

Title: **Provision of Surface and Ground water monitoring for a period of 5 years**

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1. Introduction

This scope of work outlines the description and requirements for the provision of surface and ground water monitoring at Hendrina Power Station for a period of 5 years. Surface and Ground water monitoring needs to be carried out for monitoring of pollution and its impacts on the natural environment, inclusive of the natural water resources, as required by the National Water Act (Act 36 of 1998) and related legislation/guidelines/standards/permits and amendments in support of this Act.

2. Supporting Clauses

2.1 Scope

The scope of work (SOW) specifies the required services to be rendered by the Supplier for a period of 36 months and conditions for the acceptance of such a contract. The scope herein does not substitute procurement procedures that will be followed in the procurement process.

2.1.1 Purpose

The scope of work gives detailed information on the expectations of both the Supplier and the Employer (Eskom) for the duration of the Surface and Ground water monitoring Contract.

2.1.2 Integrated Business Improvement objectives

Ensuring that roles and responsibilities are properly defined and communicated to all, to ensure that safety and reliability of equipment used receives appropriate attention. Promote the use of accurate and cautious approach in performing activities linked with this service.

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] 32-1034: Eskom Procurement Policy
- [3] 32-727: Safety, Health, Environment and Quality (SHEQ) Policy

2.2.2 Informative

- [1] NEC3 Term Services Contract
- [2] Hendrina Power Station Water Use Licence 24046033
- [3] Eskom Groundwater Sampling Guideline (GWG05b)
- [4] Eskom Groundwater Governance Guideline (240-85697643)

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2.3 Definitions

Contractor: The Supplier who is awarded the contract and will deliver the services outlined in the document.

Employer: Refers to Eskom, Hendrina Power Station

Contract Manager: The employee nominated by Eskom, Hendrina Power Station who will be overseeing the Surface and Ground water monitoring contract.

2.4 Abbreviations

Abbreviation	Explanation
SANS	South African National Standards
SACNASP	South African Council for Natural Scientific Professionals
SoW	Scope of Work
WUL	Water Use Licence

2.5 Roles and Responsibilities

Role	Responsibility
The Contractor	Will provide the surface and ground water monitoring services in line with this scope of work and adhering to all Eskom SHEQ guidelines and South African SHEQ acts.
The Employer	Will inform the Supplier of expected service requirements as documented in this scope of work and all other related procedures.

2.6 Process for Monitoring

The rendered service will be audited as part of the Internal and external WUL licence audit at an annual interval.

2.7 Related/Supporting Documents

- Eskom Groundwater Sampling Guideline (GWG05b)
- Eskom Groundwater Governance Guideline (240-85697643)

3. Scope of Work for Surface and Ground Water Monitoring

3.1 Executive Overview

Eskom, Hendrina Power Station intends to enter into a five-year contract with a suitable qualified, experienced and established contractor with the capacity to conduct surface and ground water monitoring services for Eskom at the Hendrina Power Station canteen.

The provision of the Surface and Ground water monitoring Services comprises of the following:

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- The quarterly sampling, analysis, interpretation of results, report writing and submission to relevant parties and routine maintenance of boreholes and marker posts for a period of 5 years The compilation and submission of both electronic and hard copy reports each quarter to Hendrina Power Station.
- The contractor will also be expected to produce an annual report based on the quarterly reports.
- The contractor will also be required to perform a number of specialist reports (as detailed below) and produce a report after each study is completed.
- The maintenance of marker posts as and when required.

The areas that form part of the monitoring footprint include the following areas:

- Power generation plant,
- Water cooling facilities,
- Pullenshope township area,
- Sewage treatment plant,
- Oil skimmer plant,
- Domestic General waste disposal facility
- Oil areas (rehabilitated),
- Ash sites (Ashing area and Return water facilities),
- Coal stockyard,
- Woest-Alleen spruit (east and west sections)
- and the rest of the Power station activities sites.

3.2 Employers Requirements for the service

3.2.1 Routine quarterly monitoring for both ground and surface water which includes:

- Water level monitoring, sampling and chemical analysis of the existing borehole network and any new boreholes drilled during the time of the contract.
- Sampling and chemical analysis at the existing surface monitoring points
- Maintenance of the borehole caps, marker posts and related structures of the existing borehole network and any new boreholes drilled during the time of the contract.
- Submission of quarterly reports to the Employer
- A combined or integrated annual report at the final quarter of each year.

