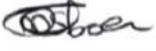


	<b>OUTAGE SCOPE OF WORK FORM/TEMPLATE</b>	Template Identifier	240-98982530 (Rev 2)
		Doc Identifier	14593
		Doc Revision	1
		Effective Date	16 February 2021
		Eskom	Page 1 of 31

<b>Matla Power Station Outage Scope of Work</b>	Reference No.	MEB-054694
	Revision:	1
	Unit No.	Generic GO
	Genix ID.	Generic GO
	Date:	NA

Outage Type:	GO	Outage Start Date:	Generic
Department:	Boiler Engineering	Plant Area:	PF Piping
Scope Review Date:	NA	Discipline:	Mechanical

Details	COMPILATION: System Engineer	APPROVAL: Line Manager	APPROVAL: Maintenance	APPROVAL: Engineering Specialist	APPROVAL Engineering Manager
Name & Surname	Abrie Preller		N Mzobe	Abrie Preller	Ettienne van Zyl
Signature					
Date	2021/09/14	15/09/2021	2021/09/28	2021/09/14	2021/09/22

Details	REVIEW: Quality Representative	REVIEW: Environmental Representative	REVIEW: AIA	ACCEPTANCE: Outage Coordinator	ACCEPTANCE: Outage Manager
Name & Surname	Dorah Mkhonto	S Ramaboea	NA		
Signature					
Date	2021/10/05	28.09.2021			

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<b>SCOPE COMPILATION REFERENCES</b>				
<b>SOURCE &amp; Ref No.</b>	<b>Yes</b>	<b>No</b>	<b>N/A</b>	<b>Comments</b>
Previous Outage Service Reports	X			
Return To Service Data Packages	X			
Maintenance Strategy With Rev Number	X			
SAP Defects (Attach List As Appendix)	X			
GHRMS (STEP) Reports (Generation Heat Rate Management System)		X		
Online Condition Monitoring	X			
Pre-Outage Performance Test Results	X			
Post Outage Performance Test Results		X		
GPSS/ Plant Performance Data On UCLF Incurred	X			
OMS / IIRMS Recommendations (Audits Reports)		X		
Risk Controls (IRM System)		X		
Previous Audits And Reviews (E.G. ERAP)		X		
Engineering Change Requests (Projects)				
LOPP Strategy Reports	X			
URS		X		
Philosophy (Outage)		X		
Condition Monitoring Report	X			
VA/PHD Viewer Trends		X		
Corrective Actions		X		
CARAB Reports		X		
Statutory Requirements		X		
Grid Code Requirements		X		
Waivers And Exemptions		X		
Calibration Requirements	X			
Previous Outage SOW Variations		X		
Post-mortems Actions From Previous Outages		X		
Pre-Outage Plant Walks	X			
Risk Based Inspection (RBI) Report		X		
Simulation, TOI's, OON, SI	X			
SOW Reviewed And Challenged Within Engineering By All Engineering Functions (Attach Proof, E, G Attendance Register Or Review Form)		X		

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## **1. GOAL**

This Scope of Work prepares the unit to achieve the performance targets as set by Matla Power Station with respect to the plant system performance.

## **2. OJECTIVES**

### **2.1 TECHNICAL CRITERIA**

- Zero forced shut down for rework after the mill outage.
- Zero mill trips because of outage poor workmanship.

### **2.2 SCOPE VARIATIONS**

- NA

### **2.3 FINANCIAL PERFORMANCE**

- NA

### **2.4 TIME MANAGEMENT**

- Spare availability can cause major delays when executing the SoW. All spares required for execution to be audited a month before outage and detailed SoW submitted to Maintenance.

## **3. SUMMARY OF THE SCOPE:**

### **3.1 HIGH LEVEL SUMMARY MILLING PLANT PF PIPES:**

This scope only pertains to the PF pipes which include the PF isolating damper, production pipes, orifices, splitter boxes, spool pieces, bends and straights.

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#### 4. BATTERY LIMITS

PLANT	START	END	EXCLUSIONS	INCLUSIONS	P&ID DRAWINGS
Milling Plant	Bunker outlet	Burner bent	C&I Instrumentation	Feeders, Chutes, Mills, PF pipes	0.47-2174/7/8/9

#### 5. GENERAL ARRANGEMENT AND LOCATION DRAWINGS

No	DRAWING NUMBER	TITLE
1	0.47-21745/6/7/8/9	Mill and PF piping arrangement drawings

#### 6. APPLICABLE GUIDELINES AND STANDARDS

No	REFERENCE NUMBER	DOCUMENT TITLE
1	240-115052916	Thermal Efficiency based Internal Inspection of Vertical Spindle Mills
2	240-76440331	Pulverised Fuel Sample Collection and Size Grading Standard
3	240-56063919	Mill Reducer Gearbox Maintenance Guideline
4	240-56239143	Ceramic Lined Pulverised Fuel Pipework Standard

#### 7. APPLICABLE MATLA POWER STATION STANDARDS AND PROCEDURES

No	REFERENCE NUMBER	DOCUMENT TITLE
1.	2107	Load-line test mills A to F
2.	2855	Mill clean air test
3.	3301	12.E Mill rotating throat version 4 installation
4.	3508	Mill loading and load changes (including trip conditions)
5.	4196	12.9E mill lower and upper grinding ring ultrasonic thickness measurement
6.	4332	Routine mill pulverised fuel sampling
7.	4333	Mill pneumatic bag cylinder loading system pressure adjustment, leak testing and nitrogen bottle replacement
8.	4349	Mill gearbox installation and motor alignment
9.	4366	Unblocking a mill pulverised fuel production pipe
10.	4367	Mill coal feeder clip joint belt installation
11.	4455	Mill Drive gearbox and motor shaft alignment
12.	4637	Setting of variable speed drive (VSD) for mill feeders units 1-6
13.	4683	Vertical spindle mill internal inspection and recommendations
14.	4763	Purging of choking mill
15.	8234	Matla Power Station System Cold Commissioning Control Sheet Mill Commissioning
16.	3410	Standard isolation for mill and pulverised fuel piping internal inspection
17.	2266	mill leak repair

