


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Document Type	Inspection Report
Outage ID	24390
Scope of Activity	GT21 Minor Inspection at Gourikwa Peaking OCGT
Purpose	This is a technical report on the “as found” condition, remedial action performed and final condition of plant or components.

Compiled		
Name/Designation	Signature	Date
L Calana Gas Turbine System Engineer		2023/01/24
J Otto Design Engineer		2023/01/24

Functional Responsibility		
Name/Designation	Signature	Date
T Keyser SEM Turbine Engineering		2023-01-30

Revision Details		
Date	Revision	Area


Accepted		
Name/Designation	Signature	Date
P Mrubata Plant Manager OCGT		2023/01/30

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SUMMARY

Gourikwa GT21 was removed from service on 1 August 2022 in order to carry out Minor Inspection activities as identified in 240-136723367. Limited disassembly, intervention and reassembly activities were performed by site maintenance personnel, and inspections were performed internally by Eskom and ERI personnel, and were carried out from August 1st until August 5th. Areas inspected included: Filter house, Compressor Inlet, Compressor Exhaust, Combustion Chambers, Turbine Inlet and the Turbine Exhaust.

LIST OF ABBREVIATIONS


BU	Business Unit
BIR	Burner Insert Ring
CC	Combustion Chamber
C&I	Control & Instrumentation
CS	Compressor Side
CV	Control Valve
DOH	Dynamic Hours
EOH	Equivalent Operating Hours
ERI	Eskom Rotek Industries
FT	Flame Tube
IC	Inner Casing
LE	Leading Edge
LHS	Open Cycle Gas Turbine
MC	Mixing Chamber
MI	Minor Inspection
MO	Major Inspection
OCGT	Right Hand Side
RHS	Right Hand Side
TBC	Thermal Barrier Coating
TE	Trailing Edge
TLa1	Turbine 1 st Stage Blades
TLa4	Turbine 4 th Stage Blades
TLe1	Turbine 1 st Stage Vanes
TLa4	Turbine 4 th Stage Blades
TLe4	Turbine 4 th Stage Vanes
TS	Turbine Side
TOT	Turbine Outlet Temperature
VIGV	Variable Inlet Guide Vane
VLa1	Compressor 1 st Stage Blades
VLe0	Compressor 0 th Stage Vanes (VIGVs)

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UNIT INFORMATION

Date	Starts	Operating Hours	EOH	DOH
2022/08/01	2242	15196	37937	252
Turbine Serial	Turbine Frame	Fuel(s)	Generator Serial	Generator Frame
800635	SGT5-2000E(6)	Fuel Oil	12008577	SGEN5-100A-2P 115/36

REFERENCES

1. Normative
 - a. Gas Turbine Minor Inspection Checklist: 3.5-0236-9420
 - b. Siemens SGTS-2000E Minor Inspection Philosophy: 240-136723367
2. Informative
 - c. Operating & Maintenance Manual – Gas Turbine Description
 - d. Intervals for Maintenance Work: 3.5-0022-9426

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Check Sheet 48: Emissions and corrections (historic)..... 110

1 EXECUTIVE SUMMARY OF FINDINGS

Section	Findings	Corrective Measures
2.1	Turbine and generator hall structure significantly corroded	Corrosion maintenance plan to be addressed
3.1	Filter house, coalescers and pre-filters dirty	Coalescers replaced
3.1	Severe corrosion at various locations of filter house observed.	Corrosion maintenance plan to be addressed
5.1.2.2, 5.2.2.2	Several burner premix bells have cracks due to overheating.	To be monitored during the next MI.
5.1.3, 5.2.3	Overlap wear found between mixing casing cooling ring and inner casing on both combustion chambers	No action – monitor at next MI
5.1.3, 5.2.3	Overlap wear noticed between flame tube and mixing casing castellation in both combustion chambers	No action – monitor at next MI
6.1	Crack in TBC of Turbine 1 st stage vane noted	No action – monitor at next MI
6.1	Flaking of TBC noted on several 1 st stage blades	No action – monitor at next MI
7	Numerous cracks noted downstream of the turbine outlet; internal cladding and expansion joint cover plates. Additionally a plate that had been installed previously was found to have cracked nearly loose.	Weld-repairs executed on several cracks, and loose plate – monitor at next MI
2.2, 2.4, 2.5, 2.6, 2.7, 2.8, 3.1	There are multiple instances of repeat findings where recommended actions have not been taken by site. In some cases notifications were raised after MI1 and MI2 – but remain unresolved during MI3.	Site to account for notifications that have been closed without the execution of recommended actions.

2 EXTERNAL INSPECTIONS

2.1 General

Finding(s):

1. Corrosion on cladding indicative of leak in turbine hall roof.
2. Turbine & Generator hall structure has severe corrosion noted.
3. General corrosion of cladding.

Corrective Measure(s):


1. Site to identify and repair leaks.
2. Corrosion assessment to be performed.

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3. No remedial action required – to be monitored during the next MI.

2.2 Ignition Gas

Finding(s):

1. Mechanical damage on gas supply line noted.
2. Loose pipe noted on RHS CC touching the walk-way frame.

Corrective Measure(s):

1. No remedial action required – noted during previous MI. Site to ensure that tooling does not damage pipework when manipulating plant components.
2. Site to amend pipe fixtures to ensure no un-desired contact takes place¹.

2.3 Control Oil Skid

Finding(s):

1. Seepage noted on top of the skid.
2. Tank slightly dirty.

Corrective Measure(s):

1. Site to clean skid and report leaks if noted.

2.4 Fuel Oil Skid

Finding(s):

1. Significant amount of oil noted on the skid
2. Fretting of fuel oil filling line with walkway.
3. Drip trays noted on both ends of FO pump.

Corrective Measure(s):

1. Site to clean skid and report any leaks if noted.
2. Site to amend pipe fixtures to ensure no un-desired contact takes place².
3. Site to plan for pump seal refurbishment during the next MO.


2.5 Lubricating Oil and Jacking Oil Skid

Finding(s):

1. Oil seepage noted under the lubricating oil filters.
2. Oil seepage noted around the jacking oil pumps.
3. Jacking oil line in compressor cone is unsupported.

¹ This is a repeat finding.

² This is a repeat finding.

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Corrective Measure(s):

1. Site to clean skid and report leaks if noted.
2. Site to clean skid and report leaks if noted.
3. Site to ensure adequate pipe support is installed³.

2.6 Turbine

Finding(s):

1. CC drain line pipes overheated and discoloured.
2. Corrosion of equipment wire shields noted.
3. White residue on cladding.

Corrective Measure(s):

1. Similar damage was noted as historic at Ankerlig and recorded in Technical Notification ANK-41-BA-2017-MJ-001. The pipes should be internally inspected, cleaned and re-painted during the next MI⁴.
2. Wire shields to be replaced at the next practicable opportunity.
3. White residue on cladding was likely caused by water from the leaking roof.

2.7 Combustion Chambers

Finding(s):

1. White residue on outside cladding.
2. General corrosion and flaking of paint noted on all burners.
3. Loose fire suppression system pipe below LHS CC platform.
4. DO return pipe bracket loose on RHS.
5. LHS ΔP pipe support slightly deformed.
6. Some seepage from premix bellow 2-6.

Corrective Measure(s):

1. White residue on cladding was caused by water from the leaking roof.
2. No remedial action required – to be monitored during the next MI.
3. Site to reconnect pipe support⁵.
4. Site to correct pipe support.
5. No remedial action required – to be monitored during the next MI.
6. To be monitored during the next MI

2.8 Generator

³ This is a repeat finding.

⁴ This is a repeat finding.


⁵ This is a repeat finding.

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Finding(s):

1. Dust from carbon brushes noted on TE bearing.
2. Jacking oil pressure gauge on EE is illegible.
3. Munters dryer pipe damaged.

Corrective Measure(s):

1. Carbon brush track appears to be wearing into shaft material – brush material properties to be verified.
2. Site to replace gauge⁶.
3. Site to replace.

3 AIR INTAKE SYSTEM

3.1 Filter House

Finding(s):

1. Drain pipe broken off and lying on roof.
2. Disconnected and exposed wiring noted from 241 MBL GW 001.
3. Bottom door seal damaged and corroded.
4. Several keys damaged and not all locks require the same keys, additionally the top LHS lock is broken and bottom RHS door could not be opened.
5. Coalescing filters dirty and sagging.
6. Pre-filter elements dirty.
7. Heavy corrosion noted on structure.
8. Some filters noted with minor damage.
9. Corrosion noted in the filter clean-room.
10. Debris noted in the filter clean-room.
11. Water noted in clean-room.

Corrective Measure(s):

1. Site to recover and reinstall drain pipe⁷.
2. Site to reconnect wiring and ensure that connections are electrically compliant⁸.


⁶ This is a repeat finding.

⁷ Notification 25243386 was raised for this action during the previous MI – but does not appear to have been executed. Another drain pipe has joined the original - Notification 25243388 was raised to correct the piping support during the previous outage – this was not done. Notification 25925766 to correct. **This was still not rectified.**

⁸ Notification 25243387 was raised for this action during the previous MI – but does not appear to have been executed. Notification 25243387 to correct. **This has still not been rectified.**

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3. Site to address corrosion and replace seal at next available opportunity⁹.
4. Site to consolidate door locks and keys so that only one key is required to open all filter house doors¹⁰.
5. Coalescing filters replaced.
6. Some pre-filters were replaced but not all. Site to consider a rotatable set of filters. This will allow site to install clean filters during an MI, and then clean the removed filters for installation during the next MI.¹¹
7. Corrosion evaluation to be done¹². Notifications 25925768 and 25925769 raised.
8. No remedial action required – to be monitored during the next MI. Site to ensure that spare filters are available at the next MI as a contingency; should replacement be required.
9. Corrosion protection to be correctly applied and the affected areas to be re-painted¹³.
10. Floor vacuum cleaned.
11. Site to investigate during rain in order to determine if a leak is present. Finally site to investigate levels so that adequate drainage may be achieved¹⁴.

3.2 Compressor Inlet

Finding(s):

1. Munters dryer inlet pipe cracked. Outlet pipe also cracked and repaired with tape.
2. Compressor Air Inlet cone gasket incomplete with signs of ingress.
3. Compressor Air Inlet cone gasket saturated with oil, likely due to seepage from lube oil drain flange internally to the cone.
4. Corrosion noted in several locations.
5. Paint running from cone to compressor.
6. Intake cone dirty.

Corrective Measure(s):

1. Munters dryer inlet and outlet pipes to be replaced¹⁵.
2. Compressor Air Inlet gasket to be replaced at the next MO.
3. Possibly indicative of a leak - to be monitored during the next MI.
4. Corrosion protection to be applied and the affected areas to be re-painted.
5. Site to clean paint and monitor during the next MI, if paint streaks continue to form site to repaint with the correct grade of paint.

⁹ This is a repeat finding.

¹⁰ This is a repeat finding. Notification 25925763 to correct. **This has still not been rectified.**

¹¹ This recommendation was also made after the previous MI.

¹² This recommendation was also made after the previous MI.


¹³ This recommendation was also made after the previous MI.

¹⁴ This is a repeat finding.

¹⁵ Notification 25925818 raised. **This has not been rectified.**

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6. Site to clean – to be monitored during the next MI.

4 COMPRESSOR

4.1 Inlet

4.2.1 VLe0

Finding(s):

1. VIGVs quite filthy with dust debris.
2. Coating abrasion noted at leading edges of the aerofoils.
3. Some red paint noted on aerofoils.

Corrective Measure(s):

1. Perform compressor washing.
2. No remedial action required – to be monitored during the next MI.
3. No remedial action required.

4.2.2 VLa1

Finding(s):

1. Deposits noted on blade aerofoils on suction and pressure sides.
2. Coating abrasion noted on leading edges of the aerofoils.
3. Radial blade tip clearance on RHS measured below specification , however no rubbing was observed in the vicinity.

Corrective Measure(s):

1. Perform compressor washing.
2. No remedial action required – to be monitored during the next MI.
3. No remedial action required – to be monitored during the next MI.

4.2 Exhaust Diffusor

No anomalies noted.

5 COMBUSTION

5.1 LHS CC

5.1.1 Sight Glasses

Finding(s):

1. Manhole sight glass dirty.

Corrective Measure(s):


1. Sight glass removed, cleaned and re-installed.

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5.1.2 Flame Tube

Finding(s):

1. Overheating of tile support ring in several areas.
2. Overheating of dome plate support ring in some areas.
3. Some cracks noted in dome plate support ring.

Corrective Measure(s):

1. No remedial action required – to be monitored during the next MI.
2. No remedial action required – to be monitored during the next MI.
3. No remedial action required – to be monitored during the next MI.

5.1.2.1 Diffusion Burners

Finding(s):

1. Coking noted on all burner caps and several axial swirlers.
2. Cracks noted on the axial swirlers of burner 1-3 and 1-8.

Corrective Measure(s):

1. Coking cleaned during MI.
2. To be monitored during the next MI. Site to plan for the refurbishment of axial swirlers during the next MO.

5.1.2.2 Premix Burners

Finding(s):

1. Light coking noted on all burner assemblies.
2. Several overheated diagonal swirlers on all burners; this is likely indicative of flashbacks having occurred.
3. Unequal deposits on all diagonal swirler outlet cones.
4. Overheating resulting in cracks on the premix bell noted on burner 1-6.

Corrective Measure(s):

1. Coking cleaned during MI.
2. Procurement of adequate quality fuel to be ensured.
3. No remedial action required – to be monitored during the next MI.
4. To be monitored during the next MI.

5.1.2.3 Ceramic Heat Shields


Finding(s)¹⁶:

1. No tiles were found with defects outside of the tolerable limits.

5.1.2.4 Dome Plates & Burner Inserts

Finding(s):

¹⁶ Tolerable limits as defined in: 37-1345-52KE00-DE-2013-12-003|004|005|006|007

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1. Minor signs of fretting noted between dome plates and burner inserts.
2. Cracks noted on burner insert ring(s) on 1-1, 1-2 and 1-8.

Corrective Measure(s):

1. No remedial action required – to be monitored during the next MI.
2. No remedial action required – to be monitored during the next MI. Site to consider application for reverse-engineering of Burner Insert Rings to alleviate replacement costs for the next MO.

5.1.3 Mixing Chamber

Finding(s):

1. Hammering noted between Flame Tube and Mixing Chamber {at castellations 7-9, 10-14, 15, 17, 24-30, 32-34, 35-36}.
2. Hammering noted between Mixing Chamber and Inner Casing {at IC castellations 7-13, 14, 16-4}.
3. Slight rubbing of manhole insert at collar noted.
4. Corrosion noted on CW2, CW3, TE support plate and TE bushing support.
5. Crack noted at CW2.
6. Clearance “t” between FT and MC above specification.
7. Cracks noted at manhole collar.

Corrective Measure(s):

1. No remedial action required – to be monitored during the next MI.
2. No remedial action required – to be monitored during the next MI.
3. No remedial action required – to be monitored during the next MI.
4. No remedial action required – to be monitored during the next MI.
5. No remedial action required – to be monitored during the next MI.
6. No remedial action required – to be monitored during the next MI.
7. No remedial action required – to be monitored during the next MI.

5.2 RHS CC

5.2.1 Sight Glasses

Finding(s):

1. 1 off damaged sight glass in flame tube.
2. Manhole sight glass dirty.

Corrective Measure(s):

1. Sight glasses replaced.
2. Sight glass removed, cleaned and re-installed.


5.2.2 Flame Tube

Finding(s):

1. Overheating of tile support ring in several areas.

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2. Overheating of dome plate support ring in some areas.
3. Some cracks noted in dome plate support ring.

Corrective Measure(s):

1. No remedial action required – to be monitored during the next MI.
2. No remedial action required – to be monitored during the next MI.
3. No remedial action required – to be monitored during the next MI.

5.2.2.1 Diffusion Burners

Finding(s):

1. Coking noted on all burner caps and several axial swirlers.
2. Erosion noted on the axial swirler outlet bell of burner 2-2.

Corrective Measure(s):

1. Coking cleaned during MI.
2. To be monitored during the next MI.

5.2.2.2 Premix Burners

Finding(s):

1. Light coking noted on all burner assemblies.
2. Several overheated diagonal swirlers on all burners; this is likely indicative of flashbacks having occurred.
3. Unequal deposits on all diagonal swirler outlet cones.
4. Erosion and overheating on the premix outer bell of burners 2-2, 2-3, 2-4 and 2-6, cracks on 2-2, 2-3, 2-4, 2-5 and 2-6.
5. 1 off plugged nozzle on burner 2-3.

Corrective Measure(s):

1. Coking cleaned during MI.
2. Procurement of adequate quality fuel to be ensured.
3. No remedial action required – to be monitored during the next MI.
4. No remedial action required – to be monitored during the next MI.
5. Blocked nozzle cleared by site.


5.2.2.3 Ceramic Heat Shields

Finding(s)¹⁷:

1. No tiles were found with defects outside of the tolerable limits. However several tiles are beginning to show signs of overheating.

5.2.2.4 Dome Plates & Burner Inserts

¹⁷ Tolerable limits as defined in: 37-1345-52KE00-DE-2013-12-003|004|005|006|007

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Finding(s):

1. Minor signs of fretting noted between dome plates and burner inserts.
2. Cracks noted on burner insert ring 2-1 and 2-5.
3. Deformation noted of plate 2-2.

Corrective Measure(s):

1. No remedial action required – to be monitored during the next MI.
2. No remedial action required – to be monitored during the next MI. Site to consider application for reverse-engineering of Burner Insert Rings to alleviate replacement costs for the next MO.
3. No remedial action required – to be monitored during the next MI.

