Eskom	OUTAGE SCOPE OF WORK FORM/TEMPLATE	Document Identifier	557-31416	Rev	2
		Effective Date	October 2024		
		Review Date	October 2027		

Matla Power Station Outage Scope of Work	Reference No.	MEB-054896
	Revision:	3
	Unit No.	Matla PS
	Genix ID.	N/A
	Date:	05/05/2026

Outage Type:	5 Year Contract Outage, Maintenance & Spares supply SOW	**Outage Start Date:**	N/A
Department:	Boiler Engineering	**Plant Area:**	Sulphur plant
Scope Review Date:	N/A	**Discipline:**	Mechanical

Details	COMPILATION:	APPROVAL:	APPROVAL:	APPROVAL:	APPROVAL
	System Engineer	Line Manager	Risk Engineer	Engineering Specialist	Engineering Manager
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Signature					
Date	27/05/2026	17/06/2026		2026/06/22	19/06/2026

Details	REVIEW:	REVIEW:	REVIEW:	REVIEW:	ACCEPTANCE:	ACCEPTANCE:
	Quality Rep.	Environmental Rep.	Metallurgist	AIA	Outage Coordinator	Outage Manager
Name & Surname	Johan Lavens	LUTENDO MUROVHI	N/A	N/A	Mthunzi Ngqulunga	**M Nhlanhla**
Signature						
Date	22/06/2026	22/06/2026			22/06/2026	**2026/06/22**

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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			

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CONTENTS

Page

1. GOAL 4
2. OJECTIVES 4
   2.1 TECHNICAL CRITERIA 4
   2.2 SCOPE VARIATIONS 4
   2.3 FINANCIAL PERFORMANCE 4
   2.4 TIME MANAGEMENT 4
3. SUMMARY OF THE SCOPE 4
   3.1 SULPHUR PLANT MAINTAINENCE: 4
4. BATTERY LIMITS 5
5. GENERAL ARRANGEMENT AND LOCATION DRAWINGS 6
6. APPLICABLE CORPORATE / GENERATION / INTERNATIONAL GUIDELINES AND STANDARDS (REFER TO THE ENGINEERING ARTIFACT INDEX) 6
7. APPLICABLE MATLA POWER STATION STANDARDS AND PROCEDURES (REFER TO OMOPS FINDER ON G: DRIVE) 6
8. GENERAL CONSIDERATIONS 7
   8.1 PRE-REQUISITES / PRE-CONDITIONS 7
   8.2 SAFETY 7
   8.3 ENVIRONMENT 7
   8.4 QUALITY 8
   8.5 OTHER REQUIREMENTS 9
   8.6 EXISTING DEFECTS 9
9. DETAILED BASELINE SCOPE OF WORK: 10
   9.1 DECOMISSIONING AND PRESERVATION SCOPE OF WORK 10
      9.1.1 SO_3 FLUE GAS CONDITIONING PLANT SKID 10
   9.2 SCAFFOLDING, LAGGING & CLADDING SCOPE OF WORK 11
      9.2.1 SO_3 FLUE GAS CONDITIONING PLANT 11
   9.3 SURFACE PREPARATION AND SANDBALSTING SCOPE OF WORK 12
      9.3.1 SO_3 FLUE GAS CONDITIONING PLANT 12
   9.4 REPLACEMENT AND REFURBISHMENT SCOPE OF WORK 13
      9.4.1 SO_3 Flue Gas Conditioning Plant 13
         9.4.1.1 Short term outage opportunity and IRs 13
         9.4.1.2 Daily SOW (requires full-time maintenance personnel) 23
         9.4.1.3 GO/MO SOW 35
         9.4.1.4 Spares 53
   9.5 BUDGET BILLS OF MATERIAL 58
      9.5.1 SO_3 Flue Gas Conditioning Plant 58
10. REFERENCE DRAWINGS 62
   10.1 GENERAL ARRANGEMENT OF COMMON PLANT 62
   10.2 WELD ASSY & DETAILS FOR SULPHUR BURNER GA 63
   10.3 DESUPERHEATER GENERAL ASSEMBLY 64
   10.4 SO_3 BURNER REFRACTORY 65
   10.5 SO_3 SUPPLY BURNER SKID TO PROBES TYPICAL GA FOR ALL UNITS 66

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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 70%
- PCLF of 13.2%
- UCLF of 12.8%
- OCLF of 7.9%

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

- List the scope variations that occurred during the previous outage and describe how this is going to be addressed during this outage.

2.3 FINANCIAL PERFORMANCE

- List the significant instances of budget variances (i.e. compensation events) that occurred during the previous outage and describe how this is going to be addressed during this outage.

2.4 TIME MANAGEMENT

- Spare availability can cause major delays when executing the SoW. All spares required for execution to be audited a month before outage and detailed SoW submitted to Maintenance.

3. SUMMARY OF THE SCOPE

3.1 SULPHUR PLANT MAINTAINENCE:

- Daily inspections
- Reports on sulphur plant.
- Repair defects
- Attend to refurbishment or modifications.
- Spares management.

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4. BATTERY LIMITS

PLANT	START	END	EXCLUSIONS	INCLUSIONS	P&ID DRAWINGS
Sulphur Trioxide plant	Unit Sulphur supply isolation valve	SO_3 Injection lances Inside the Precipitator inlet ducting		• Desuperheater plant • SO_3 Skid • Sulphur Burner • Catalytic convertor • Air Blower • Air Heater • Process Air filters	0.47/44944 0.47/44938 0.47/45893

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5. GENERAL ARRANGEMENT AND LOCATION DRAWINGS

№	DRAWING NUMBER	TITLE
1	0.47/45337	Common Plant GA
2	0.47/45323	Weld Assy & Details for Sulphur Burner GA
3	0.47/44968	De Superheater GA
4	0.47/45338	SO_3 Supply Burner Skid to Probes
5	0.47/45327	SO_3 Burner Refractory
6	0.47/45326	SO_3 Burner Sight Glass
7	0.47/45322	Fill-in for SO_3 convertor
8	1-6SP80001 sht 1, 1-6SP80001 sht 2	SO_3 FGC Injector Fabrication Drawing and BOM

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

№	REFERENCE NUMBER	DOCUMENT TITLE
1.	240-94148512	Guidelines for Generic SOW for Overhauls and Interim Repairs on ESP and SO_3
2.	240-56242850	Continuous Emission Monitoring System Selection Standard
3.	240-56242363	Emission Monitoring and Reporting Standard
4.	240-60238156	Standard for Management of Flow Accelerated Corrosion and Erosive Attack in Fossil Fired Power Plant
5.	240-75426899	Feed heating Health Care Standard
6.	240-110600232	Pressure Vessel Wall Thickness Measurement and Evaluation Standard
7.	240-56239133	High Pressure Pipework Supports Standard
8.	240-56239129	High Pressure Pipework for Fossil Fired Power Stations Standard
9.	240-56247004	Thermal Insulation Standard
10	240-56355225	Welding of High-Pressure Temperature Tube and Pipework Standard
11	240-56247788	Weld Defects Classification and Reporting Standard

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

№	REFERENCE NUMBER	DOCUMENT TITLE
1	4213	Particulate & Gaseous Emission Management
2	3756	Precips inspection
3	240-72261425	Outage Philosophy for Matla Power Station
4	240-94148512	Guidelines for Generic SOW for Overhauls and Interim Repairs on ESP and SO_3

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№	REFERENCE NUMBER	DOCUMENT TITLE
5	557-4226	Matla Common Sulphur Plant Operating Parameters and Precautions for Auxiliary Plants

8. GENERAL CONSIDERATIONS

8.1 PRE-REQUISITES / PRE-CONDITIONS	
ACTIVITIES	**SPECIFICATIONS**
Data books, 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).	WI 4418
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.	GGR 0992
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.	
BUY QUIET: All stakeholders are encouraged to purchase or rent quieter machinery, equipment and tools to reduce worker noise exposure, contribute towards compliance to OHSA noise exposure limits and ultimately reduce the risk of noise induced hearing loss.	

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

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8.3 ENVIRONMENT	
ACTIVITIES	**SPECIFICATIONS**
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.	
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.	

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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 the 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.	

