| Eskom | SOW | Camden Power Station |
|---|---|---|

Title: **BOILER AUXILIARIES MAINTENANCE CONTRACT SCOPE OF WORK**

| | |
|---|---|
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| Date: 13/02/2024 | Date: 13/02/2024 | Date: 20/02/2024 | Date: |

**Content**

## 1. Introduction

The document serves as a Scope of Work (SOW) for boiler valve auxiliaries maintenance contract, therefore contains the recommendations of the Boiler Auxiliaries SE. The content covered in this document includes all Control Valves, Isolation Valves, Transmitter Valves, Sootblowers, Boiler Drum, Pulverized fuel burners and the sealing trough. Critical valves such as Control Valves (Feed Regulating and De-superheating Control Valves) and Boiler Drain valves are expected to require overhaul and therefore should be planned accordingly.

## 2. Supporting Clause

### 2.1 Definitions and acronyms

**Acronyms**

| | |
|---|---|
| SE: | System Engineer |
| AIA: | Approved Inspection Authority |
| SOW: | Scope of Work |
| KKS: | Function Location |
| OEM: | Original Equipment Manufacturer |
| QC: | Quality Controller |

**Definitions**

| | |
|---|---|
| Good Engineering practise: | Scientific process by which a design, installation, operation/maintenance, or safety problem is systematically evaluated. |
| Boiler Auxiliaries: | Boiler Drum, Pulverized fuel burners, sealing trough, etc. |

### 2.2 Scope

This specification outlines the maintenance requirements for boiler valve auxiliaries at the South African power station. It covers Control Valves, Isolation Valves, Transmitter Valves, Sootblowers, Boiler Drum, Pulverized fuel burners, and the sealing trough.

### 2.3 Purpose

This document provides detailed recommendations for maintenance activities concerning the boiler plant and its auxiliary components.

### 2.4 Effective date

Date of signing

### 2.5 Normative References

| | |
|---|---|
| 240-126446767 | Sootblower System Dry Run |
| 240-65378602 | Camden Stuck Sootblower Response Procedure |
| 229-12303 | Sootblower Operational Philosophy |
| 004/9217 | Operating Technical Specification – Boiler Plant |

## 3. Document Content

### 3.1 Valve Recommendations

Good engineering judgement taking into account of safety must be exercised all the time. The Table **2** in **Appendix A1: Recommendations for Boiler Valves** presents the recommendations of the SE on Boiler Valves. The table contains the component name, the KKS and what need to be carried out on that component, i.e., inspection, repair, or overhaul. Lapping/packing and overhaul will dominate on the work to be carried out of the valves and these terms are defined below:

**Overhaul**

1. Remove the valve from position.
2. Dismantle valve.
3. Clean exterior of valve.
4. Clean interior of valve.
5. Clean components.
6. Inspect components.
7. Lap valve body seats / spindle seats. At least 80% sealing area is to be achieved across the seat before Eskom Engineering inspection.
8. Provide engineer with inspection report per valve (unless otherwise agreed upon), detailing all damaged components, pictures, repair recommendations, and external QC Name and Signature.
9. Repair or replace, if necessary, all damaged components as per engineering instruction in reference to above inspection report.
10. Reassemble valve using new consumables, if necessary
    - Lubricate valve.

**Lapping / packing**

1. Lapping to be done in accordance with the OEM guidelines
2. Only gland packing accepted and inspected by the SE and QC may be used.
3. No asbestos packing shall be used.
4. Graphite packing shall have anti-extrusion properties.
5. Pre-formed packing rings are the preferred option.
6. The valve refurbishment company must ensure that the gland packing rings are of the correct tolerance for the valve stuffing box and spindle. Any anomalies are to be discussed with the SE, AIA, and QC.
7. Correct packing methods must be used and approved by QC and SE.
8. A maximum of six (6) rings to be used per valve. If the desired compression is not obtained on the packing rings, Korute blocks, or carbon bushes are to be used within the bottom portion of the stuffing box to ensure that the correct radial forces are obtained on the valve spindle and stuffing box.

***Good engineering practise to be always adhered to.***

### 3.1.1 Boiler Plant Valve

**A. Control Valves**

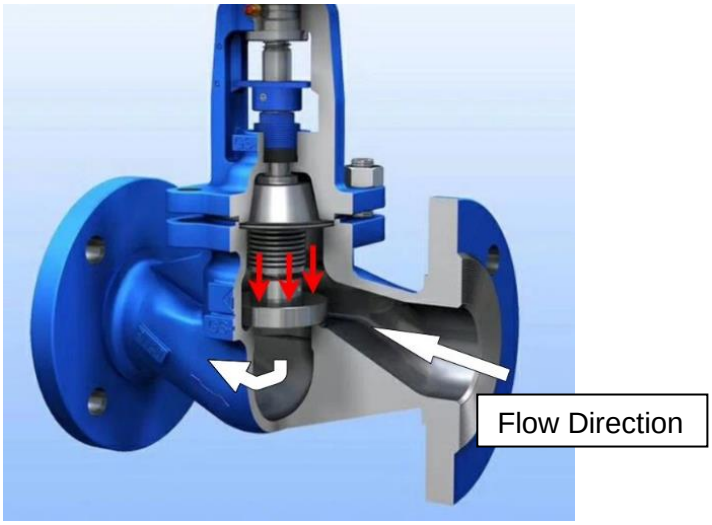
- CCI drag valves are operated on the Attemperator Spraywater lines, as well as the feedwater regulator lines.
- On the Main Steam Warming lines, the control valves installed are Mitech valves.

