PLANT AREA: MATLA POWER STATION

TITLE: Water Treatment Plant Civil Refurbishment SOW

REF: MEA-05705	Reference Rev No: 1	MULTIDISCIPLINARY: No	Plant Level. 1

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REVIEWED	*Name: Johan Lourens* *Quality Department*	Signature	Date: 2023/01/25
REVIEWED	*Name:* *Environmental Department*	Signature	Date: 24/01/2023
ACCEPTED	*Name:* *Manager Projects*	Signature.	Date.

NB: Do not tamper with the template.

GENERAL

- Data books, reviews, reports and diagrams/drawings shall be submitted to Engineering after the completion of the work Engineering to forward the data books to Quality Department (Document Control)
- All QCP's to be submitted to Engineering and Quality for approval prior to outage/project or maintenance work commencement

	SCOPE OF WORK DESCRIPTION / ACTIVITY	PROCEDURE, SPECIFICATION, ENG. REQUIREMENTS / DOCUMENTATION	HOLD POINTS, WITNESS, REPORTS	RESPONSIBLE PARTY
1 1	Safety	• 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 • Permit to work must be in place before any work commences • Worker's register must be completed and daily risk assessment conducted before any work commences	Eskom to witness	Contractor
1 2	Environmental Management.	• All activities listed in the National Environmental Act 107 of 1998, EIA Regulation 982,983,984 & 985(2014), must have **AUTHORISATION** before commencement of work • The contractor shall comply with all applicable legal and other requirements • The polluter pays principle will be applied • The contractor manager shall ensure compliance with Eskom Matla Environmental procedures to ensure the prevention of pollution (refer OMOP 4090 and 4402)	Eskom to witness	Contractor

		• The last payment will be processed based on the status of the last housekeeping check sheet (Annexure C OMOP 4402) of designated area • EMS file based on ISO14001 will be required		
1 3	*Quality Management*	• *The contractor/executioner of work will be responsible for drawing up all QCP* documentation and this must be approved by engineering and authorised by the Quality Department before commencing with the work • Contractors/executioner to adhere to QM 58 and OMOP4497 requirements • Number of NCR 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 by quality • All outage scopes creep and scopes addition should be approved by quality • No contractor should be in the possession of scopes for execution without the scopes approved by quality • The contractor is subjected to quality auditing at any point in time during execution of scope	*Hold point*	*Contractor*
1 4	Inputs from other departments			
1 5	*Commissioning reference*			

DETAILED SCOPE

2	SCOPE OF WORK DESCRIPTION / ACTIVITY	PROCEDURE, SPECIFICATION, ENG. REQUIREMENTS / DOCUMENTATION	HOLD POINTS, WITNESS, REPORTS	RESPONSIBLE PARTY
This Scope of Work (SOW) is compromised of the Mechanical and Civil work which needs to be performed in order to refurbish the Sludge Sump. The first section of the scope is for the connecting of the effluent discharge line with the sludge discharge line and the cleaning of the sump to get rid of all the debris sludge and sediments so the sump can be refurbished and returned to its design capacity The second part of the scope gives the requirements and specifications for the repair works to be conducted at the Water Treatment Plant Sludge Sump wall repair, casting of concrete for the trench covers, replacement of damaged gratings, tap welding on the angle iron to the existing rebar, coating of the steel, installation of trenches and trench linings, installation of acid resistant tiles and replacement of acid tank drain line				
	Mechanical SOW **Sludge Sump**			
2.1	The sludge sump is filled with silt/Sludge and debris, all these foreign material needs to be removed from the sump so it can be inspected/refurbished and returned to its design capacity. For the duration of the sludge sump cleaning, the effluent discharge line will be re-routed into the sludge discharge line via an HDPE pipeline installed in order to by-pass the sludge sump Angle bars are to be installed in order to isolate the sump, see figure 1 and slide gates that goes through the angle bars cannot be located.			Contractor

