Eskom	OUTAGE SCOPE OF WORK FORM/TEMPLATE	Document Identifier	557-31416	Rev	1
		Effective Date	November 2023		
		Review Date	November 2026		

Matla Power Station
Outage Scope of Work
Condensate Polishing Plant Rubberlining

Reference No.	MEP-051327
Revision:	2
Unit No.	1,2,3 & 5
Genix ID.	N/A
Date:	2026-03-19

Outage Type:	GO	Outage Start Date:	N/A
Department:	Chemical Engineering	Plant Area:	Turbine Plant
Scope Review Date:	N/A	Discipline:	Chemical Engineering

Details	COMPILATION:	APPROVAL:	APPROVAL:	APPROVAL:	APPROVAL
	System Engineer	Line Manager	Risk Engineer	Engineering Specialist	Engineering Manager
Name & Surname	Bongiwe Radebe	Brenda Moeng	N/A	N/A	Lindokuhle Ngobese
Signature			N/A	N/A	
Date	2026/03/19	2026-03-19	N/A	N/A	2026/03/23

Details	REVIEW:	REVIEW:	REVIEW:	ACCEPTANCE:	ACCEPTANCE:
	Quality Rep.	Environmental Rep.	AIA	Outage Coordinator	Outage Manager
Name & Surname	PRUDENCE MKHWANAZI QA/QC	Bethuel Moeng	N/A		
Signature	ESKOM Matla QC/O PRU		N/A		
Date	23/03/2026	23/03/2026	N/A		

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 70 3%
- PCLF of 11 38%
- UCLF of 13 86 %
- OCLF of 4 45%

2. OJECTIVES

2.1 TECHNICAL CRITERIA

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

2.2 SCOPE VARIATIONS

- None

2.3 FINANCIAL PERFORMANCE

- None

2.4 TIME MANAGEMENT

- None

3. SUMMARY OF THE SCOPE

3.1 GO

- Complete removal of old vessels rubber lining and re-rubber lining of Unit 1,2,3 & 5 Condensate Polishing Plant vessels

4. BATTERY LIMITS

PLANT	START	END	EXCLUSIONS	INCLUSIONS	P&ID DRAWINGS
RM21G001 RM22G002 RM23G003	Condensate Polishing Plant vessels only	Condensate Polishing Plant vessels only	Piping, valves and instrumentation	Vessels full rubber lining and manholes	0 47/4150

5. GENERAL ARRANGEMENT AND LOCATION DRAWINGS

№	DRAWING NUMBER	TITLE
1	0 47/4574	(WATER TREATMENT PLANT) WTP NORTH CONDENSATE POLISHERS UNIT 4A-6A, 4B-6B, 4C-6C DETAIL
2	0 47/27030	(WATER TREATMENT PLANT) WTP (NORTH) CONDENSATE POLISHER UNIT 6A ITEM OPM-06RM-21G001 ASSEMBLY AND DETAIL
3	0 47/27033	(WATER TREATMENT PLANT) WTP (NORTH) CONDENSATE POLISHER UNIT 6B ITEM OPM-06RM-22G002 ASSEMBLY AND DETAIL
4	0 47/27036	(WATER TREATMENT PLANT) WTP (NORTH) CONDENSATE POLISHER UNIT 6C ITEM OPM-06RM-23G003 ASSEMBLY AND DETAIL
5	0 47/4150	(WATER TREATMENT PLANT) WTP NORTH (CONDENSATE POLISHING PLANT) CCP TURBO SET 6 (PIPING AND INSTRUMENTATION DIAGRAM) P AND ID FLOW DIAGRAM
6	0 47/17341	(WATER TREATMENT PLANT) WTP CONDENSATE POLISHER SIGHTGLASS (OPM-01-RM23-G003) DETAIL
7	0 47/15201	(WATER TREATMENT PLANT) WTP (CONDENSATE POLISHING PLANT) CPP BOTTOM COLLECTOR CONDENSATE POLISHER DETAILS

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

№	REFERENCE NUMBER	DOCUMENT TITLE
1	240-101712128	Standard for the Internal Corrosion Protection of Water Systems, *Chemical Tanks and Vessels and Associated Piping with Linings*
2	240-144733243	Guideline for the Maintenance of the Condensate Polishing Plant
3	GE/MAT/24/044	Matla Power Station CPP Vessels Corrosion Protection Specification, Revision 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
2		
3		
4		

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	

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	
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	

8.5 OTHER REQUIREMENTS	
ACTIVITIES	**SPECIFICATIONS**
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

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)

