

PART 3: SCOPE OF WORK

THE PROVISION OF LABORATORY SERVICES FOR THE PREPARATION, ANALYSIS AND REPORTING OF RESULTS FOR CONTRACT COAL AND LIMESTONE SAMPLES FOR ESKOM PRIMARY ENERGY ON AN “AS AND WHEN REQUIRED” BASIS FOR THE PERIOD OF 36 MONTHS

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C3.1: EMPLOYER'S SERVICE INFORMATION

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1. SCOPE OF WORK

The provision of laboratory services for the preparation, analysis and reporting of results for contract coal/limestone samples for Eskom Primary Energy on an “as and when required” basis for the period of 36 months.

1.1 PREPARATION, ANALYSIS AND REPORTING OF RESULTS FOR CONTRACTUAL COAL /LIMESTONE SAMPLES

- Preparation, analysis and reporting of results shall be performed for all Eskom contract coal and limestone samples delivered at the laboratory.
- The work includes preparation and analysis of dispute samples, contractual samples, variability tests samples, drainage test samples, verification samples, samples for bias testing and other ad hoc request special samples.
- The laboratory contracted for Eskom preparation, analysis and reporting shall have procedures and systems in place specifically Laboratory Information Management System (LIMS) for sample receipt, registration and data processing of contract coal and limestone samples.
- In terms of contract coal sample preparation, the laboratory shall endeavour to eliminate the element of human error and ensure compliance to Eskom's requirements.
- All laboratory equipment should be locally supported.
- Laboratories shall comply with all environmental, health and safety and associated legislation related to the scope of work.
- The laboratory shall comply with the Environmental Management System (EMS) (ISO 14001), Occupational Health and Safety Act 85 of 1993, and ISO 9001 requirements.
- The laboratory shall comply with Eskom environmental, health, and safety as well as quality and risk (SHERQ) management systems and principles.
- The laboratory may be selected as a sample for auditing purposes against the Eskom EMS, and Occupational Health and Safety. Eskom will communicate this at the relevant time periods.

- Waste from the analysis will be stored and disposed of in a responsible and correct manner at a licenced facility. Disposal certificates for waste and left-over coal are to be sent to Eskom Environmental department monthly.
- All environmental and health and safety incidents that occur during the analysis of coal / limestone need to be reported to Eskom PED.
- A portion of the sample will be sent to Eskom Research Technology & Development (RT&D) for emissions testing.

1.2 Laboratory Accreditations

- The laboratory contracted to analyse Eskom contract coal and limestone samples shall have accreditation on the following methods:
- ISO 17025: General requirements for the competence of testing and calibration laboratories.
- ISO 1928: Solid minerals fuels - Determination of Gross Calorific Values (CV) by the bomb calorimetric method, and calculation of Net Calorific Value.
- ISO 1171: Solid minerals fuels - Determination of Ash content.
- ISO 562: Hard coal and coke – Determination of Volatile Matter or equivalent method.
- ISO 540: Solid minerals fuels – Determination of fusibility of Ash high temperature tube method in reducing Atmosphere or equivalent method.
- ISO 589, (one or two step): Hard coal – Determination of Total Moisture or equivalent method.
- ISO 11722: Solid minerals fuel- hard coal - Determination of moisture in the general analysis test sample by drying in Nitrogen or
- SANS 5925: Moisture content of coal samples intended for general analysis (air-oven dry)
- ISO 13909-4: Part 4 – Preparation of test samples or ISO 18283: Hard coal and coke- manual sampling.

- ISO 3310-1: 2000 Test sieves – Technical requirements and testing or ISO 1953: size Determination by dry method or equivalent method.
- ISO 567: Bulk density or equivalent method.
- ASTM D4239: Total Sulphur or equivalent standard.
- ASTM C25-06 Standard test methods for chemical analysis of limestone, quicklime and hydrated lime.
- ASTM C50-00 Standard Practice for Sample Preparation, Packaging, and Marking of Lime and Limestone Products.

1.3 Sample receipt and registration

- On arrival at the laboratory, each sample shall be weighed, registered on LIMS and an electronic or soft copy delivery note shall be sent to Eskom. The laboratory shall not analyse a sample below the minimum required mass. Such a sample shall be returned to the mine after consultation with Eskom.
- Laboratories shall ensure that all Eskom samples are stored in a secure and safe manner, where the integrity of analytical results will not be compromised as per the requirements of the Coal Quality Management Procedure (CQMP). Samples must be accessible and easily retrievable according to a documented system.

1.3 Sample preparation and analysis

1.3.1 The laboratory shall meet the Eskom standards for sample preparation and analysis for coal as listed below:

- Sample preparation of coal shall be done according to ISO 13909 part 4 and ISO 18283. The service provider shall endeavour to eliminate the element of human error in the process of sample preparation.
- Eskom samples shall be split in a 6- or 8-way cascade splitter to achieve minimum masses for analysis as per ISO 13909 part 4 and the Eskom CQMP.
- Drying of Total Moisture, Size Grading and General Analysis samples shall be done in the oven at the relevant controlled temperatures (environment) or shaded area.
- The final prepared sample for General Analysis shall be ground to 100% passing a 212-micron sieve.

- Splitter verification shall be done on Ash and CV , minimum six (06) monthly.
- All analytical parameters of Eskom samples shall all be done in duplicate.
- No repeat analysis shall be conducted on duplicate samples that are within the repeatability limit.