**B. Isolation Valves**

- Spraywater Isolation valves should be cut out and sent for refurbishment during an outage or whenever necessary due to necessity on the plant.
- Isolation valves are found on the Attemporating Spraywater station, Feed regulating station, economizer ring, boiler drain valves and the main steam warming lines.
- Table **2** found in **Appendix A1: Recommendations for Boiler Valves** presents the recommendations of the SE on boiler valves. The recommendation must be executed during the period of an outage or as and when required.

**C. Drain Valves**

- Drain valves comprise of various sized globe valves (15mm, 25mm, and 50mm)
- It is essential that these valves be installed after refurbishment with the pressure boundary acting on the top of the valve seat to ensure tight isolation.




**D. Air Heater Sootblower valves**

- Each unit is equipped with 12 motorised globe valves.
- These valves are usually susceptible to steam cuts on the seat/plug and should be inspected and NDT's conducted on outage opportunity.

**E. Other Valves**

- Valves not discussed above do not require special consideration and should be maintained as per Table **2** in **Appendix A1: Recommendations for Boiler Valves**.

### 3.2 Sootblower Maintenance

The furnace Sootblower plant is expected to be monitored closely on a daily basis by the contractor in order to ensure correct operation and availability of the equipment.

#### 3.2.1 On-line inspections

The contractor is expected to execute the following on the furnace sootblowers installed on each unit at least once monthly:

- On-line inspections for lance availability, oil leaks, misaligned support rollers etc.
- Perform/ oversee fault finding with the assistance of the Electrical Maintenance Department, and Control and Instrumentation Maintenance Department when Sootblower defect notification is loaded.
- Adjust blowing pressures when deemed necessary by SE.
- Perform any required mechanical repairs on the sootblowers.
- Conduct a dry run before commissioning of a unit after an outage as per 240-126446767.
- Retracting a stuck Sootblower.
- Fully commission sootblowers back into operation.

- Any other work deemed necessary by SE within the SOW for sootblowers.

***NB: In depth scope for sootblowers is attached on*** Table **3** ***found in*** **Appendix A2: Sootblower and Sealing Trough Maintenance Recommendations**

### 3.2.2 Reporting

Reporting shall form a crucial part of monitoring Sootblower daily performance and early identification of defect notifications. The contractor is required to send a report at least once weekly, detailing the below:

- Sootblower availability for each Sootblower on each unit as a percentage of available hours.
- Reasons for any permits taken on a Sootblower.
- Status of spares for the week
- All corrected defects for the week

## 3.3 Sealing Trough

Inspection of the sealing trough is required, and a detailed report should be handed to engineering at least once a month. All required repairs are to be done by the contractor.

***Further detailed recommendations for the maintenance of the sootblowers and the sealing trough are listed in*** Table **3** ***found in*** **Appendix A2: Sootblower and Sealing Trough Maintenance Recommendations**

### 3.4 Pulverized Fuel Burners

Inspections of pulverized fuel burners are required, and any repairs should be conducted.

Table 1 PF Burner Activities

| SUBSYSTEM | | | |
|---|---|---|---|
| COMPONENT ACTIVITIES | | | |
| **NO.** | **COMPONENT FLOC (KKS CODE)** | **TASK** | **ACTIVITY TYPE (INSPECTION / TEST / REFURBISH / REPLACE/OTHER)** |
| 1. | | List of defects to be compiled and to be submitted to SE | |
| 2. | HLA | Clean windbox of any accumulated ash – A to E row | |
| 3. | HHA, HLA | Conduct the following inspections on the burners and windboxes, record and report to SE: | |
| 1.1 | HHA | Visually inspect PF nozzle and PF nozzle tip for any damage or high wear/erosive areas. | |
| 1.2 | HHA | In the event of indistinct visual inspections, conduct wall thickness tests on PF nozzle and PF nozzle tip to determine estimated operable hours. | |
| 1.3 | HHA | Visually inspect core air tube for any damage. | |
| 1.4 | HHA | Visually inspect secondary air rings for any damage/cracks or deformation. | |
| 1.5 | HHA | Visually inspect air registers for any damage. | |
| 1.6 | HHA | Visually inspect air register covering plate for any damage. | |

