Eskom	Strategy	Engineering

Title:	Tender Technical Evaluation Strategy for Drakensberg Pumped Storage Scheme **Thrust Bearing Spring Assemblies**	Unique Identifier:	**31A/100393-E**
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Compiled by	Functional Responsibility	Authorised by
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TABLES

1. INTRODUCTION

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. Bearings are used to guide the shaft as well as support the vertical thrust of the shaft by means of guide bearings and thrust bearings respectively.

The function of the thrust bearing is to support the vertical load (axial thrust in the shaft) exerted by the mass of the rotor and the hydraulic downward load.

The thrust bearing segments are supported by thrust bearing spring assemblies. The thrust bearing spring assemblies absorbs any vertical thrust experienced during unusual operating conditions such as the vertical thrust during transient conditions.

Each of the four units at Drakensberg PSS is equipped with 16 thrust bearing segments. Each of the thrust bearing segments is equipped with 30 springs loaded to a preload of 2 ton ±100kg, which purpose is to absorb any unusual vertical downwards thrust exceeding the ±825 ton (±565ton shaft/turbine runner/generator rotor/pony-motor rotor mass and ±260ton hydraulic load during normal steady operation conditions) of the unit.

The springs start to compress when a vertical load of between 912 ton (480 x 1.9 ton) and 1008 ton (480 x 2.1 ton) is exerted on the thrust bearings.

The vertical hydraulic load exerted on the shaft during transient conditions will be absorbed by the thrust bearing springs.

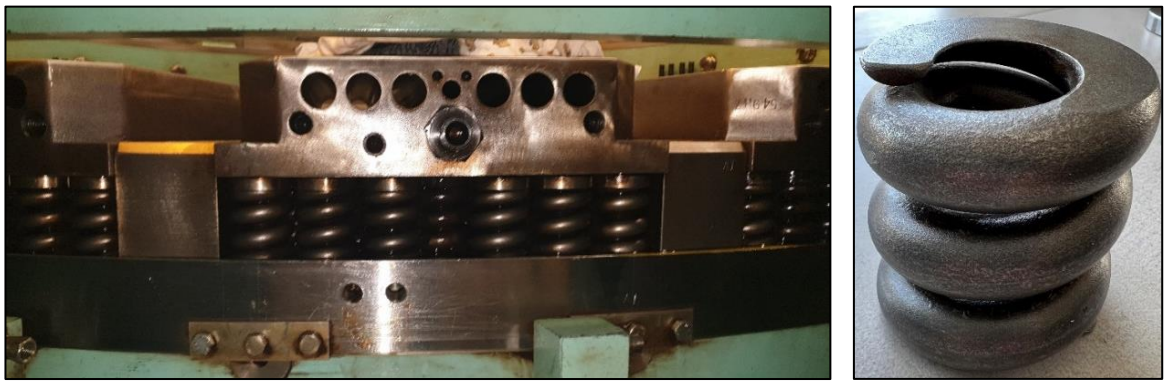


Figure 1: Original Thrust Bearing Springs (as installed) & Disassembled

2. SUPPORTING CLAUSES

2.1 SCOPE

The works include the following:

2.1.1 Supply 10 off Thrust Bearing Spring Assemblies:

The supply of 10 assemblies will be used for verification of the *Contractor's* capabilities before the purchase order of 2490 assemblies will be placed.

- The *Contractor* supplies 10 x thrust bearing spring assemblies.
- The *Contractor* delivers 10 x thrust bearing spring assemblies to the *Employer's* site (Drakensberg Pumped Storage Scheme).

2.1.2 Supply 2490 off Thrust Bearing Spring Assemblies:

The supply of 2490 assemblies will only be applicable should the *Employer* accept the 10 initial assemblies.

- The *Contractor* supplies 2490 x thrust bearing spring assemblies.
- The *Contractor* delivers 2490 x thrust bearing spring assemblies to the *Employer's* site (Drakensberg Pumped Storage Scheme).

The *Works* are thoroughly discussed in the Technical Specification Document 31A/100393-C.

