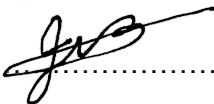

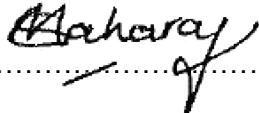
 Eskom	Specification	Peaking
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Title: **Scope of Work and Technical Specification for Brake Pad Replacement Drakensberg Pumped Storage Scheme**
 Unique Identifier: **31A/100361-G**
 Alternative Reference Number: **25713748; 25713749; 25713750 & 25713751**
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1. BACKGROUND

Drakensberg Pumped Storage Scheme consists of four pumped storage units. Each unit has a main unit shaft as one of the major components. The shaft rotates by means of water flowing through a runner of the turbine, which turns the rotor of the generator and generate electricity to the national grid of South Africa. A braking system is used to brake the unit from 30rpm to 0rpm when the unit is required to go to standstill, should the pony-motor fail. The braking system of each unit consists of 10 brake pads, which will have to be replaced in conjunction with their backing plates.

The following will be considered for the replacement of the brake pads, which can be described as follows:

The *Contractor* supplies 4 sets of brake pads with backing plates. Each set consists of 10 new non-asbestos brake pads, which are doweled and glued onto new steel backing plates. The *Contractor* delivers the new backing plates with new brake pads doweled and glued to them in a good condition to the *Employer's* site (Eskom Drakensberg Pumped Storage Scheme).

2. DESCRIPTION OF THE WORKS

2.1 *Employer's objectives*

The *Employer's* objective is to replace all asbestos containing brake pads on Drakensberg Pumped Storage Scheme with new asbestos-free brake pads.

The current brake pads installed on Drakensberg Unit 3 contains asbestos and will have to be replaced. It can be assumed that the brake pads on DRP U1; U3 and U4 contain asbestos, as the Peaking Asbestos Register clearly state that the brake pads of DRP U2 do not contain asbestos. Therefore, 4 sets will be ordered. One set for each of the three remaining units and one set as spare to ensure a workable spare set on site.

The asbestos containing brake pads will be removed by a Registered Asbestos Contractor (appointed by the *Employer*) according to the asbestos handling procedure and according to the OHS Act regulations. The old asbestos containing brake pads will be disposed by a Registered Asbestos Contractor (appointed by the *Employer*) according to regulation. These brake pads (6 pads in total per operating unit) will then be replaced by a new set.

2.2 Brief description of the works

The scope of work includes the following:

- The *Contractor* supplies 4 sets of 10 new mild steel backing plates. The *Contractor* dowels and glues 10 new brake pads to the new backing plates.
- The *Contractor* delivers the new backing plates with new brake pads doweled and glued to them in a good condition to the *Employer's* site (Eskom Drakensberg Pumped Storage Scheme).
- The *Contractor* repairs all defects.

3. WORK TO BE PERFORMED BY THE *CONTRACTOR* FOR THE WORKS

3.1 Specifications

The *Contractor* adheres to the following in providing the *works*:

- a) The *Employer's* safety rules
- b) The *Employer's* codes of practice
- c) All the documents stated in this document.

3.2 Scope of work

The *works* include the following:

- The *Contractor* supplies 4 sets of 10 new mild steel backing plates and dowels & glues a new brake pad to each of the new backing plates.
- The *Contractor* delivers the new backing plates with new brake pads doweled and glued to them in a good condition to the *Employer's* site (Eskom Drakensberg Pumped Storage Scheme).
- The *Contractor* repairs all defects.

3.2.1 Manufacturing of the brake pad backing plates

The *Contractor* manufactures 4 sets of new brake pad backing plates as per Drawing 18.48/6448 Sheet 3. Each set contains 10 brake pad backing plates. Therefore, 40 brake pad backing plates in total.

The specification of the material of the brake pad backing plates are as follows:

Standard	BS 970	BS 970:1955	Werkstoff No.	SAE/AISI
Identification Number	070 M 20 (070)	EN3A	1.0402	1020

The chemical composition of the material for the brake pad backing plates should be:

Element	Carbon	Silicon	Manganese	Sulphur	Phosphorus
Composition	0.25% Max	0.35% Max	1.00% Max	0.06% Max	0.06% Max

The mechanical properties of the material for the brake pad backing plates should be:

Property	Normalized
Minimum Tensile Strength	430MPa
Minimum Elongation	17%

3.2.2 Manufacturing of dowel pins

The *Contractor* manufactures 4 sets of new brake pad backing plate dowel pins as per Drawing 18.48/6448 Sheet 4. Each of the 4 sets of brake pad backing plate dowel pins exists out of 10 sets of 30 dowel pins. Therefore, a total of 1200 brake pad backing plate dowel pins.