9.3 SURFACE PREPARATION AND SANDBALSTING SCOPE OF WORK

SCOPE:	SURFACE PREPARATION AND SANDBLASTING						
SUBSYSTEM:	9.3.1 GENERAL REQUIREMENTS						
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	RM21G001 RM22G002 RM23G003	Condensate polishing Plant vessels	Refurbish	As per section GE/MAT/24/044 (Surface preparation)	Rubber lining Contractor		H

9.4 STATUTORY INSPECTION AND TESTING SCOPE OF WORK

SCOPE:	STATUTORY INSPECTION AND TESTING						
SUBSYSTEM:	9.4.1 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. & RBI REF.	INTERVENTION POINTS (H/W/R)

9.5 FUNCTIONAL INSPECTION AND TESTING SCOPE OF WORK

SCOPE:			FUNCTIONAL INSPECTION AND TESTING				
SUBSYSTEM:			9.5.1 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)

9.6 REPLACEMENT AND REFURBISHMENT SCOPE OF WORK

SCOPE:	REPLACEMENT AND REFURBISHMENT						
SUBSYSTEM:	9.6.1 Condensate Polishing 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	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Confirm that the Permit to work has been issued	Contractor		R
2	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Disconnect the vent line at the top of each polisher connected to the manhole Blank off resin inlet valve S202 and resin outlet valve S206 on each polisher This to ensure no water enters the polishers during the execution of the activity Rubber gasket can be used as blanks	Contractor		H
3	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Open the polisher top manhole	Contractor		
4	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Remove part of the splash screen for access into the vessel	Contractor		

SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.6.1 Condensate Polishing 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)
5	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Insert ladder for access into polisher	Contractor		
6	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Remove sight glasses Clean and inspect (If damages are observed new sight glasses will be given to contractor by Eskom) **NB: Handle with care as these may need to be reused**	Contractor		as per agreed QCP
7	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Clean out all resin still left in the polishers	Contractor		
8	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Remove Stainless Steel bottom laterals	Contractor		H
9	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Inspect the floor lining for cracks and damage Floor lining may also need to be replaced or repaired using epoxy	Contractor		H

SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.6.1 Condensate Polishing 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)
10	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Inspect the threads on the nipple of T piece and laterals for damages (If damages are observed new laterals to be given to contractor by Eskom or a scope of work for repairs will be issued by Auxiliary Engineering)	Contractor		H
11	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Strip and grind off existing rubber from the Internal vessel wall using a flapper disk, or any other suitable method where necessary **Total area of one vessel = 30m^2** The Contractor will be responsible for the removal and correct disposal of the removed old rubber	Contractor		H
12	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Conduct internal visual inspection after old rubber removal and conduct steel repairs where necessary	Contractor		H
13	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Conduct surface preparation and apply corrosion protection as per Eskom specification **GE/MAT/24/044 in Appendix A**	Contractor		As per agreed QCP

SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.6.1 Condensate Polishing 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)
14	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Re-install laterals Ensure that the installed laterals are not damaged Slots spacing to be checked using a filler gauge **Eskom to supply the laterals to be installed.**	Contractor		H
15	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Re-install clean sight glasses The bolts to be cross tightened uniformly	Contractor		H
16	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Re-install splash plate using stainless steel bolts and nuts Ensure no foreign material is left inside the vessels	Contractor		W

SCOPE:	REPLACEMENT AND REFURBISHMENT
SUBSYSTEM:	9.6.1 Condensate Polishing 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)
17	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Close the polisher manhole	Contractor		W
18	RM21G001 RM22G002 RM23G003	Condensate polisher vessels	Refurbish	Connect the vent line	Contractor		W

9.7 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.