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3.2.2 The quarterly reports shall at minimum include the following information:

- Introduction including the purpose and scope of the report.
- The datasets used (locations, periods, etc.)
- Quality Assurance and Controls
- Groundwater and Surface water quality
- Groundwater Levels and Contours
- Evaluation of the current situation of the monitoring system (including a comparison with relevant Resource Quality Objectives described in the water use licence, background, drinking water quality standards)
- Spatial and Temporal Trends
- Identification of issues of access, and borehole and marker post maintenance (which shall include photos) required during the monitoring event. The identified maintenance shall be repaired during the next phase (which shall include photos).
- Findings for the assessment period, specifically pertaining to requirements of the water use licence water quality objectives.
- Recommendations derived from the findings (including all non-compliances), the recommendations shall include feasible proposed rehabilitative measures.
- Conclusion
- All chemical analyses results for physical and inorganic constituents in the format specified by the Employer. The data should at a minimum contain the date, time, location and analysis method for each sample. The contractor shall indicate which parameters were measured in field or in a laboratory. Each report shall contain the laboratory certificate of analyses. All data shall be clear, concise and legible.
- Interpretation of results shall contain Piper and Durov plots in addition to other graphs used to assist with data interpretation.
- A soft copy and three hard copies of the final report shall be submitted to the Employer after each phase of monitoring or completion of a specialist study.

3.2.3 In addition to the quarterly report requirements, the Final Report shall include the following:

- Prediction of future environmental impacts (both positive and negative).
- A complete risk analysis assessment on areas identified as areas with high levels of contamination.

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3.2.4 The sampling and analyses should be according to the latest applicable versions of the following documents:

- Eskom Groundwater Sampling Guideline (GWG05b)
- Eskom Groundwater Governance Guideline (240-85697643)

3.2.5 General Requirements:

- All reports are to be submitted to the Employer for review within 4 weeks of sampling before the final version is submitted.
- A sampling procedure is to be submitted that is aligned with the documents specified under 1.2.4, which shall be approved by the Employer.
- No boreholes shall be decommissioned and relocated without a necessary and proper study followed by approval from DWS.
- The Contractor shall be available for an engagement with the Employer if the need arises before finalisation of the reports.
- Maps shall be updated as required after each monitoring phase.
- The Employer reserves the right to add any additional documents related to the scope for the duration of the contract.
- All information generated due to this contract (by the Contractor or its subsidiaries) is the intellectual property of the Employer.
- Parameters to be monitored as per the Hendrina Water Use Licence

3.2.6 Chemical testing and analysis:

- Chemical analysis shall be performed by qualified personnel under a SANAS accredited laboratory.
- Analysis must be carried out in accordance with methods prescribed by and obtainable from the SANS in terms of the Standards Act, 2008 (Act 8 of 2008)
- The parameters to be analysed can be found in the latest version of the Hendrina Power Station Water Use Licence.
- The contractor is to specify which instruments are to be used for each group of parameters.
- Calibration certificates for all instruments used shall be attached to each report. The employer may request calibration certificates and records at any time.
- The Employer may request a repeat sampling and/or analysis should the accuracy or validity of any sample(s) be questioned during review of the quarterly reports at no additional cost to the Employer.

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3.2.7 Specialist Studies

Before the commencement of any specialist study, the Contractor shall submit a method statement and programme to the Employer for approval. The reports shall be submitted within 1 month of receipt of comments on the draft report. The specialist reports must be both hard copy and electronically.

3.2.8 Plume Model

The contractor is required to conduct at the start of the contract and update the plume model study every 2 years. This will include an update to the flow and transport model.

3.2.9 Hydro-census and Aquifer Vulnerability Study

The contractor is required to conduct a hydro-census at the start of the contract. The census and study shall be conducted within a 5km radius. Each borehole in the study area shall be sampled and the chemical results shall be compared to the WUL quality limits and the SANS 241 Drinking Water Standard.

At a minimum the study report shall contain the following:

- The impact zone for Hendrina Power Station
- The potential impact to downstream users
- Comparison of upstream and downstream water qualities
- Identification of pollution sources and a risk assessment for each identified source
- Identification of any weaknesses or shortfalls in the current monitoring system
- The Contractor shall conduct an aquifer vulnerability assessment using an approved method that considers the use of soil media, aquifer media, vadose zone and recharge.

3.2.10 Conceptual Modelling

The contractor shall conduct a conceptual modelling of the aquifer at Hendrina Power Station once in the 3-year duration of the contract.

