Eskom	Scope of Work	Matimba Power Station

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1. INTRODUCTION

Matimba Power Station produces electricity from steam that is produced by heating demineralised water. Demineralised water with high quality is of great importance when it comes to chemistry control measures to improve plant availability and reliability during operation. The demineralised water is produced at the water treatment plant, where raw water passes through the clarifiers, varivoid sand filters, cation vessels, degassers, anion vessels, and thereafter the mixed bed vessels. Ion exchange is the primary method of treatment across all the vessels. The outlet from the mixed bed is then sent to the boilers for steam production.

Of interest amongst these ion exchange vessels are the Cation and Anion vessels. Cation 1/A vessel for example was found to pass resins to the outlet strainer. Inside the Cation vessels, like in the Anion vessels, are the sinert or tekapor bases, which are pivotal in selectively blocking resins yet allowing water to pass down to the outlet of the vessels. It has been noticed that the sinert base has been eroded in cation vessel, as a result passing resins. The assumption is that cation as well as anion vessels are due for replacements. It is for this reason that this report is compiled; that is to outline the scope of works for Cation and Anion vessels' sinert or tekapor bases replacement, coupled with inner vessel rubber-lining, to continue producing demineralised water at Water treatment Plant, Matimba Power station.

2. SUPPORTING CLAUSES

2.1 SCOPE

The primary scope of the project is to replace the sinert bases on Cation and Anion vessels which help to produce demineralised water at Matimba Power Station, Water Treatment Plant. The sinert base is a porous medium consisting of a fine upper layer and coarse lower layer of graded gravel, bounded with a chemical resistant resin. A sinert base allows the passage of water into the collecting system while preventing resin from escaping from the vessel. Enclosed in the sinert base is water collecting system located at the bottom-dished end and the regeneration chemical inlet distribution system located immediately above it. The sinert base fills the bottom dished end and part of the vessel.

The water collecting system consists of several radial polypropylene mesh tubes which connect to a collecting hub in the center of the bottom dished end. The regeneration chemical inlet distribution system consists of semi-circular polypropylene lateral tubes connected to a central P.V.C header. The lateral tubes are manufactured with several equally spaced holes drilled in their walls through which the dilute chemicals flow. Both the water collecting system and the regeneration chemicals inlet distribution system enclosed within the sinert base will also need to be replaced as they will get damaged during the removal of the old base. Also included for replacement is the rubber lining on the shell of the vessel.

The Contractor shall ensure that the complete design shall be performed by, or under the direction, control and supervision of an Engineering Council of South Africa (ECSA) registered professional engineer for each discipline. In instances where the design is performed under the direction, control and supervision of a professional engineer, the professional engineer will be responsible for signing off the design as applicable to his field of registration.

2.1.1 Purpose

The purpose of this document is to describe in detail the scope of supply and services required from the potential Contractors and to describe the technical criteria to ensure that the sinert base casted can withstand the operating conditions.

2.1.2 Applicability

This document is intended for clarification with the Contractor and Matimba Power Station.

2.2 NORMATIVE/INFORMATIVE REFERENCES

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

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2.2.1 Normative

[1] ISO 9001 Quality Management Systems.

[2] PG/240/008 Environmental Management System Requirement for the Contractors.

[3] 32-727 SHEQ Policy.

2.2.2 Informative

[4] N/A

2.3 DEFINITIONS

Definition	Description
Sinert Base	A porous medium consisting of a fine upper layer and coarse lower layer of graded gravel, bounded with a chemical resistant resin. A sinert base allows the passage of water into the collecting system while preventing resin from escaping from the vessel.

2.3.1 Disclosure Classification

Controlled disclosure: controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS.

Abbreviation	Description
MMD	Mechanical Maintenance
NaOH	Sodium hydroxide
PS	Power Station

2.5 ROLES AND RESPONSIBILITIES

Engineering: Draft scope of work and review.

Maintenance: Review of the scope of work.

Operating: Review of the scope of work.

2.6 PROCESS FOR MONITORING

The process of Cation and Anion vessel operations is monitored mainly by the differential pressure indicators. When there is an alarm for high differential pressure above 300 Kpa the system alerts the controller. The delta P across the vessel during normal operations should be around 100 Kpa. This is also used as a performance test after casting and commissioning.

