Eskom	Scope of Work	Engineering

Title: **Kendal Power Station Emergency Dump – Design Clarification and Construction Supervision Scope of Work**

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1. INTRODUCTION

1.1 BACKGROUND

Kendal Power Station is a 4 116 MW installed capacity base load coal fired power station, consisting of 6 units. Eskom commenced construction of Kendal in 1982, which was completed in 1993. The ash disposal facility is approximately 2km south-west of the Kendal Power Station terrace, and to the west of the R686.

Ash is generated as a by-product due to the combustion of coal from the power station. As a result of this process Kendal produces about 5.5 million tons of ash per annum. The ash is transported from the boilers to the dry ash dump by means of dual overland conveyors. This ash is currently being disposed of within the premises of the Kendal Power Station, on the Emergency Ash Dump and the Main Ash Dump.

The Eskom Kendal Power Station Emergency Dump or commonly known as “E-Dump” is located between the Power Station and the existing ash dump, on the Power Station terrace. The facility operates as an emergency storage of ash if the spreaders or stacker at the existing continuous Ash Disposal Facility (ADF) is inoperable. Once the equipment is operable, the ash is loaded onto the conveyor reporting to the ADF. Currently, this area is cleared by means of trucking the ash to ADF, which will be the emergency method of removal of ash in the event that the onloading conveyor is not available, in order to clear the emergency dump are as quick as possible.

1.2 PROJECT OVERVIEW

The Kendal Power Station E-Dump Extension is required to ensure that the new storage space at the E-Dump will allow for sufficient storage of ash for a period of 7 days.

The current area comprises of a reinforced concrete surface bed with an area of approximately 5,500 m^2. The facility includes for a silt-trap and Stormwater impounded facility, approximately 1,000 m^3 in capacity. The surface bed is currently unbunded. Currently less than 2 days ash production may be accommodated on the surface bed.

Zitholele Joint Venture Company (ZJVC), which comprises of Zitholele Consulting, Golder Associates Africa and JG Afrika, was appointed in September 2015 by Eskom (SOC) Ltd., Eskom, to undertake the basic and detailed design of the Kendal Power Station Emergency Dump project, in accordance with the approved licences received from Department of Environmental Forestry and Fisheries (DEFF) and Department of Water and Sanitation (DWS).

It is required by the Department of Environmental Forestry and Fisheries (DEFF) and the Department of Water and Sanitation (DWS) to appoint Engineering Council of South Africa (ECSA) professional registered Civil Engineers to supervise the construction of the works to ensure that the project complies with the conditions stated in the Environmental Authorization (EA) and Water Use License (WUL) issued to Kendal for the construction of the ADF. In addition EA condition 17.3.2 and WUL Appendix VI require that the construction and further development on the site must be carried out under the supervision of an Engineering Council of South Africa (ECSA) professional registered Civil Engineer, approved by the Designer.

In order to allow competitive tendering the appointed consultant will have to take over the design and the design liability in order to be able to address design queries during the construction supervision period.

The EA states that annual submission of report to the Authorities (Department of Environmental Forestry and Fisheries & Department of Water and Sanitation) on progress of construction and commissioning must be done by an ECSA professional registered Civil Engineer.

Provision of design clarification and construction supervision for the Emergency Dump Extension Project at Kendal Power Station to fulfil above mentioned conditions.

2. SUPPORTING CLAUSES

2.1 SCOPE

2.1.1 Purpose

The purpose of this document it to give a high level scope of work for the sourcing of engineering services from a Civil Subject Matter Expert (SME), for taking over the design and the undertaking of the design clarification and construction supervision.

