Matla Power Station Outage Scope of Work	Reference No.	MET- 053850
	Revision:	0
	Unit No.	1 to 6
	Genix ID.	Various
	Date:	2022-10-18

Outage Type:	Opportunity, IR,MGO and GO	Outage Start Date:	2022-2028
Department:	Turbine Engineering	Plant Area:	Turbine Plant
Scope Review Date:	2022/10/18	Discipline:	Condensate system

Details	COMPILATION:	APPROVAL:	APPROVAL:	APPROVAL:	APPROVAL
	System Engineer	Line Manager	Risk Engineer	Engineering Specialist	Engineering Manager
Name & Surname	Thandeka Mkhonza, Collins Phooko Onkokame Setidisho	Zain Karodia (Acting)	N/A	Sydney Mhlana	Lindokuhle Ngobese
Signature					
Date	2022/10/18	21/11/2022		29/11/2022	29/11/2022

Details	REVIEW:	REVIEW:	REVIEW:	ACCEPTANCE:	ACCEPTANCE:
	Quality Representative	Environmental Representative	AIA	Outage Coordinator	Outage Manager
Name & Surname	Johan Lourens	S Ramaboea	NIA	Lib Nyamse	
Signature					
Date	2022/11/22	22 11 2022		30.11.2022	

SCOPE COMPILATION REFERENCES				
SOURCE & Ref No.	Yes	No	N/A	Comments
Previous Outage Service Reports	X			
Return To Service Data Packages	X			
Maintenance Strategy With Rev Number		X		
SAP Defects (Attach List As Appendix)	X			
GHRMS (STEP) Reports (Generation Heat Rate Management System)	X			
Online Condition Monitoring	X			
Pre-Outage Performance Test Results	X			
Post Outage Performance Test Results	X			
GPSS/ Plant Performance Data On UCLF Incurred			X	
OMS / IIRMS Recommendations (Audits Reports)			X	
Risk Controls (IRM System)			X	
Previous Audits And Reviews (E.G. ERAP)			X	
Engineering Change Requests (Projects)			X	
LOPP Strategy Reports			X	
URS	X			
Philosophy (Outage)	X			
Condition Monitoring Report		X		
VA/PHD Viewer Trends		X		
Corrective Actions		X		
CARAB Reports			X	
Statutory Requirements			X	
Grid Code Requirements			X	
Waivers And Exemptions			X	
Calibration Requirements		X		
Previous Outage SOW Variations		X		
Post Mortems Actions From Previous Outages		X		
Pre-Outage Plant Walks	X			
Risk Based Inspection (RBI) Report			X	
Simulation, TOI's, OON, SI	X			
SOW Reviewed And Challenged Within Engineering By All Engineering Functions (Attach Proof, E,G Attendance Register Or Review Form)	X			

CONTENTS

1. GOAL

This Scope of Work prepares the unit to achieve the following performance targets as set by Matla Power Station with respect to the plant system performance

- EAF of 80 54%
- PCLF of 9 96%
- UCLF of 7%
- OCLF of 2 5%

2. OJECTIVES

2.1 SCOPE VARIATIONS

- N/A

2.2 FINANCIAL PERFORMANCE

- N/A

2.3 TIME MANAGEMENT

- Condenser refurbishment activities

3. SUMMARY OF THE SCOPE:

3.1 HIGH LEVEL FOR TURBINE PLANT

- Inspection and repairs on Condenser tapprogge screens
- HP cleaning of multiple shell and tube type heat exchangers

4. BATTERY LIMITS

PLANT	START	END	EXCLUSIONS	INCLUSIONS	P&ID DRAWINGS
Condensate system and cooling water syste,				All coolers in the turbine and feedwater systems All main and BFPT condenser tubes and screes All pipe work in the condenser online cleaning system	

5. GENERAL ARRANGEMENT AND LOCATION DRAWINGS

№	DRAWING NUMBER	TITLE
1	047/257	Turbine piping and measurement systems
2		
3		
4		

6. APPLICABLE CORPORATE / GENERATION / INTERNATIONAL GUIDELINES AND STANDARDS (REFER TO THE ENGINEERING ARTIFACT INDEX)

№	REFERENCE NUMBER	DOCUMENT TITLE
1	N/A	
2		

7. APPLICABLE MATLA POWER STATION STANDARDS AND PROCEDURES (REFER TO OMOPS FINDER ON G: DRIVE)

№	REFERENCE NUMBER	DOCUMENT TITLE
1	240-72261425	Outage Philosophy for Matla Power Station