| | | | |
|---|---|---|---|
| 1.7 | HHA | Visually inspect sliding sleeve damper for any damage. | |
| 1.8 | HHA | Visually inspect burner box around tube nest for any damage. | |
| 1.9 | HHA | Visually inspect burner scroll for any damage or high wear areas. | |
| 1.10 | HLA | Inspect windbox floor, roof and walls for any damage. Wall thickness measurements will be required in critical areas around burner flanges. Special attention to be given to expansion joints as well as plate covers on windbox floor. | |
| 1.11 | HHA | Inspect burner support brackets for any damage or deformation. | |
| 1.12 | HLA | Visually inspect windbox dampers for any damage or high wear areas. Defected dampers are to be repaired/replaced. Dampers are to seal completely and move without restriction when conducting stroke checking. | |
| 1.13 | HLA | Ensure that all windbox damper actuators are in the upright position, such that C&I have access to stroke check. | |
| 4. | HHA | Replace or repair burner components as per engineering instruction | |
| 5. | HHA | All PF scrolls to be lined with Ceramite | |
| 6. | HHA | All core air swirlers to be cleaned. | |
| 7. | HHA | All swirler directions to be verified before reinstallation (clockwise or anti-clockwise). | |
| 8. | HHA | All swirler orientations to be verified before reinstallation. Flame scanner slot to be on the RHS (as seen from burner front), and slanted in the correct position **“ \ “**. | |
| 9. | HHA | Set all burner sliding sleeve damper as follows: | |
| 8.1 | HHA | Sliding sleeve damper to be set and fixed at position 5 (Fully open) | |
| 8.2 | HHA | QC to verify that all sliding sleeve dampers are set at 40mm | |
| 10. | HHA | Set all air register vanes as follows: | |

| | | | |
|---|---|---|---|
| 9.1 | HHA | Air register vanes to be set in the 70% open position ~ 210mm ±10mm from heel of vane to tip of the next vane, in the correct direction. | |
| 9.2 | HHA | QC to verify that all air register vanes are set in the 70% open position and in the correct direction. | |
| 11. | HLA | Stroke check windbox dampers as follows: | |
| 10.1 | HLA | Confirm the fully open limit and close limit by witnessing the dampers inside the windbox. | |
| 10.2 | HLA | Verify that indication on operator desk confirms the fully open and close limit from the plant. | |
| 12. | HLA | All windbox pressure transmitter impulse lines to be blown through. | |
| 13. | HBK | All furnace pressure transmitter impulse lines to be blown through. | |
| 14. | | Conduct final repair inspections from boiler front and from within the boiler. | |
| 15. | | Replace or repair components as per engineering instruction | |

### 3.5 Boiler Drum

The contractor will inspect and conduct repairs based on inspection findings and attend to any defects loaded. This includes executing outage scope of work.

### 3.6 Boiler Chemical dosing/sampling system.

The contractor will inspect and conduct repairs based on inspection findings and attend to any defects loaded. This includes executing outage scope of work.

## 4. Development Team

The following people were involved in the development of this document:

- Kampamba Chanda – Boiler SE
- Velaphi Vilakazi – Boiler SE

## 5. Revisions

| Date | Rev | Remark | Compiler |
|---|---|---|---|
| 13 February 2024 | 00 | Original Issue | Kampamba Chanda |