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9. DETAILED BASELINE SCOPE OF WORK:
9.1 DECOMISSIONING AND PRESERVATION SCOPE OF WORK

SCOPE:		DECOMMISSIONING AND PRESERVATION					
SUBSYSTEM:		9.1.1 SO_3 FLUE GAS CONDITIONING PLANT SKID					
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		Sulphur Skid	Drain	Drain sulphur on unit skid drain valve once sulphur plant is shut down for outage opportunity.	Ops	Ops	W

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9.2 SCAFFOLDING, LAGGING & CLADDING SCOPE OF WORK

SCOPE:			SCAFFOLDING, LAGGING & CLADDING				
SUBSYSTEM:			9.2.1 SO_3 FLUE GAS CONDITIONING PLANT				
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.	10-60 HQT50AV100	Burner	Remove & Replace	Erect scaffolding around the Burner for access. Remove the lagging and cladding for inspection. Once inspection and repairs are completed replace it.	Scaffolding & Insulation Contractor	QCP	W
2.	10-60 HQT50AU100	Converter	Remove & Replace	Erect scaffolding around the Converter for access. Remove the lagging and cladding for inspection. Once inspection and repairs are completed replace it.	Scaffolding & Insulation Contractor	QCP	W
3.	10-60 HQT71BN001	Lances	Remove & Replace	Remove the lagging and cladding for inspection. Once inspection and repairs are completed replace it.	Scaffolding & Insulation Contractor	QCP	W

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9.3 SURFACE PREPARATION AND SANDBALSTING SCOPE OF WORK

SCOPE:			SURFACE PREPARATION AND SANDBALSTING				
SUBSYSTEM:			9.3.1 SO_3 FLUE GAS CONDITIONING PLANT				
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.	10-60 HQT50AV100	Burner and converter shells	Surface preparation	Sand blasting is to be done on the burner and converter shells and all stubs on it to identify areas where shell repairs are to be done	Contractor	QCP	R
2.	10-60 HQT71B	SO_3 lances	Inspect	Perform sandblasting on lances bands for preparation of wall thickness. Inspect and replace S SO_3 lance shields if eroded	Contractor	QCP	R
3.		SO_3 Injection lances	Clean	Clean/remove ash build up around SO_3 lances	Contractor	QCP	R

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9.4 REPLACEMENT AND REFURBISHMENT SCOPE OF WORK

SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.4.1 SO_3 Flue Gas Conditioning Plant				
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)
9.4.1.1 Short term outage opportunity and IRs							
Unit Skid and Burner							
1.		Unit Sulphur skid	Install	Install sulphur drain valves on SO_3 unit skids. Some of the valves are not flanged and may require flanges. i. Cut the valve and replace with a flanged valve. ii. Perform NDT on the welds (Dyepen) iii. All data packs to be sent to Boiler Engineering	Service provider	Steam jacketed Valve. QCP	H
2.		Unit Sulphur skid	Repair	• Repair Sulphur leaks when required as per findings • Repair steam leaks when required • Replace steam jumpers and fittings as an when required	Service provider	QCP	H

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SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.4.1 SO_3 Flue Gas Conditioning Plant				
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)
3.		Steam traps	Inspect and replace	Strip, clean, inspect and repair/replace if steam traps are defective Make provision for replacing a minimum of 7 steam traps per unit • Unit Skid (2) • 16 m level (1) • Between ground and 16 m (2) • Ground (2)	Service provider	QCP	H
4.		Sulphur isolating valve	Inspect and replace	Inspect sulphur isolating valve and replace valve internal with a new set if required	Service provider	QCP	H
5.		Sulphur control valve	Inspect and replace	Inspect sulphur control valve, replace valve internal with a new set if required	Service provider	QCP	H
6.		Sulphur isolating valves	Inspect and replace	Inspect and replace isolating valves when required i. Common plant sulphur supply pump suction isolating valve (2 Off) ii. Common plant sulphur supply pump discharge isolating valve (2 off).	Service provider	Ensure steam (de-superheater) is isolated. NDT required. QCP.	H

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SCOPE:	REPLACEMENT AND REFURBISHMENT						
SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant						
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)
				iii. Desuperheater hand isolating valves(steam) (4 off) iv. Desuperheater discharge isolating valves (2 off) v. Any isolating valve from common plant to the units including drain valve per unit vi. Steam isolating valves on common sulphur plant and of 6 units vii. SO_3 blower manual isolating valves per unit (6 off)			
7.		Sulphur burner	Inspect	Inspect burner inspection port valve for any erosion, WT and repair if required. • Clean the sight glass • Inspect the valve assembly, ensure it is functional repair or replace if defective • Inspect purge air valve and give report The burner inspection port tube (indicated as N5 on drawing 0.47/45323)	Service provider	QCP Valve: Reiss Wey Knife Gate Valve (100PN16) Drawing: 0.47/45326	W
	SO_3 Blower						

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SCOPE:	REPLACEMENT AND REFURBISHMENT						
SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant						
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)
8.		Process air blower filters	Replace	Replace the air blower inlet filters with new one or clean the blower inlet filters. 6 filters per unit (6 units).	Service provider	QCP	W
9.		Process air blower v belts	Inspect	Inspect and replace the air blower V-belts if required with new one. 3 v belts per unit (6 units)	Service provider	QCP	W
10.		SO_3 blower	Inspect	Inspect the blower assembly and maintain good housekeeping	Service provider	QCP	W
SO_3 Lances and Nozzles							
11.		SO_3 Flexible hoses	Repair	Inspect and replace SO_3 flexible hose if defective make provision to replace 3 flexible hoses per outage/during maintenance. New gaskets must be installed if flexible hose is removed.	Service provider	QCP	H
12.		SO_3 Injection lances	Repair	Inspect SO_3 lances and report block lances,	Service provider	QCP	H

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SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant

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)
13.		SO_3 Injection lances	Repair	Clean and unblock SO_3 nozzles and drain valve in position. Where duration allows Rig the lances and place on the roof of the ducting • Inspect all nozzles and replace if required • Flush the lances with high pressurized water and witness water coming out of the nozzles • Unblock drain and witness water flowing through the drain • Fully refurbish all lances (based on the inspection outcome) -install new lances and send removed lances for refurbishment	Service provider	QCP	H
14.		SO_3 Injection lances	Inspect	• Inspect and repair SO_3 lance shields and pedestals • Inspect lances for correct nozzle orientation	Service provider	Angle Iron 150x150x6 mm. QCP	H
15.		SO_3 lances	Replace	Replace damaged SO_3 lances make provision to replace 3 lances per outage opportunity	Service provider	QCP	H
16.		SO_3 lance thermocouples	Replace	Replace thermocouples that are defective (not reading, reading inaccurate) These thermocouples must be proven to be functional on the DCS and plant before SO_3 PTW is cleared.	C&I Maintenance	QCP	W

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SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.4.1 SO_3 Flue Gas Conditioning Plant				
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)
SO3 Converter							
17.		SO_3 convertor	Open	Open Converter top lead cover	Service provider	QCP	W
18.		SO_3 convertor	Inspect	Inspect SO_3 converter 1st stage and ceramic balls. Assess the condition of dust/ash and recommend if cleaning of the catalyst is required. This must be checked against blower current, the more the accumulation of dust the higher the current on the blower. When blower current is above 55A after cleaning the filters, cleaning of the catalyst is required	Service provider	QCP and approval from engineering	H
19.		SO_3 convertor	Inspect and replace	Replace catalyst NB! Care should be taken not to mix the hot and cold-end catalyst • All removed dust, foreign particles and broken catalyst should be handled and be disposed of as per OMOP 2366 • Catalyst that removed and cleaned out using filtering method and reuse	Service provider	QCP Service provider Drawing 0 74/45329 Catalyst Cold-end Manufacturer BASF Type 04-110 [SR10x5]	H

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SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant

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)
				• catalyst that is still within specification on size and condition Replace internal insulation if converter catalyst is changed Note Clean the catalyst using net and re-use the catalyst and ceramic balls found to be in good condition NB! Care should be taken not to mix the hot and cold-end catalyst **Note All removed dust, foreign particles and broken catalyst should be handled and be disposed of as per OMOP 2366**		Design quantity 1020 litres Hot-end Manufacturer BASF Type 04-111 [SR10x5] Design quantity 1525 litres Ceramic balls Manufacturer Prox-svers Type T-38 (1 0" diameter) Design quantity 450 litres Catalyst Cold-end Manufacturer BASF Type 04-110 [SR10x5] Design quantity 1020 litres Hot-end Manufacturer BASF Type 04-111 [SR10x5]	

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SUBSYSTEM:			9.4.1 SO_3 Flue Gas Conditioning Plant				
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						Design quantity 1525 litres Ceramic balls Manufacturer Prox-svers Type T-38 (1 0" diameter) Design quantity 450 litres Internal insulation Pyrostop blanket 128/1260 [SiO2 — 52%, Al2O3 — 47%] Design quantity 4967x420x19mm Adhesive Manufacturer Rhein Dinas Type Pyrostop-adhesive No 7670 [SiO2 69%, Al2O3 15%, Fe2O3 1%, Na2O 14%, K2O 1%] Relevant drawing 0 47/45322 Safety note Vanadium oxide dust is highly poisonous and may not be inhaled (max value 0 5 mg/m*) On changing	

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SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant						
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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						the catalyst, dust masks must at least be worn, the use of protective clothing, goggles and gloves is recommended. The sulphurised catalyst has strong mineral acid that can cause severe skin burns.	
20.		SO_3 Convertor	Inspect/ repairs	Inspect and repair dilution air pipe	Service provider	QCP Drawing 1-6 VE80101sht2. Piping Stainless steel	H
21.		SO_3 Convertor	Inspect	Inspect and send to OEM for repairs - dilution control valve if required	C&I	QCP	H
De-Superheater							
22.				De-superheater repairs can only be done when there is total SO_3 plant shutdown unless the de-superheater plant is running on a standby bank	Service provider And Ops department	QCP	H
23.		De-superheater	Inspect	Inspect and replace bank hand isolating valve (4 off)	Service provider	QCP	H
24.		De-superheater	Inspect/Replace	Inspect and replace desuperheater control valves if required	Service provider	QCP	H

