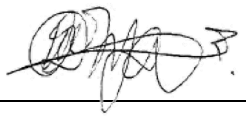
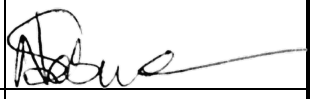
Grootvlei Power Station Outage Scope of Work	Unit	1
	Genix ID	
	Date	June 2021

Outage type	General Overhaul (GO)	**Outage start date**	February 2021
Department	Engineering	**System**	Boiler Valves
Scope review date			

Details	System Engineer	Engineering Specialist	Engineering Line Manager
Name & Surname	**Sabelo Nyandeni**	Retabile Mvelo	**Notemba Sobuwa**
Signature		pp Smabilisa	
Date	15-12-2021		17/12/2021

Details	SCOPE APPROVAL	SCOPE ACCEPTANCE	SCOPE ACCEPTANCE
	Engineering Manager	Outage Coordinator	Outage Manager
Name & Surname	**Thabo Montja**	Retabile Nhlapo	Mxolisi Simelane
Signature			
Date	21/12/2021	22/12/2021	22/12/2021

SCOPE COMPILATION REFERENCES				
SOURCE & Ref No.	**Yes**	**No**	**N/A**	**Comments**
Previous outage service reports		X		None received
Return to service data packages		X		None received
Maintenance Strategy with Rev number	X			
SAP defects (attach list as appendix)		X		Awaiting Outage defects are in SAP
GHRMS (STEP) reports (Generation Heat Rate Management System)			X	
Online Condition Monitoring			X	Based on online and previous run-up and run-down vibration reports.
Pre-outage performance test results			X	Currently pre & post outage turbine performance tests are not conducted
Post outage performance test results		X		None
GPSS/ Plant Performance data on UCLF incurred			X	
OMS / IIRMS recommendations (Audits Reports)			X	CA's on OMD from audits reviewed
Risk controls (IRM system)			X	Current safety and production risks on IRM system have been checked and work to address them included in this SOW
Previous audits and reviews (e.g. ERAP)		X		ERAP audits actions reviewed for their relevance to this scope
Engineering Change Requests (Projects)		X		Registered EC's that are to be implemented during the outage have been considered during the compilation of this SOPW.
LOPP strategy reports			X	Recommendations in the boiler strategy reports reviewed & actions covered by SOW
URS	X			URS are covered by the Engineering Change
Philosophy (Outage)	X			Forms basis of this scope of work
Condition Monitoring Report			X	
VA/PHD Viewer trends			X	Latest VA viewer trends checked to ensure that faults/defects are covered on the SOW
Corrective Actions			X	CA's on OMD from audits reviewed
CARAB reports			X	
Statutory Requirements	X			Boiler Statutory tests are covered in this scope and the unit start-up procedures
Grid code requirements			X	
Waivers and Exemptions	X			The SOW will ensure where necessary that the waivers obtained as a result of deficiencies are addressed

Calibration requirements			X	
Previous Outage SOW variations				
Post Mortems Actions from previous outages		X		Actions reviewed & considered for this SOW
Pre–Outage plant walks	X			The recent plant walks/inspections results forms part of this SOW
Risk based inspection (RBI) report			X	
Simulation, TOIs, OON, SI	X			All TOI's, OON's and SI's will be dealt with during outage meetings

SUBSYSTEM	**Y / N**	**Page №**
1. Main steam drain valves	Y	
2. Main steam stop (Crown) valves	Y	
3. Primary and Secondary super heater drain valves	Y	
4. Attemporator drain valves	Y	
5. Drum blow down valves	Y	
6. Sootblower drain valves	Y	
7. Down comer drain valves	Y	
8. Header drain valves	Y	
9. Feed water station drain and vent valves	Y	
10. Attemporating spraywater control valves	Y	
11. Boiler drum and superheater safety valves - overhaul and pressure test (Float/Trevi test)	Y	
12. Furnace sootblowers	Y	

CONTENTS

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1. GOAL

This outage prepares the unit to achieve the following performance targets with respect to the plant system this scope of work covers:

- UCLF of
- UAGS of zero (0)

2. OJECTIVES

2.1 TECHNICAL CRITERIA

- Zero forced shut down for rework after the outage
- Zero trips as a result of outage poor workmanship

2.2 SCOPE VARIATIONS

- None

2.3 SCOPE VARIATIONS

- There has been scope variation for the Boiler Valves before

2.4 FINANCIAL PERFORMANCE

- Inspection findings leading to need to cut and refurbish large valves (eg. Crown valves)

2.5 TIME MANAGEMENT

- Timeous coordination of all parties for approval of documents and other required consultations or go-aheads
- Procurement of spares with adequate time for delivery

3. SUMMARY OF THE SCOPE

Inspection and repair/refurbishment of boiler valves and soot blowers. In the case of severely damaged valves, cutting and welding in of a new valve will be necessary. Testing of safety valves. NDT of valve bodies, flanges and seats.

