
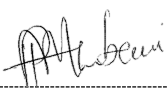

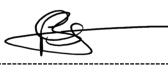


	<b>SOW</b>	<b>Camden Power Station</b>
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<b>M Nchabeleng</b>	<b>P Mthombeni</b>	<b>M Mathabatha</b>	<b>B Mbatsane</b>
<b>System Engineer</b>	<b>Line Manager</b>	<b>Engineering Manager</b>	<b>Maintenance Manager</b>
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**Content**

	Page
1. Introduction.....	3
1.1 Purpose.....	3
1.2 Applicability .....	3
2. Definitions and Abbreviations.....	3
2.1 Definitions .....	3
2.2 Abbreviations .....	3
2.3 Normative/Informative References.....	3
2.3.1 Normative .....	3
3. Scope of Work Content .....	4
3.1 Outage Goal.....	4
3.2 Outage Objectives.....	4
3.2.1 Technical Criteria.....	4
3.2.2 Scope Variations.....	4
3.2.3 Financial Performance.....	4
3.2.4 Time Management.....	4
3.3 Plant History.....	4
3.4 Operating Condition .....	5
3.5 Plant Specific Safety Requirements .....	5
3.6 Risk Report and Mitigating actions.....	5
3.7 Environmental Requirements .....	5
3.8 Engineering Drawings .....	5
3.9 Plant Preservation Requirements.....	5
3.10 Transportation and Storage Requirements .....	5
3.11 Scope compilation references .....	5
3.12 Subsystem .....	6
3.13 Service report and PQP .....	6
3.14 Quality .....	6
3.15 Experience of Staff.....	6
3.16 Work Preparation .....	6
3.17 Insulation / Lagging/ Asbestos .....	7
3.18 Scaffolding Requirements .....	7
3.19 Detailed Scope of Work.....	8
Straights (Inserts).....	14
3.20 Bills of Materials .....	15
3.21 Defects.....	16
3.22 Tools and Equipment requirements .....	16
3.23 Commissioning and Acceptance Testing Activities .....	16
4. Summary of Revision Changes .....	16
5. Acceptance.....	17
6. Appendix .....	18

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## 1. Introduction

This document defines the scope of work for sandblasting applications at Camden Power Station, encompassing various components such as Boiler pressure parts, HP Piping components, and selected boiler valves. The scope of work was carefully developed through a thorough review of historical data, ensuring a comprehensive and informed approach to the sandblasting applications.

### 1.1 Purpose

The purpose of this scope of work is to provide a detailed overview of the sandblasting services to be performed on specific components, including boiler pressure parts, select HP Piping components, and other and selected boiler valves.

### 1.2 Applicability

This document applies to Eskom Camden Power Station. It is applicable to Boiler Engineering, Maintenance, Outage department, and Projects department, including any contractor that will be involved in execution of the scope of work.

## 2. Definitions and Abbreviations

### 2.1 Definitions

**H** - Customer to inspect the plant / equipment or advice before commencing with work activities.

**W** - Customer to inspect the plant/ equipment during work activities.

**A** - Copy of inspection report to be issued to customer.

**R** - Customer to review reports or checks sheets prior to re-assembly.

### 2.2 Abbreviations

**DMS** - Documentation Management System

**NDE** – Non-Destructive Examination

**NDT** – Non-Destructive Testing

**PQP** – Process Quality Plan

**ITP** – Inspection and Test Plan

**QCP** – Quality Control Plan

**MT** – Magnetic Testing (Magnetic Particle Inspection)

**UT** – Ultrasonic Testing

**DIM** – Dimension Testing (Profile gauging)

**HD** – Hardness Testing

**RP** – Replication

### 2.3 Normative/Informative References

Parties using this document shall apply the most recent edition of the documents listed in the following paragraphs.

#### 2.3.1 Normative

- [1] ISO 9001 - Quality Management Systems.
- [2] OHS Act - Occupational Health and Safety Act and Regulations (Act No.85 of 1993)
- [3] 240-56246601 - Personnel and Entities Performing Welding Related Special Processes on Eskom Plant
- [4] 240-56247004 - Thermal Insulation Standard

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[5] 240-56239129 – High pressure piping standard

[6] 240-127549136 – Boiler Tube Failure Reduction Programme Standard

### 3. Scope of Work Content

Department	Boiler	System	Various areas

#### 3.1 Outage Goal

After successful execution and completion of the scope of work the following outcomes are expected:

- Surface preparation for NDT
- Increased accuracy of NDT inspection results
- Increased boiler plant reliability

#### 3.2 Outage Objectives

The following improvements are required after analysis of the outage effectiveness indicator:

##### 3.2.1 Technical Criteria

- All work is to be executed according to code, and Eskom procedures.
- The work executed is to be of high quality and ITPs with MSD should be adhered to at all times.
- Method statements are required up front before the outage commences approved by engineering.

##### 3.2.2 Scope Variations

Any scope variation to be submitted to Boiler Engineering for approval.

##### 3.2.3 Financial Performance

- Execute within approved budget.

##### 3.2.4 Time Management

- Availability of spares – outage to order/purchase 9 months before the outage start date such that the material/components are on site before the outage starts.
- Scaffolding erection – scaffolding to be erected before unit comes down where possible.

#### 3.3 Plant History

See detailed Scope of work.

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### 3.4 Operating Condition

The unit operates as per design and under design from time to time.

### 3.5 Plant Specific Safety Requirements

- Already addressed on the Power Station's SHE specification.

### 3.6 Risk Report and Mitigating actions

- As per R/A supported by contractor executing work.

### 3.7 Environmental Requirements

- All waste/scrap is to be disposed of in the appropriate scrap/waste bins.

### 3.8 Engineering Drawings

- Updated approved drawings can be submitted by Boiler Eng. as and when required.

### 3.9 Plant Preservation Requirements

- N/A

### 3.10 Transportation and Storage Requirements

- All spares are to be stored as per Eskom standard and QCP.

