Browns Ferry Nuclear Plant



**Unit 0**

Mechanical Corrective Instruction

**MCI-0-000-PCK001**

**Generic Maintenance Instructions for Valve Packing**

Revision 0043 Quality Related

Level of Use: Reference Use

Effective Date: 03-29-2024

Responsible Organization: MMG, Mechanical Maintenance Prepared By: Larry Haddock

Approved By: Eleanor Walker

## Current Revision Description

Page Affected: 8, 12, 14, 17-18, 22, 24, 27-28, 33-34, 37-38, 43, 46-47

Type of Change Corrective Action Tracking Number: 045 These changes where made in accordance to CR Action 1877703

Revised Attachment 2, Section 1.0, Step 10 to add inspection of leakage. Revised Attachment 3, Section 1.0, Step 10 to add inspection of leakage. Revised Attachment 4, Section 1.0, Step 11 to add inspection of leakage.

Revised Attachment 5, Section 1.0, Step 1 to add inspection of leakage and minor formatting fixes.

Revised Section 7.0 for correct formatting in accordance with NPG-SPP-01.2. Updated Attachment 1 With Minor Editorial Formatting.

**Table of Contents**

* 1. [INTRODUCTION 5](#_TOC_250029)
  2. [Purpose 5](#_TOC_250028)
  3. [Scope 5](#_TOC_250027)
  4. [Frequency 5](#_TOC_250026)
  5. [REFERENCES 6](#_TOC_250025)
  6. [Performance References 6](#_TOC_250024)
  7. [Developmental References 6](#_TOC_250023)
  8. [Commitments 6](#_TOC_250022)
  9. [PRECAUTIONS AND LIMITATIONS 7](#_TOC_250021)
  10. [Precautions 7](#_TOC_250020)
  11. [Limitations 7](#_TOC_250019)
  12. [PREREQUISITE ACTIONS 8](#_TOC_250018)
  13. [Preliminary Actions 8](#_TOC_250017)
  14. [Special Tools, Measuring and Test Equipment, Parts, and Supplies 8](#_TOC_250016)
      1. [Special Tools 8](#_TOC_250015)
      2. [Measuring and Test Equipment 9](#_TOC_250014)
      3. [Parts and Supplies 10](#_TOC_250013)
  15. [Approvals and Notifications 10](#_TOC_250012)
  16. [Field Preparations 10](#_TOC_250011)

1. [ACCEPTANCE CRITERIA 10](#_TOC_250010)
2. [PERFORMANCE 11](#_TOC_250009)
   1. [Valve Packing Instructions 11](#_TOC_250008)
   2. [Valve Packing Adjustment 11](#_TOC_250007)
3. [POST PERFORMANCE ACTIVITY 12](#_TOC_250006)
   1. [Post Maintenance Testing (PMT) 12](#_TOC_250005)
   2. [Restoration 12](#_TOC_250004)
   3. [Summarizing Results 12](#_TOC_250003)
      1. [Reconsolidation Required 12](#_TOC_250002)
      2. [Completed Work Transmittals 13](#_TOC_250001)
4. [RECORDS 13](#_TOC_250000)

**Table of Contents (continued)**

## Attachment 1: Valve Packing Information 14

## Attachment 2: Manually Operated Valves and System Service Operated

## Valves 15

## Attachment 3: Air Operated Valves 25

## Attachment 4: Motor Operated Valves 35

## Attachment 5: Preserving As Found Packing Evidence 47

## Attachment 6: Periodic Torqueing Instructions 50

## Attachment 7: Valves Meeting Criteria for Next Cycle-Reconsolidation 51

# INTRODUCTION

## Purpose

This instruction implements NPG NETP-117, Valve Stem Packing Enhancement Program. This procedure provides generic instructions for removing of old packing, cleaning, inspecting, and measuring valve stems and stuffing boxes. This instruction includes steps for installing enhanced packing arrangements, graphite valve packing rings, and Belleville type spring washers.

This procedure may be supplemented with additional valve-specific instructions contained in a Work Order (WO).

## Scope

This instruction is applicable to:

* + - Valves containing standard stuffing box configurations with rising and rotating stems.
    - New valves received from inventory that require repacking prior to installation whenever manufacturer supplied packing material and configuration are not specified during purchase or when Engineering determines a different packing arrangement is required.
    - Check Valves that are considered system service operated valves.
    - Valves requiring packing adjustment and tightening.

## Frequency

None

# REFERENCES

## Performance References

* + 1. MCI-0-000-AOV001, Maintenance of Air Operated Valves
    2. TVA-TSP-18.903, Asbestos Management and Exposure Control

## Developmental References

* + 1. BFN Drawing Series 1-47BD1000, Valve Packing Data Sheets
    2. BFN Generic Substitution Specification N1M-002, Generic Substitutions, Data Sheets 4010, 4011, 4012, and 4013.
    3. G-29B, PS 4.M.1.1, Material Fabrication and Handling Requirements for Austenitic Stainless Steel
    4. MCI-0-000-VLV000, Valve and Actuator Instruction Index
    5. NETP-115, MOV Program
    6. NETP-117, Valve Stem Packing Enhancement Program

## Commitments

* + 1. LER 260/2016-002-00, High Pressure Coolant Injection System Failure Due To Stuck Contactor
    2. BFPER970896, Actuator and Valve Not Installed Correctly On 2-FCV-003-0094
    3. BFPER03-003875-000, Identify Increases in Motor Running Currents
    4. PER 174044, Leak from 2-RPV-10-505 Rx Vessel Drain Valve
    5. PER 212791, AOV Assist Visit Equipment Reliability Recommendation 1
    6. PER 244202, BFN-3-VTV-010-0502 Has Blown Packing
    7. PER 473637, Leak Identified At 1-FCV-068-0079 During Initial Drywell Entry
    8. PER 480605-007, Smart Stem Protection
    9. PER 646078-001, Diagnostic Test Applicable to AOVs

# PRECAUTIONS AND LIMITATIONS

## Precautions

* + 1. Valves suspected of containing asbestos packing are to be unpacked in accordance with TVA Safety Manual,TSP-18.903, Asbestos Management and Exposure Control.
    2. To minimize risk of damage to MSIV internal guide surfaces caused by excessive stroking, the vendor recommends limiting the amount of dry strokes made in a short amount of time to approximately 10 minutes between each full stroke. This wait period does NOT apply to stroking MSIV with water in the line.

## Limitations

* + 1. Improper handling or undue force can affect the performance of a valve. Use care when transporting or handling valves or parts.
    2. During disassembly and reassembly activities, rubber gloves are to be worn to reduce potential of chloride contamination.
    3. When repacking valve using a two or three piece packing follower, ensure correct orientation of the packing follower is to be ensured. If the packing follower is installed upside down a loss of preload could occur causing an unplanned LCO or plant shutdown.
    4. During performance of packing consolidation by electrically stroking DC MOV, stroking of MOV may cause starter contactor to stick. An inspection is to be performed to ensure free movement of starter contactor.