## Appendix A1: Recommendations for Boiler Valves

Table 2 Recommendations for Boiler Valves

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| **DESUPERHEATING SYSTEM VALVES** | | | |
| 1 | LAE31AA001 | Left Hand Spraywater Control Valve | 1. The valve linear drives must be checked for leak, the grease must be changed, and Engineer involved. |
| | | | 2. The valve must be striped and inspected by the engineer. new seal must be installed |
| 2 | LAE31AA002 | Left Hand Spraywater By-Pass Control Valve | Inspect and Overhaul |
| 3 | LAE31AA101 | Left Hand Spraywater Control Isolating Valve 1 | 1. Cut out & overhaul the valve. |
| | | | 2. Replace parallel slide spring. |
| | | | - Material: F22 |
| | | | - Design P:19.3 MPa |
| | | | - Design T: 218$^{o}$C |
| | | | - Test P: 15 MPa |
| 4 | LAE31AA102 | Left Hand Spraywater Control Isolating Valve 2 | 1. Cut out & overhaul the valve. |
| | | | 2. Replace parallel slide spring. |
| | | | - Material: F22 |
| | | | - Design P:19.3 MPa |
| | | | - Design T: 218$^{o}$C |
| | | | - Test P: 15 MPa |
| 5 | LAE31AA103 | Left Hand Spraywater To By-Pass Control Isolating Valve | 1. Cut out & overhaul the valve. |
| | | | 2. Replace parallel slide spring. |
| | | | - Material: F22 |
| | | | - Design P:19.3 MPa |
| | | | - Design T: 218$^{o}$C |
| | | | - Test P: 15 MPa |
| 6 | LAE31AA302 | Left Hand Spraywater Flow Indicator Transmitter Isolating Valve 2 | Inspect and Overhaul |
| 7 | LAE31AA303 | Left Hand Spraywater Flow Indicator Transmitter Isolating Valve 1 | Inspect and Overhaul |
| 8 | LAE31AA401 | Left Hand Spraywater Station Air Release Valve | Inspect and Overhaul |
| 9 | LAE32AA001 | Right Hand Spraywater Control Valve | 1. The valve linear drives must be checked for leak, the grease must be changed, and Engineer involved. |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| | | | 2. The valve must be striped and inspected by the engineer. new seal must be installed |
| 10 | LAE32AA002 | Right Hand Spraywater By-Pass Control Valve 2 | Refurbish |
| 11 | LAE32AA101 | Right Hand Spraywater Control Isolating Valve 1 | - Refurbish valve.<br>- Replace parallel slide springs |
| 12 | LAE32AA102 | Right Hand Spraywater Control Isolating Valve 2 | - Refurbish valve.<br>- Replace parallel slide springs |
| 13 | LAE32AA103 | Right Hand Spraywater To By-Pass Control Isolating Valve 3 | - Refurbish valve.<br>- Replace parallel slide springs |
| 14 | LAE32AA302 | Right Hand Spraywater Flow Indicator Transmitter Isolating Valve 2 | Refurbish |
| 15 | LAE32AA303 | Right Hand Spraywater Flow Indicator Transmitter Isolating Valve 1 | Refurbish |
| 16 | LAE32AA401 | Right Hand Spraywater Station Air Release Valve | Refurbish |
| 17 | LAE32AA301 | Right Hand Spraywater Pressure Indicator Transmitter Upstream To Spraywater Ring Isolating Valve | Refurbish |
| **STEAM TRAP SYSTEM** | | | |
| 1 | HAN21AA401 | Left Hand Steam Trap Inlet Isolating Valve | Inspect and Overhaul per inspection findings. |
| 2 | HAN21AA402 | Left Hand Steam Trap Outlet Isolating Valve | Inspect and Overhaul per inspection findings. |
| 3 | HAN21BZ001 | Boiler Left Hand Steam Trap | Inspect and Overhaul per inspection findings. |
| 4 | HAN21AA403 | Boiler Left Hand Steam Trap Drain Valve | Inspect and Overhaul per inspection findings. |
| 5 | HAN22BZ001 | Boiler Right Hand Steam Trap | Inspect and Overhaul per inspection findings. |
| 6 | HAN22AA401 | Boiler Right Hand Steam Trap Inlet Isolating Valve | Inspect and Overhaul per inspection findings. |
| 7 | HAN22AA402 | Boiler Right Hand Steam Trap Outlet Isolating Valve | Inspect and Overhaul per inspection findings. |
| 8 | HAN22AA403 | Boiler Right Hand Steam Trap Drain Valve | Inspect and Overhaul |
| **FEEDWATER VALVES** | | | |
| 1 | LAB50AA101 | Feed Water Master Isolating Valve | Inspect and Overhaul |
| 2 | LAB50AA102 | Feed Water Master Isolating Valve By-Pass Valve | Inspect and Overhaul |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| 3 | LAB50AA301 | Feed Water Flow Indicator Transmitter 3 After Orifice Isolating Valve | Inspect and Overhaul |
| 4 | LAB50AA302 | Feed Water Flow Indicator Transmitter 3 Before Orifice Isolating Valve | Inspect and Overhaul |
| 5 | LAB50AA303 | Feed Water Flow Indicator Transmitter 2 After Orifice Isolating Valve | Inspect and Overhaul |
| 6 | LAB50AA304 | Feed Water Flow Indicator Transmitter 2 Before Orifice Isolating Valve | Inspect and Overhaul |
| 7 | LAB50AA305 | Feed Water Flow Indicator Transmitter 1 After Orifice Isolating Valve | Inspect and Overhaul |
| 8 | LAB50AA306 | Feed Water Flow Indicator Transmitter 1 Before Orifice Isolating Valve | Inspect and Overhaul |
| 9 | LAB50AA307 | Feed Water Pressure Indicator Transmitter 1 Isolating Valve | Inspect and Overhaul |
| 10 | LAB51AA001 | Feed Water Regulating Valve A | Overhaul<br>- Material: A105<br>- Design P:19.3 MPa<br>- Working T: 218$^{o}$C<br>- Working P: 14.7 MPa |
| 11 | LAB51AA101 | Feed Water Hydraulic Isolating Valve A By-Pass Valve | Inspect and Overhaul |
| 12 | LAB51AA102 | Feed Water Air Release Valve 1A | Inspect and Overhaul |
| 13 | LAB51AA103 | Feed Water Air Release Valve A | Inspect and Overhaul |
| 14 | LAB51AA201 | Feed Water Hydraulic Valve A | Inspect and Overhaul |
| 15 | LAB51AA501 | Feed Water Hand Isolating Valve A | Inspect and Overhaul |
| 16 | LAB52AA001 | Feed Water Regulating Valve B | Overhaul<br>- Material: A105<br>- Design P:19.3 MPa<br>- Working T: 218$^{o}$C<br>- Working P: 14.7 MPa |
| 17 | LAB52AA101 | Feed Water Hydraulic Valve B By-Pass Valve | Inspect and Overhaul |
| 18 | LAB52AA102 | Feed Water Air Release Valve 1B | Inspect and Overhaul |
| 19 | LAB52AA103 | Feed Water Air Release Valve 2B | Inspect and Overhaul |
| 20 | LAB52AA201 | Feed Water Hydraulic Valve B | Inspect and Overhaul |
| 21 | LAB52AA501 | Feed Water Hand Isolating Valve B | Inspect and Overhaul |
| 22 | LAB52AA502 | Feed Water Hand Isolating Valve B By-Pass Valve | Inspect and Overhaul |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| 23 | LAE30AA101 | Spraywater Direct Current Master Isolation Valve | Inspect and Overhaul |
| **MAINSTEAM VALVES** | | | |
| 1 | HAH41AA101 | Boiler Left Hand Crown Valve | - The Valves must be overhauled.<br>- The parallel slide springs must be replaced with new ones. |