1.3.2 The laboratory shall meet the Eskom standards for sample preparation and analysis for limestone as listed below:

- ASTM C25-06 Standard test methods for chemical analysis of limestone, quicklime, and hydrated lime.
- Limestone samples shall be split using a cascade splitter according to the agreed testing method.
- Sample preparation of limestone shall be done according to the X-ray Fluorescent Spectrometer pressed pellets or fused beads methods.
- Sample preparation and analysis of limestone for moisture and sizing shall be done as per agreed laboratory developed and validated method.
- Analysis of Eskom samples shall be done in duplicates.
- No repeat analysis shall be conducted on duplicate samples that are within the repeatability limit.

1.4 Analysis and reporting turn-around-time.

The laboratory shall guarantee a turn-around time of twenty-four (24) hours for all contract samples from the time the samples are received from the transporter to the time the results are reported to the specified parties.

1.5 Laboratory Information Management System (LIMS)

All contracted laboratories shall have a LIMS to support assurance according to the following:

- The laboratory shall have all equipment (e.g. balances and analytical instruments) linked to LIMS for automatic transfer of data and results.
- The laboratory shall ensure that they are always using the latest version of LIMS.
- The LIMS must be fully integrated or linked to Eskom LIMS (SAP Manager), and Eskom should have access to real time results.
- LIMS must be fully secured to prevent possible manipulation of results.
- LIMS must autogenerate Eskom Laboratory Test reports.
- There must be an auditable process to separate system rights (reading, editing, capturing, data export, rights etc.) for various approved users on the system.
- The system must automatically backup test results, minimum, hourly.

1.6 Laboratory Quality Controls

The laboratory shall have a documented quality control procedure. The laboratory shall ensure that Certified Reference Material (CRM) is run after every 5 samples (in duplicate) and Ash Fusion Temperature (AFT) CRM's are to be included with each load.

Quality Control (QC) charts shall be updated on a shift basis and plotted on a graph, and the QC charts shall be executed in the following manner:

QC charts shall be plotted on "dry basis" :

- When 3 successive points are on the same side of the graph between warning and action limit, corrective measures shall be put in place to address the potential negative/positive bias or potential outlier,
- When 7 successive points are on the same side of the centreline, corrective measures shall be put in place to address the negative/positive bias.

1.7 Contractual Coal and Limestone Sample Security

- Installation of auditable surveillance cameras with a view of the whole process from the sample receiving point to the reporting of the results, as well as the storage area.

- The laboratory must allow access to the surveillance cameras as and when requested by Eskom.
- The laboratory must allow linkage of systems or integration with Eskom Contractual Sample Security Systems.
- Device a system to ensure traceability of the sample from receipt to reporting of results, and the storage area.

1.8 Proficiency testing schemes

The laboratory shall participate in a minimum of two proficiency testing schemes and forward the results to Eskom.

1.9 Reporting of Results

- The results shall be reported on Air Dried, Moisture Free and As Received basis, except for AFT, Sizing, Analytical Moisture, Total Moisture, oxides, and Abrasive Index.
- Reporting of results shall be done according to the Eskom provided Excel format.
- Each analytical report shall be checked and signed off by a competent Technical Signatory as mandated by SANAS.
- The analytical report shall be sent electronically via email simultaneously to both Eskom and the Mine in line with the provided distribution list, as well as to Eskom SAP system. Results shall be reported according to Eskom's requirements.
- Incomplete or incorrect analytical report shall not be sent to Eskom and the Supplier, only the final report evaluated and signed by the Technical Signatory shall be sent out.
- No information shall be shared with third parties without consent from Eskom.
- The laboratory shall comply with Eskom Information Security Policy.

1.9 Laboratory deliverables

- The analytical report shall be sent electronically via email simultaneously to both Eskom personnel and Eskom SAP and the Mine without compromising information security.
- The laboratory shall have all analytical results readily available for the duration of the contract and 3 years post contract expiry and make them available to Eskom SAP as and when requested.
- All analytical results reported shall be traceable from LIMS to all analytical equipment or vice versa.

- The results will be reported within twenty-four (24) hours for all Eskom samples received and analysed. This is from receiving of the samples to reporting of the results.
- The laboratory shall ensure that all methods are accredited by SANAS.

2. AD HOC ACTIVITIES

- The service provider shall conduct preparation, analysis and report results of verification, variability, drainage testing, bias testing of the sampling plants, abrasive index calibration, bulk density, and stockpile auger samples, Hard Groove Index (HGI), ultimate and coal washability, disputes, density and /or float and sink analysis, ultimate analysis (Cl, C, H, N, O, and S) & waste classification on an ad hoc basis.
- The laboratory shall ensure that all methods are accredited by SANAS.
- The company shall comply with safety, health, environment, risk and quality requirements as well as the Mine Health and Safety Act when working at the Mine or the Occupational Health and Safety Act at the Power Station.

3. INTERPRETATION AND TERMINOLOGY

Abbreviation	Meaning given to the abbreviation
CSA	Coal Supply Agreement
CQMP	Coal Quality Management Procedure
LQMP	Limestone Quality Management Procedure
ISO	International Organization for Standardization
CHN	Carbon, Hydrogen, and Nitrogen
O	Oxygen
S	Sulfur
LIMS	Laboratory Information Management Systems
AFT	Ash Fusion Temperature
ASTM	American Society Testing and Materials