2.1.2 Applicability

This document applies to Generation Kendal 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:

2.2.1 Normative References

1. Concept Design Report for Kendal's Continuous and Emergency Ash Disposal Facilities Ref: 12810, 5 May 2014.
2. Kendal Power Station Existing Area Water Use Licence dated 24 June 2011.
3. Kendal Emergency Dump Extension, User Requirement Specification.
4. SANS 1200 series, Standardized specification for Civil Engineering Construction.
5. The National Water Act & Regulation GN704.
6. Environmental Protection Acts NEMA & NEMWA and regulations.
7. 240-53113685, Design Review Procedure.
8. All work shall be conducted in accordance with the requirements of the Occupational Health and Safety Act (Act 85 of 1993) as amended.
9. 379-KEN-BEEC-D00035-1, Kendal Emergency Dump Extension Project – Employer's Works Information

2.2.2 Informative References

1. Kendal Power Station Ash Disposal Facility Project: Environmental Impact Assessment Report.
2. ENV13-R019 Water management policy.
3. 240-4332798, Engineering policy.

2.3 DEFINITIONS

2.3.1 Classification

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

2.4 ABBREVIATIONS

Abbreviation	Description
DEFF	Department of Environment, Forestry and Fisheries
DWS	Department of Water and Sanitary
ECN	Engineering Change Notice
EI	Engineering Instruction
EIA	Environmental Impact Assessment
ER	Engineering Response
ITP	Inspection and Test Plan
LPS	Low Pressure Services
NCR	Non Conformance Report
N/A	Not Applicable
PCD	Pollution Control Dam
RFI	Request For Information
SME	Subject Matter Expert
SoW	Scope of Work
SRD	Stakeholders Requirements Document
QCP	Quality Control Plan

2.5 RELATED/SUPPORTING DOCUMENTS

1. Geotechnical Report on the Ash Disposal Site for Kendal Power Station. Jones & Wagener Inc. 16 May 1986. Report No: ESC 3/86/1911.
2. Kendal Power Station, Dry Ash Disposal Facility, Operating Manual, Revision 4, April 1999. Compiled by: A Oliver, Revision by: A Kreuiter, Date: 31 April 1999. Doc Ref: Kendop4.Doc. Civil & Building Division, Generation Eng. Dept.

3. SCOPE OF WORK

The scope of work entails the Design Monitoring and Construction Supervision of the detailed design for the extension of the Emergency Dump Extension Project and the interfacing with the Emergency Dump In-Loading Facility Project.

All Construction and Operating Philosophies must be in line with the existing ashing area's WUL and the new ashing area's Waste and Water Use Licence requirements.

The following is the summary of the scope of work expected from the Civil Consultant as part of the Design Clarification and Construction Supervision of the detailed design for the Emergency Dump Extension Project and the interfacing with the Emergency Dump In-Loading Facility Project.

Scope of Services

The scope of the proposal includes the following:

- Familiarise himself with the Emergency Dump Extension Project and the Emergency Dump In-Loading Facility Project.and all design progression which has occurred to date.
- Take full accountability for all design clarification updates or changes to the Kendal Emergency Dump Extension, including getting DEFF & DWS approvals if required.
- Technical queries including review of method statements and inspection plans;
- Construction and commissioning monitoring of Emergency Dump Extension including:
    - Full-time representation on site by a construction monitoring team including:
        - Monitoring of installation of civil components;
        - Weekly review and sign-off of Quality Control documentation;
        - Weekly review of data book documentation;
        - Control of Eskom documentation including ECNs, NCRs and ITPs.
    - Monthly site inspections by the design engineer, fortnightly site visits by PrEng;
    - Technical support including attendance of technical meetings and input into Eskom documentation including Engineering Change Notices (ECNs) and Engineering Responses (ER). Technical input into claim adjudication where requested by Eskom. Technical input into quantities where requested by Eskom.
    - Technical compliance in terms of environmental authorisation licences;