2.7 RELATED/SUPPORTING DOCUMENTS

N/A

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3. WORKS TO BE PERFORMED BY CONTRACTOR AND ESKOM

3.1 SCOPE OF WORK

The scope entails the replacement of the sinert base on Cation and Anion vessels at Matimba Power Station Water Treatment Plant. Sinert base is a porous medium consisting of a fine upper layer and coarse lower layer of graded gravel, bounded with a chemical resistant resin. Sinert base allows the passage of water into the collecting system while preventing resin from escaping from the vessel. Enclosed in the sinert base is water collecting system located at the bottom-dished end and the regeneration chemical inlet distribution system located immediately above it. The sinert base fills the bottom-dished end part of the vessel. Both the water collecting system and the regeneration chemicals inlet distribution system enclosed within the sinert base will also need to be replaced as they will get damaged during the removal of the old base. Also included for replacement is the rubber lining on the shell of the vessel.

The short description of the scope of work for this project includes:

- The supply and delivery of all the necessary equipment and material for the execution of works.
- Removal of old rubber lining, sinert base, water collecting system and regeneration chemical inlet distribution system.
- Installation of new rubber lining, sinert base, water collecting system and regeneration chemical inlet distribution system.
- And commissioning of the vessels.
- Provision of drawings for the water collecting laterals and regeneration chemical inlet distribution laterals.

3.2 DESCRIPTION OF WORKS

3.2.1 The Contractor's responsibility

- The contractor shall ensure that all the necessary equipment and tools required for the execution of the works are supplied to the water treatment plant.
- The contractor shall sign the workman declaration before the work commences. This clarifies that the contractor has seen and accepted the permits to work.
- The contractor will provide Eskom a Quality Control Procedure for the execution of the works.
- Remove the existing Cation and/or Anion resins from the vessels and store them properly to avoid contamination.
- Once Eskom personnel have removed the manhole cover, the contractor will be responsible for the removal of top laterals as well as the support beams inside the vessels. This will allow access to the sinert base.
- Both sight glasses should be removed and cleaned.
- Removal of the existing sinert base and disposal in accordance with proper environmental practice at Matimba PS.
- Remove the remaining rubber lining in the vessels and apply new non-conductive butyl rubber.
- Perform an inspection on the rubber lining (visual, spark test and hardness test). The calibration information for hardness and spark test instruments must be submitted to Eskom for assurances that the instruments are reliable.
- Install new water collecting system, regeneration chemical inlet distribution system and sinert base after Eskom has accepted the inspection report. Eskom to provide drawings should the inspections report indicate defects on the collecting system and chemical inlet distribution system. The material that will be used for casting the sinert base must be delivered to site and accepted by Eskom engineer prior to installation. The material will only be accepted if it meets the minimum requirements stipulated

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in Table 1. The contractor is to provide like for like water collecting system as well as the regenerating chemical inlet distribution system. The systems must conform to the information provided in Table 2. The contractor must submit detailed design of these systems prior to starting with the project for approval by Eskom engineer. The Contractor shall ensure that the complete design shall be performed by, or under the direction, control and supervision of an Engineering Council of South Africa (ECSA) registered professional engineer. In instances where the design is performed under the direction, control and supervision of a professional engineer, the professional engineer will be responsible for signing off the design applicable to his field of registration.

- Measure the depth from the top of the sinert base to the top of the vessel and report to Eskom.
- Provide a casted bucket sample of the sinert base.
- Allow the sinert base to cure for at least 10 days.
- Measure and control humidity during the curing period.
- Perform final inspection of the sinert base and report to Eskom the findings.
- Refit cleaned sight glasses, resin, pipe fitting and flanges as well as the top laterals and beams.
- Once Eskom has fitted the manhole cover. Commissioning the anion vessel with Eskom personnel.

3.2.2 The Contractor's responsibility

- Eskom personnel shall be responsible for applying for the permit to work. The permit to work to open the manhole cover and another one for internal work once the manhole cover is opened.
- MMD shall be responsible for removal/refitting of manhole cover.