8. GENERAL CONSIDERATIONS

8.1 PRE-REQUISITES / PRE-CONDITIONS

ACTIVITIES	SPECIFICATIONS
Data books, calibration certificates, reviews, reports and diagrams / drawings shall be submitted to Engineering 21 days after the completion of the work Engineering to forward all data books to the Quality Department (Documentation Control)	
All QCP's to be submitted to Engineering and Quality for approval prior to the outage / project commencement	

8.2 SAFETY

ACTIVITIES	SPECIFICATIONS
All work is to be done in accordance with Matla Plant Procedures and Safety Regulations	
Matla Power Station induction must be done before any work commences	
A permit to work must be in place before any work commences	
The worker's register must be completed and daily risk assessments conducted before any work commences	

8.3 ENVIRONMENT	
ACTIVITIES	**SPECIFICATIONS**
All activities listed in the National Environmental Act 107 of 1998, *EIA Regulations as amended, must have environmental* **AUTHORIZATION** before the work can commence	
The contractor shall comply with all applicable legal and other requirements	
The polluter pays principle shall be applied	
The contractor's manager shall ensure compliance to Eskom Matla Environmental Procedures to ensure the prevention of pollution	OMOP 4090 and OMOP 4402
The last payment will be processed based on the status of the last housekeeping check sheet of the designated work area	OMOP 4402
EMS File based on ISO 14001 will be required	

8.4 QUALITY	
ACTIVITIES	**SPECIFICATIONS**
Process Quality Process/Procedure (PQP/QCP) The Contractor / Executioner of the work will be responsible for drawing up all QCP documentation, which must be approved by Engineering and Authorized by the Quality Department prior to commencing with the work	
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	
The Contractor / Executioner shall adhere to QM58 and OMOP4497 requirements	QM58 and OMOP4497
The number of NCR's issued can affect your next tendering process	
The QCP shall be signed progressively by the Engineer / Supervisor, Eskom QC Inspector, Contractor QC Inspector and/or AIA	

8.4 QUALITY	
ACTIVITIES	**SPECIFICATIONS**
No procuring of outage items without the approval of Scopes of Work by the Quality Department	
All outage scope creep and scope addition shall be approved by the Quality Department	
No Contractor shall be in the possession of Scopes of Work for execution, without prior approval as indicated on the cover page of this document template	
The contractor is subjected to quality auditing at any point in time during the execution of the Scope of Work	

8.5 OTHER REQUIREMENTS	
ACTIVITIES	**SPECIFICATIONS**
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 both Engineering and the Matla documentation centre for safe keeping and approval 21 days after unit is synchronised on load	WI 4418
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	

8.6 EXISTING DEFECTS	
ACTIVITIES	SPECIFICATIONS
A list of all defects loaded before the submission of this SOW should be attached in Section 10	

9. DETAILED BASELINE SCOPE OF WORK:

9.1 DECOMISSIONING AND PRESERVATION SCOPE OF WORK (Refer To 240-57127944 "Preservation of Power Plant during *Shutdowns Guideline" for the preservation requirements*)

SCOPE:			DECOMMISSIONING AND PRESERVATION				
SUBSYSTEM:			9.1.1 N/A				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)

9.2 SCAFFOLDING, LAGGING & CLADDING SCOPE OF WORK

SCOPE:	SCAFFOLDING, LAGGING & CLADDING						
SUBSYSTEM:	9.2.1 N/A						
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO	INTERVENTION POINTS (H/W/R)
1		Main Condenser	Cleaning	Erect scaffolding for access to work on the Main Condenser	Contractor		W
2		BFPT Condenser	Cleaning	Erect scaffolding for access to work on the BFPT Condenser	Contractor		W
3		BFPT Condenser screen	Cleaning	Erect scaffolding for access to work on the BFPT Condenser screen	Contractor		W
4		Coolers	Cleanings	Erect scaffolding for access to all coolers specified in this scope of work	Contractor		W
5							

9.3 SURFACE PREPARATION AND SANDBALSTING SCOPE OF WORK

SCOPE:			SURFACE PREPARATION AND SANDBALSTING				
SUBSYSTEM:			9.3.1 N/A				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
1				N/A			