The specification of the material of the dowel pins is Pb3 brass with the following identification:

Standard	BS	ISO	Werkstoff No.	EN
Identification Number	CZ121-Pb3	CuZn39Pb3	2.0401	CW614N

3.2.3 Sourcing of brake pads

The *Contractor* sources and supplies 4 sets of non-asbestos brake pads. Each set of brake pads contains 10 brake pads. Therefore, a total of 40 brake pads.

The material specification of the brake pads is as follow:

Material	ZA Gold
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The size specification of the brake pads can be found in Drawing 18.48/6448 Sheet 2 and can be summarised as follow:

Description	Length	Width	Thickness
Size	480mm	360mm	19mm

3.2.4 Assembly of brake pads onto brake shoes (Doweling & Gluing)

The *Contractor* assembles the brake pads to the brake pad backing plates by using the dowels in conjunctions with glue.

The specification of the glue is *Araldite 64-1 Brake Bonding Adhesive/Primer*, which were formally known as *Redux 64-1*. This glue must be used with an *Araldite 70* primer. The application instructions must be followed during the application and curing process of the gluing process.

3.2.5 Delivery of brake pad & backing plate assemblies

The *Contractor* delivers the *Works* safely to the *Employer's* site (Eskom Drakensberg Pumped Storage Scheme, Drakensberg, Jagersrust, Kwa-Zulu Natal, South Africa) without any damage. The *Contractor* ensures that all material and equipment is packaged, transported and delivered in such a way that the parts are not damaged by minor knocks. Each part is individually wrapped in protective coating and packaged in crates. The contents of each crate are clearly marked.

3.2.6 Repairs

The *Contractor* is responsible for all repairs of damaged or defective *Works*.

3.3 Contractor's design

The *Contractor* designs and provides all equipment and jigs necessary to manufacture, assemble and glue the parts.

4. WORK TO BE PERFORMED BY THE *EMPLOYER* FOR THE *WORKS*

4.1 Scope of work

The *works* include the following:

4.1.1 Inspection

The *Employer* has the right to perform various inspection, witness and hold points of the *works* at the premises of the *Contractor* during the execution of the *works*.

The *Employer* performs visual inspection with the delivery of the *works* at the *Employer's* site (Drakensberg Pumped Storage Scheme).

4.1.2 Disassembly of current brake pads and brake pad backing plates

The *Employer* organise for a Registered Asbestos Contractor to disassemble the current brake pads from the respective operating units at Drakensberg Pumped Storage Scheme. This activity is separate from the *Works* as described in Section 3.

4.1.3 Installation of the new brake pad assemblies

The *Employer* installs the new brake pad assemblies onto the respective operating units. The new brake pad assemblies consist of the new brake pads and new brake pad backing plates.

4.1.4 Storage of the spare brake pad assemblies

The *Employer* stores the spare brake pad assemblies in a safe area on the *Employer's* plant (Drakensberg Pumped Storage Scheme) after delivery of *Works* by the *Contractor*.

5. EMPLOYER'S PHILOSOPHY

5.1 Engineering philosophy

Fully operational capability of the Pump/Turbine unit, improved reliability and maintainability of the braking system at Drakensberg PSS as well as ensuring the brake pads at Drakensberg PSS are free of asbestos.

5.2 Maintenance philosophy

Non-asbestos brake pads will ensure safe execution of maintenance in the area surrounding the generator brake pads.

6. DRAWINGS

The following drawings are supplied to the *Contractor* for manufacturing purposes.

Drawing Number:	Rev:	Title:
Drawing 18.48/6448 Sheet 1	0	Assembly Drawing – Generator Brake Pad and Brake Pad Backing Plate
Drawing 18.48/6448 Sheet 2	0	Detail Drawing – Generator Brake Pad
Drawing 18.48/6448 Sheet 3	0	Detail Drawing – Generator Brake Pad Backing Plate
Drawing 18.48/6448 Sheet 4	0	Detail Drawing – Generator Brake Pad Dowel Pins

7. SPECIFICATIONS

The *Contractor* adheres to the following in providing the items to be supplied:

Reference Number	Title	Date or revision	Tick if publicly available
240-53665024	Engineering Quality Manual	1	*
ESKASAAA3	Eskom approval of personnel performing quality related special processes on all Eskom plant.	1	*
SABS - ISO 9001:2015	Requirements for Quality management systems.	2015	*
OHSA No. 85 of 1993	Occupational Health and Safety Act.	1993 as amended	√

*Available on request.