3.3 DETAILED PROJECT SPECIFICATIONS OF WORKS

Table 1: Specification Data

ITEMS	SPECIFICATION	REMARKS
Rubber	Material: Butyl rubber Thickness: 6 mm Quantity: minimum 10 m^2 but as much as needed	
Sinert base (porous)	Number of layers: Minimum of 3 layers; Bottom layer: Coarse gravel Top layer: Fine sand	Epoxy used must be able to withstand temperature of 110 °C and pressure of 0.5 MPa. Epoxy must also be resistant to caustic attack. Bottom layer should enclose both

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		the water collecting system and regeneration chemical inlet distribution system. **See Cation and Anion drawings in appendix A.** Top layer should not allow resin to pass through. The minimum resin size is 0.45mm. **See Table 2 for resins sizes.**
Water collecting system	19 radial polypropylene mesh tubes connected to a collecting hub in the center of the bottom-dished end.	The technical data for the Cation and Anion vessels is provided in the next table. The contractor to design the collecting system as per the information provided.
Regeneration chemical inlet distribution system	Comprising of semi-circular polypropylene lateral tubes connected to a central P.V.C header. The laterals tubes should be manufactured with several, equally spaced holes drilled in their walls through which the diluted chemicals flow.	The contractor to design the distribution system as per the information provided.

Table 2: Technical Data sheet Cation and Anion vessels

Cation Supply Pumps	
Number	4
Output per pump	275 m^3/hr at 610 kPa
Cation Vessel	
Diameter	Internal 2740 mm
Height	3200 mm
Maximum Working Pressure	780 kPa
Design Pressure	820 kPa
Maximum Working Temperature	30 °C
Design Temperature	50 °C
Maximum Treatment Flow Rate	275 m^3/hr/unit
Minimum Treatment Flow Rate	70 m^3/hr/unit
Maximum differential pressure	300 kPa (full load)
Capacity between regenerations	5500 m^3/unit
Weak Acid Cation Exchange resin size	0.450 – 0.600 mm (2.95 m^3)
Strong Acid Cation Exchange resin size	0.600 – 0.700 mm (8.85 m^3)
Inert resin	900 L
Regeneration conditions	
Sulphuric Acid solution	99% H2SO4
Chemicals used for regeneration:-	Sulphuric Acid
Regeneration Flows:-	
Backwash (Subsurface)	53 m^3/hr for 5 minutes
Drain Down	50 m^3/hr for 10 minutes

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Acid Pre-inject	107 m^3/hr for 1 minute
Acid Injection (1)	At 0.8% 107.485 m^3/hr for 21 minutes
Acid Injection (2)	at 1.6% 107.970 m^3/hr for 35 minutes
Displacement Rinse	107 m^3/hr for 4 minutes
Upflow Rinse/Acidic rinse	107 m^3/hr for 11 minutes
Slam down	53 m^3/hr for 2 minutes
Refill	53 m^3/hr for 10 minutes
Cation Air hold down blowers	
Number	3
Output per blower	107 m^3/hr at 72 kPa
Anion Supply Pumps	
Number	4
Output per pump	275 m^3/hr at 820 kPa
Anion Vessel	
Diameter	Internal 2740 mm
Height	2500 mm
Maximum Working Pressure	820 kPa
Design Pressure	1000 kPa
Maximum Working Temperature	70 °C
Design Temperature	50 °C
Maximum Treatment Flow Rate	275 m^3/hr/unit
Minimum Treatment Flow Rate	70 m^3/hr/unit
Maximum differential pressure	170 kPa (full load)
Capacity between regenerations	6500 m^3/unit
Weak Base Anion Exchange resin size	0.44 – 0.59 mm (3 m^3)
Strong Base Anion Exchange resin size	0.58 – 0.68 mm (6 m^3)
Inert resin	900 L
Regeneration conditions	
Caustic Soda solution	46% NaOH
Chemicals used for Organic Cleaning:-	Caustic/Brine (7%/67% v/v) solution
Regeneration Flows:-	
Backwash (Subsurface)	55 m^3/hr for 5 minutes
Drain Down (1)	60 m^3/hr for 7 minutes
Drain Down (2)	60 m^3/hr for 2 minutes
Caustic Soda Pre-inject	13.8 m^3/hr for 1 minutes
Caustic Soda Injection (1)	At 2% 14.19 m^3/hr for 20 minutes
Caustic Soda Injection (2)	at 4% 14.6 m^3/hr for 10 minutes

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Displacement Rinse	13.8 m^3/hr for 20 minutes
Upflow Rinse/caustic rinse	28 m^3/hr for 38 minutes
Slam down	60 m^3/hr for 2 minutes
Refill	53 m^3/hr for 7 minutes
Recycle	275 m^3/hr for 10 minutes
Cation/Anion Air hold down blowers	
Number	3
Output per blower	107 m^3/hr at 72 kPa

