CONTENTS

1. PURPOSE

The objective of this outage document is to provide a clear Control and Instrumentation scope of work to be executed during outages at Tutuka PS. The scope of work shall be executed on the Boiler plant, Turbine plant and Outside plant from the coal incline to the Mill bunkers control equipment and instrumentation.

2. SCOPE OF WORK

2.1 Executive overview

The scope covers inspection, removal, repairs, installation, function checking and commissioning of control and instrumentation systems during outages on the unit's boiler plant, turbine plants and outside plant from the coal incline to the mill bunkers. All scope executed shall be accompanied by a quality control document full accepted by Eskom personnel. This document clearly defines the expectations, contractual requirements, roles, and responsibilities required for the effective control and instrumentation outage scope of work.

The contract for C&I outage resources will remain effective for a duration of five years.

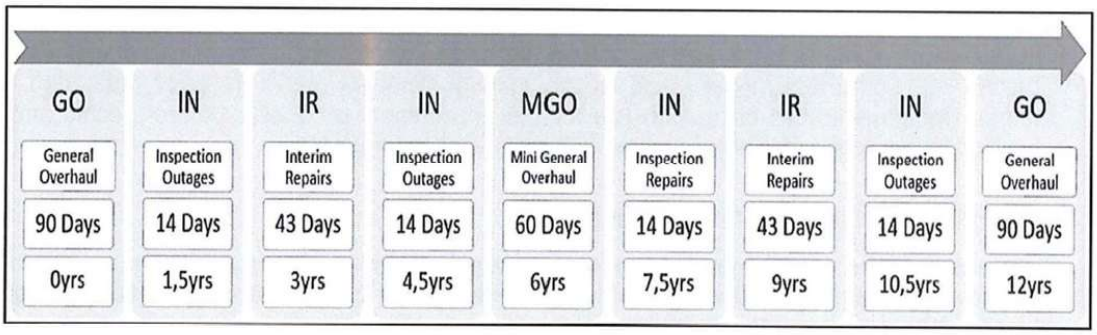

Figure 1: Tutuka Outage Philosophy Cycle.

2.2 Scope of work requirements for CI& Outage Resources

2.2.1 Summary of Scope

2.2.1.1 General and mini overhaul (Duration: 90 days and 60 days)

Normal C&I Maintenance Scope

- Clean Junction Boxes and repair damaged seals and doors.
- Clean all C&I cubicles (blow out) in the equipment room
- Fill damaged fire seals in equipment room cubicles and all cable voids
- Backup all data, application programs, system images on DCS, HMI, and PLCs.
- Attend to any AU defects
- Resolve active simulations and discrepancies on control system
- Correction of identified setting discrepancies
- Pre outage checks to be done to identify faulty signals. All faulty signals to be corrected accordingly
- Resolution of nuisance alarms

Boiler Scope

- Stroke check all dampers.
- Function check oil burners
- FD fans protection checks
- ID fans protection checks
- PA fans protection checks
- AH protection checks
- Function check SSC controls
- Send furnace flame protection equipment (pyrometers) for calibration. Reinstall if still within operating range or replace with new equipment.
- Inspect and replace damaged thermal index thermocouples
- Inspect and replace damaged metal temperature thermocouples
- Inspect AH fire detection thermocouples and pockets. Replace damaged
- Internal and external inspection on all mills level probes which have been run empty
- Calibrate boiler O2 analyser and probes
- Remove, clean and reinstall all Mill venturi
- Implementation of modifications and projects
- Perform unit performance and capability testing after unit RTS

Main Turbine and Turbine auxiliaries Scope

Turbine Centreline

- HP&IP valves hot or cold hysteresis on request from Turbine Engineering
- HP&IP Governor valves instrumentation removal
- BRG 1-12 vibration probe removal

- BRG 1-12 thermocouples removal
- Replace and set up speed probes with new probes
- Centreline internal instruments removal (Thermocouples, speed, eccentricity thrust and surge wear, differential expansion probes)
- LP bypass valves instrumentation inspection and removal on request from Turbine Engineering
- HP & IP casing thermocouples and replacement with new thermocouples
- Generator H2 seal thermocouples removal
- Generator H2 thermocouples replacement with new thermocouples
- LP bypasses stroke and protection checks if any mechanical work
- HP&IP ESV and governor valves setup and verification
- HP&IP ESV and governor valves Stroke check
- Centreline instrumentation reassembly
- Main Turbine Protection checks

Feed Pumps

- EFP A & B instrumentation removal and replacement
- BFPT instrumentation removal and replacement as per GEC manual
- Protection instrumentation recalibration
- Replace all protection thermocouples with new thermocouples
- Transmitter calibration checks
- EFP A & B protection checks
- BFPT system protection checks
- Woodward governor I to P function check

Turbine auxiliaries

- List of valves disconnecting, reconnecting and stroking
- Vacuum transmitters remove and send for calibration
- Removal of pneumatic valve positioners
- Stroking of condensate system valves
- Condensate Extraction Pumps instrumentation to be removed and replaced
- Remove and send for service of Generator H2 purity analyser
- Remove and send for service of Stator water conductivity analysers
- Calibration check of Generator H2 purity analyser with rinsed probe
- Calibration check of Stator water conductivity analysers with rinsed probes
- Blow through DST level transmitter impulse line
- Function check DST pressure controller
- Inspect HP and LP heater instrumentation. Remove and repair all damaged instruments.
- Condensate extraction pumps protection checks
- Function check lube oil temperature controller.

Outside Plant Scope

- CPP valves function check. Correct any deviating/malfunctioning actuators
- CPP PLC cubicles cleaning. (Cubicle blowouts)
- Clean Sample room analysers' probes and check calibration
- G/Lowe Panel instruments calibration and protection check.
- Verify CW pumps instruments calibration and protections
- Ash plant PLC cubicle cleaning.
- Bucket elevator conveyors protection checks.
- Replace fuel oil integrators on the fuel oil plant with Endress Hauser equipment.
- Ash conditioner conveyor protection checks.
- Ash Plant junction boxes cleaning and checks on enclosure sealing.
- Ash Plant protection checks.
- Coal Plant DCS cubicle cleaning.
- Coal Plant conveyors protection checks (reclaim, incline, shuttle, cross, bunker-feed).
- LCS function check, cleaning and verify sealing of panel.
- Review simulations on PLC/DCS and correct active simulations.
- Review and address TOIs.
- Compare PLC & DCS software backups with the running software, and action any identified differences.
- Attend to AU defects

2.2.2 General Description of work to be done

Field Device Removal: Control and instrumentation (C&I) field devices must be removed from the plant when mechanical work is carried out nearby, to prevent damage. The C&I outage contractor is responsible for assessing and documenting the status of the removed field devices (operational, faulty, or damaged). All removed field devices must be handed over to the C&I Senior Technician, who shall ensure their safekeeping and maintain records based on the contractor's report.

Defects: Defective field devices shall be repaired. If repair is not feasible, the field devices must be replaced.

Calibration: Boiler and Turbine plant protection field devices shall be calibrated by a SANAS-certified supplier, while other pressure and temperature switches shall undergo in-house calibration by the onsite outage team. All instruments which have been calibrated will be cleaned and a calibration sticker pasted on a visible are of the instrument with the name of the calibrator, date of calibration and due date for next calibration. The Employer's C&I Senior Technician is responsible for ensuring the validity of the in-house calibration equipment's certification. All calibrated instruments will be accompanied by a valid calibration certificate which indicates the deviation of and the corrected zero and span values.

Junction Boxes: Inspect the condition of all junction boxes. Verify that the dust seals are correctly installed and functioning as intended. Ensure that all junction boxes can be securely locked using panel keys. Clean all junction boxes using a dust blower.

Equipment Room and DCS Cubicles:

Unit 1, 2, and 3:

Boiler controls remain on the legacy Siemens Teleperm C and Iskamatic B systems. While Turbine controls have been upgraded to the ABB P14 Procontrol DCS. The HMI and plant information system integrates the Siemens Sicomp 70 platform with VA View, which ultimately feeds data into the ABB PGIM historian.

For the Siemens control system, all simulations must be removed. The settings of JB and JL cubicles should be verified against the configuration list provided by the Eskom C&I Senior Technician overseeing the outage. The Contractor is responsible for confirming that all modules are fitted with correctly rated fuses. Any fieldwork required to resolve active discrepancies will be carried out by the Contractor.