3.1 BATTERY LIMITS

PLANT	START	END	EXCLUSIONS	INCLUSIONS	P&ID DRAWINGS
Boiler Valves	Feed water regulating station	Steam chest inlet	Instrumentation, low pressure impulse piping, instrumentation valves	• Valves • Steam traps • Strainers (LBU only)	*Refer under 2.2*
Soot blowers	Soot blower steam supply tap-off at primary super heater	Soot blower drain valves	Instrumentation, low pressure impulse piping, instrumentation valves	• Soot blowers and associated valves	Refer under 2.2
Aux steam system	Tap off from main steam pipes	LBG20AA001 – Aux steam control valve (including valve)	Instrumentation, low pressure impulse piping, instrumentation valves	• Valves	*Refer under 2.2*

3.2 GENERAL ARRANGEMENT AND LOCATION DRAWINGS

№	DRAWING NUMBER	TITLE
1	0.19/16098	Boiler 1 soot blowing P&ID SH. 1 of 2
2	0.19/16101	Boiler Unit 1 Pressure parts P&ID SHT. 1 of 3
3	*0.19/16101*	Boiler 1 press. Parts superheater and attemperators P&ID SHT. 2 of 3
4	0.19/16101	Unit 1 Pressure Parts pressure parts drains P&ID SHT. 3 of 3
5	*0.19/16102*	Unit 1 final steam P&ID diagram
6	*0.19/16119*	Unit 1 Feed water heater train to economiser inlet P&ID SH. 3 of 3
6	*0.19/16098*	Boiler 1 soot blowing P&ID SH. 2 of 2

4. APPLICABLE CORPORATE/GENERATION/INTERNATIONAL GUIDELINES AND STANDARDS

№	REFERENCE NUMBER	DOCUMENT TITLE
1	240-84979413	Maintenance and repair of high temperature and pressure valves and fittings standard
2	240-56239129	High Energy pipework for fossil fuel fired power stations
3	240-56355225	Welding of high pressure temperature tube and pipework standard
4	240-56241933	Control of plant construction repair and maintenance welding activites standard
5	240-77196678	Heat treatment of welded components standard
6	240-56247788	Weld defects classification and reporting standard
7	240-83539994	Eskom NDT personnel approval (NPA) for quality related special process on Eskom plant standard
8	240-83540088	Requirements for Non-destructive testing (NDT) on Eskom plant standard
9	SANS 347	Categorization and conformity assessment criteria for all pressure equipment
10	BS EN 12952	Water-tube boilers and auxiliary installation
11	BS EN 13480	Metallic industrial piping
12	PD CEN ISO/TR 15608	Welding – Guidelines for metallic materials grouping system

5. APPLICABLE GROOTVLEI POWERSTATION STANDARDS AND PROCEDURES

№	REFERENCE NUMBER	DOCUMENT TITLE
1	GVLM 0032	Stroke checking of Auma electrically operated multi-turn actuators procedure
2	GVLEG 0073	Unit 1-6 Sootblower Maintenance Philosophy
3	240-40027684	Boiler valves plant operating technical specification
4	GVLEG 0029	Maintenance execution strategy for boiler pressure parts (valves)
5	GVLEG 0020	Maintenance execution strategy for Sootblower plant
6	GVLEG 0051	Unit 1- 6 Safety Valve testing With Unit On-load

6. GENERAL CONSIDERATIONS

ACTIVITIES	SPECIFICATIONS
PRE-REQUISITES / PRE-CONDITIONS	
SAFETY	
Grootvlei Power Station SHE specifications for principal contractors	
ENVIRONMENT	
Grootvlei Power Station Waste Management procedure	
QUALITY	

Process Quality Process/Procedure (PQP/QCP) Work on the turbine shall be carried out in accordance with the relevant approved PQP. The PQP shall be compiled by the contractor based on this scope of work and submitted to Grootvlei Engineering at least 2 months before the outage for approval. The QCP shall include the work that will be performed both outside the Power Station as well as on site	
Hold and witness points ➢ H&W points that form part of the QCP and have been approved prior to the start date, shall not be by-passed under any circumstances without the written concession of an authorised member of the Engineering Department. It is the Contractors responsibility to inform the Plant Engineer or his representative at the daily progress meetings when an activity will be ready for QC.	
Check Sheets Inspections to be carried out in accordance with check sheets as attached in master quality plan (QCP). All disassembly and assembly values to be recorded in relevant check sheets. No incomplete check sheets will be accepted unless the prior exemption in terms of the technical notification is obtained from Engineering. NCR will be issued for incomplete check sheets. Repair or replace all damaged/worn components out of specification or obtain a concession from engineering staff. All abnormalities to be recorded and reported with technical notifications.	OEM requirements specifications to be used on specifications unless approval to be obtained from Engineering
Quality technicians QC Technicians will be delegated by Plant Engineers to ensure quality standards and quality assurance is exercised during the repairs, replacement or refurbishment.	
Experience of staff All Engineers, technicians, supervisors and quality assurance related staff should have adequate experience to work on specified activities. All artisans should have adequate experience on specified activities and it is the responsibility of the contractor to provide assurance to Eskom that the artisan has the required experience to perform work at Grootvlei.	Short CV's of all supervisors, quality technicians, and artisans stating qualifications and relevant experience must be provided at least two weeks before commencement of outage.
General Requirements	
The importance of correct equipment spares and procedures should be included in structured toolbox talk sessions with all contractors.	

