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

Subject: Brunswick Steam Electric Plant, Unit Nos. 1 and 2  
Renewed Facility Operating License Nos. DPR-71 and DPR-62  
Docket Nos. 50-325 and 50-324  
Snubber Program Plan for Fifth 10-Year Interval Inservice Testing Program

Reference: Letter from Bryan B. Wooten (Duke Energy) to the U.S. Nuclear Regulatory Commission Document Control Desk, *Fifth 10-Year Inservice Testing Interval*, dated November 2, 2017, ADAMS Accession Number ML17310A160

Ladies and Gentlemen:

In accordance with the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code), Subsection ISTA-3200(a), "Administrative Requirements," Duke Energy Progress, LLC (Duke Energy), is enclosing for your information a copy of Administrative Procedure AD-EG-BNP-1618, *Brunswick Nuclear Plant Snubber Program Plan*, Revision 0.

The program has been developed to satisfy the snubber preservice and inservice testing and examination requirements of the ASME OM Code, 2004 Edition through 2006 Addenda, and applicable to the fifth 10-year interval for the Brunswick Steam Electric Plant (BSEP), Unit Nos. 1 and 2.

As reported by the November 2, 2017, letter (i.e., Reference), the fifth 10-year IST interval for BSEP begins December 22, 2017. The fifth 10-year interval IST Program will follow the requirements of the ASME OM Code, 2004 Edition with Addenda through OM-2006.

Please refer any questions regarding this submittal to Mr. Lee Grzeck, Manager – Regulatory Affairs, at (910) 832-2487.

Sincerely,

Bryan B. Wooten  
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WRM/wrm

Enclosure: Administrative Procedure AD-EG-BNP-1618, Revision 0, *Brunswick Nuclear Plant Snubber Program Plan*

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Administrative Procedure AD-EG-BNP-1618, Revision 0,  
*Brunswick Nuclear Plant Snubber Program Plan*



Information Use

BRUNSWICK UNIT 0  
ADMINISTRATIVE PROCEDURE

**AD-EG-BNP-1618**

**BRUNSWICK NUCLEAR PLANT  
SNUBBER PROGRAM PLAN**

REVISION 000

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REVISION SUMMARY
<p><b>PRR 2138708</b></p> <p><b>DESCRIPTION</b></p>
<p>New procedure to replace 0BNP-TR-012, Snubber Program Plan for Inspection and Testing of Snubbers, and 0ENP-16.15, Administrative Procedure for the Snubber Program.</p> <p>Revision by J. Darrell Bryant</p>

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## 1.0 PURPOSE

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

## 2.0 SCOPE

1. NRC endorses ASME Code for Operation and Maintenance of Nuclear Power Plants for inspection and testing of snubbers, as stipulated in 10CFR50.55a and NUREG-1482. Specifically, ASME OM Code Subsections ISTA and ISTD govern the snubber examination and testing activities for BNP. This is effective for the fifth 10-year IST interval for Units 1 & 2, which has a start date of December 22, 2017.
2. This program envelopes scope described in ASME OM Code, 2004 edition through 2006 addenda, Subsection ISTA, Article ISTA-1100, which is defined as the following:
  - a. Snubbers used in systems that perform a specific function in shutting down a reactor to the safe shutdown condition.
  - b. Snubbers used to maintain the safe shutdown condition.
  - c. Snubbers employed to mitigate the consequences of an accident.
  - d. Snubbers used to ensure the integrity of reactor coolant pressure boundary.
3. BNP Snubber Program Plan also applies to all snubbers except those installed on Non-Safety Related systems, which may be excluded provided their failure or failure of system on which they are installed would not have an adverse effect on any Safety Related system.
4. In keeping with good engineering practice and to provide reasonable assurance of structural reliability, any remaining snubbers not identified above (i.e., Non-Safety Related) may be included and inspected/monitored as part of BNP Snubber Program.



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### 3.0 DEFINITIONS

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

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## 4.0 RESPONSIBILITIES

### NOTE

- The general roles and responsibilities for the execution of Nuclear Generation Department (NGD) Engineering Programs are outlined in AD-EG-ALL-1600, Engineering Programs and PD-EG-ALL-1618, Snubber Program.
- Specific activities and responsibilities for those organizations and individuals that are involved with the implementation of the Snubber Program at BNP are outlined below.