Reference CR1160196.

* + 1. [NRC/C] During performance of MOV (Motor Operated Valve) packing consolidation, to protect the motor starter contactors from cyclic fatigue caused by excessive cycling in a short period of time, the maximum number of cycles for all motor starter and contactor assemblies should never exceed ten (10) within a given hour. [LER 260/2016-002-00]
    2. A support WO is required for use of Diagnostics for AOV or MOV program valves in inaccessible areas (Drywell etc) if a packing retorque is to be used to stop a minimal leak. The running loads are to be used and provided on the packing data sheet as a target with less emphasis on target packing torque.

A Maximum gland stud torque is to be provided on the data sheet to prevent over stressing the studs. This recommendation is the result of a CFA conducted by BFN in 2021 addressing highly consequential drywell leakage trends.

# PREREQUISITE ACTIONS

## Preliminary Actions

1. **ENSURE** craftsmen assigned to this task are current in the following qualifications (as applicable):
   * MMQ006.004 Torquing (Level III) - One Mechanic
   * MMQ006.018 Valve Packing (Level III) - One Mechanic
2. [PER/C] **IF** valve packing database does NOT contain a datasheet for the particular valve being worked, **THEN**

**NOTIFY** Maintenance Supervision and complete

Attachment 1, Table 2, PART 1. Otherwise, **MARK** N/A. [PER 174044]

1. **RECORD** any issue requiring Valve Engineer resolution in the Work Order performance log.
2. **IF** packing retorque is to be used to stop a minimal leak for AOV or MOV program valves in inaccessible areas (Drywell etc) , **THEN**

**INITIATE** a Condition Report (CR) for a support WO for use of Diagnostics. Otherwise, **MARK** N/A.

## Special Tools, Measuring and Test Equipment, Parts, and Supplies

## Special Tools

1. **OBTAIN** the following Special tools:
   * Standard mechanics tools
   * Packing removal tools (pullers and picks)

## Measuring and Test Equipment

**NOTE**

Only the "Item No." of the M&TE needs to be recorded at the inspection point. M&TE calibration verification for the items listed are to be performed prior to closure of the governing work order.

[1] **OBTAIN** M&TE equipment listed in M&TE Table 1 shown. [1.1] **RECORD** data in M&TE Table 1.

[1.2] **IF** additional M&TE is needed, **THEN**

**LIST** in Table 1 space. Otherwise, **MARK** N/A.

[1.3] **ENSURE,** with Peer Check, applicable M&TE meets range requirements.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Table 1, Measuring and Test Equipment Table** | | | | | |
| **Parameter** | **Recommended Instrument (Item No.)** | | **Required Range** | **Required Accuracy** | **M&TE Used** |
| Torque | (1) Torque Wrench (ft-lb.) | | As-Required |  | M&TE Used |
| TVA ID# | Cal. Due Date | Actual Range | Actual Accuracy | (Y or N) |
|  |  |  |  |  |
| Torque | (2) Torque Wrench (ft-lb.) | | As-Required |  | M&TE Used |
| TVA ID# | Cal. Due Date | Actual Range | Actual Accuracy | (Y or N) |
|  |  |  |  |  |
| Measurement | (3) Dial Calipers | | As-Required |  | M&TE Used |
| TVA ID# | Cal. Due Date | Actual Range | Actual Accuracy | (Y or N) |
|  |  |  |  |  |
| Measurement | (4) Micrometer | | As-Required |  | M&TE Used |
| TVA ID# | Cal. Due Date | Actual Range | Actual Accuracy | (Y or N) |
|  |  |  |  |  |
| Measurement | (5) Feeler Gauge | | As-Required |  | M&TE Used |
| TVA ID# | Cal. Due Date | Actual Range | Actual Accuracy | (Y or N) |
|  |  |  |  |  |
|  | (6) | | As-Required |  | M&TE Used |
| TVA ID# | Cal. Due Date | Actual Range | Actual Accuracy | (Y or N) |
|  |  |  |  |  |
|  | (7) | | As-Required |  | M&TE Used |
| TVA ID# | Cal. Due Date | Actual Range | Actual Accuracy | (Y or N) |
|  |  |  |  |  |

## Parts and Supplies

1. **OBTAIN** the following parts and supplies:
   * Demineralized water (AOVs only)
   * N-5000 or other approved thread lubricant
   * Scotchbrite or other approved cleaning cloth

## Approvals and Notifications

None

## Field Preparations

1. **READ** this procedure
2. **REQUEST** Work Supervisor provide clarification as required.
3. **WHEN** procedure is understood, **THEN PRINT** your name and sign initials.

|  |  |
| --- | --- |
| Printed Name | Initials |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. **ENSURE** Precautions and Limitations in Section 3.0 have been reviewed.
2. **ENSURE** Prerequisites listed in Section 4.0 have been met.

# ACCEPTANCE CRITERIA

The acceptance requirement is the satisfactory completion of the Work Order.

# PERFORMANCE

**NOTES**

1. Performance steps may be performed out of sequence to best facilitate the flow of work provided: no prerequisites are violated, completion of subsequent steps are not impaired, and all required hold points, inspections, and verifications are completed.
2. The steps in this instruction may be marked N/A (Not Applicable) with prior concurrence from the Work Supervisor. Concurrence is to be documented in the comments in Section 7.3.2
3. Attachments in this procedure not required for the activity being performed may be discarded from the package.
4. Lubrication of packing materials or stem is NOT allowed unless specially stated in this procedure or requested by Valve Engineer.

## Valve Packing Instructions

1. **PACK** valve in accordance with the VPDS, WO instructions, and the applicable Attachment(s).
   * Attachment 1, Valve Packing Information
   * Attachment 2, Manually Operated Valves and System Service Operated Valves
   * Attachment 3, Air Operated Valves
   * Attachment 4, Motor Operated Valves

## Valve Packing Adjustment

1. **TIGHTEN** valve packing in accordance with the VPDS, WO instructions, and the applicable Attachment(s) when required.
   * Attachment 1, Valve Packing Information
   * Attachment 2, Manually Operated Valves and System Service Operated Valves
   * Attachment 3, Air Operated Valves
   * Attachment 4, Motor Operated Valves

# POST PERFORMANCE ACTIVITY

## Post Maintenance Testing (PMT)

1. **PERFORM** PMT in accordance with WO instructions.
2. **CLEAN** work area of any debris caused by the performance of this instruction.

Comments:

## Restoration

[1] [PER/C] **IF** valve being repacked is in a normally inaccessible area (such as the Drywell, Steam Vault, RWCU HEX Room) or is in an un-isolatable position, **THEN**

**CHECK** Yes on Attachment 1, Table 3, PART 2, C. [PER 473637]

Otherwise, **MARK** N/A.