The following minimum requirements should form part of the report:

- Description of the groundwater levels, flow directions and discharge zones
- Description of unsaturated zone, such depth and flow
- Description of lithological composition (e.g., distribution of formations), which has a bearing on groundwater occurrence and the base of the groundwater system.
- Details regarding aquifer boundaries and compartments
- Presence of features of importance to groundwater occurrence and movement (e.g., fractures, cavities, faults etc.)
- Piezo metric levels of confined aquifers

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- Distribution of springs, seepage zones and wetlands
- Description of inflow and outflow zones
- Analysis of groundwater flow and mechanisms
- Quantification of groundwater flow and storage through a groundwater balance
- Recharge and evapotranspiration potential
- Identification of contamination sources and impacts (e.g., dewatered or polluted area)
- Description of the water quality distribution throughout the groundwater system

3.2.11 Incident/s Environmental Rehabilitation Studies

The consultant will be required to conduct an incident impact study/ rehabilitation study after a reportable incident has occurred within the power station. The environmental rehabilitation study per incident will be determined by the magnitude of the incident and the need for the rehabilitation. During a serious incident that probe the study, the contractor will need to respond within 24 hours for collection of data needed.

3.2.12 Water Quality Data Base Management

The contractor shall update and maintain a database for existing and future data to be collected for the duration of the contract. The updated database shall be submitted to the Employer after each monitoring phase in a format specified by the Employer. All data generated for the duration of the contract shall remain the intellectual property of the Employer.

4. The Contractors Plan for the service

4.1 The Contractor's plan for the service

The contractor is to submit a plan and schedule covering all requirements as per section 1.2 along with any relevant proof (e.g., SANAS accreditation, SACNASP accreditation), a sampling procedure as described in section 3.2.5 and a proposed sampling schedule which includes sampling dates, sample holding times, sample analysis dates and report submission dates.

NB: A draft copy of a monitoring phase programme indicating all tasks including specialist studies to be conducted for the five-year contract to be provided as a tender returnable before contract award.

4.2 Management meetings

Meetings will be convened and chaired by the *Contracts Manager* as and when required, including the following:

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Name	Frequency	Attendance by relevant Employer's personnel:	Attendance by relevant Contractor's personnel:
Contract kick-off	Once off	Contract Manager, Environmental Manager and/or other necessary representatives.	Site manager, Site supervisor and/or other necessary representatives.
Early Warning	As and when notified by either party	Contracts manager, Environmental Manager and/or other necessary representatives.	Site manager and Site supervisor/manager and other relevant personnel.
Technical and/or non-conformance	At least once every 6 months	Contracts manager, Environmental Manager and/or other necessary representatives.	Site manager, Site supervisor and technical representative.
Safety Incidents	For each occurrence	Safety Representative, Contract manager and Environmental Manager and others involved.	Safety Representative, Site manager and Site supervisor and others involved.

Table 1: Meeting Schedule

The Employer and the Contractor (and any other co-opted members) shall meet as and when required to monitor progress on sampling and monitoring of ground and surface water monitoring programme. The following aspects will be assessed and discussed:

- Contractor's challenges with access to the monitoring points
- The Employer shall inform the Contractor of any environmental incidents that might affect the outcome of the monitoring phase.
- The Employer and Contractor shall assess the adequacy of the monitoring programme.
- The contractor shall provide feedback on the monitoring borehole structural integrity.
- The progress of any other relevant activities
- To discuss any technical or commercial issues
- To discuss the current status of the Key Performance Indicators as outlined under section 2.4.

Additional Contractor Management Meetings shall be held between the Service Manager and the Contractor upon request from either party as per the table above.

Meetings of a specialist nature may be convened as specified elsewhere in this Service Information or if not so specified by persons and at times and locations to suit the Parties, the nature and the progress of the *service*. Records of these meetings shall be submitted to the *Service Manager* by the person convening the meeting within five days of the meeting. Meetings will be conducted remotely if possible.

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All meetings shall be recorded using minutes or a register prepared and circulated by the person who convened the meeting. Such minutes or register shall not be used for the purpose of confirming actions or instructions under the contract as these shall be done separately by the person identified in the *conditions of contract* to carry out such actions or instructions.

4.3 Contractor's management, supervision and key people

An organogram must be submitted for any Joint Venture clearly indicating the people and their lines of authority/communication. This includes companies who make use of external laboratories.

The contractor is to submit the full qualifications and employment history for personnel executing tasks as outlined in section 1.2.