Table 3: Environmental and atmospheric Conditions for Matimba Power Station

Altitude above sea level	877 metres above sea level
Temperature minimum	-5 ^{0}C
Temperature maximum	40 ^{0}C
Annual rainfall	432 mm
Main atmospheric conditions:	
Average annual atmospheric pressure:	91.33 kPa
Average ambient dry-bulb temperature (1.5m AGL):	21.73 °C
Maximum ambient dry-bulb temperature (1.5m AGL):	39.80 °C
Minimum ambient dry-bulb temperature (1.5m AGL):	-0.60 °C
Average wind velocity (10m AGL):	1.35 m/s
Maximum wind velocity (10m AGL):	7.10 m/s
Minimum wind velocity (10m AGL):	0.00 m/s
Average humidity (1.5m AGL):	59.33 %
Maximum humidity (1.5m AGL):	100 %
Minimum humidity (1.5m AGL):	8 %

3.3.1 Specific Documentation and information requirements for the Sinert/Tekapor base casting specifications

The documentation and information (specific to this project) to be provided by the Contractor shall include:

- The pressure loss over the base is less than 50kPa.
- The *Contractor* must provide a casting method statement detailing how the tekapor base casting will be done.
- Epoxy properties to be supplied by the *Contractor* to Eskom. This must include the working temperature, working time limitations for the epoxy and shelf life of the epoxy.
- The QCP to contain the time frame for each layer casted.

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- A certificate must be supplied that proves that the sand supplied is as per the sizing specified above.
- The following must be included as part of the QCP; verification of the cleanliness of the aggregate, verification of equipment used (hand mixing or use of drills as mixers will not be allowed), the mixing time, casting time, compaction time and time in which next layer should be casted will be included.

If any faults are picked up during the QC process, then the base will have to be immediately removed and must be re-casted at the expense of the *Contractor*.

While the base is being casted, the supplier must also cast a test sample which is a replica of the one in the bed. This will be used as a measure to determine the quality control of the application.

The environmental conditions must be measured and recorded during the entire process. The *Contractor* shall also have instrumentation on site to measure the environmental conditions and the substrate temperature. All instrumentation required must have a calibration certificate which is not expired at the time of implementation.

3.3.2 Documentation

The Contractor submits the following documents for acceptance.

1) Detailed Project plan
2) Quality Control Plan
3) Inspection and Test Plan
4) Data sheet and specification book
5) Material certificates for sand and epoxy
6) Installation methodology
7) Drawings for water collecting and caustic distribution lateral systems

4. PROJECT SPECIFICATION

4.1 WATER AND POWER REQUIREMENTS

Water and power are available free of charge on site. A mixing area will be designated for the contractor to utilize.

4.2 CONTRACTORS STAFF DURING CONSTRUCTION, INSTALLATION AND COMMISSIONING

During the period of installation and commissioning of the works, the supervisor must be within proximity to the site so that he/she can be brought to site on short notice as the engineer shall consider necessary. Such person shall be proficient and fluent in the English language and shall be empowered to act on behalf of the Contractor.

4.3 WORK PROGRAMME

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The Contractor shall include with his tender a QCP plan and preliminary implementation programme. The programme and QCP shall have sufficient details to show clearly how the works will be performed within the time for completion.

4.3.1. Tools and accessories

- All tools, special tools and accessories required for installation and commissioning shall be included in this Contract.
- The Contractor shall ensure that all tools and equipment required from site are available before the work commence.

4.3.2. Workmanship

- The Contractor shall only employ competent staff to execute the installation.
- The Contract shall be executed with the best workmanship in a skilful manner and to the satisfaction of the Engineer.
- Should any material or workmanship not be to the satisfaction of the Engineer, it shall be rectified at the cost of the Contractor and all rejected material shall be removed from site.
- The Contractor shall be responsible for the correct and complete erection of the Installation.

4.3.3. Supervision

- The Contractor shall provide full time supervision while his/her staff is working on the Contract.
- The person nominated by the Contractor to supervise the works shall have the authority to take instructions on behalf of the Contractor.

4.3.4. Inspection and testing

4.3.4.1 General

It shall be the responsibility of the Contractor to carry out factory and site acceptance tests as are practicable to ensure that all plant, equipment, and components supplied under this contract comply fully with the relevant specifications and can function as intended.