### 4.1 Programs Engineering Supervisor - GO

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

### 4.2 Snubber Program Manager

1. Maintains qualifications in accordance with BNP training program requirements.
2. Establishes, prepares, and maintains snubber testing and examination Program Plans, implementing procedures, and schedules.
3. Assigns examination and testing requirements for snubbers, as identified in the BNP Snubber Program Plan.
4. Maintains the IDDEAL Software Suite Database (SnubbWorks®) for snubbers.
5. Coordinates the performance of scheduled and non-scheduled snubber examination and testing activities, as well as preventive maintenance and condition monitoring activities.
6. Selects and identifies snubbers for examination, testing, and service life activities.
7. Reviews test and examination results for acceptability.
8. Evaluates results of examinations and tests which fail to meet acceptance criteria.
9. Performs operability/functionality evaluations for snubbers, as required.
10. Generates corrective actions:
  - a. Action Requests (ARs)
  - b. Nuclear Condition Reports (NCRs)
  - c. Work Requests (WRs) in support of Program activities

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#### **4.2 Snubber Program Manager (continued)**

11. Determines the extent of additional examinations, tests, or repairs which may be required following the discovery of an unacceptable snubber condition.
12. Establishes, monitors, and tracks the service life of installed snubbers through the Service Life Monitoring Program.
13. Prepares the scope lists for snubber functional testing and visual examination activities.
14. Provides pertinent information to the implementing work groups.
15. Selects the snubber populations to be examined and tested.
16. Identifies the applicable procedures required to satisfy the examination or testing requirements, per the BNP Snubber Program Plan.
17. Submits the required snubber work scope to the On-Line work management, Outage work management, and Planning work groups.
18. Manages the scope, including content, additions, deletions, expansions, and corrections of the snubber work scope.
19. Compares current recorded results with the prior or expected results to determine snubber continued service and/or corrective actions.
20. Identifies Licensing or Code requirements which cannot be achieved due to impracticality or hardship and initiates actions (i.e., Relief Request) necessary to notify the Nuclear Regulatory Commission (NRC).
21. Establishes industry contacts with ASME OM Code committee representatives, peers at other nuclear utilities, and outside consultants to ensure that the Snubber Program effectively utilizes external Operating Experience (OE).
22. Reviews plant design changes and revises the BNP Snubber Program Plan, as required.
23. Performs functionality evaluations for snubbers, as required.

#### **4.3 Plant Maintenance**

1. Ensures that snubber functional testing is performed in accordance with the applicable station procedures.
2. Records the results of the snubber tests, examinations, and as-found or as-left conditions of the snubber, in accordance with the appropriate station procedures.

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#### **4.3 Plant Maintenance (continued)**

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.

#### **4.4 Plant Design Engineering**

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

#### **4.5 Plant Regulatory Affairs**

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

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## 5.0 INSTRUCTIONS

### 5.1 General

1. For the purposes of this procedure, Snubber Program Manager refers to a (qualified) designee or other person assigned to complete any procedural requirement identified herein. Snubber Program Managers are qualified in accordance with applicable BNP Program Engineering requirements. [Ref. ISTA-1500(e)]
2. ASME OM Code requirements are identified and administered by the implementation of this document.
3. This document (i.e., BNP 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 BNP Snubber Program Plan may periodically be subject to revision. Reasons for revision include, but are not limited to:
  - a. Incorporation of Relief Requests
  - b. Incorporation of Code Cases
  - c. NRC Regulatory Guides, Notices, and Bulletins
  - d. Augmented examinations
  - e. Organizational/Responsibility changes
  - f. Plant License changes
  - g. Snubber replacements
  - h. Snubber Service Life Monitoring updates
  - i. Modifications to the plant that impact the Snubber Program

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## 5.1 General (continued)

5. Generation and revision to BNP Snubber Program Plan are made in accordance with applicable corporate and site procedures.