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No	REFERENCE NUMBER	DOCUMENT TITLE
18.	3767	David brown mill drive gearbox oil change
19.	2803	Mill drive gearbox commissioning
20.	4419	Mill Reject Removal
21.	10301R	Matla Power Station Boiler - Mill Prestart Check Sheet
22.	3386	Guideline to follow to unblock mill feeder - clear coal hang up
23.	3409	Emptying coal bunkers via coal feeder

## 8. GENERAL CONSIDERATIONS

8.1 PRE-REQUISITES / PRE-CONDITIONS	
ACTIVITIES	SPECIFICATIONS
Data books, reviews, reports and diagrams / drawings shall be submitted to Engineering 21 days after the completion of the work. Engineering to forward all data books to the Quality Department (Documentation Control).	WI 4418
All QCP's to be submitted to Engineering and Quality for approval prior to the outage / project commencement.	

8.2 SAFETY	
ACTIVITIES	SPECIFICATIONS
All work is to be done in accordance with Matla Plant Procedures and Safety Regulations.	GGR 0992
Matla Power Station induction must be done before any work commences.	
A permit to work must be in place before any work commences.	
The worker's register must be completed and daily risk assessments conducted before any work commences.	

8.3 ENVIRONMENT	
ACTIVITIES	SPECIFICATIONS
All activities listed in the National Environmental Act 107 of 1998, EIA Regulations as amended, must have environmental <b>AUTHORIZATION</b> before the work can commence.	
The contractor shall comply with all applicable legal and other requirements.	
The polluter pays principle shall be applied.	
The contractor's manager shall ensure compliance to Eskom Matla Environmental Procedures to ensure the prevention of pollution.	OMOP 4090 and OMOP 4402
The last payment will be processed based on the status of the last housekeeping check sheet of the designated work area	OMOP 4402
EMS File based on ISO 14001 will be required.	

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<b>8.4 QUALITY</b>	
<b>ACTIVITIES</b>	<b>SPECIFICATIONS</b>
<p><b>Process Quality Process/Procedure (PQP/QCP)</b>                      The Contractor / Executioner of the work will be responsible for drawing up all QCP documentation, which must be approved by Engineering and Authorized by the Quality Department prior to commencing with the work.</p>	
<p><b>Hold and witness points</b>                      H&amp;W points that form part of the QCP and have been approved prior to the start date, shall not be by-passed under any circumstances without the written concession of an authorised member of the Engineering Department. It is the Contractors responsibility to inform the Plant Engineer or his representative at the daily progress meetings when an activity will be ready for QC.</p>	
<p>The Contractor / Executioner shall adhere to QM58 and OMOP4497 requirements</p>	QM58 and OMOP4497
<p>The number of NCR's issued can affect your next tendering process.</p>	
<p>The QCP shall be signed progressively by the Engineer / Supervisor, Eskom QC Inspector, Contractor QC Inspector and/or AIA.</p>	
<p>No procuring of outage items without the approval of Scopes of Work by the Quality Department.</p>	
<p>All outage scope creep and scope addition shall be approved by the Quality Department.</p>	
<p>No Contractor shall be in the possession of Scopes of Work for execution, without prior approval as indicated on the cover page of this document template.</p>	
<p>The contractor is subjected to quality auditing at any point in time during the execution of the Scope of Work.</p>	

<b>8.5 OTHER REQUIREMENTS</b>	
<b>ACTIVITIES</b>	<b>SPECIFICATIONS</b>
<p>The importance of correct equipment spares and procedures should be included in structured toolbox talk sessions with all contractors.</p>	

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<b>8.5 OTHER REQUIREMENTS</b>	
<b>ACTIVITIES</b>	<b>SPECIFICATIONS</b>
<p><b>Spares</b>                      All the spares required will be ordered in time. Spares ordered and used will be reported by always quoting the ESKOM stock number (if applicable) as well as the Group and item number from the spares manuals.</p>	
<p><b>Documentation</b>                      Full-service reports must be compiled and submitted to both Engineering and the Matla documentation centre for safe keeping and approval 21 days after unit is synchronised on load</p>	WI 4418
<p><b>Equipment</b>                      Lifting equipment: An up to date test certificate will be available for all lifting equipment that will be used.                      Measuring equipment: An up to date calibration certificate must be available for all measuring equipment that will be used.                      Special tools will be serviced before the outage, will be available on site and will be on good working condition. A list if all special tools must be compiled before the outage and submitted to Engineering. The special tools must be readily available for inspection by QC and Engineering.</p>	
<p><b>Use of SAP PM to record history and costs</b>                      SAP PM will be used to record history of work done and the related costs to at least the second level of headings as listed in this document.</p>	

<b>8.6 EXISTING DEFECTS</b>	
<b>ACTIVITIES</b>	<b>SPECIFICATIONS</b>
A list of all defects loaded before the submission of this SOW should be attached in Section 10.	

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**9. DETAILED BASELINE SCOPE OF WORK:**

**9.1 DECOMMISSIONING AND PRESERVATION SCOPE OF WORK**

SCOPE:		DECOMMISSIONING AND PRESERVATION					
SUBSYSTEM:		9.1.1 Milling Plant					
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
No	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST / REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
1	XHFCXBR000	PF Pipe System	Inspect	Mark all temporary and overlay patches on PF pipes on an Auditable drawing for repair planning purposes.	Mill Contractor	0.47-2174/7/8/9	W

**9.2 SCAFFOLDING, LAGGING & CLADDING SCOPE OF WORK**

SCOPE:		SCAFFOLDING, LAGGING & CLADDING					
SUBSYSTEM:		9.2.1 Milling Plant					
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
No	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST / REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
1	XHFCXBR000	PF Production Pipe	Inspect	Erect scaffolding in mill B, C, D & E mill Vertical production pipe to splitter boxes.	Scaffolding Contractor	0.47-2174/5/6	H