| 2 | HAH42AA101 | Boiler Right Hand Crown Valve | - The Valves must be overhauled.<br>- The parallel slide springs must be replaced with new ones. |
| 3 | HAH41AA102 | Boiler Left Hand Crown Valve By-Pass Valve 1 | Inspect and Overhaul |
| 4 | HAH41AA501 | Boiler Left Hand Crown Valve By-Pass Hand Isolating Valve | Inspect and Overhaul |
| 5 | HAH42AA102 | Boiler Right Hand Crown Valve By-Pass Valve 1 | Inspect and Overhaul |
| 6 | HAH42AA501 | Boiler Right Hand Crown Valve By-Pass Hand Isolating Valve | Inspect and Overhaul |
| 7 | HAH42AA307 | Boiler Right Hand Main Steam Flow Indicator Transmitter 3 Isolating Valve | Inspect and Overhaul |
| 8 | HAH42AA311 | Boiler Right Hand Main Steam Flow Indicator Transmitter 1 First Isolating Valve | Inspect and Overhaul |
| 9 | HAH42AA312 | Boiler Right Hand Main Steam Flow Indicator Transmitter 1 Isolating Valve | Inspect and Overhaul |
| 10 | HAH42AA314 | Boiler Right Hand Main Steam Flow Second Local Pressure Indicator Transmitter | Inspect and Overhaul |
| 11 | LCQ13AA001 | Main Steam Warming Control Valve L/H | Inspect and Overhaul |
| 12 | LCQ13AA101 | Main Steam Warming Isolating Valve L/H | Refurbish |
| 13 | LCQ14AA001 | Main Steam Warming Control Valve R/H | Inspect and Overhaul |
| 14 | LCQ14AA101 | Main Steam Warming Line Isolating Valve | Refurbish |
| 15 | HAH41AA306 | Boiler Left Hand Boiler Main Flow Indicator Transmitter 3 First Isolating Valve | Inspect and Overhaul |
| 16 | HAH41AA307 | Boiler Left Hand Boiler Main Flow Indicator Transmitter 3 Second Isolating Valve | Inspect and Overhaul |
| 17 | HAH42AA301 | Boiler Right Hand Steam Pressure Indicator Transmitter Isolating Valve 1 | Inspect and Overhaul |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| 18 | HAH42AA302 | Boiler Superheater Pressure Indicator Main Isolating Valve | Inspect and Overhaul |
| 19 | HAH42AA303 | Boiler Right Hand Steam Pressure Indicator Transmitter Isolating Valve 2 | Inspect and Overhaul |
| 20 | HAH42AA304 | Boiler Right Hand Steam Local Pressure Indicator Transmitter Isolating Valve | Inspect and Overhaul |
| 21 | HAH42AA305 | Boiler Right Hand Steam Flow To Safety Valve Isolating Valve | Inspect and Overhaul |
| 22 | HAH42AA308 | Boiler Right Hand Boiler Main Flow Indicator Transmitter 3 Isolating Valve | Inspect and Overhaul |
| 23 | HAH42AA309 | Boiler Right Hand Boiler Main Flow Indicator Transmitter 2 Isolating Valve | Inspect and Overhaul |
| 24 | HAH42AA310 | Boiler Right Hand Boiler Main Flow Indicator Transmitter 2 Isolating Valve | Inspect and Overhaul |
| 25 | HAH40AA101 | Boiler 4Th Stage Superheater Outlet Vent Valve 1 | Inspect and Overhaul |
| 26 | HAH40AA102 | Boiler 4Th Stage Superheater Outlet Vent Valve 2 | Inspect and Overhaul |
| 27 | HAH41AA301 | Boiler Left Hand Steam Pressure Indicator Transmitter Isolating Valve | Inspect and Overhaul |
| 28 | HAH41AA302 | Boiler Left Hand Boiler Main Flow Indicator Transmitter 1 First Isolating Valve | Inspect and Overhaul |
| 29 | HAH41AA303 | Boiler Left Hand Boiler Main Flow Indicator Transmitter 1 Second Isolating Valve | Inspect and Overhaul |
| 30 | HAH41AA304 | Boiler Left Hand Boiler Main Flow Indicator Transmitter 2 First Isolating Valve | Inspect and Overhaul |
| 31 | HAH41AA305 | Boiler Left Hand Boiler Main Flow Indicator Transmitter 2 Second Isolating Valve | Inspect and Overhaul |
| 32 | LCQ14AA102 | Steam Leg Drain To Hp Drain Vessel Iv | Refurbish |
| 33 | LBA11AA101 | Main Steam Leg Drain Valve 12 | Inspect and Overhaul |
| **BOILER DRUM** | | | |
| 1 | HAD20AA101 | Boiler Drum Air Release Isolating Valve | Inspect and Overhaul |
| 2 | HAD20AA301 | Boiler Local Bi-Colour Water Isolating Valve | Inspect and Overhaul |
| 3 | HAD20AA302 | Boiler Local Bi-Colour Steam Isolating Valve | Inspect and Overhaul |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| 4 | HAD20AA303 | Boiler Local Bi-Colour Condensating Pot Drain Valve | Inspect and Overhaul |
| 5 | HAD20AA304 | Boiler Water Level Indicator Isolating Valve 1 | Inspect and Overhaul |
| 6 | HAD20AA305 | Boiler Steam Level Indicator Isolating Valve 1 | Inspect and Overhaul |
| 7 | HAD20AA306 | Boiler High Level Steam Main Isolating Valve 4 | Inspect and Overhaul |
| 8 | HAD20AA307 | Boiler High Level Low Pressure Isolating Valve 4 | Inspect and Overhaul |
| 9 | HAD20AA308 | Boiler Water Level Indicator Isolating Valve 2 | Inspect and Overhaul |
| 10 | HAD20AA309 | Boiler Steam Level Indicator Isolating Valve 2 | Inspect and Overhaul |
| 11 | HAD20AA310 | Boiler Water Level Indicator Isolating Valve 5 | Inspect and Overhaul |
| 12 | HAD20AA311 | Boiler Steam Level Indicator Isolating Valve 5 | Inspect and Overhaul |
| 13 | HAD20AA312 | Boiler Water Level Indicator Isolating Valve 3 | Inspect and Overhaul |
| 14 | HAD20AA313 | Boiler Steam Level Indicator Isolating Valve 3 | Inspect and Overhaul |
| 15 | HAD20AA314 | Boiler Drum Local Pressure Main Isolating Valve | Inspect and Overhaul |
| 16 | HAD20AA315 | Boiler Drum Pressure Indicator Transmitter 1 Isolating Valve | Inspect and Overhaul |
| 17 | HAD20AA316 | Boiler Drum Pressure Indicator Transmitter 3 Isolating Valve | Inspect and Overhaul |
| 18 | HAD20AA317 | Boiler Drum Pressure Indicator Transmitter 2 Isolating Valve | Inspect and Overhaul |
| 19 | HAD20CL501 | Boiler Local Bi-Colour Indicator | Inspect and Overhaul |
| 20 | HAN31AA401 | Boiler Local Bi-Colour Drain Valve | Inspect and Overhaul |
| 21 | HAN31AA601 | Boiler Local Bi-Colour Drain Non-Return Valve | Inspect and Overhaul |
| **SOOTBLOWER VALVES** | | | |
| 1 | HCB20AA101 | Boiler Furnace Sootblowers Steam Supply Isolating Valve | Inspect and Overhaul |
| 2 | HCB20AA102 | Boiler Furnace Sootblowers Steam Drain Valve | Inspect and Overhaul |
| 3 | HCB20AA301 | Boiler Furnace Sootblower Drain Valve Pressure Indicator Transmitter Isolating Valve | Inspect and Overhaul |
| 4 | HCB10AA101 | Boiler Air Heater Sootblowers Steam Supply Motorised Valve | Inspect and Overhaul |
| 5 | HCB41AA101 | Boiler Left Hand Air Heater Sootblower 1 Steam Isolating Valve | Inspect and Overhaul |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| 6 | HCB41AA102 | Boiler Left Hand Air Heater Sootblower 2 Steam Isolating Valve | Inspect and Overhaul |
| 7 | HCB41AA103 | Boiler Left Hand Air Heater Sootblower 3 Steam Isolating Valve | Inspect and Overhaul |