### 3.11 Scope compilation references

Source	Source reference No
Previous outage service reports	As per BHC
Return to service data packages	QCP
SAP PM defects (attach list as appendix)	N/A
GHRMS (STEP) reports	N/A
Pre outage performance test results	N/A
Post outage performance test results	N/A
GPSS data on UCLF incurred	N/A
OMS / IIRMS recommendations	N/A

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Risk controls (CURA system)	N/A
Previous audits and reviews	N/A
Engineering Change Requests	N/A

### 3.12 Subsystem

- As per detailed SOW

### 3.13 Service report and PQP

- A full-service report will be compiled and provided to Camden Power Station in duplicate. The report will contain a high-level description of the work done during the refurbishment. It will contain the approved PQP of work on site and all related check sheets and test reports. All technical notifications will be shown as well. It will contain a section on spares used report.
- PQP to be compiled and presented to Engineering for approval before start of outage. Duplicate service report provided to Camden Power Station within 14 days of the completion of the work. Report to be accepted by Engineering.

### 3.14 Quality

- Inspections to be carried out in accordance with check sheets as attached in master quality plan which should be compiled from this document and approved by Engineering. This document will contain all the PQP's of work that will be done on site and off site. Dismantling and assembly values to be recorded for all check sheets. Repair or replace all damaged/worn components out of specification or obtain a concession from engineering staff. All abnormalities to be recorded and reported with technical notifications.
- All work carried out will be in line with the applicable ESKOM standards. Where nothing exists, good engineering practise will be followed. This includes but is not limited to the covering of all openings and the use of approved chemicals.
- Where digital photos are required, it will be of a resolution of at least 2228x1712.
- Supplier Contract Quality Requirement Specification (QM 58) shall be the governing document.

### 3.15 Experience of Staff

- All staff shall be adequately qualified and competent of performing all work within safe and correct technical specifications.
- Short CV's of all supervisors, quality technicians, artisan, stating qualifications and relevant experience will be provided at least two weeks before commencement of outage.
- The importance of correct equipment spares and procedures should be included in structured toolbox talk sessions with all contractors.
- All personnel shall have a medical certificate of fitness as per the Stations SHE specification.

### 3.16 Work Preparation

No.	Scope of Work	Responsible work centre	Procedure or Specification	Hold or Witness Points	Check sheet
-----	---------------	-------------------------	----------------------------	------------------------	-------------

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Preparation					
1.	Install scaffolding in all applicable areas in a timely manner. This requirement applies to any unit that is down for OO, FO, MGO, or GO.	ORAM	N/A	N/A	N/A
2.	Prepare all QCP/ITP		N/A	Engineering Approval	N/A
3.	All material from the bill of material to be ordered and components verified before outage starts.	Outage	Keep engineering informed	N/A	N/A
4.	Review list of boiler defects A list of all the latest defects shall be obtained from SAP and repaired.	Maintenance	N/A	N/A	Normal defects process to be followed.
5.					

### 3.17 Insulation / Lagging/ Asbestos

- Any areas with known asbestos to be removed as per HSE standards.

### 3.18 Scaffolding Requirements

No	Task	Responsible work centre	Procedure or Specification	Hold or Witness Points	Check sheet
1.	Build scaffolding on all areas as per SOW	Outage	ORAM procedure	Hold Point	QCP
2.	Build scaffolding for inspections of refractory.	Outage	ORAM procedure	Hold Point	QCP

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### 3.19 Detailed Scope of Work

#### 3.19.1 Boiler Pressure Parts

The following components on the boiler pressure parts(Unit 1-8) require sandblasting in order to facilitate inspection:

Description	Action	Qty	Pipe size (mm)
Blow down vessel	Sandblast	12	200mm x 200mm
Evaporator LHS wall at 12ml	Sandblast	105	76mm OD x 500mm
Evaporator RHS wall at 12ml	Sandblast	105	76mm OD x 500mm
Evaporator front wall at 12ml	Sandblast	177	76mm OD x 500mm
Evaporator Front wall burner row a-e @18ml	Sandblast	177	76mm OD x 500mm
Evaporator front wall @ 29ml LHS and RHS	Sandblast	300	76mm OD x 500mm
Evaporator front wall @ 29ml	Sandblast	177	76mm OD x 500mm
Evaporator Rear wall @ 12ml	Sandblast	177	76mm OD x 500mm
Evaporator Rear wall @18ml	Sandblast	177	76mm OD x 500mm
Evaporator Rear wall @ 21ml	Sandblast	177	76mm OD x 500mm
Sat steam rear wall 32 ml	Sandblast	266	76mm OD x 500mm
Evaporator Front wall bottom slope dead space	Sandblast	177	76mm OD x 500mm
Evaporator Rear wall bottom slope dead space	Sandblast	177	76mm OD x 500mm
Evaporator front wall inlet header s-bends	Sandblast	200	76mm OD x 500mm
Evaporator rear wall inlet header s-bends	Sandblast	200	76mm OD x 500mm

Description	Action	Qty	Pipe size (mm)
Evaporator Front wall bottom slope (nose tubes)	Sandblast	200	180m2
Evaporator Rear wall bottom slope (nose tubes)	Sandblast	200	147m2
Evaporator Rear wall top nose	Sandblast	200	126m2
Evaporator rear wall below top nose	Sandblast	200	47m2
Evaporator LHS wall at 12ml	Sandblast	200	76 2mm OD x 1000 mm
Evaporator RHS wall at 12ml	Sandblast	200	76.2mm OD x 1000 mm

