubbers that do not meet examination or testing acceptance criteria.

17. **Unanticipated Transient Dynamic Event:** Any unforeseen or unanalyzed event, such as (but not limited to) a steam hammer, water hammer, void collapse, or seismic event greater than design basis.

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 AD-EG-ALL-1618, Snubber Program Plan.
- 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 Fleet Engineering Programs - Snubber Program Manager

1. Ensures that the Snubber Program is effectively managed and implemented to meet regulatory, process, and procedure requirements.

2. Provides governance and oversight of the Snubber Program and provides strategic and technical direction to the site.

3. Maintains qualifications in accordance with the Program Manager's respective Engineering Support Personnel (ESP) Training Program in which they are enrolled. No additional qualifications specific to the Snubber Program Manager position exist at either the Fleet or Site levels.

4. Establishes, prepares, and maintains snubber testing and examination Program Plans, implementing procedures, and schedules.

5. Assigns examination and testing requirements for snubbers, as identified in the MNS Snubber Program Plan.

6. Maintains the IDDEAL Software Suite Database (SnubbWorks®) for snubbers.

7. Coordinates the performance of scheduled and non-scheduled snubber examination and testing activities, preventive maintenance and condition monitoring activities.

8. Selects and identifies snubbers for examination, testing, and service life activities.

9. Reviews test and examination results for acceptability.

10. Evaluates results of examinations and tests which fail to meet acceptance criteria.

4.1 Fleet Engineering Programs - Snubber Program Manager (continued)

11. Generates corrective actions:

    a. Action Requests (ARs)

    b. Nuclear Condition Reports (NCRs) Corrective Action Program (CR)

    c. Work Requests (WRs) in support of Program activities

12. Determines the extent of additional examinations, tests, or repairs which may be required following the discovery of an unacceptable snubber condition.

13. Establishes, monitors, and tracks the service life of installed snubbers and maintains the controlled listing in program document SNU-MNS-1618-01 (MNS Installed Snubber Listing).

14. Provides pertinent information to the implementing work groups.

15. Identifies the applicable procedures required to satisfy the examination or testing requirements, per the MNS Snubber Program Plan.

16. Identifies and submits the required snubber work scope to the appropriate On-Line work management, Outage work management, and Planning work groups.

17. Manages the snubber work scope, including content, additions, deletions, expansions, and corrections.

18. Compares current recorded results with the prior or expected results to determine snubber continued service and/or corrective actions.

19. 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).

20. 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).

4.1 Fleet Engineering Programs - Snubber Program Manager (continued)

21. Reviews plant design changes and revises the MNS Snubber Program Plan, as required.

22. Assists with Operability Evaluations for snubbers as required.

4.2 Site 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.

4.3 Site Design Engineering

1. Performs Operability Evaluations on piping systems or components per AD-OP-ALL-0105, Operability Determinations.

2. Notifies Snubber Program Manager of plant design changes that may impact the Snubber Program.

4.4 Regulatory Affairs

1. Provides licensing support of the Snubber Program.

2. Processes relief requests.

3. Submits Snubber Program Plan documents to Regulatory Authorities as required by code or rulemaking.

5.0 INSTRUCTIONS

5.1 General

1. For the purposes of this procedure, references to Snubber Program Manager means a designee or other person assigned to complete any procedural requirement identified in this procedure.

2. ASME OM Code requirements are identified and administered by the implementation of this document.

3. This document (i.e., The 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

5.1 General (continued)

5. Generation and revision to The Snubber Program Plan shall be made in accordance with applicable corporate and MNS site procedures.

   a. The 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. The Snubber Program Plan is developed and maintained in accordance with AD-DC-ALL-0201, Development and Maintenance of Controlled Procedure Manual Procedures.

3. On a periodic basis the Snubber Program Plan may be revised as applicable to update pertinent information. All updates shall be documented in the Snubber Program Plan's Revision History.

4. 10-Year Updates:

   a. Once every 10 years, the Snubber Program shall be updated to comply with edition and addenda specified in 10CFR50.55a.

   b. Snubber Program Plans for each 10 year interval shall be filed with regulatory authorities in accordance with ASME OM Code and 10CFR50.55a requirements, as applicable. Submittal shall consist of latest revision to this document (i.e., AD-EG-MNS-1618), with cover sheet information 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 the Snubber Program Plan to be re-submitted to the regulatory authorities. Changes that may require resubmittal include code revision updates, utilization of code cases or regulatory relief, revised test sample plans, or any changes that significantly alter the plan implementation from existing commitments. Routine periodic revisions to address items such as organizational changes or editorial items (updated references, correct typographical errors, formatting, etc) do not require resubmittal but may be submitted as a courtesy notification.

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.

   a. 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.

   b. Examination and test reports may be generated by SnubbWorks® software to document examination and test results.

5.4 Test and Examination Scheduling

1. An inservice test campaign shall be conducted every fuel cycle. Performing testing and examinations during refueling outages allows for improved accessibility, environmental conditions conducive for examination methods, reduced exposure (ALARA) and enhanced scheduling. Testing associated with each test campaign shall begin no earlier than 92 days before a scheduled refueling outage and shall be completed prior to completion of that refueling outage.

2. 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.

5.5 Snubber Categorization

1. For examination purpose snubbers at MNS are considered a single population (for each unit) for examination intervals outlined in ASME OM Code, Subsection ISTD, Table 4252-1. Alternatively the snubbers may be categorized into separate populations.

    a. A decision to examine snubbers as separate categories shall be clearly documented.

    b. Categorization determinations may be made before, during, or after the examination.

    c. When recombining categories into one population, shorter interval of categories shall be used.

    d. 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 are no Deficient Conditions or visible indications of damage and attachments to foundation or support structure are secure.

2. Visual examinations and minor maintenance activities for snubbers are conducted in accordance with MNS Procedures PT/0/A/4200/006, Inservice Visual Inspection and Minor Maintenance of Safety Related Snubbers, MP/0/A/7650/051, Mechanical and Hydraulic Snubber Removal, Maintenance and Installation, PT/0/A/4200/035, Inspecting Mechanical Snubbers (Freedom of Motion) and MP/0/A/7650/190, Steam Generator Lisega Snubber Maintenance Activities, each of which meets requirements outlined in ASME OM Code, Subsection ISTD.

3. Code Case OMN-13 shall be utilized to conduct Visual Examinations of snubbers for each unit. The Code Case allows for examinations to be conducted on an interval beyond the maximum allowed in Table ISTD-4252-1 but not to exceed 10 years for any snubber. Revision 3 of OMN-13 was approved by Regulatory Guide 1.192 Revision 3.

5.6 Visual Examination (continued)

4. If at any time during an examination interval the cumulative number of unacceptable snubbers exceeds the applicable value from Column B in Table ISTD-4252-1, the current examination interval shall end, and all remaining examinations must be completed within the current fuel cycle. The duration of the subsequent examination interval shall be reduced in accordance with Table ISTD-4252-1, using the examination interval prior to implementing the Code Case as the base interval. The beginning of the subsequent fuel cycle shall be the starting date for the new examination interval.

5. As described in OMN-13 Revision 3 the prerequisites for utilizing the Code Case are:

    a. Requirements of ISTD-4251 and ISTD-4252 have been satisfied with the preceding examination interval performed at the maximum interval of two fuel cycles per Table ISTD-4252-1.

    b. Requirements of Code Case OMN-13 paragraphs 3.1 through 3.6 shall have been satisfied for one interval prior to extending the examination interval in accordance with the Code Case.