| 8 | HCB41AA104 | Boiler Left Hand Air Heater Sootblower 4 Steam Isolating Valve | Inspect and Overhaul |
| 9 | HCB41AA105 | Boiler Left Hand Air Heater Sootblower 5 Steam Isolating Valve | Inspect and Overhaul |
| 10 | HCB41AA106 | Boiler Left Hand Air Heater Sootblower 6 Steam Isolating Valve | Inspect and Overhaul |
| 11 | HCB42AA101 | Boiler Right Hand Air Heater Sootblower 7 Steam Isolating Valve | Inspect and Overhaul |
| 12 | HCB42AA102 | Boiler Right Hand Air Heater Sootblower 8 Steam Isolating Valve | Inspect and Overhaul |
| 13 | HCB42AA103 | Boiler Right Hand Air Heater Sootblower 9 Steam Isolating Valve | Inspect and Overhaul |
| 14 | HCB42AA104 | Boiler Right Hand Air Heater Sootblower 10 Steam Isolating Valve | Inspect and Overhaul |
| 15 | HCB42AA105 | Boiler Right Hand Air Heater Sootblower 11 Steam Isolating Valve | Inspect and Overhaul |
| 16 | HCB42AA106 | Boiler Right Hand Air Heater Sootblower 12 Steam Isolating Valve | Inspect and Overhaul |
| 17 | HCB43AA101 | Boiler Air Heater Sootblowers Steam Drain Valve | Inspect and Overhaul |
| 18 | HCB43AA301 | Boiler Air Heater Sootblower Drain Pressure Isolating Valve | Inspect and Overhaul |
| 19 | HCB50AA601 | Boiler Air Heater Sootblower Drains Non-Return Valve | Inspect and Overhaul |
| 20 | HCB51AA601 | Boiler Furnace Sootblower Drain Non-Return Valve | Inspect and Overhaul |
| 21 | HCB10AA501 | Boiler First Hand Master Isolating Valve | - Refurbish valve.<br>- Replace parallel slide springs |
| 22 | HCB10AA502 | Boiler Second Hand Master Isolating Valve | - Refurbish valve.<br>- Replace parallel slide springs |
| **AIRHEATER** | | | |
| 1 | HCB41AA301 | Boiler Left Hand Air Heater Steam Pressure After Reducer Pressure Indicator Transmitter Isolating Valve 1 | Inspect and Overhaul |
| 2 | HCB41AA302 | Boiler Left Hand Air Heater Steam Pressure After Reducer Pressure Indicator Transmitter Isolating Valve 2 | Inspect and Overhaul |
| **ECONOMIZER** | | | |
| 1 | HAN11AA101 | Boiler Economiser Left Hand Drain Valve | - Change parallel slide springs |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| 2 | HAN12AA101 | Boiler Economiser Right Hand Drain Valve | Inspect and Overhaul |
| 3 | LAB60AA401 | Economiser Ring Drain Valve 1 | Inspect and Overhaul |
| 4 | LAB60AA402 | Economiser Ring Drain Valve 2 | Inspect and Overhaul |
| 5 | HAD20AA105 | Boiler Economiser Recirculating Valve | - Cut out valves and refurbish.<br>- Change parallel slide springs |
| 6 | LAB60AA602 | Economiser Ring Non-Return Valve 2 | Cut out valves and refurbish |
| 7 | LAB60AA601 | Economiser Ring Non-Return Valve 1 | Cut out valves and refurbish |
| **CHEMICAL SERVICES VALVES** | | | |
| 1 | LFN10AA501 | Boiler Chemical Dosing Supply Line To Boiler Drum Main Isolating Valve | Refurbish |
| 2 | LFN10AA502 | Boiler Chemical Dosing Supply Line To Boiler Drum Second Isolating Valve | Refurbish |
| 3 | LFN10AA503 | Boiler Chemical Dosing Supply Line To Boiler Drum Third Isolating Valve | Refurbish |
| **HEADER DRAINS** | | | |
| 1 | HAN60AA401 | Boiler Front Bottom Header Drain Valve 1 | Inspect and Overhaul |
| 2 | HAN60AA402 | Boiler Front Bottom Header Drain Valve 2 | Inspect and Overhaul |
| 3 | HAN60AA403 | Boiler Front Bottom Header Drain Valve 3 | Inspect and Overhaul |
| 4 | HAN60AA404 | Boiler Front Bottom Header Drain Valve 4 | Inspect and Overhaul |
| 5 | HAN60AA405 | Boiler Front Bottom Header Drain Valve 5 | Inspect and Overhaul |
| 6 | HAN60AA406 | Boiler Front Bottom Header Drain Valve 6 | Inspect and Overhaul |
| 7 | HAN60AA407 | Boiler Rear Bottom Header Drain Valve 7 | Inspect and Overhaul |
| 8 | HAN60AA408 | Boiler Rear Bottom Header Drain Valve 8 | Inspect and Overhaul |
| 9 | HAN60AA409 | Boiler Rear Bottom Header Drain Valve 9 | Inspect and Overhaul |
| 10 | HAN60AA410 | Boiler Rear Bottom Header Drain Valve 10 | Inspect and Overhaul |
| 11 | HAN60AA411 | Boiler Rear Bottom Header Drain Valve 11 | Inspect and Overhaul |
| 12 | HAN60AA412 | Boiler Rear Bottom Header Drain Valve 12 | Inspect and Overhaul |
| 13 | HAN60AA413 | Boiler Left Hand Bottom Header Drain Valve 13 | Inspect and Overhaul |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| 14 | HAN60AA414 | Boiler Left Hand Bottom Header Drain Valve 14 | Inspect and Overhaul |
| 15 | HAN60AA415 | Boiler Left Hand Bottom Header Drain Valve 15 | Inspect and Overhaul |
| 16 | HAN60AA416 | Boiler Left Hand Bottom Header Drain Valve 16 | Inspect and Overhaul |
| 17 | HAN60AA417 | Boiler Right Hand Bottom Header Drain Valve 17 | Inspect and Overhaul |
| 18 | HAN60AA418 | Boiler Right Hand Bottom Header Drain Valve 18 | Inspect and Overhaul |
| 19 | HAN60AA419 | Boiler Right Hand Bottom Header Drain Valve 19 | Inspect and Overhaul |
| 20 | HAN60AA420 | Boiler Right Hand Bottom Header Drain Valve 20 | Inspect and Overhaul |
| 21 | HAN60AA601 | Boiler Water Wall Headers Non-Return Valve | Inspect and Overhaul |
| 22 | HAN70AA401 | Boiler Blowdown Vessel Drain To A Station Drain Isolating Valve | Inspect and Overhaul |
| **BLOWDOWN DRAINS** | | | |
| 1 | HAN33AA101 | Boiler Drum Blowdown Isolating Valve 1 | Inspect and Overhaul |
| 2 | HAN33AA102 | Boiler Drum Blowdown Regulating Valve 1 | Inspect and Overhaul |
| 3 | HAN33AA401 | Boiler Left Hand Drum Blowdown Main Isolating Valve | Inspect and Overhaul |
| 4 | HAN34AA101 | Boiler Right Hand Drum Blowdown Isolating Valve 1 | Inspect and Overhaul |
| 5 | HAN34AA102 | Boiler Right Hand Drum Blowdown Regulating Valve 2 | Inspect and Overhaul |
| 6 | HAN34AA401 | Boiler Right Hand Drum Blowdown Main Isolating Valve | Inspect and Overhaul |
| 7 | HAN34AA402 | Boiler Right Hand Drum Blowdown Main Isolating Valve | Inspect and Overhaul |
| **SUPERHEATER DRAINS** | | | |
| 1 | HAN41AA101 | Boiler Left Hand Superheater Circulation Drain Valve 1 | Inspect and Overhaul |
| 2 | HAN41AA102 | Boiler Left Hand Superheater Circulating Drain Valve 2 | Inspect and Overhaul |
| 3 | HAN42AA101 | Boiler Right Hand Superheater Circulation Drain Valve 1 | Inspect and Overhaul |
| 4 | HAN42AA102 | Boiler Right Hand Superheater Circulating Drain Valve 2 | Inspect and Overhaul |
| 5 | HAN42AA401 | Boiler Right Hand Superheater Circulating Main Drain Valve | Inspect and Overhaul |
| 6 | HAN51AA101 | Boiler Left Hand Primary Superheater Drain Valve 1 | Inspect and Overhaul |