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SUBSYSTEM:		9.4.1 SO_3 Flue Gas Conditioning Plant					
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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25.		De-superheater	Inspect/Replace	Inspect and replace steam drain lines if required	Service provider	QCP	H
26.		De-superheater	Inspect/Replace	Inspect and replace steam isolating valves if required (8 off)	Service provider	QCP	H
27.		De-superheater	Inspect/Replace	Inspect and repair/replace steam traps When replacing cutting and welding will be required. 100% NDT on the welds Dypen as a minimum.	Service provider	QCP NDT	H
28.		De-superheater	Refurbish	Refurbish (send to the OEM) or replace safety valves	Service provider	QCP	H
29.		De-superheater	Inspect/Replace	Inspect and replace steam line from Sulphur common plant to the units. Make provisions to replace 20-meter piping per outage	Service provider	QCP	H
30.		De-superheater	Maintain	Maintain good house keeping	Service provider	QCP	W
Sulphur Common Plant							
31.		Sulphur Common Plant	Inspect	Inspect Sulphur supply pumps for • Oil leaks • Sulphur leaks • Steam leaks	Service provider	QCP	H
32.		Sulphur Common Plant	Replace	Replace Sulphur supply pumps if required	Service provider	QCP	H
33.		Sulphur Common Plant	Replace	Inspect and send to the OEM for repairs/replace Sulphur offloading pump if required	Service provider	QCP	H
34.		Sulphur	inspect	Inspect and replace steam straps (15 off)	Service	QCP	

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SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant						
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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		Common P1ant			provider		H
35.		Sulphur Common Plant	Inspect	Cut and replace steam valves on Sulphur tank and pump house (x15 off} This includes Sulphur valves (5 off) 100% NDT's required on the welds Dypen as a minimum subjected to welding procedure specification	Service provider	QCP NDT	H
36.		Sulphur storage tank	Inspect	Inspect Sulphur storage and repair • Steam leaks • Sulphur leaks 100% NDT required on the welds Dypen as a minimum		QCP NDT	H
37.		Sulphur Storage tank and housing	Maintain	Maintain good housekeeping • SO_3 supply pump house with no oil and spillages etc. • SO_3 storage tank bound wall area	Service provider		H
9.4.1.2 Daily SOW (requires full-time maintenance personnel)							
1.		Sulphur plant	Provide	Following scope requires full-time personnel to execute daily activities as per the scope of work. The scope covers following plants i Common plant (Sulphur). ii. Unit 1-6 Sulphur	Service provider	Full time resources required • Supervisor x 1 • Fitters x 2 • General worker x1 • Boiler maker x1	H

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SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant

COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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				Trioxide plant/Skid iii Desuperheater plant Four full time resources required and 2 (Engineer and boiler maker) as when required		(only when required) • Welder x1 (only when required) • Technician /Engineer x1(only when required) Total 7 resources	
2.		Sulphur plant	Compile	**Unit 1-6 Sulphur skids** Perform daily checks and record findings Daily checks to be done twice a day(morning and afternoon) on the following but not limited to; • Sulphur flow • Burner temperatures • Steam temperatures • Sulphur density • Converter temperatures • Load produced • SO_3 trim setpoint • Blower current • Air heater gas outlet temperatures (back-end temperatures) • Emissions	Service provider	Daily report to be sent twice a day via email. Update plant status on platforms used onsite like teams or any other platform agreed upon	R

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SUBSYSTEM:		9.4.1 SO_3 Flue Gas Conditioning Plant					
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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3.		Unit skid	Clean	Clean the SO_3 skid house and ensure doors are closed	Service provider	Check sheet	W
4.		Unit skid	Inspect	Inspect unit skid for • Steam leaks • Sulphur leaks • Valves correctly open for adequate condensate drainage via steam straps • Legging, ensure steam traps are not legged Note defects to be raised for the leaks found	Service provider	QCP Check sheet	W
5.		Unit skid	inspect	Inspect steam drainage system to be operational without leaks and steam traps for correct functionality	Service provider	QCP Check sheet	W
6.		Sulphur skid		Unblock Sulphur piping whenever there is suspected blockage, this include but not limited to i Manual isolating valve ii Sulphur skid strainer (Change Sulphur skid strainer when required as per findings) iii. Sulphur isolating valve iv Before and after flowmeter	Service provider	Relevant drawing 1-6 PL32001 Sht 2 1-6 PL32001 Sht 3 1-6 PL32001 Sht 4	H

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				v Sulphur control valve and orifice vi Piping after control valve vii Burner lances Note this fault finding may require permit to work in operation to crack open flanges to trace blockage on sulphur piping 1 skid per unit		1-6 PL18202 Sht 4	
7.		Sulphur skid	Confirm	Crack opening of Sulphur flanges may be required during Sulphur blockages Risk assessment to done prior this work. This must be done by at least two personnel • Close manual Sulphur isolating valve • Crack open pipe flanges as per check sheet fault finding	Service provider	QCP Check sheet	H
8.		Sulphur piping	Inspect	Identify Sulphur pipe leaks (Steam and Sulphur) Repair the identified leaks Identifying leaks may include i Cutting Sulphur line on strategic sections ii Testing for leaks using steam or water/air iii Welding the cut sections **Note This covers common plant and 6 units**	Service provider	Relevant drawing i 1-6 PL32001 Sht 2 ii 1-6 PL18101 iii 0 47/456893 NDT	H

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SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant

COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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9.		Process Air Blower	Inspect	Inspect V-belts from unit 1 to 6 and replace when required	Service provider	QCP Check sheet	W
10.		Process Air Blower	Inspect	Inspect the air system for air leaks from unit 1 to 6. Defect notifications should be raised when plants are defective. This may require • Replacement of air bellows • Repair air ducting to the SO_3 burner • Replacement of blower This requires rigging of the blower from ground floor to SO_3 skid (about 20 meter)	Service provider	QCP Check sheet	W
11.		Process Air Blower	Inspect	Inspect, clean or replace air blower filters from unit 1 to unit 6 • Record the blower current before cleaning • Clean/replace air filters • Record the blower current	Service provider	QCP Check sheet Blower Stock number — 0177333	W

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12.		Process Air Heaters	Replace	Replace sulphur air heater when required. This will be done with Eskom electrical maintenance Test and repair: • Test heater elements and electrical connections before disconnection and removal. • Remove thermo-couple (t/c) and replace damaged ones if necessary. • Disconnect electrical wiring of the heater. Dismount and remove electrical heaters from the skid and call engineering/tech support for visual inspection of the elements. • Do visual inspection of heating elements and check for damages and distorted elements. Replace with new serviceable ones if necessary. • Send heaters for refurbishment if necessary. • Install the heaters back to its positions at the skid thereafter. Note: do not let these heaters to lie on the floor for a long time because they may get	Service provider	Requirement mechanical and electrical maintenance personnel QCP	W

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SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant

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				damaged (by external physical forces, etc). • Check and clean local 220v boards & panels. • Reconnect all heaters electrical wirings. • Test the heaters wirings. Note: Notify a service provider for heaters wiring test on time when the plant is ready for the test(s)			
13.		Sulphur convertor	Replace	Open converter top • Inspect the condition of the catalyst and report to engineering • Replace/clean the catalyst if required Replace catalyst NB! Care should be taken not to mix the hot and cold-end catalyst • All removed dust, foreign particles and broken catalyst should be handled and disposed of as per OMOP 2366. • Catalyst that are removed and cleaned out using filtering method. Re-use	Service provider	Catalyst Cold-end Manufacturer BASF Type 04-110 [SR10x5] Design quantity 1020 litres Hot-end Manufacturer BASF Type 04-111 [SR10x5] Design quantity 1525 litres Ceramic balls Manufacturer Prox-	H

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				catalyst that is still within specification on size and condition **Replace internal insulation if converter catalyst is changed. Each unit has one converter**		svers Type T-38 (1 0" diameter) Design quantity 450 litres Internal insulation Pyrostop blanket 128/1260 [SIQ2 — 52%, AI2O3 — 47%] Design quantity 4967x420x19mm Adhesive Manufacturer Rhein Dinas Type Pyrostop-adhesive No 7670 [SiO2 69%, AI2O 15%, Fe2O3 1%, Na2O 14%, K2O 1%] Relevant drawing 0	

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SUBSYSTEM:		9.4.1 SO_3 Flue Gas Conditioning Plant					
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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						47/45322 Safety note Vanadium oxide dust is highly poisonous and must not be inhaled (max value 0 5 mg/m^3) On changing the catalyst, dust masks must at least be worn, the use of protective clothing, goggles and gloves is recommended. The sulphurised catalyst has strong mineral acid that can cause severe skin burns.	
14.		SO_3 Injection Lances	Inspect/replace	Inspect and replace SO_3 flexible hose - new gaskets must be installed if flexible hose is removed	Service provider	Flexible hoses 80NBx1400mm Flange specification Flexible hoses	

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						80NB #150 ANSI flange [material A-182-F316L] Distribution manifold 80NB #150 ANSI flange [material A-182-F316L] Gasket D2 316SS/Ceramic [3mm thick for 80NB #150 ANSI flange] Hose-to-manifold 316SS / Ceramic [3mm thick for 80NB #150 ANSI flange] Relevant drawing 0. 47/45333 Rv2	
15.						Injection lance Stock number — 0177716 Minimum flushing water pressure 6 bar (g) Gasket A21	

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		SO_3 Injection Lances	Inspect	• Inspect and replace SO_3 injection lances with new or refurbished lances • Fully refurbish all lances (based on the inspection outcome) -install new lances and send removed lances for refurbishment	Service provider	316SS/Ceramic [3mm thick for 80NB #150 ANSI flange] D1 Lytherm [3 mm thick, 355 mm ID x 490mm OD] D3 316SS/Ceramic [3mm thick for 15NB for #150 ANSI flange] Relevant drawings 1-6 SP80001 Sht 1 dwg	H
16.		SO_3 Injection Lances	Compile	Unit 1-6 SO_3 injection lance temperatures: Ensure all SO_3 Injection lances have thermocouples. Blocked SO_3 Injection Lances to be Inspected and replaced	Service provider	QCP Check sheet	H
17.		Desuperheater station	Perform	Desuperheater station (at unit 4) Perform daily checks I Banks in service II Inspect and report air leaks on pneumatic valves III Maintain steam traps IV Cleaning of Sulphur spillages V Maintain good housekeeping VI Record desuperheater setpoint	Service provider	Daily report to be sent twice a day via email. Update plant status on platforms used onsite like teams or any other platform agreed upon	R
18.		Common Sulphur plant	Perform	Sulphur supply housing and Sulphur storage tanks. There are two Sulphur supply pumps,			