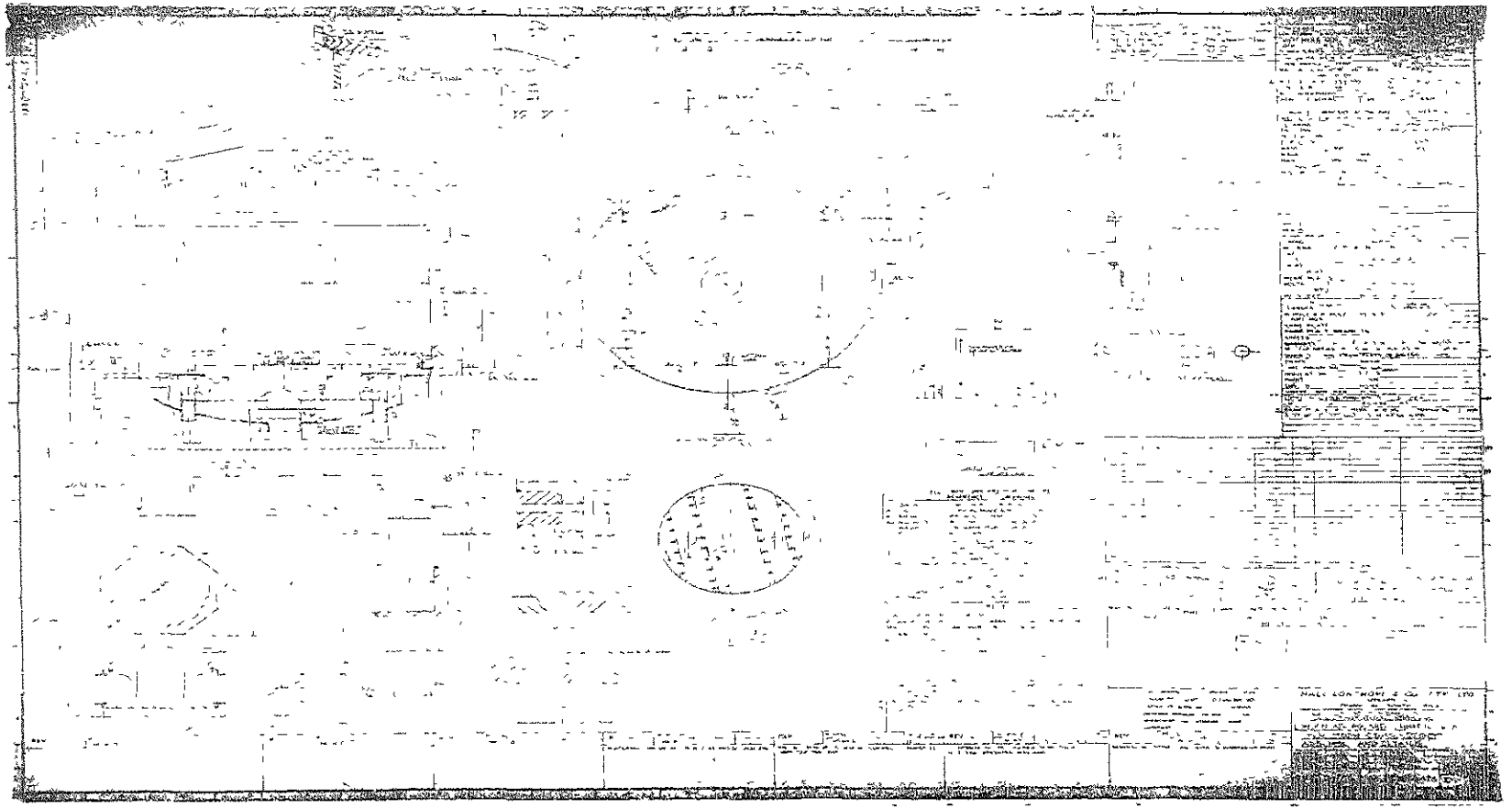
BILL OF MATERIALS							
SUBSYSTEM:			9.7.1 Condensate Polishing Plant				
№	REPLACE / REFURBISH	COMPONENT DESCRIPTION	COMPONENT MATERIAL SPECIFICATION	OPERATING PARAMETERS	PART No.	STOCK No.	DESIGN QUANTITY
1	Replace	Rubber lining system	Pre-cured Butyl Rubber Material, Grade B, 50 to 70 IRHD Rubber thickness 4 8 mm or as per **GE/MAT/24/044*: Matla Power Station CPP Vessels Corrosion Protection Specification, Revision 2" in Appendix A.***		N/A	N/A	90m²
2	Refurbish	Grit blasting	The grit to comply to Eskom specification **GE/MAT/24/044**		N/A	N/A	90m²

9.8 SAP DEFECTS

SAP DEFECT LIST										
SUBSYSTEM				9.8.1 N/A						
№	NOTIFICATION ID:	DATE:	INITIATOR:	STATUS:	FUNCTIONAL LOCATION:	DESCRIPTION:	PRIORITY:	TYPE:	MAIN WORK CENTRE:	PLANNER GROUP:

10. REFERENCE DRAWINGS

10.1 CONDENSATE POLISHING PLANT VESSELS



APPENDIX A

GE/MAT/24/044: MATLA POWER STATION CPP VESSELS CORROSION PROTECTION SPECIFICATION, REVISION 2

To be considered as Annexure D of 240-101712128: "Specification for the Internal Corrosion Protection of Water Systems, Chemical Tanks and Vessels and Associated Piping with Linings"	
Components	**Condensate Polishing Plant (CPP) Vessels including *Vessels Piping attachment and Flange Faces*** For specific details with respect to vessels sizes, quantities and manufacturing standards etc refer to the Scope of Work section of the enquiry document
Material/Substrate (Internal)	**Existing steel** • Vessels Wall – Internally rubber lined (aged rubber) • Vessels Floor – Internal corrosion protection unknown For existing steel there is a high probability of soluble salt contamination For further details/requirements refer to the relevant sections below Prior to execution of the project the vessels floors are to be inspected to identify current corrosion protection.
Internal Environment (Immersed)	• **Medium** Demineralised (Condensate) Water • **pH** 9 • **Design Temperature** Ambient to 70 °C • **Design Pressure** 2000 kPa For more specific details with respect to the water analysis refer to the Scope of Work section of the enquiry document
Surface Preparation (Internal Surface)	Abrasive blast clean to Grade **Sa 3 as per ISO 8501-1.** Suitable substrate profile as per the rubber lining material and adhesive Manufacturer's requirements
Generic System	**Pre-cured Butyl Rubber Lining (Grade B): 50 - 70 IRHD**