**9.3 FUNCTIONAL INSPECTION AND TESTING SCOPE OF WORK**

SCOPE:		STATUTORY INSPECTION AND TESTING					
SUBSYSTEM:		9.3.1 Milling Plant					
COMPONENT ACTIVITIES						GOVERNING DOCUMENTS	
No	COMPONENT FLOC (AKZ / KKS)	COMPONENT DESCRIPTION	ACTIVITY TYPE (INSPECT / TEST / REFURBISH / REPLACE)	DETAILED ACTIVITY DESCRIPTION	RESPONSIBLE PARTY	WORK SPEC & CHECK SHEET NO.	INTERVENTION POINTS (H/W/R)
2	10HFB00	PF pipes	Inspect	Internal PF piping inspections	Engineering	OMOP 4683	W

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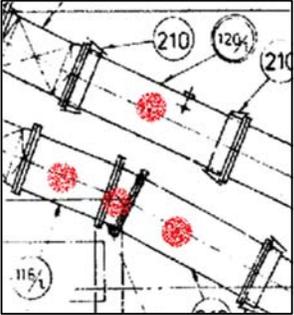
**9.4 REPLACEMENT AND REFURBISHMENT SCOPE OF WORK - GO**

SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
<b>Mill - PF Pipe SOW</b>				
<b>1.) Preparation</b>				
1.	Conduct the required Work Risk Assessment.			Tile-Contractor
2.	All the horizontal piping (1335 & 946) after the PF isolating damper/s needs to be cleaned internally of all debris and PF.		Witness	Tile-Contractor
<b>2.) General</b>				
3.	<b>Weld-on tiles needs to be fixed with welded studs as per their intended design.</b>			Tile-Contractor
<b>3.) Mill A</b>				
4.	All sections of piping (946 horizontals) that are chrome casted or epoxied needs to be cleaned and wire mesh removed. Prepare piping surfaces for tiling.	0.47-21747	Witness	Tile-Contractor

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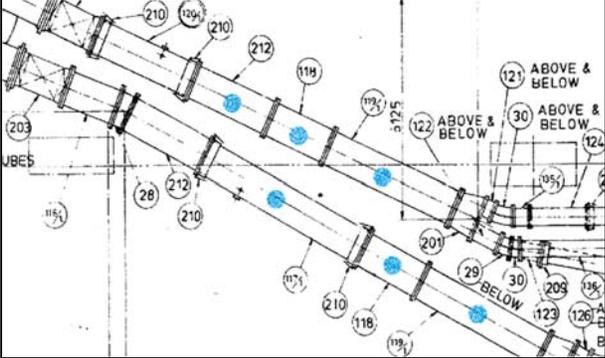
Matla Outage Scope of Work Reference No. [MEB-054694](#)  
 Unit and Plant Area: [PF Piping Milling Plant](#)  
 Outage Genix ID: [Generic GO](#)

Unique Identifier: **14593**  
 Revision: **1**  
 Page: **11 of 31**

SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
5.	<p>Pipes (946 horizontal) 116, R28, 212, 120 directly after the two PF isolating dampers needs to be fully tiled (staggered) with 12mm weld-on tiles.</p> 	<p>WO1(150x100x12)-161913            RTV 160096</p>	<p>Witness</p>	<p>Tile-Contractor</p>

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SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
6.	<p>Pipes (946 horizontal) 117,118,119 and 212 to be tiled on the bottom to a height of 570mm. Tiles need to be staggered. Edges of all tiling sections need to be in a straight line achieved by means of smaller fill-in tiles. All discontinuities and steps to be smoothed with wear resistant beaded epoxy and the tiling sections edged/framed with 6mm finger tiles.</p> 	<p>WO1(150x100x12)-161913                      P25(150x25x6)-247240                      RTV 160096                      Ceramic beaded epoxy - 160224</p>	Witness	Tile-Contractor
7.	The pipe orifices need to be wear protected by means of tiling (drawing in Appendix A).	<p>WO1(150x100x12)-161913                      P25(150x25x6)-247240                      RTV 160096                      Ceramic beaded epoxy - 160224</p>	Witness	Tile-Contractor
8.	Horizontal pipes joints need to be dressed as per Appendix B.	Appendix B	Witness	Tile-Contractor
9.	Remove all spool pieces, bends and straights (121, 122, 126, 127, 29, 30, 31, 135, 123, 124, 128, 136) for internal inspection, repair, tiling and/or replacement.	0.47-21747	Report	Tile-Contractor
10.	All removed (121, 122, 126, 127, 29, 30, 31, 135, 123, 124, 128, 136) splitter box pipes that have been repaired needs to be tiled as per drawing 0.47/59211 with either 92% 150x47/45x12 or 92% 150x47/43x25 tiles depending on the repaired pipe ID.	Spool pieces - BOM	Hold	Tile-Contractor

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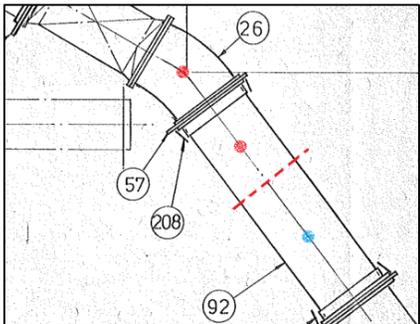
Matla Outage Scope of Work Reference No. [MEB-054694](#)  
 Unit and Plant Area: [PF Piping Milling Plant](#)  
 Outage Genix ID: [Generic GO](#)