## 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. Snubber Program Plans may use Controlled Supporting Documents to provide supplemental information.
2. BNP Snubber Program Plan is developed and maintained in accordance with AD-DC-ALL-0201, Development and Maintenance of Controlled Procedure Manual Procedures.
3. Snubber Program Plan related CSD's will use PAS formatting and meet the formatting requirements for Administrative CSD's as described in AD-DC-ALL-0301, Development and Maintenance of Controlled Supporting Documents. The BNP Snubber Program Plan CSD is to be numbered as CSD-EG-BNP-1618.
4. During the implementation of the BNP Snubber Program Plan, and generally within six to twelve months of completing a refueling outage, the BNP Snubber Program Plan and/or respective Controlled Supporting Document (CSD) will be revised, as applicable. All updates will be documented in the BNP Snubber Program Plan or CSD Revision History.
5. 10-Year Updates:
  - a. Once every 10 years, the Snubber Program will be updated to comply with edition and addenda specified in 10CFR50.55a.
  - b. Snubber program intervals are concurrent with ASME OM Code 10-year intervals. Fifth IST interval for Units 1 & 2 begins on December 22, 2017, at which time program and this document was updated to incorporate 2004 edition through 2006 addenda of ASME OM Code as governing commitment. The Fifth Interval expires on December 22, 2027.
  - c. Snubber Program Plans for each 10 year interval will be filed with regulatory authorities in accordance with ASME OM Code requirements. Submittal will consist of latest revision to this document (i.e., AD-EG-BNP-1618), as required by ASME OM Code, Article ISTA-3200. Other pertinent articles of ASME OM Code, Subsection ISTA, include 1300, 3110, 9220, and 9230.
6. Changes to program testing or inspection methodologies may require BNP Snubber Program Plan to be re-submitted to regulatory authorities.

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## 5.2 Snubber Program Plan (continued)

7. Snubbers which have a 12-hour replacement window in accordance with LCO 3.0.8b and Technical Requirements Manual 3.21, Required Compensatory Measure B2, are listed in Attachment 4, Snubbers with 12-Hour LCO Completion Times.

## 5.3 IDDEAL Software Suite

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

## 5.4 Test and Examination Scheduling

1. Test and examination scheduling routinely coincides with refueling outages. Performing testing and examinations during refueling outages allows for improved accessibility, environmental conditions conducive for examination methods, and reduced exposure (ALARA).
2. Examinations and functional testing may be performed during plant operation or during refueling outages, as conditions allow. Functional testing for test plan credit may begin no earlier than 60 days prior to scheduled start of a refueling outage.

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## 5.5 **Snubber Categorization**

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

## 5.6 **Visual Examination**

1. Visual examinations will be performed in accordance with ASME OM Code, Subsection ISTD, to verify that no visible indications of damage or impaired functionality exist and attachments to foundation or support structure are secure.
2. Visual examinations activities for snubbers will be conducted in accordance with BNP Procedure OPT-19.6.0A, Visual Inspection of Accessible Hydraulic Snubbers or OPT-19.6.0B, Visual Inspection of Inaccessible Hydraulic Snubbers, which meets requirements outlined in ASME OM Code, Subsection ISTD.
3. Accessible snubbers are visually examined every 48 months under OPT-19.6.0A, Visual Inspection of Accessible Hydraulic Snubbers. The snubbers under this periodic test procedure are divided into multiple groups organized primarily by system and loop. These examinations are performed online during system windows.
4. Snubber groups 21 and 22 are located in high dose areas during plant operation. Although accessible for inspection online, these are scheduled during refueling outages to minimize dose. Snubber group 4 is located in an area of highly sensitive instrumentation during plant operation. Although accessible for online, these are scheduled during refueling outages during the system maintenance windows to minimize the risk to plant operations.
5. Inaccessible snubbers are visually examined every 48 months under OPT-19.6.0B, Visual Inspection of Inaccessible Hydraulic Snubbers. The snubbers under this periodic test procedure are divided into two groups for the purpose of the visual inspections – group 1 snubbers are located above the 38' elevation in the drywell and group 2 snubbers are located at the 38' elevation and below in the drywell. These two groups are scheduled on a rotating outage basis to levelize workload.



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## 5.6 Visual Examination (continued)

6. Specific snubbers on the Reactor Recirculation system are inspected every outage per the recommendations of calculation 0SNUB-0007, Lower Elevations Drywell Snubber Seal Life.
7. All snubber groups are tracked by ST PMs to ensure schedule requirements are met.
8. Visual examination of as-found conditions will be performed prior to disconnecting or removing any snubber, to determine presence of visible damage or impaired functional ability due to physical damage, leakage, corrosion, or degradation from environmental exposure or operating conditions, and to document position of snubber with respect to compression/extension. Additional discussion of fluid level is provided in Attachment 3, Fluid Level Trending and Corrective Actions.
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, will be classified as unacceptable and may be reclassified acceptable by functionally testing each snubber starting with piston in as-found setting, extending piston rod in tension direction.
11. In accordance with ASME OM Code, Subsection ISTD, Articles 4270 and 4280, Snubber Program Manager (or designated individual knowledgeable in snubber operability requirements) will perform an evaluation for any snubber identified as not meeting acceptance criteria.
  - a. An evaluation will be performed to determine type and cause of visual examination discrepancy and effect on operability of snubber and related components.
  - b. If unacceptable condition is determined to be generic, then additional examinations may be required, or a Work Request may be generated to correct any discrepancies found, as appropriate.
  - c. For any snubber determined to be unacceptable or unsatisfactory, Snubber Program Manager or designee will initiate a NCR.