## Summarizing Results

## Reconsolidation Required

1. **IF** work performed was repacking of valve, **THEN REVIEW** Attachment 7. Otherwise, **MARK** N/A.
2. **IF** valve is listed in Attachment 7, **THEN**

**PERFORM** the following, otherwise **MARK** Steps 7.3.1[2.1] and 7.3.1[2.2] N/A.

[2.1] **RECORD** date of repack.

Date of Repack:

[2.2] **INITIATE** Condition Report for Work Order to reconsolidate this valve two years from date listed in Step 7.3.1[2.1].

Condition Report Number:

## Completed Work Transmittals

1. **COMPLETE** Maintenance documentation in accordance with MMDP-1, Maintenance Management System.
2. **CLEAN** work area of any debris caused by the performance of this instruction.

Comments:

# RECORDS

Completed portions of this procedure are retained with the work order package.

**Attachment 1**

**(Page 1 of 1)**

**Valve Packing Information**

**Table 2, PART 1**

Complete Table 2, PART 1 if the VPDS is NOT available and submit to Valve Engineer or Planner.

UNID/TAG No: Work Order:

Location: Safety Classification:  NQR  QR  SR

Valve Manufacturer:

Model No.:

Size:

\_

Operator Type:  Air Operated  Motor Operated  Manually Operated  Other:

|  |  |  |  |
| --- | --- | --- | --- |
| Valve Stem O.D. | ” | Upper Bushing HT: | ” |
| Stuffing Box I.D. | ” | Lower Bushing HT: | ” |
| Stuffing Box Depth: | ” | Live Loaded: | Yes  No  |
| Stud/Bolt Diameter (Nom.) | ” | Spring Cfg: | ” |
| Number of Packing Studs/Bolts: |  | Number of Flat Washers per Stud: |  |

Completed By:

Performer/Designee:

## Table 3, PART 2

Date

Complete Table 3, PART 2 to record final torque for each valve pack and submit to the Valve Engineer.

1. Work Order:
2. Record Final Torque from the applicable Attachment following completion of all testing and adjustments:

Attachment No: Final Torque:

1. Valve is located in an inaccessible area during full power operations. Yes  No 
2. Provide a copy of Attachment to the Valve Engineer.

Completed By:

Performer/Designee: Date

**(Page 1 of 10)**

**Manually Operated Valves and System Service Operated Valves**

# 1.0 VALVE PACKING REMOVAL AND INSPECTION

**CAUTIONS**

Care is to be used to prevent scratching or damaging valve stem or stuffing box interior surfaces.

**WARNING**

Valve is under system pressure if packing gland/follower moves upward when loosening gland/follower nuts.

1. **LOOSEN** packing gland/follower nuts.
2. **MONITOR** gland/follower upward movement.
3. **IF** gland/follower moves upward, **THEN**

**TIGHTEN** gland/follower nuts immediately to minimize leakage. Otherwise, **MARK** N/A.

1. **REMOVE** packing gland/follower nuts.
2. **IF** valve is live loaded, **THEN**

**REMOVE** live load sets. Otherwise, **MARK** N/A.

1. **RAISE** packing gland/follower.

**(Page 2 of 10)**

**Manually Operated Valves and System Service Operated Valves**

**1.0 VALVE PACKING REMOVAL AND INSPECTION (continued)**

**NOTES**

1. Lantern rings are to be removed. However, if removal requires an unplanned valve disassembly then lantern rings may be placed in the location specified by the Valve Engineer.
2. As a minimum, lantern rings are to be lifted so that packing material below lantern rings can be removed.
3. **IF** lantern rings are installed, **THEN**

**REMOVE** lantern rings. Otherwise, **MARK** N/A. [7.1] **IF** lantern rings cannot be removed, **THEN**

**NOTIFY** Supervision and Valve Packing Engineer.

Otherwise, **MARK** N/A.

1. **REMOVE** packing.

**CAUTION**

If a Stem repack is being done to repair a significant leak/or repeat leak in a high energy system (steam) especially in Containment, it is recommended that the Stem be removed to allow a full cleaning of the Stuffing Box and Gland to allow for a thorough Stuffing Box and Gland inspection for steam cuts.

1. **CLEAN** the following accessible areas:
   * Stuffing Box
   * Stem
   * Packing Gland/Follower
   * Studs

**Attachment 2**

**(Page 3 of 10)**

**Manually Operated Valves and System Service Operated Valves**

**1.0 VALVE PACKING REMOVAL AND INSPECTION (continued)**

1. **INSPECT** the following components for evidence of leakage, damage, corrosion, or other unserviceable condition:
   * Bonnet gasket leakage
   * Leakoff port leakage
   * Plugged leakoff leakage
   * Thru wall leakage in valve body
   * Thru wall leakage in adjacent piping or flange gasket leakage
   * Packing Gland/Follower
   * Entire Stuffing Box
   * Packing Studs/Swing Bolts/Nuts
   * Stem (Accessible Area)
2. **IF** any damage or unserviceable condition is identified, **THEN**

**NOTIFY** Supervisor. Otherwise, **MARK** N/A.

1. **IF** stem is removed, **THEN**

**CHECK** for allowable runout in Table 4. Otherwise, **MARK**

N/A.

## Table 4, MOV And SSOV Allowable Runout

|  |  |
| --- | --- |
| Stem Diameter | Allowable Runout |
| Less than or equal to 2" | 0.010" per ft. of length |
| Greater than 2" | 0.015" per ft. of length |

[12.1] **IF** Table 4 allowable runout is NOT met, **THEN NOTIFY** Valve Engineering. Otherwise, **MARK** N/A.

**Attachment 2**

**(Page 4 of 10)**

**Manually Operated Valves and System Service Operated Valves**

**1.0 VALVE PACKING REMOVAL AND INSPECTION (continued)**

1. **ENSURE** packing gland/follower slides smoothly and easily into and out of stuffing box.
2. **IF** VPDS does NOT exist for valve being worked, **THEN COMPLETE** Attachment 1, Table 2, PART 1 and submit to the

Valve Engineer/Designee or Planner. Otherwise, **MARK** N/A.

**Attachment 2**

**(Page 5 of 10)**

**Manually Operated Valves and System Service Operated Valves**

# 2.0 VALVE PACKING INSTALLATION

**NOTES**

1. [PER/C] Check valves manufactured by Schutte & Koerting Co. require the rockshaft actuator arm to be oriented correctly. [BFPER970896]
2. The cut locations on two-piece packing rings are to be staggered 90 and split ring packing staggered 120 to 180 to reduce the possibility of leaking.
3. Lubrication of packing materials or stem is NOT allowed unless specially stated in this procedure or requested by Valve Engineer.