6. Verification of satisfying OMN-13 Prerequisites:

    a. During the Fourth ISI Interval snubbers were visually examined on the required schedule noted in Table ISTD-4252-1 and evaluated to determine their operational readiness. In accordance with the table, the frequency of examination was determined by the total number of snubbers in the examination category and the number of unacceptable examinations recorded during the previous examination period. The maximum interval of two cycles was successfully utilized for the duration of the Fourth ISI Interval for both units. At no time did the number of unacceptable snubbers exceed the limits of Table ISTD-4252-1. Therefore it is acceptable to extend the interval in accordance with OMN-13 for this prerequisite. [ASME OM ISTD-4252].

    b. OMN-13 paragraph 3.1 through 3.6 requirements:

5.6 Visual Examination (continued)

(1) OMN-13 paragraph 3.1 states: “Examinations per paras. ISTD- 4210, ISTD-4220, ISTD-4230, and ISTD-4240 shall include examination for indications of degradation and severe operating environments.” All snubber examinations were/are performed using procedures listed in Section 5.6 Step 2 which include such indications in the examination checklist.

(2) OMN-13 paragraph 3.2 states: “All snubbers shall be examined in accordance with the requirements of paras. ISTD-4210, ISTD- 4220, ISTD-4230, and ISTD-4240 and para. 3.1 of this Code Case prior to conducting any maintenance, stroking, or testing, and prior to removal, for any reason, from their installed location.” All snubber in-field maintenance, removal or stroking is performed using one of the procedures listed in Section 5.6 Step 2. Each of these procedures requires the prerequisite examinations as described in the referenced paragraphs.

(3) OMN-13 paragraph 3.3 states: "Fluid level in hydraulic snubber reservoirs shall be sufficient to ensure that the snubber is acceptable for continued service to the next examination interval." Procedures MP/0/A/7650/051, MP/0/A/7650/190 and PT/0/A/4200/006 include requirements for verifying snubber fluid levels within acceptable limits.

(4) OMN-13 paragraph 3.4 requires that inservice test data be evaluated for pertinent indications and anomalies indicative of progressive degradation. This evaluation is included within the Service Life Monitoring activities as described in Section 5.7, Service Life Monitoring Section and Attachment 1, Pre-Defined Model Work Order Descriptions.

5.6 Visual Examination (continued)

(5) OMN-13 paragraph 3.5 states:" Snubbers and snubber parts shall be examined for indications of degradation and severe operating environments during disassembly (e.g., during failure evaluation, refurbishment)." This evaluation is included within the Service Life Monitoring activities as described in Section 5.7, Service Life Monitoring Section and Attachment 1, Pre-Defined Model Work Order Descriptions, as well as included in corrective actions required in accordance with Section 5.8, Operational Readiness Testing.

(6) OMN-13 paragraph 3.6 states:" The service life evaluation required by para. 2.1 of this Code Case shall include any transient dynamic event and actions taken under ISTD-1750." As described in Section 5.7, Service Life Monitoring Section, Section 5.15, Transient Dynamic Events and Attachment 1, Pre-Defined Model Work Order Descriptions of this document (AD-EG-MNS-1618) all failures are accounted for within the scope of Service Life Monitoring activities.

7. The start date for adoption of the OMN-13 Code Case is the date of issuance for revision 4 of this procedure, AD-EG-MNS-1618. From that date, unless the period is truncated in accordance with OMN-13, 3.7(b) each snubber shall be examined within 10 years of that snubber's most recent previous examination on an ongoing basis. Should such truncation be required this document (AD-EG-MNS-1618) shall be revised to document the required inspection interval.

8. Visual examination of as-found conditions shall be performed prior to conducting any maintenance, stroking, or testing, and 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. The results of these as-found examinations may be documented as completed examinations for visual examination tracking purposes (in addition to the 100% examination results).

5.6 Visual Examination (continued)

9. 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.

10. Hydraulic snubbers found with fluid port uncovered, and all hydraulic snubbers found connected to a non-functional common reservoir, shall be classified as unacceptable but may be reclassified acceptable by functionally testing each snubber with acceptable test results.

11. 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 an unacceptable condition is determined to be generic, then additional examinations may be required, and 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 Condition Report (CR).

12. 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 as defined in the noted maintenance procedures 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)

13. An augmented scope is invoked in cases where a visual examination is to be performed as a supplemental scope, outside of program requirements.

14. For purposes of defining unacceptable snubbers in accordance with Table ISTD-4242-1 examination boundaries shall include the snubber assembly from pin to pin, inclusive. Procedural guidance may include examination outside of this boundary as good practice but is not an ASME OM requirement. Discrepancies outside of the pin to pin boundary that are not directly related to snubber function are not considered to render the snubber unacceptable for the purposes of ISTD-4242-1.

5.7 Service Life Monitoring

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

The snubber program includes a Service Life Monitoring component that addresses the following (See Attachment 5 for further explanation) [ASME OM ISTD-6000]:

1. Each installed snubber within the program scope has an estimated service life established and documented in SNU-MNS-1618-01.

2. Snubber service life values shall be reviewed by the Program Manager each fuel cycle and those snubbers that will reach end of life during the upcoming fuel cycle are to be identified for replacement or refurbishment.

5.7 Service Life Monitoring (continued)

3. Previously established Service Life values for every installed snubber shall be evaluated at least once each fuel cycle for continued acceptability. Based upon the evaluation the estimated service life values may remain as previously established, reduced, or increased. The snubber Service Life listing is documented in SNU-MNS-1618-01 and shall be periodically updated to reflect the evaluation results The evaluation methodology and basis for conclusions are to be documented in outage summary reports or other QA documentation.

   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.

      (1) Lisega hydraulic snubbers are generically assumed to have a 24-year seal life in accordance with Lisega document SLR-001. The 24-year seal life is applied to the installation date of each snubber and is adjusted based upon the time the snubber was in storage prior to installation. Lisega policy is that each snubber is delivered with a 24-year seal life from date of delivery, however site policy is to consider any elapsed time from initial snubber factory assembly or rebuild date to be considered as storage. Unless more specific information is readily available the assumed date of assembly is January 1 of the year of manufacture (as determined from the serial number information). Snubbers in storage up to 3 years have an assumed seal life of 24 years from date of installation. From 3 - 6 years storage the seal life is set at 23 years, and over 6 years the life is reduced one year for each additional year in storage. The listing provides expected life values for each location based upon the generic values and storage time as described, with certain exceptions as noted in the listing due to actual experience under severe or unique conditions.

5.7 Service Life Monitoring (continued)

(2) A 25 year seal life is generically assumed for Anvil/Grinnell hydraulic snubbers. Exceptions may be made as noted in the snubber listing due to service history, environmental conditions, and OEM recommendations. 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.

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, per the OEM no specific pressurization testing or monitoring are required during this seal life period, but all visual examination results and results of any fluid sampling that may be performed shall be evaluated for adverse indications. Additionally, the seals are evaluated by comparison with those utilized in other snubber models that are similar except for the overall seal diameter. Large pipe snubbers that utilize the same seal material and design are periodically included in the general population testing and examination activities and the resultant data is applicable to the SG snubber applications. This addresses OM ISTD-6400 which states: “The service life evaluation for hydraulic snubbers that are tested without applying a load to the snubber piston rod shall consider the results from fluid sampling and monitoring of seal integrity”.