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## 5.6 Visual Examination (continued)

12. Following completion of each visual examination interval, results will be reviewed for compliance with ASME OM Code, Subsection ISTD, Table 4252-1 (See Attachment 1) to verify that interval duration is acceptable.
  - a. All snubbers identified during visual examination interval which do not meet specified acceptance criteria will be considered in this review.
  - b. Appropriate corrective actions will be taken if examination results dictate truncation of an extended interval.
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. ASME OM Code Case OMN-13, Requirements for Extending Snubber Inservice Visual Examination Interval at LWR Power Plants, hereafter referred to as OMN-13, allows extension of visual examination interval beyond maximum allowed by ASME OM Code, Subsection ISTD. BNP Snubber Program Plan does not currently utilize OMN-13. When OMN-13 is implemented for snubber population at BNP, this document (AD-EG-ALL-1618) will be revised to document program provisions.

## 5.7 Service Life Monitoring

### NOTE

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

1. An estimated service life has been established for each installed snubber within program scope.
  - a. Snubber service life will be reviewed by Snubber Program Manager prior to each fuel cycle.
  - b. Snubbers that will reach end of service life during upcoming cycle will be identified for replacement or refurbishment.
2. Previously established service life durations for installed snubbers will be evaluated prior to each fuel cycle for continued applicability. Snubber listing will be updated to reflect evaluation results, and evaluation methodology / basis for conclusions will be clearly documented.
  - 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, and/or seal life studies.

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## 5.7 Service Life Monitoring (continued)

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

## 5.8 Operational Readiness Testing

1. Safety Related snubber population will be tested for operational readiness during each fuel cycle, to verify that:
  - a. Activation (restraining action) is achieved within specified range in both tension and compression, except that inertia-dependent acceleration-limiting mechanical snubbers may be tested to verify only that activation takes place in both directions of travel.
  - b. Snubber bleed or release rate, where required, is present in both tension and compression, within specified range.
  - c. Where required, force required to initiate or maintain motion of snubber is within specified range in both directions of travel.
  - d. For snubbers specifically required not to displace under continuous load, ability of snubber to withstand load without displacement.
2. Non-Safety Related snubbers may be tested at discretion of Snubber Program Manager.
3. Operational readiness testing will be performed in accordance with testing sample plans defined in Section 5.9.

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## 5.8 Operational Readiness Testing (continued)

4. Test scheduling will be established in accordance with Section 5.4. In accordance with ASME OM Code, Article ISTD-5240, snubber testing may begin no earlier than 60 days before a scheduled refueling outage.
5. Snubbers will be tested in their as-found condition regarding parameters to be tested to fullest extent practicable.
  - a. Test methods will not alter condition of a snubber to extent that results do not represent as-found snubber condition.
  - b. Pipe snubbers will be removed from field installation and bench tested in accordance with BNP Procedure PT-19.6.1.
  - c. Snubbers will not be subjected to prior preventive or corrective maintenance (i.e., pre-conditioning) specifically for purpose of meeting applicable examination or testing requirements. Verification of freedom of motion upon snubber removal is not considered to be pre-conditioning.
6. Snubbers that are maintained or repaired by removing/adjusting a part that can affect results of applicable tests required by this program, will be examined/tested before returning to service. Applicable installation requirements will also be met. Requirements selected will ensure that affected parameters are verified to be acceptable through examination/testing.
7. Applicable site maintenance procedures will govern removal and reinstallation of plant installed snubbers. BNP Procedure 0CM-SUP505, Bergen-Paterson Hydraulic Shock and Sway Arrestor Removal, Installation, and Maintenance, is the governing procedure for all support/restraint removal/restoration activities.
8. Each snubber will have an as-found visual examination performed prior to removal activities and an as-left visual examination following reinstallation.