**CAUTIONS**

1. When repacking valve using a two or three piece packing follower, a check for correct orientation of the packing follower is to be performed. If the packing follower is installed upside down a loss of preload could occur causing an unplanned LCO or plant shutdown.
2. The stem or packing is NOT to be lubricated unless specifically stated in this procedure (AOV's with demineralized water only).
3. **CHECK** VPDS matches valve configuration.

[1.1] **IF** VPDS does NOT match valve configuration, **THEN**

**PERFORM** the following, otherwise **MARK** Steps 2.0[1.1.1] and 2.0[1.1.2] N/A.

[1.1.1] **NOTIFY** Supervisor.

[1.1.2] **MARK** differences on original VPDS and submit to Valve Engineer.

1. **PACK** valve in accordance with VPDS.
2. **LUBRICATE** stud threads with N-5000 or other approved thread lubricant.

**Attachment 2**

**(Page 6 of 10)**

**Manually Operated Valves and System Service Operated Valves**

**2.0 VALVE PACKING INSTALLATION (continued)**

1. **ENSURE** packing gland/follower is installed as follows:
   * Inserted into stuffing box a minimum of 1/8"
   * Centered in stuffing box
   * Centered around valve stem (for valve stems 1-1/2” and larger, use a feeler gauge to ensure clearance)
2. **LUBRICATE** surface between nut and hardened washer.

**CAUTION**

Lubricating inside the Belleville washer dish is to be avoided as this will interfere with washer’s ability to provide proper deflection.

1. **LUBRICATE** hardened washers.
2. **INSTALL** hardened washers.

**NOTE**

A split spacer/bushing may be used to consolidate packing if live-load (longer) bolting has been previously installed.

1. **IF** gland/follower studs are to be live-loaded, **THEN**

**PERFORM** the following, otherwise **MARK** Steps 2.0[8.2] through 2.0[8.3] N/A.

[8.1] **LUBRICATE** live-load spring sets ID and OD lightly with an approved graphite.

[8.2] **INSTALL** live-loading in accordance with VPDS.

[8.3] **LUBRICATE** surface between top flat washer and nut.

1. **INSTALL** packing gland/follower nuts finger tight.

**Attachment 2**

**(Page 7 of 10)**

**Manually Operated Valves and System Service Operated Valves**

# 3.0 RISING STEM PACKING CONSOLIDATION

**NOTES**

1. Packing is consolidated on rising stem valves by moving the valve stem in open and closed directions a minimum distance of packing set height.
2. Recommended minimum valve stroke length is equal to total height of packing set, excluding carbon spacer/bushings.
3. Gland/follower nuts are to be torqued following down stroke during consolidation. Gland/follower nuts are to be tightened evenly and in small increments to ensure packing gland/follower remains close to level and does not become cocked in stuffing box.
4. A minimum of 5 strokes is preferred to consolidate packing. Valve packing is fully consolidated when no additional nut rotation is observed while applying final torque.

**CAUTIONS**

1. A feeler gauge for stems 1-1/2” or larger, is to be used to check clearance all around stem and gland ID for clearance after each increment.
2. Do NOT stroke valves with loose packing. Compression force will keep packing rings in place and prevent damage.
3. [PER/C] All newly installed packing is to be consolidated. [PER 244202]
4. **PERFORM** packing consolidation in accordance with VPDS by repeatedly torqueing packing gland/follower nuts evenly then cycling valve.

**(Page 8 of 10)**

**Manually Operated Valves and System Service Operated Valves**

**3.0 RISING STEM PACKING CONSOLIDATION (continued)**

**Hold Point**

[1.1] **RECORD**, with Peer Check, torque value and M&TE item number.

Final Torque: M&TE:

Cal. Due Date:

Performer: Date:

Peer Check: Date:

1. **ENSURE** valve OPENS and CLOSES smoothly.
2. **RECORD** final torque on Attachment 1.

**(Page 9 of 10)**

**Manually Operated Valves and System Service Operated Valves**

# 4.0 ROTATING STEM PACKING CONSOLIDATION

**NOTE**

Packing is consolidated on rotating stem valves by applying full torque to seat each packing ring. Only final torque is recorded following seating of last ring.

**CAUTIONS**

1. Stroking valves with loose packing can cause stem damage.
2. [PER/C] All newly installed packing is to be consolidated. [PER 244202]
3. **SEAT** each individual packing ring to torque value specified in VPDS.
4. **WHEN** all individual packing rings have been seated, **THEN**

**ENSURE** clearance all around between gland and stem using feeler gauge for stems 1-1/2” or larger.

**(Page 10 of 10)**

**Manually Operated Valves and System Service Operated Valves**

**4.0 ROTATING STEM PACKING CONSOLIDATION (continued)**

1. **PERFORM** final torque of packing set to value specified in VPDS.

**Hold Point**

[3.1] **RECORD**, with Peer Check, torque value and M&TE item number.

Final Torque: M&TE:

Cal. Due Date:

Performer: Date:

Peer Check: Date:

1. **ENSURE** valve OPENS and CLOSES smoothly.
2. **RECORD** final torque on Attachment 1.

# 1.0 VALVE PACKING REMOVAL AND INSPECTION

**NOTES**

1) For AOV repack activities, it may be necessary to take local control of valve by installing pneumatic bypass jumpers around solenoid valves, positioners, etc. Installation of pneumatic jumper is controlled by work instructions contained in the WO, MCI-0-000-AOV001, or other procedure unique to valve being repacked.

**CAUTION**

Care is to be used to prevent scratching or damaging valve stem or stuffing box interior surfaces.

**WARNING**

Valve is under system pressure if packing gland/follower moves upward when loosening gland/follower nuts.

1. **LOOSEN** packing gland/follower nuts.
2. **MONITOR** gland/follower upward movement.
3. **IF** gland/follower moves upward, **THEN**

**TIGHTEN** gland/follower nuts immediately to minimize leakage. Otherwise, **MARK** N/A.

1. **REMOVE** packing gland/follower nuts.
2. **IF** valve is live-loaded, **THEN**

**REMOVE** live-load sets. Otherwise, **MARK** N/A.

1. **RAISE** packing gland/follower.

**NOTES**

1. Lantern rings are to be removed. However, if removal requires an unplanned valve disassembly then lantern rings may be placed in the location specified by the Valve Engineer.
2. As a minimum, lantern rings are to be lifted so that packing material below lantern rings can be removed.
3. **IF** lantern rings are installed, **THEN**

**REMOVE** lantern rings. Otherwise, **MARK** N/A. [7.1] **IF** lantern rings cannot be removed, **THEN**

**NOTIFY** Supervision and Valve Packing Engineer.

Otherwise, **MARK** N/A.

1. **REMOVE** packing.

**CAUTION**

If a Stem repack is being done to repair a significant leak/or repeat leak in a high energy system (steam) especially in Containment, it is recommended that the Stem be removed to allow a full cleaning of the Stuffing Box and Gland to allow for a thorough Stuffing Box and Gland inspection for steam cuts.