5.7 Service Life Monitoring (continued)

c. For mechanical snubbers a generic service life of 40 years from the date of manufacture was initially assumed as a baseline value per initial OEM recommendations. To date this generic assumption has been validated based largely upon the condition monitoring trending performed using stroke testing per MNS Procedure PT/0/A/4200/035. Data is insufficient to accurately predict an exact end of life, however the entire population is hand stroked over 4 fuel cycles and the results evaluated to validate suitability for the next fuel cycle. Based upon this program a generic administrative value of 60 years is used in the Iddeal database for PSA mechanical snubbers, although actual acceptability is confirmed through the rolling evaluation. Certain snubbers in severe (high vibration) applications have previously been replaced with hydraulic snubbers, and this will continue to be the practice as applicable.

(1) Hand stroking also serves to distribute internal lubricant of mechanical snubbers, thus extending service life.

4. Historical data should be reviewed to identify any trends regarding service life values. Causes for any snubber failures (regardless of the means or time of discovery) shall be determined, documented, and considered in establishing or reestablishing service life.

5. 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 prior to the end of that snubber's service life:

a. Snubbers shall be replaced with a snubber for which service life will not be exceeded before the next scheduled system or plant outage.

b. Technical justification for ensuring continued operational readiness shall be documented for extending service life until the time when the snubber can be reconditioned or replaced.

c. Snubbers shall be reconditioned such that service life will be extended to or beyond the next scheduled system or plant outage.

5.7 Service Life Monitoring (continued)

6. Prior to the beginning of each fuel cycle (startup following refueling), it shall be documented that all installed snubbers have a service life that will not be exceeded prior to either the next refuel outage or next scheduled maintenance activity for that snubber. This is documented in the Outage Summary Report in accordance with Section 6.0 Step 2

7. If testing is conducted specifically for service life monitoring purposes, the results of such testing do not require sample testing of additional snubbers (ref. ISTD-6500).

5.8 <u>Operational Readiness Testing</u>

1. Snubber populations within the program scope shall be tested for operational readiness during each fuel cycle. Test campaigns shall be performed in accordance with the specified sampling plan as designated in Section 5.9, Defined Test Plan Group (DTPG) and Section 5.10, Testing Sample Plans. [ASME OM ISTD-5260]

2. Testing is required to be performed each fuel cycle, based upon the plant licensing requirements in SLC 16.9-15 and ASME OM.

3. Testing may be performed during normal system operation, or during system or plant outages, depending upon the plant licensing requirements.

    a. For ASME OM program scope, sample testing shall begin no earlier than permitted by ASME OM ISTD (unless otherwise approved by the regulatory authorities) and must be completed prior to the return to power.

5.8 Operational Readiness Testing (continued)

4. Snubber operational readiness tests shall verify the following:

   a. Activation is within the specified range of velocity or acceleration in both tension and compression. For snubbers that do not have an activation function, this parameter is not applicable.

   b. Release rate (also known as bleed) when applicable, is present in both tension and compression, within specified range.

   c. For mechanical snubbers, drag force is within specified limits, in tension and in compression.

   d. For snubbers specifically required not to displace under continuous load, ability of snubber to withstand load without displacement.

5. Non-Safety Related snubbers may be tested at discretion of Snubber Program Manager.

6. Snubbers shall be tested in their as-found condition regarding parameters to be tested to fullest extent practicable.

7. Test methods shall not alter condition of a snubber to extent that results do not represent as-found snubber condition.

8. Pipe snubbers shall be removed from field installation and bench tested in accordance with MNS Procedure MP/0/A/7650/228.

9. 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.

10. 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.

5.8 Operational Readiness Testing (continued)

11. 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.

12. 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.

13. Each snubber shall have an as-found visual examination performed prior to removal activities and an as-left visual examination following reinstallation.

14. For each snubber within the program scope determined to be unacceptable by operational readiness testing, additional snubbers shall be tested in accordance with ASME OM Code, Article ISTD-5270. The number of additional snubbers tested is dependent upon the testing sample plan being utilized.

15. Unacceptable (i.e., failed) snubbers shall be evaluated and documented in accordance with Corrective Action Program (CR). The evaluation shall include review of information related to other unacceptable snubbers found during that test campaign.

16. An engineering evaluation shall be performed on the 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.

17. 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.

5.8 Operational Readiness Testing (continued)

18. For each Non-Safety Related snubber determined to be unacceptable by operational readiness testing, additional tests may be required as determined by the Program Manager. This will be performed as warranted to address extent of condition and service life concerns in accordance with the Corrective Action Program.

19. Degraded snubbers are typically replaced with new snubbers as a preventive maintenance action.

    a. Scope expansion is not required for degraded snubbers unless deemed necessary to address extent of condition concerns.

    b. 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.

    c. Information gathered from degraded snubbers shall be considered in service life monitoring program, as applicable.

20. Test equipment failure during functional testing may invalidate all testing performed during respective day, unless it can be determined exactly when the failure occurred, and which snubbers were affected. Failed testing equipment shall be repaired or replaced.

21. Initial test performed for an inservice snubber test shall be maintained as as-found test of record.

    a. If multiple tests are performed for any reason, all test results shall be saved and documented.

    b. Copies of all tests shall be included with test procedure records, and reason for performing multiple tests shall be documented.

    c. Snubber Program Manager may provide additional comments or justification as an attachment to procedure, as required.

22. Test results shall be reviewed for adverse trends, to help establish service life for specific snubbers or locations.

5.8 Operational Readiness Testing (continued)

23. Snubbers placed in same locations as snubbers which failed during the previous test campaign shall be retested at the time of the subsequent test campaign, unless cause of failure is clearly established and corrected so as to preclude reoccurrence. Such snubbers shall not be considered as part of the test campaign functional testing sample. Failures found by these retests shall not require additional testing as described in Section 5.12, Sample Expansion but shall be evaluated for appropriate corrective action.

24. Each snubber in a parallel or multiple-snubber installation shall be identified and counted individually.

25. Fractional sample sizes shall be rounded up to next integer.

26. All unacceptable snubbers shall be adjusted, repaired, modified, or replaced.

27. Hydraulic snubbers that have been rebuilt shall have a subsequent drag test performed to verify proper assembly.

5.9 <u>Defined Test Plan Group (DTPG)</u>

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 the exception of large bore Lisega SG snubbers, which are tested as a separate DTPG.

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. DTPGs shall not be changed after initiating a test campaign.

5. For unacceptable snubber(s), additional testing shall continue within DTPG or FMG, as described in Section 5.8 Step 12.

5.11 Testing Sample Plan Selection

The sample selection is intended to represent snubbers that have been in service for at least one fuel cycle. New or replacement snubbers that have been installed since the previous test campaign are not included in the sampled population (This includes snubbers installed to replace snubbers found unacceptable in the previous cycle testing.) Likewise, snubbers that have had maintenance activities performed which could affect test results are to be excluded. An exception to this would be where a special DTPG is identified consisting solely of snubbers that have been newly installed or maintained.

1. The initial sample selection shall be random as described in ASME OM ISTD- 5311 & 5411.

2. Selection of the representative 10% Plan samples may also be selected from snubbers concurrently scheduled for seal replacement or other similar activity related to service life monitoring. The snubbers shall be tested on a generally rotational basis to coincide with the service life monitoring activity.

5.12 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 ISTD-5312 & 5412.

    a. 37 Plan supplemental samples shall consist of either 18 or 19 snubbers, based on number of unacceptable snubbers and mathematical 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 the size of initial sample from that DTPG population, per ASME OM Code, Article ISTD-5312. Testing shall satisfy the mathematical expressions in ISTD-5331.

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, snubbers found unacceptable according to operational readiness test requirements may be assigned into a FMG containing all unacceptable snubbers with the same failure mode and all other snubbers with similar potential for similar failure.