5.2.3 Mixing Chamber

Finding(s):

1. Hammering noted between Flame Tube and Mixing Chamber {at castellations 6-12, 13, 16, 17-22, 25-29}.
2. Hammering noted between Mixing Chamber and Inner Casing {at IC castellations 1-12}.
3. Slight rubbing of manhole insert as well as cracks at collar noted.
4. Corrosion noted on CW3, CW4, TE support plate and TE bushing support.
5. Cracks noted at both inspection ports and CW2.
6. Clearance “B” between Mixing Chamber and Inner Casing below specification.
7. Clearance “t” between FT and MC below specification.

Corrective Measure(s):

1. No remedial action required – to be monitored during the next MI.
2. No remedial action required – to be monitored during the next MI.
3. No remedial action required – to be monitored during the next MI.
4. No remedial action required – to be monitored during the next MI.
5. No remedial action required – to be monitored during the next MI.
6. No remedial action required – to be monitored during the next MI.
7. No remedial action required – to be monitored during the next MI.

5.3 Inner Casing

Finding(s):

1. There were no findings on the TBC of the IC hub, and no coating spallation was observed.
2. Some corrosion was noted on the IC walls

Corrective Measure(s):

1. No remedial action required.
2. No remedial action required – to be monitored during the next MI.


6 TURBINE

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6.1 Inlet

Finding(s):

1. Normal discoloration of TLe1 and TLa1 TBC observed.
2. Minor flaking of TBC on some TLa1 blades observed.
3. Several TE radial blade tip clearances were measured to be tight – however there were no visible signs of rubbing.
4. LE radial blade tip clearance at the bottom an LHS top were measured to be tight – however there were no visible signs of rubbing.
5. Crack in TBC noted on vane 23 aerofoil.

Corrective Measure(s):

1. No remedial action required.
2. No remedial action required – to be monitored during the next MI.
3. No remedial action required – to be monitored during the next MI.
4. No remedial action required – to be monitored during the next MI
5. No remedial action required – to be monitored during the next MI

6.2 Outlet

Finding(s):

1. Most radial blade tip clearances were measured to be tight – however there were no visible signs of rubbing.
2. Standard deposits noted on the 4th stage blades and vanes.

Corrective Measure(s):

1. No remedial action required – to be monitored during the next MI.
2. No remedial action required.

7 EXHAUST

Finding(s):

1. Cracks indications noted in several areas of the exhaust casing, expansion joint plates and turbine bearing hub.
2. Plate in exhaust that had been previously repaired found cracked loose.
3. Wear noted on turbine bearing hub cover plate, 1st and 2nd expansion joint plates.
4. Some insulation is visible out of the hub cover plate.

Corrective Measure(s):

1. Several cracks were weld-repaired. To be monitored during the next MI.
2. Weld repairs executed by site.
3. No remedial action required – to be monitored during the next MI.
4. Site to raise contingency to manufacture and replace plate during the next MI.

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APPENDIX A



Figure 1: Door rusted



Figure 4: Lubricating oil skid



Figure 2: Lubricating oil skid



Figure 5: Lubricating oil skid



Figure 3: Lubricating oil skid



Figure 6: Lubricating oil skid

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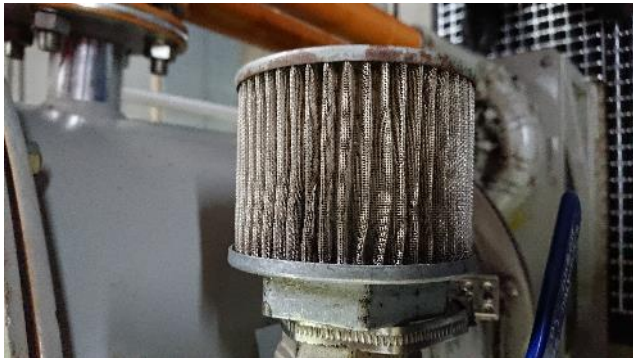


Figure 7: Lubricating oil skid



Figure 11: Fuel oil skid



Figure 8: Structure



Figure 12: Fuel oil skid



Figure 9: Control oil skid



Figure 13: Fuel oil skid



Figure 10: Fuel oil skid



Figure 14: Fuel oil skid

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Figure 15: Fuel oil skid



Figure 16: Fuel oil skid



Figure 17: Fuel oil skid



Figure 18: Structure



Figure 19: Structure



Figure 20: Munters dryer pipe



Figure 21: Munters dryer pipe



Figure 22: Munters dryer pipe

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Figure 23: Compressor flap axel



Figure 24: Compressor flap axel



Figure 25: Compressor nose-cone (internal)



Figure 26: Compressor nose-cone (internal)



Figure 27: Compressor nose-cone (internal)



Figure 28: Compressor nose-cone (internal)



Figure 29: Generator TE bearing



Figure 30: Generator EE bearing

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Figure 31: Generator EE bearing



Figure 35: Structure



Figure 32: Generator EE bearing



Figure 36: Structure



Figure 33: Generator Munters dryer pipe



Figure 37: Structure



Figure 34: Generator munters dryer pipe



Figure 38: Turbine cladding

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Figure 39: Cladding

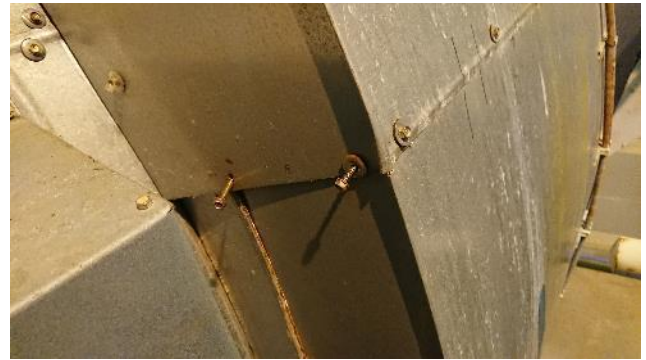


Figure 43: Cladding



Figure 40: Material used to prevent pipe contact



Figure 44: Cladding



Figure 41: Structure



Figure 45: Cladding



Figure 42: Cladding



Figure 46: CC top

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Figure 47: CC top

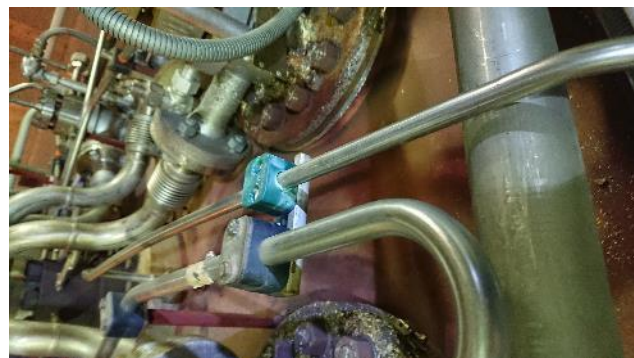


Figure 51: CC top

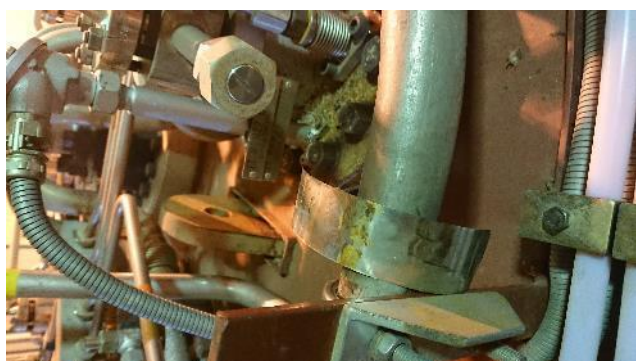


Figure 48: CC top



Figure 52: CC dome cladding



Figure 49: Burners



Figure 53: Burners overview



Figure 50: Burners



Figure 54: Burners overview

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Figure 55: Cladding



Figure 59: Loose pipe support



Figure 56: Cladding



Figure 60: Loose pipe support

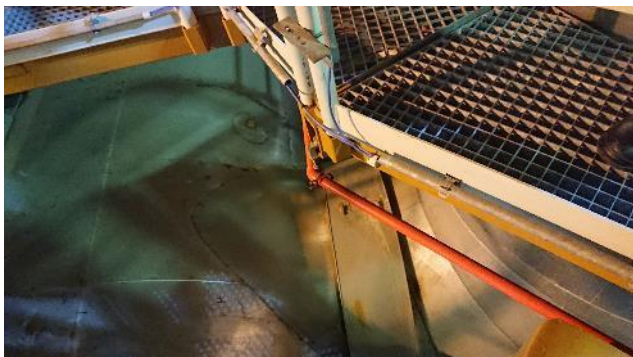


Figure 57: Cladding

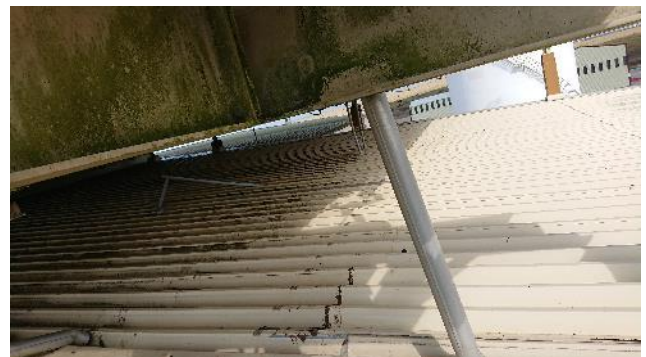


Figure 61: Drain pipes on roof



Figure 58: Cladding



Figure 62: Exposed electrical wires

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Figure 63: Filter house



Figure 67: Pre-filters



Figure 64: Filter house



Figure 68: Pre-filters



Figure 65: Filter house



Figure 69: Pre-filters



Figure 66: Coalescing filters



Figure 70: Filter house

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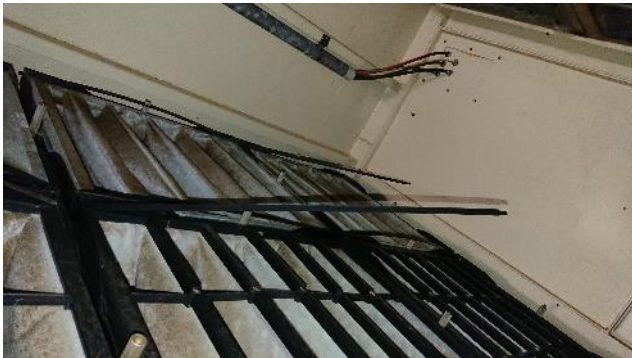


Figure 71: Pre-filters



Figure 75: Door lock different



Figure 72: Door seal



Figure 76: Filter house



Figure 73: Pre-filters



Figure 77: Missing door lock



Figure 74: Coalescing filters



Figure 78: Door doesn't unlock



Figure 79: Clean room



Figure 83: Clean room



Figure 80: Clean room



Figure 84: Clean room



Figure 81: Clean room



Figure 85: Clean room



Figure 82: Clean room



Figure 86: Clean room

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Figure 87: Clean room



Figure 91: Clean room



Figure 88: Clean room



Figure 92: Clean room

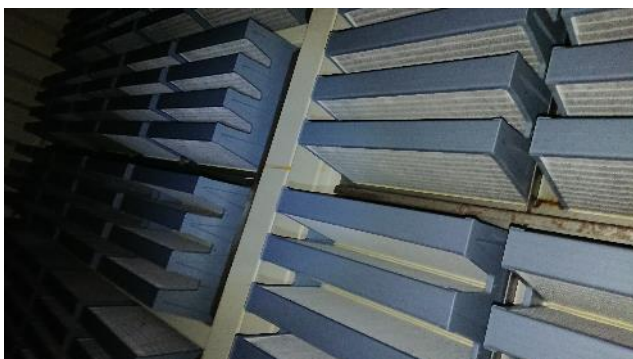


Figure 89: Clean room

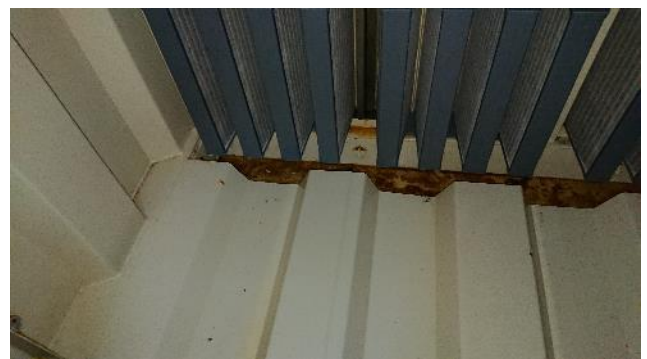


Figure 93: Clean room



Figure 90: Clean room



Figure 94: Clean room

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Figure 95: Clean room



Figure 99: Clean room



Figure 96: Clean room

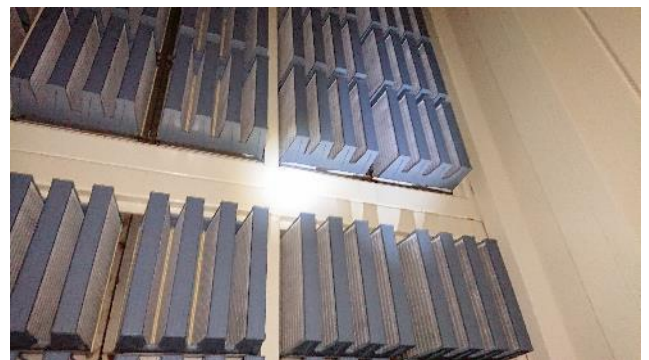


Figure 100: Clean room



Figure 97: Dent on silencer



Figure 101: Generator hall roof



Figure 98: Clean room



Figure 102: Compressor inlet

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Figure 103: Compressor inlet

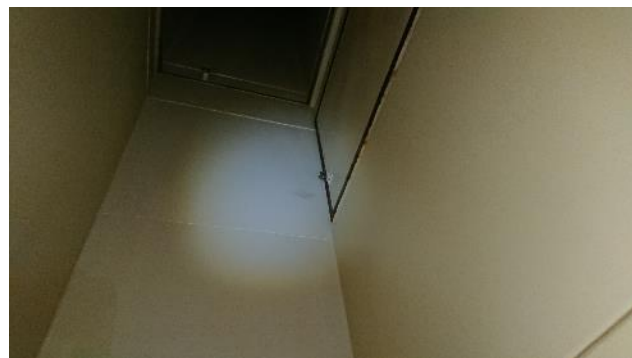


Figure 107: Compressor inlet



Figure 104: Compressor inlet



Figure 108: Compressor inlet



Figure 105: Compressor inlet



Figure 109: Compressor inlet



Figure 106: Compressor inlet

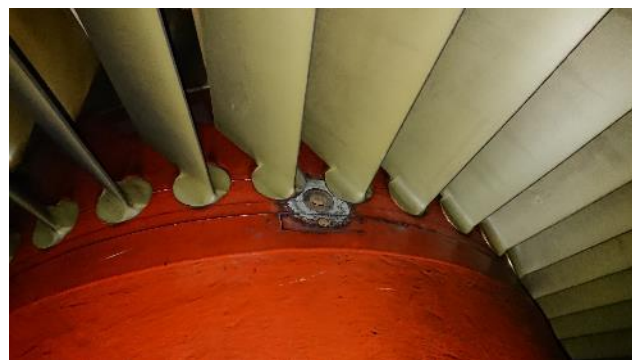


Figure 110: VIGVs

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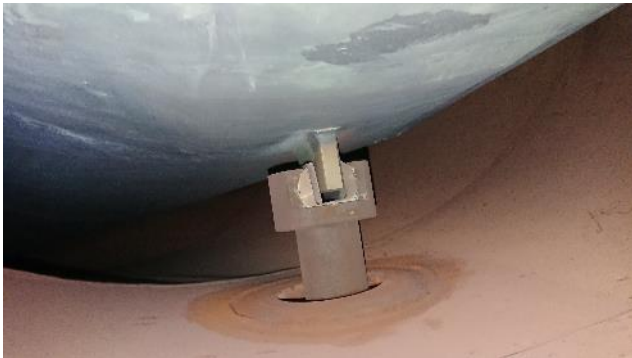