8. CONSTRAINTS ON HOW THE *CONTRACTOR* PROVIDES THE *WORKS*

8.1 Factory testing

The *Contractor* performs factory testing which includes verification of sizes.

8.1.1 Verification of sizes

- a) The *Contractor* verifies all relevant dimensions and features of the brake pad backing plates and submits these recordings to the *Employer* for acceptance as a Hold Point before gluing of the brake pads onto the brake pad backing plates. The *Contractor* performs the measurements with calibrated measuring equipment. All measured and recorded dimensions must be within a tolerance of $\pm 0.1\text{mm}$ of the specified measurement, except if otherwise stated.
- b) The *Contractor* records the sizes of the brake pad backing plates on a check sheet and submits these recordings to the *Employer* for acceptance with the delivery of the *works*. The *Contractor* compiles the check sheet and submits the check sheet to the *Employer* for revision and acceptance after contract award.
- c) The *Contractor* records the sizes of the brake pads on a check sheet and submits these recordings to the *Employer* for acceptance prior to the delivery of the *works*. The *Contractor* compiles the check sheet and submits the check sheet to the *Employer* for revision and acceptance after contract award and before commencing work.
- d) The *Contractor* ensures the new brake pads are doweled and glued onto the brake pad backing plates as per the application instructions. The *Contractor* adds all required steps as per the gluing application process to the final Quality Control Plan, which must be used as a check sheet. The *Employer* reserves the right to revise the Quality Control Plan after contract award.
- e) The *Contractor* records the sizes of the brake pad assemblies on a check sheet and submits these recordings to the *Employer* for acceptance with the delivery of the *works*. The *Contractor* compiles the check sheet and submits the check sheet to the *Employer* for revision and acceptance after contract award.

8.1.2 Material certificates

The *Contractor* submits copies of all material certificates to the *Employer* for acceptance as part of the tender returnable documents as well as part of the project data pack with the delivery of the *Works*.

8.1.3 Final inspections

- a) The *Contractor* ensures all edges and corners of all components are free of burrs, rags and slivers.
- b) The *Contractor* ensures all surface finishes as per the drawings as tabled in Section 6. The *Contractor* records all measurements. The *Employer* reserves the right to witness all measurements.
- c) All recorded measurements are submitted to the *Employer* within five (5) calendar days of being performed for acceptance.
- d) The *Contractor* repairs all damaged or defective components.

8.1.4 Repairs

The *Contractor* repairs all defects and damages incurred at the *Contractor's* workshop and/or during delivery of the *Works* to the *Employer's* site (Drakensberg Pumped Storage Scheme).

8.2 Labelling

The *Contractor* adds numbering by hard stamping the non-working surfaces to label the different brake pad assemblies. The brake pad assemblies should be labelled as follows:

Set 1	U1-1 up to U1-10		Set 3	U3-1 up to U3-10
Set 2	S-1 up to S-10		Set 4	U4-1 up to U4-10

8.3 Dispatch, delivery and offloading

- The *Contractor* delivers the *Works* safely to the *Employer's* site (Eskom Drakensberg Pumped Storage Scheme, Drakensberg, Jagersrust, Kwa-Zulu Natal, South Africa) without any damage.
- The *Contractor* ensures that all material and equipment is packaged, transported and delivered in such a way that the parts are not damaged by minor knocks.
- Each part is individually wrapped in protective coating and packaged in crates.
- The contents of each crate are clearly marked.
- The *Contractor* repairs all damaged or defective components.

8.4 Quality management

- The *Contractor* submits a quality control plan (QCP) to the *Employer* for acceptance as part of the tender returnable documents. This QCP include inspection, hold and witness points. Refer to Section 9.
- The *Employer* reserves the right to revise the Quality Control Plan after contract award.
- The *Contractor* submits the final QCP to the *Employer* for acceptance within one week after contract award. Refer to Section 9.

8.5 Safety management

- The *Contractor* complies with the Occupational Health and Safety Act. (OHSA No. 85 of 1993)
- The *Contractor* takes every precaution to ensure safety and to protect the *works* and temporary *works*.
- The *Contractor* is responsible for the safety and security of his personnel, materials on site and the *works* at all times.
- The *Contractor* adheres to the safety regulations pertaining to the *Employer's* Power Station (Drakensberg Pumped Storage Scheme).
- The *Contractor* provides all the required safety and personal protective equipment to his staff for the duration of the contract.