2.1.3 Purpose

The purpose of this tender technical evaluation strategy is to define the Mandatory Evaluation Criteria, Qualitative Evaluation Criteria and TET member responsibilities for tender technical evaluation. The technical evaluation strategy serves as basis for the tender technical evaluation process.

2.1.4 Applicability

This document applies to the Drakensberg Pumped Storage Centreline Bearing System. The project applies to the Turbine Engineering Department, Drakensberg Mechanical Maintenance Department, Procurement Department and Drakensberg Pumped Storage Scheme.

2.2 NORMATIVE/INFORMATIVE REFERENCES

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

2.2.1 Normative

[1] 240-48929482: Tender Technical Evaluation Procedure

[2] Doc. No. 31A/100393-C - Technical Specification – DRP – Thrust Bearing Spring Assembly

2.2.2 Informative

[3] Drawing 18.48/6335 Sheet 1 Rev. 1 - Detail Drawing – Thrust Bearing Spring

[4] Drawing 18.48/6335 Sheet 2 Rev. 1 - Detail Drawing – Thrust Bearing Spring Top Flange

[5] Drawing 18.48/6335 Sheet 3 Rev. 1 - Detail Drawing – Thrust Bearing Spring Bottom Flange

[6] Drawing 18.48/6335 Sheet 4 Rev. 1 - Detail Drawing – Thrust Bearing Spring Bolt

[7] Drawing 18.48/6335 Sheet 5 Rev. 1 - Assembly Drawing – Thrust Bearing Spring Assembly

2.3 DEFINITIONS

2.3.1 Classification

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

2.4 ABBREVIATIONS

Abbreviation	Description
Do. No.	Document Number
PSS	Pumped Storage Scheme
QCP	Quality Control Plan
Rev.	Revision

2.5 ROLES AND RESPONSIBILITIES

N/A as per 240-48929482: Tender Technical Evaluation Procedure

2.6 PROCESS FOR MONITORING

N/A

2.7 RELATED/SUPPORTING DOCUMENTS

All referenced documents as per Section 2.2.

3. TENDER TECHNCIAL EVALUATION STRATEGY

3.1 TECHNICAL EVALUATION THRESHOLD

The minimum weighted final score (threshold) required for a tender to be considered from a technical perspective is 70%.

3.2 TET MEMBERS

Table 1: TET Members

TET number	TET Member Name	Designation
TET 1	Jaco van Zyl Pr. Eng.	Senior Engineer – Turbine Engineering
TET 2	Edmond Dumema Pr. Eng.	Senior Engineer – Turbine Engineering
TET 3	Isak Meyer Pr. Eng.	Senior Engineer – Turbine Engineering

3.3 MANDATORY TECHNICAL EVALUATION CRITERIA

Table 2: Mandatory Technical Evaluation Criteria

	Mandatory Technical Criteria Description	**Reference to Technical Specification / Tender Returnable**	**Motivation for use of Criteria**
1.	Thrust bearing spring top & bottom flange material.	The thrust bearing spring top & bottom flange material specification is: EN8 The *Contractor* submits written confirmation of EN8 availability to the *Employer* for acceptance as part of the tender returnable documents. The submission of the EN8 material availability is mandatory. A detailed quote stating the material as EN8 will also be accepted by the *Employer.* The *Contractor* will have to submit material certificates within 7 calendar days after purchase order placement.	EN8 steel was used during the detail design and found to be acceptable. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.
2.	Thrust bearing spring bolt material.	The thrust bearing spring bolt material specification is: EN19 Condition T (Quenched & Tempered). The *Contractor* submits written confirmation of EN19 Condition T availability to the *Employer* for acceptance as part of the tender returnable documents. The submission of the EN19 Condition T material availability is mandatory. A detailed quote stating the material as EN19 Condition T will also be accepted by the *Employer.* The *Contractor* will have to submit material certificates within 7 calendar days after purchase order placement.	EN19 Condition T (Quenched & Tempered) steel was used during the detail design and found to be acceptable. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.
3.	Thrust bearing spring constant/rate.	The *Contractor* submits written confirmation that they will be able to manufacture a spring to the required technical specification with a spring rate of 800kg/mm ± 40kg/mm. The submission of this written confirmation is mandatory. The successfully awarded *Contractor* will have to submit spring test certificates for each spring after manufacturing of the springs.	The spring rate of 800kg/mm ± 40kg/mm is the OEM design and will not be changed. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.
4.	Proof of technical services company.	The *Contractor* provides proof that the Engineering manufacturing and machining, as well as the manufacturing of the springs is provided by the company internally and not sourced out by a labour broker.	A labour broker must not be used for this specialized service that is required. The *Contractor* must provide the technical services themselves.