Figure 111: CC1 MC CS guide

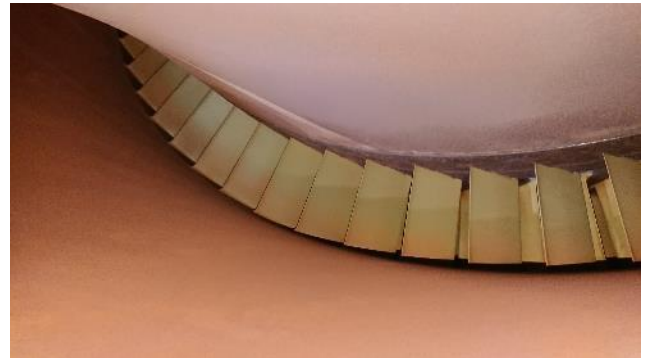


Figure 115: Compressor outlet



Figure 112: CC1 IC CS support palm



Figure 116: IC drain



Figure 113: Compressor outlet



Figure 117: IC bottom guide

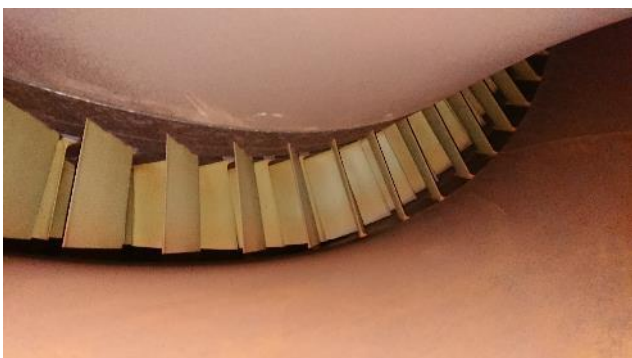


Figure 114: Compressor outlet



Figure 118: CC2 MC CS guide

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Figure 119: CC2 IC CS guide



Figure 123: CC1 tiles



Figure 120: CC1 tiles



Figure 124: CC1 tiles



Figure 121: CC1 tiles



Figure 125: CC1 dome plate support ring



Figure 122: CC1 tiles



Figure 126: Burner 1-1

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Figure 127: Burner 1-1



Figure 131: Burner 1-2



Figure 128: Burner 1-1

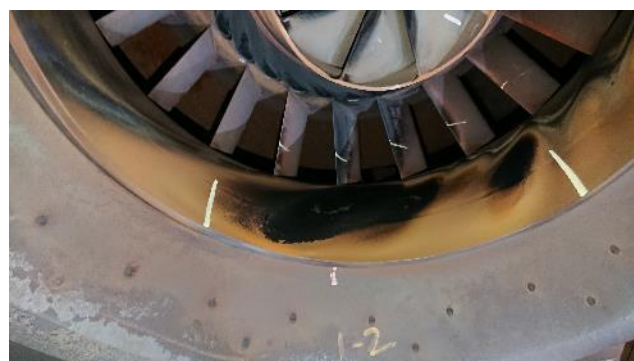


Figure 132: Burner 1-2



Figure 129: Burner 1-2



Figure 133: Burner 1-3



Figure 130: Burner 1-2



Figure 134: Burner 1-3

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Figure 135: Burner 1-3



Figure 139: Burner 1-4



Figure 136: Burner 1-3



Figure 140: Burner 1-5



Figure 137: Burner 1-4

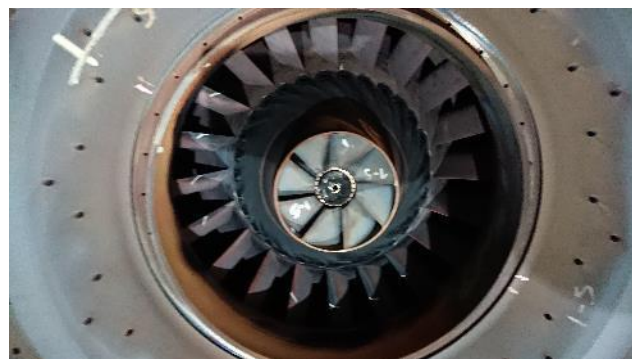


Figure 141: Burner 1-5



Figure 138: Burner 1-4



Figure 142: Burner 1-5

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Figure 143: Burner 1-6



Figure 147: Burner 1-6



Figure 144: Burner 1-6



Figure 148: Burner 1-7



Figure 145: Burner 1-6



Figure 149: Burner 1-7

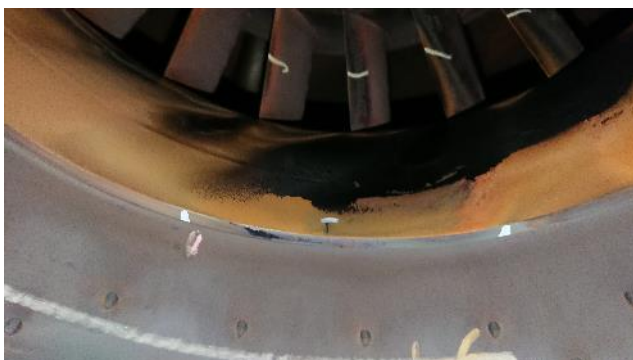


Figure 146: Burner 1-6



Figure 150: Burner 1-7

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Figure 151: Burner 1-7



Figure 155: Burner 1-8



Figure 152: Burner 1-8



Figure 156: Burner 1-8



Figure 153: Burner 1-8



Figure 157: CC2 tiles



Figure 154: Burner 1-8



Figure 158: CC2 tiles

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Figure 159: CC2 tiles



Figure 163: Burner 2-1



Figure 160: CC2 tiles



Figure 164: Burner 2-1



Figure 161: CC2 tiles



Figure 165: Burner 2-2



Figure 162: Burner 2-1



Figure 166: Burner 2-2

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Figure 167: Burner 2-2



Figure 171: Burner 2-3



Figure 168: Burner 2-2



Figure 172: Burner 2-3



Figure 169: Burner 2-2



Figure 173: Burner 2-3



Figure 170: Burner 2-2



Figure 174: Burner 2-3

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Figure 175: Burner 2-3



Figure 179: Burner 2-4



Figure 176: Burner 2-3



Figure 180: Burner 2-4



Figure 177: Burner 2-4



Figure 181: Burner 2-4



Figure 178: Burner 2-4

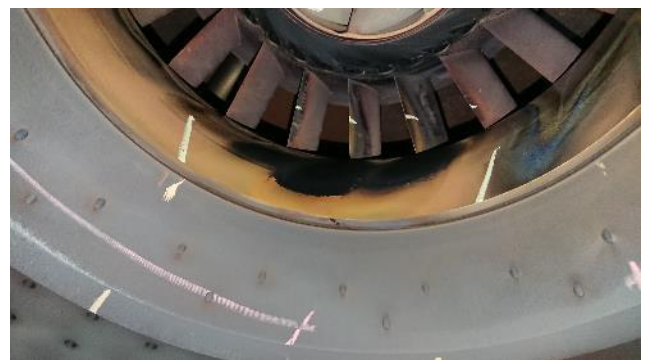


Figure 182: Burner 2-4

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Figure 183: Burner 2-5



Figure 187: Burner 2-5



Figure 184: Burner 2-5



Figure 188: Burner 2-6



Figure 185: Burner 2-5



Figure 189: Burner 2-6



Figure 186: Burner 2-5



Figure 190: Burner 2-6

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Figure 191: Burner 2-6



Figure 195: Burner 2-7



Figure 192: Burner 2-6



Figure 196: Burner 2-8



Figure 193: Burner 2-7



Figure 197: Burner 2-8



Figure 194: Burner 2-7



Figure 198: Burner 2-8

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Figure 199: CC1 FT to MC



Figure 203: CC1 FT to MC



Figure 200: CC1 MC



Figure 204: CC1 FT to MC



Figure 201: CC1 MC



Figure 205: CC1 FT to MC



Figure 202: CC1 FT to MC



Figure 206: CC1 MC

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Figure 207: CC1 MC



Figure 211: CC1 MC



Figure 208: CC1 MC



Figure 212: CC1 MC



Figure 209: CC1 MC



Figure 213: CC1 MC



Figure 210: CC1 MC



Figure 214: CC1 MC

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Figure 215: CC1 MC



Figure 219: CC1 MC



Figure 216: CC1 MC



Figure 220: CC1 MC



Figure 217: CC1 MC



Figure 221: CC1 MC

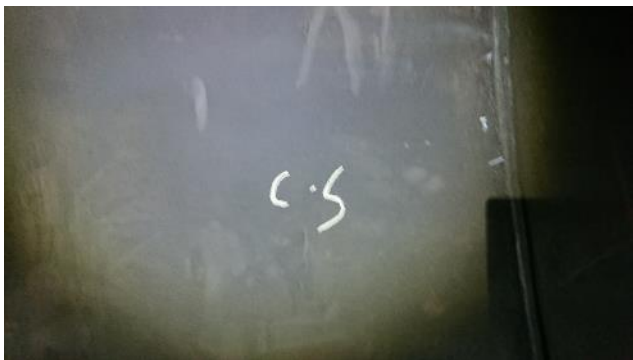


Figure 218: CC1 MC



Figure 222: CC1 MC

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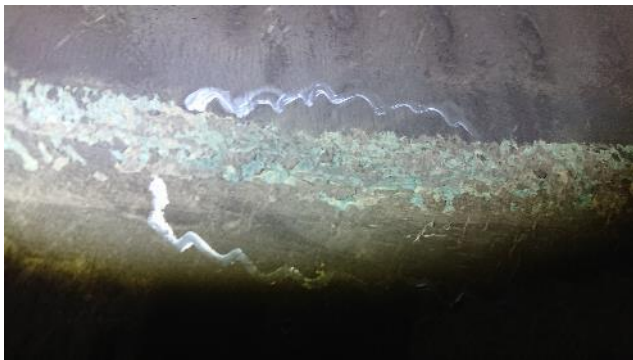


Figure 223: CC1 MC



Figure 227: CC1 MC to IC



Figure 224: CC1 MC to IC

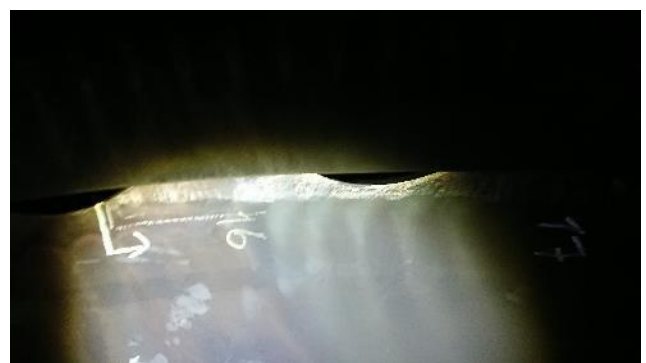


Figure 228: CC1 MC to IC



Figure 225: CC1 MC to IC



Figure 229: IC



Figure 226: CC1 MC to IC



Figure 230: IC

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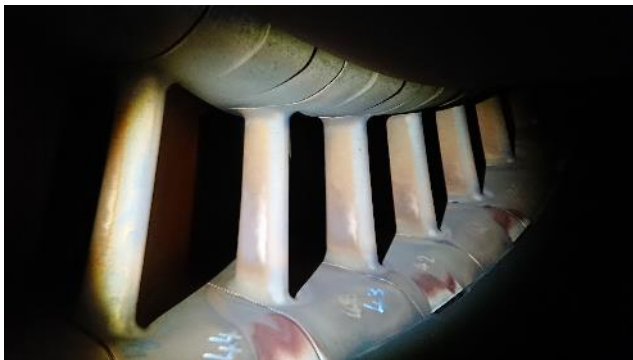


Figure 231: Turbine 1st stage vanes



Figure 235: Turbine 1st stage vanes



Figure 232: Turbine 1st stage vanes & blades

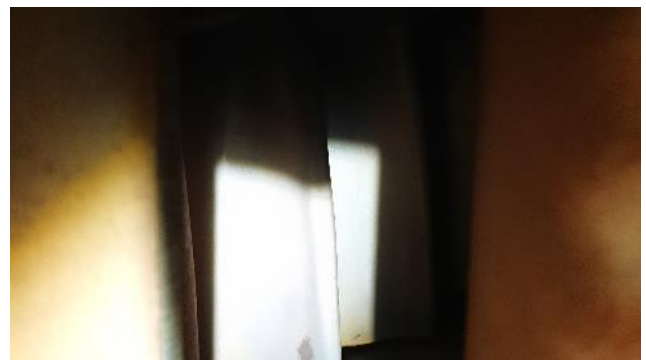


Figure 236: Turbine 1st stage blades



Figure 233: Turbine 1st stage vanes & blades



Figure 237: Turbine 1st stage blades

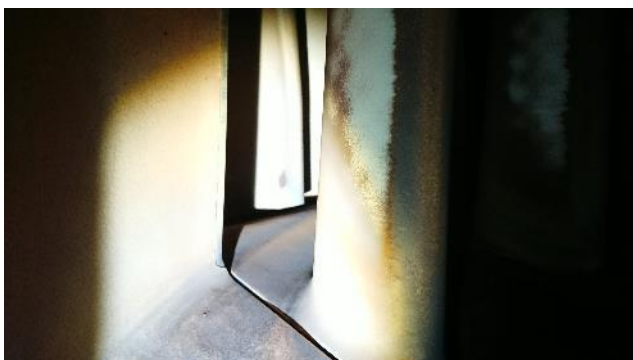


Figure 234: Turbine 1st stage vanes & blades

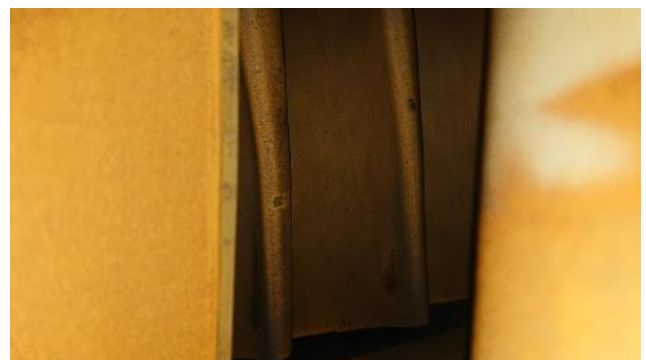


Figure 238: Turbine 1st stage blades

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Figure 239: Turbine 1st stage blades



Figure 243: CC2 FT to MC



Figure 240: CC2 MC



Figure 244: CC2 FT to MC



Figure 241: CC2 MC



Figure 245: CC2 MC



Figure 242: CC2 FT to MC



Figure 246: CC2 MC

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Figure 247: CC2 MC



Figure 251: CC2 MC



Figure 248: CC2 MC



Figure 252: CC2 MC



Figure 249: CC2 MC



Figure 253: CC2 MC



Figure 250: CC2 MC



Figure 254: CC2 MC

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Figure 255: CC2 MC



Figure 256: CC2 MC



Figure 257: CC2 MC



Figure 258: CC2 MC



Figure 259: CC2 MC



Figure 260: CC2 MC



Figure 261: CC2 MC to IC



Figure 262: CC2 MC to IC

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Figure 263: CC2 MC to IC

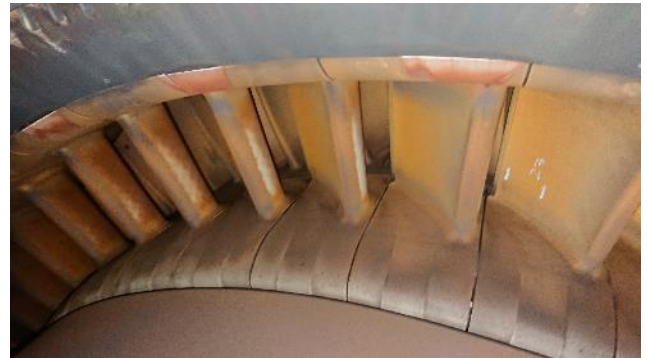


Figure 267: Turbine 1st stage vanes & blades



Figure 264: IC



Figure 268: Turbine 1st stage vanes & blades



Figure 265: IC hub



Figure 269: Turbine 1st stage vanes & blades



Figure 266: Turbine 1st stage vanes



Figure 270: Turbine 1st stage vanes

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Figure 271: Turbine 1st stage vane #23

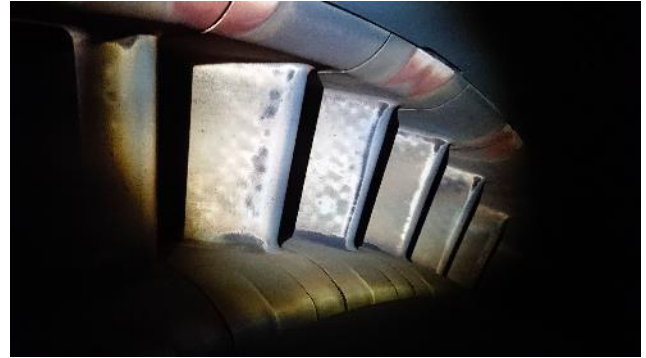


Figure 275: Turbine 1st stage vanes



Figure 272: Turbine 1st stage blades

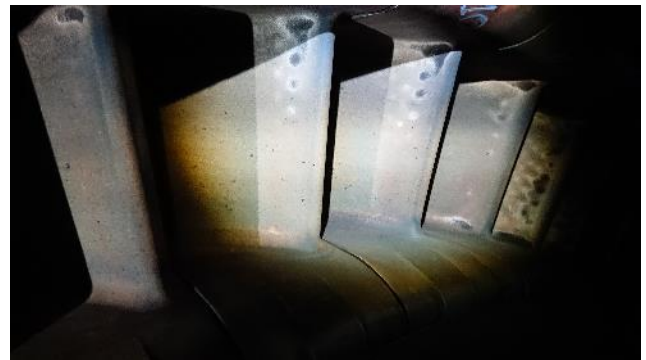


Figure 276: Turbine 1st stage vanes

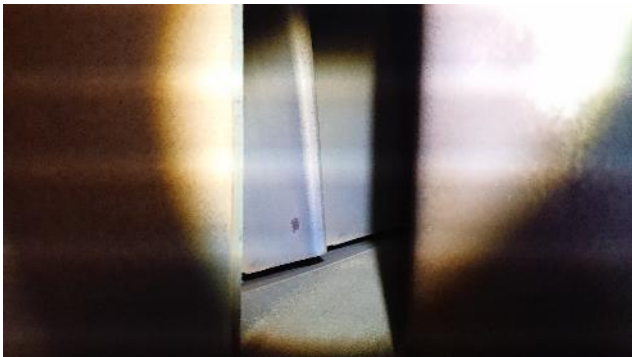


Figure 273: Turbine 1st stage blades



Figure 277: Turbine 1st stage vanes



Figure 274: Turbine 1st stage vanes



Figure 278: IC

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Figure 279: Turbine 4th stage blades