Unique Identifier: **14593**  
 Revision: **1**  
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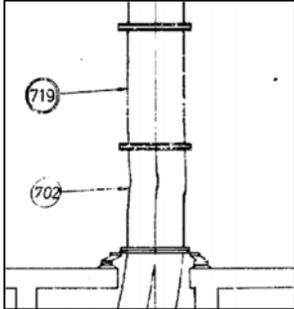
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SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
11.	Inspect both 4-way splitter boxes.	4-way - 592708	Hold	Tile-Contractor
12.	Missing or worn tiles in splitter box that cannot be repaired by tiling needs to be replaced by cleaning the surface and welding tiling studs (or similar) to casing and using wear resistant epoxy with alumina beads to fill the missing tile areas.	0.47-46937 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
13.	Build-up the nose cone with a layer of epoxy taking care to fill worn-out tile grout between the tiles. If the splitter box ceramic nose cone is worn down to the inner cement layer, the remaining nose cone tiles removed and a new section of nose cone welded in and tiled and capped with a new ceramic nose cone.	0.47-46937 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
<b>4.) Mill B</b>				
14.	All sections of piping (26 & 92) that are chrome casted or epoxied needs to be cleaned and wire mesh removed. Prepare piping surfaces for tiling.	0.47-21748	Witness	Tile-Contractor

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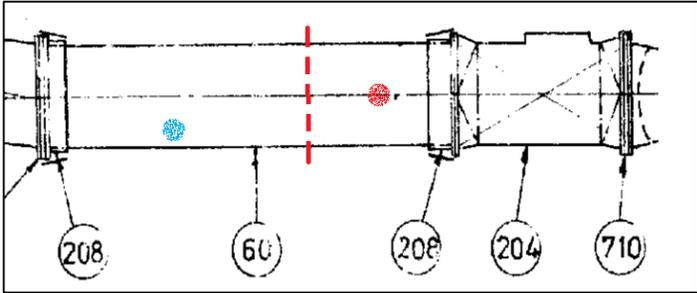
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SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
15.	<p>Pipe (1335 horizontal) 26 directly after the two PF isolating dampers needs to be fully tiled with 12mm weld-on tiles and pipe 92 needs to be fully tiled 2.5m from pipe 26. The rest of pipe 92 can be tiled halfway to a height of 800mm. Tiles need to be staggered. Edges of all tiling sections need to be in a straight line. All discontinuities and steps to be smoothed with wear resistant beaded epoxy and the tiling sections All discontinuities and steps to be smoothed with wear resistant beaded epoxy and the tiling sections edged/framed with 6mm finger tiles.</p> 	<p>WO1(150x100x12)-161913                      P25(150x25x6)-247240                      RTV 160096                      Ceramic beaded epoxy - 160224</p>	Witness	Tile-Contractor
16.	<p>If the R1 bend is wear protected with Chromecast, the wear protection should be maintained by plastering worn out sections back to 18-25mm thickness and ensure the entire bend is smoothed and level with chrome cast. If large sections of Chromecast collapsed, it should be removed and the pipe prepped for tiling with 12mm weld-on tiles.</p>	<p>WO1(150x100x12)-161913                      RTV 160096                      Chromecast-114795</p>	Witness	Tile-Contractor
17.	<p>The pipe orifices need to be wear protected by means of tiling.</p>	<p>WO1(150x100x12)-161913                      P25(150x25x6)-247240                      RTV 160096                      Ceramic beaded epoxy - 160224</p>	Witness	Tile-Contractor
18.	<p>Horizontal pipes joints need to be dressed as per Appendix B.</p>	Appendix B	Witness	Tile-Contractor

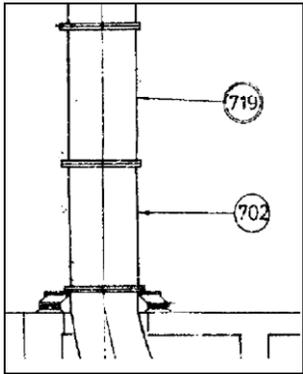
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SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
19.	The vertical 1335mm pipes (702 and 719) needs to be wear protected with 12mm weld-on alumina tiles (100% of circumference). 	0.47-21745Rev2 WO1(150x100x12)-161913 P25(150x25x6)-247240 RTV 160096 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
20.	Inspect all 8 spool pieces (78, 74, 70, 69) internally from inside the 8-way splitter boxes. Note worn and holed sections, missing tiles, worn grout between tiles and epoxy used during previous outages.	0.47-21745Rev2	Report	Tile-Contractor
21.	Remove all spool pieces from splitter box with noted defects as per above inspection and repairs. Badly worn spool pieces and straights can be replaced with stock items.	Spool pieces - BOM 0.47/59212	Hold	Tile-Contractor
22.	All repaired spool pieces (as above SOW) to be tiled as per drawing 0.47/59212 with either 92% 150x47/45x12 or 92% 150x47/43x25 tiles depending on the repaired pipe ID.	92% 150x47/45x12 92% 150x47/43x25 RTV 160096 0.47/59212	Hold	Tile-Contractor
23.	Inspect 8-way splitter boxes.	8-way - 0592702	Hold	Tile-Contractor
24.	Missing or worn splitter box tiles that cannot be repaired by tiling needs to be replaced by cleaning the surface and welding tiling studs (or similar) to casing and using wear resistant epoxy with alumina beads to fill the missing tile areas.	0.47-46938 92% 25mm tiles Ceramic beaded epoxy - 160224	Witness	Tile-Contractor

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SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
25.	Build-up the nose cone with a layer of epoxy taking care to fill worn-out tile grout between the tiles. If the splitter box ceramic nose cone is worn down to the inner cement layer, the remaining nose cone tiles removed and a new section of nose cone welded in and tiled and capped with a new ceramic nose cone.	0.47-46938 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
<b>5.) Mill C</b>				
26.	All sections of piping (60) that are chrome casted or epoxied needs to be cleaned and wire mesh removed. Prepare piping surfaces for tiling.	0.47-21746	Witness	Tile-Contractor
27.	<p>Pipe (1335 horizontal) 60 directly after the two PF isolating dampers needs to be fully tiled with 12mm weld-on tiles 2.5m from the PF isolating damper. The rest of pipe 60 can be tiled halfway to a height of 800mm. Tiles need to be staggered and the edges of all tiling sections need to be in a straight line. All discontinuities and steps to be smoothed with wear resistant beaded epoxy and the tiling sections edged/framed with 6mm finger tiles.</p> 	WO1(150x100x12)-161913 P25(150x25x6)-247240 RTV 160096 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
28.	If the R1 bend is wear protected with Chromecast, the wear protection should be maintained by plastering worn out sections back to 18-25mm thickness and ensure the entire bend is smoothed and level with chrome cast. If large sections of Chromecast collapsed, it should be removed and the pipe prepped for tiling with 12mm weld-on tiles.	WO1(150x100x12)-161913 RTV 160096 Chromecast-114795	Witness	Tile-Contractor