Units 4, 5 and 6:

Both the turbine and boiler control systems are currently operating on the ABB P14 Procontrol DCS. The HMI is hosted on the ABB POS 30 system, which interfaces with the ABB PGIM, serving as the plant historian.

For Units 4 to 6, all simulations will be coordinated by the Eskom Senior Technicians in collaboration with the Eskom Engineer overseeing the outage. A comprehensive list of discrepancies and active simulations will be compiled and issued by the Eskom C&I Senior Technician, following input from the onsite ABB engineers. The Contractor will be responsible for executing the necessary fieldwork to resolve the identified discrepancies.

Cubicles marshalling and all cable entries to cubicles must be cleaned using Nano Cleaning Solution to eliminate dust accumulation and reduce the risk of premature failures. The Section Senior Supervisor is responsible for creating notifications for faulty field devices, which the C&I outage contractor must resolve.

The C&I Senior Supervisor shall compile a list of standing alarms related to control system module failures and errors. These defects must be addressed during the outages by the *Contractor*. The availability of control and instrumentation spares shall be free issued to the *Contractor* by the Eskom representative, as outlined in the outage scope of work.

Commissioning: Field devices removed from the plant must undergo recommissioning. This process includes conducting loop checks, verifying measurement ranges, ensuring the accuracy of AKZs, and confirming all settings are correct.

Quality Control Plan: All executed scope shall be inspected by a contracted quality control officer. As a control measure, the Employer's Senior Technician overseeing the outages must sign the Quality Control Plans (QCPs). All QCPs and check sheets shall be retained by the C&I outage contractor as evidence of scope completion, ensuring compliance for future reference and audit purposes.

2.2.3 Boiler Plant High level Scope of Work to be executed by the C&I Outage Contractor: *(Outage Department to issue signed scope of work)*

Calibration:

- Calibrate all Boiler Protection instruments through a SANAS-accredited supplier. The C&I outage resources contractor must provide certificates for all boiler protection instruments and ensure tags are affixed to the instruments. These tags should display the name and signature of the individual who performed the calibration, the calibration date, and the SANAS accreditation number. The calibration certificates must be approved by the C&I Engineer responsible for the plant. Below is the list of instruments scheduled for calibration during the Mini General Outage (MGO) and General Outage (GO):

BOILER PROTECTION INSTRUMENTS

TEMPERATURE

	AKZ	DESCREPTION	CAL. RANGE	Trip
1	0*RA31T001	HP BYP. OUTL. 1 T1	0 - 600 deg. C	>400.2 deg
2	0*RA31T002	HP BYP. OUTL. 1 T2	0 - 600 deg. C	>400.2 deg
3	0*RA31T00*	HP BYP. OUTL. 1 T3	0 - 600 deg. C	>400.2 deg
4	0*RA32T001	HP BYP. OUTL. 2 T1	0 - 600 deg. C	>400.2 deg
5	0*RA32T002	HP BYP. OUTL. 2 T2	0 - 600 deg. C	>400.2 deg
6	0*RA32T00*	HP BYP. OUTL. 2 T3	0 - 600 deg. C	>400.2 deg
7	0*RA33T001	HP BYP. OUTL. 3 T1	0 - 600 deg. C	>400.2 deg
8	0*RA33T002	HP BYP. OUTL. 3 T2	0 - 600 deg. C	>400.2 deg
9	0*RA33T00*	HP BYP. OUTL. 3 T3	0 - 600 deg. C	>400.2 deg
10	0*RA34T001	HP BYP. OUTL. 4 T1	0 - 600 deg. C	>400.2 deg
11	0*RA34T002	HP BYP. OUTL. 4 T2	0 - 600 deg. C	>400.2 deg
12	0*RA34T00*	HP BYP. OUTL. 4 T3	0 - 600 deg. C	>400.2 deg
13	0*NA31T001	ATT. 1.1 STM INL. T1	0 - 600 deg. C	>475.2 deg
14	0*NA31T002	ATT. 1.1 STM INL. T2	0 - 600 deg. C	>475.2 deg
15	0*NA31T00* /4	ATT. 1.1 STM INL. T3	0 - 600 deg. C	>475.2 deg
16	0*NA32T001	ATT. 1.2 STM INL. T1	0 - 600 deg. C	>475.2 deg
17	0*NA32T002	ATT. 1.2 STM INL. T2	0 - 600 deg. C	>475.2 deg
18	0*NA32T00* /4	ATT. 1.2 STM INL. T3	0 - 600 deg. C	>475.2 deg
19	0*NL05T001	F/OIL DEL. PIPE TEMP	0 - 250 deg. C	<85 deg
20	0*NA10T004	ECON. OUTL. FW TEMP.	0 - 400 deg. C	306 deg
21	0*NA10T002	ECON. INL. FW TEMP.	0 - 400 deg. C	246 deg

22	0*NG11T001	LH FDF IN AIR TEMP.	0 - 100 deg. C	38 deg
23	0*NG21T001	RH FDF IN AIR TEMP.	0 - 100 deg. C	38 deg

PRESSURE

1	0*NA10F001	ECON. OUTL. FLOW 1	0 - 200 kPa	215.9 bar
2	0*NA10F002	ECON. OUTL. FLOW 2	0 - 200 kPa	215.9 bar
3	0*NA10F00*	ECON. OUTL. FLOW 3	0 - 200 kPa	215.9 bar
4	0*NA10F011	ECON. INL. FLOW 1	0 - 200 kPa	<208 kg/s
5	0*NA10F012	ECON. INL. FLOW 2	0 - 200 kPa	<208 kg/s
6	0*NA10F013	ECON. INL. FLOW 3	0 - 200 kPa	<208 kg/s
7	0*NG11F001	LH FDF IN AIR FLOW 1	0-625Pa	- 600 Pa
8	0*NG11F002	LH FDF IN AIR FLOW 2	0-625Pa	- 600 Pa
9	0*NG11F00*	LH FDF IN AIR FLOW 3		- 600 Pa
10	0*NG21F001	RH FDF IN AIR FLOW 1	0-625Pa	- 600 Pa
11	0*NG21F002	RH FDF IN AIR FLOW 2	0-625Pa	- 600 Pa
12	0*NG21F00*	RH FDF IN AIR FLOW 3		- 600 Pa
13	0*NR21P001	RH S/HTR INL. F/GAS P1	(-3) - (+3) kPa	>2.5/<-2.5
14	0*NR21P002	RH S/HTR INL. F/GAS P2	(-3) - (+3) kPa	>2.5/<-2.5
15	0*NR21P009	RH S/HTR INL. F/GAS P3	(-3) - (+3) kPa	>2.5/<-2.5
16	0*NX01P001	CONTR. AIR SUPPLY P	0 - 1000 kPa	<350 kPa
17	0*NL05P00*	F/OIL DEL. PIPE PRES.	0 - 6 Mpa	<3.5 Mpa
18	0*NK01P001	LP GAS SUPPLY VLV DISCH.	0 - 300 kPa	<70 kPa
19	0*NA10P001	ECON. INL. FW PRESS.	0 - 30 Mpa	<14Mpa
20	0*NA20P002	ECON. OUTL. FW PRESS.	0 - 30 Mpa	215.9 bar
21	0*NG11P001	LH FDF IN AIR PRESS.	0 - 1000 pa	-657 Pa
22	0*NG21P001	RH FDF IN AIR PRESS.	0 - 1000 pa	-657 Pa

PYROMETERS

23	0*NR11T001	LH FLAME TEMP 1	500 - 1200 Deg C	600 Deg C
24	0*NR11T009	LH FLAME TEMP 4	500 - 1200 Deg C	600 Deg C
25	0*NR11T002	LH FLAME TEMP 2	500 - 1200 Deg C	600 Deg C
26	0*NR11T010	LH FLAME TEMP 5	500 - 1200 Deg C	600 Deg C
27	0*NR11T00*	LH FLAME TEMP 3	500 - 1200 Deg C	600 Deg C
28	0*NR11T011	LH FLAME TEMP 6	500 - 1200 Deg C	600 Deg C
29	0*NR21T001	RH FLAME TEMP 1	500 - 1200 Deg C	600 Deg C
30	0*NR21T009	RH FLAME TEMP 4	500 - 1200 Deg C	600 Deg C
31	0*NR21T002	RH FLAME TEMP 2	500 - 1200 Deg C	600 Deg C
32	0*NR21T010	RH FLAME TEMP 5	500 - 1200 Deg C	600 Deg C
33	0*NR21T00*	RH FLAME TEMP 3	500 - 1200 Deg C	600 Deg C
34	0*NR21T011	RH FLAME TEMP 6	500 - 1200 Deg C	600 Deg C

- Perform in-house calibration of pressure switches and temperature switches using properly calibrated equipment. All calibration equipment will have valid calibration certificates.