| No. | KKS Code | Description | Scope / Recommendations |
|---|---|---|---|
| 7 | HAN51AA102 | Boiler Left Hand Primary Superheater Regulating Drain Valve | Inspect and Overhaul |
| 8 | HAN51AA403 | Boiler Left Hand Primary Superheater Main Drain Valve | Inspect and Overhaul |
| 9 | HAN52AA101 | Boiler Right Hand Primary Superheater Drain Valve 1 | Inspect and Overhaul |
| 10 | HAN52AA102 | Boiler Right Hand Primary Superheater Regulating Drain Valve | Inspect and Overhaul |
| 11 | HAN52AA401 | Boiler Right Hand Primary Superheater Drain Valve | Inspect and Overhaul |
| 12 | HAN52AA402 | Boiler Right Hand Primary Superheater Drain Valve | Inspect and Overhaul |
| **ATTEMPERATOR DRAINS** | | | |
| 1 | HAN21AA101 | Boiler Left Hand Attemperator Drain Valve 1 | Inspect and Overhaul |
| 2 | HAN21AA102 | Boiler Left Hand Attemperator By-Pass Drain Valve 2 | Inspect and Overhaul |
| 3 | HAN21AA103 | Boiler Left Hand Attemperator Vent Valve | Inspect and Overhaul |
| 4 | HAN22AA101 | Boiler Right Hand Attemperator Drain Valve 1 | Inspect and Overhaul |
| 5 | HAN22AA102 | Boiler Right Hand Attemperator By-Pass Drain Valve 2 | Inspect and Overhaul |
| 6 | HAN22AA103 | Boiler Right Hand Attemperator Vent Valve | Inspect and Overhaul |