1. **CLEAN** the following accessible areas:
   * Stuffing Box
   * Stem
   * Packing Gland/Follower
   * Studs

**Attachment 3**

**(Page 3 of 10) Air Operated Valves**

**1.0 VALVE PACKING REMOVAL AND INSPECTION (continued)**

1. **INSPECT** the following components for evidence of leakage, damage, corrosion, or other unserviceable condition:
   * Bonnet gasket leakage
   * Leakoff port leakage
   * Plugged leakoff leakage
   * Thru wall leakage in valve body
   * Thru wall leakage in adjacent piping or flange gasket leakage
   * Packing Gland/Follower
   * Entire Stuffing Box
   * Packing Studs/Swing Bolts/Nuts
   * Stem (Accessible Area)
2. **IF** any damage or unserviceable condition is identified, **THEN**

**NOTIFY** Supervisor. Otherwise, **MARK** N/A.

**Attachment 3**

**(Page 4 of 10) Air Operated Valves**

**1.0 VALVE PACKING REMOVAL AND INSPECTION (continued)**

1. **IF** stem is removed, **THEN**

**CHECK** for allowable runout in Table 5. Otherwise, **MARK**

N/A.

## Table 5, AOV Allowable Runout

|  |  |
| --- | --- |
| Stem Diameter | Allowable Runout |
| Less than or equal to 2" | 0.010" per ft. of length |
| Greater than 2" | 0.015" per ft. of length |

[12.1] **IF** Table 5 allowable runout is NOT met, **THEN NOTIFY** Valve Engineering.

1. **ENSURE** packing gland/follower slides smoothly and easily

into and out of stuffing box.

1. **IF** VPDS does not exist for valve being worked, **THEN**

**COMPLETE** Attachment 1, Table 2, PART 1 and submit to Valve Engineer/Designee or Planner. Otherwise, **MARK** N/A.

**Attachment 3**

**(Page 5 of 10) Air Operated Valves**

# 2.0 VALVE PACKING INSTALLATION

**NOTES**

1. The cut locations on two-piece packing rings are to be staggered 90 and split ring packing staggered 120 to 180 to reduce the possibility of leaking.
2. Lubrication of packing materials or stem is NOT allowed unless specially stated in this procedure or requested by Valve Engineer.

**CAUTION**

When repacking valve using a two or three piece packing follower, a check for correct orientation of the packing follower is to be performed. If the packing follower is installed upside down a loss of preload could occur causing an unplanned LCO or plant shutdown.

1. **CHECK** VPDS matches valve configuration.

[1.1] **IF** VPDS does NOT match valve configuration, **THEN**

**PERFORM** the following, otherwise, **MARK** Steps 2.0[1.1.1] and 2.0[1.1.2] N/A.

[1.1.1] **NOTIFY** Supervisor.

[1.1.2] **MARK** differences on original VPDS and submit to Valve Engineer.

1. **PACK** valve in accordance with VPDS.
2. **LUBRICATE** stud threads with N-5000 or other approved thread lubricant.

## (Page 6 of 10) Air Operated Valves

**2.0 VALVE PACKING INSTALLATION (continued)**

**CAUTION**

[PER/C] Demineralized water may be used for lubricating AOV packing. [PER 212791-001]

1. **ENSURE** packing gland/follower is installed as follows:
   * Inserted into stuffing box a minimum of 1/8"
   * Centered in stuffing box
   * Centered around valve stem (for valve stems 1-1/2” and larger, use a feeler gauge to ensure clearance)
2. **LUBRICATE** surface between nut and hardened washer.

**CAUTION**

Lubricating inside the Belleville washer dish is to be avoided as this will interfere with washer’s ability to provide proper deflection.

1. **LUBRICATE** hardened washers.
2. **INSTALL** hardened washers.

## (Page 7 of 10) Air Operated Valves

**2.0 VALVE PACKING INSTALLATION (continued)**

**NOTE**

A split spacer/bushing may be used to consolidate packing if live-load (longer) bolting has been previously installed.

1. **IF** gland/follower studs are to be live-loaded, **THEN**

**PERFORM** the following, otherwise **MARK** Steps 2.0[8.2] through 2.0[8.3].

[8.1] **LUBRICATE** live-load spring sets ID and OD lightly with an approved graphite.

[8.2] **INSTALL** live-loading in accordance with VPDS.

[8.3] **LUBRICATE** surface between the top flat washer and nut.

1. **INSTALL** packing gland/follower nuts finger tight.

**(Page 8 of 10) Air Operated Valves**

# 3.0 RISING STEM PACKING CONSOLIDATION

**NOTES**

1. Packing is consolidated on rising stem valves by moving the valve stem in open and closed directions a minimum distance of packing set height.
2. Recommended minimum valve stroke length is equal to total height of packing set, excluding carbon spacer/bushings.
3. Gland/follower nuts are to be torqued following down stroke during consolidation. Gland/follower nuts are to be tightened evenly and in small increments to ensure packing gland/follower remains close to level and does not become cocked in stuffing box.
4. A minimum of 5 strokes is preferred to consolidate packing. Valve packing is fully consolidated when no additional nut rotation is observed while applying final torque.
5. [PER/C] To alleviate the chance of high friction on an AOV that requires a diagnostics test the initial torque is applied at 50% of the minimal value specified on the VPDS.

[PER 646078-001]

**CAUTIONS**

1. A feeler gauge for stems 1-1/2” or larger, is to be used to check clearance all around stem and gland ID for clearance after each increment.
2. Do NOT stroke valves with loose packing. Compression force will keep packing rings in place and prevent damage.
3. [PER/C] All newly installed packing is to be consolidated. [PER 244202]
4. **PERFORM** packing consolidation in accordance with VPDS by repeatedly torqueing packing gland/follower nuts evenly then cycling valve.

[1.1] **IF** valve diagnostics test do NOT apply to the AOV,

# THEN

**TORQUE** packing gland/follower nuts in small increments to obtain packing in-range torque values specified on the VPDS and manufacturers bench set tag. Otherwise, **MARK** N/A.

## (Page 9 of 10) Air Operated Valves

**3.0 RISING STEM PACKING CONSOLIDATION (continued)**

[1.2] [PER/C] **IF** valve diagnostics test apply to the AOV, **THEN**

**TORQUE** packing gland/follower nuts to 50% of minimum value specified on the VPDS. Final torque is applied during diagnostic testing. [PER 646078-001] Otherwise, **MARK** N/A.

**Hold Point**

[1.3] **RECORD**, with Peer Check, torque value and M&TE item number.

Final Torque: M&TE:

Cal. Due Date:

Performer: Date:

Peer Check: Date:

1. **ENSURE** valve OPENS and CLOSES smoothly.
2. **RECORD** final torque on Attachment 1.