Field Devices:

- Remove all field devices from the plant as outlined in the outage scope of work issued by C&I Engineering.

Functional Checks:

- Verify the operation of SSC controls and short and long coarse ash protection conveyors.
- Perform function checks on HP Bypass and RH Safety valves control systems.
- Perform function checks and protection checks on the milling plant.

Inspection, Repair, and Replacement:

- Inspect, repair, and replace damaged instruments in the milling plant. Conduct Mills protection checks prior to and during the unit's return to service.
- Inspect, repair, and replace damaged thermal index thermocouples, compensating leads, and converter modules.
- Inspect, repair, and replace damaged metal temperature thermocouples, compensating leads, and converter modules.
- Inspect and repair Air Heater (AH) Fire Detection thermocouples, compensating leads, and converter modules.
- Inspect and replace damaged Tube Leak Detectors and cabling as needed.

List of instruments scheduled for outage execution:

AKZ Number	Component Description	Work specifications
HP HEATER OUTL FW 09-0*NA10T001 **ECONOMIZER INL FW** 09-0*NA10T00*	**Boiler Thermocouple**	The contractor must remove and store the thermocouples once the unit is shut down. After all other outage work on the boiler is completed, those in working condition should be reinstalled, while damaged thermocouples identified during inspection must be replaced.

EVAP DIV WALL WATER 09-0*NA20T001 **SCREW WALL METAL** 09-0*NA30T002 **SUPER STRUCTURE METAL** 09-0*NA30T00* **COMB CHAMBER DIFF** 09-0*NA30T105 09-0*NA30T107 09-0*NA30T109 **STRAIN GAUGE TEMP** 09-0*NA30T004 - 09-0*NA30T006 **ATT 1.1 STEAM INL** 09-0*NA30T011 - 09-0*NA31T004 **ATT 1.1 STEAM OUTL** 09-0*NA31T007 **ATT 1.2 STEAM INL** 09-0*NA30T013- 09-0*NA32T004 **ATT 1.2 OUTL STEAM** 09-0*NA32T007 **ATT 2.1/2.2 AST**		

09-0*NA61T002 **ATT 2.3/2.4 AST** 09-0*NA61T001 **ATT 3.1/3.2 AST** 09-0*NA71T001 **ATT 3.3/3.4 AST** 09-0*NA71T002 **ATT 2.3 STEAM INL** 09-0*NA63T002 **ATT 2.3 STEAM OUTL** 09-0*NA63T004 **ATT 2.4 STEAM INL** 09-0*NA64T002 **ATT 2.4 STEAM OUTL** 09-0*NA64T004 **ATT 3.1 STEAM INL** 09-0*NA71T002 **ATT 3.1 STEAM OUTL** 09-0*NA71T004 **ATT 3.2 STEAM INL** 09-0*NA72T002 **ATT 3.2 STEAM OUTL** 09-0*NA72T004		

ATT 3.3 STEAM INL 09-0*NA73T002 **ATT 3.3 STEAM OUTL** 09-0*NA73T004 **ATT 3.4 STEAM INL** 09-0*NA74T002 **ATT 3.4 STEAM OUTL** 09-0*NA74T004 **COMBUSTION DIFF TEMP** 09-0*NA30T105 **SEPARATING VESSEL 1** 09-0*NA41T001 **SEPARATING VESSEL 2** 09-0*NA42T001 **SEPARATING VESSEL 3** 09-0*NA43T001 **SEPARATING VESSEL 4** 09-0*NA44T001 **S/HEATER 2.1** 09-0*NA61T011 - 09-0*NA61T013 **S/HEATER 2.2** 09-0*NA62T011 -		

09-0*NA62T013 **S/HEATER 2.3** 09-0*NA63T011 - 09-0*NA63T013 S/HEATER 2.4 09-0*NA64T011 - 09-0*NA64T013 **S/HEATER 3.1** 09-0*NA71T011 - 09-0*NA71T013 **S/HEATER 3.2** 09-0*NA72T011 - 09-0*NA72T013 **S/HEATER 3.3** 09-0*NA73T011 - 09-0*NA73T013 **S/HEATER 3.4** 09-0*NA74T011 - 09-0*NA74T013 **S/HEATER 4.1** 09-0*NA81T011 - 09-0*NA81T013 **S/HEATER 4.2** 09-0*NA82T011 - 09-0*NA82T013 **S/HEATER 4.3** 09-0*NA83T011 -		

09-0*NA83T013 **S/HEATER 4.4** 09-0*NA84T011 - 09-0*NA84T013 **CIRC PUMP** 09-0*NB11T001 09-0*NB21T001 **BLOW DOWN VESS** 09-0*NB13T001 **COM DUCT SEC AIR** 09-0*NS01T001 - 09-0*NS01T006 **RE-HEATER 1.1** 09-0*NE11T011 - 09-0*NE11T013 **RE-HTR ATT 2** 09-0*NE12T001 - 09-0*NE12T00* **RE-HEATER 1.2** 09-0*NE12T011 - 09-0*NE12T013 **RE-HTR ATT 3** 09-0*NE13T001 - 09-0*NE13T00* **RE-HEATER 1.3** 09-0*NE13T011 - 09-0*NE13T013		

RE-HTR ATT 4 09-0*NE14T001 - 09-0*NE14T003 **RE-HEATER 1.4** 09-0*NE14T011 - 09-0*NE14T013 **RE-HEATER 2.1** 09-0*NE21T011 - 09-0*NE21T013 **RE-HEATER 2.2** 09-0*NE22T011 - 09-0*NE22T013 **RE-HEATER 2.3** 09-0*NE23T011 - 09-0*NE23T013 **RE-HEATER 2.4** 09-0*NE24T011 - 09-0*NE24T013		
Not Applicable	**Boiler thermocouple pockets**	The contractor must inspect all boiler thermocouple pockets. If any are found to be damaged, the outage coordinator must notify the responsible boiler system engineer to issue cut-and-weld instructions for new pockets.
AIR HEATER FIRE DETECTION (L/H) 09-0*NH10T001 09-0*NH10T002	**Air Heater Thermocouples**	The contractor must inspect and test all thermocouples prior to their removal from the plant. The contractor must remove and store the thermocouples once the unit

AIR HEATER FIRE DETECTION (R/H) 09-0*NH20T001 09-0*NH20T002 **AIR HEATER GUIDE BEARING** 09-0*NH32T001 09-0*NH31T001 **L/H AIR HTR** 09-0*NG32T001 - 09-0*NG12T001 09-0*NR12T001 - 09-0*NR13T001 **R/H AIR HTR** 09-0*NG42T001 - 09-0*NG23T001 09-0*NR22T001 - 09-0*NR23T001		is shut down. After all other outage work on the boiler is completed, those in working condition should be reinstalled, while damaged thermocouples identified during inspection must be replaced. Work Instruction for Testing of Air Heater Fire Alarm System – 15MNT GEN-220* and 15ENG BLR-941
L/H FD FAN 09-0*NG10T001 09-0*NG10T002 09-0*NG19T001 09-0*NG19T002 **R/H FD FAN** 09-0*NG20T001 09-0*NG20T002 09-0*NG29T001 09-0*NG29T001 09-0*NG29T002 **L/H PA FAN**	**Fan thermocouples**	The contractor must inspect and test all thermocouples prior to their removal from the plant. The contractor must remove and store the thermocouples once the unit is shut down. After all other outage work on the boiler is completed, those in working condition should be reinstalled, while damaged thermocouples identified during inspection must be replaced.

09-0*NG30T001 09-0*NG30T002 09-0*NG39T001 09-0*NG39T002 **R/H PA FAN** 09-0*NG40T001 09-0*NG40T002 09-0*NG49T001 09-0*NG49T002 **L/H ID FAN** 09-0*NR10T001 09-0*NR10T002 09-0*NR19T001 09-0*NR19T002 **R/H ID FAN** 09-0*NR20T001 09-0*NR20T002 09-0*NR29T001 09-0*NR29T002 **FLUE GAS DUCT** ***L/H AIR HTR*** 09-0*NR12T001 - 09-0*NR12T005 09-0*NR13T001 09-0*NR14T001 ***R/H AIR HTR*** 09-0*NR22T001 - 09-0*NR22T005 09-0*NR23T001		

09-0*NR24T001 ***L/H S/HTR 2 OUTL*** 09-0*NR11T006 09-0*NR11T007 ***L/H RE-HTR 1 OUTL*** 09-0*NR11T007 ***L/H ECON OUTL*** 09-0*NR11T008 ***R/H S/HTR 2 OUTL*** 09-0*NR21T006 ***R/H RE-HTR 1 OUTL*** 09-0*NR21T007 ***L/H ECON OUTL*** 09-0*NR21T008		
A MILL to F Mill 09-0*NM10T001 - 09-0*NM10T003 09-0*NM12T001 09-0*NM12T002 09-0*NM14T001 09-0*NM14T002 09-0*NM15T001 09-0*NM15T004 09-0*NM16T001 09-0*NM16T004	**Mill thermocouple**	The contractor must inspect all thermocouple pockets. If any are found to be damaged, the outage coordinator must notify the responsible boiler system engineer to issue cut-and-weld instructions for new pockets. The contractor must inspect and test all thermocouples prior to their removal from the plant. The contractor must remove and store the thermocouples once the unit is shut down. After all other outage work on the boiler is

		completed, those in working condition should be reinstalled, while damaged thermocouples identified during inspection must be replaced.
09-0RA11T001 – 09-0*RA11T003 09-0RA12T001 – 09-0*RA12T003 09-0*RA13T001 – 09-0*RA13T003 09-0*RA14T001 – 09-0*RA14T003 09-0*RA31T001 – 09-0*RA31T003	**BLR OUTLET SH Thermocouples**	The contractor must inspect and test all thermocouples prior to their removal from the plant. The contractor must remove and store the thermocouples once the unit is shut down. After all other outage work on the boiler is completed, those in working condition should be reinstalled, while damaged thermocouples identified during inspection must be replaced.
09-0*RA32T001 – 09-0*RA32T003 09-0*RA33T001 – 09-0*RA33T003 09-0*RA44T001 – 09-0*RA44T003	**HP BYPASS VLV MSB OUTLET Thermocouples**	
09-0*RB11T001 – 09-0*RB11T003 09-0*RB12T001 – 09-0*RB12T003 09-0*RB13T001 – 09-0*RB13T003 09-0*RB14T001 – 09-0*RB14T003	**RH Thermocouples**	

List of transmitters scheduled for outage execution:

AKZ Number	Component Description	Work specifications
ID FAN IN/OUT BD 09-0*NR18P003 09-0*NR18P004 09-0*NR28P003 09-0*NR28P004 **ID FAN IN/OUT BD** 09-0*NR18P003 09-0*NR18P004 09-0*NR28P003 09-0*NR28P004 **ID FAN L/OIL PMP** 09-0*NR18P001 09-0*NR18P002 09-0*NR28P001 09-0*NR28P002 **FD FAN IN/OUT BD** 09-0*NG18P003 09-0*NG18P004 09-0NG28P003 09-0*NG28P004 **FD FAN L/OIL PMP** 09-0*NG18P001 09-0*NG18P002 09-0*NG28P001 09-0*NG28P002 **PA FAN IN/OUT BD** 09-0*NG38P003 09-0*NG38P004 09-0*NG38P003 09-0*NG38P004 **PA FAN L/OIL PMP** 09-0*NG38P001 09-0*NG38P002 09-0*NG38P001 09-0*NG38P002	**DRAUGHT GROUP L/OIL**	All boiler protection Transmitters to be removed from the plant and sent for calibration to a SANAS certified supplier. Transmitters found to be damaged/faulty shall be replaced with new ones. Boiler protection and capabilities trip testing instruction.
A MILL TO F MILL FLOW TRANSMITTERS 09-0*NM15F001 09-0*NM15F002 09-0*NM15F003 09-0*NM16F001 09-0*NM16F002 09-0*NM16F003 **FDR SPD/ROT SWT** 09-0*NM15Y001 09-0*NM15Y002 09-0*NM15Y003 09-0*NM16Y001 09-0*NM16Y002	**Mill transmitters**	Function check and verify protection transmitters. **PM – 09MSP2015STAT** Mill Protection Tests Work Instruction to be used. **15ENG C&I-8013**

09-0*NM16Y003 **LEVEL TRANSMITTERS** 09-0*NM18L001 09-0*NM18M001 **PRESSURE TRANSMITTERS** 09-0*NM11P001 09-0*NM10P001 09-0*NM13P001 09-0*NM15P001 09-0*NM16P001 09-0*NM18P003 09-0*NM18P004 **MILL L/OIL SYS** 09-0*NM17P001 09-0*NM17P016 09-0*NM17P021 09-0*NM17P022 09-0*NM17F001 09-0*NM17F002 09-0*NM17F003		
09-0*PH01L102 - 09-0*PH06L102	**Mill bunker level transmitters**	Replace damaged transmitters. **PM – 09MSP2015STAT.** Mill Protection Tests Work Instruction to be used. **15ENG C&I-8013**
09-0*NA10F001- 09-0*NA10F003	**Economiser outlet Flow transmitters**	All boiler protection transmitters must be removed from the plant and sent for calibration by a SANAS-certified supplier. Any transmitters identified as damaged or faulty shall be replaced with new units. Boiler protection and capabilities trip testing must be conducted according to instruction document **15MNT C&I PC-1246**.
09-0*NA10F011- 09-0*NA10F013 09-0*NE11P001 09-0*NW00F001	**Economiser Inlet Flow transmitters**	
S/ATT1.1 IN SPR WTR F 09-0*NW11F001 **S/ATT1.2 IN SPR WTR F** 09-0*NW12F001 **R/ATT1 IN SPR WTR F** 09-0*NW51F001	**SPRAYWATER**	

R/ATT2 IN SPR WTR F 09-0*NW52F001 **R/ATT3 IN SPR WTR F** 09-0*NW53F001 **R/ATT4 IN SPR WTR F** 09-0*NW54F001 **S/ATT2.1 IN SPR WTR F** 09-0*NW21F001 **S/ATT2.2 IN SPR WTR F** 09-0*NW22F001 **S/ATT2.3 IN SPR WTR F** 09-0*NW23F001 **S/ATT2.4 IN SPR WTR F** 09-0*NW24F001		
09-0*NB10L001 09-0*NB10L002 09-0*NB10P001 09-0*NB10P002 09-0*NB13L001 09-0*NB13P001	**Collecting Vessel and Blow Down Vessel Transmitters**	
09-0*NR11P002 09-0*NR21P002	**Furnace Pressure Transmitter**	

09-0*NG00F001 - 09-0*NG43P001	**Air Heater and Secondary Air Transmitters**	
09-0*NS01P002	**CIRC Pump Transmitters**	
09-0*NB11F001 09-0*NW40F001		

FD FAN **VIBRATION** 09-0*NG10Z901 09-0*NG20Z901 **FLOW** 09-0*NG11F001 09-0*NG11F002 **PRESSURE** 09-0*NG11P001 09-0*NG21P001 **PA FAN** **VIBRATION** 09-0*NG30Z901 09-0*NG40Z901 **PRESSURE** 09-0*NG31P001 09-0*NG41P001 **ID FAN** **VIBRATION** 09-0*NR10Z901 09-0*NR20Z901 **PRESSURE** 09-0*NR14P001 09-0*NR24P001	**FAN Transmitters**	
09-0*NK01P001A 09-0*NK01P001B	**LP Gas Supply Transmitters**	

09-0*NR11P002 - 09-0*NR11P010 09-0*NR12P001 09-0*NR13P001 09-0*NR17P001 09-0*NR21P002A 09-0*NR24P001	**Flue Gas Duct Transmitters**	
09-0*NX01P001A 09-0*NX01P001C	**Control Air Transmitters**	
09-0*RQ80P001	**Aux STM Range Pressure Transmitter**	
ATTEMPERATURE 09-04NW51F001 09-04NW52F001 09-04NW53F001 09-04NW54F001 09-04NW21F001 09-04NW22F001 09-04NW23F001 09-04NW24F001	**ATT IN FLOW Transmitters**	
09-0*RA31P001 09-0*RA32P001 09-0*RA33P001 09-0*RA34P001	**HP BYPASS VLV OUTLET PRESSURE Transmitter**	

09-0*NU10P004 09-0*NU10Y001 09-0*NU10S005 09-0*NU10S006 09-0*WE11K13A 09-0*WE11K13B 09-0*WD20Y001 09-0*NU10M001 09-0*WD20P003 09-0*NU40L003 09-0*NU10D001 09-0*NU10T004 09-0*NU10L004 09-0*NU10P001 09-0*NU10P003 09-0*NU10P005 09-0*NU10P006 09-0*WE11K011 09-0*WE11K012 09-0*WE12K100 09-0*WE12K101 09-0*WE11K401 09-0*WE11K402 09-0*WE12K401 09-0*WE12K401 09-0*WE11K001 09-0*WE12K301 09-0*WE11Y001 09-0*WE12Y001	**SUBMERGED SCRAPPER CONVEYER PLANT**	

09-0*NR12A001 09-0*NR13A001 09-0*NR22A001 09-0*NR23A001 09-0*NW01S101A-09-0*NW04101A 09-0*RA31T002 09-0*RA34T002 09-0*RA31P001 09-0*RA34P001 09-0*NW01S001 09-0*NW04S001 09-0*RA31S001 09-0*RA34S001 09-0*RA31S001 & 09-0*RA34S001	**O2 Analyser** **HP BYPASS**	
HJ101 HJ151	**HP Bypass Valves Cubicle** **RH Safety Valves Cubicle**	Inspect, clean and function check the operation of the valves. This is done after unit is retuned on load.

Drain v/v temps 09-0*NV11T001 09-0*NV12T001 09-0*NV21T001 09-0*NV22T001 09-0*NV41T003 09-0*NV42T003 ***Pressure Gauges*** 09-0*NV02P002 09-0*NV0*P003 09-0*NV41P001 09-0*NV41P002 09-0*NV42P001 09-0*NV42P002 ***RH Wall Pressure switches*** 09-0*NV22P102 09-0*NV22P104 09-0*NV22P106 09-0*NV22P108 09-0*NV22P110 09-0*NV22P112 09-0*NV22P114 09-0*NV22P116 09-0*NV22P118 09-0*NV22P120 09-0*NV22P122 09-0*NV22P124 09-0*NV22P126 09-0*NV22P128 09-0*NV22P130 09-0*NV22P132	**SOOTBLOWER PLANT**	Ensure gauges are in working conditions, replace if found faulty or damaged Inspection as per the work instruction: 15MNT-MSMW00*9 Replace if found faulty: 15MNT-MSMW0015 Remove from the plant and calibrate as per the maintenance calibration instruction: 15MNT-MSMW0015 Replace if found faulty/damaged as per the scheduled replacement work instruction: 15MNT-MSMW0014

09-0*NV22P134 09-0*NV22P136 09-0*NV22P138 09-0*NV22P140 ***LH Wall Pressure switches*** 09-0*NV12P101 09-0*NV12P103 09-0*NV12P105 09-0*NV12P107 09-0*NV12P109 09-0*NV12P111 09-0*NV12P113 09-0*NV12P115 09-0*NV12P117 09-0*NV12P119 09-0*NV12P121 09-0*NV12P123 09-0*NV12P125 09-0*NV12P127 09-0*NV12P129 09-0*NV12P131 09-0*NV12P133 09-0*NV12P135 09-0*NV12P137 09-0*NV12P139 09-0*NV1P107 **Pressure transmitter** 09-0*NV02P003 09-0*NV0*P001		

09-0*HE10M001 09-0*HE10M002 to 09-0*HE10M028	**Tube Leak Detectors Amplifiers**	Inspect and remove the components before the boiler outage scope commences. After the outage scope is completed, calibrate and reinstall those in working condition, while replacing any found to be faulty. Replace damaged PVC mounting pipes.

Junction Boxes:

- Clean and blow out all C&I junction boxes. Confirm terminal wiring accuracy against drawings, repair damaged seals, and ensure all junction boxes are securely closed.

Valve and Actuator Setup:

- Set up and stroke pneumatic valves and controllers, including Siemens SIPART, ABB TZID, Fisher FESTO, METSO, and any additional brands that may be installed at Tutuka in the future.
- Configure and stroke actuators such as Rotork (A-Range and IQ range), Siemens, Hopkinson, Auma, Drehmo, Lewa and other actuator brands potentially installed at Tutuka.

Defects and Discrepancies:

- Address all AU defects reported by the C&I Senior Supervisors.
- Resolve discrepancies in the control system and verify JB and JL cubicles settings.
- Resolve all active simulations within the control system.
- Address and rectify discrepancies to ensure system functionality and accuracy.

Cleaning and Documentation:

Cubicles marshalling and all cable entries to cubicles must be cleaned using Nano Cleaning Solution to eliminate dust accumulation and reduce the risk of premature failures. Equipment cubicle filters must be replaced with new units supplied by the Eskom Senior Technician overseeing the outage.

2.2.4 Turbine Plant High level Scope of Work to be executed by the C&I Outage Contractor: ***(Outage Department to issue signed scope of work)***

Calibration:

- Calibrate all Turbine Protection instruments through a SANAS-accredited supplier. The C&I outage resources contractor must provide certificates for all boiler protection instruments and ensure tags are affixed to the instruments. These tags should display the name and signature of the individual who performed the calibration, the calibration

date, and the SANAS accreditation number. The calibration certificates must be approved by the C&I Engineer responsible for the plant. Below is the list of instruments scheduled for calibration during the Mini General Outage (MGO) and General Outage (GO):

TURBINE PROTECTION INSTRUMENTS

	TEMPERATURE		Calibration Range	Trip Setting
1	0*SA13T001	LP 1 RH FRONT EXH STM TEMP1	0-200 Degree	153 C
2	0*SA13T021	LP 1 RH FRONT EXH STM TEMP2	0-200 Degree	153 C
3	0*SA13T0*1	LP 1 RH FRONT EXH STM TEMP3	0-200 Degree	153 C
4	0*SA13T002	LP 1 LH FRONT EXH STM TEMP1	0-200 Degree	153 C
5	0*SA13T022	LP 1 LH FRONT EXH STM TEMP2	0-200 Degree	153 C
6	0*SA13T0*2	LP 1 LH FRONT EXH STM TEMP3	0-200 Degree	153 C
7	0*SA13T00*	LP 1 RH REAR EXH STM TEMP1	0-200 Degree	153 C
8	0*SA13T023	LP 1 RH REAR EXH STM TEMP2	0-200 Degree	153 C
9	0*SA13T0*3	LP 1 RH REAR EXH STM TEMP3	0-200 Degree	153 C
10	0*SA13T004	LP 1 LH REAR EXH STM TEMP1	0-200 Degree	153 C
11	0*SA13T024	LP 1 LH REAR EXH STM TEMP2	0-200 Degree	153 C
12	0*SA13T0*4	LP 1 LH REAR EXH STM TEMP3	0-200 Degree	153 C
13	0*SA14T005	LP 2 RH FRONT EXH STM TEMP1	0-200 Degree	153 C
14	0*SA14T025	LP 2 RH FRONT EXH STM TEMP2	0-200 Degree	153 C
15	0*SA14T0*5	LP 2 RH FRONT EXH STM TEMP3	0-200 Degree	153 C
16	0*SA14T006	LP 2 LH FRONT EXH STM TEMP1	0-200 Degree	153 C
17	0*SA14T026	LP 2 LH FRONT EXH STM TEMP2	0-200 Degree	153 C
18	0*SA14T0*6	LP 2 LH FRONT EXH STM TEMP3	0-200 Degree	153 C
19	0*SA14T007	LP 2 RH REAR EXH STM TEMP1	0-200 Degree	153 C
20	0*SA14T027	LP 2 RH REAR EXH STM TEMP2	0-200 Degree	153 C
21	0*SA14T0*7	LP 2 RH REAR EXH STM TEMP3	0-200 Degree	153 C
22	0*SA13T008	LP 1 LH REAR EXH STM TEMP1	0-200 Degree	153 C
23	0*SA13T028	LP 1 LH REAR EXH STM TEMP2	0-200 Degree	153 C
24	0*SA13T0*8	LP 1 LH REAR EXH STM TEMP3	0-200 Degree	153 C
25	0*SC11T100	TURBINE BRG 1 METAL TEMP	0-200 Degree	> 82 C
26	0*SC11T072	TURBINE BRG 1 OIL DRAIN TEMP	0-100 Degree	> 82 C
27	0*SC11T101	TURBINE BRG 2 METAL TEMP	0-200 Degree	> 82 C
28	0*SC11T073	TURBINE BRG 2 OIL DRAIN TEMP	0-100 Degree	> 82 C
29	0*SC11T102	TURBINE BRG 3 METAL TEMP	0-200 Degree	> 82 C
30	0*SC11T074	TURBINE BRG 3 OIL DRAIN TEMP	0-100 Degree	> 82 C
31	0*SC11T10*	TURBINE BRG 4 METAL TEMP	0-200 Degree	> 82 C
32	0*SC11T075	TURBINE BRG 4 OIL DRAIN TEMP	0-100 Degree	> 82 C
33	0*SC11T104	TURBINE BRG 5 METAL TEMP	0-200 Degree	> 82 C
34	0*SC11T076	TURBINE BRG 5 OIL DRAIN TEMP	0-100 Degree	> 82 C
35	0*SC11T105	TURBINE BRG 6 METAL TEMP	0-200 Degree	> 82 C
36	0*SC11T077	TURBINE BRG 6 OIL DRAIN TEMP	0-100 Degree	> 82 C
37	0*SC11T106	TURBINE BRG 7 METAL TEMP	0-200 Degree	> 82 C
38	0*SC11T078	TURBINE BRG 7 OIL DRAIN TEMP	0-100 Degree	> 82 C

39	0*SC11T107	TURBINE BRG 8 METAL TEMP	0-200 Degree	> 82 C
40	0*SC11T079	TURBINE BRG 8 OIL DRAIN TEMP	0-100 Degree	> 82 C
41	0*SC11T108	TURBINE BRG 9 METAL TEMP	0-200 Degree	> 82 C
42	0*SC11T080	TURBINE BRG 9 OIL DRAIN TEMP	0-100 Degree	> 82 C
43	0*SC11T109	TURBINE BRG 10 METAL TEMP	0-200 Degree	> 82 C
44	0*SC11T081	TURBINE BRG 10 OIL DRAIN TEMP	0-100 Degree	> 82 C
45	0*SC11T110	TURBINE BRG 11 METAL TEMP	0-200 Degree	> 82 C
46	0*SC11T082	TURBINE BRG 11 OIL DRAIN TEMP	0-100 Degree	> 82 C
47	0*SC11T115	TURBINE BRG 12 METAL TEMP	0-200 Degree	> 82 C
48	0*SC11T083	TURBINE BRG 12 OIL DRAIN TEMP	0-100 Degree	> 82 C
49	0*ST11T041	GEN CASING GAS E.E ALARM TEMP	0-150 Degree	> 90 C
50	0*ST11T042	GEN CASING GAS T.E ALARM TEMP	0-150 Degree	> 90 C
51	0*ST11T043	GEN CASING GAS E.E ALARM TEMP	0-150 Degree	> 90 C
52	0*ST11T044	GEN CASING GAS T.E ALARM TEMP	0-150 Degree	> 90 C
53	0*RA11T001	BOILER OUTLET STM TEMP	0-600 Degree	diff
54	0*RA11T002	BOILER OUTLET STM TEMP	0-600 Degree	diff
55	0*RA11T00*	BOILER OUTLET STM TEMP	0-600 Degree	diff
56	0*RA12T001	BOILER OUTLET STM TEMP	0-600 Degree	diff
57	0*RA12T002	BOILER OUTLET STM TEMP	0-600 Degree	diff
58	0*RA12T00*	BOILER OUTLET STM TEMP	0-600 Degree	diff
59	0*RA13T001	BOILER OUTLET STM TEMP	0-600 Degree	diff
60	0*RA13T002	BOILER OUTLET STM TEMP	0-600 Degree	diff
61	0*RA13T00*	BOILER OUTLET STM TEMP	0-600 Degree	diff
62	0*RA14T001	BOILER OUTLET STM TEMP	0-600 Degree	diff
63	0*RA14T002	BOILER OUTLET STM TEMP	0-600 Degree	diff
64	0*RA14T00*	BOILER OUTLET STM TEMP	0-600 Degree	diff

PRESSURE

1	0*SA11P114	HP INLET PRESSURE	0-9 Mpa	diff
2	0*SA11P124	HP INLET PRESSURE	0-9 Mpa	diff
3	0*SA11P134	HP INLET PRESSURE	0-9 Mpa	diff
4	0*RC12P00*	HP OUTLET PRESSURE	0-6 Mpa	<200kPa
5	0*RC12P004	HP OUTLET PRESSURE	0-6 Mpa	<200kPa
6	0*RC12P005	HP OUTLET PRESSURE	0-6 Mpa	<200kPa
7	0*RA99P001	STEAM PRESS BEFORE S.V.	0-25 Mpa	<12,5Mpa
8	0*RA99P002	STEAM PRESS BEFORE S.V.	0-25 Mpa	<12,5Mpa
9	0*RA99P00*	STEAM PRESS BEFORE S.V.	0-25 Mpa	<12,5Mpa
10	0*SC11P901	HP LUB OIL PROT PRES	0-600 Kpa	<93kPa
11	0*SC11P902	HP LUB OIL PROT PRES	0-600 Kpa	<93kPa
12	0*SC11P90*	HP LUB OIL PROT PRES	0-600 Kpa	<93kPa
13	0*SJ0*P201	FRF HYDRAULIC PROT PRESS	0-20MPa	<5.36MPa
14	0*SJ0*P202	FRF HYDRAULIC PROT PRESS	0-20MPa	<5.36MPa
15	0*SJ0*P20*	FRF HYDRAULIC PROT PRESS	0-20MPa	<5.36MPa

16	0*SP11F006	GEN STATOR WATER FLOW	0-25 KPa	<15 l/s
17	0*SP11F106	GEN STATOR WATER FLOW	0-25 KPa	<15 l/s
18	0*SP11F206	GEN STATOR WATER FLOW	0-25 KPa	<15 l/s

	ABS PRESSURE			
1	0*SD01P022	COLD CONDENSOR VACUUM	0-100 Kpa ABS	>22 kPa ab
2	0*SD01P023	COLD CONDENSOR VACUUM	0-100 Kpa ABS	>22 kPa ab
3	0*SD01P024	COLD CONDENSOR VACUUM	0-100 Kpa ABS	>22 kPa ab
4	0*SD02P811	HOT CONDENSOR VACUUM	0-100 Kpa ABS	>22 kPa ab
5	0*SD02P812	HOT CONDENSOR VACUUM	0-100 Kpa ABS	>22 kPa ab
6	0*SD02P813	HOT CONDENSOR VACUUM	0-100 Kpa ABS	>22 kPa ab
7	0*SD81P502	BFPT vac	0-100 Kpa ABS	>34 kPa Abs
8	0*DS81P502	BFPT vac	0-100 Kpa ABS	>34 kPa Abs
9	0*SD81P511	BFPT vac	0-100 Kpa ABS	>34 kPa Abs

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Perform in-house calibration of pressure switches and temperature switches using properly calibrated equipment.

Field Devices:

- Remove all field devices from the plant as outlined in the outage scope of work issued by C&I Engineering. Ensure the approved scope is provided by the outage department. The C&I outage contractor is not required to execute any scope on the turbine centre line. Field devices on the turbine centre line and generator will be removed and reinstalled by Tutuka PS C&I Maintenance department.

Feed Pumps:

- Remove and replace instrumentation for EFP A & B.
- Remove and replace BFPT instrumentation.
- Replace all protection thermocouples with new ones.

Turbine Auxiliaries:

- Disconnect, reconnect, and stroke the specified valves.
- Remove vacuum transmitters.
- Remove pneumatic valve positioners.

- Remove field devices on the Water Air Ejectors (WEA) and Steam Air Ejectors (SAE). Inspect, repair or replace if damaged.
- Stroke condensate system valves.
- Remove and reinstall Secondary Cooling Water pumps instrumentation.
- Remove and replace Condensate Extraction Pumps instrumentation.
- Perform calibration checks on the Generator H2 purity analyser.
- Conduct calibration checks on Stator water conductivity analysers.
- Blow through the DST level transmitter impulse line.
- Perform a function check on the DST pressure controller.
- Inspect HP and LP heater instrumentation, removing and repairing any damaged instruments.

List of instruments scheduled for outage execution:

AKZ Number	Component Description	Work specifications
Eccentricity probe 09-0*SB82Z504I ***Bearing vibrations probe*** 09-0*SB82Z50*I 09-0*SB81Z502I 09-0*RL13Z522I 09-0*RL13Z523I ***Diff expansion probe*** 09-0*SB82Z505I *Thrust wear probe* 09-0*SB81Z506I ***Speed probes*** 09-0*SO81Y001I 09-0*SB81Y501I	**BOILER FEED PUMP TURBINE**	The contractor must remove and store the thermocouples once the unit is shut down. After all other outage work on the boiler feed pump is completed, those in working condition should be reinstalled, while damaged thermocouples identified during inspection must be replaced. **15MNT C&I-042**

Pressure Transmitters 09-0*RL13P504 09-0*RL13P505 09-0*RL13P506 09-0*SE71P518 09-0*SJ71P504 09-0*RL13P509 09-0*RL13P510 09-0*RL23P501 09-0*RL23P502 09-0*RW11P501 09-0*RW12P502 09-0*VG01P530 09-0*SD81P501 09-0*SD81P502 09-0*SD81P511 09-0*SA81P521 09-0*SA81P522 09-0*SA81P523 09-0*SA81P524 09-0*SA81P518 09-0*SA81P519 09-0*SE71P506 09-0*SE71P507 09-0*RF41P517 09-0*RF41P549 09-0*RF41P049 09-0*RF51P515 09-0*RF51P549 09-0*SC71P520 09-0*SC71P513 09-0*SC71P514 09-0*SC71P515 09-0*SC71P507		All BFPT protection transmitters and thermocouples must be calibrated by a SANAS-certified supplier. Any transmitters identified as damaged or faulty shall be replaced with new transmitters. BFPT protections and capabilities trip testing procedures must be followed accordingly.

09-0*SC71P526 09-0*SC71P527 09-0*SC71P528 09-0*SC71P509 09-0*SG71P519 09-0*SE71P506 09-0*SE71P507 09-0*SE71P518 09-0*SK71P970 ***Flow Transmitters*** 09-0*RW11F516 *09-0*RL23F513* *09-0*RL23F514* *09-0*RL23F515* *09-0*RL23F511* 09-0*RL23F001 09-0*RL23F003 09-0*RL23F003 ***Thermocouples*** *09-0*SD11T003* *09-0*SD81T510* *09-0*VG01T510* 09-0*RF41T532 09-0*RF42T533 09-0*RF51T531 09-0*SC71T502 09-0*SC71T504 09-0*SC71T510 09-0*SC71T511 09-0*SC71T512 09-0*SC71T521 09-0*SC71T504 09-0*RW14T515 09-0*SH71T511 09-0*SH71T513 09-0*SH71T514 09-0*SH71T515		

09-0*RF51T509 09-0*RF51T510 09-0*RL13T533 09-0*RL13T534 09-0*RL13T535 09-0*RL13T536 09-0*SM81T528 09-0*SM81T529 09-0*SM81T530 09-0*SM81T531 09-0*SA81T540 09-0*RL13T524 09-0*RL13T525 09-0*RL13T526 09-0*RL13T527 09-0*RL13T560 09-0*RL13T561 09-0*RL23T545		
Positioners 09-0*SE71S518 09-0*RW11S007		Remove the positioner before work on the Woodward governor begins. Inspect the positioner plug for any damage. If the positioner mounting or positioner shaft is found to be damaged, replace it with a new positioner. The pneumatic positioner (TZID) must be removed and inspected for any signs of damage. During stroking, the positioner must undergo a functional check. If its functionality is in question, replace it with a new unit.

Level transmitters 09-0*RW15L517 09-0*RW15L519 09-0*RW15L520		Transmitters must be inspected, and any damaged or malfunctioning display screens replaced accordingly. Calibration checks must be performed in accordance with the specified maintenance procedures
Bearing vibrations probes 09-0*RL11Z623 09-0*RL11Z624 09-0*RL12Z823 09-0*RL12Z824 ***Pressure Transmitters*** 09-0*SC77P612 09-0*SC76P618 09-0*SC76P615 09-0*SC76P616 09-0*SC76P622 09-0*SC79P812 09-0*SC78P818 09-0*SC78P815 09-0*SC78P816 09-0*SC78P822 ***Flow transmitters*** 09-0*RL21F693 09-0*RL21F001 09-0*RL22F893 09-0*RL22F001 ***Level transmitters*** 09-0*SC76L619 09-0*SC78L819	**ELECTRIC FEED PUMP A & B**	All EFPs protection transmitters and thermocouples must be calibrated by a SANAS-certified supplier. Any transmitters identified as damaged or faulty shall be replaced with new transmitters. BFPT protections and capabilities trip testing procedures must be followed accordingly. Transmitters must be inspected, and any damaged or malfunctioning display screens replaced accordingly. Calibration checks must be performed in accordance with the specified maintenance procedures

Speed probes 09-0*SM71Y665 09-0*SM72Y865		

Thermocouples 09-0*SJ01T004 09-0*SJ21T010 09-0*SJ01T028 09-0*SJ01T009 ***Pressure transmitters*** 09-0*SJ21P025 09-0*SJ21P021 09-0*SJ21P023 09-0*SJ01P003 09-0*SJ01P022 09-0*SJ01P020 09-0*SJ01P024 ***Level Transmitters*** 09-0*SJ01L015 09-0*SJ01L016	**FRF SYSTEM**	Before mechanical work begins, all thermocouples must be removed for inspection. Any damaged thermocouples should be replaced. Compensating leads must also be checked, and any visible damage should be corrected by removing faulty leads and replacing them with new leads of the appropriate thermocouple type. Once replacements are completed, a loop check must be performed. Additionally, all thermocouple pockets should be removed and inspected, with any visibly damaged pockets being replaced.

Pressure transmitters 09-0*VG13P051 09-0*VG14P052 09-0*SD23P008 09-0*SD24P010 09-0*VG11P045 09-0*VG12P046 09-0*VG11P043 09-0*VG12P044 09-0*SD21P009 09-0*SD22P007 09-0*RQ52P002 09-0*RQ52P005 09-0*RQ80P003 09-0*RM15P002 09-0*RM14P001 ***Level Transmitters*** 09-0*VG21L062 ***Thermocouples*** 09-0*RQ80T002 09-0*RM13T456 09-0*RM13T457 09-0*RM13T458 09-0*RM13T459 09-0*RM13T460 09-0*RM12T450 09-0*RM12T451 09-0*RM12T452 09-0*RM12T453 09-0*RM12T454	**Sec CW, WAE's & CEP**	
Thermocouples	**CONDESATE SYSTEM**	

09-0*SD01T016 09-0*SD01T020 09-0*SD02T017 09-0*SD02T021 09-0*SD81T510 09-0*SD81T511 09-0*SD11T001 09-0*SD11T00* 09-0*SD11T005 09-0*SD12T002 09-0*SD12T004 09-0*SD12T006 **Transmitters** 09-0*SD02P811 09-0*SD02P812 09-0*SD02P813 09-0*SD01P022 09-0*SD01P023 09-0*SD01P024 09-0*RM16F001 09-0*RM42F001 **Level Transmitter** 09-0*RM32L071 09-0*RM32L072 09-0*RM32L073 09-0*RM16S143 09-0*RM42S047 09-0*RM51S218 09-0*RM54S010		
Thermocouple	**AUXILLARY STEAM RANGE**	

09-0*RQ80T001 09-0*RQ80T002 09-0*RQ81T001 09-0*RQ82T001 **Transmitters** 09-0*RQ52P002 09-0*RQ52P005 09-0*RQ54P020 09-0*RQ80P001 09-0*RQ80P003		
Thermocouples 09-0*RF11T024 09-0*RF12T025 09-0*RF21T026 09-0*RF31T027 09-0*RF41T532 09-0*RF42T533 09-0*RF51T509 09-0*RF51T510 09-0*RF51T531 09-0*RM16T021 09-0*RM16T022 09-0*RM16T023 09-0*RM16T024 09-0*RM16T025 09-0*RM16T026 09-0*RM16T043 09-0*RM19T023 09-0*RM31T023 **Transmitters** 09-0*RF11P008	**FEEDWATER HEATING SYSTEMS**	

09-0*RF12P009 09-0*RF21P010 09-0*RF31P011 09-0*RF41P517 09-0*RH11P001 09-0*RH21P002 09-0*RH31P003 09-0*RH41P004 09-0*RH51P005 09-0*RH52P006 09-0*RH61P007 09-0*RH62P0*0 09-0*RN52P001 09-0*RN53P002 **Level Transmitter** 09-0*RN54L071 09-0*RN54L081 09-0*RN54L083 09-0*RP15L057 09-0*RP15L057 09-0*RP15L087 09-0*RP15L091 09-0*RP16L089 09-0*RP16L093 09-0*RP16L095 09-0*RP25L058 09-0*RP25L088 09-0*RP25L092 09-0*RP26L082 09-0*RP26L090 09-0*RP26L094 **Positioners**		

09-0*RN51S021 09-0*RN52S028 09-0*RP11S003 09-0*RP12S093 09-0*RP13S007 09-0*RP14S013 09-0*RP21S004 09-0*RP22S094 09-0*RP23S008 09-0*RP24S018		
Transmitters 09-0*SC31P028 09-0*SC31P027 09-0*SC11P911 09-0*SC11P903 09-0*SC11P902 09-0*SC11P901 09-0*SC11P035 09-0*SC11P026 09-0*SC11P011 09-0*SC11P010 09-0*SC11P009 09-0*SC11P008 09-0*SC11P006 09-0*SC11P005 09-0*SC11P004 09-0*SC11P003 **Flow Transmitter** 09-0*SC11F130 **Level Transmitter** 09-0*SC11L153	**Main Turbine Oil System**	

09-0*SC71L531 09-0*SC76L619 09-0*SC78L819		

Functional Checks:

- Perform loop checks on all reinstalled field devices to ensure functionality.
- Verify the proper operation of the DST pressure controller.
- Confirm the performance of the Secondary CW pump, including the Secondary CW sump level control.
- Ensure the operation of the condensate extraction pumps.
- Validate the functionality of the HP and LP bypass control system.