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## 5.8 Operational Readiness Testing (continued)

9. For each Safety Related snubber determined to be unacceptable by operational readiness testing, additional snubbers will be tested in accordance with ASME OM Code, Article ISTD-5270. Number of additional snubbers tested is dependent upon testing sample plan being utilized.
  - a. Unacceptable (i.e., failed) snubbers will be evaluated and documented in accordance with Corrective Action Program (NCR).
  - b. An engineering evaluation will be performed on System, Structure, or Component (SSC) to which unacceptable snubbers are attached.
    - (1) Engineering evaluation is performed to determine whether SSC to which inoperable snubbers are attached was adversely affected by inoperability of snubbers, to ensure that SSC remains capable of meeting designed service.
10. If a snubber selected for functional testing either fails to activate or fails to move (i.e., frozen-in-place), cause will be evaluated and, if caused by manufacturer or design deficiency, all snubbers of same type and subject to same defect will be evaluated to ensure functionality.
11. For Non-Safety Related snubbers determined to be unacceptable by operational readiness testing, additional tests may be required to address extent of condition and service life concerns in accordance with Corrective Action Program. Requirement for additional testing will be determined by Snubber Program Manager.
12. Degraded snubbers should be replaced with new snubbers as a preventive maintenance action. Scope expansion is not required for degraded snubbers unless deemed necessary to address extent of condition concerns. Additional snubbers may be tested or replaced at discretion of Snubber Program Manager, based on cause of degradation and potential impact on service life assumptions. Information gathered from degraded snubbers will be considered in service life monitoring program, as applicable.
13. Test equipment failure during functional testing may invalidate all testing performed during respective day, unless it can be determined exactly when failure occurred and which snubbers were affected. Failed testing equipment will be repaired or replaced.
14. Initial test performed for an inservice snubber test will be maintained as as-found test of record. If multiple tests are performed for any reason, all test results will be saved and documented. Copies of all tests will be included with test procedure records, and reason for performing multiple tests will be documented. Snubber Program Manager may provide additional comments or justification as an attachment to procedure, as required.

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## 5.8 Operational Readiness Testing (continued)

15. Test results will be reviewed for adverse trends, to help establish service life for specific snubbers or locations.
16. Snubbers placed in same locations as snubbers which failed previous functional test will be retested at time of next scheduled functional test, unless cause of failure is clearly established and corrected. Such snubbers will not be considered as part of functional testing sample.
17. Each snubber in a parallel or multiple-snubber installation will be identified and counted individually.
18. Fractional sample sizes will be rounded up to next integer.

## 5.9 Defined Test Plan Group (DTPG)

1. DTPGs will include all Safety Related or Safety Significant snubbers, with exception of replacement snubbers and snubbers repaired/adjusted as a result of not meeting acceptance requirements, which will be exempt for concurrent test interval.
2. For BNP, all hydraulic snubbers belong to a single DTPG.

## 5.10 Testing Sample Plans

1. Safety Related snubbers in each DTPG at BNP will be tested in accordance with one of the below listed testing plans in accordance with ASME OM Code, Subsection ISTD.
  - a. 37 Test Plan.
  - b. 10% Test Plan.

### **NOTE**

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

2. BNP currently utilizes the 37 Test Plan. Initial sample selection will be random, as described in ASME OM Code, Articles ISTD-5311 & 5411.
3. Test plan will be selected for each DTPG before scheduled testing begins and will be used throughout refueling outage campaign for that DTPG and any Failure Mode Group (FMG) that is derived from it.
4. For unacceptable snubber(s), additional testing will continue within DTPG or FMG, as described in Section 5.10.

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### 5.11 **Sample Expansion**

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

### 5.12 **Snubber Replacement**

1. Snubber replacement will be performed in accordance with BNP Procedure OCM-SUP505.
2. Any replacement or modified snubbers will have a proven suitability for application and environment.
3. Replacement or modified snubbers will be examined/tested prior to placing them into service. Test results will be obtained from manufacturer for all new/rebuilt snubbers.

### 5.13 **Snubber Deletion**

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

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#### 5.14 **Transient Dynamic Events**

1. During each outage, systems having potential to experience a severe dynamic event will be reviewed to determine whether a severe dynamic event has occurred.
2. If an unanticipated dynamic event (e.g., water hammer, steam hammer, beyond Design Basis Event (DBE), etc.) occurs that may affect snubber operability, then affected snubbers and systems will be reviewed and any appropriate corrective action taken. Event information, scope of review, and actions taken will be documented in Corrective Action Program (NCR).
  - a. Program Manager will notify System Engineer and/or Design Engineering to define extent of evaluation for affected system.
  - b. Snubbers within affected region will 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.