The supervisor/manager shall be present on site during the sampling phase to ensure all activities are as per the prescribed standards and procedures. The Employer shall be notified if the supervisor/manager is replaced by another person. In such a case, the Contractor is to provide the Employer with proof of the manager/supervisor's employment history, full qualifications and professional registration for approval. The employer may refuse the new supervisor/manager if the criteria are not met.

The Contractor shall appoint a competent Contract Manager / Employer's Representative who shall manage all contract related matters and if necessary, may also manage technical issues. Change of this person shall be communicated in writing within one week of such change to the Employer party.

4.4 Scope Review / Job Task Assessments

The Employer may conduct reviews or job task assessments as deemed necessary of the Contractor's work execution against this Scope, the Eskom Groundwater Guideline (240-85697643) and any other document listed in this Scope.

The contractor will be assessed quarterly on the following Key Performance Indicators (KPI's)

- 1) Adherence to the schedule provided
- 2) Safety File Audits
- 3) Database management

The KPI's will be rated on a score of 1-5 (1 poor performance, 5 excellent performance) as follows:

- 1) 1 – two weeks deviation from schedule
- 2 – one week deviation from schedule
- 3 – 4 days deviation from schedule

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4 – 2 days deviation from schedule

5 – No deviation from schedule

Any anticipated deviation may be communicated to the contract manager beforehand with valid reason of constraint.

2(i) Completeness of safety file:

1 – Does not pass the audit

5 – Passes the audit

3) Database Management:

1 – Database does not contain all data, database not updated and communicated within 2 months of sampling.

2 – Database contains all data, database updated and communicated within 2 months of sampling.

3 – Database contains all data, database updated and communicated within 6 weeks of sampling.

4 – Database contains all data, database updated and communicated within 5 weeks of sampling.

5 – Database contains all data, database updated and communicated within 4 weeks of sampling.

The contractor is expected to perform achieve a score of 3 for the latter KPI's throughout the contract. The Contractor shall be penalised if the average score is less than three. Should the issues not be resolved on time the 0.5% on the total amount of the invoice for that quarter shall be deducted per day as penalty.

4.5 Documentation control

A detailed report of the monitoring must be submitted after each monitoring phase. An electronic copy must be emailed to the Environmental Department as soon as available. In addition, three hardcopies and a softcopy loaded on a cd or DVD drive must be submitted to the Environmental Department.

All documentation (i.e., drawings, graphs, data etc.) must be provided to the Employer by the Contractor. These documents will become the lawful property of the Employer.

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4.6 Invoicing and payment

Payments will be made per quarter. Payment will only be made upon the receipt of the final hard copies of the reports. Refer to section 2.4 for penalties should any requirement stated in section 2.1 be omitted.

All invoices must be submitted via e-invoicing.

Within one week of receiving a payment certificate from the *Service Manager* in terms of core clause 51.1, the Contractor provides the Employer with a tax invoice showing the amount due for payment equal to that stated in the *Service Manager's* payment certificate.

The Contractor shall address the tax invoice to

Eskom Holdings SOC Limited

Hendrina Power Station

Private Bag

Pullenshope

and include on each invoice the following information:

- Name and address of the Contractor and the Service Manager.
- The contract number and title.
- *Contractor's* VAT registration number.
- The *Employer's* VAT registration number 4740101508.
- Description of service provided for each item invoiced based on the Price List.
- Total amount invoiced excluding VAT, the VAT and the invoiced amount including VAT.

4.7 Training workshops and technology transfer

The Employer may request the Contractor to provide one-day skills-transfer workshops at Hendrina Power Station once a year.

4.8 Things provided at the end of the *service period* for the *Employer's* use.

All data, reports, studies and results are to be provided to the Employer at the end of the service period and they shall remain the intellectual property of Eskom.

4. SHEQR requirements

SHEQR requirements that cover the total holistic approach to all potential risks includes the following legal obligation:

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- **S** = All possible **Safety** risks associated with the applicable activity is identified and captured in a risk assessment format which include compliance to the Occupational Health and Safety Act and regulations - 85 of 1993
- In terms of describing the actions required for the routine to be executed, the safety aspects below need to be reviewed in liaison with the Safety officer and addressed accordingly:
 - 1) *Does the System and/or Process introduce any Safety risks in terms of OHS requirements?*
 - 2) *Does the System and/or Process minimise risk to personnel? - personal protective equipment requirements to be stipulated.*
 - 3) *Have all aspects of occupational hygiene / health been considered? - if there is uncertainty, it may be prudent to request assistance from the Medical station or the Safety Officer*
 - 4) *Security aspects must also be considered - this is to prevent unauthorised entry into limited access areas such as equipment rooms, etc. It is important that the requirements for access, as well as contact persons regarding such be stipulated clearly.*
 - 5) *Fire precautions to be detailed in terms of the type of fires that can occur as a result of the routine and the type of fire control that needs to be exercised.*
 - In respect of hazardous locations, certain tools, equipment and personal protective equipment needs to be specified. The following quick reference to be used to define the risk and establish the relevant safety measures, and control measures initiated in liaison with the Electrical system engineer responsible for hazardous locations:
 - 1) *Is it a storage area for chemicals (Lime, Ammonia, Caustic, Acids)?*
 - 2) *Is it a storage area for fuels (Diesel, Petroleum, Oil)?*
 - 3) *Is it a storage area for gases (Hydrogen, LPG)?*
 - 4) *Is there a risk of exposure to flammable or combustible gases as a result of the process in the area (Hydrogen generating plant, Generators, Battery rooms, Sewage plant, Paint spray booths)?*
 - 5) *Is there a risk of exposure to flammable combustible liquids or particles as a result of the process in the area (Oil burner workshop, Fuel off loading and filling stations, Coal plant, Carpenter workshop)?*
 - 6) *Is there a risk of exposure to flammable or combustible chemicals as a result of the process in the area (Chlorine dosing)*
 - 7) *Is any X-ray testing performed in the area?*
- **H** = All possible **Health** risk exposures to employees are to be identified in liaison with the Occupational Hygienist in respect of the following aspects when defining measures to ensure the health of personnel is not compromised in the execution of the activities described by the document:
- 1) *Is there any risk of exposure to hazardous substances, i.e., asbestos, silica, dust?*
 - 2) *Does the routine include working in a confined space?*
 - 3) *Does the routine include working in an area where the noise levels exceed 85dB?*
 - 4) *Does the routine include working at heights?*
 - 5) *Does the routine include working in an area where lighting may be compromised?*

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- **E** = All **Environmental** aspects and impacts are identified to mitigate any potential environmental impact and ensure compliance with ISO 14001:2004. Use the questions below to guide you on what may lead to environmental impacts and liaise with the Environmental Management Department in order to capture these impacts on the EMS database, reference to the legal register and include suitable processes to manage the aspects:

- 1) *Will any effluent, (solid, liquid or gas) be produced as a result of this activity?*
- 2) *Could any environmental emergency (i.e., ash or oil spillage) result from this activity being carried out?*
- 3) *Will this activity have an effect on any third party? I.e., the draining of units could lead to overflow of the Maturation Pond into the farmer's dam.*
- 4) *Will this activity impact on the physical environment? I.e., are you dumping ash, coal etc.*
- 5) *Is this activity governed by any permits or legislation that may be contravened? I.e., the changing of fabric filter bags.*
- 6) *Can any possible aspects be identified as a result of the input, process and output of the activity under normal as well as abnormal conditions?*

Note: An environmental aspect is the element of an organisation's activities or products or services that can interact with the environment, i.e., during the maintenance of a motor, the environmental aspect in this activity would be oil, degreasers, solids, rags, etc. These aspects create a negative impact through pollution when they interact with the environment.

- **Q** = All Contract **Quality** Plans, Quality Inspections plans, and compliance to ISO 9001:2015 to be included in the document and adhered to.
Quality requirements to be specified in the form of a Quality Inspection Plan (QIP):
- *A QIP contains a list of all activities contained in the process and refers back to the document for all detailed information, as would be contained in the document annexures. It is also attached to the document as an annexure.*
 - *Hold and/or witness points are indicated for each activity listed, in order to define the type of quality control activity required.*
 - *Master QIP's need to be approved per process but can be compiled for a group of components. However, before work on any component commences, a QIP must be approved for that component specifically.*
- **R** = All **Business risks** applicable to the specific activity are identified and captured to mitigate business risk impacts. This is done in accordance with the Risk assessment procedure (HSPPA/036) and is to include all other risk disciplines, i.e., Protective Services.
- *The Integrated Risk Management philosophy is to be applied when compiling the risk assessment.*
 - *All aspects identified in respect of Safety, Health, Environmental, Quality, Finance, Commercial, Legal and Security requirements need to be listed and ranked, and mitigating strategies identified.*
 - *Responsible persons to be listed by designation, and time frames for mitigation to be included.*
 - *The risk assessment included in the document will basically serve the purpose of a baseline risk assessment, with a detailed risk assessment being compiled whenever there is a need, based on the system status at the time of the activity taking place.*

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