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COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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				one on duty and standby. There is one Sulphur offloading pump which only runs when there is a Sulphur road tanker to offload Perform following checks and report common plant I Running pump II Pump pressure gauge reading III Surge pipe level IV Pump speed on display (VSD) V Inlet pump temperatures VI Common plant temperatures VII Supply pump outlet temperatures VIII Sulphur storage tank level IX Sulphur storage tank temperature X Maintain good housekeeping	Service provider	Daily report to be sent twice a day via email. Update plant status on platforms used onsite like teams or any other platform agreed upon	R
19.		Spares	Record	Keep Sulphur plant spares inventory and update it on weekly basis This report to be sent to engineering.	Service provider	Spares inventory	R
20.		Sulphur plant	Compile	Compile weekly Comprehensive report on Sulphur plant performance and outstanding defects/work. This must include spares available against minimum and maximum required	Service provider	Report to be sent to Boiler maintenance and Engineering	R
21.		Spares	Provide	Provide consumable spares as per bill of material as when required	Service provider	Bill of material	H

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SUBSYSTEM:		9.4.1 SO_3 Flue Gas Conditioning Plant					
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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9.4.1.3 GO/MO SOW							
Unit Skid and Burner							
1.		SO_3 control valve	Inspect and replace	Inspect control valve and replace the valve internals with a new set if required	Service provider	QCP	H
2.		SO_3 isolating valve	Inspect and replace	Inspect isolating valve and replace the valve internals with a new set if required	Service provider	QCP	H
3.		Unit Sulphur Trioxide plant supply line	Inspect	The bends on the skid may have solidified Sulphur Inspect the skid Sulphur piping for blockages • Remove burner lance to test for blockage • Remove the bend after control valve for unblocking solidified Sulphur • Unblock solidified Sulphur on the strainer (to avoid blockage with drain Sulphur before steam isolations). This is in preparation of light-up when no refurbishment is done During GO it may be required to refurbish the unit skid piping from manual isolation valve to the burner lance • Cut and replace Sulphur piping from manual isolating valve up to the burner lance	Service provider	QCP Drawing Inner pipe stainless steel Outer pipe carbon steel Drawing 1-6PL32001	H

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SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant

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)
				• Refurbish the burner lance (1 off) • Replace steam jumpers and fittings (20 • Replace all steam isolating valves (12 Off). This includes drain line at 16-meter and below 16-meter level • Inspect and repair/replace steam traps if required, as per findings • Replace steam drain line if required from Sulphur skid until ground floor Make provision to replace approximately 50 meters in one unit			
4.		Unit SO_3 skid	Inspect and replace	Strip, clean, inspect and repair/replace if steam traps are defective Make provision for replacing a minimum of 7 steam traps per unit • Unit skid (2) • 16 m level (1) • Between ground and 16 m (2) Ground (2)	Service provider	QCP	H
5.		Unit skid	Measure	Measure wall thickness for the following • Skid piping bends (10 off per unit, minimum) Burner shell	Service provider	Include the wall thickness matrix and measurements on the report. Report to be sent to Engineering for review	R
6.				Refurbish/replace SO_3 burner • Refractory/lining			

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SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant

COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
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		Sulphur Burner Vessel	Refurbish	• Burner floor • Dome • Outer shell Note all holes and opening must be maintained as per the drawing. For the outer shell use 12 mm plates Curing time must be covered on QCP	Service provider	As per drawing 0.47/45327	H
Refurbishment of Burner Refractory							
7.		Sulphur Burner Vessel	Remove	Remove the top lid for SO_3 burner Lid needs to be rigged and safely secured on the floor	Service provider	QCP The rigging hoist/lifting equipment to be operation	W
8.		Sulphur Burner Vessel	Cut	Cut open the entire top of the burner shell	Service provider	QCP	W
9.		Sulphur Burner Vessel	Remove	Remove/demolish the section above fire-proof brick, insulation bricks on wall above the dome	Service provider	QCP All rubble to be disposed correctly	W
10.		Sulphur Burner Vessel	Remove	Remove the dome structure. This requires rigging and to be placed safely on the floor. This dome may be used for reverse engineering or be inspected for future improvements	Service provider	QCP All rubble to be disposed correctly	W
11.		Sulphur Burner Vessel	Remove	Remove/demolish the brick work (fire-proof and insulation bricks) from the dome down to the floor	Service provider	QCP	W

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						All rubble to be disposed correctly	
12.		Sulphur Burner Vessel	Inspect	Inspect the burner shell for wall thickness. Do visual inspections on the burner shell	Service provider	QCP	H
13.		Sulphur Burner Vessel	Inspect and repair	Repair the burner shell using plates (12 mm thickness) These plates may require bending to fit the shape of the shell Note Overlay patching not allowed	Service provider	QCP	H
14.		Sulphur Burner Vessel	Inspection/test	Perform NDT on the welds Dye-Pen as a minimum to be done on 100% of all welds	Service provider	QCP	H
15.		Sulphur Burner Vessel	Rebuild	Rebuild the S line floor as per the attached Drawing. This requires casting and curing regime to be strictly followed Service provider shall provide method statement with curing times for approval to engineering	Service provider	QCP Minimum 12 hours of curing time	H
16.		Sulphur Burner Vessel	Rebuild	Install the insulation line on the burner shell as per the drawing	Service provider	QCP	H
17.		Sulphur Burner Vessel	Rebuild	Rebuild the brick work up to the dome as per method statement stages Maximum 1 meter to be rebuilt per day. This is to be clearly indicated on the method statement	Service provider	QCP	H
18.		Sulphur Burner Vessel	Rebuild	Rebuild the fire-proof brick work from the floor up to the dome in stages as per method statement Maximum 1 meter to be rebuilt per day. This is to be clearly indicated on the method statement	Service provider	QCP Method statement	H

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19.		Sulphur Burner Vessel	Replace	Replace the dome, this will require dome to be rigged into position after it has been delivered to site Note; Dome is a high castable refractory which requires special curing. This may be done off site and deliver the dome to site	Service provider	QCP Engineering to witness the curing process at offsite	H
20.		Sulphur Burner Vessel	Rebuild	Rebuild the insulation brick work to the top as per drawing Note: follow the drawing dimensions and plan for the lid	Service provider	QCP	H
21.		Sulphur Burner Vessel		Weld back the top section of the shell Perform NDT on the weld Perform NDT on the welds Dye-Pen as a minimum to be done on 100% of all welds	Service provider	QCP NDT	H
22.		Sulphur Burner Vessel	Replace	Replace the lid and bold in	Service provider	QCP	H
23.		Sulphur Burner Vessel	Casting	Casting of the refractory is required • Side manhole lid • Top lid manhole Dome Burner floor	Service provider	QCP Method statement	W
SO_3 Air Blower							
24.		Process Air Blower inlet filters	Replace	The air blower inlet filters are to be replaced with new ones	Service provider	QCP	W

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25.		Process Air Blower V-belt	Inspect and replace	Inspect, replace air blower V-belts with new set	Service provider	QCP	W
26.		Process Air Blower	Inspect	IR's/MO/short term outage inspect the blower • blower condition (air leaks, oil leaks, visible defects) • oil condition • motor bushes and pulleys • Report on oil condition and change oil GOs refurbish the blower or replace with a new one Overhaul: • Remove blower and take it to the OEM for refurbishment and full refurbishment	Service provider	QCP To be refurbished off site Strip and access Call engineering to with strip and inspect Compile scope of work and send to engineering for approval Engineering approves in writing Send QCP to Engineering for approval Engineering to be called for final inspection and testing offsite	R

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				report is required that includes QCP with intervention points for refurbishment. • Replace with the new serviceable blower from the OEM. • Remove motor for refurbishment (full overhaul report required). • Fill-up with new oil to oil level plug. Use a type of oil as specified by OEM. • Grease the DE bearing through grease nipple. Note - when re-greasing, the old grease will be forced out of the vents which must be open at all times. • If the blower requires refurbishment, then, the service shall be outsourced preferably to OEM. Calibrate: Remove and calibrate pressure gauge and pressure transmitter. Inspect and Repair: Check vibrations and submit a report to engineering Note: Notify a service provider for vibration test on time when the plant is ready for the test(s).			
27.		Process Air Blower	Replace	Inspect and replace blower bellows with new ones if necessary	Service provider	QCP	H

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28.		Process Air Blow-off valve	Inspect and replace	Inspect blow off control valve. Make provision to refurbish or replace the valve if defective. This must include doing blow throughs on the orifice	Service provider	QCP	R
				SO_3 Lances and Nozzles			
29.		SO_3 lance bends	Measure	Measure wall thickness on the SO_3 bends	Service provider	QCP	W
30.		Lance flexible hose	Inspect and replace	Inspect flexible lance hoses and replace defective flexible hoses. GOs Replace the flexibles hoses (20 off} IR/short term outage make provision replace 10 flexible hoses per Unit	Service provider	QCP	W
31.		SO_3 Injection Lances	Inspect and replace	Inspect lances in position GOs - Replace SO_3 lances (20 off) with new gaskets On IR/short term outage Rig the lances and place on the roof of the ducting • Inspect all nozzles and replace if required • Flush the lances with high	Service provider	QCP Drawing	H