STATUTORY INSPECTION and TESTING scope of work N/A

SCOPE:			STATUTORY INSPECTION AND TESTING				
SUBSYSTEM:			9.3.2				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & RBI REF.	INTERVENTION POINTS (H/W/R)
1				N/A			

9.4 FUNCTIONAL INSPECTION AND TESTING SCOPE OF WORK

SCOPE:			FUNCTIONAL INSPECTION AND TESTING				
SUBSYSTEM:			9.4.1 HP Cleaning				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO	INTERVENTION POINTS (H/W/R)

9.5 REPLACEMENT AND REFURBISHMENT SCOPE OF WORK

Note:

- Each unit is estimated to be cleaned twice a year for full scope resulting to total of 12 cleaning intervals for a period of one year.
- Additionally, each main turbine condenser and BFPT condenser must be estimated to be flushed twice a year, this will occur on any opportunity maintenance shut down or when a unit will be on half load.

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO	INTERVENTION POINTS (H/W/R)
1 1	06-60MAG10BB001 06-60XAG10BB001	Main and BFPT Condenser	Inspect, HP Clean, repair	• HP Clean the main condenser tubes internally, maximum pressure to be used is1000 bar • HP Clean the BFPT condenser tubes internally, maximum pressure to be used is 700bar • Inspect condition of tubes using endoscope, contractor to provide endoscope • Conduct second high level after cleaning and inspect tubes for leaks and check for external leaks and repair any leaks found (plug leaking tubes and replace leaking gaskets on flanges and weld repair damaged areas • Close all manholes and replace all gaskets with new (site maintenance)	Contractor		H

SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.5.1 HP Cleaning and Refurbishment

COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
1 2	06-60MAG10BB001 06-60XAG10BB001	Main and BFPT Condenser	Inspect, Flush, repair	• Flush the condenser using fire hydrant pressure with pneumatic assistance • Inspect condition of tubes using endoscope, contractor to provide endoscope • Inspect tubes for leaks and check for external leaks and repair any leaks found (plug leaking tubes and replace leaking gaskets on flanges and weld repair damaged areas • Close all manholes and replace all gaskets with new (site maintenance)	Contractor		H
2	06-60MAG10BB001 06-60XAG10BB001	Main and BFPT Condenser Screens	Inspect, clean and repair	• Open manhole covers on both main condenser and BFPT condenser screens (A and B on main turbine) (site maintenance) • HP clean all three screens	Contractor		H
3	06-60MAG10BB001 06-60XAG10BB001	Main and BFPT Condenser Screens inlet and outlet pipeline	Inspect, clean and repair	• Loosen pipe work from flanges and place in the floor, call engineering for inspection, HP clean pipeline, inspect pipeline and report all noted defects to engineering			H

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				• Install all pipes back to their position after repairs and cleaning is completed			
4		MT Lube Oil Coolers	Inspect, clean and repair	• HP Clean the main turbine tubes internally to remove all scale, maximum pressure to be used is1000 bar • Inspect condition of tubes using endoscope, contractor to provide endoscope • Conduct flush after acid cleaning of tubes **Tube specifications** Number of tubes 1192 Tube type finned Tube length 4 8 m Tube NB 19 mm Tube thickness 1 mm Material Brass (fins aluminium) Number of coolers 2 per Unit			H
5		BFPT Lube Oil Coolers	Inspect, clean and repair	• HP Clean the BFPT Lub Oil tubes internally to remove all scale, maximum pressure to be used is 1000 bar • Inspect condition of tubes using endoscope, contractor to provide endoscope • Conduct flush after acid cleaning of tubes **Tube Specifications**			H

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO	INTERVENTION POINTS (H/W/R)
				Number of tubes 334 Tube type finned Tube length 1 505 m Tube NB 19 mm Tube thickness 1 mm Material Brass (fins aluminium) Number of coolers 2 per Unit			
6		Hydrogen Coolers	Inspect, clean and repair	• HP Clean the Hydrogen Coolers internally to remove all scale, maximum pressure to be used is 1000 bar • Inspect condition of tubes using endoscope, contractor to provide endoscope • Conduct flush after acid cleaning of tubes Tube Specifications Number of tubes 108 Tube type Finned Tube length 6 m Tube NB 25 4 mm Tube thickness 1 mm Tube material Brass (aluminium fins) Number of coolers 4 per Unit			H