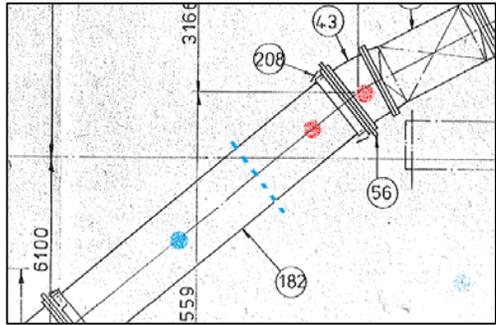
**PUBLIC**

SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
29.	The pipe orifices need to be wear protected by means of tiling.	WO1(150x100x12)-161913 P25(150x25x6)-247240 RTV 160096 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
30.	Horizontal pipes joints need to be dressed as per Appendix B.	Appendix B	Witness	Tile-Contractor
31.	The vertical 1335mm pipes (702 and 719) needs to be wear protected with 12mm weld-on alumina tiles (100% of circumference) staggered. 	0.47-21745Rev2 WO1(150x100x12)-161913 P25(150x25x6)-247240 RTV 160096 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
32.	Inspect all 8 spool pieces (78, 74, 70, 69) internally from inside the 8-way splitter boxes. Note worn and holed sections, missing tiles, worn grout between tiles and epoxy used during previous outages.	0.47-21745Rev2	Report	Tile-Contractor
33.	Remove all spool pieces from splitter box with noted defects as per above inspection and repairs. Badly worn spool pieces and straights can be replaced with tiled stock item pipes.	Spool pieces - BOM 0.47/59212	Hold	Tile-Contractor
34.	All repaired spool pieces (as above SOW) to be tiled as per drawing 0.47/59212 with either 92% 150x47/45x12 or 92% 150x47/43x25 tiles depending on the repaired pipe ID.	92% 150x47/45x12 92% 150x47/43x25	Hold	Tile-Contractor

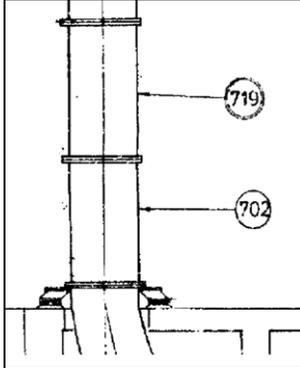
**PUBLIC**

SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
		RTV 160096 0.47/59212		
35.	Inspect 8-way splitter boxes.	8-way - 0592702	Hold	Tile-Contractor
36.	Missing or worn splitter box tiles that cannot be repaired by tiling needs to be replaced by cleaning the surface and welding tiling studs (or similar) to casing and using wear resistant epoxy with alumina beads to fill the missing tile areas.	0.47-46938 92% 25mm tiles Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
37.	Build-up the nose cone with a layer of epoxy taking care to fill worn-out tile grout between the tiles. If the splitter box ceramic nose cone is worn down to the inner cement layer, the remaining nose cone tiles removed and a new section of nose cone welded in and tiled and capped with a new ceramic nose cone.	0.47-46938 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
<b>5.) Mill D</b>				
38.	All sections of piping (43, 182) that are chrome casted or epoxied needs to be cleaned and wire mesh removed. Prepare piping surfaces for tiling.	0.47-21748	Witness	Tile-Contractor

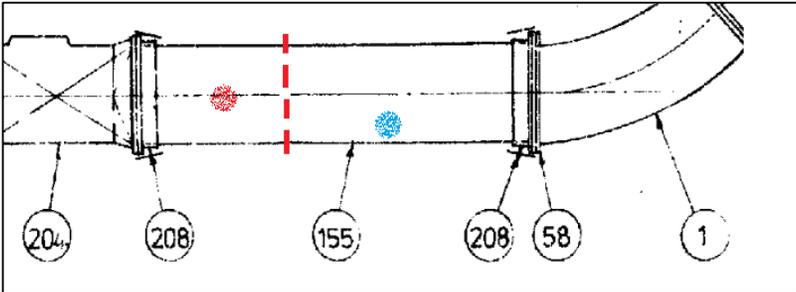
**PUBLIC**

SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
39.	<p>Pipe (1335 horizontal) 43 directly after the two PF isolating dampers needs to be fully tiled with 12mm weld-on tiles and pipe 182 needs to be fully tiled 2.5m from pipe 43. The rest of pipe 182 can be tiled halfway to a height of 800mm. Tiles need to be staggered and the edges of all tiling sections need to be in a straight line. All discontinuities and steps to be smoothed with wear resistant beaded epoxy and the tiling sections edged/framed with 6mm finger tiles.</p> 	<p>WO1(150x100x12)-161913                      P25(150x25x6)-247240                      RTV 160096                      Ceramic beaded epoxy - 160224</p>	Witness	Tile-Contractor
40.	<p>If the R1 bend is wear protected with Chromecast, the wear protection should be maintained by plastering worn out sections back to 18-25mm thickness and ensure the entire bend is smoothed and level with chrome cast. If large sections of Chromecast collapsed, it should be removed and the pipe prepped for tiling with 12mm weld-on tiles.</p>	<p>WO1(150x100x12)-161913                      RTV 160096                      Chromecast-114795</p>	Witness	Tile-Contractor
41.	<p>The pipe orifices need to be wear protected by means of tiling.</p>	<p>WO1(150x100x12)-161913                      P25(150x25x6)-247240                      RTV 160096                      Ceramic beaded epoxy - 160224</p>	Witness	Tile-Contractor
42.	<p>Horizontal pipes joints need to be dressed as per Appendix B.</p>	Appendix B	Witness	Tile-Contractor