GE/MAT/24/044: Matla Power Station CPP Vessels Corrosion Protection Specification, Revision 2

1 1 To enable proper visual inspection, the vessels need to be emptied and all components that are removable shall be removed from the vessel These components include but are not limited to the splash screen, laterals, nozzles and distribution pipes

1.2 The Rubber Liner or Contractor shall remove most of the existing rubber lining by initial removal techniques such as cutting out, stripping and flapper disc grinding

1 3 After the old rubber lining is removed and initial surface preparation is completed, a detailed visual inspection shall be carried out by the Contractor and Eskom representative to check for defects of the substrate surface Where necessary mechanical repairs i e , welding and grinding shall be carried out before new rubber is installed The Contractor shall propose substrate repair procedures and submit these to Eskom for approval The procedure shall be agreed by both parties before commencement of work

1 4 For these mechanical repairs, it is strongly recommended that the appropriate engineering subject matter experts (welding engineers and NDT subject matter experts) are consulted The engineering experts in consultation with the Rubber Liner or Contractor and Lining Manufacturer shall compile substrate repair procedures for the works and submit to Eskom for review and approval

1 5 The depth and morphology of corrosion damage, extent of component wall thickness loss and pitting needs to be considered For steel, the following guide (obviously dependent on installed wall thickness) can be applied to all areas of extensive deep pitting

- All pits less than 2mm in depth and all edges and weld seams shall be stripe coated after application of the primer/first coat
- All pits in excess of 2mm and up to 5 mm in depth shall be filled using a compatible two component solvent free epoxy filler (rubber manufacturer to be consulted) The filler to be used shall be supplied by the same supplier as the rest of the corrosion protection system and confirmed to be compatible to the specified system in the table above
- If accessible, severely grooved/corroded weld shall be filled by welding (engineering subject matter experts to be consulted as indicated above)

1 6 Corrosion Protection shall only proceed once all mechanical or welding activities on the vessels have been completed and released in terms of the applicable mechanical repair Quality Control Plan (QCP) And under no circumstances shall this work be performed until the corrosion protection QCP and Method Statement have been accepted by the Eskom Engineer

GE/MAT/24/044: Matla Power Station CPP Vessels Corrosion Protection Specification, Revision 2

1 7 The Eskom standard 240-101712128 (Section 5 in particular), SANS 1201, SANS 1198 and BS 6374-5 shall apply for the manufacture, selection and installation of rubber lining The Rubber Liner/ Contractor to take note of the selected type of rubber required in the Table above NOTE Special Requirements as per SANS 1198, Table 4, Property Column (Special points (III), (V) and (VI)) shall apply

1 8 The type of rubber for lining shall be one of those given in SANS 1198, as specified by the Rubber Liner, to meet Eskom's requirements namely Pre-cured Butyl rubber grade B with 50-70 IRHD

1 9 The rubber lining thickness of 4 8 mm is specified on condition that this thickness is suitable for the flange arrangement and eventual fitment/re-assembly in terms of existing piping/flange length and alignment The Rubber Liner or Contractor shall confirm the specified thickness as satisfactory for the application 1 10 The rubber lining Manufacturer, adhesive Manufacturer and Rubber Liner or Contractor shall select relevant primer and or adhesive system for the type of rubber lining material, substrate and service conditions to ensure compatibility

1 11 All parts comprising systems i e , Rubber Lining System, in this specification sheet, shall be supplied by the same Manufacturer Should this not be possible the rubber lining Supplier shall confirm suitability or compatibility of the particular product with his system

1 12 Surface preparation by abrasive blasting shall be performed by means of blasting equipment capable of removing remaining/residual rubber, rust and suitably preparing the substrate to the required cleanliness of Grade Sa 3 as specified in ISO 8501-1

1 13 The requirement for surface preparation of all metallic surfaces for immersion is strictly Grade Sa 3 (ISO 8501-1), in which case the surfaces shall be blast cleaned to white metal where all traces of rust, mill scale and other foreign matter are removed