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## 6.0 RECORDS

1. 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.

## 7.0 REFERENCES

### NOTE

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

### 7.1 Commitments

None

### 7.2 Procedures

1. [0CM-SUP505](#), Bergen-Paterson Hydraulic Shock and Sway Arrestor Removal, Installation and Maintenance
2. [0CM-SUP506](#), Rebuild of Bergen-Paterson Hydraulic Shock and Sway Arrestors
3. [0PT-19.6.0A](#), Visual Inspection Of Accessible Hydraulic Snubbers
4. [0PT-19.6.0B](#), Visual Inspection Of Inaccessible Hydraulic Snubbers
5. [0PT-19.6.1](#), Snubber Functional Testing
6. [0PT-19.6.3](#), Inspection Of Safety-Related Snubbers Which Have Experienced An Unusual Shock
7. [AD-DC-ALL-0201](#), Development and Maintenance of Controlled Procedure Manual Procedures
8. [AD-DC-ALL-0301](#), Development and Maintenance of Controlled Supporting Documents.
9. [AD-EG-ALL-1000](#), Conduct of Engineering
10. [AD-EG-ALL-1006](#), Conduct Of Fleet Programs Engineering
11. [AD-EG-ALL-1202](#), Preventive Maintenance and Surveillance Testing Administration
12. [AD-EG-ALL-1450](#), Preconditioning of Structures, Systems And Components

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## 7.2 Procedures (continued)

13. [AD-EG-ALL-1600](#), Engineering Programs
14. [AD-EG-ALL-1618](#), Snubber Program Plan
15. [AD-IT-ALL-0002](#), Software Quality Assurance (SQA) Program Administration
16. CSD-EG-BNP-1618, BNP Installed Snubber Listing
17. [PD-EG-ALL-1618](#), Snubber Program Description

## 7.3 Miscellaneous Documents

1. [0SNUB-0006](#), Lower Elevation Drywell and Balance of Plant Snubber Seal Life
2. [0SNUB-0007](#), Lower Elevations Drywell Snubber Seal Life
3. ASME OM Code, Code for Operation and Maintenance of Nuclear Power Plants
4. Code of Federal Regulations: 10CFR50.55a, Codes and Standards
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. Regulatory Guide 1.192, Operation and Maintenance Code Case Applicability, ASME OM Code
8. Regulatory Guide 1.193, ASME Code Cases Not Approved for Use
9. [UFSAR](#), Section 3.9.3 & 5.2.4
10. [Unit 1](#) ([Unit 2](#)), Technical Requirements Manual. Section 3.21

## &lt;&lt; Visual Examination Table &gt;&gt;

Table ISTD-4252-1 Visual Examination Table

Population or Category [Note (1)]	Number of Unacceptable Snubbers		
	Column A for Extended Interval [Notes (2), (3)]	Column B for Interval Same as Previous [Notes (2), (4), (5)]	Column C for Interval Reduction to $\frac{2}{3}$ [Notes (2), (5), (6)]
1	0	0	1
80	0	0	2
100	0	1	4
150	0	3	8
200	2	5	13
300	5	12	25
400	8	18	36
500	12	24	48
750	20	40	78
≥ 1000	29	56	109

## NOTES:

- (1) Interpolation between population or category sizes and the number of unacceptable snubbers is permissible. The next lower integer shall be used when interpolation results in a fraction.
- (2) The basic interval shall be the normal fuel cycle up to 24 months. The examination interval may be as great as twice, the same, or as small as fractions of the previous interval as required by the following Notes. The examination interval may vary  $\pm 25\%$  of the current interval.
- (3) If the number of unacceptable snubbers is equal to or less than the number in Column A, then the next examination interval may be increased to twice the previous examination interval, not to exceed 48 months. In that case, the next examination according to the previous interval may be skipped.
- (4) If the number of unacceptable snubbers exceeds the number in Column A, but is equal to or less than the number in Column B, then the next visual examination shall be conducted at the same interval as the previous interval.
- (5) If the number of unacceptable snubbers exceeds the number in Column B, but is equal to or less than the number in Column C, then the next examination interval shall be decreased to two-thirds of the previous examination interval or, in accordance with the interpolation between Columns B and C, in proportion to the exact number of unacceptable snubbers.
- (6) If the number of unacceptable snubbers exceeds the number in Column C, then the next examination interval shall be decreased to two-thirds of the previous interval.