4.3.4.2 Repairs of Damage

If it becomes apparent that an item is damaged or is defective when it is inspected or delivered, the item shall immediately be repaired by the supplier of such an item, to the satisfaction of the Engineer upon detection. Where damage is such that, in the opinion of the Engineer, satisfactory repairs are not practicable, the damaged articles shall be replaced at no cost to the Client who shall accept no responsibility for any loss or damage which may be suffered because of delays in obtaining the necessary replacements.

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4.3.4.3 Testing after Installation

On completion of the installation of all plant and equipment the Contractor will be required to make appropriate arrangements and supply any instruments or apparatus etc. necessary for the testing of all plant and equipment supplied by the Contractor. Testing shall be in the presence of the Engineer's representative to demonstrate compliance with the requirements or the specification.

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4.3.5. Quality Assurance Requirements

- The Contractor submits a quality control plan prior to commencing work. The quality control plans should cover inspections and test proposals for items or activities to be supplied in the contract. The quality control plan indicates the following as a minimum:
- The identification of the activity.
- A list of sequences of operations including inspections and tests.
- The identification of the specification and procedure/ standard for each operation.
- The acceptance criteria with reference to the appropriate technical specification set out by the Contractor.
- The inspections and tests the Contractor has nominated for hold and witness points.
- Provision for inspections and tests nominated by the Eskom, and /or his representative
- Inspection and test records which are generated by the Contractor

4.3.6. Safety Precautions

4.3.6.1. Health and Safety Plan (Construction Regulations)

- Upon the award of the contract, successful Contractor must submit a Health and Safety Plan, filed in a Health and Safety File.
- The Safety Officer employed by Matimba Power Station will audit these Health and Safety Plan to ensure compliance with the provisions of the Act. The approval of the health and safety plan can sometimes take 2 to 3 days to approve, and ***NO WORK*** shall commence before approval of the plan.

4.3.6.2. Protection of Persons and Plant

- Provide adequate protection of people and plant, from accidents arising or likely to arise from whatever source.
- Plant operation shall be adequately protected as laid down in the Occupational Health and Safety Act No. 85 of 1993.

4.3.6.2. Appointment of Responsible Person

a) The Contractor shall cause all work to be carried out under the general supervision of a responsible person appointed by the Contractor in writing in accordance with the provisions of the Occupational Health and Safety Act No. 85 of 1993.

b) A copy of the letter of appointment and of the appointee's written acceptance thereof shall be lodged with the Engineer.

c) Work on site shall not commence until the documents referred to in sub-clause (b) have been received by the Engineer.

d) The contractor shall provide proof that the workers are trained to work in confined spaces.

Precautions shall be taken to avoid safety and health hazards to workers. The Contractor shall be responsible for supplying appropriate protective clothing etc. for use of the workers.

4.3.7. Commissioning

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- The Contractor commissions the sinert base and ensures conformance to Eskom's performance requirements. Eskom takes over once the system performance requirements have been verified by the Contractor.
- The Contractor submits a commissioning schedule and program for acceptance. The schedule shall consist of cold commissioning and hot commissioning plan.
- The Contractor's preliminary trials and commissioning of the sinert base shall be carried out by the Contractor's representatives, who shall remain in attendance until such time the sinert base is working to Eskom's satisfaction.
- In the event of incorrect functioning, the Contractor determines the cause, and he ensures that he corrects the defect.
- Where the sinert base fails, the contractor (own expense) repairs the sinert base to obtain stated tolerance. Fully detailed proposals are submitted in writing for approval before any repairs are done and they will be carried out when convenient to the Eskom.
- Records and reports of all tests and inspections are prepared and submitted to the Eskom.

4.3.8. Definition of Handover

Hand-over will not occur until testing and commissioning report has been submitted and approved. The guarantee period will commence on the date of hand-over, which is the date of certification of completion of the works.

4.3.8.1. Proving Period

- After completion of the Contractor's preliminary tests and commissioning of the sinert base to Eskom's satisfaction, the sinert base will be taken over to Eskom and continue in normal service for a minimum period of 24 months.
- During this proving period of 24 months, the Contractor shall be responsible for any defects resulting from design short comings, faulty material and poor workmanship. The Contractor shall remedy such defects at his own expense and as soon as possible when called upon to do so by Eskom.
- Any outage of the demin train (train 1, stream A) required by the Contractor during this period shall as far as practicable be arranged to suit the convenience of Eskom.