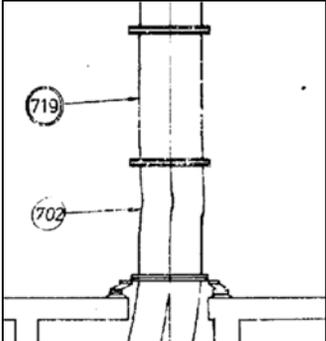
**PUBLIC**

SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
43.	<p>The vertical 1335mm pipes (702 and 719) needs to be wear protected with 12mm weld-on alumina tiles (100% of circumference) staggered.</p> 	<p>0.47-21745Rev2                      WO1(150x100x12)-161913                      P25(150x25x6)-247240                      RTV 160096                      Ceramic beaded epoxy - 160224</p>	Witness	Tile-Contractor
44.	Inspect all 8 spool pieces (78, 205, 206, 207) internally from inside the 8-way splitter boxes. Note worn and holed sections, missing tiles, worn grout between tiles and epoxy used during previous outages.	0.47-21745Rev2	Report	Tile-Contractor
45.	Remove all spool pieces from splitter box with noted defects as per above inspection and repairs. Badly worn spool pieces and straights can be replaced with tiled stock item pipes.	Spool pieces - BOM 0.47/59212	Hold	Tile-Contractor
46.	All repaired spool pieces (as above SOW) to be tiled as per drawing 0.47/59212 with either 92% 150x47/45x12 or 92% 150x47/43x25 tiles depending on the repaired pipe ID.	92% 150x47/45x12 92% 150x47/43x25 RTV 160096 0.47/59212	Hold	Tile-Contractor
47.	Inspect 8-way splitter boxes.	8-way - 0592702	Hold	Tile-Contractor

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SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
48.	Missing or worn splitter box tiles that cannot be repaired by tiling needs to be replaced by cleaning the surface and welding tiling studs (or similar) to casing and using wear resistant epoxy with alumina beads to fill the missing tile areas.	0.47-46938 92% 25mm tiles Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
49.	Build-up the nose cone with a layer of epoxy taking care to fill worn-out tile grout between the tiles. If the splitter box ceramic nose cone is worn down to the inner cement layer, the remaining nose cone tiles removed and a new section of nose cone welded in and tiled and capped with a new ceramic nose cone.	0.47-46938 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
<b>6.) Mill E</b>				
50.	All sections of piping (155) that are chrome casted or epoxied needs to be cleaned and wire mesh removed. Prepare piping surfaces for tiling.	0.47-21746	Witness	Tile-Contractor
51.	<p>Pipe (1335 horizontal) 155 directly after the two PF isolating dampers needs to be fully tiled with 12mm weld-on tiles 2.5m from the PF isolating damper. The rest of pipe 155 can be tiled halfway to a height of 800mm. Tiles need to be staggered and the edges of all tiling sections need to be in a straight line. All discontinuities and steps to be smoothed with wear resistant beaded epoxy and the tiling sections edged/framed with 6mm finger tiles.</p> 	WO1(150x100x12)-161913 P25(150x25x6)-247240 RTV 160096 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor

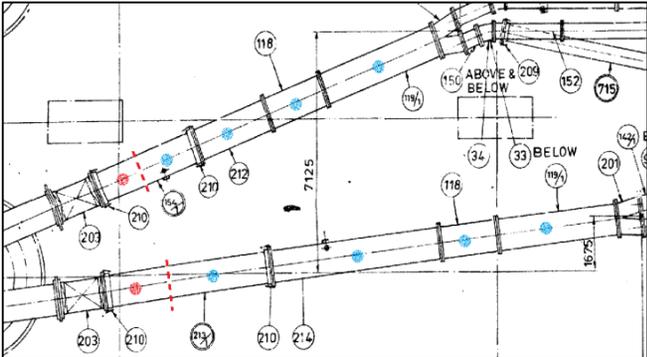
**PUBLIC**

SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
52.	If the R1 bend is wear protected with Chromecast, the wear protection should be maintained by plastering worn out sections back to 18-25mm thickness and ensure the entire bend is smoothed and level with chrome cast. If large sections of Chromecast collapsed, it should be removed and the pipe prepped for tiling with 12mm weld-on tiles.	WO1(150x100x12)-161913 RTV 160096 Chromecast-114795	Witness	Tile-Contractor
53.	The pipe orifices need to be repaired as per the drawing in Appendix A and wear protected by means of tiling.	WO1(150x100x12)-161913 P25(150x25x6)-247240 RTV 160096 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
54.	Horizontal pipes joints need to be dressed as per Appendix B.	Appendix B	Witness	Tile-Contractor
55.	The vertical 1335mm pipes (702 and 719) needs to be wear protected with 12mm weld-on alumina tiles (100% of leading circumference) staggered. 	0.47-21745Rev2 WO1(150x100x12)-161913 P25(150x25x6)-247240 RTV 160096 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
56.	Inspect all 8 spool pieces (78, 205, 206, 207) internally from inside the 8-way splitter boxes. Note worn and holed sections, missing tiles, worn grout between tiles and epoxy used during previous outages.	0.47-21745Rev2	Report	Tile-Contractor

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SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
57.	Remove all spool pieces from splitter box with noted defects as per above inspection and repairs. Badly worn spool pieces and straights can be replaced with tiled stock item pipes.	Spool pieces - BOM 0.47/59212	Hold	Tile-Contractor
58.	All repaired spool pieces (as above SOW) to be tiled as per drawing 0.47/59212 with either 92% 150x47/45x12 or 92% 150x47/43x25 tiles depending on the repaired pipe ID.	92% 150x47/45x12 92% 150x47/43x25 RTV 160096 0.47/59212	Hold	Tile-Contractor
59.	Inspect 8-way splitter boxes.	8-way - 0592702	Hold	Tile-Contractor
60.	Missing or worn splitter box tiles that cannot be repaired by tiling needs to be replaced by cleaning the surface and welding tiling studs (or similar) to casing and using wear resistant epoxy with alumina beads to fill the missing tile areas.	0.47-46938 92% 25mm tiles Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
61.	Build-up the nose cone with a layer of epoxy taking care to fill worn-out tile grout between the tiles. If the splitter box ceramic nose cone is worn down to the inner cement layer, the remaining nose cone tiles removed and a new section of nose cone welded in and tiled and capped with a new ceramic nose cone.	0.47-46938 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
<b>7.) Mill F</b>				
62.	All sections of piping (946 horizontals) that are chrome casted or epoxied needs to be cleaned and wire mesh removed. Prepare piping surfaces for tiling.	0.47-21749	Witness	Tile-Contractor

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SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
63.	<p>Pipes (946 horizontal) 154 &amp; 213 directly after the two PF isolating dampers need to be fully tiled with 12mm weld-on tiles to 2.5m from the PF isolating damper. The rest of 154 &amp; 213 pipes can be tiled halfway to a height of 570mm. Tiles need to be staggered and the edges of all tiling sections need to be in a straight line. All discontinuities and steps to be smoothed with wear resistant beaded epoxy and the tiling sections edged/framed with 6mm finger tiles.</p> 	WO1(150x100x12)-161913 RTV 160096	Witness	Tile-Contractor
64.	The pipe orifices need to be wear protected by means of tiling.	WO1(150x100x12)-161913 P25(150x25x6)-247240 RTV 160096 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
65.	Horizontal pipes joints need to be dressed as per Appendix B.	Appendix B	Witness	Tile-Contractor
66.	Remove all spool pieces, bends and straights (140, 139, 142, 147, 94, 150, 152, 34, 33, 209) from both the 4-way splitter boxes for internal inspection, repair, tiling and/or replacement	0.47-21749	Report	Tile-Contractor

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SCOPE:		REPLACEMENT AND REFURBISHMENT		
SUBSYSTEM:		9.4.1 Milling Plant		
COMPONENT ACTIVITIES			GOVERNING DOCUMENTS	
No	DETAILED ACTIVITY DESCRIPTION	WORK SPEC & CHECK SHEET NO.	HOLD, WITNESS, REPORTS	RESPONSIBLE PARTY
67.	All removed splitter box pipes that have been repaired needs to be tiled as per drawing 0.47/59211 with either 92% 150x47/45x12 or 92% 150x47/43x25 tiles depending on the repaired pipe ID. Turn all adjacent pipes 180 degrees.	Spool pieces - BOM	Hold	Tile-Contractor
68.	Inspect both 4-way splitter boxes.	4-way - 592708	Hold	Tile-Contractor
69.	Missing or worn tiles that cannot be repaired by tiling needs to be replaced by cleaning the surface and welding tiling studs (or similar) to casing and using wear resistant epoxy with alumina beads to fill the missing tile areas.	0.47-46937 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
70.	Build-up the nose cone with a layer of epoxy taking care to fill worn-out tile grout between the tiles. If the splitter box ceramic nose cone is worn down to the inner cement layer, the remaining nose cone tiles removed and a new section of nose cone welded in and tiled and caped with a new ceramic nose cone.	0.47-46937 Ceramic beaded epoxy - 160224	Witness	Tile-Contractor
<b>7.) Mill PF Isolating Damper</b>				
71.	Damper plate and body wear protection to be repaired with weld-on tiles.	0.47-46935 0.47-46936 WO1(150x100x12)-161913 RTV 160096	Witness	Tile-Contractor

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## 9.5 BUDGET BILLS OF MATERIAL

**NOTE: SOW OF WORK VARIATIONS WILL BE ISSUED ONLY IF REFURBISHMENT OR REPLACEMENT COMPONENTS EXCEED BUDGET, OTHERWISE CUTTING INSTRUCTIONS WILL BE USED TO COMMUNICATE WHICH COMPONENTS MUST BE REPAIRED, REPLACED OR REFURBISHED.**

BILL OF MATERIALS							
SUBSYSTEM:			9.5.1 Milling Plant				
No	Replace/Refurbish	COMPONENT DESCRIPTION	COMPONENT MATERIAL SPECIFICATION	OPERATING PARAMETERS	PART No.	STOCK No.	QUANTITY
1.	Replace	Weld-on Tiles WO1 (150x100x12)	>=92% Alumina			161913	20000 (300m <sup>2</sup> )
2.	Replace	Finger Tiles P25 (150x25x6)	>=92% Alumina			247240	6000 (23m <sup>2</sup> )
3.	Replace	Engineered Pipe Tile (150x47/43x25)	>=92% Alumina				3000 (20m <sup>2</sup> )
4.	Replace	Engineered Pipe Tile (150x47/45x12)	>=92% Alumina				2000 (14m <sup>2</sup> )
5.	Replace	High Temperature RTV Silicon		>300°C		160096	2500 (775L)
6.	Replace	Wear Resistant Ceramic Beaded Epoxy		>150°C		222700	100 (500kg)
7.	Replace	Cement Chrome Cast				114795	40 (800kg)
8.	Replace	Valomoid Gasket				210819	15m <sup>2</sup>
9.	Replace	490mm bore piping				In Stock	24 metres
10.	Replace	946mm bore piping				In Stock	12 metres
11.	Replace	1335mm bore piping				In Stock	6 metres
12.	Replace	PF pipe spool piece L2875				619827	1
13.	Replace	PF pipe spool piece L1944				619830	1
14.	Replace	PF pipe spool piece L2858				619828	1
15.	Replace	PF pipe spool piece L1961				619829	1
16.	Replace	PF pipe spool piece L1046				619831	1
17.	Replace	PF pipe spool piece L1029				619832	1