Spares It should be kept in mind that lead time of turbine spares required during major overhauls can be as much as 12 months. Therefore all the spares required will be ordered in time. Spares ordered and used will be reported by always quoting the ESKOM stock number (if applicable) as well as the Group and item number from the spares manuals.	
Documentation Full service reports must be compiled and submitted to the XXX documentation centre for safe keeping and approval 40 days after unit is synchronised on load	
Equipment Lifting equipment: An up to date test certificate will be available for all lifting equipment that will be used. Measuring equipment: An up to date calibration certificate must be available for all measuring equipment that will be used. Special tools will be serviced before the outage, will be available on site and will be on good working condition. A list if all special tools must be compiled before the outage and submitted to Engineering. The special tools must be readily available for inspection by QC and Engineering.	
Use of SAP PM to record history and costs SAP PM will be used to record history of work done and the related costs to at least the second level of headings as listed in this document.	
EXISTING DEFECTS	
A list of all defects loaded before the submission of this SOW are attached	Attached defect list

7. DETAIL SCOPE OF WORK: DECOMMISSIONING AND PRESERVATION SCOPE

SUBSYSTEM		DECOMMISSIONING AND PRESEVATION				
COMPONENT ACTIVITIES					GOVERNING DOCUMENTS	
№	COMPONENT FLOC (KKS CODE)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECTION / TEST / REFURBISH / REPLACE)	WORK SPECIFICATIONS	CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
	All as listed in detailed SOW	**Valve**	All open valve bodies to be sealed temporarily to prevent dirt ingress			
			All stripped valve components to be bagged and tagged with relevant KKS. List of components to be included in bag.			

Detailed Scope of Work

Notes:

- For all valve replacements, PMI (Spectro, OD and WT) to be performed before cutting and correct spare to be confirmed to be available before cutting, including EN 10204 – 3.1 cert.
- After stripping of valves, a list of valves deemed “cut outs” must be verified by Eskom QC and sent to system engineer along with the PMI report (Spectro, OD and WT) and the material cert of the valve/piping to be welded before the cutting instruction will be compiled.
- Approved welding procedure to be used for all welding activities. Appropriate material group numbers shall apply as per PD CEN ISO/TR 15608 Welding – Guidelines for metallic materials grouping system.
- For all valves DN 50 and below, the valve internals must be removed prior to welding/heat treatment. Valve to be blue checked and reassembled thereafter.

SUBSYSTEM		Boiler Valves inspection and repair/replace				
COMPONENT ACTIVITIES					GOVERNING DOCUMENTS	
№	**COMPONENT FLOC (KKS CODE)**	**COMPONENT DESCRIPTION**	**ACTIVITY TYPE (INSPECTION / TEST / REFURBISH / REPLACE)**	**WORK SPECIFICATIONS**	**Notes**	**INTERVENTION POINTS (H/W/R)**
1	**HAN01AA101**	**Drum blow down valve electrical iso. valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
2	**HAN01AA401**	**Drum blow down valve manual iso. valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
3	**HAN02AA101**	**Drum blow down valve electrical iso. valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
4	**HAN02AA401**	**Drum blow down valve manual iso. valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
5	**HAC02AA101**	**Drum recirculation valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
6	**HAC01AA101**	**Drum recirculation valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
7	**HAC02AA601**	**Drum recirculation NRV**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
8	**HAC01AA601**	**Drum recirculation NRV**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
9	**HAN40AA101**	**Right hand attemperator drain**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP

10	**HAN40AA102**	**Right hand attemperator drain**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
11	**HAN30AA101**	**Left hand attemperator drain**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
12	**HAN30AA102**	**Left hand attemperator drain**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
13	**HAN20AA101**	**Right hand outlet header drains**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
14	**HAN20AA102**	**Right hand outlet header drains**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
15	**HAN10AA101**	**Left hand outlet header drains**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
16	**HAN10AA102**	**Left hand outlet header drains**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
17	**HAN09AA101**	**L.H. Final steam drain valve**	Open, inspect and refurbish. Refurbishment requires cut out and refurbishment by OEM off site. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
18	**HAN09AA102**	**L.H. Final steam drain valve**	Open, inspect and refurbish. Refurbishment requires cut out and refurbishment by OEM off site. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
19	**HAN25AA101**	**R.H. Final steam drain valve**	Open, inspect and refurbish. Refurbishment requires cut out and refurbishment by OEM off site. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP

20	**HAN25AA102**	**R.H. Final steam drain valve**	Open, inspect and refurbish. Refurbishment requires cut out and refurbishment by OEM off site. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
21	**HAN09AA104**	**Final steam drains to blowdown vessel isolating valve**	Open, inspect and refurbish. Refurbishment requires cut out and refurbishment by OEM off site. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
22	**HAN17AA101**	**Main downcomer drain isolating valves**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
23	**HAN17AA102**	**Main downcomer drain isolating valves**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
24	**HAN50AA501**	**Main header drain isolating valve (Bottom headers common drain)**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
25	**LAE22AA507**	**R.H. Spray water isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
26	**LAE22AA501**	**R.H. Spray water isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
27	**LAE22AA101**	**R.H. Spray water isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
28	**LAE21AA507**	**L.H. Spray water isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
29	**LAE21AA501**	**L.H. Spray water isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP

30	LAE21AA101	**L.H. Spray water isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing		Service report req.	As per QCP
31	**LAE20AA101**	**Spray water main Isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
32	**LAE20AA102**	**Spray water main Isolating valve (DC Valve)**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
33	LAE21AA001	**L.H. attemperator spray water control valve**	Open, inspect and refurbish (In situ). Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
34	**LAE22AA001**	**R.H. attemperator spray water control valve**	Open, inspect and refurbish (In situ). Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
35	**LAE21AA601**	**L.H. attemperator spray water NRV**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
36	**LAE22AA601**	**L.H. attemperator spray water NRV**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
37	**LAE20AA601**	**Spray water main NRV**	Open, inspect and refurbish (In situ). Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
38	**LAB51AA601**	**Economiser inlet NRV**	Open, inspect and refurbish. Stripping will require removal and preplacement of spindle seal welds. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
39	**LAB52AA601**	**Economiser inlet NRV**	Open, inspect and refurbish. Stripping will require removal and preplacement of spindle seal welds. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
40	**LAB41AA101**	**Feed Reg A inlet isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP

41	LAB42AA101	Feed Reg B inlet isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
42	LAB43AA101	Feed Reg C inlet isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
43	LAB41AA102	Feed Reg A inlet isolating valve pressure equalising bypass valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
44	**LAB42AA102**	Feed Reg B inlet isolating valve pressure equalising bypass valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
45	**LAB43AA102**	Feed Reg C inlet isolating valve pressure equalising bypass valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
46	**LAB41AA501**	**Feed Reg A outlet isolating valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
47	**LAB42AA501**	Feed Reg B outlet isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
48	**LAB43AA501**	Feed Reg C outlet isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
49	**LAB41AA502**	Feed Reg A outlet isolating valve pressure equalising bypass valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
50	LAB42AA502	Feed Reg B outlet isolating valve pressure equalising bypass valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP

51	**LAB43AA502**	Feed Reg C outlet isolating valve pressure equalising bypass valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
52	**LAB51AA501**	Economiser inlet isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
53	**LAB51AA502**	Economiser inlet isolating valve pressure equalising bypass valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
54	**LAB52AA501**	Economiser inlet isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
55	**LAB52AA502**	Economiser inlet isolating valve pressure equalising bypass valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
56	**LAB41AA401**	Feed reg line A drain isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
57	**LAB41AA402**	Feed reg line A drain isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req. Service report req.	As per QCP
58	**LAB42AA401**	Feed reg line B drain isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
59	**LAB42AA402**	Feed reg line B drain isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP

60	**LAB43AA401**	Feed reg line C drain isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
61	LAB43AA402	Feed reg line C drain isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	
62	LAB41AA403	Feed reg line A vent isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
63	LAB41AA404	Feed reg line A vent isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
64	LAB42AA403	Feed reg line B vent isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
65	LAB42AA404	Feed reg line B vent isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
66	LAB43AA403	Feed reg line C vent isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
67	LAB43AA404	Feed reg line C vent isol. valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
68	LAE21AA401	LH Attemporator spraywater vent isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
69	LAE22AA401	RH Attemporator spraywater vent isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
70	LBA10AA101	LH Main steam crown valve	Open, inspect and refurbish. Perform NDT (PT) on body and spindle seats. If cracking found, valve must be cut out for off-site renewal of stellite	240-84979413 and GVLEG 0029	Service report req.	As per QCP

71	**LBA10AA102**	**LH Crown valve by-pass**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
72	**LBA10AA504**	LH Crown valve by-pass manual	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
73	**LBA20AA101**	RH Main steam crown valve	Open, inspect and refurbish. Perform NDT (PT) on body and spindle seats. If cracking found, valve must be cut out for off-site renewal of stellite	240-84979413 and GVLEG 0029	Service report req.	As per QCP
74	**LBA20AA102**	RH Crown valve by-pass	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
75	**LBA20AA504**	RH Crown valve by-pass manual valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
76	**LBU20AA101**	R.H. Main steam drain E/O isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
77	**LBU20AA601**	R.H. Main steam drain NRV	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
78	**LBU20AT002**	R.H. Main steam drains steam trap	Open, inspect, refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
79	**LBU10AA101**	L.H. Main steam drain E/O isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
80	**LBU10AA601**	L.H. Main steam drain isolating NRV	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP

81	**LBU10AT002**	L.H. Main steam drains steam trap	Open, inspect, refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
82	**LBU10AT001**	LH Main steam drains steam strainer	Open, clean and refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
83	**LBU20AT001**	RH Main steam drains steam strainer	Open, clean and refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
84	**HCB01AA501**	Main Sootblower supply manual valve	Open, clean and refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
85	**HCB01AA101**	Main Sootblower supply E/O valve	Open, clean and refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
86	**HCB05AA101**	Main Furnace Sootblower supply E/O valve	Replace. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
87	**HCB01AA102**	Main Air heater Sootblower supply E/O valve	Open, clean and refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
88	**HCB01AA201**	L.H. Top Air heater Sootblower supply valve (Poppet valve)	Open, clean and refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
89	**HCB03AA201**	L.H. Bottom Air heater Sootblower supply valve (Poppet valve	Open, clean and refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP

90	**HCB02AA201**	R.H. Top Air heater Sootblower supply valve (Poppet valve)	Open, clean and refurbish. Renew seals/gaskets	240-84979413 and GVLEG 0029	Service report req.	As per QCP
91	HCB04AA201	R.H. Bottom Air heater Sootblower supply valve (Poppet valve)	Open, inspect and refurbish Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
92	HAN05AA101	L.H Main Air heater Sootblower drain valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
93	HAN06AA101	R.H Main Air heater Sootblower drain valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
94	HAN07AA101	L.H Furnace Sootblower dain valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
95	HAN08AA101	**R.H Furnace Sootblower dain valve**	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
96	LBU10AA401	LH Final Steam drain manual isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
97	LBU20AA401	RH Final Steam drain manual isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
98	LBH01AA001	LH Start-up warming leg drains control valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP

99	LBH02AA001	RH Start-up warming leg drains control valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
100	LBH01AA101	LH Start-up warming leg drains isolating valve	Open, inspect and refurbish. Refurbishment requires cut out and refurbishment by OEM off site. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
101	LBH02AA101	RH Start-up warming leg drains isolating valve	Open, inspect and refurbish. Refurbishment requires cut out and refurbishment by OEM off site. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
102	LBG20AA101	Aux steam isolating valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
103	LBG20AA102	Aux steam isolating valve pressure equalising valve	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
104	LBG20AA001	Aux steam control valve (Steam converting valve)	Open, inspect and refurbish. Renew seals/gaskets and gland packing	240-84979413 and GVLEG 0029	Service report req.	As per QCP
105	HAD11AA601	Boiler drum safety valve	Open, inspect, refurbish or replace where necessary. Replace torsion bars. NDT on flanges. Trevi Test and seal within 72 hours of RTS	240-84979413 and GVLEG 0029	Service report req.	As per QCP
106	HAD12AA602	Boiler drum safety valve	Open, inspect, refurbish or replace where necessary. Replace torsion bars. NDT on flanges. Trevi Test and seal within 72 hours of RTS	240-84979413 and GVLEG 0029	Service report req.	As per QCP
107	HAD13AA603	Boiler drum safety valve	Open, inspect, refurbish or replace where necessary. Replace torsion bars. NDT on	240-84979413 and GVLEG 0029	Service report req.	As per QCP

			flanges. Trevi Test and seal within 72 hours of RTS			
108	HAD14AA604	Boiler drum safety valve	Open, inspect, refurbish or replace where necessary. Replace torsion bars. NDT on flanges. Trevi Test and seal within 72 hours of RTS	240-84979413 and GVLEG 0029	Service report req.	As per QCP
109	HAD15AA605	Boiler drum safety valve	Open, inspect, refurbish or replace where necessary. Replace torsion bars. NDT on flanges. Trevi Test and seal within 72 hours of RTS	240-84979413 and GVLEG 0029	Service report req.	As per QCP
110	LBA20AA601	R.H. Superheater safety valve	Open, inspect, refurbish or replace where necessary. Replace torsion bars. NDT on flanges. Trevi Test and seal within 72 hours of RTS	240-84979413 and GVLEG 0029	Service report req.	As per QCP
111	LBA10AA601	L.H. Superheater safety valve	Open, inspect, refurbish or replace where necessary. Replace torsion bars. NDT on flanges. Trevi Test and seal within 72 hours of RTS	240-84979413 and GVLEG 0029	Service report req.	As per QCP
112	All above	All above	1. Remove lagging and cladding 2. Clean valve (external) 3. Record valve installed specs as per Appendix A 4. Perform Spectro OD and WT on connecting pipes 5. Perform spectro, OD and WT on reducers or connect			

Note: Drum safety valve testing MUST be done BEFORE super heater safety valve floating

SUBSYSTEM		Feed Regulating Control Valves				
COMPONENT ACTIVITIES					GOVERNING DOCUMENTS	
№	**COMPONENT FLOC (KKS CODE)**	**COMPONENT DESCRIPTION**	**ACTIVITY TYPE (INSPECTION / TEST / REFURBISH / REPLACE)**	**WORK SPECIFICATIONS**	**CHECK SHEET NO.**	**INTERVENTION POINTS (H/W/R)**
		1) Inspect the following components for damage and record findings: i) Packing follower ii) Plug assembly iii) Seat ring iv) Disk stack 2) Replace the following components: i) Flexitallic gaskets ii) Balance seal iii) Metal seal iv) Stem packing and spacer 3) Functional check all instrumentation, control devices and actuator		OEM – CCI	Service report req.	Refer to QCP
113	LAB41AA001	Feed water regulating station control valve		240-84979413 and GVLEG 0029	Service report req.	Refer to QCP
114	LAB42AA001	Feed water regulating station control valve		240-84979413 and GVLEG 0029	Service report req.	Refer to QCP
115	LAB43AA001	Feed water regulating station control valve		240-84979413 and GVLEG 0029	Service report req.	Refer to QCP

8. BUDGET BILLS OF MATERIAL

(SOW OF WORK VARIATION WILL BE ISSUED ONLY IF REFURBISMENT OR REPLACEMENT COMPONENTS EXCEED BUDGET. OTHERWISE CUTTING INSTRUCTION WILL BE USED TO COMMUNICATE WHICH COMPONENTS MUST BE REPLACED OR REFURBISHED)

NB: All valves to be ordered with ends un-machined. Butt-weld ends to be machined to fit pipe in plant for specific application confirmed by NDT (PMI – Spectro, OD and WT measurement)

Note 1: Electrically operated valves must be ordered to fit actuators as per existing plant (confirm with actuator list from C&I Engineering prior to order)

Note 2: All valves prepped for butt weld ends except safety valves. Valves to be supplied with pressure test and 3.1 Cert, Engineering to be requested to perform technical evaluation prior to granting of order.

Note 3: The following BOM is based on findings from other units due to a lack of the availability of an installed components inventory list. Therefore it is not guaranteed that the plant spec will match the BOM. Spec is to be confirmed before a valve is cut from the plant.