4.4. ENVIRONMENTAL RULES AND REGULATIONS

- Matimba Power Station is ISO 14001 compliant. The Contractor must comply with the requirements of this procedure titled: Environmental Management System Requirement for the Contractors' number PG/240/008.
- Matimba also has an SHEQ Policy, ESKOM Doc. No. 32-727, to which every Contractor and employee must adhere to. It is therefore the responsibility of the Contractor to ensure that the Contractor obtains copies of Matimba SHEQ Policy. The Contractor must identify all Environmental aspects and impacts related to his/her activities. The Contractor must have copy of the legal register related to the scope.
- Matimba procedures applicable to the Contractor's area of responsibility to assist the Contractor and his/her employees to prevent pollution and comply with legislative requirements, and to familiarize themselves with such procedures, within 30 days from the date of commencement of work at Matimba. Copies of the above-mentioned documents shall be obtained from the Eskom Agent and/or Environmental Officer on the first day prior to commencement of work at Matimba.

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- The Contractor shall submit a proof to the Environmental Officer of Matimba that he and his employees has done all the necessary training on procedures and Policies supplied to them and that they do understand the contents of the procedures, registers and policies and will always adhere to them.
- The non-adherence to the rules will result in a non-conformance, hence immediate termination of the contract.
- Rules are as follows:

a) Provide sufficient storage containers, labelled depicting general or hazardous waste and store in a designated storage area.

b) Ensure that all hazardous waste is disposed of at a licensed site. A copy of the hazardous waste disposal certificate must be submitted to the Eskom Representative.

c) Ensure that all other general waste is disposed of at the licensed landfill site.

d) Ensure that your site does comply with the general good housekeeping practices.

4.5. CONSTRAINTS ON HOW THE CONTRACTOR PROVIDES THE WORKS

- The permit system is utilized throughout Matimba Power Station. It is the responsibility of the Contractor, with the assistance of Matimba personnel to apply for the permit to work. The permit Coordinator will issue permits to work.

5. SITE FACILITIES AND SERVICES PROVIDED BY THE CONTRACTOR

5.1. CONTRACTORS EQUIPMENT

a) The Contractor provides all Equipment that is required to complete the Works.

b) The Contractor's Equipment should not impair the operation or access to the plant.

c) The Contractor provides all or any temporary or expendable materials required for the storage of material.

Any Equipment, or appliances, used by the Contractor conforms to the applicable OHS Act safety standards and is maintained in a safe and proper working condition. The Project Manager has the right to

stop the Contractor's use of any Equipment which, in the opinion of Project Manager, does not conform to the foregoing OHS Act safety standards.

5.2. GENERAL

The Contractor shall ensure that there are always sufficient suitably qualified, experienced, and skilled staff available to carry out and supervise all the activities.

5.3. ACCOMMODATION AND TRANSPORTATION

The Contractor provides his own accommodation and transport for all his employees engaged in the execution of the works. This includes the needs of his Subcontractors. The cost for accommodation, as well as for transportation to and from Site is included in the Prices. No accommodation is available at Matimba Power Station.

5.4. CONTRACTOR'S ORGANISATION

The Contractor submits a project organogram for acceptance, indicating the Contractor's and the Subcontractors employees.

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5.5. REFUSE DISPOSAL

The Contractor is responsible to keep the work area clean of any rubble. All waste generated by the contractor in this project must be handled in accordance with the minimum requirements for handling waste. It is the responsibility of the Contractor to remove waste.

6. TENDER RETURNABLES

The following tender returnable need to be submitted:

- The lead design engineer is required to be a professional, recognized engineer registered with ECSA. Supply the relevant qualifications and previous work experience.
- Supply the CV with relevant work experience of the Sinert Base Specialist / Supervisor for execution of the works.
- Provide a proposal for the work that will be carried out.
- A proposed schedule of activities with timelines for execution of the works.
- Warranty period for the newly installed sinert base.

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7. INSPECTIONS EVIDENCE

Cation 1 internal vessel inspection evidence is depicted on Figure 1. It is evident the tekapor/sinert base is worn out. It is recommended that it is replaced, same as the Anion vessels' bases.