8.6 Environmental management

- The *Employer's* Power Station (Drakensberg Pumped Storage Scheme) is situated in an environmentally sensitive area.
- The *Contractor* acquaints himself with all statutory and local environment regulations and adheres to these without exception.
- The *Contractor* complies with the Hazardous Chemical Regulations when using any hazardous chemicals, as well as complying with the requirements of the National Environmental Management Act of 1988.

8.7 Installation

8.7.1 Security

General access to the *Employer's* Power Station (Drakensberg Pumped Storage Scheme) is controlled and it is mandatory that the *Contractor* adhere to all security regulations in force during the period of the contract.

8.7.2 Other construction activities

The *Contractor* notes that there may be other work taking place during the period when he/she is providing the *works* to the *Employer's* Site and liaises with the other *Contractors* in this regard.

8.8 Title to site materials

The *Contractor* has no title to plant and/or materials resulting from him/her carrying out the *works*.

8.9 Documentation

8.9.1 Pre-implementation documentation

The *Contractor* submits the following to the *Employer* for acceptance (within one week of contract award):

- a) Detailed quality control plan
- b) Check sheets

The *Contractor* notes the following:

- a) Metric sizes, as specified by the International Standards Organization and agreed to by the South African Metrication Boards, are used.
- b) SI units are used on drawings, pamphlets, calculations and documents.

8.9.2 Post-implementation documentation

The *Contractor* submits one hardcopy and one electronic version of all documentation described below on take-over of the *works* to the *Employer* for acceptance within five (5) calendar days of being performed.

- a) All material certificates.
- b) A drawing and dimensional check sheet indicating all relevant final machined dimensions of the brake pads and brake pad assemblies.
- c) A completed and signed-off quality control plan certificate.
- d) All test certificates of the tests performed on the manufactured components.

8.10 Completion

Completion is when the following has been done by completion date:

- The *Contractor* has done everything required to provide the *works*.
- The *Contractor* has delivered the *works* and the *works* is accepted by the *Employer*.
- The *Contractor* has provided all as-built documentation described in Section 8.9.2 and is accepted by the *Employer*.
- The *Contractor* submitted all other documentation as required to the *Employer* for acceptance.

8.11 Accounts and records

Eskom assesses payments with the *Contractor* on completion of the *works* and prior to submission of the invoices for payment.

Invoices are submitted to:

Accounts Payable

Eskom Peaking Generation

P O Box 3487

Tyger Valley, 7536

Failure to submit the invoice to the correct address could result in delays in payment.

The *Contractor's* Tax Invoices comply with the requirements as stated in clause A3 of the Contract Data.

9. REQUIREMENTS FOR THE PROGRAM

- a) The *Contractor* submits a Gantt chart program and quality control plan detailing how the *works* is executed with a timeline included to the *Employer* for acceptance as part of the tender returnable documents.
- b) The *Contractor* submits the finalized program and quality control plan within one week after contract award.
- c) The program and quality control plan indicates the start date, completion date and duration of each activity.
- d) The *Contractor* indicates the following on his program and quality control plan submitted to the *Employer* for acceptance:
 - The time required from notification of work (contract award) to obtaining material (including brake pad backing plate material, brake pad material, dowel pin material and glue).
 - Manufacturing of the *works* (including manufacturing of the brake pad backing plates, dowel pins and brake pads).
 - Assembly of the brake pads on brake pad backing plates (including the dowelling and gluing process).
 - Final inspection of the *works*.
 - Delivery to the *Employer's* Site (Eskom Drakensberg Pumped Storage Scheme, Drakensberg, Jagersrust, Kwa-Zulu Natal, South Africa)
 - Statutory and other non-working days included in the contract period and occurring just after the contract period.

10. SERVICES AND OTHER THINGS PROVIDED BY THE *EMPLOYER*

The *Employer* provides the following to the *Contractor*:

10.1 Crane

A crane is available in the *Employer's* power station machine hall. The *Contractor* ensures that all necessary arrangements and preparations are made for the use of this crane in terms of letting the *Employer* know when to expect delivery.

10.2 Area for site establishment and storage

The *Employer* indicates a storage yard to the *Contractor*.

All other services and things needed to provide the *works*, is supplied by the *Contractor*.