Figure 283: Turbine 4th stage blades



Figure 280: Turbine 4th stage blades

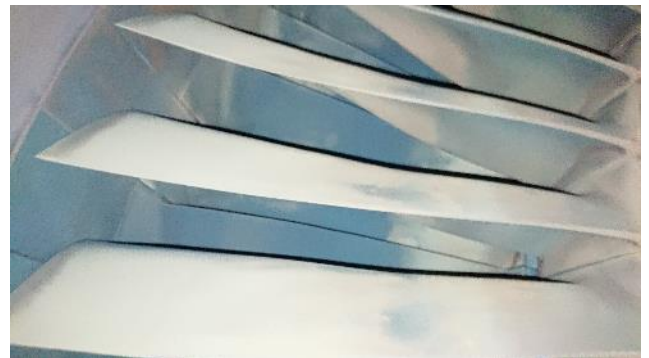


Figure 284: Turbine 4th stage blades & vanes



Figure 281: Turbine 4th stage blades & vanes



Figure 285: Exhaust cushion

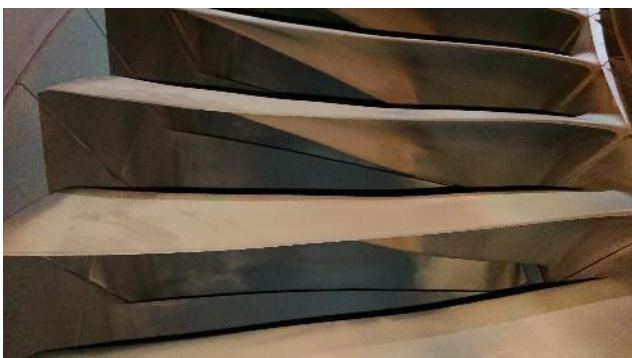


Figure 282: Turbine 4th stage blades & vanes



Figure 286: Loose cladding

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Figure 287: loose cladding



Figure 291: Exhaust – example of crack



Figure 288: Exhaust



Figure 292: Exhaust – example of crack



Figure 289: Exhaust – example of crack



Figure 293: Exhaust



Figure 290: Exhaust – example of rubbing



Figure 294: Exhaust

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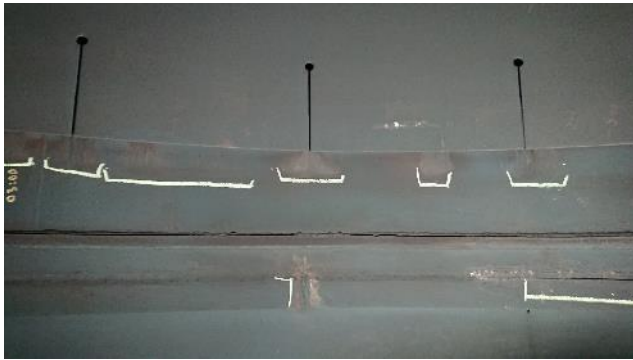


Figure 295: Exhaust – example of crack & rubbing



Figure 299: Exhaust – example of rubbing



Figure 296: Exhaust – example of rubbing



Figure 300: Exhaust – example of rubbing



Figure 297: Exhaust



Figure 301: Exhaust – example of rubbing



Figure 298: Exhaust – example of rubbing



Figure 302: Exhaust – example of rubbing

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Figure 303: Exhaust – example of crack



Figure 307: Exhaust – example of crack



Figure 304: Exhaust – example of crack



Figure 308: Exhaust – example of crack

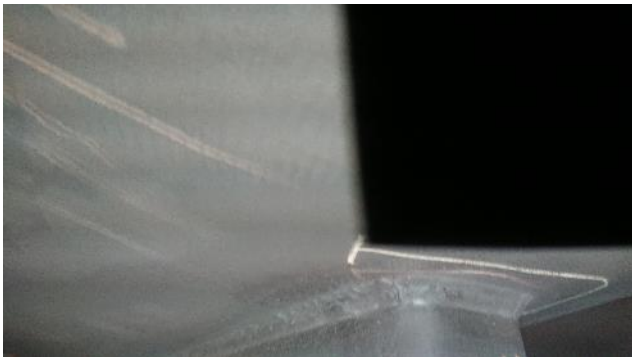


Figure 305: Exhaust – example of crack



Figure 309: Exhaust – loose plate

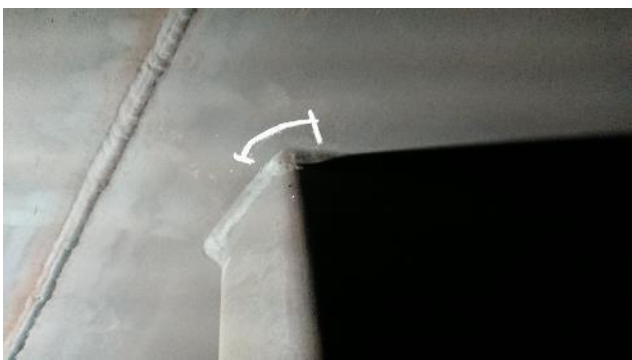


Figure 306: Exhaust – example of crack

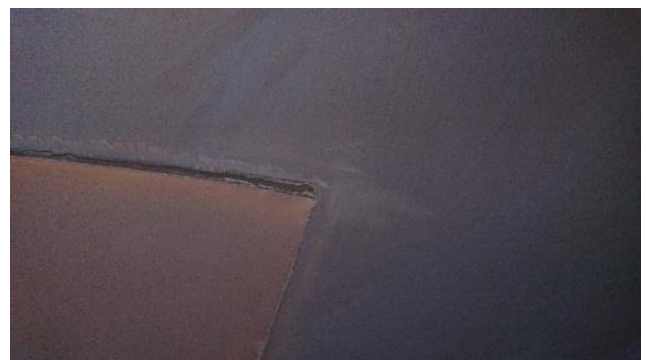



Figure 310: Exhaust – example of crack

	Business Management System Inspection Report Gourikwa – GT21 Minor Inspection	Document Identifier	195/453	Rev	0
		Date	24/01/2023		
		Page	63 of 110		

APPENDIX B

	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Leak Check Visual Inspection	Checksheet Reference #:	9002
Decommissioning	Siemens SGT5-2000E Gas Turbine	Page #:	3 of 5
		Project #:	GOU.M13
		Relevant Procedures:	Decommissioning

Notes:

- 1 All fuel, gas and oil piping systems need to be inspected for possible leakage with the machine on load.
- 2 When inspecting gas pipelines, use a foam-forming agent or gas detectors.
- 3 High-frequency blowing noises during GT operation are normally associated with leaks at the half-joints, housing connections or manhole covers.
- 4 Request from the client a list of any / all leakage-related non-conformities prior to the outage.
- 5 Record all anomalies in the spaces below, and add photos of all anomalies to the back of this checksheet.

Control oil skid including pipework to Control valves


Some oil noted on lid


Skid slightly dirty

Lube oil and Jacking oil skid including pipework to all bearings

Oil seepage noted at filters, lube oil pumps, jacking oil pumps and mist separator

Oil drip tray noted near filter valve

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				NCR OR WORK ORDER NUMBER:
ERI ENGINEER	Johan Otto		2022/08/03	

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P. L. Galana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:	Log #:	DATE:		DATE:	2022/08/03

Check Sheet 1: Leak check - VI

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Business Management System
Inspection Report
Gourikwa – GT21 Minor
Inspection

Document Identifier	195/453	Rev	0
Date	24/01/2023		
Page	64 of 110		

	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Leak Check Visual Inspection	Checksheet Reference #:	9002
Decommissioning	Siemens SGT5-2000E	Page #:	2 of 5
	Gas Turbine	Project #:	GOU.MI3
		Relevant Procedures:	Decommissioning

Notes:

- 1 All fuel, gas and oil piping systems need to be inspected for possible leakage with the machine on load.
- 2 When inspecting gas pipelines, use a foam-forming agent or gas detectors.
- 3 High-frequency blowing noises during GT operation are normally associated with leaks at the half-joints, housing connections or manhole covers.
- 4 Request from the client a list of any / all leakage-related non-conformities prior to the outage.
- 5 Record all anomalies in the spaces below, and add photos of all anomalies to the back of this checksheet.

Fuel oil skid including pipework to Combustion chambers

Some oil noted on the skid

Drip trays noted at both seals for the FO pump

Ignition Gas skid including pipework to Combustion chambers

Pipe on RHS CC touching the walkway frame

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/03


Check Sheet 2: Leak check - VI


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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Insulation	Checksheet Reference #:	V94-2-6004
		Page #:	1 of 4
		Project #:	GOU.MB
Inspection	Siemens SGT5-2000E Centreline	Relevant Procedures:	15: Combustion chamber inspections; 12: Compressor inspections; 33 - Turbine inspections

Notes:

The term "Insulation" refers to cladding, lagging, cushions and any other form of insulation used on the centreline



Inspect the insulation for:

- Mechanical damage,
- Thermal degradation,
- Moisture contamination,
- Fastener integrity

Combustion Chambers
Some rust and white deposits noted on surface

Centre Casing
Rust & white deposits noted on surface

Exhaust Casing
Rust & white deposits noted on surface

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:	Log #:	DATE:		DATE: 2022/08/03

Check Sheet 3: Insulation - VI

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Business Management System
Inspection Report
Gourikwa – GT21 Minor
Inspection

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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Combustion Chamber Outer Pipework Visual Inspections - LHS	Checksheet Reference #:	V94-2-2016
Inspection	Siemens SGT5-2000E	Page #:	1 of 2
	Combustion	Project #:	GOU.MI3
		Relevant Procedures:	13. Inspection of CC

Area	Inspection	Findings	Remarks
Fuel Oil Return Line	Signs of overheating / Discoloration	No	
	Paint Burned Off	No	
	Coking / Soot	No	
Fuel Oil Supply Line	Corrosion	No	
	Damage	No	
Fuel Gas Line	Damage	No	
	Discoloration	No	
Fuel Gas Expansion Joints	Damage	No	
	Corrosion	No	
	Deformation (Stretching / Axial Offset of Bellows)	No	
	Stress-free installation	No	
Thread Lockers, Lock Washers, and Nord-Lock Positive Lock Washers	Adequate Locking (Flanges that are not normally loosened)	No	
Remaining Pipework	Cracks	No	
	Abraded regions	No	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
APPROVED BY - ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:
DATE:	Log #:	DATE:		DATE: 2022/08/03

Check Sheet 4: CC1 - VI

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ESKOM GOURIKWA POWER STATION
Combustion Chamber Outer Pipework
Visual Inspections - RHS

Unit #: GT21
Checksheet Reference #: V94-2-2016
Page #: 2 of 2
Project #: GOU.MI3

Inspection

Siemens SGT5-2000E
Combustion

Relevant Procedures: 13. Inspection of CC

Area	Inspection	Findings	Remarks
Fuel Oil Return Line	Signs of overheating / Discoloration	No	DO supply making contact with platform near turbine level [repeat]
	Paint Burned Off	No	Material used to control pipework position, permanent solution required
	Coking / Soot	No	
Fuel Oil Supply Line	Corrosion	No	
	Damage	No	
Fuel Gas Line	Damage	No	
	Discoloration	No	
Fuel Gas Expansion Joints	Damage	No	
	Corrosion	No	
	Deformation (Stretching / Axial Offset of Bellows)	No	
	Stress-free installation	No	
Thread Lockers, Lock Washers, and Nord-Lock Positive Lock Washers		Adequate Locking (Flanges that are not normally loosened)	No
Remaining Pipework	Cracks	No	
	Abraded regions	No	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
APPROVED BY - ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:		DATE:		DATE: 2022/08/03

Check Sheet 5: CC2 - VI

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ESKOM GOURIKWA POWER STATION

Unit #:

GT21

Leak Check Visual Inspection

Checksheet Reference #:

9002

Page #:

1 of 5

Project #:

GOU.MI3

Decommissioning

Siemens SGT5-2000E
Gas Turbine

Relevant Procedures:

Decommissioning

Notes:

- 1 All fuel, gas and oil piping systems need to be inspected for possible leakage with the machine on load.
- 2 When inspecting gas pipelines, use a foam-forming agent or gas detectors.
- 3 High-frequency blowing noises during GT operation are normally associated with leaks at the half-joints, housing connections or manhole covers.
- 4 Request from the client a list of any / all leakage-related non-conformities prior to the outage.
- 5 Record all anomalies in the spaces below, and add photos of all anomalies to the back of this checksheet.

LHS Combustion chamber

General corrosion and paint flaking noted on burners

Spark-plug rubbers perished

ΔP pipe fretting with top holder

Loose fire suppression system pipe below CC platform [repeat finding]

RHS Combustion chamber

General corrosion and paint flaking noted on burners

Spark-plug rubbers perished

Some seepage from premix below 2-6

DO return support sheaths not installed

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PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P. L. Calana
SIGNATURE:		SIGNATURE:		
DATE:		DATE:		DATE: 2022/08/03


Check Sheet 6: Leak check - VI


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
	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Insulation	Checksheet Reference #:	V94-2-6004
		Page #:	2 of 4
		Project #:	GOU.MB
Inspection	Siemens SGT5-2000E Centreline	Relevant Procedures:	35 - Turbine inspections, 15. Combustion chamber inspections, 16. Blow-off line inspections

Notes:
 The term "Insulation" refers to cladding, lagging, cushions and any other form of insulation used on the centreline
 Inspect the insulation for:
 Mechanical damage,
 Thermal degradation,
 Moisture contamination,
 Fastener integrity

Exhaust Diffusor
Insulation has some white deposits

Blow-off Pipes
Rust and white deposits noted

Fuel Oil Lines
LHS bracket on purge water line not correctly affixed

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PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/03


Check Sheet 7: Insulation - VI


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
	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Insulation	Checksheet Reference #:	V94-2-6004
		Page #:	3 of 4
		Project #:	GOU.MB
Inspection	Siemens SGT5-2000E Centreline	Relevant Procedures:	12: Compressor Inspections; 33: Inspection - Turbine Inspections

Notes:
 The term "Insulation" refers to cladding, lagging, cushions and any other form of insulation used on the centreline
 Inspect the insulation for:
 Mechanical damage,
 Thermal degradation,
 Moisture contamination,
 Fastener integrity

Compressor Bearing Casing
Jacking oil line not supported in cone [repeat finding]
Some oil from the bearing casing noted in the cone

Inlet Guide Vane
No findings

Compressor Vane Carrier 1
No findings

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				
VERIFIED BY - TECHNICIAN				TECHNICAL NOTIFICATION:
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P. L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/03

Check Sheet 8: Insulation - VI

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Business Management System
Inspection Report
Gourikwa – GT21 Minor
Inspection

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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Leak Check Visual Inspection	Checksheet Reference #:	9002
Decommissioning	Siemens SGT5-2000E	Page #:	4 of 5
	Gas Turbine	Project #:	GOU.MI3
		Relevant Procedures:	Decommissioning

Notes:

- 1 All fuel, gas and oil piping systems need to be inspected for possible leakage with the machine on load.
- 2 When inspecting gas pipelines, use a foam-forming agent or gas detectors.
- 3 High-frequency blowing noises during GT operation are normally associated with leaks at the half-joints, housing connections or manhole covers.
- 4 Request from the client a list of any / all leakage-related non-conformities prior to the outage.
- 5 Record all anomalies in the spaces below, and add photos of all anomalies to the back of this checksheet.

