



ESKOM HOLDINGS LIMITED

PANEL B CONSULTANTS JOINT VENTURE

KUSILE POWER STATION

EMERGENCY ASH DUMP LAYER WORKS DESIGN

PRELIMINARY DESIGN REPORT 5452-40-005 REV 0

Task Order Number: PBC JV #19

November 2008



ESKOM HOLDINGS LIMITED

KUSILE POWER STATION

EMERGENCY ASH DUMP LAYER WORKS DESIGN

PRELIMINARY DESIGN REPORT 5452-40-005 REV 0

CONTENTS

Chapter	Description	Page
1	INTRODUCTION	1
	1.1 Background	1
	1.2 General	1
	1.3 Scope	2
	1.4 Client User Requirement Specification	2
2	DESIGN	3
	2.1 Hydrology	3
	2.2 Geotechnical	3
	2.3 Emergency Ash Dump Terrace Layer Works Description	3
3	CONSTRUCTION	3
	3.1 Method	3
	3.2 Layer Construction Specifications	4
4	REFERENCES	5

APPENDICES:

Appendix A – Drawings

ESKOM HOLDINGS LIMITED

KUSILE POWER STATION

EMERGENCY ASH DUMP LAYER WORKS DESIGN

PRELIMINARY DESIGN REPORT 5452-40-005 REV 0

NOVEMBER 2008

1 INTRODUCTION

The Panel B Consultants Joint Venture has been appointed by ESKOM Enterprises under PO 45 0020 9487 (TO # 19) to carry out the civil design of various aspects of the Kusile coal-fired power station located near Witbank in the Mpumalanga province.

This report details the design of the emergency ash dump foundation layer works.

1.1 Background

Eskom is the principal supplier of electricity in South Africa. In order to meet the growing need for electricity, and in support of the growth and development strategy of national government, Eskom has embarked on an expansion programme to develop new power stations. Part of this expansion program includes the building of a number of coal-fired power stations. A proposed new 4,800 MW coal-fired power station (Kusile Power Station) near Kendal Power Station is one of the coal-fired power stations to be built. An extremely tight design and construction program is in place to achieve a commissioning date of 2013. The project has been given National priority status. This necessitates the drafting and early issue of design reports in preliminary form for the Integrated Water Licence Application (IWULA) to the Department of Water Affairs and Forestry (DWAF). This design report will be amplified and finalised as the detail designs proceed towards finalisation..

1.2 General

The emergency ash dump facility is provided in the event that coarse ash cannot be disposed for short periods to the main station ash dump.

The facility will be located within the main power station terrace area, on the Western side as indicated on Black and Veatch drawing 146838-OUXB-S1001 Rev 4 (area 76), in Appendix 1.

The emergency stockpile will be served by stacker conveyors supplied off the main station conditioned ash conveyor. Recovery from the facility will be by mechanical reclaimer and by mobile mechanical plant under Eskom design management (not part of this design report).

The emergency ash dump facility is 215m by 65m in plan extent and will comprise a concrete slab surrounded by a perimeter kerb to prevent ingress of external clean stormwater or discharge of internal dirty stormwater. An internal dirty water drain discharging to a settling sump for subsequent transfer by gravity to the coal stock yard settling tanks and hence to the station dirty water dams), is provided.

The following preliminary Eskom concept drawings in Appendix 1 show the overall emergency ash dump concept:

0.90/526: Plan View

0.90/527: Conveyor profiles

A preliminary General Arrangement drawing for the facility concrete layer works is presented on drawing K5452-40-XXX in Appendix 1.

1.3 Scope

The emergency ash dump facility, approximately 215m by 65m in extent, is designed to store 30 hours of coarse ash generation from 30 hours of operation. The facility is formed onto terrace fill formed under the main terracing contract, not part of this design report.

The emergency ash dump facility design is to address all relevant South African regulatory requirements, in particular:

- The National Water Act, No 36 of 1998.
- Government Notice No.704, Regulations on use of water for mining and related activities aimed at the protection of water resources, in terms of the National Water Act (Act 36 of 1998)
- SANS 1200: Standardised Specifications for Civil Engineering Construction

1.4 Client User Requirement Specification

The design criteria for the emergency ash dump facility will satisfy the requirements of the ESKOM User Requirement Specification (URS) as detailed in Sections 8.5.2.3 to 8.5.2.7.

Selected extracts from the URS state the following:

- *“An on site emergency ash disposal facility must be provided for the short term in the event that ash cannot be disposed to the mine” (or main ash dump)*
- *All conveyor/ transfer house wash water shall be collected and clarified through desilting prior to re-use in the ash conditioning system or cascading to the appropriate drain. Silt and wash water shall be separated at source and the design of the system shall allow for effective desilting of the facility*
- *Stormwater runoff shall be retained in an impoundment conforming to the requirements of GN 704 and approved by DWAF. Migration of pollutants shall be prevented/minimised by the incorporation of a suitable capillary breaker”*

2 DESIGN

2.1 Hydrology

Stormwater run-off arising from the catchment outside the emergency ash dam facility will be intercepted by a series of trapezoidal canals at natural ground level around the perimeter.