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Evaporator front wall at 12ml	Sandblast	200	76.2mm OD x 1000 mm
Evaporator Front wall burner row c - e (18ml	Sandblast	200	76 2mm OD x 1000 mm
Evaporator Front wall @ 29ml	Sandblast	200	76.2mm OD x 1000 mm
Evaporator Front wall @ 29ml RHS and LHS	Sandblast	200	76.2mm OD x 1000 mm
Evaporator Rear wall @ 12ml	Sandblast	200	76.2mm OD x 1000 mm
Evaporator Rear wall @18ml	Sandblast	200	76.2mm OD x 1000 mm
Evaporator rear wall @ 21ml	Sandblast	200	76.2mm OD x 1000 mm
Superheater 4, 1st transition pieces	Sandblast	204	57.15mm OD x 500mm
Front screen tubes sb path 107/108 - wf29	Sandblast	69	76.2mm OD x 1000 mm
Front screen tubes bottom bends - wf31	Sandblast	69	76 2mm OD x 1000mm
Front screen tubes sb path 109/110 - wf33	Sandblast	69	76.2mm OD x 1000 mm
Superheater 3 elements - wf66	Sandblast	68	57.15mm OD x 6000mm
Superheater 3 elements - wf67	Sandblast	34	57 15mm od x 1300mm
Superheater 3 front bends - wf68	Sandblast	204	57.15mm OD x 300mm
Superheater 4 - wf51	Sandblast	408	57 15mm OD x 2500mm
Saturated steam rear wall	Sandblast	200	76 mm OD x 2500mm
Saturated steam rear wall	Sandblast	200	76 mm OD x 2500mm
Rear bends	Sandblast	200	76.1mm OD x 2500mm
Boiler doors & sb openings manipulation tubes	Sandblast	1000	76.1mm OD x 2500mm
Superheater 4	Sandblast	204	57.15mm OD x 1300mm
Platen Elements(Unit 6-7)	Sandblast	21	76.2mm OD x 1500mm
Tube leak detectors attachment welds			

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**3.19.2 HP Piping**

The following components on HP piping require sandblasting in order to facilitate inspection:

Plant Section		Action	Quantit y (Per Unit)	Numb er Of Units	Total Quantit y	Pipe Size
Turbine Loops	Butt Welds	Sand Blasting	95	8	760	235.9mm OD x 500mm length per Unit
			14	8	112	197.5mm OD x 500mm length per Unit
	Stubs		2	8	16	152.4mm ID x as per drawing
			4	8	32	190.5mm ID x as per drawing
	Bends		18	8	144	235.9mm OD x 500mm length per Unit
			2	8	16	197.5mm OD x 500mm length per Unit
Main Steam	Butt Welds	Sand Blasting	14	8	112	407mm OD x 500mm length per Unit
			64	8	512	372mm OD x 500mm length per Unit
	Stubs		20	8	160	292.1 mm ID x as per drawing
	Bends		2	8	16	407mm OD x 500mm length per Unit
			23	8	184	372mm OD x 500mm length per Unit
Attemperator	Butt Welds	Sand Blasting	5	8	40	434mm OD x 500mm length per Unit
			48	8	384	355.6mm OD x 500mm length per Unit
	Stubs		5	8	40	434mm OD x as per drawing
			5	8	40	355.6mm OD x as per drawing
	Bends		9	8	72	355.6mm OD x as per drawing

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Super Heater 1	Butt Welds	Sand Blasting	5	8	40	244.5mm OD x 500mm Length
	Stubs		224	8	1792	50.8mm OD x as per drawing
			32	8	256	57.15mm OD x as per drawing
			114	8	912	47.6mm OD x as per drawing
Super Heater 2	Butt Welds	Sand Blasting	3	8	24	406mm OD x 500mm Length
	Stubs		224	8	1792	54mm OD x as per drawing
Super Heater 3	Butt Welds	Sand Blasting	1	8	8	355.4mm OD x 500mm Length
	Stubs		204	8	1632	57.15mm OD x as per drawing
Super Heater 4	Butt Welds	Sand Blasting	3	8	24	457mm OD x 500mm Length
	Tube Stubs		204	8	1632	57mm OD x as per drawing
	Valve Stubs		3	8	24	82.6mm OD x as per drawing
Steam Drum	Butt Welds	Sand Blasting	3	8	24	1901.825mm OD x 500mm Length
	Stubs		499	8	3992	76.2mm OD x as per drawing
	Nozzles		9	8	72	57.15mm OD x as per drawing
			3	8	24	95.25mm OD x as per drawing
			6	8	48	63.5mm OD x as per drawing
			6	8	48	276.225mm OD x as per drawing
			6	8	48	409.5mm OD x as per drawing
			3	8	24	82.55mm OD x as per drawing
			6	8	48	211.13mm OD x as per drawing

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			28	8	224	238.125mm OD x as per drawing
Lower Platen Header	Butt Welds	Sand Blasting	2	8	16	219.025mm OD x 500mm Length
	Stubs		6	8	48	168.2mm OD x as per drawing
			21	8	168	76.2mm OD x as per drawing
Middle Platen Header	Butt Welds	Sand Blasting	2	8	16	219.025mm OD x 500mm Length
	Stubs		27	8	216	76.2mm OD x as per drawing
Upper Platen Header	Butt Welds	Sand Blasting	2	8	16	219.025mm OD x 500mm Length
	Stubs		27	8	216	76.2mm OD x as per drawing
Saturate Inlet Header	Butt Welds	Sand Blasting	6	8	48	244.47mm OD x 500mm Length
	Stubs		60	8	480	76.2mm OD x as per drawing
			256	8	2048	50.8mm OD x as per drawing
Evaporator L/H Wall Outlet Header	Butt Welds	Sand Blasting	7	8	56	298.45mm OD x 500mm Length
	Stubs		125	8	1000	76.2mm OD x as per drawing
			14	8	112	168.275mm OD x as per drawing
Evaporator R/H Wall Outlet Header	Butt Welds	Sand Blasting	7	8	56	298.45mm OD x 500mm Length
	Stubs		125	8	1000	76.2mm OD x as per drawing
			14	8	112	168.275mm OD x as per drawing
Evaporator L/H Wall Inlet Header	Butt Welds	Sand Blasting	7	8	56	298.45mm OD x 500mm Length
	Stubs		125	8	1000	76.2mm OD x as per drawing
			2	8	16	48.42mm OD x as per drawing

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			9	8	72	139.7mm OD x as per drawing
Evaporator R/H Wall Inlet Header	Butt Welds	Sand Blasting	7	8	56	298.45mm OD x 500mm Length
	Stubs		125	8	1000	76.2mm OD x as per drawing
			2	8	16	48.42mm OD x as per drawing
			9	8	72	139.7mm OD x as per drawing
Evaporator Front Wall Inlet Header	Butt Welds	Sand Blasting	10	8	80	298.45mm OD x 500mm Length
	Stubs		177	8	1416	76.2mm OD x as per drawing
			3	8	24	48.42mm OD x as per drawing
			16	8	128	139.7mm OD x as per drawing
Evaporator Rear Wall Inlet Header	Butt Welds	Sand Blasting	10	8	80	298.45mm OD x 500mm Length
	Stubs		177	8	1416	76.2mm OD x as per drawing
			3	8	24	48.42mm OD x as per drawing
			16	8	128	139.7mm OD x as per drawing
R/H Wall Economiser Outlet Header	Butt Welds	Sand Blasting	6	8	48	298.45mm OD x 500mm Length
	Stubs		3	8	24	168.275mm OD x as per drawing
			49	8	392	50.8mm OD x as per drawing
			1	8	8	127mm OD x as per drawing
L/H Wall Economiser Outlet Header	Butt Welds	Sand Blasting	6	8	48	298.45mm OD x 500mm Length
	Stubs		3	8	24	168.275mm OD x as per drawing
			49	8	392	50.8mm OD x as per drawing

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			1	8	8	127mm OD x as per drawing
Economiser R/H Outlet Header	Butt Welds	Sand Blasting	2	8	16	273mm OD x 500mm Length
	Stubs		49	8	392	50.8mm OD x as per drawing
			118	8	944	48.26mm OD x as per drawing
Economiser L/H Outlet Header	Butt Welds	Sand Blasting	2	8	16	273mm OD x 500mm Length
	Stubs		49	8	392	50.8mm OD x as per drawing
			118	8	944	48.26mm OD x as per drawing
Economiser Inlet Header U6&7	Butt Welds	Sand Blasting	4	8	32	244.47mm OD x 500mm Length
	Stubs		18	8	144	88.9mm OD x as per drawing
			98	8	784	60mm OD x as per drawing
Economiser Inlet Header U1-5&8	Butt Welds	Sand Blasting	4	8	32	273.1mm OD x 500mm Length
	Stubs		18	8	144	88.9mm OD x as per drawing
			236	8	1888	48.26mm OD x as per drawing

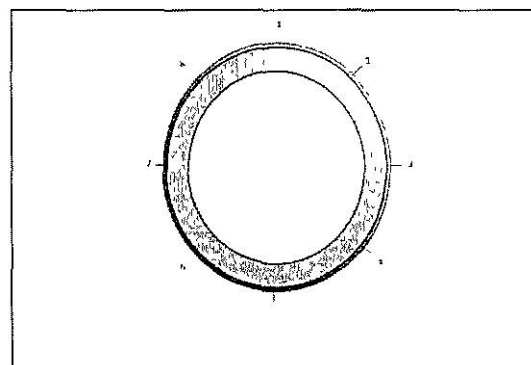
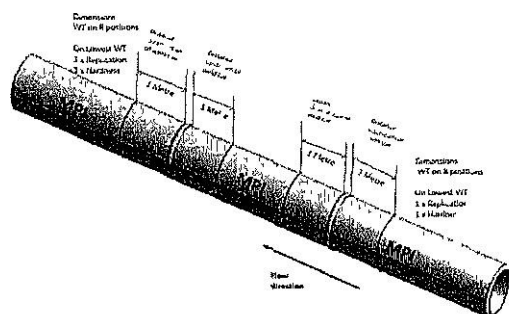
### Straights (Inserts)

The inspections contractor should take note of the following:

- 100% Visual Inspection and 100% MT must be done on X20 pipework between butt welds specified in the scope of work.
- WT must be performed in 8 equally spaced areas around the circumference (see below), 1m upstream and 1m downstream of each weld. The thinnest area must be identified. In this area, WT measurements must be performed in circumferential steps of not more than 50mm to identify the thinnest spot. This area must be marked clearly for Replication and Hardness Testing
- Replicas must be lifted on the parent material as specified in the drawing below. Lowest WT area marked.
- Hardness Testing (H T) must be done at the area where the replica was lifted.
- Provided the Insert / spool is shorter than or equals to 2 metre the required NDT's will be taken in one position in the centre of spool.
- For seam-welded pipework, keep within the HP piping strategy requirements.

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- Insert or spool marking should be done for the purpose of labelling and record keeping.



### 3.19.3 Boiler Valves

The following components on Boiler valves and Steam Drum require sandblasting in order to facilitate inspection:

Boiler Valves	
Components	Area
0 HAD20 AA601	Boiler Drum Safety Valve
0 HAD20 AA602	Boiler Drum Safety Valve
0 HAD20 AA603	Boiler Drum Safety Valve
0 HAD20 AA604	Boiler Drum Safety Valve
0 HAD20 AA605	Boiler Drum Safety Valve
0 HAD20 AA606	Boiler Drum Safety Valve
0 HAH40 AA201	Super Heater 4 Safety Valve
0 HAH40 AA601	Super Heater 4 Safety Valve

### 3.20 Bills of Materials

	Description	Responsible Work Centre	SOW	Hold 1 Witness Points	Check Sheet
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	<p>NOTE: MICRO BLAST GRID (40160)</p> <p>The following sandblasting grid specifications must be used:</p> <p>Sandblast Grid "A" to be used</p> <p>Particle size between 0.3 mm and 0.9 mm</p> <p>Profile between 47 and 58 (Microns)</p>	Outage/Contractor	Supply material	QCP	Method Statement
--	--	-------------------	-----------------	-----	------------------

### 3.21 Defects

- As per SAP

### 3.22 Tools and Equipment requirements

NO.	COMPONENT DESCRIPTION	QUANTITIES
1.	As per Contractors procedures	

### 3.23 Commissioning and Acceptance Testing Activities

NO.	TASK	RESPONSIBLE CENTRE	WORK	PROCEDURE SPECIFICATION /
1.	Lagging and cladding	Outages and ORAM		Eskom Thermal insulation standard

## 4. Summary of Revision Changes

Date	Rev.	Remarks/ Changes	Compiler
August 2024	0	Draft	Michelle Nchabeleng
September 2024	1	Final Document	Michelle Nchabeleng