1 14 Burnishing of the surface shall not be permitted

1 15 In all cases, after wire brushing or grinding, all traces of loose material shall be removed from the surface by vacuum cleaning Cleaned surfaces shall not be contaminated with oil, grease, rust or other deposits before primer application

1 16 Prior and during rubber lining application the Contractor shall prepare the test plates/samples and submit to Eskom for verification and ensuring compliance to this specification In addition to the test plates the contractor shall submit rubber sheet samples together with manufacturer product datasheet and batch certificates The testing of the samples and requirements shall be as per document 559-381336486 – "Testing protocol for rubber lining product in Eskom" As minimum the testing will be as follows

GE/MAT/24/044: Matla Power Station CPP Vessels Corrosion Protection Specification, Revision 2

- The properties in Table 4 of SANS 1198 will be verified during the testing
- 150mm x 150 mm x (4 8 mm) rubber sheet for material identification by FTIR
- 200mm x 300mm x 3mm test plate rubber lined with 4 8 mm rubber for adhesion tests and hardness tests (The first test plate shall be prepared at Contractor's workshop where else the other test plates shall be prepared at the same time and under the same conditions as the vessels
- 5 off dumbbells (2 mm) for tensile and elongation baseline testing
- 5 off dumbbells (2 mm) for tensile and elongation testing after immersion in 10% sulphuric acid for aging
- 5 off dumbbells (2 mm) for tensile and elongation testing after immersion in 10% sodium hydroxide for aging
- 5 off dumbbells (4 8 mm) for tensile and elongation baseline testing
- 5 off dumbbells (4 8 mm) for tensile and elongation testing after immersion in 10% sulphuric acid for aging
- 5 off dumbbells (4 8 mm) for tensile and elongation testing after immersion in 10% sodium hydroxide for aging
- The dumbbells/specimen shall be prepared as per SANS 10037 "Type 1 Dumb-bell"

2 General Requirements

2 1 The Contractor shall be wholly responsible for the surface preparation and lining/coating application

2 2 Sharp edges shall be dressed to a radius of not less than 3 mm All burrs and weld spatter shall be removed Welds shall be free from imperfections (e g , asperities, undercutting, blowholes, craters, and spatter)

2 3 Weld beads with a surface irregularity exceeding 3 mm or with sharp crests having a radius less than 3 mm shall be ground

2 4 All welds shall be free of slag, inclusions and pinholes Adjacent areas shall be free of weld spatter, which shall be removed by grinding or scraping

GE/MAT/24/044: Matla Power Station CPP Vessels Corrosion Protection Specification, Revision 2

2 5 All surfaces shall be completely dry and free from contaminants such as traces of oil, grease, etc , before surface preparation is carried out

2 6 After initial blasting of representative patches soluble salt testing shall be performed by the Bresle soluble salt test method If not within acceptable limits (as per the Manufacturer requirement but not exceeding 100 mg/m2), the surfaces shall then be washed/decontaminated by High Pressure (HP) water washing using fresh/clean water (with a conductivity reading of maximum 100 µS/cm) at a minimum pressure of 300 bar A salt decontamination chemical additive with demonstrated capability of removing salts may be used in conjunction with HP cleaning.

2 7 Soluble salt testing shall be repeated on representative test patches and if acceptable then proceed with blasting and application steps – if not then repeat HP washing until the salt contamination has been removed to within acceptable limits

2 8 Prior to any surface preparation all surfaces that are or are likely to be contaminated with oil or grease shall be solvent cleaned with a suitable water-soluble biodegradable alkaline cleaner/detergent or with appropriate organic solvents

2 9 Cleaning may be performed by using rags for small areas, or a spray gun for large areas The detergent/solvent-cleaned surfaces shall then be thoroughly washed down with fresh/clean water ensuring that the oil-water emulsion formed is completely removed from the metal Special attention shall be paid to drillings, bolt holes, etc

2 10 Degreased and water washed surfaces shall be checked for residual oil and grease using the atomized water spray test as per ASTM F21 and further degreasing shall be carried out if residual oil or grease is found to be present In instances where there is no or poor natural lighting then the interpretation of the ASTMF21 shall be assessed by means of ultraviolet light i e , back light

2 11 A black light test shall be used to check for oil contamination Zero oil and grease contamination are the acceptable limit Washing with fresh/clean water containing a suitable degreasing agent of partially painted components shall take place between coats, if surfaces are found to be contaminated

2 12 During the corrosion protection process on site care shall be taken to ensure adequate protection of the surrounding areas and any parts of the ancillary equipment i e , pumps, filters, valves seats, drains, inlet and outlet piping from abrasive blasting and spent grit particles

2 13 No abrasive blasting or lining applications shall take place when conditions are likely to affect these operations Clauses 4 1 1 2 to 4 1 1 5 of BS 6374-5 shall apply