The design storm rainfall event is presented in the project hydrology report^(Ref. 1). The report gives the one-day rainfall for various recurrence intervals. The 1:50 year storm is selected as the design storm event. The one-day rainfall with a recurrence interval of 1:50 years was given as 122 mm. This value was then adjusted by a factor of 1.3 to represent the 24hr storm event, resulting in a rainfall depth of 159 mm.

2.2 Geotechnical

The emergency ash dump terrace is formed by compacted fills. The terrace formation falls under the scope of Black and Veatch (appointed designers for the power station terracing and the power station design. Therefore this aspect is not covered fully in this report.

The terrace fill is formed using selected granular fills with a low Plasticity Index. The Black and Veatch/Eskom specification for forming the compacted terrace fills requires compaction to 95% Modified Proctor standard.

2.3 Emergency Ash Dump Terrace Layer Works Description

The emergency ash dump layer works will comprise a reinforced concrete slab for accommodation of heavy mobile machinery on the slab. The slab will be underlain by a LDPE geomembrane and protective geofabric layer, to prevent any seepage to the groundwater table and any loss of concrete water/cement slurry during construction.

3 CONSTRUCTION

3.1 Method

The prepared bulk terrace will be graded to fall for drainage and prepared to receive the geomembrane under-liner.

A protective geofabric will be placed over the membrane to protect this before placing the reinforced concrete slab.

The concrete slab will be constructed in accordance with the Kusile project construction specifications.

PANEL B CONSULTANTS JOINT VENTURE

The construction of the emergency ash dump layer works will be presented in more detail in "Emergency Ash Dump Layer Works, Work Method Statement report WMS 5452-40-005".

To follow when the layer designs are completed

3.2 Layer Construction Specifications

To follow when the layer designs are completed

4 REFERENCES

1. Government Notice No.704, Regulations on use of water for mining and related activities aimed at the protection of water resources, in terms of the National Water Act (Act 36 of 1998)
2. The National Water Act, No 36 of 1998
3. SANS 1200: Standardised Specifications for Civil Engineering Construction
4. Eskom User Requirement Specification (URS): April 2007

PANEL B CONSULTANTS JOINT VENTURE

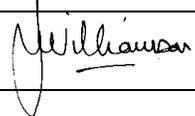
5. DOCUMENT CONTROL SHEET

CLIENT : ESKOM HOLDINGS LIMITED

PROJECT : KUSILE POWER STATION

PROJECT No : 5406/10

TITLE : RAW WATER RESERVOIR – DESIGN REPORT

	Prepared by	Reviewed by	Approved by
ORIGINAL	NAME J R WILLIAMSON	NAME A J STRAUSS	NAME D GRANT-STUART
DATE		SIGNATURE 	SIGNATURE 

REVISION	NAME	NAME	NAME
DATE	SIGNATURE	SIGNATURE	SIGNATURE

REVISION	NAME	NAME	NAME
DATE	SIGNATURE	SIGNATURE	SIGNATURE

This report, and information or advice, which it contains, is provided by PANEL B CJV solely for internal use and reliance by its Client in performance of PANEL B CJV duties and liabilities under its contract with the Client. Any advice, opinions, or recommendations within this report should be read and relied upon only in the context of the report as a whole. The advice and opinions in this report are based upon the information made available to PANEL B CJV at the date of this report and on current SA standards, codes, technology and construction practices as at the date of this report. Following final delivery of this report to the Client, PANEL B CJV will have no further obligations or duty to advise the Client on any matters, including development affecting the information or advice provided in this report. This report has been prepared by PANEL B CJV in their professional capacity as Consulting Engineers. The contents of the report do not, in any way, purport to include any manner of legal advice or opinion. This report is prepared in accordance with the terms and conditions of the PANEL B CJV contract with the Client. Regard should be had to those terms and conditions when considering and/or placing any reliance on this report. Should the Client wish to release this report to a Third Party for that party's reliance, PANEL B CJV may, at its discretion, agree to such release provided that:

- (a) PANEL B CJV written agreement is obtained prior to such release, and
- (b) By release of the report to the Third Party, that Third Party does not acquire any rights, contractual or otherwise, whatsoever against PANEL B CJV and PANEL B CJV, accordingly, assume no duties, liabilities or obligations to that Third Party, and
- (c) PANEL B CJV accepts no responsibility for any loss or damage incurred by the Client or for any conflict of PANEL B CJV interests arising out of the Client's release of this report to the Third Party.