5.12 Sample Expansion (continued)

3. For the Safety Related/Safety Significant 37 Plan Failures – Additional samples shall be selected randomly from the remaining population of the DTPG, or from untested Snubbers of the FMG as applicable.

4. For the Safety Related/Safety Significant 10% Plan Failures – When an unacceptable Snubber has not been assigned to an FMG, the additional sample shall be taken from the DTPG. As practicable, the additional sample shall include the following:

   a. Snubbers of the same manufacturer's design.

   b. Snubbers immediately adjacent to those found unacceptable.

   c. Snubbers from the same piping system.

   d. Snubbers from other piping systems that have similar operating conditions such as temperature, humidity, vibration, and radiation.

   e. Snubbers that are previously untested.

5. A contingency additional sample may be selected prior to the start of testing to facilitate early planning and reduce emergent outage resource impact. If this option is chosen and an initial sample test is unacceptable the acceptability of the contingency sample per ISTD-5313 composition requirements must be validated for the 10% Plan and the acceptability documented in the Corrective Action Program. For the 37 Plan the first additional sample is randomly selected so a random contingency sample is appropriate. In the event of an initial sample failure all contingency snubbers tested as unacceptable must be counted as failures in the completion equations for that DTPG regardless of when tested. If no initial sample snubber fails then any contingency snubber tests performed are counted only as Service Life Monitoring test.

5.13 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. Documentation of the suitability evaluation shall be made in the Work Order documentation and appropriate procedure signoffs.

3. Replacement or modified snubbers shall be examined/tested prior to placing them into service. Testing may be performed at the manufacturer's facility.

5.14 Snubber Deletion

1. As a corrective action snubbers discovered to be unacceptable may subsequently be deleted from the plant based on analysis of the affected piping system. In such cases the deleted snubber shall still be counted as unacceptable in its respective examination population, examination category, or test group (DTPG/FMG) until the current test campaign or visual examination interval is completed.

2. The number of deleted snubbers failing/passing tests or examinations prior to being deleted shall be used in determining examination/testing frequencies.

5.15 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. Performance of Freedom of Motion stroking each outage is sufficient in scope to satisfy this requirement.

2. If an unanticipated transient 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 (CR).

    a. Program Manager shall notify System Engineer and 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. No records are generated by this procedure.

2. Records of inspections, tests, repairs, evaluations, and outage summaries will be maintained within an appropriate Work Order or periodic test procedure. Work Orders and/or PMID histories are searchable in the Consolidated Asset Suite (CAS) application and Document Management System.

3. Documentation of outage summary reports may be found in outage work orders generated from PM model work orders 00390475-12 and 00390517-13 (PMIDs 02007330-01 and 02011318-01).

4. Corrective Actions for Conditions adverse to Quality are documented within the site Corrective Action Program (AD-PI-ALL-0100).

5. Documentation of the installed snubber listing is maintained in SNU-MNS-1618-01. The listing includes the unique location identification number (Mark number) of each snubber along with the installed serial number, manufacturer, model, date built/rebuilt, date installed at the location, expected service life and service life expiration.

7.0 REFERENCES

7.1 Commitments

NOTE

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

1. None.

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. AD-EG-ALL-1703, ASME Section XI Repair/Replacement Program Administration
7. AD-PI-ALL-0100, Corrective Action Program
8. AD-EG-ALL-1450, Preconditioning of Structures, Systems And Components
9. AD-EG-ALL-1202, Preventive Maintenance and Surveillance Testing Administration
10. AD-IT-ALL-0002, Software Quality Assurance (SQA) Program Administration
11. MP/0/A/7650/046, Hydraulic Snubber Corrective Maintenance
12. MP/0/A/7650/051, Mechanical and Hydraulic Snubber Removal, Maintenance and Installation
13. MP/0/A/7650/190, Steam Generator Lisega Snubber Maintenance Activities
14. MP/0/A/7650/228, Operation Of Barker/Diacon S-2000 Snubber Test Machine

7.2 Procedures (continued)

15. PT/0/A/4200/006, Inservice Visual Inspection and Minor Maintenance of Safety Related Snubbers

16. PT/0/A/4200/035, Inspecting Mechanical Snubbers (Freedom Of Motion)

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

10. Code of Federal Regulations: 10CFR50.55a, Codes and Standards

11. MNS UFSAR Section 3.9.3.2.9

12. MNS Technical Specification Section 3.0.8

13. MNS Selected Licensee Commitment SLC 16.9.15

14. CSD-EG-MNS-1618, MNS Installed Snubber Listing (superseded by Program Document SNU-MNS-1618-01)

7.3 Miscellaneous Documents (continued)

15. SNU-MNS-1618-01 (MNS Installed Snubber Listing)

<< Pre-Defined Model Work Order Descriptions >>

1.0 Unit 1 Model Work Orders and Descriptions

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

2. 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

<< Pre-Defined Model Work Order Descriptions >>

2.0 Unit 2 Model Work Orders and Descriptions

1. 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

2. 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

3.0 Additional Information

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

2. FOM (i.e., stroke testing) is performed every fuel cycle for 25% of mechanical snubber population, and is split into four rotating test groups: 1st 25%, 2nd 25%, 3rd 25%, & 4th 25%.

3. 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.

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Enclosure 2
AD-EG-MNS-1618, "McGuire Nuclear Station Snubber Program Plan," Revision 005

(39 pages including this cover)

DUKE ENERGY

Information Use

MCGUIRE UNIT 0

ADMINISTRATIVE PROCEDURE

SAFETY RELATED

AD-EG-MNS-1618

MCGUIRE NUCLEAR STATION
SNUBBER PROGRAM PLAN

REVISION 005

REVISION SUMMARY

PRR 02524382

DESCRIPTION

Rev 005

1. PRR 02524382 Step 2.1 Changed "of revision 5 of this procedure" to "of revision 4 of this procedure". Fifth 10-year snubber program interval began on the date revision 4 was issued and was not intended to begin on issuance of a future revision.

Rev 004

1. PRR 02502929 the following changes incorporated:
   - Revised and reorganized format for consistency across the fleet.
   - Corrected typographical and grammatical errors.
   - Updated to change interval alignment from IST to ISI interval and updated code references.
   - Revised periodicity of plan updates to remove specific limits.
   - Added examples of changes requiring resubmittal to regulators.
   - Added reference to SNU-MNS-1618-01 which supersedes CSD-EG-MNS-1618.
   - Added detail to SG snubber service life description.
   - Incorporated Code Case OMN-13.

Rev 003

1. PRR 02380040 - Changes incorporated for correction of typographical errors, enhancements desired for fleet consistency, and updated program requirements, as per PRR markup. Also reformatted Attachment 1 to standards.

Rev 002

1. PRR 02290357 (controlling) and including PRR 02308806 - changes were incorporated minor revisions/enhancements per fleet assessment SAST 02242216 as per PRR markup.

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1.0 PURPOSE

The purpose of the 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 the 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 GOVERANANCE AND SCOPE

1. The NRC endorses the ASME Code for Operation and Maintenance of Nuclear Power Plants for inspection and testing of snubbers, as stipulated in 10CFR50.55a and NUREG-1482. Specifically, ASME OM Code (Operation and Maintenance of Nuclear Power Plants), 2004 Edition through 2006 Addenda is the effective edition/addenda for the fourth 10-year IST interval for Units 1 & 2, which had a start date of March 1, 2014 and is planned to be extended by one year to March 1, 2025. The fifth 10-year snubber program interval will begin on the date of issuance of revision 4 of this procedure and the effective Edition is the 2020 Edition (with the inclusion of Code Case OMN-13 Revision 3). Future MNS snubber program interval updates will be aligned with the Unit 2 ISI update interval (the fifth ISI interval is scheduled to end February 28, 2034). Specifically, ASME OM Code Subsections ISTA and ISTD govern snubber examination and testing activities.