GT centerline (under GT, at the Intermediate shaft, Compressor Bearing housing, Turning gear, and SSS Clutch if installed)

Possible signs of overheating on drain lines

Generator (including bearings and oil seals)

Old oil and jacking gauge illegible @ EE

Munters dryer pipe not tight

Munters dryer pipe damaged - site to replace

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PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/03


Check Sheet 9: Leak check - VI


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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Insulation	Checksheet Reference #:	V94-2-6004
		Page #:	4 of 4
		Project #:	GOU.MB
Inspection	Siemens SGT5-2000E Centreline	Relevant Procedures:	12: Compressor Inspections; 33: Inspection - Turbine Inspections

Notes:
 The term "Insulation" refers to cladding, lagging, cushions and any other form of insulation used on the centreline
 Inspect the insulation for:
 Mechanical damage,
 Thermal degradation,
 Moisture contamination,
 Fastener integrity

Turbine Bearing Hub Cover Plate
No findings

Generator
Structure is severely rusted

Intermediate shaft
No findings

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/02	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/03

Check Sheet 10: Insulation - VI

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Business Management System
Inspection Report
Gourikwa – GT21 Minor
Inspection

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	ESKOM Gourikwa POWER STATION	Unit #:	GT21
	Filter House Visual Inspection	Checksheet Reference #:	V94-2-1901
Inspection	Siemens SGT5-2000E	Page #:	1 of 6
	Compressor	Project #:	GOU.MI3
		Relevant Procedures:	15. NDT WI and 12. Inspection - Compressor inspections

Area	Inspection Type	Findings	Remarks
Dirty Side	Deposits	Yes	
	Damage	Yes	
	Filter Completeness	No	
	Detached parts / Loose Filters	Yes	Coalescing filters out of position
	Soiling of Filters	Yes	Filters extremely dirty - large particles noted
	Non-Uniform alignment of Filters	No	
	Unexpected Modifications	No	
	Missing Filters	No	
	Foreign Objects	Yes	
Clean Side	Deposits	Yes	Mostly rust, some water
	Damage	No	Some filters damaged - previously marked
	Detached parts / Loose Filters	No	
	Formation of Gaps (Light Test)	No	
	Flaking of paint / Corrosion	Yes	Corrosion protection required on floor to prevent deterioration
	Locking	No	
	Foreign Objects	Yes	
Structure	Damage to Door Seals	Yes	Top
	Damage to Door Locks	Yes	Bottom RHS door could still not be unlocked - site to replace lock [repeat]
	Damage to seals in the Wall region	Yes	Top RHS - rust
	Holes in the Wall	No	
Silencer	Detached Parts / Loose Elements	No	
	Deposits, Corrosion	Yes	
	Cracks	No	
	Damage	Yes	Historic dent noted

RESPONSIBLE PERSON		NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN					
CHECKED BY - SUPERVISOR					M & TE NUMBER:
CHECKED BY - QC					TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN					
ERI ENGINEER		Johan Otto		2022/08/04	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME: P.L. Calana	
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE: 2022/08/04	

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
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ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
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ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
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DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
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ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
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SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
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DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
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SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
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SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
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SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

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NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

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Inspection Report
Gourikwa – GT21 Minor
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ESKOM Gourikwa POWER STATION

Unit #:

GT21

Compressor Inlet Systems
Visual Inspection

Checksheet Reference #:

V94-2-1901

Page #:

2 of 6

Project #:

GOU.MI3

Inspection

Siemens SGT5-2000E
Compressor

Relevant Procedures:

15. NDT WI and 12. Inspection -
Compressor inspections

Area	Inspection Type	Findings	Remarks
Air Intake Flap	Proper Operation	No	
	Loose Parts	No	
	Foreign Objects	No	
	Corrosion	No	
	Damage	Yes	Scuffing on wall noted - no change to operation
Air Intake	Loose Parts	No	
	Foreign Objects	Yes	Crickets
	Deposits	Yes	
	Oil	Yes	
	Proper installation of intake Gaskets	Yes	Several gaps where air can be seen to have been drawn in (previously noted)
Gasket between Cone and Inlet Structure	Damage	No	
	Oil Saturation	Yes	
Intake Cone Half-Joint Flat Gasket	Damage	No	
Air Intake Structure	Damage to Door Seals	No	
	Damage to Door Locks	No	
	Damage to seals in the Wall region	No	
	Holes in the Wall	Yes	
	Oil through the Wall	No	
	Flaking of Paint / Corrosion	Yes	
Intake Cone	Deposits / Oil Traces	Yes	
	Foreign Objects	No	
	Incomplete Painting	Yes	
	Corrosion	No	
Support Struts	Cracks	No	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/04	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
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SIGNATURE:		SIGNATURE:		
DATE:		DATE:		DATE: 2022/08/04

Check Sheet 12: Compressor inlet systems - VI

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ESKOM Gourikwa POWER STATION

Unit #: GT21

Compressor Inlet Systems
Visual Inspection

Checksheet Reference #: V94-2-1901

Page #: 3 of 6

Project #: GOU.MI3

Inspection

Siemens SGT5-2000E
Compressor

Relevant Procedures: 15. NDT WI and 12. Inspection - Compressor inspections

Area	Inspection Type	Findings	Remarks
Compressor Washing System	Tack Welds Cracks	No	
	Tack Welds Number of Welds	No	
	Pipe Clamps Damage	No	
	Pipe Clamps Cracks	No	
	Nozzles Correct Alignment	No	
	Deposits	No	
	Clogging	No	
	Missing Components	No	
	Corrosion	Yes	
Dehumidification System and Unit	Damage	No	
	Foreign Objects	No	
	Pipe Damage	Yes	Inlet pipe cracked. Outlet pipe repaired with some sort of tape - site to replace [repeat] Drier was not active during outage
	Soiling / Clogging of Filters	No	
	Corrosion of Pipes in Intake Region	Yes	
	Damage / Deformation of Pipes in Flow Path	No	
Area of VIGV adjustment range	Inner Wall Scoring	No	
	Outer Wall Scoring	No	
Stage 1 Blades	Rubbing between Blades and Casing	Yes	Possible rubbing observed - to be monitored

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
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CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
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ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:		DATE:		DATE: 2022/08/04


Check Sheet 13: Compressor inlet systems - VI

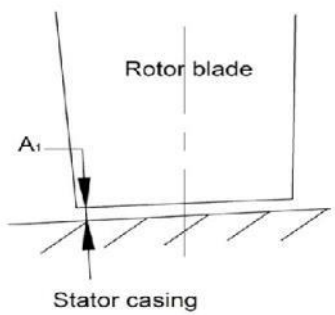
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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Compressor Stage 1 Radial Blades Tip Clearances (VLA1)	Checksheet Reference #:	V94-2-6102
Disassembly	Siemens SGT5-2000E	Page #:	1 of 2
	Centreline	Project #:	GOU.MB
		Relevant Procedures:	03. Pre-disassembly inspections and measurements



Rotor blade

Stator casing

A1

Remarks:

Similar distribution to previous outage

Note: Values determined at minimum clearance for each measuring point using a feeler gauge

2.2

Um

Theoretical Centre	
Top	Right
-0.15	0.18

2.2

UI

1.9

Ur

0.1

LI

1.7

Lr

2.1



LI

1.9

Lm

1.9

Specifications	Min	Max
Blade clearance	1.9	2.3
ΔS		0.1

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PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
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ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:		DATE:		DATE: 2022/08/04

Check Sheet 14: Compressor 1st stage radial blade tip clearances

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ESKOM Gourikwa POWER STATION

Unit #:

GT21

Diffuser
Inspection

Checksheet Reference #:

V94-2-1604

Page #:

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Project #:

GOU.MB

Inspection

Siemens SGT5-2000E
Compressor

Relevant Procedures:

12. Inspection - Compressor Visual
Inspections Work Instruction

Visual Inspection

Area to Inspect	Findings	Remarks
Vanes - Lock Washers Damage	No	
Vanes - Lock Washers Installation Configuration	No	
Vanes - Lock Washers Loose Components	No	
Vanes - Lock Washers Offset	No	
Vanes Deformation	No	
Vanes FOD	No	
Vanes Cracks	No	
Vane Screws Tightness	No	
Seal Tips Wear		
Seal Tips Material break-out		
Seal Tips Cracks		
Seal Tips Bending Deformation		
Seal Tips Height Uniformity Deviations		
Inner Casing Slot Mechanical Material Thinning		
Anti-rotation Pin Pressure marks		
Anti-rotation Pin Wear		
Anti-rotation Pin Fracture		
Half-joint Faces Cracks		

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Check Sheet 15: Compressor diffusor - VI

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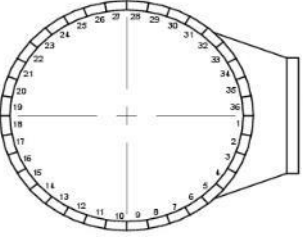
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Check Sheet 16: CC1 FT - VI

Form No.: 240-94066774 Rev 0

	ESKOM GOURIKWA POWER STATION LHS Flame Tube - Ceramic Tile Inspection	Unit #: GT21 Checksheet Reference #: V94-2-2006-1 Page #: 1 of 1 Project #: GOU.M13
	Siemens SGT5-2000E Combustion	Relevant Procedures: 13. Inspection of CC





Remarks: OH near 1-4

Row	K	J	I	H	G	F	E	D	C	B	A2	A1	
1													1
2													2
3													3
4													4
5													5
6													6
7													7
8													8
9													9
10													10
11													11
12													12
13													13
14													14
15													15
16													16
17													17
18													18
19													19
20													20
21													21
22													22
23													23
24													24
25													25
26													26
27													27
28													28
29													29
30													30
31													31
32													32
33													33
34													34
35													35
36													36

Tiles to be Removed	0
Tiles to be Replaced	0

Key	
Crack	C
Partial Crack	P
Missing Tile	M
Partly Missing Tile	G
Loose Tile (clearance > 7mm)	L
No deviations	
Damage detected during disassembly	D
Tile holder damage	^
Replace	
Remove	

*Note: Tiles to be removed in order to reach/replace damaged tiles

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NAME:		NAME:		NAME: P.L. Calana
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Check Sheet 17: CC1 ceramic tile inspection

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Check Sheet 18: CC2 FT - VI

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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	RHS Flame Tube - Ceramic Tile Inspection	Checksheet Reference #:	V94-2-2006-2
Inspection	Siemens SGT5-2000E	Page #:	1 of 1
	Combustion	Project #:	GOU.M13
		Relevant Procedures:	13. Inspection of CC

Remarks: Hot from burners 2-3 and 2-4

Row	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
A																																				
B																																				
C																																				
D																																				
E																																				
F																																				
G																																				
H																																				
I																																				
J																																				
K																																				

Tiles to be Removed	0
Tiles to be Replaced	0

Key	
Crack	C
Partial Crack	P
Missing Tile	M
Partly Missing Tile	G
Loose Tile (clearance > 7mm)	L
No deviations	
Damaged during disassembly	D
Tile holder damage	A
Replace	
Remove	

*Note: Tiles to be removed in order to reach/replace damaged tiles

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Check Sheet 19: CC2 ceramic tile inspection

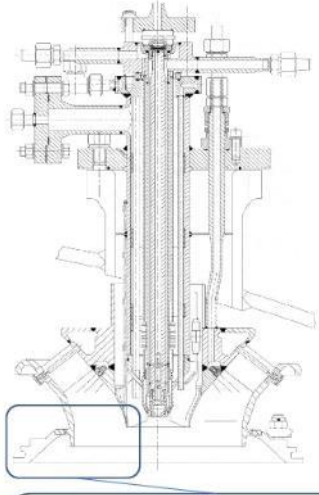
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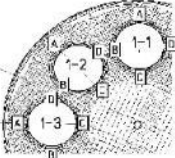
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Form No.: 240-94066774 Rev 0

	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	LHS CC Burner Alignment	Checksheet Reference #:	V94-2-2010-1
	Siemens SGT5-2000E	Page #:	1 of 2
	Combustion	Project #:	GOU.MB
Disassembly		Relevant Procedures:	07. Disassembly of Combustion Chambers

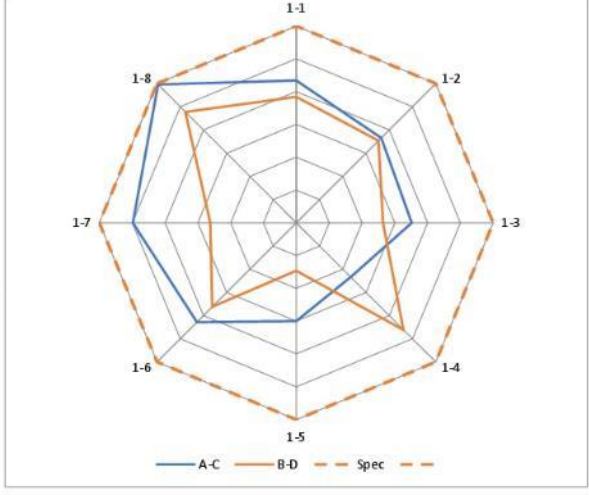




Viewed from below





Viewed from Above



Location	1-1	1-2	1-3	1-4	1-5	1-6	1-7	1-8
A	4.6	4.4	5.8	4.4	5.7	6.0	6.6	5.8
B	4.0	3.1	5.3	4.6	5.3	5.6	5.6	5.0
C	3.9	4.1	5.6	4.8	5.7	5.3	5.6	4.4
D	3.6	2.8	5.4	3.8	6.1	5.3	5.7	4.1
A-C	0.7	0.3	0.3	0.3	0.0	0.6	1.0	1.5
B-D	0.4	0.3	0.2	0.8	0.8	0.3	0.2	0.9


Spec	Max
Mis-alignment	1.5

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CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				NCR OR WORK ORDER NUMBER:
ERI ENGINEER	Johan Otto		2022/08/02	
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:	Log #:	DATE:		DATE: 2022/08/04

Check Sheet 20: CC1 burner alignment

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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Hot Side Dome Plate LHS CC	Checksheet Reference #:	V94-2-2009-1
Disassembly	Siemens SGT5-2000E	Page #:	1 of 2
	Combustion	Project #:	GOU.MB
		Relevant Procedures:	03. Pre-disassembly inspections and measurements

Bottom plate Left
View in opposite flow direction

Rotor Shaft →

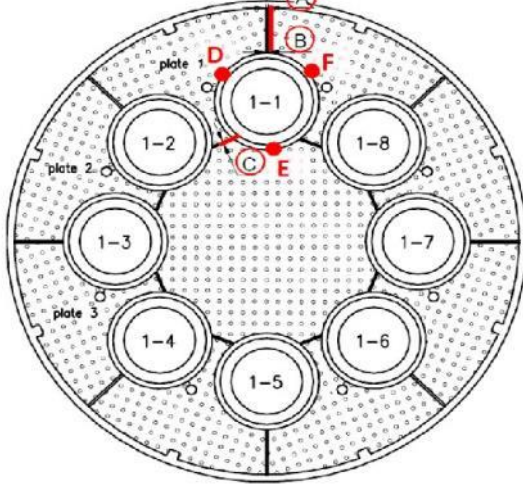




Plate	A	B	C	D	E	F
1	8.2	8.3	8.2	12.5	13.3	13.5
2	9.8	10.2	11.8	13.2	14.1	12.4
3	12.0	11.9	13.5	13.2	13.2	13.4
4	9.1	8.4	13.0	12.7	12.9	12.3
5	7.5	8.4	9.7	12.9	12.9	13.1
6	5.5	7.9	8.1	13.3	12.9	12.8
7	10.0	8.9	7.0	12.1	12.9	14.0
8	9.3	9.5	5.3	14.4	13.6	13.3

Remarks: _____

Spec	Min	Max
A	8	12
B	8	12
C	8	12

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
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VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/02	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Celana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:		DATE:		DATE: 2022/08/04


Check Sheet 21: CC1 dome plate clearances

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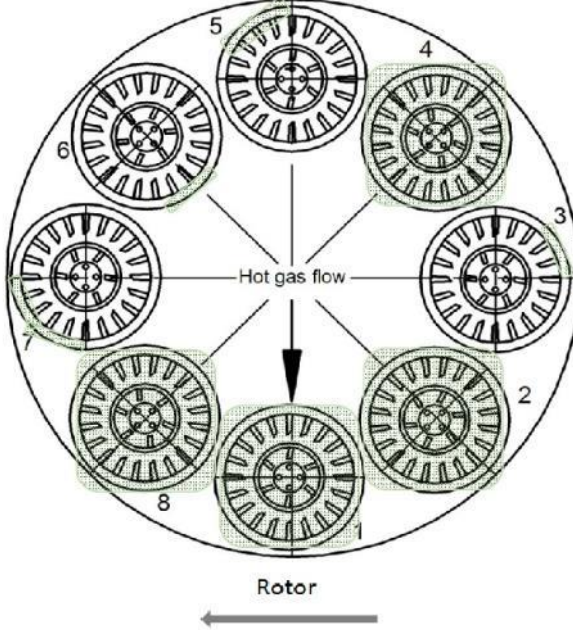
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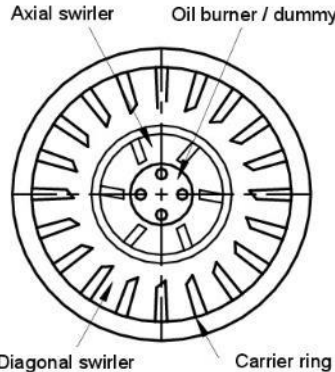
	ESKOM GOURIKWA POWER STATION LHS CC Burner Assembly Visual Inspection	Unit #: GT21 Checksheet Reference #: V94-2-2012-1 Page #: 1 of 1 Project #: GOU.MB
	Siemens SGT5-2000E Combustion	Relevant Procedures: 03. Pre-disassembly inspections and measurements

Inspection



Hot gas flow

Rotor



Axial swirler

Oil burner / dummy

Diagonal swirler

Carrier ring

Remarks: BIR cracks 1-1 & 1-8

Key	
Corrosion	

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PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				NCR OR WORK ORDER NUMBER:
ERI ENGINEER	Johan Otto		2022/08/02	
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:
DATE:		DATE:		DATE: 2022/08/04

Check Sheet 22: CC1 burner assembly - VI

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Business Management System
Inspection Report
Gourikwa – GT21 Minor
Inspection

Document Identifier	195/453	Rev	0
Date	24/01/2023		
Page	85 of 110		

	ESKOM GOURIKWA POWER STATION				Unit #:	GT21
	Diffusion Burners LHS Visual Inspections				Checksheet Reference #:	V94-2-2023-1
Inspection	Siemens SGT5-2000E Combustion				Page #:	1 of 1
					Project #:	GOU.MB
					Relevant Procedures:	15. NDT WI and 13. Inspection of CC

Area	Inspection	Burner 1-1	Burner 1-2	Burner 1-3	Burner 1-4	Burner 1-5	Burner 1-6	Burner 1-7	Burner 1-8
Fuel Oil Lance	Discoloration	No	No	No	No	No	No	No	No
	Erosion *Boroscopic Inspection*								
	Seat								
	Scaling								
	Deposits								
	Discoloration								
Burner Needle	Signs of overheating								
	Cracks *Boroscopic Inspection*								
	Correct Installation *Boroscopic Inspection*								
Axial Swirlers	Deposits	No	Yes	Yes	Yes	Yes	No	Yes	Yes
	Clogging of bores	No	No	No	No	No	No	No	No
	Deformation of Vanes	No	No	No	No	No	No	No	No
	Scaling	No	No	No	No	No	No	No	No
	Erosion	No	No	No	No	No	No	No	No
	Cracks	No	No	Yes	No	No	No	No	Yes
	Discoloration	No	No	No	No	No	No	No	No
Burner Support	Corrosion / Damage								
	Discoloration								
	Signs of Overheating								
	Cracks								
Igniter	Damage								
	Spark Test								
Thermo-couples	Damage								

Remarks:

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
APPROVED BY - ENGINEER	Johan Otto		2022/08/02	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/03

Check Sheet 23: CC1 diffusion burners - VI

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Business Management System
Inspection Report
Gourikwa – GT21 Minor
Inspection

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Date

24/01/2023

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ESKOM GOURIKWA POWER STATION

Unit #:

GT21

Premix Burner
LHS Visual Inspections

Checksheet Reference #:

V94-2-2028

Page #:

1 of 3

Project #:

GOU.MB

Inspection

Siemens SGT5-2000E
Combustion

Relevant Procedures:

15. NDT WI and 13. Inspection of CC

Area	Inspection	Burner 1-1	Burner 1-2	Burner 1-3	Burner 1-4	Burner 1-5	Burner 1-6	Burner 1-7	Burner 1-8
Nozzles	Deposits / Coking / Plugging	No	No	No	No	No	No	No	No
	Hub - Deposits / Coking	Yes	No	No	No	No	No	No	Yes
	Hub - Fit of Nozzles								
Diagonal Swirler Entire Surface	Deposits / Coking / Plugging								
	Corrosion	No	No	Yes	Yes	Yes	No	No	No
	Deformation	No	No	No	No	No	No	No	No
	Material Break-out	No	No	No	No	No	No	No	No
	Hammering Marks to Burner Insert Ring								
	Hammering Marks to Axial Swirler								
	Tight fit of Vanes								
	Misalignment								
	Clogging of Premix Gas Nozzles								
	Signs of Overheating	No	Yes	No	No	Yes	Yes	Yes	Yes
Expansion Joint	Cracks	No	No	No	No	No	Yes	No	No
	Damage								
	Wear								
Hold-downs for Diagonal Swirler	Cracks								
	Tight fit								
Gas Distributor (Spider)	Corrosion								
	Cracks								
	Deposits "Boroscopic Inspection"								

Remarks: OH on diagonal swirlers; 1-1-11, 1-2-7, 1-3-6, 1-4-5, 1-5-8, 1-6-8, 1-7-8, 1-8-6
Reddish hue on bell and swirler of 1-1

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CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/02	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:
DATE:	Log #:	DATE:		DATE: 2022/08/03


Check Sheet 24: CC1 premix burners - VI

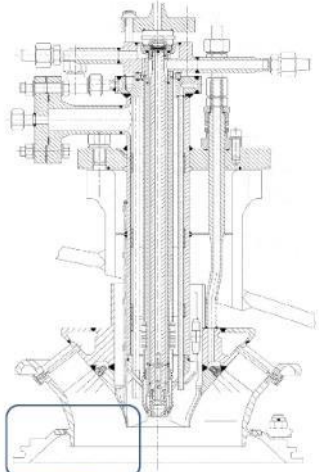
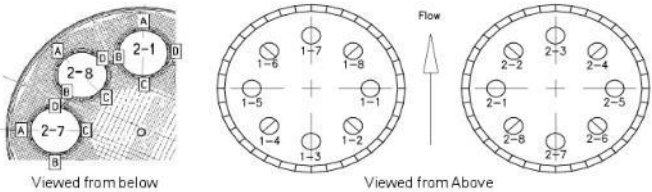
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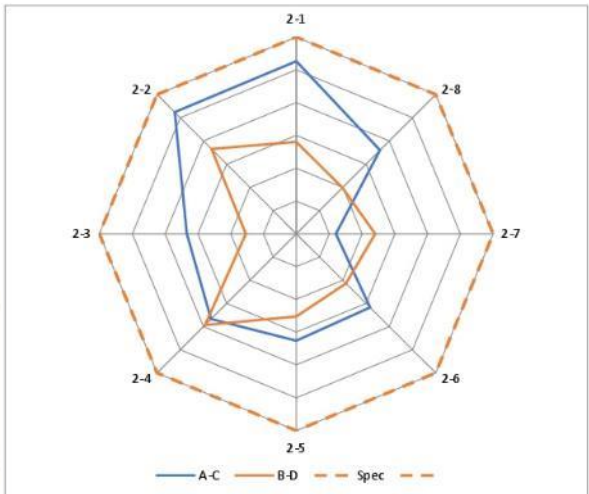
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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	RHS CC Burner Alignment	Checksheet Reference #:	V94-2-2010-2
		Page #:	1 of 2
		Project #:	GOU.MB
Disassembly	Siemens SGT5-2000E Combustion	Relevant Procedures:	07. Disassembly of Combustion Chambers






Viewed from below Viewed from Above



Location	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
A	5.8	6.4	6.4	6.3	6.0	6.5	5.6	5.9
B	4.4	5.5	5.2	5.9	5.2	5.5	5.2	5.1
C	4.7	5.3	6.2	5.9	5.9	6.4	6.5	5.6
D	4.5	5.2	5.9	5.4	5.5	6.0	5.5	5.6
A-C	1.1	1.1	0.2	0.3	0.1	0.1	0.9	0.3
B-D	0.1	0.3	0.7	0.5	0.2	0.4	0.3	0.5

Spec	Max
Mis-alignment	1.5

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CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				NCR OR WORK ORDER NUMBER:
ERI ENGINEER	Johan Orro		2022/0803	
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:	Log #:	DATE:		DATE: 2022/08/03


Check Sheet 25: CC2 burner alignment

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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Hot Side Dome Plate RHS CC	Checksheet Reference #:	V94-2-2009-2
Disassembly	Siemens SGT5-2000E Combustion	Page #:	1 of 2
		Project #:	GOU.MB
		Relevant Procedures:	03. Pre-disassembly inspections and measurements

Bottom plate Right
 View in opposite flow direction

Rotor Shaft

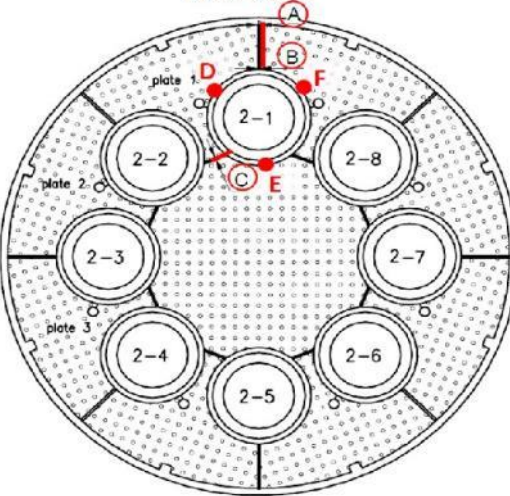




Plate	A	B	C	D	E	F
1	12.1	10.4	17.4	17.8	12.6	13.6
2	10.9	11.4	18.8	18.5	12.3	20.4
3	9.3	10.2	16.2	13.4	12.7	16.7
4	7.6	7.8	8.1	12.4	12.7	14.4
5	12.1	10.9	5.6	13.5	13.3	12.8
6	11.3	10.3	4.7	12.9	13.6	15.2
7	9.6	9.2	6.2	13.3	13.8	13.6
8	7.7	8.9	8.2	13.1	13.4	14.0

Remarks: _____
 Similar pattern noted previous outage


Spec	Min	Max
A	8	12
B	8	12
C	8	12

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
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CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P. L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:		DATE:		DATE: 2022/08/03

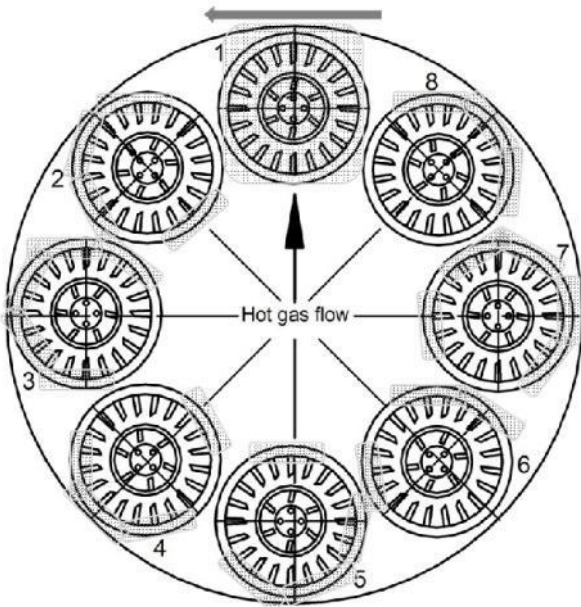
Check Sheet 26: CC2 dome plate clearances

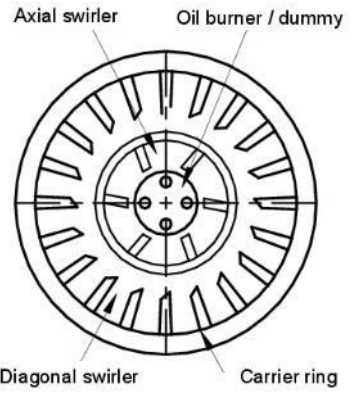
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	ESKOM GOURIKWA POWER STATION RHS CC Burner Assembly Visual Inspection	Unit #: GT21 Checksheet Reference #: V94-2-2012-2 Page #: 1 of 1 Project #: GOU.MB
	Siemens SGT5-2000E Combustion	Relevant Procedures: 03. Pre-disassembly inspections and measurements



Rotor





Remarks: BIR cracks: 2-1 & 2-5


Key	
Corrosion	

RESPONSIBLE PERSON		NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN					
CHECKED BY - SUPERVISOR					M & TE NUMBER:
CHECKED BY - QC					TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN					NCR OR WORK ORDER NUMBER:
ERI ENGINEER		Johan Otto		2022/08/02	
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P. L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/03

Check Sheet 27: CC2 burner assembly - VI

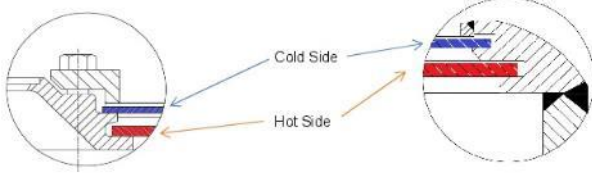
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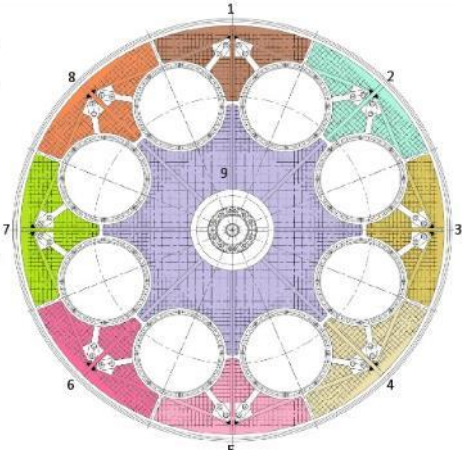
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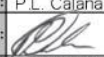
	ESKOM GOURIKWA POWER STATION						Unit #:		GT21	
	Dome Plates Visual Inspection						Checksheet Reference #:		V94-2-2020	
	Siemens SGT5-2000E Combustion						Page #:		1 of 2	
Inspection						Project #:		GOU.MB		
						Relevant Procedures:		15. NDT WI and 13. Inspection of CC		

Area	Inspection	Plate 1	Plate 2	Plate 3	Plate 4	Plate 5	Plate 6	Plate 7	Plate 8	Plate 9	
LHS CC	Cold Side	Hammering Marks									
		Scaling									
		Cracks									
	Hot Side	Hammering Marks	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Scaling	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
		Cracks	No	No	No	No	No	No	No	No	No
		Deformation	No	No	No	No	No	No	No	No	No
RHS CC	Cold Side	Hammering Marks									
		Scaling									
		Cracks									
	Hot Side	Hammering Marks	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
		Scaling	Yes	Yes	Yes	Yes	Yes	No	No	No	No
		Cracks	No	No	No	No	No	No	No	No	No
		Deformation	No	Yes	No	No	No	No	No	No	No

Inspection	Findings	Remarks
End Plate Material (Cold Side)	LHS	
	RHS	





RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
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VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:		DATE:		DATE: 2022/08/03

Check Sheet 28: Dome plate - VI

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Business Management System
Inspection Report
Gourikwa – GT21 Minor
Inspection

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	ESKOM GOURIKWA POWER STATION				Unit #:	GT21
	Diffusion Burners RHS Visual Inspections				Checksheet Reference #:	V94-2-2023-2
Inspection	Siemens SGT5-2000E Combustion				Page #:	1 of 1
					Project #:	GOU.MB
					Relevant Procedures:	13. Inspection of CC

Area	Inspection	Burner 2-1	Burner 2-2	Burner 2-3	Burner 2-4	Burner 2-5	Burner 2-6	Burner 2-7	Burner 2-8
Fuel Oil Lance	Discoloration	No	No	No	No	No	No	No	No
	Erosion *Boroscopic Inspection*								
	Seat								
	Scaling								
	Deposits								
	Discoloration								
Burner Needle	Signs of overheating								
	Cracks *Boroscopic Inspection*								
	Correct Installation *Boroscopic Inspection*								
Axial Swirlers	Deposits	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
	Clogging of bores	No	No	No	No	No	No	No	No
	Deformation of Vanes	No	No	No	No	No	No	No	No
	Scaling	No	No	No	No	No	No	No	No
	Erosion	No	No	No	No	No	No	No	No
	Cracks	No	No	No	No	No	No	No	No
	Discoloration	Yes	No	No	Yes	No	No	No	No
Burner Support	Corrosion / Damage								
	Discoloration								
	Signs of Overheating								
	Cracks								
Igniter	Damage								
	Spark Test								
Thermo-couples	Damage								

Remarks:

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
APPROVED BY - ENGINEER	Johan Otto		2022/08/02	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/03

Check Sheet 29: CC2 diffusion burners - VI

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ESKOM GOURIKWA POWER STATION

Unit #:

GT21

Premix Burner
RHS Visual Inspections

Checksheet Reference #:

V94-2-2028

Page #:

2 of 3

Project #:

GOU.MB

Inspection

Siemens SGT5-2000E
Combustion

Relevant Procedures:

13. Inspection of CC

Area	Inspection	Burner 2-1	Burner 2-2	Burner 2-3	Burner 2-4	Burner 2-5	Burner 2-6	Burner 2-7	Burner 2-8
Nozzles	Deposits / Coking / Plugging	No	No	Yes	No	No	No	No	No
	Hub - Deposits / Coking	No	No	No	No	Yes	No	No	No
	Hub - Fit of Nozzles								
Diagonal Swirler Entire Surface	Deposits / Coking / Plugging								
	Corrosion	No	No	No	Yes	Yes	No	No	No
	Deformation	No	No	No	No	No	No	No	No
	Material Break-out	No	Yes	No	Yes	No	Yes	No	No
	Hammering Marks to Burner Insert Ring								
	Hammering Marks to Axial Swirler								
	Tight fit of Vanes								
	Misalignment								
	Clogging of Premix Gas Nozzles								
	Signs of Overheating	No	Yes	Yes	Yes	Yes	Yes	No	No
	Cracks	No	Yes	Yes	Yes	No	Yes	No	No
Expansion Joint	Damage								
Hold-downs for Diagonal Swirler	Wear								
	Cracks								
	Tight fit								
Gas Distributor (Spider)	Corrosion								
	Cracks								
	Deposits "Boroscopic Inspection"								

Remarks: Plugging; 2-3:1

OH on diagonal swirlers; 2-1:4, 2-2:6, 2-3:6, 2-4:8, 2-5:8, 2-6:8, 2-7:10, 2-8:5

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CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
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ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/03


Check Sheet 30: CC2 premix burners - VI

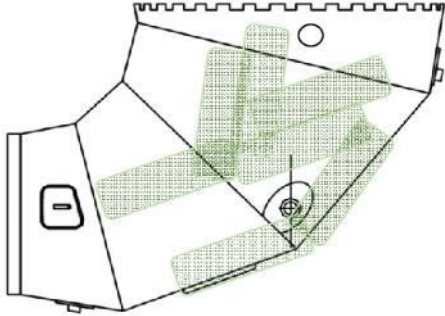
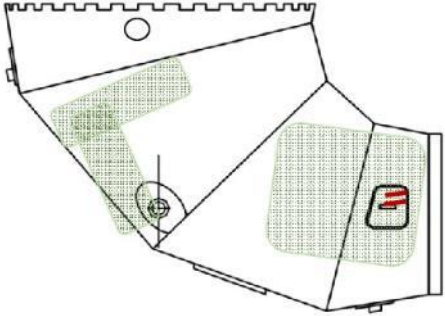
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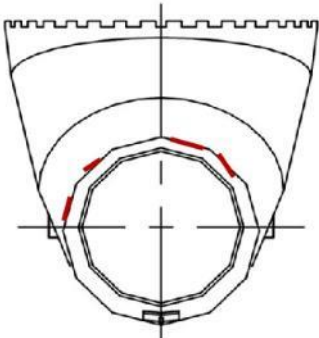
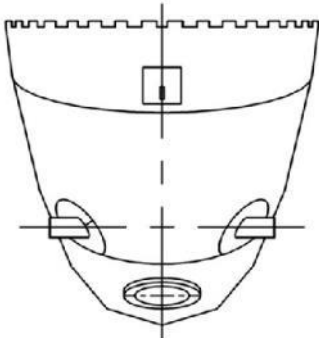
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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	LHS Mixing Chamber Visual Inspection	Checksheet Reference #:	V94-2-2011-1
Inspection	Siemens SGT5-2000E Combustion	Page #:	1 of 3
		Project #:	GOU.MB
		Relevant Procedures:	15. NDT WI and 13. Inspection of CC