Junction Boxes:

- Clean and blow out all C&I junction boxes. Confirm terminal wiring accuracy against drawings, repair damaged seals, and ensure all junction boxes are securely closed.

Valve and Actuator Setup:

- Set up and stroke pneumatic valves and controllers, including Siemens SIPART, ABB TZID, Fisher FESTO, METSO, and any additional brands that may be installed at Tutuka in the future.
- Configure and stroke actuators such as Rotork (old and new models), Siemens, Hopkinson, Auma, Drehmo, and other actuator brands potentially installed at Tutuka.

Defects and Discrepancies:

- Address all AU defects reported by the C&I Senior Supervisors.
- Resolve discrepancies in the control system and verify JB and JL settings.
- Resolve all active simulations within the control system.
- Address and rectify discrepancies to ensure system functionality and accuracy.

Cleaning and Documentation:

Cubicles marshalling and all cable entries to cubicles must be cleaned using Nano Cleaning Solution to eliminate dust accumulation and reduce the risk of premature failures. Equipment cubicle filters must be replaced with new units supplied by the Eskom Senior Technician overseeing the outage.

2.2.4 Outside Plant High level Scope of Work to be executed by the C&I Outage Contractor: *(Outage Department to issue signed scope of work)*

Outside Plant Scope:

- Conduct function checks on CPP valves and correct any deviating or malfunctioning actuators.
- Clean CPP cubicles in the equipment room using Nano Technology cleaning.
- Verify calibration and protection settings of CW pump instruments.
- Inspect coal incline field devices, repairing any damage or replacing them with new ones as necessary.
- Perform protection checks on coal incline elevator conveyors.
- Conduct protection checks for Coal Plant conveyors, including reclaim, incline, shuttle, cross, and bunker-feed conveyors.
- Function check the LCS, clean the system, and verify the sealing of the panel.

Coal incline and bunker feeders List of instruments scheduled for outage execution:

BELT SLIP SW 01PC01Y001 01PC01Y002 **BELT ALIGNMENT SW** 01PC01K401 01PC01K402 0*PC02K401 0*PC02K402 0*PC03K401 0*PC03K402 0*PC21K401 0*PC21K401 0*PC22K401 0*PC22K402	**Unitised Coal Plant**	Verify the instrument's operation and carry out any necessary cleaning, repairs, or replacements during the outage. Perform protection checks on all unit conveyors before returning the unit to service, following the procedure outlined in 15ENG GEN-3003: Conveyor Belt Protection Checks.

0*PC23K401 0*PC23K402 0*PC24K401 0*PC24K402 0*PC12K401 0*PC12K402 0*PC13K401 0*PC13K402 0*PC14K401 0*PC14K402 **BLOCK CHUTE DETECTOR SW** 0*PK01L001 0*PK02L001 0*PK02L002 0*PK11L001 0*PK22L001 0*PK22L002 0*PK22L003 0*PK22L004 0*PK12L001 0*PK12L002 0*PK12L003 0*PK12L004 **SCOOP COUP TEMP TX** 0*PC02T001 0*PC02T002 **BELT SPEED SW** 0*PC02Y001 0*PC02Y002 0*PC03Y001 0*PC21Y001 0*PC22Y001 0*PC23Y001 0*PC24Y001 0*PC12Y001 0*PC13Y001 0*PC14Y001 **BELT RIP SW** 0*PC02K301		

0*PC21K301 **BELT WEIGHER TX** 0*PC02F001 **FLUID COUPLING TEMP SW** 0*PC22T001 0*PC12T001 **LEVEL MAX TILT SW** 0*PH01L101 0*PH02L101 0*PH03L101 0*PH04L101 0*PH05L101 0*PH06L101 **BUNKER LEVEL TX** 0*PH01L201 0*PH02L201 0*PH03L201 0*PH04L201 0*PH05L201 0*PH06L201 **EMERG. TRIP DEVICE** 0*PC01K101 0*PC01K102 0*PC02K101 0*PC02K102 0*PC02K103 0*PC02K104 0*PC02K105 0*PC02K106 0*PC02K107 0*PC21K101 0*PC21K102 0*PC21K103 0*PC12K101 0*PC12K102 0*PC12K103 0*PC13K101 0*PC13K200 0*PC14K101 0*PC14K200		

0*PC22K101 0*PC22K102 0*PC22K103 0*PC23K101 0*PC23K200 0*PC24K101 0*PC24K200		

CPP List of instruments scheduled for outage execution:

Pressure Gauges and Transmitters 0*UC10P001 0*UC10P002 0*UC10P003 0*UC10P004 0*UC10P005 0*UC10P006 0*UC10P008 0*UC10P011 0*UC10P012 0*UC10P013 0*UC10P016 0*UC11P001 0*UC11P003 0*UC11P004 0*UC11P005 0*UC11P006 0*UC12P001 0*UC12P003 0*UC12P004 0*UC12P005 0*UC12P006 0*UC13P001 0*UC13P003 0*UC13P004 0*UC13P005 0*UC13P006 **Temperature Tx** 0*UC10T001 0*UC10T010 0*UC10T012 0*UC10T101	CONDESATE POLISHING PLANT	The Instruments to be removed from the plant at the beginning of the outage and before mechanical work commences. Check calibration, check condition of a transmitter wiring. Check calibration and test operation of switches. Check calibration and test operation of pressure indicator or gauge. Clean, repair or replace where necessary.

Valve Position Switch 0*UC11S202-B01 0*UC11S202-B02 0*UC11S203-B01 0*UC11S203-B02 0*UC11S204-B01 0*UC11S204-B02 05UC11S211-B01 05UC11S211-B02 0*UC12S202-B01 0*UC12S202-B02 0*UC12S203-B01 0*UC12S203-B02 0*UC12S204-B01 0*UC12S204-B02 0*UC12S211-B01 0*UC12S211-B02 0*UC13S202-B01 0*UC13S202-B02 0*UC13S203-B01 0*UC13S203-B02 0*UC13S204-B01 0*UC13S204-B02 0*UC13S211-B01 0*UC13S211-B02 **Flow Tx** 0*UC11F001QP02 0*UC12F001QP02 0*UC13F001QP02 **Flow Switch** 0*UC11F002QP02 0*UC12F002QP02 0*UC13F002QP02		

2.2.5 Clean up

The Contractor must ensure the site is cleaned and free of rubble upon completion of the work. Once cleaning is finalized, the Senior C&I Technician shall be called to inspect and confirm that the site is in a presentable condition. Additionally, the Employer's Environmental Section will conduct ad-hoc inspections of the work site and perform a final inspection at the dumping site.

3 PPE.

PPE to be provided by the contractor as per Eskom Regulations

4 Required Resources

The contractor must provide Outage department with the specified expertise, ensuring relevant experience aligns with the technical evaluation strategy. The below resources are required:

2 x Senior Supervisor – Overseeing all activities on all plants
3 x Senior Technician – Boiler, Turbine Plants and Outside Plant (Auxiliaries, Coal incline and CCP)
4 x Technicians – Auxiliaries, Boiler and Turbine Plants
6 x Mechanicians – Turbine Plant
6 x Mechanicians - Boiler Plant
4 x Mechanicians – Auxiliaries, Coal incline and CCP Plants
1 x Safety officer