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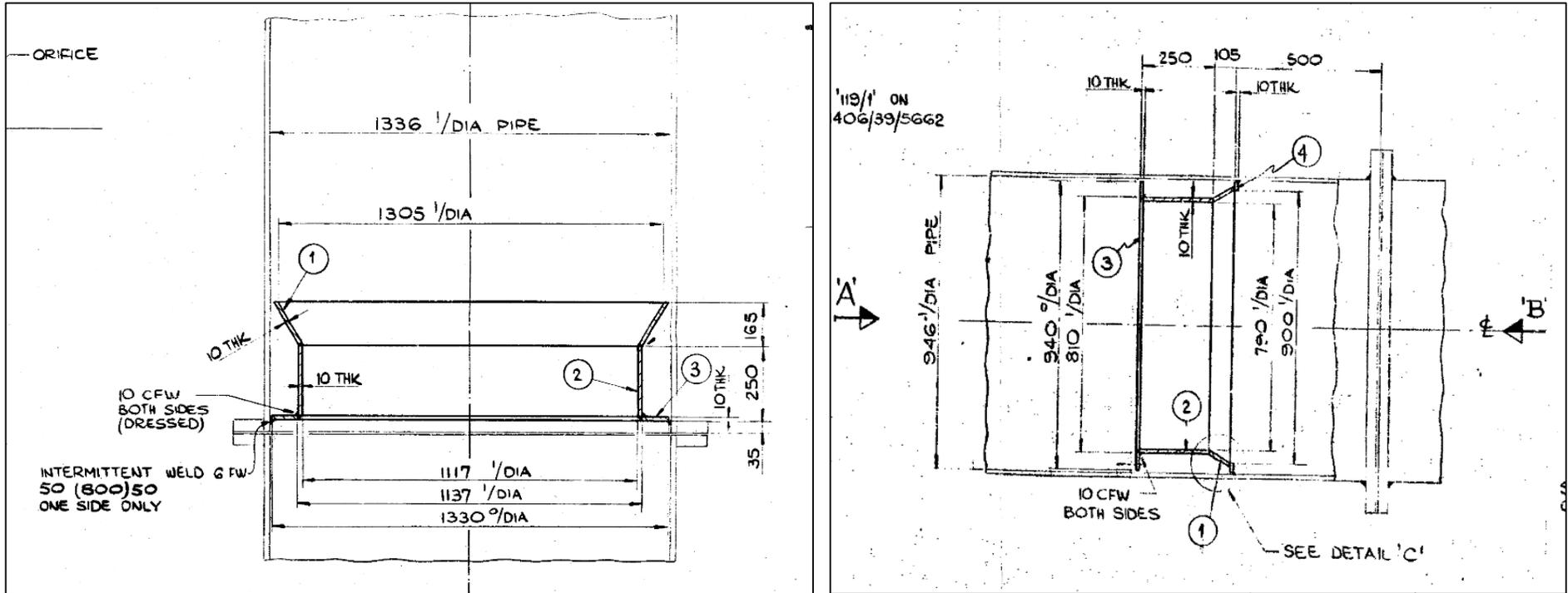
**BILL OF MATERIALS**

SUBSYSTEM:		9.5.1 Milling Plant					
No	Replace/ Refurbish	COMPONENT DESCRIPTION	COMPONENT MATERIAL SPECIFICATION	OPERATING PARAMETERS	PART No.	STOCK No.	QUANTITY
18.	Replace	PF pipe spool piece L323				619833	4
19.	Replace	PF pipe spool piece L1132				619834	1
20.	Replace	PF pipe spool piece L3719				619835	1
21.	Replace	PF pipe spool piece L1035				619836	1
22.	Replace	PF pipe spool piece L982				619837	1
23.	Replace	PF pipe spool piece L834				619838	4
24.	Replace	PF pipe spool piece L587				619839	4
25.	Replace	PF pipe spool piece L482				619840	4
26.	Replace	PF pipe spool piece L446				619841	4
27.	Replace	PF pipe spool piece L319				619842	4
28.	Replace	M20 x 100mm Bolts and Nuts				84601	100 off
29.	Replace	M20 x 75mm Bolts and Nuts.				84600	100 off
30.	Replace	M20 Flat Washers				87703	600 off
31.	Replace	M20 Spring Washers				87516	300 off

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**APPENDIX A- ORIFICE DIMENSIONS: 1335MM AND 946MM PIPES**

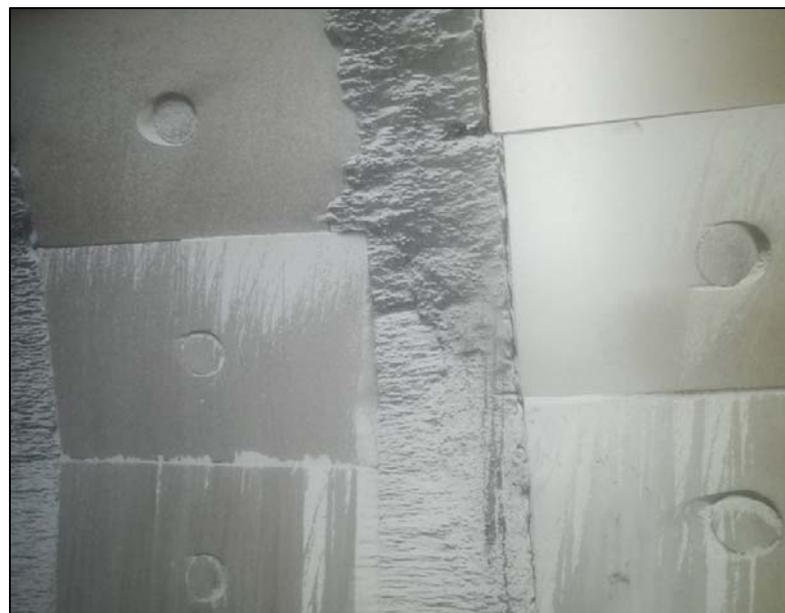


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## APPENDIX B – PIPE JOINTS



**A.)**



**B.)**

All joints need to be dressed with epoxy that overlaps the pipe joint to the adjacent pipe's tiles, taking care not to create unnecessary steps.

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## APPENDIX C – SPLITTERBOX NOSE CONES



A.)



B.)

Note worn out nose cones (A.) needs to be build up with wear resistant alumina beaded epoxy and M6 bolts or threaded studs and (B.) nose cones with worn out tiling cement needs to be rebuild by plastering wear resistant alumina beaded epoxy over the first 250mm of the cone.

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