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
7		EFP Motor Coolers	Inspect, clean and repair	• HP Clean the EFP Coolers internally to remove all scale, maximum pressure to be used is1000 bar • Inspect condition of tubes using endoscope, contractor to provide endoscope • Conduct flush after acid cleaning of tubes **Tube Specifications:** Number of tubes 180 Tube type Finned (7 75 mm long) Tube NB 16 mm Tube thickness 1 5 mm Tube length 2 m Tube Material Brass with aluminium fins Number of coolers 4 per Unit			H
8		Generator Stator Coolers	Inspect, clean and repair	• *HP Clean the Stator Coolant Coolers* internally to remove all scale, maximum pressure to be used is 1000 bar • Inspect condition of tubes using endoscope, contractor to provide endoscope • Conduct flush after acid cleaning of tubes **Tube Specifications:** Number of tubes 373			H

SCOPE:	REPLACEMENT AND REFURBISHMENT						
SUBSYSTEM:	9.5.1 HP Cleaning and Refurbishment						
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				ID of the tubes 14 mm Wall thickness 1 mm Length of tubes approximately 5 m Tube material Stainless steel (Z2Cn18-10) Number of coolers 2 per Unit			
9		Main Turbine Oil Tank	Inspect, clean and repair	• HP Clean the Main Turbine Oil Tank internally to remove all sludge, maximum pressure to be used is 1000 bar **Tank Specifications:** Length of the Tank 8000mm Width of Tank 3300mm Height of tank 4160mm Capacity 80000L Tube material Carbon steel Number of Tanks 1 per Unit			H
10		BFPT Lube Oil Tank	Inspect, clean and repair	• HP Clean the BFPT Oil Tank internally to remove all sludge, maximum pressure to be used is 1000 bar **Tank Specifications:** Length of the Tank 3700mm Width of Tank 2000mm Height of tank 2200mm			H

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				Capacity 15000L Tube material Carbon steel Number of Tanks 1 per Unit			
11		FRF Tank	Inspect, clean and repair	• HP Clean the IP Bypass FRF Oil Tank internally to remove all sludge, maximum pressure to be used is 1000 bar **Tube Specifications:** Length of the Tank 1000mm Width of Tank 610mm Height of tank 520mm Capacity 250L Tube material Carbon steel Number of Tanks 1 per Unit			
12	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	**Specifications of items to be cleaned:** Shell Chamber (Oil) & Tube Chamber (Water) 1. **Lube oil coolers (2-off each)** ➢ Tube ID – Ø 10mm ➢ Length 3255mm ➢ Quantity 476	Cleaning Contract/ Outage		

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				➢ Material Stainless Steel 2. <u>Working oil coolers (2-off each)</u> ➢ Tube ID – Ø =10mm ➢ Length – 3405mm ➢ Quantity – 798 ➢ Material Stainless Steel			
13	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	<u>Dismantling cooler connections</u> ➢ Remove water box to access the tube bundle ➢ Remove inlet and outlet oil pipework to the coolers Only remove 1st pipe section on each cooler inlet and outlet side (8- pipes)	Sulzer/Maintenance		
14	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	<u>HP CLEANING OF TUBE BUNDLES</u> ➢ Jet water at very high pressure, the water is propelled from a nozzle at an extremely high pressure blowing away dirt and debris ➢ The internal cleaning of the tube bundle is carried out with flexible hoses or with stainless	Cleaning contractor/ Engineering/Outage	Pressure to be applied inside tubes is 700 kPa	Hold Call Engineering prior to cleaning to inspect the tube plate

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				steel lances Do not use rotating head inside the tubes ➢ During cleaning lances are pushed down and back along the entire length of the tube Note The coolers can be cleaned in position, there is enough space No need to dismantle the cooler			
15	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	MECHANICAL CLEANING OF TUBE PLATE ➢ Apply brushing method combined with low pressure water to remove dirt and debris on the tube plates Use wire brush UNDER NO CIRCUMSTANCE SHALL THE TUBE PLATE BE HIGH PRESSURE CLEANED CRACKES CAN OCCUR ON THE PLATE	Cleaning contractor/ Engineering/Outage		
16	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	Once tube cleaning is complete, engineering to perform visual inspection of the tubes	Cleaning contractor/ Engineering		Hold Call Engineering prior to cleaning to inspect the tube plate