<< 37 Test Plan >>

37 Test Plan Mathematical Expression

Testing satisfies the mathematical expressions as follows:

(a) For each DTPG:

$$N \geq 36.49 + 18.18C \text{ (Fig. ISTD-5431-1)}$$

where:

N = total number of snubbers tested that were selected from the DTPG

C = total number of unacceptable snubbers found in the DTPG (excluding those counted in FMG tests), plus one for each applicable FMG requiring additional tests in accordance with ISTD-5424

(b) For each FMG requiring additional tests:

$$NF \geq 18.18Cf$$

where:

NF = all snubbers selected and tested after the FMG was established from DTPG

CF = total number of unacceptable snubbers in the FMG, plus those found in the DTPG and used to establish the FMG

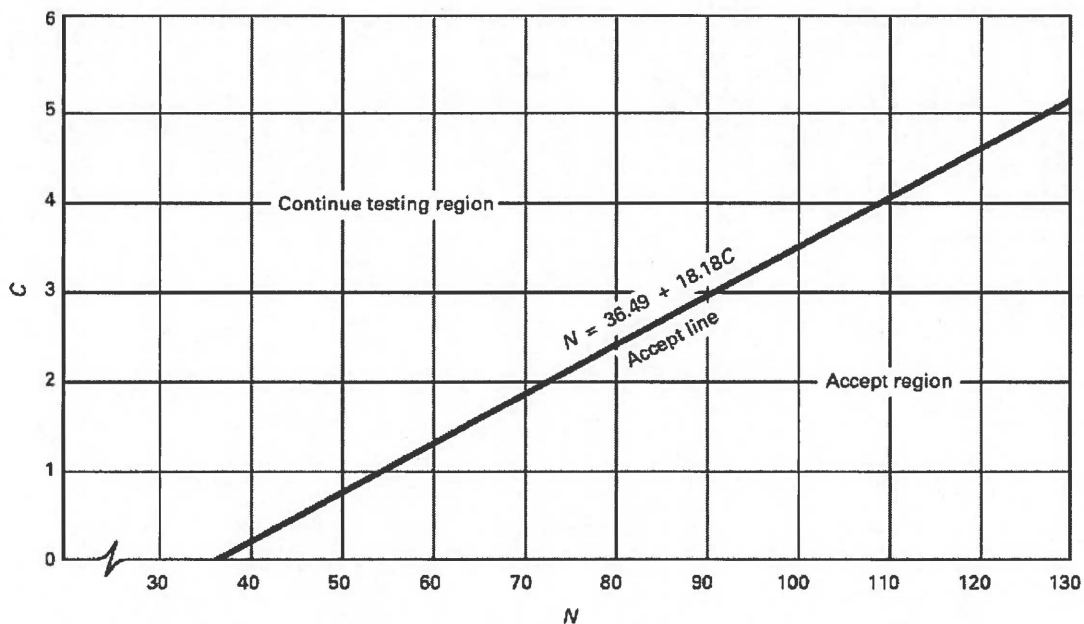


Fig. ISTD-5431-1 The 37 Testing Sample Plan

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ATTACHMENT 3

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### << Fluid Level Trending and Corrective Actions >>

1. The current practice of replacing snubbers pulled for service life or for functional testing precludes any meaningful trending of functional test data. However, fluid levels recorded during visual examination provide a parameter for monitoring snubber fluid leakage and indirectly the sealing capability of snubber seals.
2. Snubbers identified during visual examinations with leakage or a total indicated fluid level of less than 5-3/4 inch on 6 inch stroke snubbers require a review of previous examination data to investigate adverse trending.
3. Corrective actions will be dependent upon the magnitude of reduction in fluid level over previous examinations.
  - a. Accessible snubbers identified with evidence of active leakage should be re-examined at approximately two-year intervals if not replaced.
  - b. Inaccessible snubbers identified with active leaks and not replaced will be scheduled for examination during the next refueling outage.
  - c. If corrective action is addition of snubber fluid, a visual examination will be performed for trending purposes.
4. Any safety-related snubber with a total indicated fluid level of less than 3.25 inch for 6 inch stroke snubbers or a total indicated fluid of less than the thermal movement for 2 inch stroke snubbers will be pulled and functionally tested per OPT-19.6.1, Snubber Functional Testing for operability.