**(Page 10 of 10) Air Operated Valves**

# 4.0 ROTATING STEM PACKING CONSOLIDATION

**NOTE**

Packing is consolidated on rotating stem valves by applying full torque to seat each packing ring. Only final torque is recorded following seating of last ring.

**CAUTIONS**

1. Stroking valves with loose packing can cause stem damage.
2. [PER/C] All newly installed packing is to be consolidated. [PER 244202]
3. **SEAT** each individual packing ring to torque value specified in VPDS.
4. **WHEN** all individual packing rings have been seated, **THEN**

**PERFORM** final torque of packing set to value specified in the VPDS.

**Hold Point**

[2.1] **RECORD**, with Peer Check, torque value and M&TE item number.

Final Torque: M&TE:

Cal. Due Date:

Performer: Date:

Peer Check: Date:

1. **ENSURE** valve OPENS and CLOSES smoothly.
2. **RECORD** final torque on Attachment 1.

**Attachment 4**

**(Page 1 of 12) Motor Operated Valves**

# 1.0 VALVE PACKING REMOVAL AND INSPECTION

**NOTES**

1. Packing friction has an impact on MOV performance. When packing is adjusted or replaced, MOVATS testing is to be coordinated with the Manager of Valve Maintenance/Designee. Work steps will be included in WO when MOVATS testing is required.
2. MOVs are to be backseated manually.
3. [PER/C] The MOVATS Engineer is to be contacted anytime MOV packing gland is to be adjusted [BFPER03-003875-000]

**CAUTIONS**

1. Many MOVs have strain gauges mounted on valve stem. These are expensive and sensitive devices. Care is to be used to protect strain gauges when repacking MOVs or when manually backseating valve.
2. Care is to be used to prevent scratching or damaging valve stem or stuffing box interior surfaces.

**WARNING**

Valve is under system pressure if packing gland/follower moves upward when loosening gland/follower nuts.

1. **LOOSEN** packing gland/follower nuts.
2. **MONITOR** gland/follower upward movement.
3. **IF** gland/follower moves upward, **THEN**

**TIGHTEN** gland/follower nuts immediately to minimize leakage. Otherwise, **MARK** N/A.

1. **REMOVE** packing gland/follower nuts.

**Attachment 4**

**(Page 2 of 12) Motor Operated Valves**

**1.0 VALVE PACKING REMOVAL AND INSPECTION (continued)**

1. **IF** valve is live-loaded, **THEN**

**REMOVE** live-load sets. Otherwise, **MARK** N/A.

1. **RAISE** packing gland/follower.

**CAUTION**

Smart stems require protective measures to protect them from damage during valve assembly/disassembly process.

1. [PER/C] **IF** smart stem is used, **THEN**

**ENSURE** smart stem protective measures are implemented in accordance with valve assembly/disassembly procedure being

used. [PER 480605-007] Otherwise, **MARK** N/A.

**NOTES**

1. Lantern rings are to be removed. However, if removal requires an unplanned valve disassembly then lantern rings may be placed in the location specified by the Valve Engineer.
2. As a minimum, lantern rings are to be lifted so that packing material below lantern rings can be removed.
3. **IF** lantern rings are installed, **THEN**

**REMOVE** lantern rings as necessary. Otherwise, **MARK** N/A. [8.1] **IF** lantern rings cannot be removed, **THEN**

**NOTIFY** Supervision and Valve Packing Engineer.

Otherwise, **MARK** N/A.

**Attachment 4**

**(Page 3 of 12) Motor Operated Valves**

**1.0 VALVE PACKING REMOVAL AND INSPECTION (continued)**

**CAUTION**

If a Stem repack is being done to repair a significant leak/or repeat leak in a high energy system (steam) especially in Containment, it is recommended that the Stem be removed to allow a full cleaning of the Stuffing Box and Gland to allow for a thorough Stuffing Box and Gland inspection for steam cuts.

1. **REMOVE** packing.
2. **CLEAN** the following accessible areas:
   * Stuffing Box
   * Stem
   * Packing Gland/Follower
   * Studs
3. **INSPECT** the following components for evidence of leakage, damage, corrosion, or other unserviceable condition:
   * Bonnet gasket leakage
   * Leakoff port leakage
   * Plugged leakoff leakage
   * Thru wall leakage in valve body
   * Thru wall leakage in adjacent piping or flange gasket leakage
   * Packing Gland/Follower
   * Entire Stuffing Box
   * Packing Studs/Swing Bolts/Nuts
   * Stem (Accessible Area)

**Attachment 4**

**(Page 4 of 12) Motor Operated Valves**

**1.0 VALVE PACKING REMOVAL AND INSPECTION (continued)**

1. **IF** any damage or unserviceable condition is identified, **THEN**

**NOTIFY** Supervisor. Otherwise, **MARK** N/A.

1. **IF** stem is removed, **THEN**

**CHECK** for allowable runout in Table 6. Otherwise, **MARK**

N/A.

## Table 6, MOV Allowable Runout

|  |  |
| --- | --- |
| Stem Diameter | Allowable Runout |
| Less than or equal to 2" | 0.010" per ft. of length |
| Greater than 2" | 0.015" per ft. of length |

[13.1] **IF** Table 6 allowable runout is NOT met, **THEN NOTIFY** Valve Engineering. Otherwise, **MARK** N/A.

1. **ENSURE** packing gland/follower slides smoothly and easily

into and out of stuffing box.

1. **IF** VPDS does NOT exist for valve being worked, **THEN**

**COMPLETE** Attachment 1, Table 2, PART 1 and submit to the Valve Engineer/Designee or Planner. Otherwise, **MARK** N/A.

**Attachment 4**

**(Page 5 of 12) Motor Operated Valves**

# 2.0 VALVE PACKING INSTALLATION

**NOTES**

1. The cut locations on two-piece packing rings are to be staggered 90 and split ring packing staggered 120 to 180 to reduce the possibility of leaking.
2. Lubrication of packing materials or stem is NOT allowed unless specially stated in this procedure or requested by Valve Engineer.

**CAUTIONS**

1. When repacking valve using a two or three piece packing follower, a check for correct orientation of the packing follower is to be performed. If the packing follower is installed upside down a loss of preload could occur causing an unplanned LCO or plant shutdown.
2. The stem or packing is NOT to be lubricated unless specifically stated in this procedure (AOV's with demineralized water only).
3. **CHECK** VPDS matches valve configuration.

[1.1] **IF** VPDS does not match valve configuration, **THEN**

**PERFORM** the following, otherwise, **MARK** Steps 2.0[1.1.1] and 2.0[1.1.2] N/A.

[1.1.1] **NOTIFY** Supervisor.

[1.1.2] **MARK** differences on VPDS and submit to Valve Engineer.