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**5. Acceptance**

This document has been seen and accepted by:

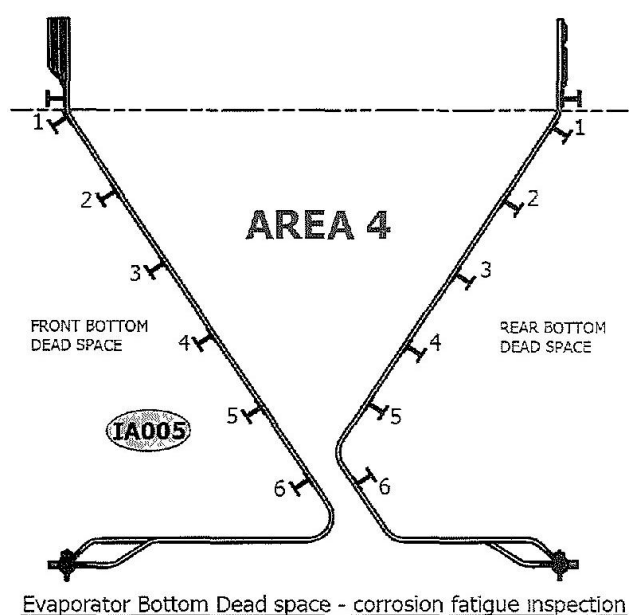
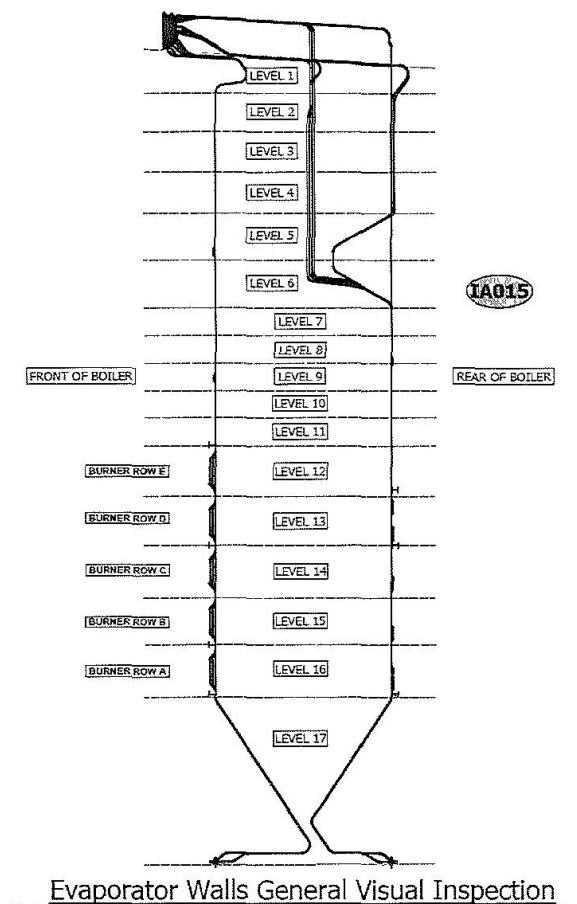
Name	Designation
Sydney Tshalane	Outage Co-ordinator
Sipho Ndhlovu	Senior Boiler inspector
Mlungisi Makhaya	Senior Boiler inspector
Michelle Nchabeleng	System Engineer
Tetelo Letsoalo	HP Piping Engineer
Kampamba Chanda	Boiler Plant Engineer
Phello Sejake	Boiler Plant Engineer

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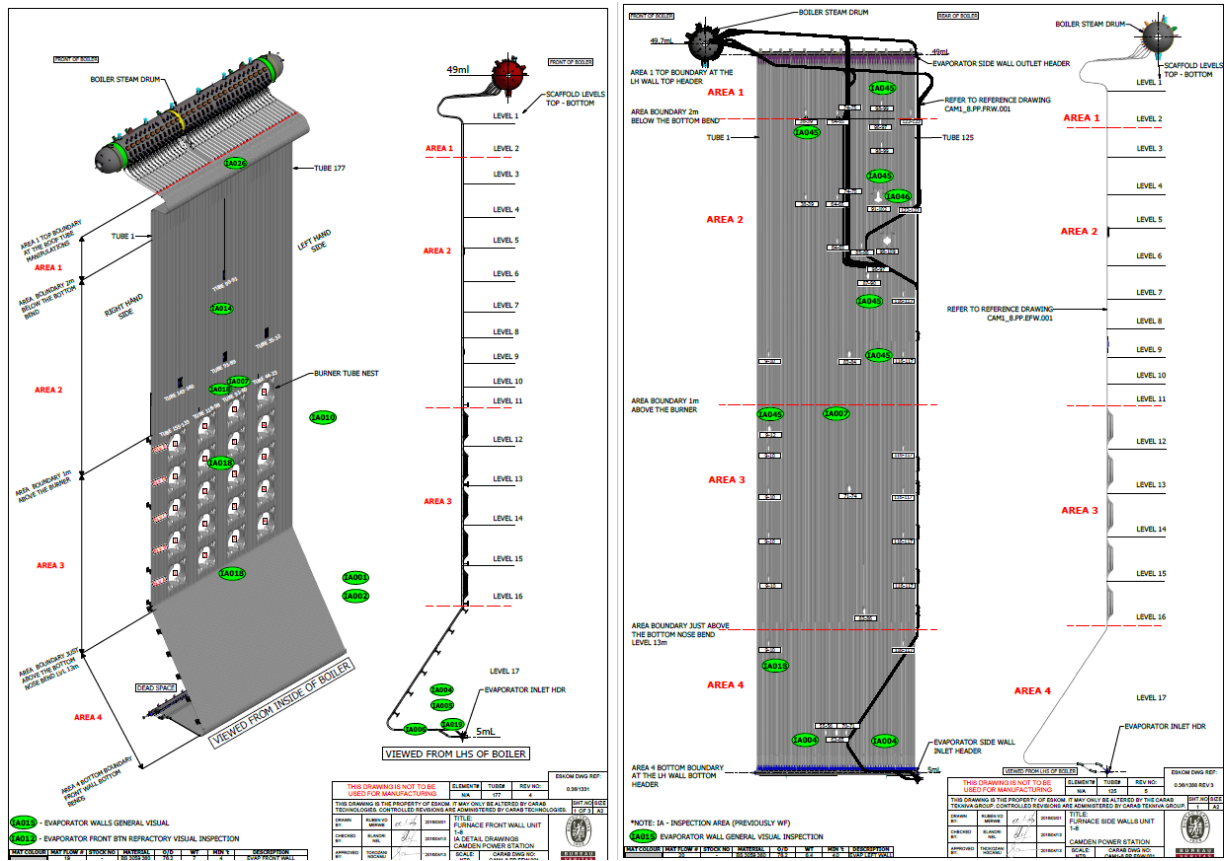
## 6. Appendix