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO	INTERVENTION POINTS (H/W/R)
17	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	<u>CLEANING SHELL CHAMBER</u> Connect degreasing pipework to cooler inlet and outlet flanges Fit/Connect appropriate temporary connection flanges and pipework to coolers in a closed loop arrangement to enable degreasing	Cleaning contractor/ Outage	Contractor to supply their own connection flanges and fittings	
18	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	Connect contractor pump motor to power supply	EMD		
19	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	<u>The following procedure to be followed for degreasing process:</u> ➢ Fill shell chamber with water to check for leaks ➢ Flush shell chamber to first remove debris and dirt ➢ Inject decreasing solution prepared ➢ This solution will be circulated for approximately 4-6 hours before flushing to waste ➢ Then flush the shell chamber thoroughly with clean water to achieve low conductivity	Cleaning contractor/ Engineering/Outage	Degreasing solution will consist of the following ➢ 2 0% Caustic Soda ➢ Tri-Sodium Phosphate ➢ Detergent	Hold Contractor to submit the method statement and degreasing solution MSDS's to engineering prior to execution

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				Drain the shell chamber and remove temporary connections			
20	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	Once degreasing is complete, engineering to perform visual inspection on the shell chamber		Cleaning contractor/Engineering	Hold Call Engineering post cleaning to inspect
21	(01-06)VE**G005/(01-06)VE**G007	EFP WORKING AND LUBE OIL COOLERS	CLEANING	<u>Assembling coolers connections</u> ➢ Re-fit inlet and outlet pipework to cooler ➢ Refit water boxes and dished ends	Sulzer/Maintenance		
22		<u>TOP SCREENS MAIN CONDENSER AND BFPT:</u>	REFURSH	<u>REFURBISMENT OF 2-OFF MAIN CONDENSERS TAPROGGE SCREENS AND 1 OFF BFPT CONDENSER SCREEN</u> Loosen bolts on screens and remove screen and rig them to identified area Open all three screens manhole cover Remove all pipes on the suction and on the discharge of screens, insect pipes and use HP flushing to remove all debris and scale build up the pipeline Inspect screen and remove screen if major repairs are confirmed by engineering			

SCOPE:	REPLACEMENT AND REFURBISHMENT						
SUBSYSTEM:	9.5.1 HP Cleaning and Refurbishment						
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				• Check screen for proper sealing and ease of operation • New bolts, nuts, set screws, packing, silicone gasket etc to be supplied • Material certificates to accompany all newly machine shaft and bushes • The contractor to supply Teflon, spacers/washers where required such as at the hydrofoil locating bracket • Remove hydrofoil, drive screens, and inspect and conduct repair as per findings and discuss with engineering, replace hydrofoil after all work is completed • Close all manholes and replace all gaskets with new • For defects on top screens and spacers the duct should be removed for removal of screens • Remove hydrofoil, check condition, and remove scale build-up Screens to be cleaned using mechanical scraper and high pressure machine to remove scale •			
23		Top Screen	REFURSH	• Remove debris from screens • Note Provision to acid clean screens has been made, engineering will advise after			

SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.5.1 HP Cleaning and Refurbishment

COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				inspection If scale is found to be thick acid cleaning shall be done (as per scope for acid cleaning)			
24		Top Screen	REFURSH	• Move screen to original position Loosen allen caps on taper lock and adjust			
25		Top Screen	REFURSH	• Replace all missing rubber screen spacers with stainless steel spacers Spacers to be 316 Stainless Steel			
26		Top Screen	REFURSH	• Check screen for proper sealing and ease of operation Make adjustments if required			
27		Top Screen	REFURSH	• Inspect all pipe work on the discharge and on the suction of screens , conduct PMI and replace damaged pipes with new, Replace all damaged pipes and flanges			
28		Bottom Screen	REFURSH	• Build scaffold on CW valve T2 (main) and BFPT for access to shafts and screens, if required.			
29		Bottom Screen	REFURSH	• Remove actuating arms and clean • Sandblast with aluminium slag • Paint to suite existing condenser colour			
30		Bottom Screen	REFURSH	**Note: Inspection to be conducted with engineering, after inspection a decision to**			