1. **PACK** valve in accordance with VPDS.
2. **LUBRICATE** stud threads with N-5000 or other approved thread lubricant.

**Attachment 4**

**(Page 6 of 12) Motor Operated Valves**

**2.0 VALVE PACKING INSTALLATION (continued)**

1. **ENSURE** packing gland/follower is installed as follows:
   * Inserted into stuffing box a minimum of 1/8"
   * Centered in stuffing box
   * Centered around valve stem (for valve stems 1-1/2” and larger, use a feeler gauge to ensure clearance)
2. **LUBRICATE** surface between nut and hardened washer.

**CAUTION**

Lubricating inside the Belleville washer dish is to be avoided as this will interfere with washer’s ability to provide proper deflection.

1. **LUBRICATE** hardened washers.
2. **INSTALL** hardened washers.

**Attachment 4**

**(Page 7 of 12) Motor Operated Valves**

**2.0 VALVE PACKING INSTALLATION (continued)**

**NOTE**

A split spacer/bushing may be used to consolidate packing if live-load (longer) bolting has been previously installed.

1. **IF** gland/follower studs are to be live-loaded, **THEN**

**PERFORM** the following, otherwise **MARK** Steps 2.0[8.2] and 2.0[8.3].

[8.1] **LUBRICATE** live-load spring sets ID and OD lightly with an approved graphite.

[8.2] **INSTALL** live-loading in accordance with VPDS.

[8.3] **LUBRICATE** surface between the top flat washer and nut.

1. **INSTALL** packing gland/follower nuts finger tight prior to manual consolidation using handwheel.

**Attachment 4**

**(Page 8 of 12) Motor Operated Valves**

# RISING STEM PACKING CONSOLIDATION

**NOTES**

* + 1. Packing is consolidated on rising stem valves by moving the valve stem in open and closed directions a minimum distance of packing set height.
    2. Recommended minimum valve stroke length is equal to total height of packing set, excluding carbon spacer/bushings.
    3. Gland/follower nuts are to be torqued following down stroke during consolidation. Gland/follower nuts are to be tightened evenly in small increments to ensure packing gland/follower remains close to level and does not become cocked in stuffing box.
    4. A minimum of 5 strokes(maximum 10 in a given hour) is preferred to consolidate packing. Valve packing is fully consolidated when no additional nut rotation is observed while applying final torque.
    5. Packing is to be consolidated using handwheel prior to electric stroking. MOVs may be further consolidated with MOVATS crew and/or Operations assistance.
    6. MOVs in the GL 89-10 program are initially torqued to 50% of minimum value shown on the VPDS. Final torque is applied during diagnostic testing.
    7. If DC MOVs are cycled electrically for packing consolidation, then the starter contactors are to be inspected and burnished (as necessary) prior to returning the valve to service. (This may be conducted following as-left MOVATS testing.)

EPI-0-000-MCC001 is to be referred to for guidance on starter contactor inspection and burnishing.

**Attachment 4**

**(Page 9 of 12) Motor Operated Valves**

**3.0 RISING STEM PACKING CONSOLIDATION (continued)**

**CAUTIONS**

1. Using a feeler gauge for stems 1-1/2” or larger, clearance is to be checked all around stem and gland ID for clearance after each increment.
2. Do NOT stroke valves with loose packing. Compression force will keep packing rings in place to prevent damage.
3. [PER/C] All newly installed packing is to be consolidated. [PER 244202]
4. [NRC/C] To protect the motor starter contactors from cyclic fatigue caused by excessive cycling in a short period of time, the maximum number of cycles for all motor starter and contactor assemblies should never exceed ten (10) within a given hour. Additional consolidation may be required after the one hour time frame. [LER 260/2016-002- 00]
5. **PERFORM** packing consolidation in accordance with VPDS by repeatedly torqueing packing gland/follower nuts evenly then cycling valve.

**Hold Point**

[1.1] **RECORD**, with Peer Check, torque value and M&TE item number.

Final Torque: M&TE:

Cal. Due Date:

Performer: Date:

Peer Check: Date:

**Attachment 4**

**(Page 10 of 12) Motor Operated Valves**

**3.0 RIS**[**I**1**N**.2**G**] **STEM PACKING CONSOLIDATION (continued)**

[1.2] **IF** consolidation was performed on DC MOV by electrically stroking valve, **THEN**

**REQUEST** MEG to perform inspection of starter contactors. Otherwise, **MARK** N/A.

[1.2.1] **IF** starter contactors require cleaning, **THEN CREATE** Condition Report (CR) and **RECORD**

below. Otherwise, **MARK** N/A.

Condition Report Number:

1. **ENSURE** valve OPENS and CLOSES smoothly.
2. **RECORD** final torque on Attachment 1.

**Attachment 4**

**(Page 11 of 12) Motor Operated Valves**

# 4.0 ROTATING VALVE STEM PACKING CONSOLIDATION

**NOTES**

1. If cycled electrically valve operation may be limited by stroke limits. Cycling is to be coordinated with MOVATS personnel so that travel limits are NOT exceeded.
2. Packing is consolidated on rotating stem valves by applying full torque to seat each packing ring. Only final torque is recorded following seating of last ring.

**CAUTIONS**

1. Stroking valves with loose packing can cause stem damage.
2. [PER/C] All newly installed packing is to be consolidated. [PER 244202]
3. [NRC/C] To protect the motor starter contactors from cyclic fatigue caused by excessive cycling in a short period of time, the maximum number of cycles for all motor starter and contactor assemblies should never exceed ten (10) within a given hour. Additional consolidation may be required after the one hour time frame.

[LER 260/2016-002-00]

1. **SEAT** each individual packing ring to torque valve specified in VPDS.
2. **WHEN** all individual packing rings have been seated, **THEN**

**PERFORM** final torque of packing set to value specified in VPDS.

**Attachment 4**

**(Page 12 of 12) Motor Operated Valves**

# 4.0 ROTATING VALVE STEM PACKING CONSOLIDATION

## (continued)

**Hold Point**

[2.1] **RECORD**, with Peer Check, torque value and M&TE item number.

Final Torque: M&TE:

Cal. Due Date:

Performer: Date:

Peer Check: Date:

1. **ENSURE** valve OPENS and CLOSES smoothly.
2. **RECORD** final torque on Attachment 1.

**Attachment 5**

**(Page 1 of 3)**

**Preserving As Found Packing Evidence**

# 1.0 INSTRUCTIONS

1. **INSPECT** for evidence of leakage:
   * Bonnet Gasket
   * Leakoff Ports (Plugged or active)
   * Thru wall leakage in valve body or adjacent piping
   * Piping Gaskets

[1.1.1] **IF** any evidence of leakage exist, **THEN**

**CREATE** Condition Report (CR) to document the need for additional work required.

Otherwise, **MARK** N/A. Condition Report Number:

**NOTE**

The last known torque value is to be listed in the Valve Packing Data Sheet (VPDS) and/or the Work Order instructions.