3.4 QUALITATIVE TECHNICAL EVALUATION CRITERIA

Table 3: Qualitative Technical Evaluation Criteria

	Qualitative Technical Criteria Description	Reference to Technical Specification / Tender Returnable	Criteria Weighting (%)	Criteria Sub Weighting (%)
1.	**Thrust bearing spring design calculations.** The *Contractor* submits the complete design calculations for the manufacturing of the spring, detailing the proposed spring material, wire diameter, spring dimensions and spring constant. Acceptable and unacceptable risks for this qualitative technical criterion can be found in Section 3.6.1.	The *Contractor* provides the calculations to assure that the design meet the requirements as per the Technical Specification (Document 31A/100393-C). A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.	**20%**	N/A
2.	**Proof of similar work executed and capabilities.**		**30%**	N/A
2.1	**Proof of similar services provided – springs.** The *Contractor* supplies a list of services provided, similar to supplying of large stiff springs, as evidence. The similar services provided should cover springs with a wire diameter of at least 19mm and a spring constant of at least 800kg/mm. Acceptable and unacceptable risks for this qualitative technical criterion can be found in Section 3.6.1.	The *Contractor* supplies a list of springs supplied to the *Employer* (or other companies), as part of the tender returnable documents, to the *Employer* for acceptance. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.		30%
2.2	**Proof of similar work executed – machined components.** The *Contractor* supplies a list of machining and manufacturing work executed, similar to the machined components as per drawing 18.48/6335 Sheet 2 to 4 (thrust bearing spring bolt, top flange and bottom flange, as evidence. The submission must include photo evidence. Acceptable risks, unacceptable risks and acceptable exceptions for this qualitative technical criteria can be found in Section 3.6.1 and 3.6.2.	The *Contractor* supplies a list of similar manufacturing work done for the *Employer* (or other companies), as part of the tender returnable documents, to the *Employer* for acceptance. The submission must include photo evidence. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.		30%

	Qualitative Technical Criteria Description	Reference to Technical Specification / Tender Returnable	Criteria Weighting (%)	Criteria Sub Weighting (%)
2.3	**Proof of similar work executed – assembly.** The *Contractor* supplies a list of similar work executed, similar to the assembly as per drawing 18.48/6335 Sheet 5, as evidence. The submission must include photo evidence. Acceptable risks, unacceptable risks and acceptable exceptions for this qualitative technical criteria can be found in Section 3.6.1 and 3.6.2.	The *Contractor* supplies a list of similar assembly work done for the *Employer* (or other companies), as part of the tender returnable documents, to the *Employer* for acceptance. The submission must include photo evidence. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.		20%
2.4	**Capabilities.** The *Contractor* supplies a company profile stipulating their capabilities as a company, including photos of the *Contractor's* workshop to indicate the company's capabilities which is in line with the scope of work. The *Employer* reserves the right to visit the *Contractor's* premises (including the premises of possible subcontractors) for evaluating purposes. Acceptable and unacceptable exceptions for this qualitative technical criteria can be found in Section 3.6.2.	The *Contractor* submits a company profile, including photos of their workshop to indicate their capabilities as a company, as part of the tender returnable documents to the *Employer* for acceptance. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.		20%
3.	**Proof of technical services company.** The *Contractor* provides proof that the Engineering manufacturing and machining, as well as the manufacturing of the springs is provided by the company internally and not sourced out by a labour broker. The *Employer* reserves the right to visit the *Contractor's* premises (including the premises of possible subcontractors) for evaluating purposes. Acceptable and unacceptable risks for this qualitative technical criteria can be found in Section 3.6.1.	The *Contractor* provides the proof to the *Employer* for acceptance, as part of the tender returnable documents. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.	**20%**	