Note 4: All valves and materials must be compliant with BS EN standards. No ASME/ASTM materials is permited.

Note 5: All valves are Butt-Weld ends (unless otherwise specified)

SUBSYSTEM										
№	**COMPONENT FLOC (KKS CODE)**	**Make and model/type**	**Size (DN (mm) or Inch if “**	**COMPONENT / MATERIAL SPECIFICATION**	**OPERATING PARAMETERS**		**Design PARAMETERS**		**New valve req.**	**Requirements [Qty]**
					Operating Pressure (MPa)	**Operating Temp (°C)**	**Design Pressure (MPa)**	**Design Temp (°C)**		
1	LAB41AA001	CCI Drag 100D	150/150	A216 WCB	16	210	19.8	221	No	Refer to Appendix B

2	LAB42AA001	CCI Drag 100D	150/150	A216 WCB	16	210	19.8	221	No	Refer to Appendix B
3	LAB43AA001	CCI Drag 100D	150/150	A216 WCB	16	210	19.8	221	No	Refer to Appendix B
4	LAB41AA101	Dewrance	9”	Carbon steel	16	210	18.8	218.3	No	Gland packing ring [Set], Packing strip [1], Bonnet gasket [1], Seat Springs [1set
5	LAB42AA101	Dewrance	9”	Carbon steel	16	210	18.8	218.3	No	Gland packing ring [Set], Packing strip [1], Bonnet gasket [1], Seat Springs [1set
6	LAB43AA101	Dewrance	9”	Carbon steel	16	210	18.8	218.3	No	Gland packing ring [Set], Packing strip [1], Bonnet gasket [1], Seat Springs [1set
7	LAB41AA102	Dewrance	¾”	Carbon steel	16	210	18.8	218.3	Yes	Graphite gland packing [set], bonnet gasket [1]
8	LAB42AA102	Dewrance	¾”	Carbon steel	16	210	18.8	218.3	Yes	Graphite gland packing [set], bonnet gasket [1]
9	LAB43AA102	Dewrance	¾”	Carbon steel	16	210	18.8	218.3	Yes	Graphite gland packing [set], bonnet gasket [1]
10	LAB41AA501	Dewrance	9”	Carbon steel	16	210	18.8	218.3	No	Gland packing ring [Set], Packing strip [1], Bonnet gasket [1], Seat Springs [1set]
11	LAB42AA501	Dewrance	9”	Carbon steel	16	210	18.8	218.3	No	Gland packing ring [Set], Packing strip [1], Bonnet gasket [1], Seat Springs [1set]
12	LAB43AA501	Dewrance	9”	Carbon steel	16	210	18.8	218.3	No	Gland packing ring [Set], Packing strip [1], Bonnet gasket [1], Seat Springs [1set]
13	LAB41AA502	Dewrance	¾”	Carbon steel	16	210	18.8	218.3	Yes	Graphite gland packing [set], bonnet gasket [1]
14	LAB42AA502	Dewrance	¾”	Carbon steel	16	210	18.8	218.3	Yes	Graphite gland packing [set], bonnet gasket [1]

15	LAB43AA502	Dewrance	¾”	Carbon steel	16	210	18.8	218.3	Yes	Graphite gland packing [set], bonnet gasket [1]
16	LAB41AA401	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
17	LAB41AA402	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
18	LAB42AA401	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
19	LAB42AA402	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
20	LAB43AA401	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
21	LAB43AA402	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
22	LAB41AA403	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
23	LAB41AA404	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
24	LAB42AA403	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
25	LAB42AA404	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
26	LAB43AA403	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
27	LAB43AA404	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]

28	LAB51AA501	Dewrance P/S P369V090A	9”	Carbon Steel	16	210	18.8	218.3	No	Graphite gland packing [set], metaflex gasket [1]
29	LAB52AA501	Dewrance P/S P369V090A	9”	Carbon Steel	16	210	18.8	218.3	No	Graphite gland packing [set], metaflex gasket [1]
30	LAB51AA502	Dewrance bypass valve Fig. No. 57415EA	¾”	Carbon Steel	16	210	18.8	218.3	Yes	Graphite gland packing [set], bonnet gasket [1]
31	LAB52AA502	Dewrance bypass valve Fig. No. 57415EA	¾”	Carbon Steel	16	210	18.8	218.3	Yes	Graphite gland packing [set], bonnet gasket [1]
32	LAB51AA601	Dewrance NRV Fig. No. 63910	9”	Carbon Steel	16	210	18.8	218.3	Yes	Metaflex ring gasket [1]
33	LAB52AA601	Dewrance NRV Fig. No. 63910	9”	Carbon Steel	16	210	18.8	218.3	Yes	Metaflex ring gasket [1]
34	HAC01AA101	KSB GTS P/S gate valve	80	16Mo3	11.3	332	13.2	---	Yes	Pressure seal/Bonnet gasket [1], Graphite gland packing [set]
35	HAC02AA101	KSB GTS P/S gate valve	80	16Mo3	11.3	332	13.2	---	Yes	Pressure seal/Bonnet gasket [1], Graphite gland packing [set]
36	HAC01AA601	NRV			11.3	332	13.2	---	No	
37	HAC02AA601	NRV			11.3	332	13.2	---	No	
38	LAE21AA001	Hora globe control 1312-05	3”/3”	1.7357 /w BW ends 16Mo3	16	210	18.8	218.3	Yes	Graphite packing [set], Bonnet gasket 1.4541/Gr [1] as per OEM Fig. E-75470/GB