1. **IF** valve is live loaded, **THEN**

**MEASURE** and **RECORD** As Found washer height from top of follower to top of top washer with a dial caliper. Otherwise, **MARK** N/A.

1. **MEASURE** As-Found torque with a deflecting beam torque wrench.

**Attachment 5**

**(Page 2 of 3)**

**1.0 INSTRUCTIONS (continued)**

[3.1] **IF** a deflecting beam is NOT available, **THEN**

**PERFORM** the following. Otherwise, **MARK** Steps 1.0[3.1.1] and 1.0[3.1.2] N/A.

[3.1.1] **MEASURE** torque by starting at 1/2 of As-Left torque value.

[3.1.2] **INCREASE** torque by 10% of total until As-Found torque is determined.

1. **RECORD** As-Found torque of each fastener. As-Found Torque:
2. **LOOSEN** nuts.
3. **IF** valve is live loaded, **THEN**

**PERFORM** the following, otherwise **MARK** Steps 1.0[6.1] and 1.0[6.2] N/A.

[6.1] **TIGHTEN** nuts finger tight against live load. [6.2] **MEASURE** and **RECORD** relaxed height of live load

stack from top of follower to top of top washer with a dial

caliper.

Height Of Live-Load Stack:

[6.3] **REMOVE** packing follower/gland.

1. **ENSURE** packing follower and gland were installed correctly utilizing available valve drawings and or skill of craft.

**Attachment 5**

**(Page 3 of 3)**

**1.0 INSTRUCTIONS (continued)**

1. **REMOVE** packing rings as follows:

**NOTE**

The first packing ring is to be placed in a storage bag labeled as “Number 1 Ring” and Work Order number, the second ring into bag labeled as “Number 2 Ring” and Work Order number, with each ring bagged and marked accordingly.

[8.1] **REMOVE** each ring individually and **PLACE** in separate labeled bags.

[8.2] **STORE**, with Radiation Protection (RP) support, all packing rings for evaluation by Packing Engineer.

1. **USE** camera to take pictures of any damage found during the process of completing Attachment 5.
2. **IF** stem or stuffing box shows signs of damage or wear, **THEN**

**PERFORM** the following, otherwise **MARK** Steps 1.0[10.1] and 1.0[10.2] N/A.

[10.1] **USE** camera to take picture(s) of damage. [10.2] **RECORD** orientation of valve damage below.

Area of Valve Damage:

1. **CLEAN** stem with new Scotchbrite or other approved cleaning cloth.

**NOTE**

Cleaning cloths are to be placed in a storage bag labeled as “Cleaning” and Work Order number.

1. **STORE** cleaning material and all remnants in labeled bag.

# 1.0 INSTRUCTIONS

**Attachment 6**

**(Page 1 of 1)**

**Periodic Torqueing Instructions**

**NOTE**

The last known torque value is to be listed in the Valve Packing Data Sheet (VPDS) and/or the Work Order instructions.

1. **MATCHMARK** all gland nut locations.
2. **LOOSEN** all gland nuts 1/2 turn.
3. Alternately **TIGHTEN** each gland nut 1/2 turn to the original nut location using matchmarks.
4. Alternately **TORQUE** each nut to last known torque value starting at following increments:

3/4 Torque of Last Known Value: Torque to Last Known Value:

1. **RECORD** number of flats turned to return to last known torque value for each nut.
2. **RECORD** approximate height of follower adjustment remaining.

Adjustment Height Remaining:

|  |  |  |
| --- | --- | --- |
| **BFN**  **Unit 0** | **Generic Maintenance Instructions for Valve Packing** | **MCI-0-000-PCK001 Rev. 0043**  **Page 51 of 53** |

**Attachment 7**

**(Page 1 of 3)**

**Valves Meeting Criteria for Next Cycle-Reconsolidation**

|  |  |  |
| --- | --- | --- |
| FCV-001-0014 | DW | AOV |
| FCV-001-0026 | DW | AOV |
| FCV-001-0037 | DW | AOV |
| FCV-001-0051 | DW | AOV |
| FCV-001-0055 | DW | MOV |
| FCV-003-0098 | DW | AOV |
| FCV-003-0099 | DW | AOV |
| FCV-003-0188A | DW | AOV |
| FCV-003-0188B | DW | AOV |
| FCV-043-0013 | DW | AOV |
| FCV-068-0001 | DW | MOV |
| FCV-068-0003 | DW | MOV |
| FCV-068-0033 | DW | MOV |
| FCV-068-0035 | DW | MOV |
| FCV-068-0077 | DW | MOV |
| FCV-068-0079 | DW | MOV |
| FCV-069-0001 | DW | MOV |
| FCV-070-0020 | DW | AOV |
| FCV-070-0022 | DW | AOV |
| FCV-070-0024 | DW | AOV |
| FCV-070-0026 | DW | AOV |
| FCV-070-0028 | DW | AOV |
| FCV-070-0030 | DW | AOV |

**(Page 2 of 3)**

|  |  |  |
| --- | --- | --- |
| FCV-070-0032 | DW | AOV |
| FCV-070-0034 | DW | AOV |
| FCV-071-0002 | DW | MOV |
| FCV-073-0002 | DW | MOV |
| FCV-074-0048 | DW | MOV |
| FCV-001-0015 | S | AOV |
| FCV-001-0027 | S | AOV |
| FCV-001-0038 | S | AOV |
| FCV-001-0052 | S | AOV |
| FCV-001-0056 | S | MOV |
| FCV-001-0057 | S | MOV |
| FCV-001-0058 | S | MOV |
| FCV-001-0059 | S | MOV |
| FCV-001-0168 | S | MOV |
| FCV-001-0169 | S | MOV |
| FCV-001-0170 | S | MOV |
| FCV-001-0171 | S | MOV |
| FCV-071-0003 | S | MOV |
| FCV-001-0150 | SJAE | AOV |
| FCV-001-0152 | SJAE | AOV |
| FCV-001-0155 | SJAE | MOV |
| FCV-001-0156 | SJAE | MOV |
| FCV-001-0172 | SJAE | MOV |
| FCV-001-0173 | SJAE | MOV |
| FCV-006-0113 | SJAE | MOV |

**(Page 3 of 3)**

|  |  |  |
| --- | --- | --- |
| FCV-006-0114 | SJAE | MOV |
| FCV-012-0003 | SJAE | MOV |
| FCV-012-0005 | SJAE | MOV |
| FCV-012-0070 | SJAE | MOV |
| FCV-012-0072 | SJAE | MOV |
| PCV-001-0151 | SJAE | AOV |
| PCV-001-0153 | SJAE | AOV |
| PCV-001-0166 | SJAE | AOV |
| PCV-001-0167 | SJAE | AOV |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |