

RFI – Technical Requirements

Background:

The Koeberg generator step-up power transformers banks comprise three single-phase power transformers connected in a delta-star configuration. (See Attachment 1 for Electrical Data). Transformer units are housed in phase-segregated bays with fire walls and oil-catchment sumps. See Attachments 2, 3, 4 for typical layout arrangement.

Eskom on the grounds of personnel and plant safety has mandated that all existing generator step-up unit (GSU) transformers to be retrofitted with Explosion & Fire Prevention Systems (EFPS)s. The system historically employed by Eskom Generation has been the SERGI Transformer Protector system. The EFPS definition is expanded to include alternative methods of fire prevention; these include generator transformer “rupture proof” tank solutions as well as the use of ester oils.

Explosion & Fire Prevention System (EFPS) Requirements:

1. Reliable, proven, proactive system
2. Prevents Transformer Tank explosion in the event of an internal arc-fault
3. Provides fire protection and fire extinguishing functionality
4. Low Maintenance
5. EFPS to be retrofit to existing (GSU) transformers on site.

Information Required:

1. Principle of Operation of Proposed EFPS solution
2. Overview of System Implementation i.e. methodology & installation considerations
3. Estimate Times Frames for Installation
4. Estimate Cost Projections and work breakdown structure (WBS)
5. Testing & Verification of System Effectiveness (Can this be done on energized transformer)
6. Maintenance Requirements & Regime

Attachments:

1. Transformer Data Sheet
2. Transformer Layout Overview – 1
3. Transformer Layout Overview – 2
4. Transformer Layout Overview – 3
5. SMIT – Transformer Drawings

Electrical data

1. Description : 350 MVA, single phase transformer, with cooling design to allow 375 MVA.
2. Rated power : Class ODAF; 350 MVA
3. Rated frequency : 50 Hz
4. Rated voltage : HV: 400 kV
LV: 24 kV
5. Range of voltage control : HV: 400 kV \pm 7,5% in \pm 6 steps
6. Vector group symbol : Ynd11
7. No-load loss **guaranteed values** : 136 kW at 350 MVA
8. Load loss **guaranteed values** : 715 kW at 350 MVA
9. Auxiliary power **guaranteed values** : 11,5 kW per cooler
3,3 kW per pump
10. Impedance voltage **guaranteed values** : 14,5% at 350 MVA
11. Insulation Levels : HV LV
Power frequency voltage 630 kV 70 kV
Lightning impulse withstand voltage 1425 kV 170 kV
Switching impulse withstand voltage 1175 kV
12. Temperature rise : Average winding : 65 K
Hot spot : 72 K
Top oil : 60 K
13. Audible sound level : maximum acoustic noise generated by transformer:
 $L_p = 90 \text{ dB(A)}$



Benaming :

Electrical data

document nr. :

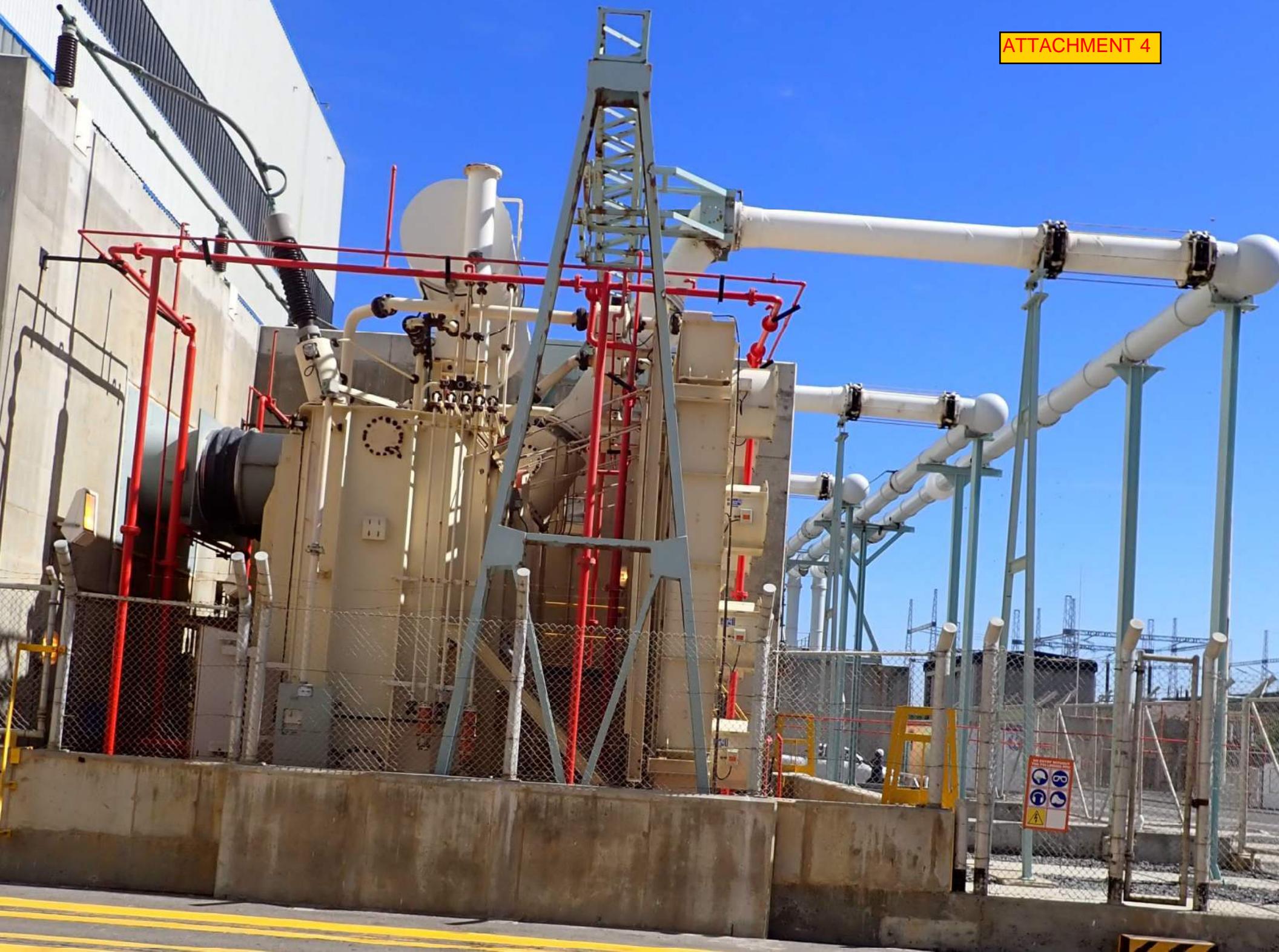
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




ATTACHMENT 4



ATTACHMENT 5



Approximate weights:

Total weight of complete transformer : 276555 kg
Total weight of complete oil : 52192 kg
Transport weight without oil : 199083 kg

8436 C.G.C.: Central Gravity Complete
C.G.S.: Central Gravity Shipment

Customer : Eskom
Destination: Koeberg

2768-mK 13920-BG 302 5817-C -12	Omschrijving van de wijziging Drawing updated			Gew. door S Gefferie	Datum 20-10-2008
Projectie 	Materiaal: n.a.	Proj. nr.: 312000175	Getekend S Gefferie	14-Oct-2008	
Schaal: 		Artikel nr.: LT_TRAFO_COMPL	Gecl. gez. B Weijers	20-Oct-2008	
benaming	Transformer 375/375 MVA - 420/24 kV	ID nr.: 224669	Rev. C	For A	
MIT BATTERIES	Blad nr. 224669-002	van			