	Supply, Manufacture and install • 4 x 4mm Rubber lined Slide gates with rubber lining for both west and east sludge discharge lines see figure 1 Two slide gates should be installed on each launder as a safety precaution in case water manages to go past the first isolation slide gate and this slide gates should about 2 meters apart • 2 x Submersible pumps which will be installed inside the East and West launders which usually transport sludge and effluent to the sludge sump under normal operations The size of these pumps will be limited by the Launder dimensions as the space might be too small for the required pump specification. The contractor may explore various available pumps in the market which might still meet the combined required pump specification such as making use of more pumps instead of just two but the Flow requirements including head should still be met • The two sludge pumps should be able to pump out sludge from either of the two launders so that both pumps may be used to pump out sludge from the same launder in case one	Specifications Height 3.5m, width 60mm, WT 8mm Minimum Pumping Capacity of each pump is to be 250 m^3/h and head of 100 m		

	pump is not copying alone due to increased sludge water composition in the launders. • The sludge in the launders should be agitated in order to avoid it from settling/solidifying which might result in the pump being unable to pump out the sludge This may be done by tapping off air from the air supply line which supplies agitation air to the sludge sump or an alternative efficient way may be used • Contractor to verify launder dimensions before getting the submersible pump in order to ensure that the pump will be able to fit inside the launder • The submersible pump discharge lines should be supported sufficiently in order to reduce the risk of pipe failure due to vibrations which might be due to the flow and pump movement The pump should also be secured • The contractor is to monitor the launder sludge *levels and develop an effective pumping* procedure which will be able to maintain the water in the launder to acceptable levels in order to eliminate the risk of damaging the pump, due to pumping against an empty/low level launder The pumping procedure should also be maintained in order to eliminate the risk			

	of having full launders which might overflow into the isolated sludge sump • Saunders type valves (100NB) • 1 Stainless steel NRV (100NB) • All necessary HDPE piping and fittings to join the effluent line (110mm HDPE) to the sludge line (225mm HDPE) • Supply pipeline of approximately 30m to the sludge line that drains to the slurry line. • +- 110mm HDPE pipe will be needed • Bolts and nuts to be supplied for the slide gate and all necessary measurements to be done including for the slide gate by the contractor (Approximately 26 nuts and bolts – (12mm – 20mm size)) • Bolts and nuts to be supplied • Contractor to have a provision for an additional HDPE pipe and fittings which might be required to divert any other additional sludge sump water sources which might have been missed due to unforeseen reasons.			

2.2	**Sump Cleaning/Sludge Removal** Cleaning the existing concrete by means of grit blasting or a high pressure water spray Remove the sludge in the sump of about 100m² by means of a vacuum truck and dispose by the Eskom licenced dumping site (Ash Dam) Sludge sump cleaning It is recommended that sludge in the launders be agitated and loosened prior to pumping it in order to preserve the pump and also to avoid any blockages due to the sludge The contractor is to recommend the method that will be used to agitate the sludge If additional water is required to pump the sludge out of the launders at any given time, then this may be done manually or by making use of a vacuum truck. The vacuum truck is to deposit the sludge at the ash dams when full			Contractor
2 3	**Clarifier Blowdown** Four additional HDPE pipes are to be connected to the four Portable Clarifier blowdown lines which discharge into the sludge sump under normal operations in order to divert these lines from discharging into the sludge sump and the fittings for these pipes should be free of any leakages			Contractor

	These lines are of about 200NB size and contractor is to confirm the measurements before manufacturing the required 4 HDPE lines. These four lines should discharge *into the nearest launder The contractor can perform work* between the times 07 00 to 16 15 Blow downs of the clarifier will take place between 16 20 and 07 00 and no work should take place during clarifier blow downs and in addition these times should be confirmed with the Water Treatment Plant/Operating Department and should be monitored on a daily basis for the safety of the personal Contractor to submit method statement with the reply to the RFQ describing how the work will take place *If the above 2 items are not supplied with the RFQ the RFQ* will not be considered			
2.4	**Sump Agitation Air Supply Line** The Sump Agitation air supply line which supplies air into the sump should be replaced with a suitable line that will be able to withstand the Demin water effluent and sludge under normal operating conditions Contractor to verify the pipeline dimensions prior to replacing the current line			Contractor