39	LAE22AA001	Hora globe control 1312-05	3”/3”	1.7357 /w BW ends 16Mo3	16	210	18.8	218.3	Yes	Graphite packing [set], Bonnet gasket 1.4541/Gr [1] as per OEM Fig. E-75470/GB
40	LAE21AA101	KSB GTS P/S	80/80	16Mo3	16	210	18.8	218.3	Yes	
41	LAE22AA101	KSB GTS P/S	80/80	16Mo3	16	210	18.8	218.3	Yes	
42	LAE21AA501	KSB GTS P/S	80/80	16Mo3	16	210	18.8	218.3	Yes	
43	LAE22AA501	KSB GTS P/S	80/80	16Mo3	16	210	18.8	218.3	Yes	
44	LAE21AA507	KSB GTS P/S	80/80	16Mo3	16	210	18.8	218.3	Yes	
45	LAE22AA507	KSB GTS P/S	80/80	16Mo3	16	210	18.8	218.3	Yes	
46	LAE21AA601	Dewrance NRV	3”	Carbon steel	16	210	18.8	218.3	Yes	Metaflex ring gasket [1]
47	LAE22AA601	Dewrance NRV	3”	Carbon steel	16	210	18.8	218.3	Yes	Metaflex ring gasket [1]
48	LAE20AA101	KSB GTS P/S	100	16Mo3	16	210	18.8	218.3	Yes	
49	LAE20AA102	KSB GTS P/S	100	16Mo3	16	210	18.8	218.3	Yes	
50	LAE20AA601	Dewrance NRV Fig. No. 63910	4”	Carbon steel	16	210	18.8	218.3	No	Metaflex ring gasket [1]
51	LAE21AA401	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
52	LAE22AA401	KSB Nori 500 Globe	20	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
53	HAN01AA101	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]

54	HAN02AA101	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
55	HAN01AA401	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
56	HAN02AA401	KSB Nori 500 Globe	32	16Mo3	16	210	18.8	218.3	Yes	Graphite gland packing [set]
57	HAN10AA101	KSB Nori 500 Globe	50	10CrMo9-10	11.3	477	13.1	---	Yes	Graphite gland packing [set]
58	HAN10AA102	KSB Nori 500 Globe	50	10CrMo9-10	11.3	477	13.1	---	Yes	Graphite gland packing [set]
59	HAN20AA101	KSB Nori 500 Globe	50	10CrMo9-10	11.3	477	13.1	---	Yes	Graphite gland packing [set]
60	HAN20AA102	KSB Nori 500 Globe	50	10CrMo9-10	11.3	477	13.1	---	Yes	Graphite gland packing [set]
61	HAN30AA101	KSB Nori 500 Globe	32	10CrMo9-10	11.3	477	13.1	---	Yes	Graphite gland packing [set]
62	HAN30AA102	KSB Nori 500 Globe	32	10CrMo9-10	11.3	477	13.1	---	Yes	Graphite gland packing [set]
63	HAN40AA101	KSB Nori 500 Globe	32	10CrMo9-10	11.3	332	13.1	---	Yes	Graphite gland packing [set]
64	HAN40AA102	KSB Nori 500 Globe	32	10CrMo9-10	11.3	332	13.1	---	Yes	Graphite gland packing [set]
65	HAN17AA101	KSB Nori 500 Globe	32	16Mo3	11.3	332	13.1	---	Yes	Graphite gland packing [set]
66	HAN17AA102	KSB Nori 500 Globe	32	16Mo3	11.3	332	13.1	---	Yes	Graphite gland packing [set]

67	HAN50AA401	KSB Nori 500 Globe	32	16Mo3	11.3	332	13.1	---	Yes	Graphite gland packing [set]
68	HAN50AA401	Sempell GTS 2 P/S	12”	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set], Graphite pressure seal [1]
69	LBA20AA101	Sempell GTS 2 P/S	12”	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set], Graphite pressure seal [1]
70	LBA10AA102	Sempell VA500	25	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
71	LBA20AA102	Sempell VA500	25	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
72	LBA10AA504	Sempell VA500	25	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
73	LBA20AA504	Sempell VA500	25	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
74	HAN09AA101	KSB ZTS-C (PSV)	65/65	10CrMo9-10	11.3	543	13.1	560	Yes	Pressure seal [1], Graphite gland packing [set].
75	HAN09AA102	KSB ZXSVA – D stop start control isolating valve	80/70/80	10CrMo9-10	11.3	543	13.1	560	Yes	Pressure seal [1], Graphite gland packing [set].
76	HAN25AA101	KSB ZTS-C (PSV)	65/65	10CrMo9-10	11.3	543	13.1	560	Yes	Pressure seal [1], Graphite gland packing [set].
77	HAN25AA102	KSB ZXSVA – D stop start control isolating valve	80/70/80	10CrMo9-10	11.3	543	13.1	560	Yes	Pressure seal [1], Graphite gland packing [set].
78	HAN09AA104	KSB ZTS-C	125/125	1.4903 / 1.7380	11.79	543	13.1	560	No	1.4903 body with 10CrMo9-10 branches, TBC 1.4903 requires 3.2 cert.
79	LBU10AA101	KSB Nori 500 Globe	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
80	LBU20AA101	KSB Nori 500 Globe	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]