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2 14 Different grades and types of blasting media exist It is important that the correct abrasive be used in combination with a specific corrosion protection system to achieve the specified surface profile The required blast profile height should be carefully considered The Contractor shall select an appropriate abrasive type and mesh size to attain the specified surface profile

2 15 Only inert mineral grit or steel grit abrasives shall be used Sand or silica-based abrasives shall not be used Abrasive material for blast cleaning shall be used in line with local environmental regulations

2 16 The abrasive shall be used in accordance with the Manufacturer's specifications and shall be clean, sound, hard particles free from foreign substances such as dirt, oil, grease, toxic substances, organic matter and water-soluble salts It is important that good quality abrasives are used in order to minimize the amount of waste grit and dust generated and contamination of the surfaces

2 17 The use of re-cycled blasting media for the final blast is strictly prohibited

2 18 All abrasive media shall be stored in an area that is completely dry, covered and protected from weather

2 19 All compressed air for blasting and lining activities shall be free from entrained moisture and oil All traps shall be in a functional condition The compressed air shall be tested at regular intervals using clean white clothes to assess cleanliness and dryness This requirement shall be included in the QCP

2 20 On completion of grit blasting the surface shall be thoroughly vacuumed until no loose dust is evident The process shall be repeated until the required level of dust and debris removal is achieved

2 21 The level of cleanliness required shall be less than "dust quality rating" 1 when tested in accordance with ISO 8502-3 It is imperative that all surface dirt and contaminants are completely removed before lining or the adhesion of the lining shall be impaired

2 22 Cleaned surfaces shall not be contaminated with oil, grease, rust or other deposits before coating application Unnecessary traffic prior to painting/lining shall be avoided

2 23 The Contractor shall ensure that during surface preparation and corrosion protection activities the relative humidity (RH) in open, undercover shop environments is less than 80 % RH and for the vessel internal space is less than 60% RH. Ambient temperatures shall be between 5 °C and 30 °C or as per the Manufacturer recommendations, whichever is the more stringent

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2 24 The maximum/minimum substrate temperature at the time of corrosion protection application shall be strictly in accordance with the product data sheet During stable weather conditions environmental parameters shall be measured and recorded at least 4 times per shift

2 25 During periods of inclement or cold weather conditions the environmental parameters shall be measured and recorded hourly In the event that the latest two readings of any of the parameters indicate a deteriorating trend which would likely exceed parameter/s limit then no final surface preparation or spray application shall be permitted All measurements shall be recorded at the steel surface Dew point requirements shall be as per the Product Datasheet or Eskom standards 240-101712128

2 26 In order to avoid recontamination and flash rusting of the surfaces, the primer shall be applied within 4 hours after final surface preparation of the steel surfaces

2 27 Individual rubber sheets shall be tailored to fit the surface to be lined The lining shall be bonded to the manhole flange faces The mating surface of the flange face to gasket shall be suitably dressed such that the face is acceptably flat to ensure sealing between the liner and the gasket The application and flange arrangement shall be as per SANS 1201 Figure 7 a) or c) and the Eskom Engineer requirements

2 28 All joints of lined rubber shall be strapped as per BS 6374-5

2 29 All surfaces shall be pinhole tested (only after completion of all handling, moving and equipment and scaffolding removal) to ensure the lining is pinhole free and if required additional repairs shall be performed and once cured then the repair areas shall be retested. The process to be repeated until a pinhole free lining is achieved

2 30 The rubber lining Manufacturer and Rubber Liner or Contractor shall specify the test voltage and the length of spark (no less than 2 kilovolts per mm) If the rubber Manufacturer cannot comply then a detailed motivation describing the reasons why this requirement can't be met shall be submitted for review, acceptance or rejection

2 31 The installed lining shall present a smooth appearance and be free of voids, blisters, pinholes, cracks, open seams, entrapped air or any other defects which will impair its use Defective areas shall be cause for rejection of the lining

2 32 For all inspections of all surface preparation and coating/lining activities the surfaces shall be clean allowing unhindered visual access to the surface The Contractor shall provide sufficient and adequate lighting (Cool White) to enable inspections Cell phone lighting is not acceptable

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2 33 Prior to commencement of rubber lining the Applicator shall submit detailed repair procedures in accordance with BS 6374-5 Any defects such as mechanical damage, cuts, blisters, lack of adhesion and poor joints shall be marked up and repaired according to BS 6374-5 Clause 5 2 4

2 34 The supply and cost of all testing, inspection and specialized testing equipment shall be the Contractor's responsibility QC shall be performed by the Applicator and the Quality Assurance inspection shall be conducted by Eskom A series of witness and hold points shall be agreed such that Eskom may witness any of the above tests Eskom may elect to carry out its own tests at these times