2 5	**Blow Down Pits drainage Pump** 2 x submersible pumps should be provided which will be used to drain any water that may have accumulated inside the clarifier pits which house the clarifier blow down pipework and the Lime dosing lines into the clarifier These submersible pumps should have a minimum performance of 30 L/s and a minimum head of 100 m. These pumps will remain the property of Eskom upon the completion of the Sludge Sump Refurbishment	Pump Specifications 2 x Submersible pumps of minimum flow rate of 30 L/s and a minimum head of 90 m		Contractor
2 6	**Safety Operation Precaution** No work is to take place inside the sludge sump if the sump is not completely isolated and the contractor is to verify that all Sludge sump water sources have been diverted or isolated. All work should be stopped if there is any chance of water overflowing from the launders into the sludge sump due to full launders.			Contractor
2 7	As per OHSAct requirements, the pump must be supplied with the necessary control panels and isolators which are			Contractor

	tested and verified for use. Authorized pump operator must be available for the duration of the outage to operate the pump Correct lifting slings must be used by the authorised crane operator during the pump fitting Refer to the OHSAct for further safety requirement for the pump connection			
2 8	*General* Contractor to confirm all site measurements and technical data before any work could commence			Contractor
3.1	**Civil Refurbishment SOW** *Supply all material and conduct concrete repairs as per Eskom standard.*	All concrete works shall be conducted in accordance with Eskom Standard **240-144332407: Standard for Eskom Power Stations Concrete Remedial Work**	Hold/Witness	Contractor
3 2	**Repairs should follow Standard for Eskom Power Stations Remedial work (240 -144332407) Civil Concrete Remedial.** **It is expected from the contractor to submit their method statement in executing this works and it should be**	**Surface preparation** Prior to applying spray concrete, all deteriorated or defective concrete shall be removed and substrate prepared as follows	Hold/Witness	Contractor

	reviewed and sign off by their Prof Civil Engineer ECSA registered.	☐ Carbonated concrete shall be removed to a depth of at least 20mm behind rebar and 50mm into non-carbonated concrete ☐ Where concrete deteriorated due to chloride attack, concrete shall be removed to a depth of at least 30mm behind rebar and 100mm into sound concrete. ☐ Area to be repaired shall be marked clearly. ☐ Sprayed concrete shall not be used in temperatures below 2°C or on substrates exposed to windy conditions or rainfall. ☐ Substrate must be damp but without free water prior to application of sprayed concrete		

3 3	**Sludge removal** Launders • Clean sludge in the launder channels (V= 0 1m depth x 0.6 m wide x 83m length) • Total estimated sludge to be removed is 5m3 Sludge Sump • Remove sludge in the sump (V= 0 5m *5m* 10) • Total estimated sludge to be removed is 25m3 In total the sludge to be removed is approximately 30m3. This can be done through a vacuum truck.		Witness	Contractor
3 4	Sludge Sumps and Launder drain channel • Supply material and install acid resistant tiling over the first 2m from the ground of the channel. The drain channel for the installation of the tiles is **(Area = 83m x (2m +1m) = 249m2)** • Repair the concrete sump as per the concrete repair specification (V of the sump= 30m x 5m x 10m= 1500m3) and Install acid resistant tiles from the base of the sludge sump to 5m • **Concrete repair volume for the sump 5m from *the bottom of the sump is 35m3 – the preferred* method is concrete gunite machine however**	• Repair concrete at the sludge sump and trench leading to the sump as per the concrete repair standard	Witness	Contractor

the contractor can still propose their preferred method of repairs and submit for acceptance.