	Qualitative Technical Criteria Description	Reference to Technical Specification / Tender Returnable	Criteria Weighting (%)	Criteria Sub Weighting (%)
4.	**Quality control plan.**		**30%**	N/A
4.1	**Detailed quality control plan** The *Contractor* submits a detailed Quality Control Plan (QCP) as part of the tender returnable documents to the *Employer* for acceptance. The *Employer* reserves the right to revise the QCP after purchase order placement. Acceptable and unacceptable risks for this qualitative technical criterion can be found in Section 3.6.1.	The *Contractor* submits a detailed Quality Control Plan (QCP) as part of the tender returnable documents to the *Employer* for acceptance. The QCP must include the high-level scope as per the Technical Specification (Document 31A/100393-C): A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.		30%
4.2	**Method statement** The method statement must include the works as per the Technical Specification and Scope of Work (Document 31A/100393-C). Acceptable risks for this qualitative technical criterion can be found in Section 3.6.1.	The *Contractor* submits a method statement to the *Employer* for acceptance as part of the tender returnable documents. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.		50%
4.3	**Intervention points** The QCP must include intervention points (including hold and witness points) indicating the quality control planned for this project. A hold point is a predetermined stage beyond which work may not proceed without the attendance of the relevant personnel, as indicated on the QCP. Further work may not be carried out until the inspection or event has been completed and signed off by the relevant personnel, as indicated on the QCP. A witness point is a predetermined stage beyond which work may continue, provided that the relevant personnel, as indicated in the QCP, has been notified in writing of the witness point.	The *Contractor* submits intervention points (within the QCP) as part of the tender returnable documents to the *Employer* for acceptance. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.		20%
			TOTAL: 100	N/A

3.5 TET MEMBER RESPONSIBILITIES

Table 4: TET Member Responsibilities

Mandatory Criteria Number	TET 1	TET 2	TET 3
1	X	X	X
2	X	X	X
3 & 4	X	X	X
Qualitative Criteria Number	**TET 1**	**TET 2**	**TET 3**
1	X	X	X
2	X	X	X
3	X	X	X
4	X	X	X

3.6 FORESEEN ACCEPTABLE / UNACCEPTABLE QUALIFICATIONS

3.6.1 Risks

Table 5: Acceptable Technical Risks

Risk	Description
1.	Refer to qualitative technical criteria number 1 – Thrust bearing spring design calculations. The risk of the *Contractor* submitting acceptable calculations without submitting all the dimensions, will be accepted as an acceptable technical risk. The risk of the *Contractor* submitting calculations for a somewhat different spring, but clearly illustrates the *Contractor's* ability to perform the scope, will be accepted as an acceptable technical risk.
2.	Refer to qualitative technical criteria number 2.1 – Proof of similar services provided – springs. The *Contractor* supplies a list of services provided, similar to supplying of large stiff springs, as evidence. The similar services provided should cover springs with a wire diameter of at least 15mm wire diameter and a spring constant of at least 500kg/mm.
3.	Refer to qualitative technical criteria number 2.2 – Proof of similar work executed – machined components. The *Contractor* only provides photo evidence of similar work executed, similar to the machined components as per the Scope of Work, as evidence for the *Employer's* acceptance.