3 Recommended Tender Technical Returnables

Note:

- **The finalisation of the tender technical returnables and evaluation criteria for this project shall be the team effort (i.e., Technical Evaluation Team - TET) as per Eskom Procedure 240-168966153.**
- **The final returnables as agreed by the TET shall be returned as part of the Contractor's Tender document/submission.**

3.1 Mandatory Tender Returnables

3 1 1 At the time of tender verifiable evidence shall be submitted that the Rubber Liner has experience in the application of corrosion protection systems in comparable environments i e , tanks/confined spaces In this regard the experience shall, as a minimum, be equal to the surface area (m2) as defined in enquiry and Scope of Work (SOW) documents

This verifiable evidence shall be for projects where vessels have been successfully lined by the Contractor, within the last five years The verifiable evidence shall include formal signed off QCP's or release certificates and contact details for at least 3 similar projects

3.2 Tender Returnables for Evaluation

3 2 1 The System Supplier or Rubber Liner or Contractor shall supply individual product datasheets and material safety datasheets (MSDS) for all products comprising the system i e., rubber lining, adhesives, tack coats and solvents As a minimum the following shall be submitted

- A description of the generic type of rubber lining
- Rubber lining physical and chemical properties (for rubber lining Table 4 of SANS 1198 shall apply)

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- Recommended and non-recommended uses
- Service temperatures and chemical resistance limits For the chemical resistance, special property (I), (III), (V) and (VI) as per SANS 1198 Clauses 4 2 2 (d), 4 2 3 (b) in conjunction with the environment and operating conditions in the table above in this specification sheet shall apply Confirmation that the lining shall not contaminate the system/process fluid to be handled Special property (V & VI) as per 240-101712128 and SANS 1198 The approved test results or certificates from the independent laboratory shall be written in English
- Maximum recommended service temperature which shall be a minimum of 30 % greater than the maximum temperatures as is indicated in the table at the top of this specification sheet
- Surface preparation requirements

3 2 2 A detailed procedures/method statements shall be submitted to Eskom at the time of tender detailing all steps, procedures and activities of the corrosion protection application process The steps to be considered includes

- The methods, steps, sequence and equipment required for ventilation and dust mitigation
- Grease decontamination and washing
- Soluble salt decontamination
- Methods for dust and debris removal, maintaining and ensuring cleanliness between adhesives and lining shall be described
- The Method Statement shall detail the precise sequence and breakdown of work areas/activities in order to apply the system with due consideration of dust contamination
- The Method Statement shall also consider the most efficient methods and sequencing to avoid unnecessary delays that may have an impact i e , time required for removal of spent abrasive grit and dust/debris
- All inspection interventions during and after completion of corrosion protection installation shall be considered and included

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- The Method Statement shall describe all measures and details for establishing and maintaining
  - The environmental conditions as required by this specification
  - The required ventilation for the prevention and/or management of fumes and dust build-up The number of extraction fans, mounting diameters, sizes and mounting methods of fans to manholes, power rating of fans, positioning of fans and direction of intended air flow shall be described and detailed

3 2 3 A detailed Quality Control Plan (QCP) shall be submitted at the tender stage and shall detail all inspections and tests with acceptance criteria during lining application Inspections during lining application shall at least cover compressed air blotter test for blasting and spray applications, surface preparation, environmental parameters, rubber thickness, hardness, adhesion, continuity and visual tests Tests for continuity shall be carried out using the high frequency spark test method

3 2 4 List of deviations or exclusions from this specification If there are none then there shall be a definitive written statement to such effect This mentioned list of deviations or definitive written statement shall be used as part of the contract In addition to this statement the Contractor, Rubber Liner or Manufacturer shall also provide a definitive statement of the submission of samples as prescribed above

4 Safety Requirements and Considerations

4 1 During the application of all lining systems, care shall be taken to ensure adequate ventilation and lighting, to avoid/minimise health and safety risks

4 2 Special care needs to be taken when working with all organic coatings/linings Prior to the use of any coating material, the Material Safety Data Sheets shall be obtained from the relevant Coating Manufacturer

4 3 A confined spaces (CSs) may be defined as an enclosed, restricted, or limited space in which, because of its construction, location or contents, or any work activity carried on therein, a hazardous substance may accumulate and/or an oxygen-deficient atmosphere may occur, and/or in which a dangerous liquid or dangerous concentration of gas, vapour, dust or fumes may be present It includes any chamber, tunnel, pipe, pit, sewer, container, valve, pump, sump, chute, bunker, silo, gearbox, tank, receiver, drum or any similar construction, equipment, machinery or object

4 4 Flammable Atmospheres Gases, vapours and dusts can become trapped in CSs and create flammable or explosive atmospheres, and include combustibles e g , Hydrogen, Acetylene, Rubber and thinning/cleaning solvents, etc