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				pressurized water Witness water coming out of nozzles • Unblock drain Witness water flowing freely through the drain make provision replace 5 SO_3 lances			
32.		SO_3 Injection Lances	Inspect	Inspect and repair SO_3 lance shields and pedestals		Angle iron 150x150x6mm	W
33.		SO_3 Injection Lances thermocouples	Replace	Replace thermocouples that are defective (not reading, reading inaccurate) These thermocouples must be proven to be functional on DCS and plant before SOA PTW is cleared	C&I Maintenance	QCP	W
34.		SO_3 Injection Lance Nozzles	Inspect and replace	Inspect, clean, and replace SO_3 injection lance nozzles if required	Service provider	QCP	H
SO_3 Convertor Vessel							
35.		SO_3 Convertor Vessel	Open	Open Converter top lead cover	Service provider	QCP	W
36.				Inspect the condition of the catalyst NB! Care should be taken not to mix the hot and cold-end catalyst		QCP Service provider Drawing 0.47/45329 Catalyst	

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		SO_3 Convertor Vessel	Inspect and replace	• All removed dust, foreign particles and broken catalyst should be handled and be disposed of as per OMOP 2366 • Catalyst that removed and cleaned out using filtering method and reuse catalyst that is still within specification on size and condition Replace internal insulation if converter catalyst is changed Note Clean the catalyst using net and re-use the catalyst and ceramic balls found to be in good condition NB! Care should be taken not to mix the hot and cold-end catalyst **Note All removed dust, foreign particles and broken catalyst should be handled and be disposed of as per OMOP 2366**	Service provider	Cold-end Manufacturer BASF Type 04-110 [SR10x5] Design quantity 1020 litres Hot-end Manufacturer BASF Type 04-111 [SR10x5] Design quantity 1525 litres Ceramic balls Manufacturer Prox-svers Type T-38 (1 0" diameter) Design quantity 450 litres Internal insulation Pyrostop blanket	

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						128/1260 [SIQ2 — 52%, AI2O3 — 47%] Design quantity 4967x420x19mm Adhesive Manufacturer Rhein Dinas Type Pyrostop-adhesive No 7670 [SiO2 69%, AI2O 15%, Fe2O3 1%, Na2O 14%, K2O 1%] Relevant drawing 0 47/45322 Safety note Vanadium oxide dusts are highly poisonous and may not be inhaled (max value 0 5 mg/m^3) On changing the catalyst, dust masks must at	

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						least be worn, the use of protective clothing, goggles and gloves is recommended. The sulphurised catalyst has strong mineral acid that can cause severe skin burns.	
37.		Convertor	Inspect	Inspect and repair dilution air pipe	Service provider	QCP Drawing 1-6 VE80101 sht2 Piping stainless steel	H
38.		Dilution Valve		Inspect and send to OEM for repairs dilution control valve if required	C&I	QCP	H
SO_3 Process Air Heater							
39.		SO_3 air Heater	Inspect and replace	Inspect SO_3 process air heater, this must include	EMD/MMD	QCP	W

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				• Measure insulation resistance between phases and earth. • Measure element resistance between phases reading. • Inspect the bus bars and connections in heater connection box. • Inspect the baffle plate condition on the heater. • Do visible inspection on each element for damage. • Replace any faulty heaters.			
40.		SO_3 air heater	Clean	Clean dust off the air heater	Service provider	QCP	W
De-superheater							
41.		De-superheater	Inspect and replace	De-superheater repairs can only be done when there is total SO_3 plant shutdown unless the de-superheater plant is running on a standby bank	Operating	Shutdown procedure	
42.		De-superheater	Inspect and replace	Inspect and replace bank hand isolating valve (4 off}	Service provider	QCP	H
43.		De-superheater	Inspect and replace	Inspect and replace desuperheater control valves if required	Service provider	QCP	H
44.		De-superheater	Inspect and replace	Inspect and replace steam drain lines if required		QCP	H

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45.		De-superheater	Inspect and replace	Inspect and replace steam isolating valves if required (8 off)	Service provider	QCP	H
46.		De-superheater	Inspect and replace	Inspect and repair/replace steam traps	Contractor	QCP	H
47.		De-superheater	Refurbish	Refurbish or replace safety valves	Service provider	QCP	H
48.		De-superheater	Inspect and replace	Inspect and replace steam line from common plant to the units. Make provisions to replace 20-meter piping per outage	Service provider	QCP	H
Sulphur Common Plant							
53.		Sulphur Common Plant	Inspect	Inspect Sulphur supply pumps	Service provider	QCP	H
54.		Sulphur Common Plant	Replace	Replace Sulphur supply pumps if required	Service provider	QCP	H
55.		Sulphur Common Plant	Replace	Inspect, send to the OEM for repairs /replace Sulphur offloading pump if required	Service provider	QCP	H
56.		Sulphur Common Plant	Inspect and replace	Inspect and replace steam straps (15 off)	Service provider	QCP	H
57.		Sulphur Common Plant	Replace	Replace Sulphur line piping when required	Service provider		H

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						QCP	
58.		Sulphur Common Plant	Inspect	Inspect and replace steam valves on Sulphur tank and pump house (15 off) This includes Sulphur valves (5 off)	Service provider	QCP	H
59.		Sulphur plant	Provide	Provide resources for outage maintenance work on sulphur plant covering the following plants i. Common plant (Sulphur). ii. Units sulphur plant. iii. Desuperheater plant, Provide the following resources that will be required. Site Manger x1 Supervisor x1 Mechanical fitter x2 Semi-skilled x2 Safety officer x1 Quality officer x1 Boiler maker x2(when required) Welder x2(when required) Engineer x1(As when required) and must give engineering advise and expertise including reviewing of inspection reports)	Service provider	As per requirement	H

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				Note: additional resources might be required for MGOs for outage.			
60.		Common Sulphur plant	Perform	Sulphur supply housing and sulphur storage tanks. Perform following checks and reports on common plant I. Running pump II. Pump pressure gauge reading. III. Surge pipe level IV. Pump speed on display V. Repair sulphur leaks. VI. Repair steam leaks VII. Maintain good housekeeping. One sulphur plant housing with two common plant supply pumps. One sulphur storage pump	Service provider	Daily report to be sent twice a day via email. Update plant status on platforms used onsite like teams or any other platform agreed upon.	R

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61.		Desuperheater station	Perform	**Desuperheater station (one stationed at unit 4)** Perform daily checks I. Banks in service II. Inspect and report air leaks on pneumatic valves. III. Maintain (repair and replace) steam traps IV. Repair steam leaks V. Cleaning of sulphur spillages. VI. Maintain good housekeeping.	Service provider	Daily report to be sent twice a day via email. Update plant status on platforms used onsite like teams or any other platform agreed upon.	R

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62.		Sulphur plant	Compile	**Unit 1-6 sulphur skids** Perform daily checks. Daily checks to be done twice a day, morning and afternoon. I. Sulphur flow II. Steam temperatures III. Sulphur density IV. Burner temperature V. Check steam leaks VI. Check sulphur leaks VII. Inspect the burner for leaks VIII. Inspect convertor for leaks IX. Inspect the blower for air leaks X. Change blower inlet filter as per PM or as per request. XI. Record lances temperatures XII. Perform any PM as may be required XIII. Cleaning sulphur spillages	Service provider	Daily report to be sent twice a day via email. Update plant status on platforms used onsite like teams or any other platform agreed upon.	R
63.		Sulphur plant	Compile	Compile weekly Comprehensive report on sulphur plant performance and outstanding defects/work. This must include spares available against minimum and maximum required.	Service provider	Report to be sent to Boiler maintenance and Engineering	R

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64.		Spares	Provide	Provide critical spares as per bill of material as when required	Service provider	Bill of material	H
9.4.1.4 Spares							
1.				The spares are for • GO/MGO • IR • Opportunity outages • On load spares (normal running) The outages are as follows over the 5 years • 8x GO/MGO • 9 IR • 30 opportunities (1 opportunity outage per 2 months over 5-year period)		Supply Original Equipment Manufacturer (OEM) data sheet or documentation where applicable on every delivery. Spares to be supplied in their original OEM packaging still sealed.	H
2.		SO_3 Process air blower	Refurbish	• Engineering to approve the service provider that will refurbish • Engineering to be called after stripping to inspect and determine the scope of work • Strip and access report to be sent to engineering	Service provider	QCP	H

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SCOPE:	REPLACEMENT AND REFURBISHMENT						
SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant						
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)
				• Engineering to approve the scope of work in writing • Engineering to be called for testing on service provider site • Engineering to QC onsite upon delivery			
3.		SO_3 Supply pump		• Engineering to approve the service provider that will refurbish • Engineering to be called after stripping to inspect and determine the scope of work • Strip and access report to be sent to engineering • Engineering to approve the scope of work in writing • Engineering to be called for testing on service provider site Engineering to QC onsite upon delivery	Service provider	QCP	H
4.		SO_3 Offloading pump		• Engineering to approve the service provider that will refurbish • Engineering to be called after stripping to inspect and determine the scope of work • Strip and access report to be sent to engineering • Engineering to approve the scope of work in writing • Engineering to be called for testing on service provider site	Service provider	QCP	H