### Boiler Pressure Parts Map Drawings



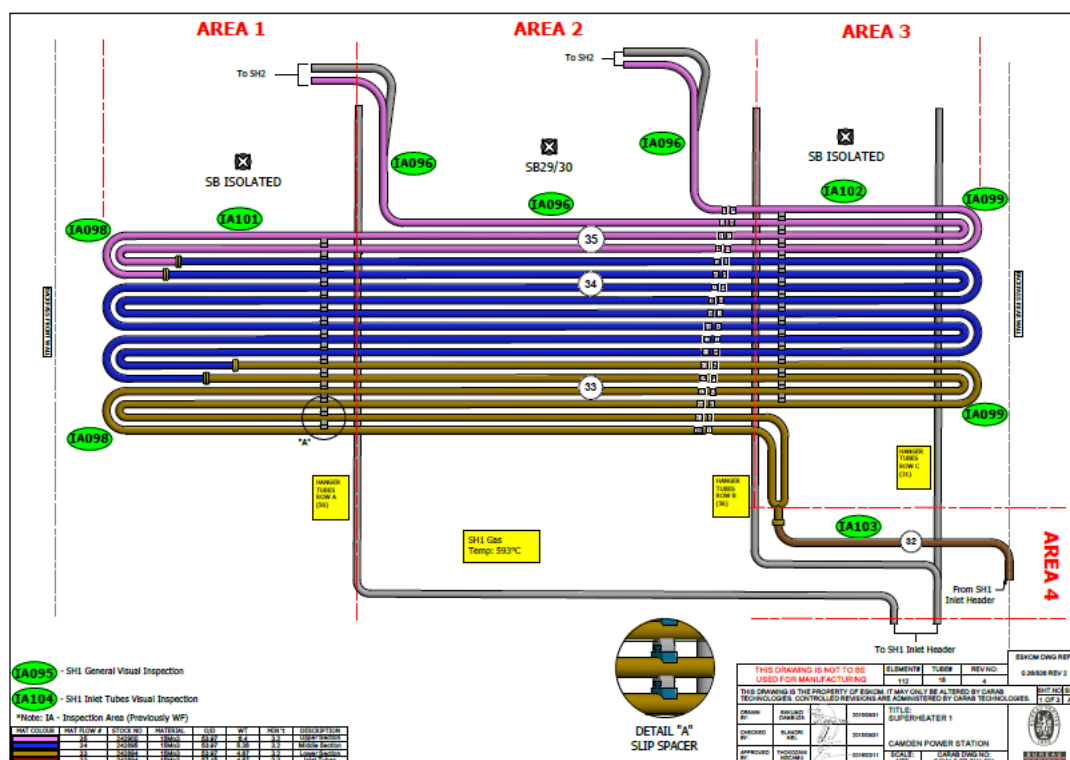
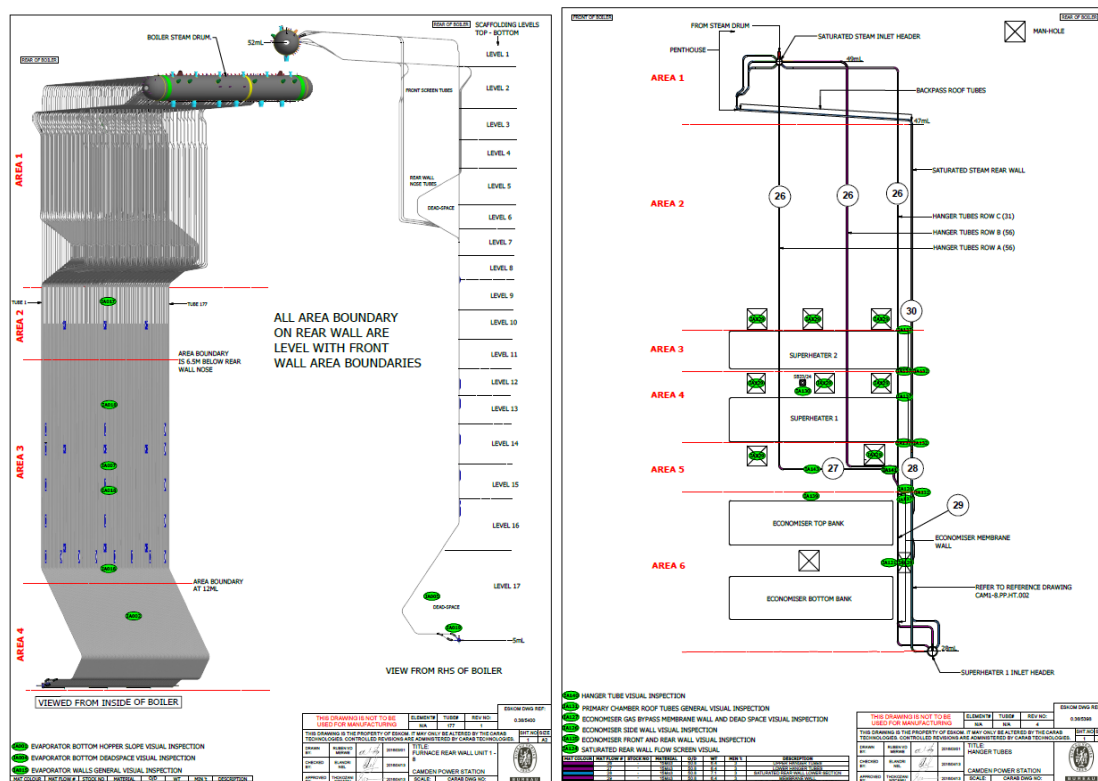
Evaporator Bottom Dead space - corrosion fatigue inspection