Remarks: Cracks at manhole collar

Key	
	
Corrosion	
Cracks	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				NCR OR WORK ORDER NUMBER:
ERI ENGINEER	Johan Otto		2022/08/04	
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:		DATE:		DATE: 2022/08/04

Check Sheet 31: CC1 MC - VI

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Business Management System
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Gourikwa – GT21 Minor
Inspection

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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	LHS Mixing Chamber Visual Inspection	Checksheet Reference #:	V94-2-2011-1
Inspection	Siemens SGT5-2000E	Page #:	2 of 3
	Combustion	Project #:	GOU.MI3
		Relevant Procedures:	27 Reassembly - CCs

Area	Inspection	Findings	Remarks
Complete Surface	Corrosion	Yes	
	Scaling	Yes	
	Mechanical Material Thinning	No	
	Cracks	Yes	CW 2
	Deformation	No	
Reinforcement and Guide Plate Regions	Corrosion	Yes	
	Scaling	Yes	
	Mechanical Material Thinning	No	
	Cracks	Yes	
Castellations	Scoring Marks / Wear	Yes	7-9, 10-14, 15, 17, 24-30, 32-34, 35-36
	Deformation	No	
Guides	LHS - Wear		
	Bottom - Wear		
	RHS - Wear		
Bushing Supports	LHS - Wear		
	RHS - Wear		
Cooling Air Ring	Wear / Hammering Marks	Yes	7-13, 14, 16-4
Manhole Insert	Mechanical Material thinning		
	Scaling		
Manhole Collar	Scaling		
	Cracks		

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:
DATE:		DATE:		DATE: 2022/08/03


Check Sheet 32: CC1 MC - VI

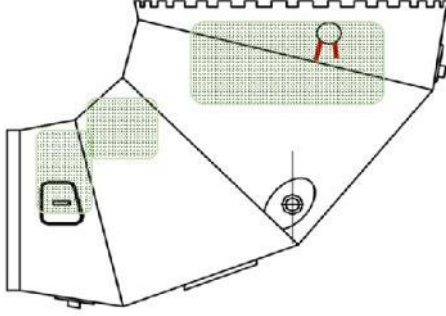
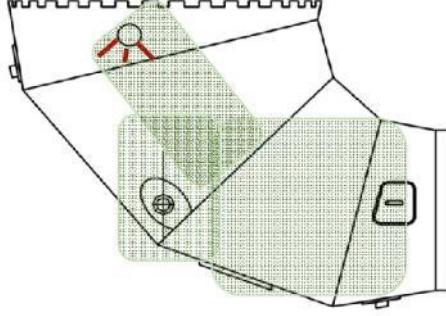
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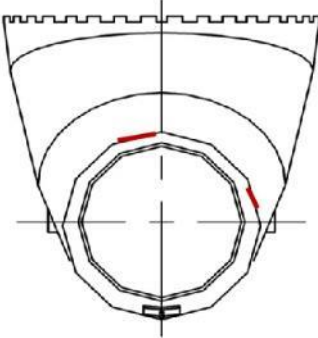
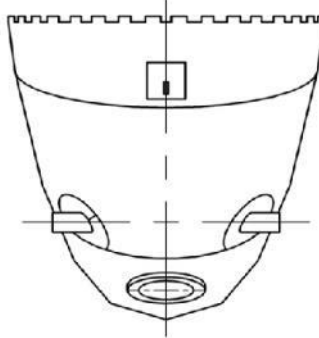
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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	RHS Mixing Chamber Inspection	Checksheet Reference #:	V94-2-2011-2
		Page #:	1 of 3
		Project #:	GOU.MB
Inspection	Siemens SGT5-2000E Combustion	Relevant Procedures:	15. NDT WI and 13. Inspection of CC






Remarks: _____

Key

	
Corrosion	
Cracks	

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VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:		DATE:		DATE: 2022/08/03

Check Sheet 33: CC2 MC - VI

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ESKOM GOURIKWA POWER STATION

Unit #: GT21

RHS Mixing Chamber Inspection

Checksheet Reference #: V94-2-2011-2

Page #: 2 of 3

Project #: GOU.MI3

Inspection

Siemens SGT5-2000E
Combustion

Relevant Procedures: 27 Reassembly - CCs

Area	Inspection	Findings	Remarks
Complete Surface	Corrosion	Yes	
	Scaling	Yes	
	Mechanical Material Thinning	No	
	Cracks	Yes	Both inspection ports and CW2
	Deformation	No	
Reinforcement and Guide Plate Regions	Corrosion	Yes	
	Scaling	Yes	
	Mechanical Material Thinning	No	
	Cracks	Yes	
Castellations	Scoring Marks / Wear	Yes	6-12, 13, 16, 17-22, 25-29
	Deformation	No	
Guides	LHS - Wear		
	Bottom - Wear		
	RHS - Wear		
Bushing Supports	LHS - Wear		
	RHS - Wear		
Cooling Air Ring	Wear / Hammering Marks	Yes	1-12
Manhole Insert	Mechanical Material thinning	No	
	Scaling	No	
Manhole Collar	Scaling	Yes	
	Cracks	Yes	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
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CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:
DATE:	Log #:	DATE:		DATE: 2022/08/03


Check Sheet 34: CC2 MC - VI

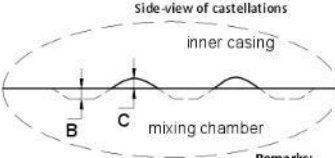
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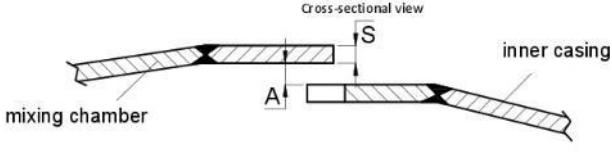
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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Mixing Chamber to Inner Casing Clearances	Checksheet Reference #:	V94-2-2005
		Page #:	1 of 2
		Project #:	GOU.MB
Disassembly	Siemens SGT5-2000E Combustion	Relevant Procedures:	03. Pre-disassembly inspections and measurements



Side-view of castellations

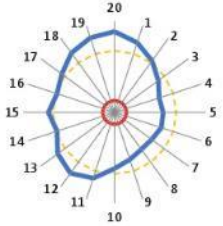


Cross-sectional view

Remarks: _____

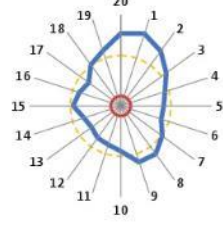
A="A"+S"

Values very similar to those collected during the previous minor



View in flow direction



Specification	Min	Max
Average A	3	3.5
B	16	19



View in flow direction

LHS CC				
Location	A	B	C	S
1	20.1	12		
2	17.5	13		
3	14.8	12		
4	12.8	10		
5	13.3	15		
6	13.5	12		
7	12.6	10		
8	12.5	12		
9	13.6	13		
10	15.4	11		
11	19.0	13		
12	20.6	15		
13	19.3	16		
14	16.6	16		
15	18.2	19		
16	16.6	19		
17	17.9	16		
18	20.2	14		
19	21.5	12		
20	22.2	10		
Average	16.9	13.4		


RHS CC				
Location	A	B	C	S
1	25.1	11		
2	22.3	11		
3	18.5	13		
4	15.3	14		
5	14.1	16		
6	14.0	16		
7	16.8	14		
8	19.5	14		
9	19.4	14		
10	14.9	13		
11	13.4	14		
12	13.0	12		
13	11.9	14		
14	12.7	12		
15	15.6	15		
16	14.4	13		
17	13.0	10		
18	16.8	11		
19	19.1	11		
20	23.9	10		
Average	16.7	12.8		

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CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:		DATE:		DATE: 2022/08/04

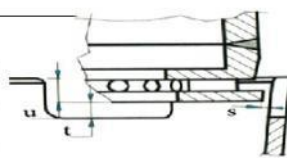
Check Sheet 35: MC to IC clearances

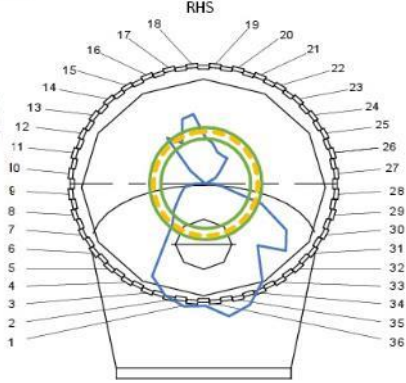
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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Flame Tube Clearances	Checksheet Reference #:	V94-2-2008
	Siemens SGT5-2000E	Page #:	1 of 2
Disassembly	Combustion	Project #:	GOU.MI3
		Relevant Procedures:	03. Pre-disassembly inspections and measurements

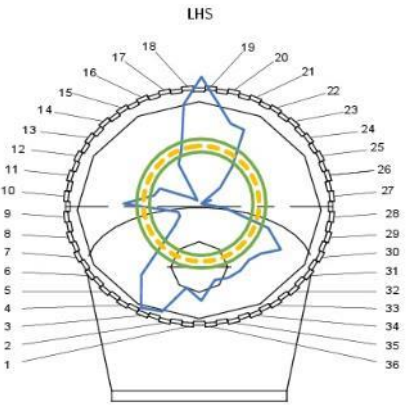
Remarks: "s" value distribution very similar to pattern observed last outage





LHS			
Point	s	t	u
1	7.5	8	
2	6.6	7	
3	8.9	7.3	
4	9.3	7	
5	7.2	6	
6	2.7	8	
7	1.9	8	
8	1.9	9	
9	2.8	9	
10	6.0	10	
11	3.7	10	
12	3.4	10	
13	0.9	9	
14	0.4	9	
15	0.7	8	
16	3.5	7	
17	4.5	9	
18	7.8	10	
19	9.8	8	
20	7.8	7	
21	6.6	7	
22	6.6	7	
23	3.7	8	
24	1.9	6	
25	0.0	8	
26	0.8	7	
27	0.1	7	
28	0.0	9	
29	1.8	9	
30	5.5	9	
31	7.1	9	
32	6.0	7	
33	5.7	7	
34	6.0	6	
35	6.1	5	
36	6.0	5	
Ave	4.5	9.7	

RHS			
Point	s	t	u
1	10.9	8	
2	11.1	9	
3	10.6	7	
4	9.5	8	
5	4.6	7	
6	3.7	9	
7	2.8	6	
8	2.3	7	
9	1.9	9	
10	1.0	8	
11	0.1	7	
12	0.0	8	
13	0.2	7	
14	1.8	7	
15	5.3	9	
16	4.2	10	
17	6.1	9	
18	6.3	8	
19	4.1	9	
20	3.6	7	
21	3.0	6	
22	2.9	7	
23	3.0	7	
24	1.6	5	
25	1.0	4	
26	0.0	5	
27	0.1	4	
28	0.7	4	
29	1.5	4	
30	5.3	5	
31	8.3	6	
32	9.3	8	
33	7.2	7	
34	10.1	6	
35	11.5	7	
36	12.0	6	
Ave	4.7	7	



Specification	Min	Max
Radial Clearance s	4	5
t	8	9
Nominal		
Overlap u	30	

Check Sheet 36: FT to MC clearances

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Gourikwa – GT21 Minor
Inspection

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		ESKOM GOURIKWA POWER STATION		Unit #:	GT21
		Inner Casing Visual Inspection		Checksheet Reference #:	V94-2-2805
				Page #:	1 of 3
				Project #:	GOU.M13
Inspection		Siemens SGT5-2000E Combustion		Relevant Procedures:	22. Inspection - Inner Casing

Area	Inspection	Findings	Remarks
Support Paws (4 off)	Mechanical Material Thinning (towards shim)	No	
	Mechanical Material Thinning (towards hold-down)	No	
Hold-downs (4 off)	Mechanical Material Thinning	No	
Hold-down shims (4 off)	Mechanical Material Thinning	No	
Center Guide	Mechanical Material Thinning	No	
Surface	Corrosion	Yes	Blocked cooling hole on LHS
	Scaling	No	
	Mechanical Material Thinning	No	
	Dents / Bulges	No	
	Cracks (Isolated)	No	
	Net of Cracks	No	
	Spalling of TBC	No	
Inlet Shell	Scaling / Erosion		
	Cracks		
	Mechanical Material Thinning At Shrink-fit Connection		
Anti-rotation Pin	Mechanical Material Thinning		
	Fracture / Cracks		
K-ring Guide	Mechanical Material Thinning		
	Cracks		
Cooling Air Ring Guide Rib	Mechanical Material Thinning	No	
	Cracks	No	
Clamping Bolt for Protective Liner and Flow Baffle	Wear		
	Thermal Stress Cracks On Transition Radius of Bolt		
	Cracks in other Locations		

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CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/04


Check Sheet 37: IC - VI

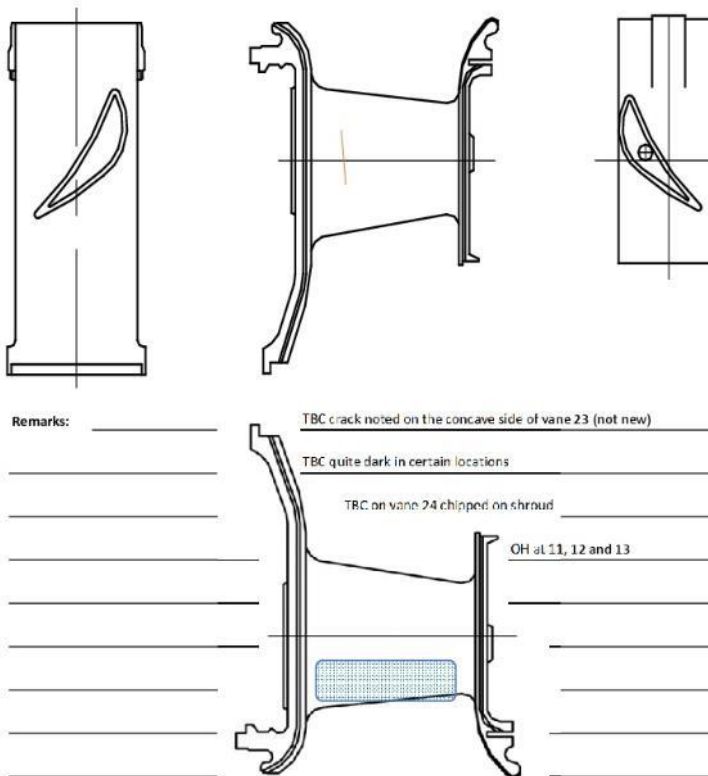
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	ESKOM GOURIKWA POWER STATION		Unit #:	GT21
	Stage 1 Vanes Visual Inspection		Checksheet Reference #:	V94-2-3005-1
			Page #:	2 of 6
			Project #:	GOU.MB
Inspection	Siemens SGT5-2000E Turbine		Relevant Procedures:	26. Reassembly - Turbine Stator Vane WI



Remarks:







TBC crack noted on the concave side of vane 23 (not new)



TBC quite dark in certain locations

TBC on vane 24 chipped on shroud

OH at 11, 12 and 13

Damage Type	Counts	
Outer Shroud	Wear or Cracks on Groove for Anti-rotation Pin	
	Wear or Cracks on Fitting Surface	
	Wear or Cracks on Groove for Seals	
	Overheating	
	Rubbing Marks	
	Cracks	
	Deformation	
	Coating Abrasion / Thinning	
	Mechanical Material Thinning	
Airfoil	Cracks	
	FOD	
	Break Out	
	Overheating	
	Corrosion / Erosion	
	Deformation of Trailing Edge	
	Coating Abrasion / Thinning	
Inner Shroud	Wear or Cracks on Groove for Seals	
	Cracks	
	Axial Rubbing Marks	
	Overheating	
	Coating Abrasion / Thinning	
	Wear or Cracks on Circumferential Seal	
	Deformation	
Mechanical Material Thinning		

Key			
FOD		Cracks	
Wear		Over-heating	
Damage due to disass		Corrosion	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
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CHECKED BY - QC				TECHNICAL NOTIFICATION:
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ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:		DATE:		DATE: 2022/08/03


Check Sheet 38: Turbine 1st stage vanes - VI

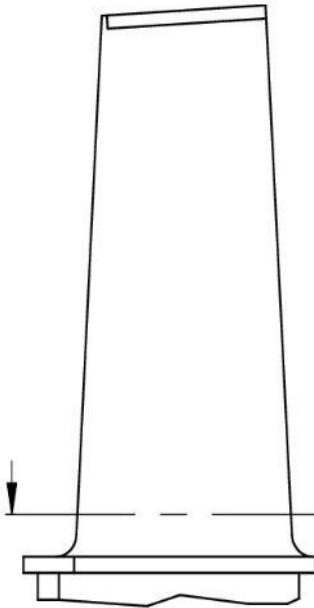
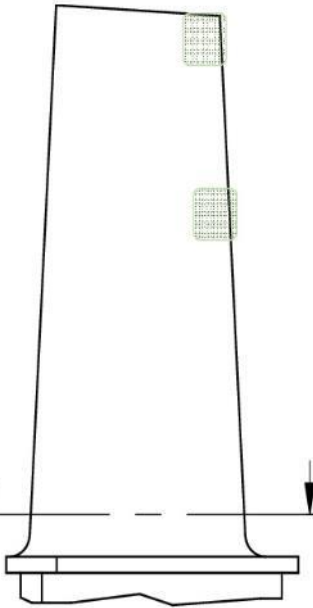
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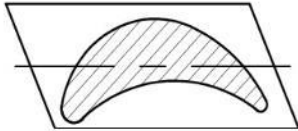
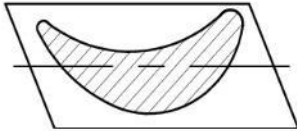
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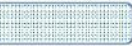