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SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.4.1 SO_3 Flue Gas Conditioning Plant				
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)
				• Engineering to QC onsite upon delivery			
Supply and deliver Unit 1 - 6 SO_3 spares to Matla Power Station as per BOM and specifications provided below							
5.		SO_3 flexible hose		Provide Flexible hoses, **QUANTITY = 460 flexi hoses required** **GO/MGO** 20 Flexible hoses per outage Total 20 x 8 (outages in 5 yrs) = 160 hoses **IR** 10 hoses per outage Total 10 X 9 (outages in 5 yrs) = 90 hoses **Opportunity outage** 7 hoses per opportunity Total 7 X 30 (opportunities in 5 yrs) = 210 hoses	Service provider	Flexible hoses 80NB x 1400mm Flange specification Flexible hoses 80NB #150 ANSI flange [material A-182-F316L] Distribution manifold 80NB #150 ANSI flange [material A-182-F316L] **Stock number:** 652609	H
6.		SO_3 flexible hose gaskets		Provide Gaskets as per drawing, **QTY = 1 250 gaskets required** **GO/MGO** 70 gaskets per outage Total 70 x 8 = 560 gaskets **IR** 30 gaskets per outage Total 30 X 9 = 270 gaskets **Opportunity outage** 14 gaskets	Service provider	Gasket D2 316SS/Ceramic [3mm thick for 80NB #150 ANSI flange] Hose-to-manifold 316SS/Ceramic [3mm thick for 80NB #150 ANSI flange]	H

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SCOPE:	REPLACEMENT AND REFURBISHMENT						
SUBSYSTEM:	9.4.1 SO_3 Flue Gas Conditioning Plant						
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)
				Total 14 X 30= 420 gaskets		Drawing number 047/57908 **Stock number:** 747109	
7.		SO_3 Injection lances		Supply Injection lances as per Drawing number 047/57908, **QTY = 460 injection lances required** **GO/MGO** 20 lances per outage Total 20 x 8 (outages in 5 yrs) = 160 **IR** 10 lances per outage Total 10 X 9 (outages in 5 yrs) = 90 **Opportunity outage** 7 lances per opportunity Total 7 X 30 (opportunities in 5 yrs) = 210	Service provider	Injection lance Stock number — 0177716 Minimum flushing water pressure 6 bar (g) Gasket A21 316SS/Ceramic [3mm thick for 80NB #150 ANSI flange] D1 Lytherm [3 mm thick, 355 mm ID x 490mm OD] D3 316SS/Ceramic [3mm thick for 15NB for #150 ANSI flange] Relevant drawings 1-6 SP80001 Sht 1 dwg **Stock number:** 759978	H
8.		Sulphur control valve		Provide Control valve as per stock no. 0559416, **QTY = 9 valves required**	Service provider	Valve 1" ball valve, 150 PSI, 140deg C, SS,	H

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SCOPE:			REPLACEMENT AND REFURBISHMENT				
SUBSYSTEM:			9.4.1 SO_3 Flue Gas Conditioning Plant				
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)
				GO/MGO 1 valve Total 1 x 8/2 = 4 valves **IR** 1 valve Total 1 X 9/2 = 5 valves		Grade CF8M, 1/32 in slot characteristic seat **Stock number:** 0559416	

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9.5 BUDGET BILLS OF MATERIAL

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:			9.5.1 SO_3 Flue Gas Conditioning Plant				
№	REPLACE / REFURBISH	COMPONENT DESCRIPTION	COMPONENT MATERIAL SPECIFICATION	OPERATING PARAMETERS	PART No.	STOCK No.	DESIGN QUANTITY
1)		Sulphur control valve actuator				0559486	36
2)		Control valve	Valve 1" ball valve, 150 PSI, 140deg C, SS, Grade CF8M, 1/32 in slot characteristic seat		CV3000R-1-S6F1ATTVNN	0559416	15
3)		Sulphur control valve repair kit (internals)	1" Marwin 3000 Bettis D 0200 Drawing 53642			0559063	10
4)		Sulphur Isolating valve(block)	1" Marwin 3000			0559340	10
5)		Air blower Filter-inner	Air filter ADG 522			25016	100
6)		Air blower filter-outer	Air filter ADG 523			25017	100
7)		Air blower motor	Motor			140377	5
8)		Air blower	Aerzener GMB 1410 Electrical rating 476 kW Size 14 mm/ 10 mm			0177333	3
9)		Air heater	Convection Dimensions; DIA 400 x LG 2 M Potential 380 VAC Current 456 A Power 300 kW			0177778	8
10)		Air blower to motor V-belts	Aerzener GMB 1410 pulleys Electrical rating 476 kW Size 14 mm/ 10 mm		16NSPB2840	28692	80
11)		Air blow-off control valve	Rotork valve			0590179	8

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BILL OF MATERIALS							
SUBSYSTEM:			9.5.1 SO_3 Flue Gas Conditioning Plant				
№	REPLACE / REFURBISH	COMPONENT DESCRIPTION	COMPONENT MATERIAL SPECIFICATION	OPERATING PARAMETERS	PART No.	STOCK No.	DESIGN QUANTITY
12)		SO_3 strainer	Sulphur strainer 25 NB Krombach (Mesh size 0.25mm)			206197	40
13)		Burner top gasket	• Gasket: Milam PSS 300 [1430x1350x8 mm] • Bolts: M20x75 GR46 • Nuts & washers: M20 GR46 Bolt tightening sequence: ASME PCC-1-2013 Drawing no.: 0.47/45323			0625608	60 500 500
14)		Convertor top cover gasket	• Gasket: Milam PSS 300 [675x615x8 mm] • Bolts: M16x70 GR46 • Nuts & washers: M16 GR46 Drawing no.: 0.47/45329			625605	60 500 500
15)		Sulphur flow meter	Yokogawa RCSS31			0606259	3
16)		Sulphur supply pump	Lewa LDD1 mechanical diaphragm metering pump Operating pressure; 8.3 bar Flow; 520 l/h Power; 2.2 kW			559286	4
17)		Sulphur offloading pump	Rhine Ruhr Horizontal centrifugal pump Motor; 7.5 kW Flow; 2900 L/min Head; 20m			177558	2 2
18)		Sulphur flexible hose	Flexible hoses 80NB x 1400mm Flange specification Flexible hoses 80NB #150 ANSI flange [material A-182-F316L]			652609	60

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BILL OF MATERIALS							
SUBSYSTEM:			9.5.1 SO_3 Flue Gas Conditioning Plant				
№	REPLACE / REFURBISH	COMPONENT DESCRIPTION	COMPONENT MATERIAL SPECIFICATION	OPERATING PARAMETERS	PART No.	STOCK No.	DESIGN QUANTITY
			Distribution manifold 80NB #150 ANSI flange [material A-182-F316L]				
19)		SO_3 flexible hose gaskets	Gasket D2 316SS/Ceramic [3mm thick for 80NB #150 ANSI flange] Hose-to-manifold 316SS/Ceramic [3mm thick for 80NB #150 ANSI flange] Drawing number 047/57908			747109	100
20)		SO_3 Injection lances	Drawing number 047/57908			759978	25
21)		Cold-end catalyst	Manufacturer: BASF Type 04-110 [SR10x5] Design quantity 1020 litres (about 5x200 kg)			0777800	100 drums (200 kg)
22)		Hot-end catalyst	Manufacturer: BASF Type 04-110 [SR10x5] Design quantity 1525 litres			0777 777	100 drums (200 kg)
23)		Ceramic balls	Manufacturer Prox-svers Type T-38 (10" diameter) Design quantity 450 litres			0778 357	3000 litres
24)		Steam trap	Gestra MK 35/11 (Socket-weld ends, 15NB)			0641 628	50
25)		Steam trap	Gestra MK 35/11 (Socket-weld ends, 25NB)			0641 627	50
26)		Steam trap	Armstrong CD33SL (Screwed ends, 15NB)			0641 629	50
27)		Transmitter	SO_3 Air Heater airflow and air filter diff pressure Tx 0.05 to 1 kPa			0245 255	10
28)		Thermocouple	SO_3 Air heater temperatures T/C = 2M x 5mm 3 off			0145 247	60
29)		Thermocouple	SO_3 Lance inlet temperature T/C = 3700mm x 6mm, 20 off			0153 423	140
30)		Thermocouple	Burner temp T/C = 890 mm x 6 mm 1 off			0155 848	40

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BILL OF MATERIALS							
SUBSYSTEM:			9.5.1 SO_3 Flue Gas Conditioning Plant				
№	REPLACE / REFURBISH	COMPONENT DESCRIPTION	COMPONENT MATERIAL SPECIFICATION	OPERATING PARAMETERS	PART No.	STOCK No.	DESIGN QUANTITY
31)		Thermocouple	ABB Railmount Temperature transmitter TTR200 RTD and TC's			0245 254	200
32)		Small head SO_3 lance temp	T/C 375mm x 6mm + small head SO_3 lance temp			0155 860	60
33)		Respirator cartridges				189950	40
34)		Respirator filters				188850	40
35)		Full face respirator				2244760	40