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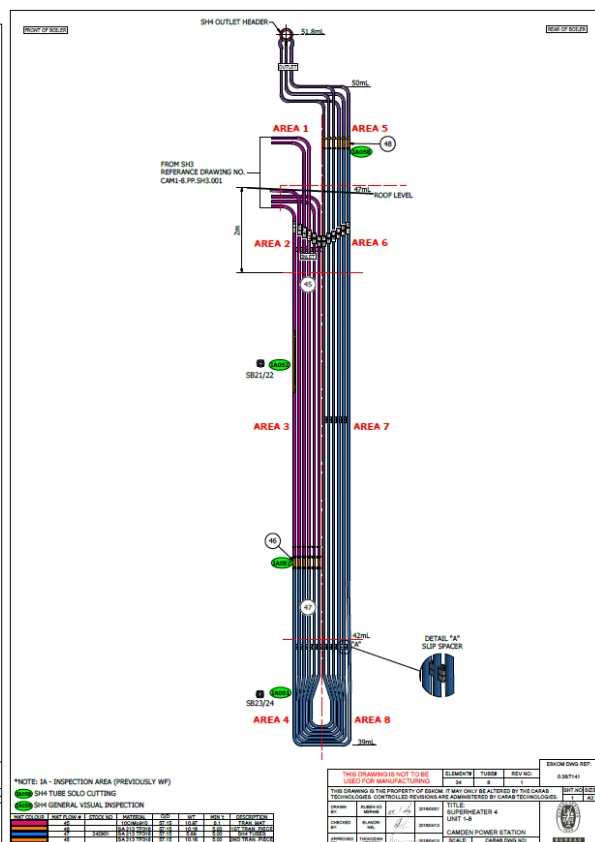
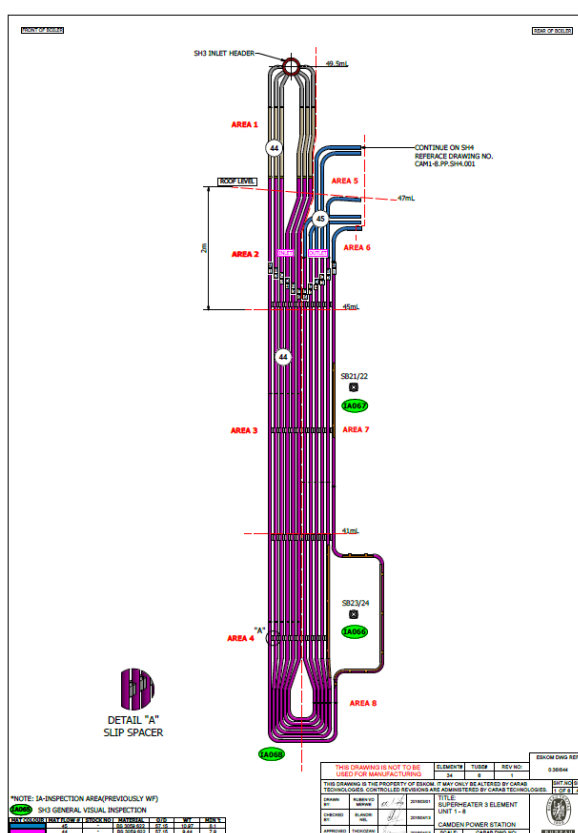
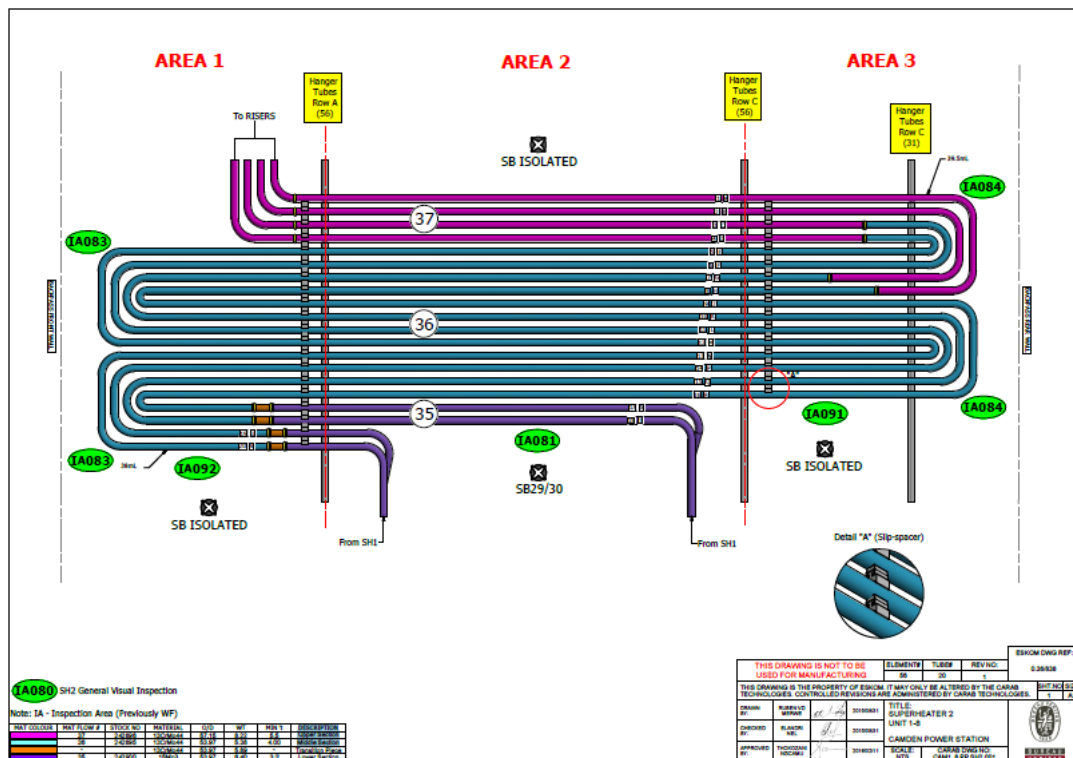