- Risk identification, monitoring and mitigation;
- Annual submission of report to the Authorities (DEFF & DWS) on progress of construction and commissioning;
- Assistance with the Contractor's procurement plan;
- Performance of duties required as Designer in terms of the Construction Regulations 2014 including:
  - carry out the necessary inspections at appropriate stages to verify that the construction of the scope of works is carried out in accordance with the design;
  - stop any contractor from executing any construction work which is not in accordance with the relevant design`s health and safety aspects;
  - in the final inspection of the completed structure, include the health, safety and environmental aspects of the scope of works as far as reasonable practicable, declare the infrastructure safe for use, and issue a completion certificate to the client;

- Draft a constructability report;
- Technical oversight of Contractor's Programme.
- Finalisation of civil construction drawings, reinforced Concrete details and schedules.
- As-built documentation review and drafting for Emergency Dump Extension development including:
  - Review and approval of as-built surveys;
  - Drafting of as-built drawings;
  - Drafting of construction completion report;
  - Defects report at handover stage;
  - Commissioning Acceptance and Operational Readiness report.
- Independent Laboratory verification testing
  - (Required ADHOC - verification of material properties, sample acquisition and review of results),

- The Consultant conducts additional surveys as required to verify the Contractors findings. This is done via independent Surveyor which should be supplied by the Consultant. This is done at the discretion of the Consultant based on the results received to ensure adequate Technical Assurance is conducted.
- Head Office project management of the Task Order.
- Interfacing with the Emergency Dump In-Loading Facility Project including:

Project Management:

Project management is broken down as follows:

- Invoicing including all backup documentation such as signed timesheets and payment certificates.
- General project communication regarding historic decisions, actions and documentation:
- Report back on project progress.

Technical support:

Technical support is broken down as follows:

- Managing interfaces with other consultants at battery limits;
- Technical meetings;
- Input into Eskom documentation including ECNs and ERs;
- Technical input into claim adjudication;
- Technical review of specific quantity measurements submitted by the Contractor;
- Drafting requirements for ECNs and ERs;
- Correspondence between parties including formal letters;
- Reviewing method statements;
- Research time for specific queries;
- Updates on the project specification.

***Consultant*'s scope to address design review conditions**

The *Consultant* must check CQA plan, specifications and drawings and identify items which may potentially be considered as anti-competitive practices as well as product specific naming.

If any items are identified, the *Consultant* must recommend appropriate amendments to the CQA plan, specification and drawings to align with the Competitions Act (Act 89 of 1998).

A summary of the construction work that will be monitored is as follows:

Civil/Structural

- Site Cleaning
- Fencing
- Preparation of laydown areas and access roads deviation & construction of service roads and traffic barriers
- Earthworks construction
- Construction of walls (including ramps)
- Construction of ground slabs (including ramps)
- Construction of structures (i.e. channel, silt trap, sump, pumphouse, etc.)
- Construction of pipelines (to and from the existing dirty water dam)

Electrical

- The electrical scope includes the following:
- Designing, sizing, manufacturing, supplying, installing, testing and commissioning of high mast lighting in the emergency ash dump layout area.
- Lighting survey (lux test) in the emergency dump layout area.
- Sizing, supply and installation of supply cables for the high mast lights.
- Trenching for the power cables to the power distribution box/panel and the supply cables to the high mast lighting poles.
- Relocation of the two 11kV Overhead Line poles from inside the Emergency Ash Dump layout area to the outside of the E-dump footprint.
- Construction of the concrete plinth to erect the high mast lighting poles.
- Retrofit the spare circuits on 400V Transfer House Boards A & B so as to make the circuits ready to supply the high mast lights.

Low Pressure Services

- Detailed design, supply and installation of the Dust suppression systems.

Site Supervision

Should 24-hour construction monitoring be required, additional resources will be required to manage the higher work load.

Deliverables

The deliverables for the above scope will be as follows:

- Taking over of the design and resolution of construction queries during construction.
- Updated design reports.
- Annual submission report to authorities on progress, construction and commissioning (2 off);
- Constructability report;
- Defects report;
- Commissioning Acceptance and Operations Readiness Report;
- As-built documentation:
  - As-built drawings;
  - Construction completion report;
  - PEC certificates for completed works.