81	LBU10AA401	KSB Nori 500 Globe	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
82	LBU20AA401	KSB Nori 500 Globe	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
83	LBU10AA601	KSB ZRS Swing check NRV	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite joint ring [1]. Custom body - max. width 135mm.
84	LBU20AA601	KSB ZRS Swing check NRV	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite joint ring [1]. Custom body - max. width 135mm.
85	LBU10AT001	KSB SFS Y-Pattern strainer	20	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite pressure seal [1]
86	LBU20AT001	KSB SFS Y-Pattern strainer	20	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite pressure seal [1]
87	LBU10AT002	Gestra BK 212 thermostatic disc	25	10CrMo9-10	11.3	543	13.1	560	Yes	Gasket [1], Bolts - 21CrMoV5-7[x8], Nuts – 24CrMo5 [8], Regulator [1]
88	LBU20AT002	Gestra BK 212 thermostatic disc	25	10CrMo9-10	11.3	543	13.1	560	Yes	Gasket [1], Bolts - 21CrMoV5-7[x8], Nuts – 24CrMo5 [8], Regulator [1]
89	LBH01AA001	Welland & Tuxhorn Globe Control valve	80/100	10CrMo9-10	11.3	543	13.1	560	Yes	Bonnet Gasket [1], Graphit gland packing [set]
90	LBH01AA101	KSB GTS-C PSV	80/65	X10CrMoVNb9-1 (requires 3.2 Cert)	11.3	543	13.1	560	Yes	Pressure seal [1], Graphite gland packing [set]. 10CrMo9-10 connection branches
91	LBH02AA001	Welland & Tuxhorn Globe Control valve	80/100	10CrMo9-10	11.3	543	13.1	560	Yes	Bonnet Gasket [1], Graphite gland packing [set]
92	LBH02AA101	KSB GTS-C PSV	80/65	X10CrMoVNb9-1 (requires 3.2 Cert)	11.3	543	13.1	560	Yes	Pressure seal [1], Graphite gland packing [set]. 10CrMo9-10 connection branches
93	HCB05AA101	KSB Nori 500 Globe	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]

94	HCB01AA102	KSB Nori 500 Globe	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
95	HAN05AA101	KSB Nori 500 Globe	20	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
96	HCB01AA101	KSB Nori 500 Globe	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
97	HCB01AA501	KSB Nori 500 Globe	50	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
98	HAN06AA101	KSB Nori 500 Globe	20	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
99	HAN07AA101	KSB Nori 500 Globe	20	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
100	HAN08AA101	KSB Nori 500 Globe	20	10CrMo9-10	11.3	543	13.1	560	Yes	Graphite gland packing [set]
101	HAD11AA601	Hopkinson 7020 Hylif Torsion bar safety valve	3”	214%Cr,1%Mo steel	11.3	543	13.1	560	No	Refer to OEM recommended spares list Flanged ends
102	HAD12AA602	Hopkinson 7020 Hylif Torsion bar safety valve	3”	214%Cr,1%Mo steel	11.3	543	13.1	560	No	Refer to OEM recommended spares list Flanged ends
103	HAD13AA603	Hopkinson 7020 Hylif Torsion bar safety valve	3”	214%Cr,1%Mo steel	11.3	543	13.1	560	No	Refer to OEM recommended spares list Flanged ends
104	HAD14AA604	Hopkinson 7020 Hylif Torsion bar safety valve	3”	214%Cr,1%Mo steel	11.3	543	13.1	560	No	Refer to OEM recommended spares list Flanged ends
105	HAD15AA605	Hopkinson 7020 Hylif Torsion bar safety valve	3”	214%Cr,1%Mo steel	11.3	543	13.1	560	No	Refer to OEM recommended spares list Flanged ends
106	LBA10AA601	Hopkinson 7020 Hylif Torsion bar safety valve	21/2”	214%Cr,1%Mo steel	11.3	543	13.1	560	No	Refer to OEM recommended spares list Flanged ends
107	LBA20AA601	Hopkinson 7020 Hylif Torsion bar safety valve	3”	214%Cr,1%Mo steel	11.3	543	13.1	560	No	Refer to OEM recommended spares list Flanged ends
108	HCB01AA201	Diamond power poppet valve	-	10CrMo9-10	11.3	543	13.1	560	Yes	Poppet valve with OEM modified steam for pneumatic actuator. Flanged ends

109	HCB03AA201	Diamond power poppet valve	-	10CrMo9-10	11.3	543	13.1	560	Yes	Poppet valve with OEM modified steam for pneumatic actuator. Flanged ends
110	HCB02AA201	Diamond power poppet valve	-	10CrMo9-10	11.3	543	13.1	560	Yes	Poppet valve with OEM modified steam for pneumatic actuator. Flanged ends
111	HCB04AA201	Diamond power poppet valve	-	10CrMo9-10	11.3	543	13.1	560	Yes	Poppet valve with OEM modified steam for pneumatic actuator. Flanged ends
112	LBG20AA101	Sempell GA 251-601	4"	P/S	-	-	12.01	543.4	Yes	
113	LBG20AA102	Sempell VA 500	112 "	Globe	-	-	12.01	543.4	Yes	
114	LBG20AA001	Globe Control Welland & Tuxhorn	DN100	Globe Control	-	-	12.01	543.4	Yes	Fig. No. 0.C55394Ea Steam Converting Valve