2. The program envelopes the scope described in the ASME OM Code Subsection ISTA, Article ISTA-1100, which is defined as those Snubbers used in systems that perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, in mitigating the consequences of an accident, or to ensure the integrity of the reactor coolant pressure boundary.

3. This procedure 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 the failure of the 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 the SLC scope are enveloped by either QA Condition 1 or 4 classifications. The SLC scope conservatively includes all QA Condition 1 and 4 snubbers, including some Seismic Category II snubbers classified as QA Condition 4 which may potentially be excluded based on having no adverse effect on Safety Related systems. Any such exclusions from SLC activities will be documented on a case by case basis.

2.0 GOVERANANCE AND 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 in the 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 (e.g., radiation or extreme heat) or placing operating equipment at risk.

3. **Activation:** The change of condition from passive to active, in which the snubber resists rapid displacement of the attached pipe or component.

4. **Defined Test Plan Group (DTPG):** A population of snubbers selected for testing in accordance with the snubber testing sample plan.

5. **Degraded:** Any snubber that has an examination or testing parameter that is approaching but has not exceeded the limits of the acceptance criteria.

6. **Drag Force:** The force that will sustain low-velocity snubber movement without activation throughout the working range of the snubber stroke.

7. **Failure Mode Group (FMG):** A group of snubbers that have failed and those other snubbers that have similar potential for similar failure.

8. **Fuel Cycle:** Time period beginning with the start of the reactor until the completion of the next refuel outage and subsequent restart.

9. **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.

10. **Release Rate:** The rate of the axial snubber movement under a specified load after activation of the snubber takes place.

3.0 DEFINITIONS (continued)

11. **Safety-Significant Snubbers:** Snubbers designated as Non-Safety Related but it is determined that their failure or the failure of the system on which they are installed would have an adverse effect on a Safety Related system.

12. **Service Life:** The period of time a snubber is expected to meet the operational readiness requirements at its installed location without maintenance.

13. **Snubber**: Dynamic restraints that are utilized to allow slow, constant movement of an attached component while providing rigid restraint against rapid motion due to dynamic loads.

14. **Test Campaign:** The series of actions required to complete the testing of DTPG samples for a specific cycle.

15. **Test Interval:** The period between completed test campaigns for a given DTPG.

16. **Unacceptable:** Snubbers that do not meet examination or testing acceptance criteria.

17. **Unanticipated Transient Dynamic Event:** Any unforeseen or unanalyzed event, such as (but not limited to) a steam hammer, water hammer, void collapse, or seismic event greater than design basis.

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 AD-EG-ALL-1618, Snubber Program Plan.
- 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 Fleet Engineering Programs - Snubber Program Manager

1. Ensures that the Snubber Program is effectively managed and implemented to meet regulatory, process, and procedure requirements.

2. Provides governance and oversight of the Snubber Program and provides strategic and technical direction to the site.

3. Maintains qualifications in accordance with the Program Manager's respective Engineering Support Personnel (ESP) Training Program in which they are enrolled. No additional qualifications specific to the Snubber Program Manager position exist at either the Fleet or Site levels.

4. Establishes, prepares, and maintains snubber testing and examination Program Plans, implementing procedures, and schedules.

5. Assigns examination and testing requirements for snubbers, as identified in the MNS Snubber Program Plan.

6. Maintains the IDDEAL Software Suite Database (SnubbWorks®) for snubbers.

7. Coordinates the performance of scheduled and non-scheduled snubber examination and testing activities, preventive maintenance and condition monitoring activities.

8. Selects and identifies snubbers for examination, testing, and service life activities.

9. Reviews test and examination results for acceptability.

10. Evaluates results of examinations and tests which fail to meet acceptance criteria.

4.1 Fleet Engineering Programs - Snubber Program Manager (continued)

11. Generates corrective actions:

    a. Action Requests (ARs)

    b. Nuclear Condition Reports (NCRs) Corrective Action Program (CR)

    c. Work Requests (WRs) in support of Program activities

12. Determines the extent of additional examinations, tests, or repairs which may be required following the discovery of an unacceptable snubber condition.

13. Establishes, monitors, and tracks the service life of installed snubbers and maintains the controlled listing in program document SNU-MNS-1618-01 (MNS Installed Snubber Listing).

14. Provides pertinent information to the implementing work groups.

15. Identifies the applicable procedures required to satisfy the examination or testing requirements, per the MNS Snubber Program Plan.

16. Identifies and submits the required snubber work scope to the appropriate On-Line work management, Outage work management, and Planning work groups.

17. Manages the snubber work scope, including content, additions, deletions, expansions, and corrections.

18. Compares current recorded results with the prior or expected results to determine snubber continued service and/or corrective actions.

19. 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).

20. 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).

4.1 Fleet Engineering Programs - Snubber Program Manager (continued)

21. Reviews plant design changes and revises the MNS Snubber Program Plan, as required.

22. Assists with Operability Evaluations for snubbers as required.

4.2 Site 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.

4.3 Site Design Engineering

1. Performs Operability Evaluations on piping systems or components per AD-OP-ALL-0105, Operability Determinations.

2. Notifies Snubber Program Manager of plant design changes that may impact the Snubber Program.

4.4 Regulatory Affairs

1. Provides licensing support of the Snubber Program.

2. Processes relief requests.

3. Submits Snubber Program Plan documents to Regulatory Authorities as required by code or rulemaking.

5.0 INSTRUCTIONS

5.1 General

1. For the purposes of this procedure, references to Snubber Program Manager means a designee or other person assigned to complete any procedural requirement identified in this procedure.

2. ASME OM Code requirements are identified and administered by the implementation of this document.

3. This document (i.e., The 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

5.1 General (continued)

5. Generation and revision to The Snubber Program Plan shall be made in accordance with applicable corporate and MNS site procedures.

   a. The 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. The Snubber Program Plan is developed and maintained in accordance with AD-DC-ALL-0201, Development and Maintenance of Controlled Procedure Manual Procedures.

3. On a periodic basis the Snubber Program Plan may be revised as applicable to update pertinent information. All updates shall be documented in the Snubber Program Plan's Revision History.

4. 10-Year Updates:

   a. Once every 10 years, the Snubber Program shall be updated to comply with edition and addenda specified in 10CFR50.55a.

   b. Snubber Program Plans for each 10 year interval shall be filed with regulatory authorities in accordance with ASME OM Code and 10CFR50.55a requirements, as applicable. Submittal shall consist of latest revision to this document (i.e., AD-EG-MNS-1618), with cover sheet information 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 the Snubber Program Plan to be re-submitted to the regulatory authorities. Changes that may require resubmittal include code revision updates, utilization of code cases or regulatory relief, revised test sample plans, or any changes that significantly alter the plan implementation from existing commitments. Routine periodic revisions to address items such as organizational changes or editorial items (updated references, correct typographical errors, formatting, etc) do not require resubmittal but may be submitted as a courtesy notification.

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.

   a. 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.

   b. Examination and test reports may be generated by SnubbWorks® software to document examination and test results.

5.4 Test and Examination Scheduling

1. An inservice test campaign shall be conducted every fuel cycle. Performing testing and examinations during refueling outages allows for improved accessibility, environmental conditions conducive for examination methods, reduced exposure (ALARA) and enhanced scheduling. Testing associated with each test campaign shall begin no earlier than 92 days before a scheduled refueling outage and shall be completed prior to completion of that refueling outage.