Risk	Description
4.	Refer to qualitative technical criteria number 2.2 – Proof of similar work executed – machined components. The *Contractor* only supplies a list of similar work executed, similar to the machined components as per the Scope of Work, as evidence for the *Employer's* acceptance.
5.	Refer to qualitative technical criteria number 2.3 – Proof of similar work executed – assembly. The *Contractor* only provides photo evidence of similar work executed, similar to the assembly as per the Scope of Work, as evidence for the *Employer's* acceptance.
6.	Refer to qualitative technical criteria number 2.3 – Proof of similar work executed – assembly. The *Contractor* only supplies a list of similar work executed, similar to the assembly as per the Scope of Work, as evidence for the *Employer's* acceptance.
7.	Refer to qualitative technical criteria number 3 – Proof of technical services company. The *Contractor* can be a specialised spring manufacturing company (with a company profile as evidence for the *Employer's* acceptance), but sub-contracts the Engineering manufacturing scope of work to a technically acceptable company as per the evaluation. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.
8.	Refer to qualitative technical criteria number 4.1 – Detailed quality control plan. The risk if the *Contractor* submits a basic QCP (Quality Control Plan) including the high-level scope of work as described in the Technical Specification (Document 31A/100393-C) will be an acceptable risk.
9.	Refer to qualitative technical criteria number 4.2 – Method statement. The risk if the *Contractor* submit a detailed QCP (Quality Control Plan) including the entire method statement as per the scope of work in the Technical Specification (Document 31A/100393-C) will be an acceptable risk.

Table 6: Unacceptable Technical Risks

Risk	Description
1.	Refer to qualitative technical criteria number 1 – Thrust bearing spring design calculations. The risk of the *Contractor* submitting calculations not in line with the scope of work will be seen as an unacceptable technical risk.
2.	Refer to qualitative technical criteria number 2.1 – Proof of similar services provided – springs. The *Contractor* supplies a list of services provided, similar to supplying springs, as evidence. The similar services provided covers springs with a wire diameter of less than 15mm wire diameter and a spring constant of less than 500kg/mm.
3.	Refer to qualitative technical criteria number 2.2 – Proof of similar work executed – machine components. The risk of the tenderer submitting proof of work executed (list or photos) which is not similar to the machined components as per the Scope of Work is an unacceptable risk.

Risk	Description
4.	Refer to qualitative technical criteria number 2.3 – Proof of similar work executed – assembly. The risk of the tenderer submitting proof of work executed (list or photos) which is not similar to the assembly as per the Scope of Work is an unacceptable risk.
5.	Refer to qualitative technical criteria number 3 – Proof of technical services company. The *Contractor* can be an Engineering manufacturing company (with a company profile as evidence for the *Employer's* acceptance), but sub-contracts the spring manufacturing scope of work to a technically acceptable company as per the evaluation. A potential sub-contractor will be scored as per the evaluation criteria stipulated for the *Contractor*, without any exceptions, except if an exception is clearly stated.
6.	Refer to qualitative technical criteria number 4.1 – Detailed quality control plan The risk if the *Contractor* submits a QCP (Quality Control Plan) with a complete different scope of work will be unacceptable.

3.6.2 Exceptions / Conditions

Table 7: Acceptable Technical Exceptions / Conditions

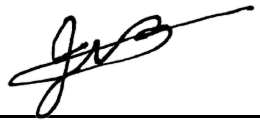
Risk	Description
1.	Refer to qualitative technical criteria number 2.4 – Capabilities. It will be an acceptable exception if the tenderer supply a company profile as evidence of their capabilities, which is in line with the scope of work, without sending photos of their workshop.

Table 8: Unacceptable Technical Exceptions / Conditions

Risk	Description
1.	Refer to qualitative technical criteria number 2.4 – Capabilities. It will be an unacceptable exception if the tenderer supply photos of their workshop and/or a company profile as evidence of their capabilities, which is not in line with the scope of work.

4. AUTHORISATION

This document has been seen and accepted by:

Name	Designation	Signature
Jaco van Zyl	Senior Engineer – Turbine Engineering	
Edmond Dumema	Senior Engineer – Turbine Engineering	
Isak Meyer	Senior Engineer – Turbine Engineering	

5. REVISIONS

Date	Rev.	Compiler	Remarks
June 2023	1	JH van Zyl	Document registered as official document.

6. DEVELOPMENT TEAM

Edmond Dumema – Senior Engineer – Turbine Engineering

Isak Meyer – Senior Engineer – Turbine Engineering

Jaco van Zyl – Senior Engineer – Turbine Engineering

7. ACKNOWLEDGEMENTS

N/A