## Appendix A2: Sootblower and Sealing Trough Maintenance Recommendations

Table 3 Sootblower and Sealing Trough Maintenance Recommendations

| **Plant Description** | | |
|---|---|---|
| **1.** | **Coarse Ash Hopper/Sealing Trough** | **Remarks** |
| 1.1 | Inspect target and hopper nozzles | |
| 1.1.1 | Clean blocked target and hopper nozzles | |
| 1.2 | Inspect external surface of hopper near seal trough to prevent ingress air intake, record, and report to ENG weekly | |
| 1.2.1 | Weld CS material to cracked and leaking external surface of hopper near seal trough | |
| 1.3 | Repair dipper plate to ensure proper sealing | |
| 1.4 | Clean sealing trough of any debris, drain/flush boiler sealing trough and fill up with water after flushing | |
| 1.5 | Refurbish ash hopper | |
| 1.6 | Perform any further work instruction as agreed between ENG and outage | |
| **2.** | **Soot blowers** | **Remarks** |
| 2.1 | Lance wall thickness measurements to be taken and report to Engineering. | |
| 2.1.1 | Replace worn lances | |
| 2.2 | Do dry run on each lance during commissioning to check for alignment INSIDE boiler | Lance to be checked from inside boiler to see if it's aligning and<br>not scrapping or touching from both outside & inside boiler |
| 2.22 | Do dry run on each lance during commissioning to check for alignment OUTSIDE boiler | |
| 2.23 | Conduct soot blower lance travel test | |
| 2.23.1 | Verify that the pivot block and cam assemblies are correctly setup to ensure that the poppet valve only opens once the lance is through the boiler wall | |
| 2.24 | Verify the condition of the wall boxes | |
| 2.24.1 | Inspect wall sleeves and boxes for correct length, damage and condition of refractory and rectify | |
| 2.24.2 | Replace all missing and worn wall sleeves | |
| 2.25 | Monitor sootblower performance by doing on-load inspections and off-load inspections. | Issue report weekly to engineering. |

| Plant Description | | |
|---|---|---|
| 2.26 | Poppet valve links to be adjusted to correct position | |
| 2.27 | Replace all pressure switches and limit switches ensuring positioning and timing is correct | |
| 2.28 | Replace all worn soot blower front support rollers | |
| 2.27 | Record soot blower poppet pressures: | |
| 2.27.1 | Install pressure gauges as per sketch 1 | As per mod- BLR-023 |
| 2.27.2 | Ensure that elbow of Air relief vent is not facing walkways | |
| 2.28 | Visually inspect drain system valves and pipework, record defects | |
| 2.28.1 | Replace passing poppet valves according to defect system and submitted SOW | |
| 2.29 | Repair all defects as per on SAP system | Draw latest defects list and report to boiler engineering |
| 2.3 | Perform any further work instruction as agreed between Eng and maintenance | |