2. 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.

5.5 Snubber Categorization

1. For examination purpose snubbers at MNS are considered a single population (for each unit) for examination intervals outlined in ASME OM Code, Subsection ISTD, Table 4252-1. Alternatively the snubbers may be categorized into separate populations.

    a. A decision to examine snubbers as separate categories shall be clearly documented.

    b. Categorization determinations may be made before, during, or after the examination.

    c. When recombining categories into one population, shorter interval of categories shall be used.

    d. 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 are no Deficient Conditions or visible indications of damage and attachments to foundation or support structure are secure.

2. Visual examinations and minor maintenance activities for snubbers are conducted in accordance with MNS Procedures PT/0/A/4200/006, Inservice Visual Inspection and Minor Maintenance of Safety Related Snubbers, MP/0/A/7650/051, Mechanical and Hydraulic Snubber Removal, Maintenance and Installation, PT/0/A/4200/035, Inspecting Mechanical Snubbers (Freedom of Motion) and MP/0/A/7650/190, Steam Generator Lisega Snubber Maintenance Activities, each of which meets requirements outlined in ASME OM Code, Subsection ISTD.

3. Code Case OMN-13 shall be utilized to conduct Visual Examinations of snubbers for each unit. The Code Case allows for examinations to be conducted on an interval beyond the maximum allowed in Table ISTD-4252-1 but not to exceed 10 years for any snubber. Revision 3 of OMN-13 was approved by Regulatory Guide 1.192 Revision 3.

5.6 Visual Examination (continued)

4. If at any time during an examination interval the cumulative number of unacceptable snubbers exceeds the applicable value from Column B in Table ISTD-4252-1, the current examination interval shall end, and all remaining examinations must be completed within the current fuel cycle. The duration of the subsequent examination interval shall be reduced in accordance with Table ISTD-4252-1, using the examination interval prior to implementing the Code Case as the base interval. The beginning of the subsequent fuel cycle shall be the starting date for the new examination interval.

5. As described in OMN-13 Revision 3 the prerequisites for utilizing the Code Case are:

    a. Requirements of ISTD-4251 and ISTD-4252 have been satisfied with the preceding examination interval performed at the maximum interval of two fuel cycles per Table ISTD-4252-1.

    b. Requirements of Code Case OMN-13 paragraphs 3.1 through 3.6 shall have been satisfied for one interval prior to extending the examination interval in accordance with the Code Case.

6. Verification of satisfying OMN-13 Prerequisites:

    a. During the Fourth ISI Interval snubbers were visually examined on the required schedule noted in Table ISTD-4252-1 and evaluated to determine their operational readiness. In accordance with the table, the frequency of examination was determined by the total number of snubbers in the examination category and the number of unacceptable examinations recorded during the previous examination period. The maximum interval of two cycles was successfully utilized for the duration of the Fourth ISI Interval for both units. At no time did the number of unacceptable snubbers exceed the limits of Table ISTD-4252-1. Therefore it is acceptable to extend the interval in accordance with OMN-13 for this prerequisite. [ASME OM ISTD-4252].

    b. OMN-13 paragraph 3.1 through 3.6 requirements:

5.6 Visual Examination (continued)

(1) OMN-13 paragraph 3.1 states: “Examinations per paras. ISTD- 4210, ISTD-4220, ISTD-4230, and ISTD-4240 shall include examination for indications of degradation and severe operating environments.” All snubber examinations were/are performed using procedures listed in Section 5.6 Step 2 which include such indications in the examination checklist.

(2) OMN-13 paragraph 3.2 states: “All snubbers shall be examined in accordance with the requirements of paras. ISTD-4210, ISTD- 4220, ISTD-4230, and ISTD-4240 and para. 3.1 of this Code Case prior to conducting any maintenance, stroking, or testing, and prior to removal, for any reason, from their installed location.” All snubber in-field maintenance, removal or stroking is performed using one of the procedures listed in Section 5.6 Step 2. Each of these procedures requires the prerequisite examinations as described in the referenced paragraphs.

(3) OMN-13 paragraph 3.3 states: "Fluid level in hydraulic snubber reservoirs shall be sufficient to ensure that the snubber is acceptable for continued service to the next examination interval." Procedures MP/0/A/7650/051, MP/0/A/7650/190 and PT/0/A/4200/006 include requirements for verifying snubber fluid levels within acceptable limits.

(4) OMN-13 paragraph 3.4 requires that inservice test data be evaluated for pertinent indications and anomalies indicative of progressive degradation. This evaluation is included within the Service Life Monitoring activities as described in Section 5.7, Service Life Monitoring Section and Attachment 1, Pre-Defined Model Work Order Descriptions.

5.6 Visual Examination (continued)

(5) OMN-13 paragraph 3.5 states:" Snubbers and snubber parts shall be examined for indications of degradation and severe operating environments during disassembly (e.g., during failure evaluation, refurbishment)." This evaluation is included within the Service Life Monitoring activities as described in Section 5.7, Service Life Monitoring Section and Attachment 1, Pre-Defined Model Work Order Descriptions, as well as included in corrective actions required in accordance with Section 5.8, Operational Readiness Testing.

(6) OMN-13 paragraph 3.6 states:" The service life evaluation required by para. 2.1 of this Code Case shall include any transient dynamic event and actions taken under ISTD-1750." As described in Section 5.7, Service Life Monitoring Section, Section 5.15, Transient Dynamic Events and Attachment 1, Pre-Defined Model Work Order Descriptions of this document (AD-EG-MNS-1618) all failures are accounted for within the scope of Service Life Monitoring activities.

7. The start date for adoption of the OMN-13 Code Case is the date of issuance for revision 4 of this procedure, AD-EG-MNS-1618. From that date, unless the period is truncated in accordance with OMN-13, 3.7(b) each snubber shall be examined within 10 years of that snubber's most recent previous examination on an ongoing basis. Should such truncation be required this document (AD-EG-MNS-1618) shall be revised to document the required inspection interval.

8. Visual examination of as-found conditions shall be performed prior to conducting any maintenance, stroking, or testing, and 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. The results of these as-found examinations may be documented as completed examinations for visual examination tracking purposes (in addition to the 100% examination results).

5.6 Visual Examination (continued)

9. 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.

10. Hydraulic snubbers found with fluid port uncovered, and all hydraulic snubbers found connected to a non-functional common reservoir, shall be classified as unacceptable but may be reclassified acceptable by functionally testing each snubber with acceptable test results.

11. 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 an unacceptable condition is determined to be generic, then additional examinations may be required, and 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 Condition Report (CR).

12. 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 as defined in the noted maintenance procedures 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)

13. An augmented scope is invoked in cases where a visual examination is to be performed as a supplemental scope, outside of program requirements.

14. For purposes of defining unacceptable snubbers in accordance with Table ISTD-4242-1 examination boundaries shall include the snubber assembly from pin to pin, inclusive. Procedural guidance may include examination outside of this boundary as good practice but is not an ASME OM requirement. Discrepancies outside of the pin to pin boundary that are not directly related to snubber function are not considered to render the snubber unacceptable for the purposes of ISTD-4242-1.

5.7 Service Life Monitoring

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

The snubber program includes a Service Life Monitoring component that addresses the following (See Attachment 5 for further explanation) [ASME OM ISTD-6000]:

1. Each installed snubber within the program scope has an estimated service life established and documented in SNU-MNS-1618-01.

2. Snubber service life values shall be reviewed by the Program Manager each fuel cycle and those snubbers that will reach end of life during the upcoming fuel cycle are to be identified for replacement or refurbishment.