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4 5 The Contractor shall be familiar with the contents of the safety data sheets and ensure that the necessary safety precautions are taken in order to comply with local and national safety and health requirements such as the OHS Act

4 6 Any solid waste materials or liquids stripped or generated during the corrosion application shall be discarded in accordance with the requirements of the appropriate national and/or local authorities or the requirements of Eskom

4 7 The Contractor shall ensure compliance with all statutory regulations, municipal by-laws, etc concerning pollution and the health and safety of personnel and/or members of the public who may be affected by the work The Contractor shall provide the personnel with the appropriate required PPE

4 8 The Contractor shall advise Eskom of all hazardous materials to be brought on site

4 9 The Contractor's Safety File shall address all the hazardous activities of abrasive blast cleaning and spray painting The Contractor shall verify that the personnel carrying out these activities are suitably qualified

4 10 The Contractor shall ensure that the abrasive materials used conform to all National Health and Safety Standards

4 11 All materials shall be stored in designated areas in storage facilities that meet the storage requirements of the rubber Manufacturer The Contractor shall be responsible for the provision of appropriate storage/shipping containers as required These containers shall include the appropriate refrigeration/conditioning systems for temperature control This requirement shall be dependent on where the container will be located (indoors/outdoors), typical ambient temperature for the particular season of the year and the maximum storage temperature limits as per the Manufacturer's recommendations

4 12 The Contractor shall provide for all necessary safety precautions and risk assessments

5 Reference Documents

The latest revision of the referenced standards shall apply Where conflict exists between any of these documents the more stringent requirement shall apply

5 1 240-101712128 Standard for the internal corrosion protection of water systems, Chemical Tanks and Vessels and Associated Piping with Coatings

5 2 240-168966153 Generation Tender Technical Evaluation Procedure

5 3 559-381336486 Testing protocol for rubber lining in Eskom

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5 4 ASTM D4414 Standard practice for measurement of wet film DFT by notch gauges

5 5 ASTM D4541 Standard Method for Pull-off Strength of Coatings using Portable Adhesion Testers

5 6 ASTM D5162 Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates 5 7 ASTM E376 Measuring coating DFT by magnetic field or eddy current electro-magnetic test Methods

5 8 ASTM F21 Standard Test Method for Hydrophobic Surface Films by the Atomizer Test

5.9 BS 6374-5 Lining of equipment with polymeric materials for the process industries

5 10 ISO 4624 Paints and varnishes – Pull-off test for adhesion

5 11 ISO 4628 – 1 Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 1 General introduction and designation system

5 12 ISO 4628 – 3 Paints and varnishes – Evaluation of degradation of coatings – Designation of quantity and size of defects, and of intensity of uniform changes in appearance – Part 3 Assessment of degree of rusting

5 13 ISO 8501-1 Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Part 1 Rust grades and *preparation grades of uncoated steel substrates and of steel substrates after overall* removal of previous coatings

5 14 ISO 8502-3 Preparation of steel substrates before application of paint and related products – Test for the assessment of surface cleanliness – Part 3 Assessment of dust on steel surfaces prepared for painting (pressure sensitive tape method)

5 15 ISO 8502-6 Preparation of steel substrates before application of paint and related products – Test for the assessment of surface cleanliness – Part 6 Extraction of soluble contaminants for analysis – The Bresle method

5 16 ISO 8503-4 Preparation of steel substrates before application of paint and related products – Surface roughness characteristics of blast-cleaned steel substrates - Part 4 Method for the calibration of ISO surface profile comparators and for the determination of surface profile – Stylus instrument procedure (May be used as an alternative to SANS 5772)

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5.17 ISO 9001 Quality Management Systems - "is defined as the international standard that specifies requirements for a quality management system (QMS) Organizations use the standard to demonstrate the ability to consistently provide products and services that meet customer and regulatory requirements "

5 18 ISO 9223 Corrosion of metal and alloys – Corrosivity of atmospheres – Classification

5 19 ISO 12944-3 Paint and varnishes – Corrosion protection of steel structures by protective paint systems Part 3 Design considerations

5 20 SANS 1198 The manufacture of rubber sheeting for rubber lining

5 21 SANS 1201: The application of rubber linings to pipes, pipe fittings and vessels
SANS / ISO 2808 Paints and Varnishes· Determination of film DFTs (Can be used as alternative to ASTM E376)

5.23 SANS 5770 Preparation of steel substrates before the application of paints and related products – Test for the assessment of cleanliness of blast-cleaned steel surface – Freedom from certain soluble salts

5 25 SANS 10037 Rubber, vulcanized or thermoplastic - Determination of tensile stress-strain properties

Submitted by:	**Accepted by:**
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