Eskom	Scope Of Work	Generation

Refurbishment of MV Circuit Breakers on an "as and when" required basis at Kriel Power Station for the period of five years

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Compiled by	Functional Responsibility	Authorized by
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System Engineer	**EPE Manager**	**Engineering Manager**
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CONTENTS

1. INTRODUCTION

The scope detailed herein serves as an input to the *Employer's* Service Information for the five-year term service contract covering refurbishment of Medium Voltage (MV) circuit breakers) for stores at Kriel Power Station.

2. SUPPORTING CLAUSES

2.1 SCOPE

This document details the scope of work for refurbishment of medium voltage (MV) circuit breakers for stores at Kriel Power Station in the on an "as and when required" basis for the period of five (5) years.

The service required includes inspection, testing, servicing and/or refurbishment of the Medium Voltage Circuit Breakers on an "as and when required" basis by qualified technical specialist not available within Eskom electrical maintenance department.

2.1.1 PURPOSE

The required refurbishment is executed in response to plant breakdown whereby the damaged circuit breakers by the contractor onsite to their workshop, stripped and assessed, serviced and/or refurbished as per the approved assessment report. The contractor is to return the circuit breaker to Eskom stores repaired and fit for purpose.

2.1.2 APPLICABILITY

This document is applicable to Kriel Power Station.

2.2 NORMATIVE/INFORMATIVE REFERENCES

2.2.1 NORMATIVE

[1] ISO 9000: Quality Management Systems.

[2] Occupational Health and Safety Act (Osh Act; Act 85 of 93)

[3] 240-56227573 Air-Insulated Withdrawable AC Metal-Enclosed Switchgear Control-gear for 1kV to 52kV (Rev 1)

[4] 240-56227516 LV Switchgear Control Gear Assembly Associated Equipment for Voltage 1000V AC and 1500V Standard

[5] 240-56357424 MV and LV Protection Standard

[6] 240-143485806 Generation auxiliary plant medium voltage protection standard

[7] Act 85 of 1993 OSH Act: Plant Safety Regulation

2.3 Definitions

Term	Definition
Corrective Maintenance	Is the maintenance carried out after a failure has occurred and is intended to restore an item to a state in which it can perform its required function.
Preventive Maintenance	Is the maintenance carried out at pre-determined intervals, or corresponding to prescribed criteria, and intended to reduce the probability of failure, or the performance degradation of an item.
Planned Maintenance	Is the work performed during a planned (scheduled) outage of the specific plant or generating unit in question.
Routine Maintenance	Is time based maintenance work that is performed with the plant either ON or OFF load.
General Overhaul	A declared outage when a Generating unit is taken off-line. During this outage all plant having no redundancy is overhauled to ensure reliable and safe operation.
Mini General Overhaul	During this outage, only the following interventions will be attended to: - Those plant items with no redundancy and which will not remain reliable up to the next General Overhaul. - Inspections of suspect plant items.

2.3.1 DISCLOSURE CLASSIFICATION

Controlled Disclosure: Controlled Disclosure to external parties (either enforced by law, or discretionary)

2.4 ABBREVIATIONS

Abbreviations	Description
AKZ	Anlagen Kenn Zeichnungs
BOQ	Bill of Quantities
CoE	Centre of Excellence
PTM	Protection, Testing and Metering
EMD	Electrical Maintenance Department

EOD	Electrical Operating Desk
HAZOP	Hazard and Operability Analysis
LAR	Limited Access Register
LV	Low Voltage
MCC	Motor Control Centre
NDT	Non-Destructive Testing
OHSA	Occupational Health and Safety Act
PPE	Personal Protective Equipment
PSR	Plant Safety Regulations
PTW	Permit To Work
QA	Quality Assurance
QC	Quality Control
QCP	Quality control program/plan/procedure
QCP	Quality Control Procedure
SHE	Safety, Health & Environmental
SHEQ	Occupational Safety, Health, Environmental, and Quality
SOW	Scope of Work
AC	Alternative Current
kV	Kilovolts
MV	Medium Voltage

2.5 ROLES AND RESPONSIBILITIES

a) **System Engineer** – Compile the scope of work for the contract and provision for technical assurance

2.6 PROCESS FOR MONITORING

Refer to the NEC TSC.

3. Description of the *service*

3.1 Executive overview

The scope detailed herein serves as an input to the *Employer's* Service Information for the five-year term service contract covering electrical maintenance services required online (outside the general overhaul and mini general overhaul of units) to per the maintenance strategy.

3.2 Employer's requirements for the service

The contractor shall inspect, service and/or repair each medium voltage circuit breaker listed below in accordance with Eskom standards in section 2.2.1.

3.2.1 MEDUIM VOLTAGE CIRCUIT BREAKER REFURBISHMENT

a. VD4 CIRCUIT BREAKER 17.20.32 P210

The following circuit breakers are installed in 11kV Maintenance Isolator Boards, 11kV Unit Boards A and B from Units 1 to 6.

Item No	Description	Unit	Qty
100	**VD4 CIRCUIT BREAKER 17.20.32 P210** **Stock Item No: 706411** BREAKER, CIRCUIT: SWITCHGEAR DESIGN: ZS1; POTENTIAL: 175 KV; CURRENT: 2000 AMP; SHORT TIME CURRENT: 315 (3SEC) KA; POLE: 3; CONTROL VOLTAGE: 110 V; CREEPAGE: 455 MM; BASIC INSULATION LEVEL: 95 KV; INSULATION MATERIAL: VACUUM; OPERATING CONTROL TYPE: ELECTROMAGNETIC; POLLUTION CLASS: IP2X; APPLICATION: 11KV UNIT BOARD A&B; SPECIFICATION: IEC 62271-100; TEMPERATURE RATING: -5 TO +40 DEG C; WIDTH: 570 MM; LENGTH: 424 MM; HEIGHT: 475 MM; COLOR: WHITE; TYPE: VACUUM; MOUNT: WITHDRAWABLE; PHASE SPACING: 210 MM; INTERRUPT CAPACITY: 315 KA; MANUF P/N: 1VCF337123R0552; VD4 CB 17 20 32 P150		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	8
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	8
103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	8
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	8
105	Perform all applicable routine tests as per SANS 62271-100	EA	8

106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	8
107	Deliver the circuit breaker to site	EA	8

b. VD4 CIRCUIT BREAKER 17.06.32 P150

The following circuit breakers are installed in 3.3kV Service Boards C & D from Unit 1, 4, 5 and 6.

Item No	Description	Unit	Qty
	VD4 CIRCUIT BREAKER 17.06.32 **Stock Item No: 706419** BREAKER, CIRCUIT: SWITCHGEAR DESIGN: ZS1; POTENTIAL: 12 KV; CURRENT: 630 AMP; SHORT TIME CURRENT: 31.5 (3SECS) KA; POLE: 3; CONTROL VOLTAGE: 110 V; CREEPAGE: 455 MM; BASIC INSULATION LEVEL: 95 KV; INSULATION MATERIAL: VACUUM; OPERATING CONTROL TYPE: ELECTRONIC CARD; POLLUTION CLASS: IP2X; APPLICATION: FEEDERS; SPECIFICATION: IEC 62771-100; TEMPERATURE RATING: -5 TO +40 DEG C; WIDTH: 570 MM; LENGTH: 424 MM; HEIGHT: 475 MM; COLOR: WHITE; TYPE: VACUUM; MOUNT: WITHDRAWABLE; PHASE SPACING: 150 MM; INTERRUPT CAPACITY: 31.5 KA; MANUF P/N: 1VCF337123R0552; VD4/P CB 17.06 32 P150		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	10
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	10
103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	10
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	10
105	Perform all applicable routine tests as per SANS 62271-100	EA	10
106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	10
107	Deliver the circuit breaker to site	EA	10

c. VD4 CIRCUIT BREAKER 17.12.32 P150

The following circuit breakers are installed in 11kV Maintenance Isolator Boards, 11kV Unit Boards A and B from Units 1 to 6.

Item No	Description	Unit	Qty
	VD4 CIRCUIT BREAKER 17.12.32 P150 **Stock Item No: 706418**		

	BREAKER, CIRCUIT: SWITCHGEAR DESIGN: ZS1; POTENTIAL: 175 KV; CURRENT: 1250 AMP; SHORT TIME CURRENT: 31.5 (3SECS) KA; POLE: 3; CONTROL VOLTAGE: 110 V; CREEPAGE: 455 MM; BASIC INSULATION LEVEL: 95 KV; INSULATION MATERIAL: VACUUM; OPERATING CONTROL TYPE: ELECTROMAGNETIC; POLLUTION CLASS: IP2X; APPLICATION: 33KV SERVICE BRDS C&D FEEDERS; SPECIFICATION: IEC 62271-100; TEMPERATURE RATING: -5 TO +40 DEG C; WIDTH: 450 MM; LENGTH: 424 MM; HEIGHT: 461 MM; COLOR: WHITE; TYPE: VACUUM; MOUNT: WITHDRAWABLE; PHASE SPACING: 150 MM; INTERRUPT CAPACITY: 315 KA; MANUF P/N: 1VCF337123R0552; VD4/P CB 17.12 32 P150		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	6
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	6
103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	6
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	6
105	Perform all applicable routine tests as per SANS 62271-100	EA	6
106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	6
107	Deliver the circuit breaker to site	EA	6

d. VM1 CIRCUIT BREAKER 17.06.32 P150

The following circuit breakers are installed in 3.3kV Service Boards C & D from Unit 1, 4, 5 and 6.

Item No	Description	Unit	Qty
	VM1 CIRCUIT BREAKER 17.06.32 P150 **Stock Item No: 706404** BREAKER, CIRCUIT: SWITCHGEAR DESIGN: ZS1; POTENTIAL: 175 KV; CURRENT: 630 AMP; SHORT TIME CURRENT: 315 (3 SEC) KA; POLE: 3; CONTROL VOLTAGE: 110 V; CREEPAGE: 455 MM; BASIC INSULATION LEVEL: 95 KV; INSULATION MATERIAL: VACUUM; OPERATING CONTROL TYPE: ELECTROMAGNETIC; POLLUTION CLASS: IP2X; APPLICATION: 33KV SERVICE BRDS C&D FEEDERS; SPECIFICATION: IEC 62271-100; TEMPERATURE RATING: -5 TO +40 DEG C; WIDTH: 450 MM; LENGTH: 424 MM; HEIGHT: 589 MM; COLOR: WHITE; TYPE: VACUUM; MOUNT: WITHDRAWABLE; PHASE SPACING: 150 MM; INTERRUPT CAPACITY: 31.5 KA; MANUF P/N: 1VCF336123R0151; VM1 CB 17 06 32 P150		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	**15**
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	**15**

103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	**15**
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	**15**
105	Perform all applicable routine tests as per SANS 62271-100	EA	**15**
106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	**15**
107	Deliver the circuit breaker to site	EA	**15**

e. VD4EL CIRCUIT BREAKER 17.12.40 P210

The following circuit breakers are installed in 3.3kV Service Boards A & B from Unit 1 to 6.

Item No	Description	Unit	Qty
	VD4EL CIRCUIT BREAKER 17.12.40 P210 **Stock Item No: 706413** BREAKER, CIRCUIT: SWITCHGEAR DESIGN: ZS1; POTENTIAL: 175 KV; CURRENT: 1250 AMP; SHORT TIME CURRENT: 40 (3SECS) KA; POLE: 3; CONTROL VOLTAGE: 110 V; CREEPAGE: 555 MM; BASIC INSULATION LEVEL: 95 KV; INSULATION MATERIAL: VACUUM; OPERATING CONTROL TYPE: ELECTROMAGNETIC; POLLUTION CLASS: IP2X; APPLICATION: 33KV SERVICE BRDS A&B FEEDERS; SPECIFICATION: IEC 62271-100; TEMPERATURE RATING: -5 TO +40 DEG C; WIDTH: 570 MM; LENGTH: 424 MM; HEIGHT: 589 MM; COLOR: WHITE; TYPE: VACUUM; MOUNT: WITHDRAWABLE; PHASE SPACING: 210 MM; INTERRUPT CAPACITY: 315 KA; MANUF P/N: 1VB7002617R1136; VD4/P CB 17.12 40 P210		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	12
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	12
103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	12
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	12
105	Perform all applicable routine tests as per SANS 62271-100	EA	12
106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	12
107	Deliver the circuit breaker to site	EA	12

f. VD4EL CIRCUIT BREAKER 17.25.40 P210

The following circuit breakers are installed in 3.3kV Service Boards A & B from Unit 1 to 6.

Item No	Description	Unit	Qty
	VD4EL CIRCUIT BREAKER 17.25.40 P210 **Stock Item No: 706410** BREAKER, CIRCUIT: SWITCHGEAR DESIGN: ZS1; POTENTIAL: 175 KV; CURRENT: 2500 AMP; SHORT TIME CURRENT: 40 (3SEC) KA; POLE: 3; CONTROL VOLTAGE: 110 V; CREEPAGE: 555 MM; BASIC INSULATION LEVEL: 95 KV; INSULATION MATERIAL: VACUUM; OPERATING CONTROL TYPE: ELECTROMAGNETIC; POLLUTION CLASS: IP2X; APPLICATION: 33KV SERVICE BRDS A&C INCOMERS AND BUS SECTION; SPECIFICATION: IEC 62271-100; TEMPERATURE RATING: -5 TO +40 DEG C; WIDTH: 700 MM; LENGTH: 424 MM; HEIGHT: 616 MM; COLOR: WHITE; TYPE: VACUUM; MOUNT: WITHDRAWABLE; PHASE SPACING: 275 MM; INTERRUPT CAPACITY: 40 KA; MANUF P/N: 1VB7002617R1136; VD4/P CB 17 25 40 P275		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	12
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	12
103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	12
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	12
105	Perform all applicable routine tests as per SANS 62271-100	EA	12
106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	12
107	Deliver the circuit breaker to site	EA	12

g. D4-1212-25ZSIM CIRCUIT BREAKER

The following circuit breakers are installed in 3.3kV Service Boards C & D from Unit 2 and 3.

Item No	Description	Unit	Qty
	D4-1212-25ZSIM CIRCUIT BREAKER **Stock Item No: 183680** BREAKER, CIRCUIT: POTENTIAL: 3.3-6.6 KV; CURRENT: 1.25 KA; TYPE: VACUUM; INTERRUPT CAPACITY: 25 KA; REFERENCE NO: GCE7002612R0193, TYPE VD4-1212-25ZS1M, SHORT CIRCUIT BREAKING SYMM 27.3KA, SHORT CIRCUIT MAKING CURRENT (PEAK) 63KA, SHORT CIRCUIT DURATION 3S, ALL CONTROL EQUIPMENT IS 110V DC		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	12
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	12
103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	12
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	12
105	Perform all applicable routine tests as per SANS 62271-100	EA	12
106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	12
107	Deliver the circuit breaker to site	EA	12

h. V7-ZC CONTACTOR

The following circuit breakers are installed in 3.3kV Service Boards C & D from Unit 2 and 3.

Item No	Description	Unit	Qty
	V7-ZC CONTACTOR **Stock Item No: 716878** BREAKER, CIRCUIT: SWITCHGEAR DESIGN: UNIFLEX; POTENTIAL: 7.2 KV; CURRENT: 400 A; SHORT TIME CURRENT: 31.5 (3SECS) KA; POLE: 3; CONTROL VOLTAGE: 110 V; CREEPAGE: 455 MM; BASIC INSULATION LEVEL: 95 KV; INSULATION MATERIAL: VACUUM; OPERATING CONTROL TYPE: ELECTRONIC CARD; POLLUTION CLASS: IP2X; APPLICATION: 3.3 KV; SERVICE BOARD C&D; SPECIFICATION: IEC62771-100; TEMPERATURE RATING: -5 TO +40 DEG C; WIDTH: 570 MM; LENGTH: 424 MM; HEIGHT: 475 MM; COLOR: WHITE; MOUNT: WITHDRAWABLE; PHASE SPACING: 150 MM; INTERRUPT CAPACITY: 31.5 KA; MANUF P/N: AB00030226; IVCF68140850075; CONTACTOR V5C7/P		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	12
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	12
103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	12
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	12
105	Perform all applicable routine tests as per SANS 62271-100	EA	12
106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	12
107	Deliver the circuit breaker to site	EA	12

i. Vmax CIRCUIT BREAKER

The following circuit breakers are installed at 3.3kV And 11kV Common Plant Boards.

Item No	Description	Unit	Qty
	Vmax CIRCUIT BREAKER **Stock Item No: 706402** BREAKER, CIRCUIT: SWITCHGEAR DESIGN: ZS1 (550); POTENTIAL: 175 KV; CURRENT: 1250 AMP; SHORT TIME CURRENT: 315 KA; POLE: 3; CONTROL VOLTAGE: 110 V; CREEPAGE: 455 MM; BASIC INSULATION LEVEL: 95 KV; INSULATION MATERIAL: VACUUM; OPERATING CONTROL TYPE: ELECTROMAGNETIC; POLLUTION CLASS: IP2X; APPLICATION: INCOMERS; FEEDERS; SPECIFICATION: IEC 62271-100; TEMPERATURE RATING: -5 TO +40 DEG C; WIDTH: 461 MM; LENGTH: 416 MM; HEIGHT: 665 MM; COLOR: WHITE; TYPE: VACUUM; MOUNT: WITHDRAWABLE; PHASE SPACING: 150 MM; INTERRUPT CAPACITY: 315 KA; MANUF P/N: 1VCF327133R052; VMAL CB 17 12 32 P150		
101	Collect breaker from Kriel Power Station at Main Stores Transport	EA	**15**
102	Issue QCP to Kriel Power Station for approval by System Engineer	EA	**15**
103	Strip and assessment of the circuit breaker and issue assessment report stating recommendations with a quote	EA	**15**
104	Refurbishment and/or repair of the circuit breaker including all tests and functional checks	EA	**15**
105	Perform all applicable routine tests as per SANS 62271-100	EA	**15**
106	Perform all circuit breaker functional checks including interlocks as per the OEM manuals	EA	**15**
107	Deliver the circuit breaker to site	EA	**15**

4. AUTHORISATION

This document has been seen and accepted by:

Name	Designation
[redacted]	Engineering Manager
[redacted]	Electrical Plant Engineering Manager
[redacted]	Materials Manager
[redacted]	Electrical Maintenance Department

5. REVISIONS

Date	Rev.	Compiler	Remarks
Feb. 2024	1	[redacted]	First revision
Mar 2025	2	[redacted]	Addition of the stock items.

6. DEVELOPMENT TEAM

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

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