5.7 Service Life Monitoring (continued)

3. Previously established Service Life values for every installed snubber shall be evaluated at least once each fuel cycle for continued acceptability. Based upon the evaluation the estimated service life values may remain as previously established, reduced, or increased. The snubber Service Life listing is documented in SNU-MNS-1618-01 and shall be periodically updated to reflect the evaluation results The evaluation methodology and basis for conclusions are to be documented in outage summary reports or other QA documentation.

   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.

      (1) Lisega hydraulic snubbers are generically assumed to have a 24-year seal life in accordance with Lisega document SLR-001. The 24-year seal life is applied to the installation date of each snubber and is adjusted based upon the time the snubber was in storage prior to installation. Lisega policy is that each snubber is delivered with a 24-year seal life from date of delivery, however site policy is to consider any elapsed time from initial snubber factory assembly or rebuild date to be considered as storage. Unless more specific information is readily available the assumed date of assembly is January 1 of the year of manufacture (as determined from the serial number information). Snubbers in storage up to 3 years have an assumed seal life of 24 years from date of installation. From 3 - 6 years storage the seal life is set at 23 years, and over 6 years the life is reduced one year for each additional year in storage. The listing provides expected life values for each location based upon the generic values and storage time as described, with certain exceptions as noted in the listing due to actual experience under severe or unique conditions.

5.7 Service Life Monitoring (continued)

(2) A 25 year seal life is generically assumed for Anvil/Grinnell hydraulic snubbers. Exceptions may be made as noted in the snubber listing due to service history, environmental conditions, and OEM recommendations. 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.

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, per the OEM no specific pressurization testing or monitoring are required during this seal life period, but all visual examination results and results of any fluid sampling that may be performed shall be evaluated for adverse indications. Additionally, the seals are evaluated by comparison with those utilized in other snubber models that are similar except for the overall seal diameter. Large pipe snubbers that utilize the same seal material and design are periodically included in the general population testing and examination activities and the resultant data is applicable to the SG snubber applications. This addresses OM ISTD-6400 which states: “The service life evaluation for hydraulic snubbers that are tested without applying a load to the snubber piston rod shall consider the results from fluid sampling and monitoring of seal integrity”.

5.7 Service Life Monitoring (continued)

c. For mechanical snubbers a generic service life of 40 years from the date of manufacture was initially assumed as a baseline value per initial OEM recommendations. To date this generic assumption has been validated based largely upon the condition monitoring trending performed using stroke testing per MNS Procedure PT/0/A/4200/035. Data is insufficient to accurately predict an exact end of life, however the entire population is hand stroked over 4 fuel cycles and the results evaluated to validate suitability for the next fuel cycle. Based upon this program a generic administrative value of 60 years is used in the Iddeal database for PSA mechanical snubbers, although actual acceptability is confirmed through the rolling evaluation. Certain snubbers in severe (high vibration) applications have previously been replaced with hydraulic snubbers, and this will continue to be the practice as applicable.

(1) Hand stroking also serves to distribute internal lubricant of mechanical snubbers, thus extending service life.

4. Historical data should be reviewed to identify any trends regarding service life values. Causes for any snubber failures (regardless of the means or time of discovery) shall be determined, documented, and considered in establishing or reestablishing service life.

5. 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 prior to the end of that snubber's service life:

a. Snubbers shall be replaced with a snubber for which service life will not be exceeded before the next scheduled system or plant outage.

b. Technical justification for ensuring continued operational readiness shall be documented for extending service life until the time when the snubber can be reconditioned or replaced.

c. Snubbers shall be reconditioned such that service life will be extended to or beyond the next scheduled system or plant outage.

5.7 Service Life Monitoring (continued)

6. Prior to the beginning of each fuel cycle (startup following refueling), it shall be documented that all installed snubbers have a service life that will not be exceeded prior to either the next refuel outage or next scheduled maintenance activity for that snubber. This is documented in the Outage Summary Report in accordance with Section 6.0 Step 2

7. If testing is conducted specifically for service life monitoring purposes, the results of such testing do not require sample testing of additional snubbers (ref. ISTD-6500).

5.8 <u>Operational Readiness Testing</u>

1. Snubber populations within the program scope shall be tested for operational readiness during each fuel cycle. Test campaigns shall be performed in accordance with the specified sampling plan as designated in Section 5.9, Defined Test Plan Group (DTPG) and Section 5.10, Testing Sample Plans. [ASME OM ISTD-5260]

2. Testing is required to be performed each fuel cycle, based upon the plant licensing requirements in SLC 16.9-15 and ASME OM.

3. Testing may be performed during normal system operation, or during system or plant outages, depending upon the plant licensing requirements.

    a. For ASME OM program scope, sample testing shall begin no earlier than permitted by ASME OM ISTD (unless otherwise approved by the regulatory authorities) and must be completed prior to the return to power.

5.8 Operational Readiness Testing (continued)

4. Snubber operational readiness tests shall verify the following:

   a. Activation is within the specified range of velocity or acceleration in both tension and compression. For snubbers that do not have an activation function, this parameter is not applicable.

   b. Release rate (also known as bleed) when applicable, is present in both tension and compression, within specified range.

   c. For mechanical snubbers, drag force is within specified limits, in tension and in compression.

   d. For snubbers specifically required not to displace under continuous load, ability of snubber to withstand load without displacement.

5. Non-Safety Related snubbers may be tested at discretion of Snubber Program Manager.

6. Snubbers shall be tested in their as-found condition regarding parameters to be tested to fullest extent practicable.

7. Test methods shall not alter condition of a snubber to extent that results do not represent as-found snubber condition.

8. Pipe snubbers shall be removed from field installation and bench tested in accordance with MNS Procedure MP/0/A/7650/228.

9. 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.

10. 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.

5.8 Operational Readiness Testing (continued)

11. 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.

12. 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.

13. Each snubber shall have an as-found visual examination performed prior to removal activities and an as-left visual examination following reinstallation.

14. For each snubber within the program scope determined to be unacceptable by operational readiness testing, additional snubbers shall be tested in accordance with ASME OM Code, Article ISTD-5270. The number of additional snubbers tested is dependent upon the testing sample plan being utilized.

15. Unacceptable (i.e., failed) snubbers shall be evaluated and documented in accordance with Corrective Action Program (CR). The evaluation shall include review of information related to other unacceptable snubbers found during that test campaign.

16. An engineering evaluation shall be performed on the 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.

17. 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.

5.8 Operational Readiness Testing (continued)

18. For each Non-Safety Related snubber determined to be unacceptable by operational readiness testing, additional tests may be required as determined by the Program Manager. This will be performed as warranted to address extent of condition and service life concerns in accordance with the Corrective Action Program.

19. Degraded snubbers are typically replaced with new snubbers as a preventive maintenance action.

    a. Scope expansion is not required for degraded snubbers unless deemed necessary to address extent of condition concerns.

    b. 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.

    c. Information gathered from degraded snubbers shall be considered in service life monitoring program, as applicable.

20. Test equipment failure during functional testing may invalidate all testing performed during respective day, unless it can be determined exactly when the failure occurred, and which snubbers were affected. Failed testing equipment shall be repaired or replaced.

21. Initial test performed for an inservice snubber test shall be maintained as as-found test of record.

    a. If multiple tests are performed for any reason, all test results shall be saved and documented.

    b. Copies of all tests shall be included with test procedure records, and reason for performing multiple tests shall be documented.

    c. Snubber Program Manager may provide additional comments or justification as an attachment to procedure, as required.

22. Test results shall be reviewed for adverse trends, to help establish service life for specific snubbers or locations.