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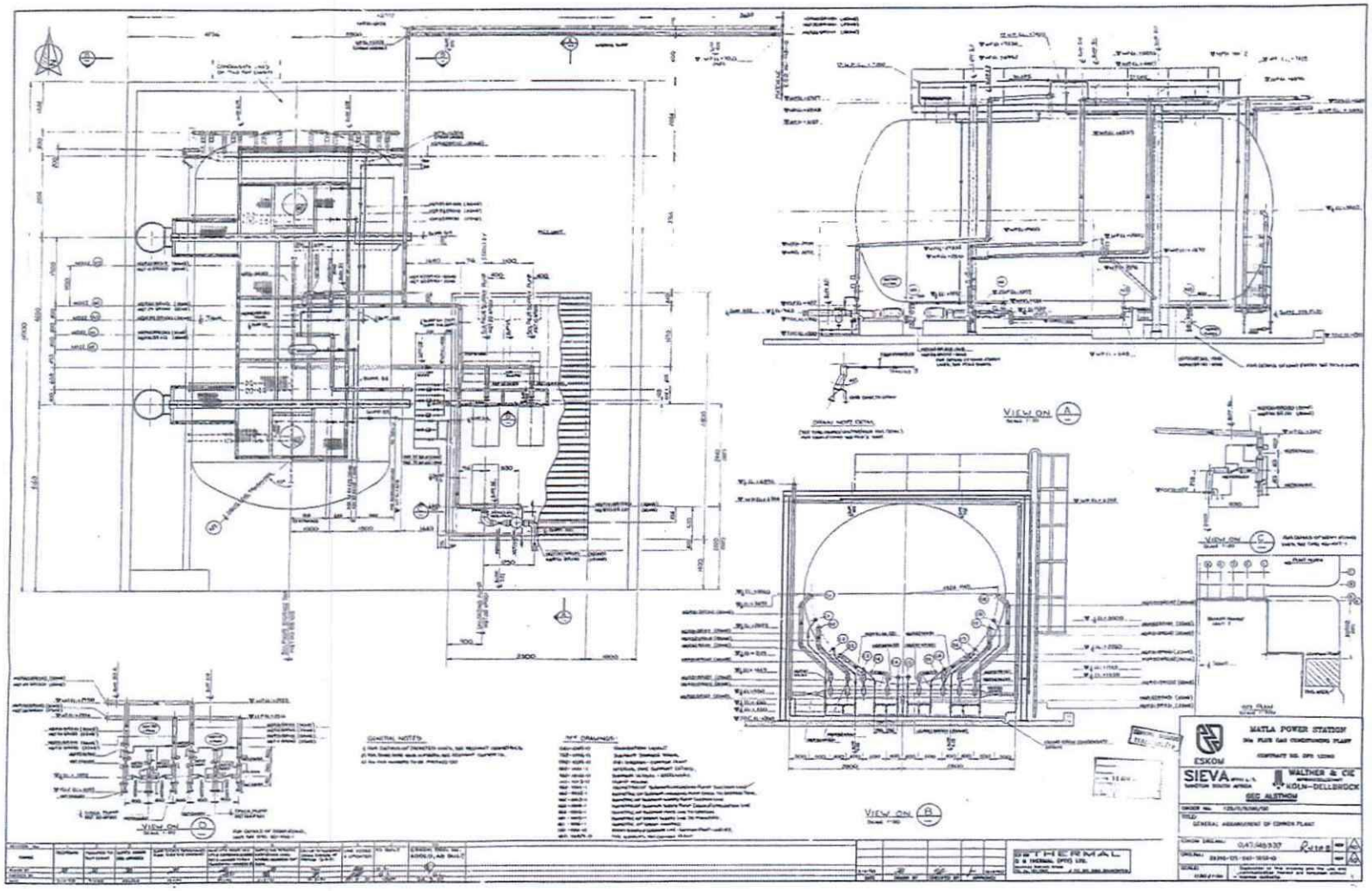
10. REFERENCE DRAWINGS

10.1 GENERAL ARRANGEMENT OF COMMON PLANT



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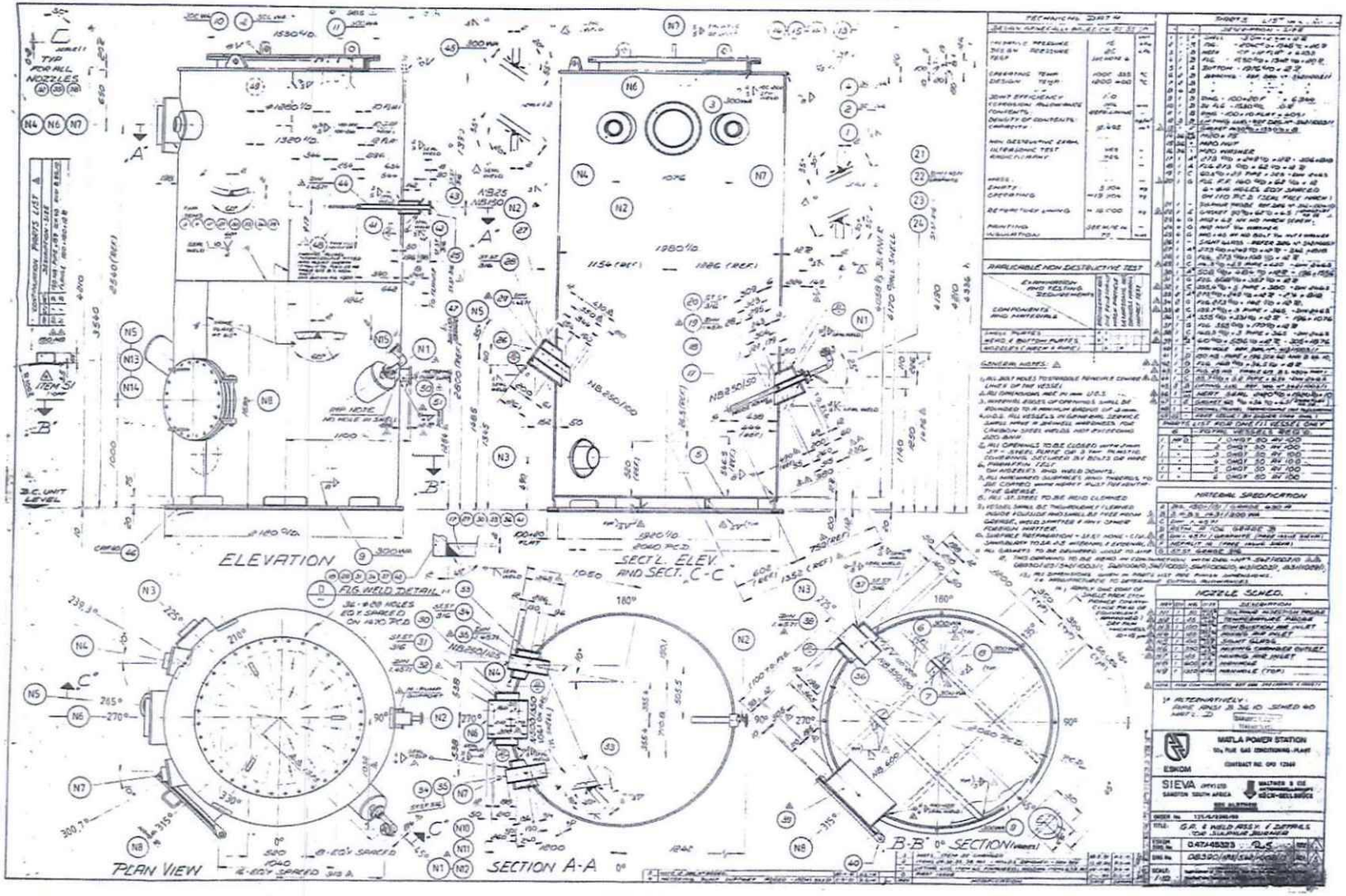
10.2 WELD ASSY & DETAILS FOR SULPHUR BURNER GA



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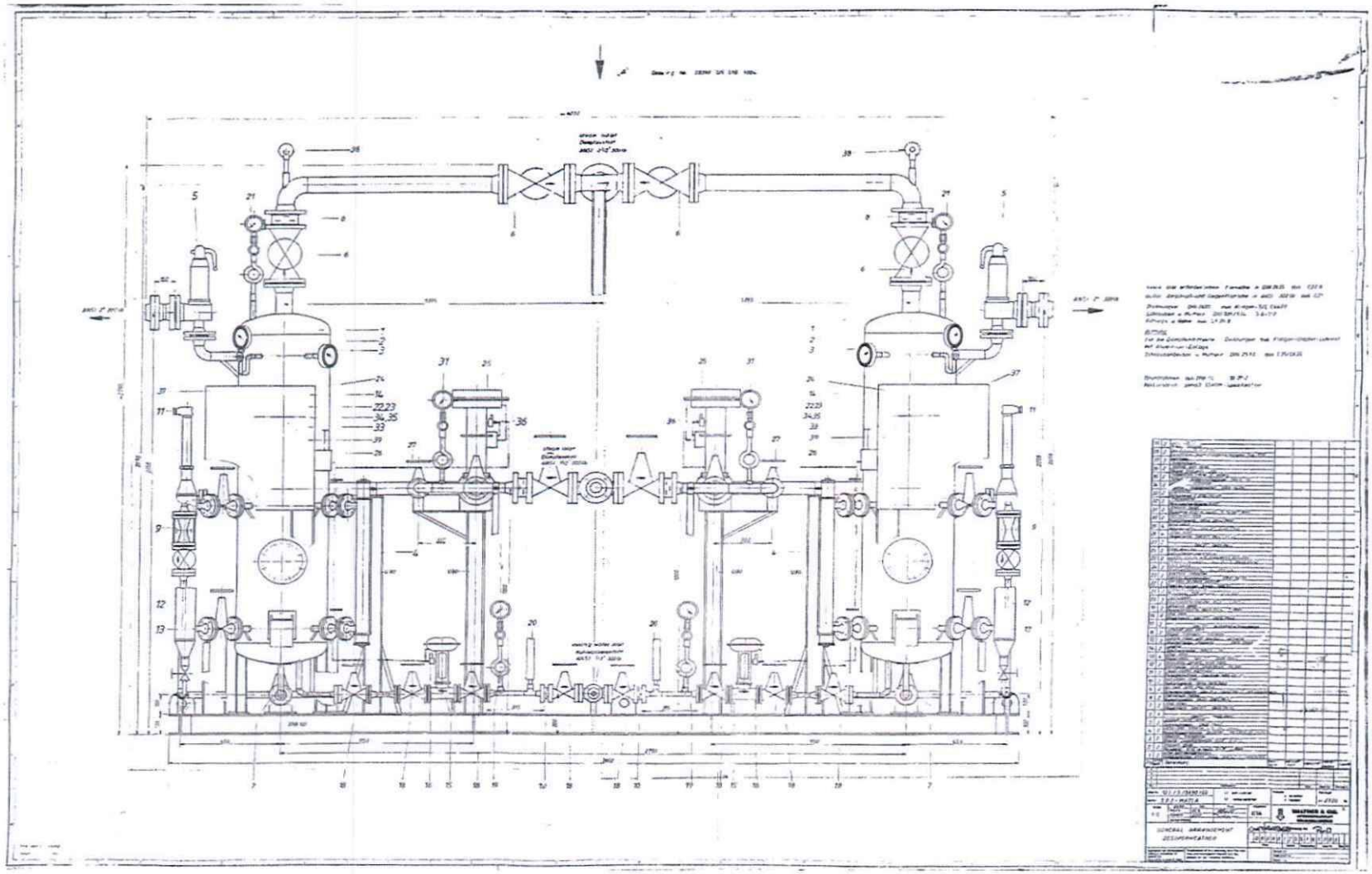
10.3 DESUPERHEATER GENERAL ASSEMBLY