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**ATTACHMENT 4**

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**<< Snubbers with 12-Hour LCO Completion Times >>**

The following list identifies those snubbers which have a 12 hour completion time in accordance with LCO 3.0.8b and TRM 3.21 Required Compensatory Measure B2:

**Unit 1 Snubbers**

Component	Drawing	Component	Drawing
1-CO-202SS12	BP-12212	1-E11-53SS192	BP-10792
1-CO-202SS19	BP-12219	1-E11-53SS195	BP-10795
1-DW-203SS2	BP-12602	1-E11-53SS197	BP-10797
1-DW-203SS7	BP-12607	1-E11-53SS200	BP-15200
1-DW-203SS8	BP-12608	1-E11-53SS464	BP-15464
1-DW-203SS9	BP-12609	1-E11-53SS465	BP-15465
1-E11-1SS302	BP-15302	1-E11-53SS466	BP-15466
1-E11-1SS303	BP-15303	1-E11-54SS551	BP-15551
1-E11-2SS396	BP-15396	1-E11-54SS552	BP-15552
1-E11-2SS413	BP-15413	1-E11-60SS423	BP-15423
1-E11-3SS403	BP-15403	1-E11-60SS425	BP-15425
1-E11-4SS397	BP-15397	1-E11-60SS437	BP-15437
1-E11-4SS399	BP-15399	1-E11-60SS438	BP-15438
1-E11-4SS401	BP-15401	1-E11-60SS440	BP-15440
1-E11-5SS398	BP-15398	1-E11-60SS443	BP-15443
1-E11-5SS400	BP-15400	1-E11-60SS451	BP-15451
1-E11-5SS402	BP-15402	1-E11-60SS452	BP-15452
1-E11-6SS404	BP-15404	1-E11-60SS453	BP-15453
1-E11-37SS95	BP-10695	1-E11-60SS454	BP-15454
1-E11-37SS184	BP-10784	1-E11-187SS77	BP-10677
1-E11-50SS201	BP-15201	1-E41-19SS103	BP-11103
1-E11-50SS467	BP-15467	1-MVD-330SS105	BP-15105
1-E11-50SS468	BP-15468	1-SGT-10SS17	BP-1281
1-E11-51SS546	BP-15546		
1-E11-51SS547	BP-15547		
1-E11-51SS1188	BP-17188		

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ATTACHMENT 4

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**<< Snubbers with 12-Hour LCO Completion Times >>**

**Unit 2 Snubbers**

Component	Drawing	Component	Drawing
2-CO-202SS12	BP-22212	2-E11-51SS546	BP-25546
2-CO-202SS19	BP-22219	2-E11-51SS547	BP-25547
2-DW-203SS2	BP-22602	2-E11-53SS192	BP-20792
2-DW-203SS7	BP-22607	2-E11-53SS195	BP-20795
2-DW-203SS8	BP-22608	2-E11-53SS197	BP-20797
2-DW-203SS9	BP-22609	2-E11-53SS200	BP-25200
2-DW-203SS48	BP-22648	2-E11-53SS464	BP-25464
2-DW-223SS49	BP-22649	2-E11-53SS465	BP-25465
2-DW-223SS50	BP-22650	2-E11-53SS466	BP-25466
2-DW-223SS51	BP-22651	2-E11-54SS551	BP-25551
2-E11-1SS302	BP-25302	2-E11-54SS552	BP-25552
2-E11-1SS303	BP-25303	2-E11-60SS423	BP-25423
2-E11-2SS396	BP-25396	2-E11-60SS425	BP-25425
2-E11-2SS413	BP-25413	2-E11-60SS437	BP-25437
2-E11-3SS403	BP-25403	2-E11-60SS438	BP-25438
2-E11-4SS397	BP-25397	2-E11-60SS440	BP-25440
2-E11-4SS399	BP-25399	2-E11-60SS443	BP-25443
2-E11-4SS401	BP-25401	2-E11-60SS451	BP-25451
2-E11-5SS398	BP-25398	2-E11-60SS452	BP-25452
2-E11-5SS400	BP-25400	2-E11-60SS453	BP-25453
2-E11-5SS402	BP-25402	2-E11-60SS454	BP-25454
2-E11-6SS404	BP-25404	2-E11-188SS77	BP-21077
2-E11-37SS95	BP-20695	2-E11-196SS574	BP-25574
2-E11-37SS184	BP-20784	2-E41-19SS103	BP-21103
2-E11-50SS201	BP-25201	2-E51-17SS94	BP-21294
2-E11-50SS467	BP-25467		
2-E11-50SS468	BP-25468		