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
				replace all damaged parts will be confirmed by engineering. • Strip shut of flaps, throttle flap and their associated indication mechanisms (6-off), Sandblast with aluminium slag and coat with protective coating on inside • Coat with **Dulux Sigma Guard EHB Paint & Hardener** to a maximum thickness of 0 75mm to withstand a Pressure of **250 Kpa and Temp of 75 Deg C.** • Paint to suit existing condenser colour on outside			
31		**Bottom Screen**		• Sand blast gland boxes (8-off) Sandblast with aluminium slag and coat with protective coating on inside • Coat with **Dulux Sigma Guard EHB Paint & Hardner** to a maximum thickness of 0 75mm to withstand a Pressure of **250 Kpa and Temp of 75 Deg C.** Paint to suit existing condenser colour on outside			
32		**Bottom Screen**	REFURSH	• Sand blast gland boxes (8-off)			

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO	INTERVENTION POINTS (H/W/R)
				• Machine new gland followers (14-off) Material to be 316 Stainless			
33		Bottom Screen	REFURSH	• Sand Blast discharge pipe distance pieces(4-off) Sandblast with aluminium slag and coat with protective coating inside • Coat with **Dulux Sigma Guard EHB Paint & Hardener** to a maximum thickness of 0 75mm to withstand a Pressure of **250 Kpa and Temp of 75 Deg C.** • Paint to suit existing condenser colour on outside			
34		Bottom Screen	REFURSH	• Re-tap/repair all broken/corroded gland follower and indication mechanisms studs and fit new studs & nuts (Studs & Nuts to be 316 Stainless) • Machine new screen shafts to fit actuating arms taper bushes (8-off)(Shaft material to be to spec **ASTM A312, TYPE 321 Stainless.)**			

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.5.1 HP Cleaning and Refurbishment				
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO	INTERVENTION POINTS (H/W/R)
35		**Bottom Screen**	REFURSH	• Machine new shaft to screen connection bushes if required • (8-off)(Bushes to be to spec **ASTM A312, TYPE 321 Stainless.):** Eng to check correct fit			
36		**Bottom Screen**	REFURSH	• Remove bottom screen from box and clean (Sandblast • Sandblast with aluminium slag) • Machine new screen spacers if required (Spacers to be Vesconite)			
37		**Bottom Screen**	REFURSH	• Re-assemble screens, shafts, actuating arms, shut &throttle flaps, shafts, enclosing box and flap open/close indicating mechanisms Install new gland packing at screen, shut-off and throttling flaps shafts Packing Specification Burgmann packing style 6320 / Teadit 2007 / John Crane C1065 / Chesterton 1750 / Nexis 2301 (Non-asbestos)			

SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.5.1 HP Cleaning and Refurbishment

COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
№	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST/ REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO	INTERVENTION POINTS (H/W/R)
38		Bottom Screen	REFURSH	• Check for correct screen open/closing sequence proper screen sealing and general ease of operation (Adjustments to be made if required)			
39		Bottom Screen	REFURSH	• Re-tap Hydrofoil locating holes, fit Hydrofoil and supply new setscrews (Setscrews to be Stainless Steel 316)			
40		Bottom Screen	REFURSH	• Supply new tightening nuts for shut-off and throttling flaps open/close indicating mechanisms (Stainless Steel 316) • Paint actuating arms, gland followers, and open/close indicating mechanisms Paint to suit existing condenser colour			
41		Bottom Screen	REFURSH	• Supply new hand wheel turning mechanisms, **where these are missing.** • Check glands for leaks once the condenser has been re-commissioned Pull glands up • New bolts, nuts, setscrews, studs, packing, silicone, gaskets, etc to be supplied, by **THE CONTRACTOR.** • Material certificates to accompany all newly machined shafts and bushes Supply new tightening nuts for shut-off			

NOTE: SOW OF WORK VARIATIONS WILL BE ISSUED ONLY IF REFURBISMENT OR REPLACEMENT COMPONENTS EXCEED BUDGET, OTHERWISE CUTTING INSTRUCTIONS WILL BE USED TO COMMUNICATE WHICH COMPONENTS MUST BE REPAIRED, REPLACED OR REFURBISHED.

BILL OF MATERIALS							
SUBSYSTEM:			9.5.3 Bill of materials				
№	REPLACE / REFURBISH	COMPONENT DESCRIPTION	COMPONENT MATERIAL SPECIFICATION	OPERATING PARAMETERS	PART No.	STOCK No.	DESIGN QUANTITY

10. SAP DEFECTS

As per scope of work

11. DRAWINGS