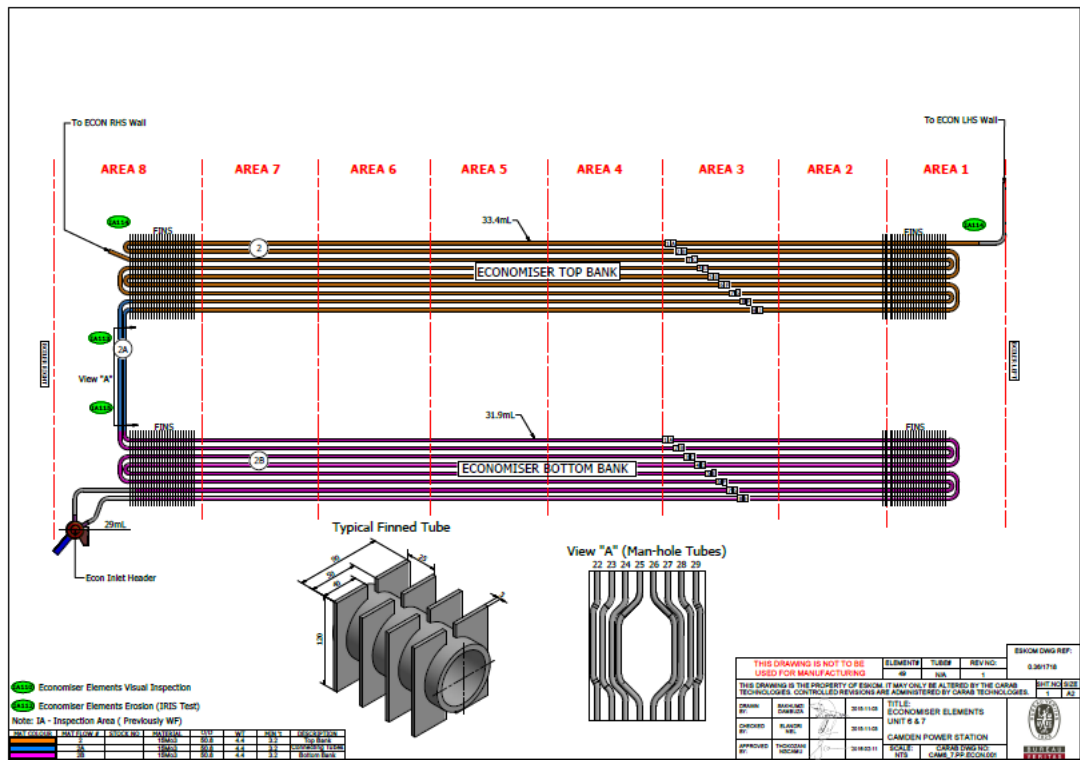
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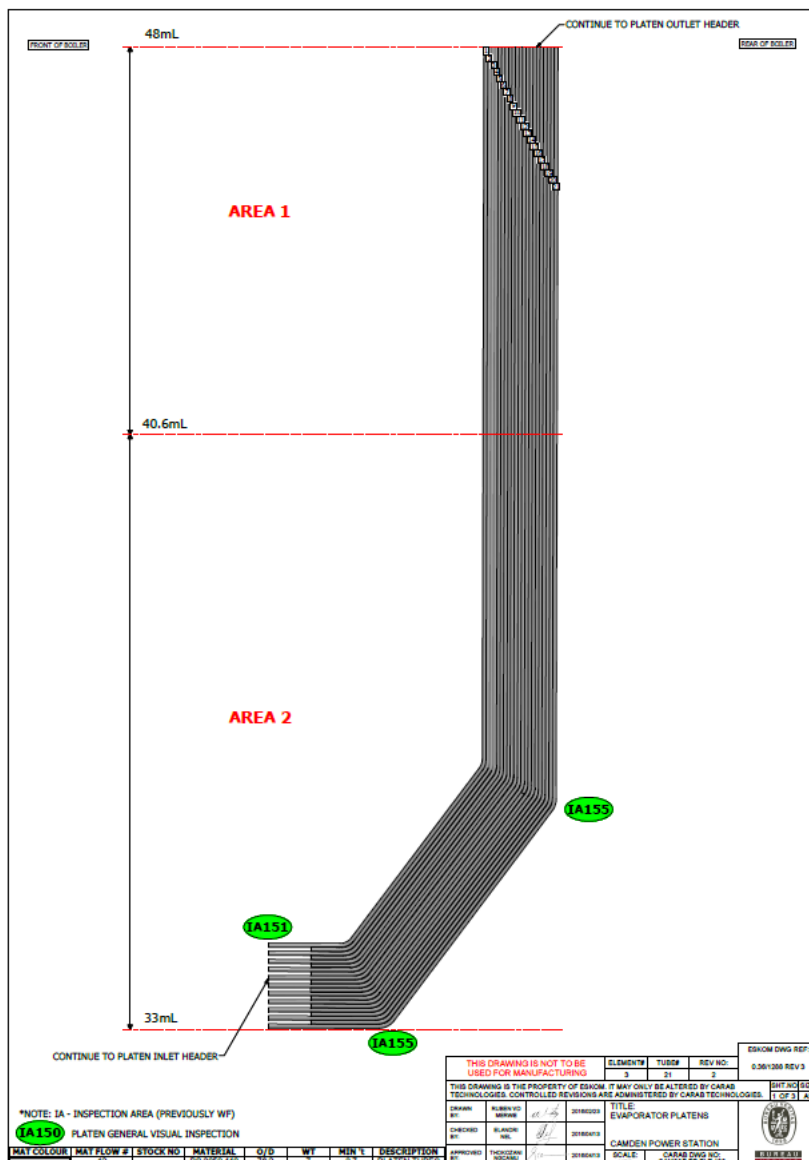
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## Thick Wall components Drawings

- Supporting documents

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