Figure 1: Internal visuals of Cation 1/A, in train 1, demin stream 1/A

5. AUTHORISATION

This document has been seen and accepted by:

Name & Surname	Designation
Sumayyah Sulliman	Eskom Generation Chief Engineer
Gift Nkuna	Matimba PS - Auxiliary Engineering Manager
Ntebaleng Setlau	Matimba PS - Senior Advisor Chemistry
Rirhandzu Chuma	Matimba PS – Auxiliary System Engineer
Maphuti Garrine	Matimba PS - Chemical Services Manager
Kenneth Matloga	Matimba PS – Mechanical Maintenance Manager

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Name & Surname	Designation
Biko Mukhomi	Matimba PS – Mechanical Maintenance Senior Technician

6. REVISIONS

Date	Rev.	Compiler	Remarks
October 2025	1	R.E. Chuma	Scope of work for the sinert or tekapor base replacement on Cation and Anion exchange vessel.

7. DEVELOPMENT TEAM

The following people were involved in the development of this document:

- Rirhandzu Chuma – Matimba PS Auxiliary Engineer

8. ACKNOWLEDGEMENTS

- Gift Nkuna – Matimba PS Auxiliary Engineering Manager

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APPENDIX A: VESSEL DRAWINGS

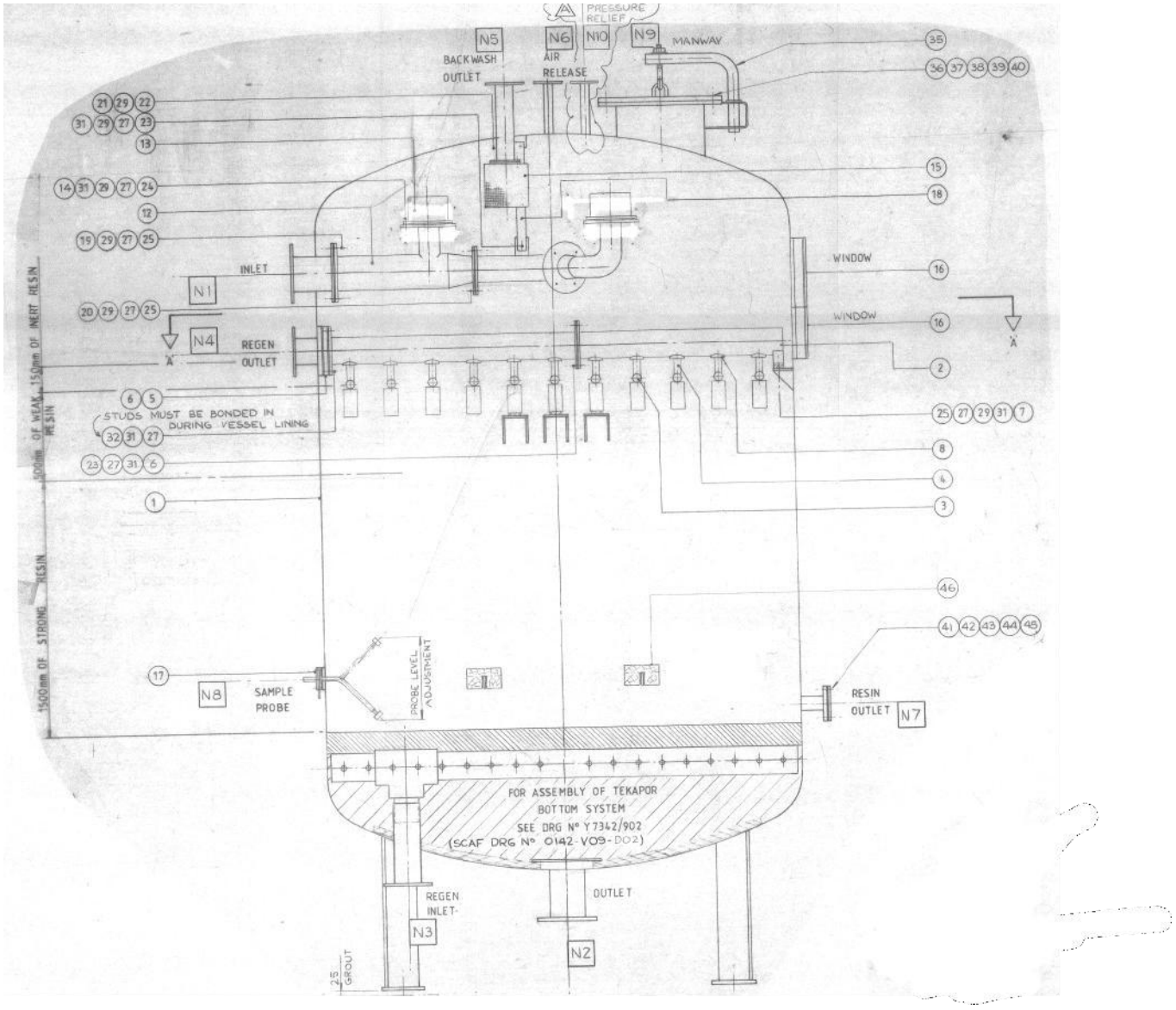

Figure 2: Demin Stream Cation Vessel drawing

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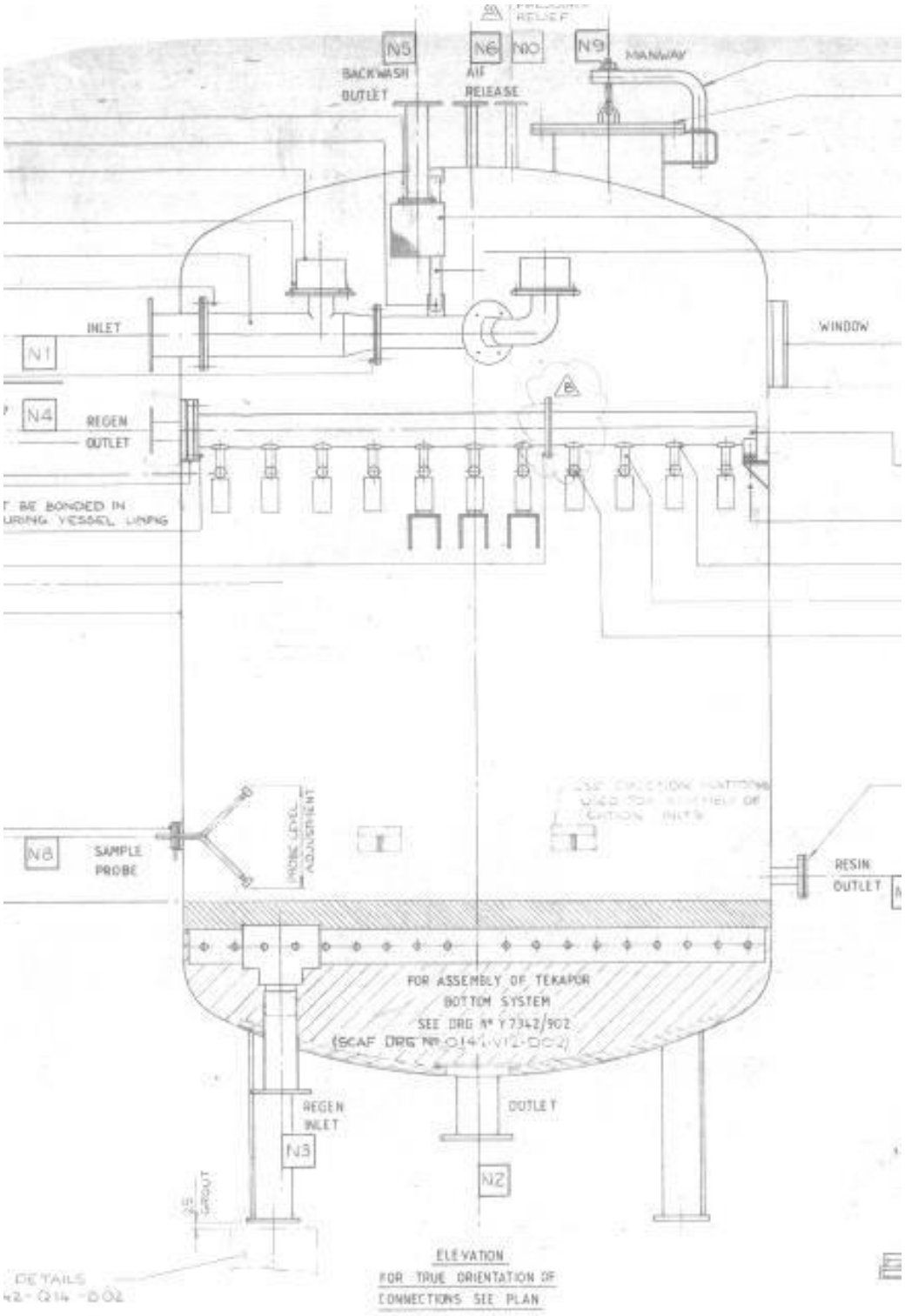

Figure 3: Anion vessel drawing

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