Programme

The expected duration for Construction Supervision is: 12 months

4. RESOURCE REQUIREMENTS

The minimum required resources are as follows:

Resource Required	Details	Time Requirement
Senior Engineers	Head office based resources must oversee the technical details of various aspects of the design. Resources are functionally responsible for design changes and all responses noted of RFI's, EI's and ECN's.	Part Time
Civil Engineers	Site based resources which will conduct site engineering support during construction.	Full Time
Project Manager	Office based project manager will assist in team co-ordination, invoicing, cost and time management, bridge interface for consolidation of technical data and responses from the Designer.	Part Time
Draftsman	Office based for production of design query updates/changes and as built drawings.	Part Time

5. ROLES AND RESPONSIBILITIES

Role as Engineering Support during Construction	Requirements of Role
Site Communications	The Consultant does not officially communicate directly with the Contractor. Communications to the Contractor are done via correspondence sent to the Project Manager.
Technical Assurance	The Consultant ensures that the civil engineering construction is done in accordance to the Detailed Design, and therefore aligns to the Works Information technical specifications.
Attendance to site meetings	The Consultant attends all technical and progress meetings which require Engineering attendance or input. Should Technical Assurance be required on site, the Engineer is present primarily as Engineering representation.
Review of Contractors Quality Control Plans, Inspection and Test Plans & Method Statements/ Review and Approval of ITP	The Consultant reviews the QCP, ITP and Method Statement documentation for review from Project Manager. The Consultant reviews the content and submits comments to the Project Manager. The Project Manager then communicates the findings to the Contractor and will relay work stoppages or continuations (as required).
Inspection of Hold Points	The Consultant evaluates test results and construction procedures related to the identified hold points. The Consultant communicates findings to the Project Manager. The Project Manager then communicated the findings to the

	Contractor and will relay work stoppages or continuations (as required).
Handling of technical queries and resolutions	The Consultant receives Technical Queries via the Project Manager. The Consultant assesses the query versus the Detailed Design and determines how the query is to be resolved (interface is made with the responsible Designer to ensure that the necessary checks have been completed and design intent maintained).
Construction Materials Approval	The Consultant reviews test results on the proposed construction materials. The test results are evaluated against the required materials specifications as seen in the Works Information Technical Specification and drawings. The review findings are communicated to the Project Manager.
Record of site activities	The Consultant is required to keep a record of site activities impacting technical assurance and report it on a weekly basis through the relevant weekly reports submitted to the Project Manager.
Review of as built information and update of drawings	The Consultant reviews the as built information against the required design to ensure that the construction has been done in accordance with the detailed design. The Consultant will produce as-built drawings signed by a professionally registered designer.
Independent checks of tests and survey / Laboratory verification of tests	The Consultant conducts additional tests and surveys as required to verify the Contractors findings. This is done at the discretion of the Consultant based on the results received to ensure adequate Technical Assurance is conducted.

Construction Close out reports & Professional Engineering Certificates	The Consultant conducts the necessary technical assurance to ensure that all civil engineering construction has been conducted according to the Works Information technical specifications. The Consultant ensures that all the necessary checks have been conducted to allow the certificates to be issued.
Schedule review	The Consultant reviews the schedule to ensure that all civil engineering items are present and in line with the Works Information. The Consultant is not responsible for the scheduling of the works. In the instance of re-baselining of schedules, the Consultant will review the validating Compensation Event (CE).

6. AUTHORISATION

This document has been seen and accepted by:

Name	Designation
Maxwell Makhanya	Senior Civil Engineering Technologist

7. REVISIONS

Date	Rev	Compiler	Remarks
July 2020	N/A	S. Govindasami	Original Document
November 2021	N/A	M.Makhanya	Update

8. DEVELOPMENT TEAM

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

- Maxwell Makhanya

9. ACKOWLEDGEMENTS

N/A