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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Stage 1 Blades Visual Inspection	Checksheet Reference #:	V94-2-3802-1
Inspection	Siemens SGT5-2000E	Page #:	2 of 7
	Turbine	Project #:	GOU.MB
		Relevant Procedures:	33. Inspection- Turbine Inspections






Damage Type		Counts
Blade Tip	Cracks	
	Rubbing	
	Oxidation	
	Deformation	
	Break-out	
Airfoil and Platform	Deposits	
	Cracks	
	Coating Thinning	
	Overheating	
	FOD	
Root	Break-out	
	Corrosion / Erosion	
	Wear	
	Damage	

Key			
FOD		Cracks	
TBC Spallation		Over-heating	
Damage due to disass		Corrosion	

Remarks: No signs of rubbing observed
 2 off blades noted with TBC spallation on LE of aerofoil
 Slight TBC loss noted at blade tips for 4 off blades

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:	
PERFORMED BY - ARTISAN					
CHECKED BY - SUPERVISOR				M & TE NUMBER:	
CHECKED BY - QC				TECHNICAL NOTIFICATION:	
VERIFIED BY - TECHNICIAN				NCR OR WORK ORDER NUMBER:	
ERI ENGINEER	Johan Otto		2022/08/03		
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

Check Sheet 39: Turbine 1st stage blades - VI

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		ESKOM GOURIKWA POWER STATION		Unit #:	GT21
		Exhaust Casing Inspections		Checks Reference #:	V94-2-5002
				Page #:	1 of 1
				Project #:	GOU.MI3
				Relevant Procedures:	15.10.10.1 and 15.10.10.2 - Pre-disassembly and 33. Inspection - Turbine Inspection
Inspection		Siemens SGT5-2000E Exhaust			

Area	Sub-Area	Inspection	Findings	Remarks
Casing Lining	Inside Wall Surface	Deposits	No	Exhaust appears to have too few deposits, fuel water content
		Deformation / Dents	Yes	
		Foreign Object Impact	No	
		Cracks	Yes	
	Transition to Hub	Wear	Yes	NDE Report Number
	Weld Beads	PT - Upper Half		
		PT - Bottom Half		
	Radial Displacement relative to TB4 Root Plate	Offset (Radial, Inward or Outward)		
Exhaust Diffuser	Cover Plate for Expansion Joint	Scuffing Marks	Yes	
		Lack of Overlap	Yes	
		Cracks	Yes	Plate on top loose - weld repairs required
		Deformation / Dents	No	
		Weld Bead - Cracks	Yes	Circumferential crack around top - weld repair required
	Expansion Joint	Cracks		Boroscopic Inspection
Exhaust Casing	Horizontal Joint Faces	Scoring Marks		
		Marks indicating that Hot Air has Escaped		
		Gapping (Horizontal / Vertical)		
	Partition Plate to TVC	Mechanical Material Thinning		
	Vertical Flange	Galling Marks		
Hub Cover Plate	Sheet Metal Jacketing	Scuffing Marks / Wear	Yes	
	Weld Beads	Cracks	Yes	Insulation coming out of the top left

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ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:
DATE:		DATE:		DATE: 2022/08/04

Check Sheet 41: Exhaust casing - VI

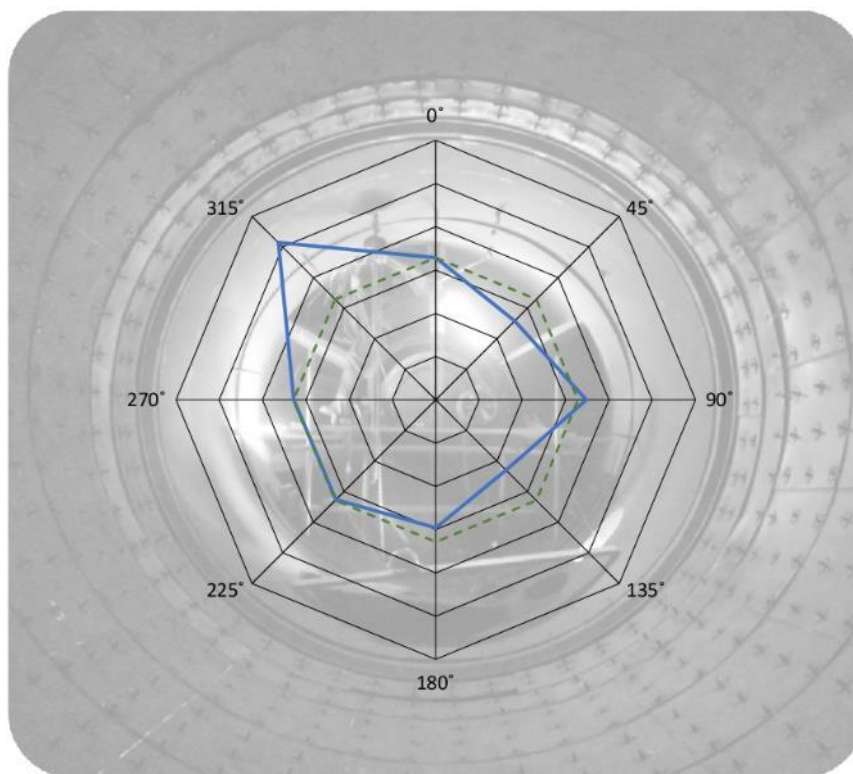
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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	Casing to Cover Plate Measurements	Checksheet Reference #:	V94-2-5003
	Siemens SGT5-2000E Exhaust	Page #:	1 of 1
		Project #:	GOU.MI3
Inspection		Relevant Procedures:	05. Disassembly of GT Body - Work Instruction



Gap between Exhaust Casing and Cover Plate for Expansion Joint								
0°	45°	90°	135°	180°	225°	270°	315°	Average
19.4	12.9	17.4	11.5	14.8	16.3	16.4	25.7	16.4

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CHECKED BY - QC				TECHNICAL NOTIFICATION:	
VERIFIED BY - TECHNICIAN					
ERI ENGINEER	Johan Otto		2022/08/03	NCR OR WORK ORDER NUMBER:	
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER	
NAME:		NAME:		NAME:	P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:	
DATE:		DATE:		DATE:	2022/08/04

Check Sheet 42: Exhaust casing to cover plate clearances

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ESKOM GOURIKWA POWER STATION

Downstream of Exhaust Casing
Inspections

Unit #:

GT21

Checksheet Reference #:

V94-2-5004

Page #:

1 of 1

Project #:

GOU.MI3

Inspection

Siemens SGT5-2000E
Exhaust

Relevant Procedures:

33. Inspection -Turbine Inspections

Area	Sub-Area	Inspection	Findings	Remarks
Exhaust Diffuser	Surface of Inside Walls	Deformation / Dents	Yes	
		Foreign Object Impact	No	
		Cracks	Yes	
	Weld Beads	Cracks	Yes	
	Manhole Contact Surfaces	Scoring Marks	No	
	Cover Plate for Expansion Joint	Scuffing Marks	No	
		Cracks	Yes	
Thermocouples		Corrosion	Yes	
		Loosened / Detached	No	
		Cracks (Weld beads at screw-in head)	No	
		Damage	No	

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PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/02	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE:
DATE:	Log #:	DATE:		DATE: 2022/08/03


Check Sheet 43: Downstream of exhaust casing - VI

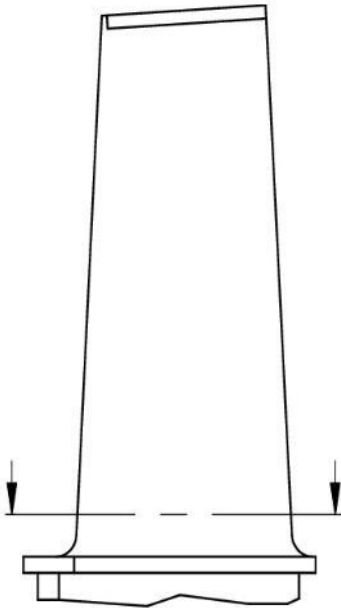
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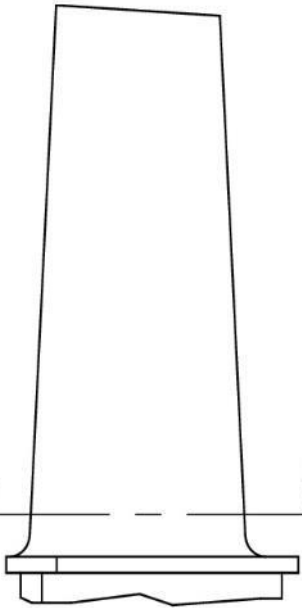
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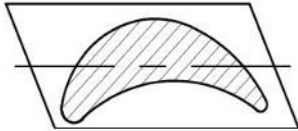
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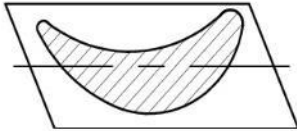
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	ESKOM GOURIKWA POWER STATION		Unit #:	GT21
	Stage 4 Blades Visual Inspection		Checksheet Reference #:	V94-2-3802-4
	Siemens SGT5-2000E Turbine		Page #:	2 of 6
			Project #:	GOU.MB
Inspection			Relevant Procedures:	33. Inspection- Turbine Inspections




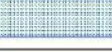












Damage Type		Counts
Blade Tip	Cracks	
	Rubbing	
	Oxidation	
	Deformation	
	Break-out	
Airfoil and Platform	Deposits	
	Cracks	
	Coating Thinning	
	Overheating	
	FOD	
Root	Break-out	
	Corrosion / Erosion	
	Wear	
	Damage	

Key			
FOD		Cracks	
Wear		Over-heating	
Damage due to disass		Corrosion	

Remarks: No rubbing observed

Blades appear quite clean - investigate water content in fuel

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
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CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				NCR OR WORK ORDER NUMBER:
ERI ENGINEER	Johan Otto		2022/08/04	
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		SIGNATURE: 
DATE:		DATE:		DATE: 2022/08/04

Check Sheet 44: Turbine 4th stage blades - VI

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	ESKOM GOURIKWA POWER STATION	Unit #:	GT21
	General operating data and operating parameters for last full-load run	Checksheet Reference #:	9001
		Page #:	2 of 12
Decommissioning	Siemens SGT5-2000E	Project #:	GOU.M13
	Gas Turbine	Relevant Procedures:	Decommissioning

General Operating Data (current)	Tag Number	Actual Value
Equivalent Operating Hours:	21MBY10EP801 XQ10	37937
Number of Starts:	21MBY10EP801 XQ11	2242
Number of Emergency loads / Black starts:	21MBY10EP801 XQ12	7
Number of Hours operating at or below Baseload:	21MBY10EP801 XQ13	14906
Number of Hours operating above Baseload:	21MBY10EP801 XQ14	290
Number of Dynamic Operating Hours:	21MBY10EP801 XQ15	252
Number of starts at 15 MW/min:	21MBY10EP801 XQ16	2
Number of starts at 30 MW/min:	21MBY10EP801 XQ17	2

Operating parameters at full load during the last full load run (Premix Mode)	Tag Number	Actual Value
Date of last full load run (yyyy/mm/dd):		
Fuel Mode (Diffusion or Premix):		
Duration at full load (hh:mm:ss):		
Steady-state load prior to deloading (MW):	21MBY10CE901 XQ01	
Engine speed prior to deloading (Hz):	21MBY10CS901 ZQ11	
Compressor inlet temperature (°C):	21MBA11CT901 ZQ01	
Compressor outlet temperature (°C):	21MBA12CT901 ZQ02	
Turbine exhaust temperatures (°C):	21MBA22CT102B XQ01	
	21MBA22CT103B XQ01	
	21MBA22CT104B XQ01	
	21MBA22CT106B XQ01	
	21MBA22CT107B XQ01	
	21MBA22CT108B XQ01	
Inlet Guide Vane position (%):	21MBA12CT901 ZQ02	
Lube Oil Temperature in tank (°C):	22MBV10CT101A XQ01	

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CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/04	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/04

Check Sheet 45: General operating parameters

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ESKOM GOURIKWA POWER STATION

Emmissions and Corrections

Unit #:

GT21

Checksheet Reference #:

V94-2-9000-1

Page #:

1 of 3

Project #:

GOU.MB

Decommissioning

Siemens SGT5-2000E
Gas Turbine

Relevant Procedures:

Decommissioning

Date of data taken			2022/06/09 06:33	
Description	Unit	Value	Signal tag	Use factor
Ambient Pressure	bar	1.0004	01CXM00CP001A XQ01	Y
Compressor inlet Temperature	°C	14.825	21MBA11CT901 ZQ01	Y
Relative humidity	%	83.2067	01CXM00CM001A XQ01	Y
Engine speed	Hz	50.0918	21MBY10CS901 ZQ11	Y
Compressor inlet Pressure loss	mBar			N
EOH	hrs		21MBY10EP801 XQ10	N
Fuel Consumption	kg/s	10.0563	21CJA00FF918 ZQ01	
LHV	kJ/kg	43090		
Fuel Enthalpy	kJ/kg	17.8		
NO _x	mg/m ³	148.7245	21MBR20CQ002A 290702 OUT	
CO	mg/m ³	1.936	21MBR20CQ003A XQ01	
SO ₂	mg/m ³	1.1361	21MBR20CQ004A OUT	
Power	MWe	148.9229	21MBY10CE901 XQ01	
Corrected Power	kWe	147615.9		
Calculated Heat rate	kJ/kWe	10479.4		
Corrected Heat rate	kJ/kWe	10538.5		
OTC Temperature	°C	520.5244	21MBA22FT901 ZQ01	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/04	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:		DATE:		DATE: 2022/08/04

Check Sheet 46: Emissions and corrections (historic)

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ESKOM GOURIKWA POWER STATION

Unit #:

GT21

Emissions and Corrections

Checksheet Reference #:

V94-2-9000-1

Page #:

2 of 3

Project #:

GOU.MB

Decommissioning

Siemens SGT5-2000E
Gas Turbine

Relevant Procedures:

Decommissioning

Date of data taken			2022/07/11 06:51	
Description	Unit	Value	Signal tag	Use factor
Ambient Pressure	bar	0.9986289	01CXM00CP001A XQ01	Y
Compressor inlet Temperature	°C	13.875	21MBA11CT901 ZQ01	Y
Relative humidity	%	73.3181	01CXM00CM001A XQ01	Y
Engine speed	Hz	49.9561	21MBY10CS901 ZQ11	Y
Compressor inlet Pressure loss	mBar			N
EOH	hrs		21MBY10EP801 XQ10	N
Fuel Consumption	kg/s	10.0338	21CJA00FF918 ZQ01	
LHV	kJ/kg	43090		
Fuel Enthalpy	kJ/kg	17.8		
NOx	mg/m³	157.4725	21MBR20CQ002A 290702 OUT	
CO	mg/m³	0.00913	21MBR20CQ003A XQ01	
SOx	mg/m³	4.516	21MBR20CQ004A OUT	
Power	MWe	148.9562	21MBY10CE901 XQ01	
Corrected Power	kWe	147365.2		
Calculated Heat rate	kJ/kWe	10453.6		
Corrected Heat rate	kJ/kWe	10528.3		
OTC Temperature	°C	519.8143	21MBA22FT901 ZQ01	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/04	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/04

Check Sheet 47: Emissions and corrections (historic)

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ESKOM GOURIKWA POWER STATION

Unit #:

GT21

Emissions and Corrections

Checksheet Reference #:

V94-2-9000-1

Page #:

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Project #:

GOU.MB

Decommissioning

Siemens SGT5-2000E
Gas Turbine

Relevant Procedures:

Decommissioning

Date of data taken			2022/07/31 07:03	
Description	Unit	Value	Signal tag	Use factor
Ambient Pressure	bar	1.007	01CXM00CP001A XQ01	Y
Compressor inlet Temperature	°C	10.375	21MBA11CT901 ZQ01	Y
Relative humidity	%	71.1444	01CXM00CM001A XQ01	Y
Engine speed	Hz	50.0095	21MBY10CS901 ZQ11	Y
Compressor inlet Pressure loss	mBar			N
EOH	hrs		21MBY10EP801 XQ10	N
Fuel Consumption	kg/s	10.2302	21CJA00FF918 ZQ01	
LHV	kJ/kg	43090		
Fuel Enthalpy	kJ/kg	17.8		
NOx	mg/m³	164.7412	21MBR20CQ002A 290702 OUT	
CO	mg/m³	1.3955	21MBR20CQ003A XQ01	
SOx	mg/m³	1.3549	21MBR20CQ004A OUT	
Power	MWe	154.8958	21MBY10CE901 XQ01	
Corrected Power	kWe	148643.4		
Calculated Heat rate	kJ/kWe	10249.5		
Corrected Heat rate	kJ/kWe	10377.8		
OTC Temperature	°C	519.3862	21MBA22FT901 ZQ01	

RESPONSIBLE PERSON	NAME (BLOCK LETTERS)	SIGNATURE	DATE	SERIAL NUMBERS:
PERFORMED BY - ARTISAN				
CHECKED BY - SUPERVISOR				M & TE NUMBER:
CHECKED BY - QC				TECHNICAL NOTIFICATION:
VERIFIED BY - TECHNICIAN				
ERI ENGINEER	Johan Otto		2022/08/04	NCR OR WORK ORDER NUMBER:
ESKOM QUALITY CONTROL		ESKOM TECHNICIAN		ESKOM ENGINEER
NAME:		NAME:		NAME: P.L. Calana
SIGNATURE:		SIGNATURE:		
DATE:	Log #:	DATE:		DATE: 2022/08/04

Check Sheet 48: Emissions and corrections (historic)

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