APPENDIX A

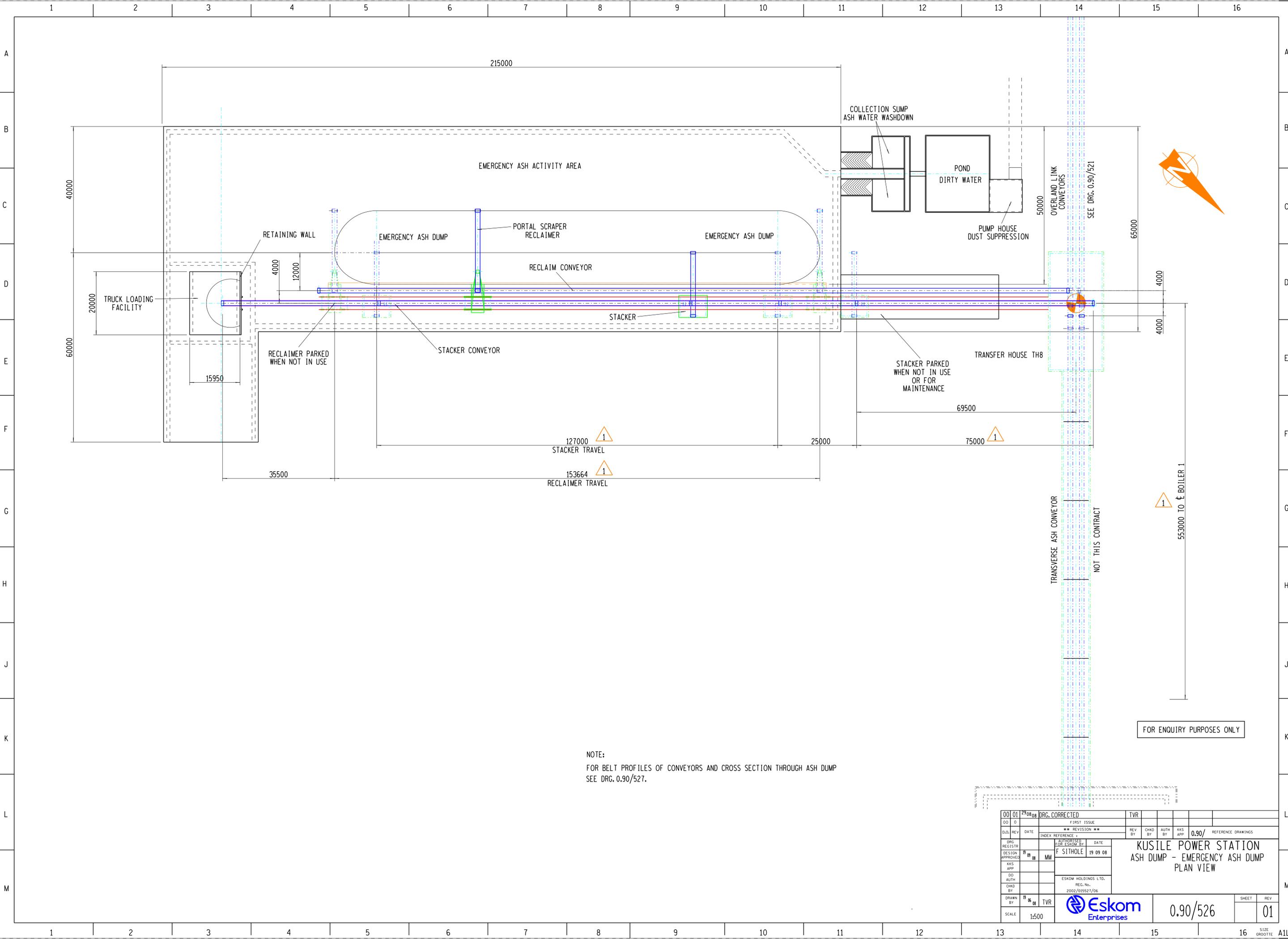
DRAWINGS

Black and Veatch drawing 146838-OUXB-S1001 Rev 4

Eskom 0.90/526: Plan View

Eskom 0.90/527: Conveyor profiles

General Arrangement K5452-40-004



NOTE:
FOR BELT PROFILES OF CONVEYORS AND CROSS SECTION THROUGH ASH DUMP
SEE DRG. 0.90/527.

FOR ENQUIRY PURPOSES ONLY

00	01	29	08	DRG. CORRECTED	TVR				
00	0			FIRST ISSUE					
D.O.	REV	DATE	INDEX REFERENCE		REV BY	CHKD BY	AUTH BY	KKS APP	0.90/ REFERENCE DRAWINGS
DRG REGISTR			AUTHORISED FOR ESKOM BY						
DESIGN APPROVED	18	09	MM	F SITHOLE	19	09	08		
KKS APP									
DD									
AUTH									
CHKD BY									
DRAWN BY	18	08	TVR						
SCALE	1:500								

ESKOM Enterprises

0.90/526

SHEET 01