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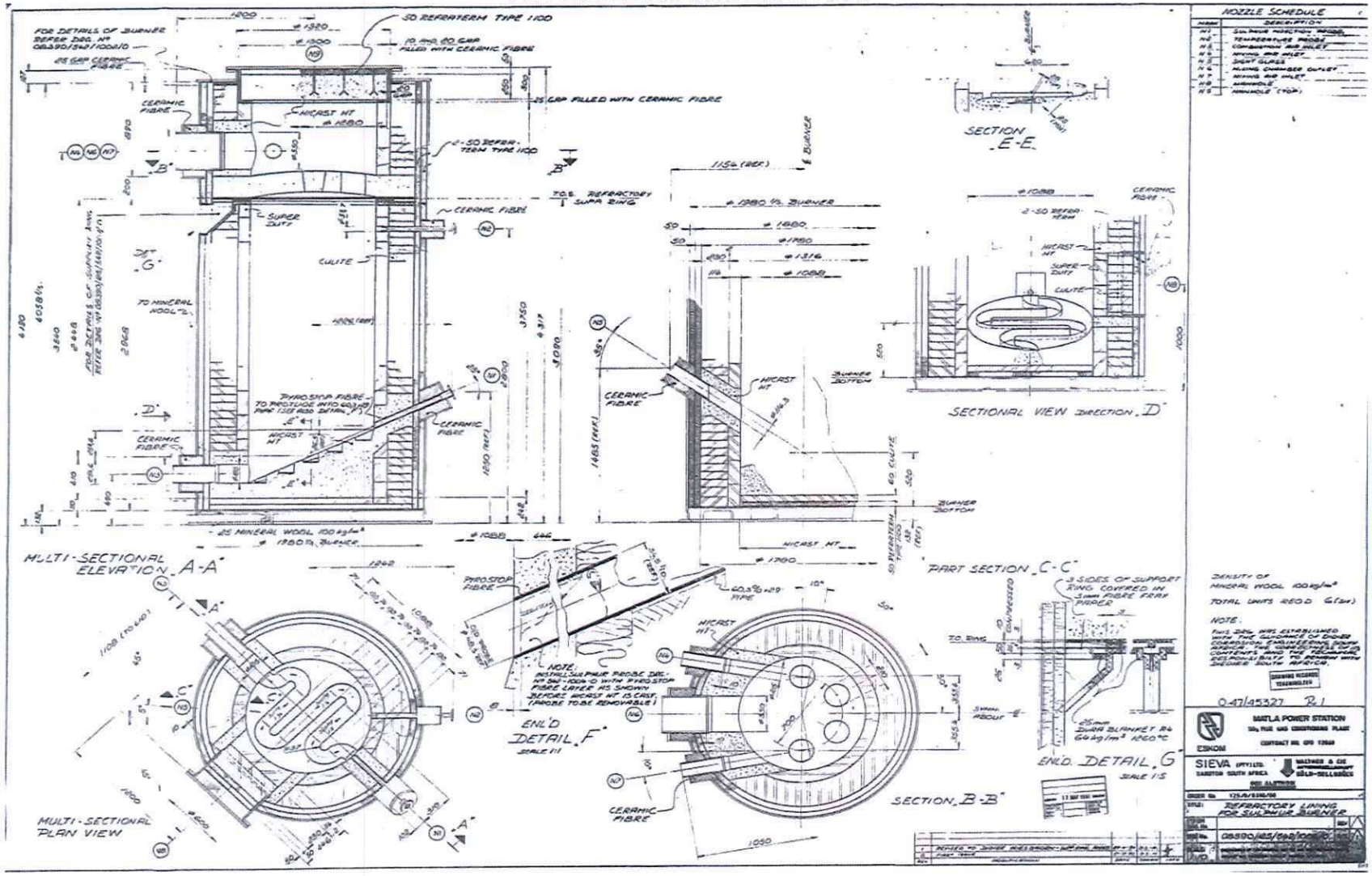
10.4 SO3 BURNER REFRACTORY



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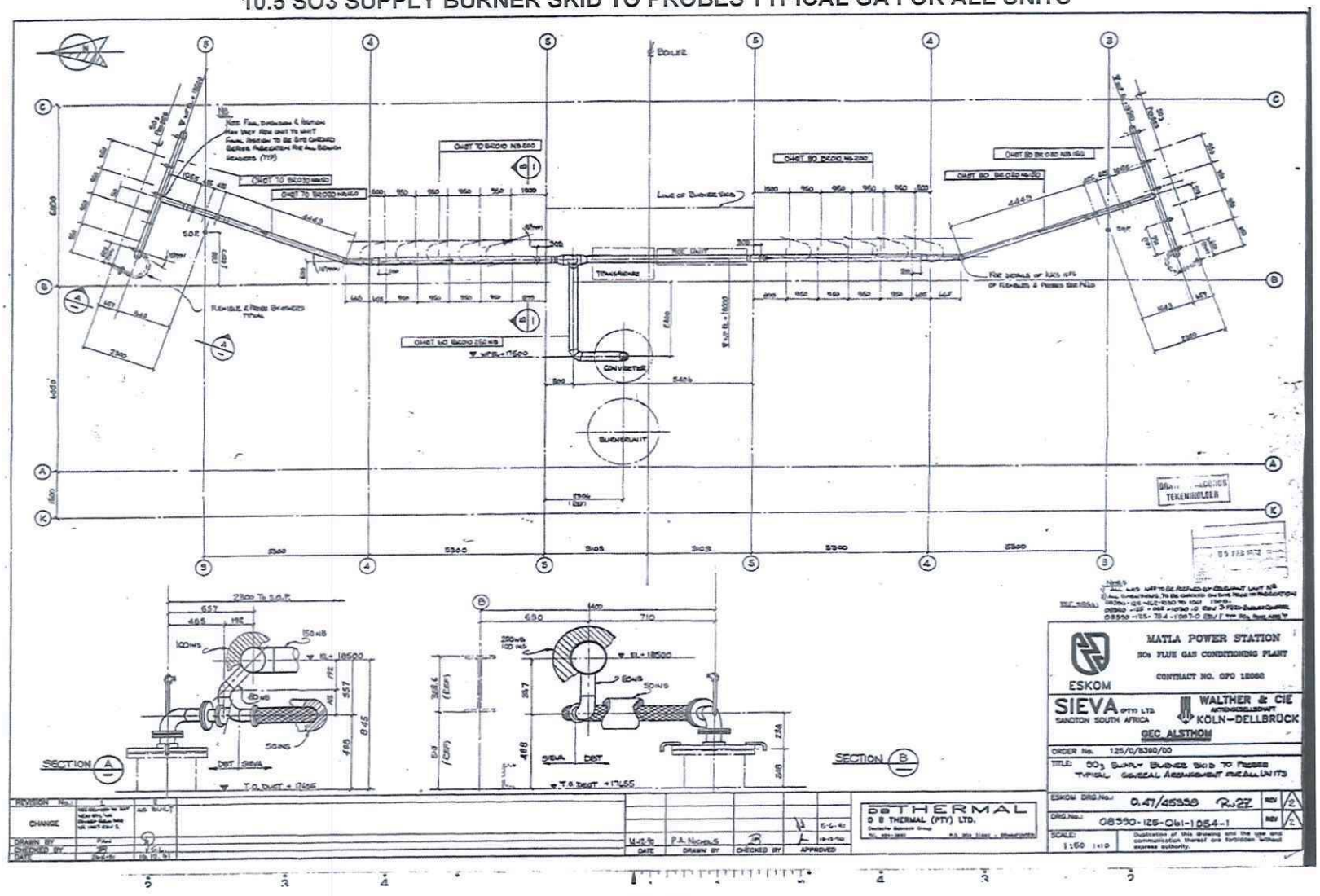
10.5 SO3 SUPPLY BURNER SKID TO PROBES TYPICAL GA FOR ALL UNITS



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