5.8 Operational Readiness Testing (continued)

23. Snubbers placed in same locations as snubbers which failed during the previous test campaign shall be retested at the time of the subsequent test campaign, unless cause of failure is clearly established and corrected so as to preclude reoccurrence. Such snubbers shall not be considered as part of the test campaign functional testing sample. Failures found by these retests shall not require additional testing as described in Section 5.12, Sample Expansion but shall be evaluated for appropriate corrective action.

24. Each snubber in a parallel or multiple-snubber installation shall be identified and counted individually.

25. Fractional sample sizes shall be rounded up to next integer.

26. All unacceptable snubbers shall be adjusted, repaired, modified, or replaced.

27. Hydraulic snubbers that have been rebuilt shall have a subsequent drag test performed to verify proper assembly.

5.9 <u>Defined Test Plan Group (DTPG)</u>

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 the exception of large bore Lisega SG snubbers, which are tested as a separate DTPG.

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. DTPGs shall not be changed after initiating a test campaign.

5. For unacceptable snubber(s), additional testing shall continue within DTPG or FMG, as described in Section 5.8 Step 12.

5.11 Testing Sample Plan Selection

The sample selection is intended to represent snubbers that have been in service for at least one fuel cycle. New or replacement snubbers that have been installed since the previous test campaign are not included in the sampled population (This includes snubbers installed to replace snubbers found unacceptable in the previous cycle testing.) Likewise, snubbers that have had maintenance activities performed which could affect test results are to be excluded. An exception to this would be where a special DTPG is identified consisting solely of snubbers that have been newly installed or maintained.

1. The initial sample selection shall be random as described in ASME OM ISTD- 5311 & 5411.

2. Selection of the representative 10% Plan samples may also be selected from snubbers concurrently scheduled for seal replacement or other similar activity related to service life monitoring. The snubbers shall be tested on a generally rotational basis to coincide with the service life monitoring activity.

5.12 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 ISTD-5312 & 5412.

    a. 37 Plan supplemental samples shall consist of either 18 or 19 snubbers, based on number of unacceptable snubbers and mathematical 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 the size of initial sample from that DTPG population, per ASME OM Code, Article ISTD-5312. Testing shall satisfy the mathematical expressions in ISTD-5331.

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, snubbers found unacceptable according to operational readiness test requirements may be assigned into a FMG containing all unacceptable snubbers with the same failure mode and all other snubbers with similar potential for similar failure.

5.12 Sample Expansion (continued)

3. For the Safety Related/Safety Significant 37 Plan Failures – Additional samples shall be selected randomly from the remaining population of the DTPG, or from untested Snubbers of the FMG as applicable.

4. For the Safety Related/Safety Significant 10% Plan Failures – When an unacceptable Snubber has not been assigned to an FMG, the additional sample shall be taken from the DTPG. As practicable, the additional sample shall include the following:

   a. Snubbers of the same manufacturer's design.

   b. Snubbers immediately adjacent to those found unacceptable.

   c. Snubbers from the same piping system.

   d. Snubbers from other piping systems that have similar operating conditions such as temperature, humidity, vibration, and radiation.

   e. Snubbers that are previously untested.

5. A contingency additional sample may be selected prior to the start of testing to facilitate early planning and reduce emergent outage resource impact. If this option is chosen and an initial sample test is unacceptable the acceptability of the contingency sample per ISTD-5313 composition requirements must be validated for the 10% Plan and the acceptability documented in the Corrective Action Program. For the 37 Plan the first additional sample is randomly selected so a random contingency sample is appropriate. In the event of an initial sample failure all contingency snubbers tested as unacceptable must be counted as failures in the completion equations for that DTPG regardless of when tested. If no initial sample snubber fails then any contingency snubber tests performed are counted only as Service Life Monitoring test.

5.13 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. Documentation of the suitability evaluation shall be made in the Work Order documentation and appropriate procedure signoffs.

3. Replacement or modified snubbers shall be examined/tested prior to placing them into service. Testing may be performed at the manufacturer's facility.

5.14 Snubber Deletion

1. As a corrective action snubbers discovered to be unacceptable may subsequently be deleted from the plant based on analysis of the affected piping system. In such cases the deleted snubber shall still be counted as unacceptable in its respective examination population, examination category, or test group (DTPG/FMG) until the current test campaign or visual examination interval is completed.

2. The number of deleted snubbers failing/passing tests or examinations prior to being deleted shall be used in determining examination/testing frequencies.

5.15 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. Performance of Freedom of Motion stroking each outage is sufficient in scope to satisfy this requirement.

2. If an unanticipated transient 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 (CR).

    a. Program Manager shall notify System Engineer and 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. No records are generated by this procedure.

2. Records of inspections, tests, repairs, evaluations, and outage summaries will be maintained within an appropriate Work Order or periodic test procedure. Work Orders and/or PMID histories are searchable in the Consolidated Asset Suite (CAS) application and Document Management System.

3. Documentation of outage summary reports may be found in outage work orders generated from PM model work orders 00390475-12 and 00390517-13 (PMIDs 02007330-01 and 02011318-01).

4. Corrective Actions for Conditions adverse to Quality are documented within the site Corrective Action Program (AD-PI-ALL-0100).

5. Documentation of the installed snubber listing is maintained in SNU-MNS-1618-01. The listing includes the unique location identification number (Mark number) of each snubber along with the installed serial number, manufacturer, model, date built/rebuilt, date installed at the location, expected service life and service life expiration.

7.0 REFERENCES

7.1 Commitments

NOTE

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

1. None.

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. AD-EG-ALL-1703, ASME Section XI Repair/Replacement Program Administration
7. AD-PI-ALL-0100, Corrective Action Program
8. AD-EG-ALL-1450, Preconditioning of Structures, Systems And Components
9. AD-EG-ALL-1202, Preventive Maintenance and Surveillance Testing Administration
10. AD-IT-ALL-0002, Software Quality Assurance (SQA) Program Administration
11. MP/0/A/7650/046, Hydraulic Snubber Corrective Maintenance
12. MP/0/A/7650/051, Mechanical and Hydraulic Snubber Removal, Maintenance and Installation
13. MP/0/A/7650/190, Steam Generator Lisega Snubber Maintenance Activities
14. MP/0/A/7650/228, Operation Of Barker/Diacon S-2000 Snubber Test Machine

7.2 Procedures (continued)

15. PT/0/A/4200/006, Inservice Visual Inspection and Minor Maintenance of Safety Related Snubbers

16. PT/0/A/4200/035, Inspecting Mechanical Snubbers (Freedom Of Motion)

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

10. Code of Federal Regulations: 10CFR50.55a, Codes and Standards

11. MNS UFSAR Section 3.9.3.2.9

12. MNS Technical Specification Section 3.0.8

13. MNS Selected Licensee Commitment SLC 16.9.15

14. CSD-EG-MNS-1618, MNS Installed Snubber Listing (superseded by Program Document SNU-MNS-1618-01)

7.3 Miscellaneous Documents (continued)

15. SNU-MNS-1618-01 (MNS Installed Snubber Listing)

<< Pre-Defined Model Work Order Descriptions >>

1.0 Unit 1 Model Work Orders and Descriptions

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

2. 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

<< Pre-Defined Model Work Order Descriptions >>

2.0 Unit 2 Model Work Orders and Descriptions

1. 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

2. 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

3.0 Additional Information

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

2. FOM (i.e., stroke testing) is performed every fuel cycle for 25% of mechanical snubber population, and is split into four rotating test groups: 1st 25%, 2nd 25%, 3rd 25%, & 4th 25%.

3. 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.