- **Re-instate the rebar by splicing and treat all the corroded rebar's prior placing the concrete.**
- **Install the wall tiling on the sump on the first 3 m from the ground**and the floor (Acid resistance)
- Supply and install steel angle irons above the sump and steel I beams as per the table below Supply

Member	Dimension	Length	Quantity
Angle Iron	50mmx50mmx8mm	9m	2
Angle Iron	50mmx50mmx8mm	5m	2
Angle Iron	50mmx50mmx8mm	10m	2
Angle Iron	50mmx50mmx8mm	6m	2
I beams	250mmx125mmx6mm	5 -6m	5

- Remove and Reinstate the joint sealant Size of the repair (6m long x 30mm)

	Important notes: • *Suppliers specifications on all products must be strictly adhered to* • Data sheets and product MSDS should be supplied by the contractor prior to commencement of works • Prior to application of any repair mortar, Concrete, Tiles or bricks, the application method must be strictly adhered to • A ten year guarantee of all products must be supplied upon completion of works. • Quantities are merely a guide and it is the contractor's responsibility to confirm all exact measurements and quantities before commencement of works If there are any changes, the contractor shall notify Matla Power station Civil Engineer or the Project Manager • Concrete repair areas will be identified marked out by the Civil Engineer for the contractor • It is the contractors Responsibility to ensure that waste removal is Included on the budget Quote • Contractor must elaborate on how they going to do their chemical handling during the construction		HOLD/Witness	Contractor

	House Keeping • All materials removed from site and regarded as waste shall be transported and disposed of at a licenced dumping site as per their categories or classification.		Witness	Contractor

BILL OF QUANTITIES

Iterm	Description	Rate	Unit	Qty
1	Preliminary and General		Sum	1
2	Site Clearance and substrate preparation		Sum	1
3	Pit Drainage Pump	2 x Surbmisible pumps of minimum flow rate of 30 L/s and a minimum head of 90	l/s	2
4	**Sludge Sumps and Drain channel**			
4.1	Sludge removal			
4.2	Supply material and install acid resistant tiles	649	m2	
4.3	Repair the concrete on the sump sump	35	m3	
4.4	Angle Iron (9m long)	50mmx50mmx8mm	kg	2
4.5	Angle Iron 5m	50mmx50mmx8mm	kg	2
4.6	Angle Iron 10m	50mmx50mmx8mm	kg	2
4.7	Angle Iron 6m	50mmx50mmx8mm	kg	2
4.8	I beams 5m	250mmx125mmx6mm	kg	5
4 9	Joint Sealer	20	l	2
5	**Sludge Pump**	Minimum Pumping Capacity of each pump is to be 200 m^3/h and head of 100 m	m3/hr	2

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, TOIs, OON, SI			x	

COMMENTS

Compiled by: .....

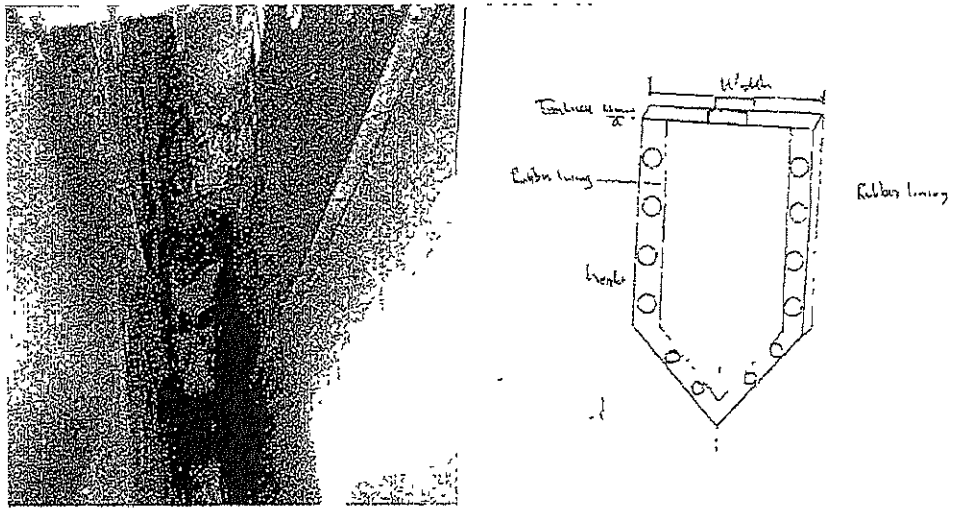

Figure 1 – Isolation Slide Gate Example