	Scope of Work	Auxiliary Engineering Department
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Alternative Reference Number

Area of Applicability **Kendal Power Station**

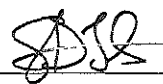
Functional Area **Engineering**

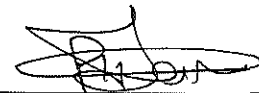
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## 1. Introduction

Compressed air receivers' isolation valves have been in operation for more than 30 years and have reached end of life. These valves are operated to achieve isolation of air flow to or from the Air receivers. There have been numerous unexpected valve failures, and this put the compressed air system at risk and non-compliance to the RBI scope. Majority of defective valves cannot be replaced or repaired while the system is in operation and will require shutting down production Units which is not possible due to production constraints. Compressed Air Plant is classified as level 1 plant according to Eskom standard 240-72273656. Level 1 plant can result in MUT, and it has a major impact on production costs should it fail.

### 1.1 Plant Operational Data

- System design and operating pressure **700 kPa**
- Systems design and operating temperature **10-30 degrees Celsius**
- The name of the material being welded **Schedule 40 Carbon Steel**
- Component being welded description **Pipe**
- Working medium in your system **Compressed Air**

## 2. Objectives

### 2.1 Technical criteria

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

### 2.2 Quality related aspects

#### 2.2.1 Documentation package

The contractor shall provide 1 hard copy of the two-hole punch printed pages documentation on a lever arch file or binder as well as 1 electronic copy saved both as an editable soft copy and as a PDF onto a memory stick in viewable final version which is easily transfer to a USB. Each section according to the index must be scanned separately. The documentation shall contain the following as a minimum

- Mechanical design drawings and calculations
- Welding requirements as stated in **2.3.4**.
- Wall thickness measurements taken on the pipes
- Completed execution QCPs
- Bill of materials with material specifications and relevant certificate copies
- Copies of all approved procedures and method statements
- Task specific risk assessment (contractor)

#### 2.2.2 Quality Control Plans

- The contractor shall exercise strict and adequate quality control during all phases of the work
- Any defects shall be reported to the system engineering and a technical notification with a proposed method to address the defect shall be submitted to the system engineer for

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approval

- The contractor shall compile a detailed QCP to be submitted for approval to the Eskom System Engineer before the work can be executed
- The QCP shall indicate relevant hold and witness points to be agreed upon by the Employer
- The QCPs must meet the technical requirements and include relevant inspections and tests to be done. The reference documentation and acceptance criteria should be included on the QCP
- The contractor shall prepare suitable QCPs and inspection and test plans (ITPs) for all work carried out
- The employer, the employer QC representative and the contractor shall review the QCPs and the ITPs jointly and the actual scope of quality control and inspection required for the contract agreed upon
- The QCPs/ITPs shall be subject to the Employer's approval and shall indicate all inspection and test points, the methods and procedures to be used and the acceptance criteria to be applied
- The Contractor is required to notify the Employer 24 hours in advance of witness and hold intervention points
- The programme to allow for QC activities and rework repairs
- Recovery plan must be provided by the contractor in the event of any repair work/re-work etc
- Surveillance Inspection by the Client can be done at any point during work. The client will have full power and authority to inspect the works at any time wherever in progress, either on the site or at the Contractor's premises where work in connection with the work carried out may be in hand or where the materials are being manufactured or are to be supplied
- This comprises of monitoring or making observations to verify whether or not materials/items or services conform to specified requirements. Surveillance activities may include audit inspections, testing witnesses, review of quality documentation & records, personnel qualifications etc
- Any scope deviation during the time of execution shall be approved in writing from the Eskom System Engineer via Project Manager

### 2.2.3 Commissioning, test, verify and hand-over

- Safety clearance certificates to be completed prior to commencing with commissioning activities
- Perform commissioning with Engineering, Maintenance and operating for acceptance. Complete final inspection with relevant engineering, operating and maintenance personnel
- The contractor shall compile a commissioning procedure to be submitted for acceptance to the Eskom System Engineer before the work can commence

### 2.2.4 Welding Requirements

- Eskom standard 240-106628253 (**Standard for Welding Requirements on Eskom Plant**) will be adhered to for all welding activities. The Contractor to perform welding activity must

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1. The Contractor shall ensure that all welding activities are carried out in accordance with the Eskom standard 240-106628253 (Standard for Welding Requirements on Eskom Plant) and the relevant technical specifications. The Contractor shall ensure that all welding activities are carried out in accordance with the Eskom standard 240-106628253 (Standard for Welding Requirements on Eskom Plant) and the relevant technical specifications.

be accredited to **ISO 3834**

- Eskom shall reserve the right to review a WPS and associated weld maps prior to commencement of fabrication using third party AIA
- The WPQR/PQR shall be approved by a registered IWE or IWT
- Minimum information to be submitted by contractor
  - I Welding Procedure Specification
  - II Welding Procedure Qualification Record
  - III Welder qualification record
  - IV Quality Control plan- detailed
  - V NDT personnel qualifications
  - VI NDT procedures to Eskom plant standard 240-8354008

### 3. Scope of Work

The purpose of this scope of work is to conduct line stopping on 2<sup>nd</sup> service air receiver (0 SCA 22 BB001) and 2<sup>nd</sup> control air receiver (0 0QFB20 BB001) to achieve isolation on each air receiver separately. The contractor shall provide a detailed methodology on how they are going to complete the work. Line stop will be conducted on 5 lines (highlighted in red), see figure 1 drawing 0,64/30473

#### 3.1.1 2<sup>nd</sup> Service Air Receiver

- Line-stop to be conducted on 150 NB line 0 0SCB 02 BR001 (outlet)
- Line-stop to be conducted on 150 NB line 0 SCA 22 BR001 (inlet)

#### 3.1.2 2<sup>nd</sup> Control Air Receiver

- Line-stop to be conducted on 150 NB line 0 0SCA 24 BR001 (Inlet)
- Line-stop to be conducted on 200 NB line 0 0QFB 20 BR015 (Outlet)
- Line-stop to be conducted on 80 NB line 0 0QFB 20 BR001 (Outlet)

#### 3.1.3 Applicability

- This document shall apply to Eskom Kendal Power station

#### 3.1.4 Effective Date

- Effective from issuing

### 3.2 Normative/Informative References

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

#### 3.2.1 Normative

- ISO 9001 Quality Management Systems
- Insert normative document references here

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- Occupational Health and Safety Act 85 of 1993
- ISO 14001 of 2004 Environmental management system
- 240-105929225 Compressed air standard

### 3.2.2 Informative

- Safety Health and Environment Specifications for Contractors - GVLIR 0007
- Construction, Safety, Health and Environment Management in Eskom - 32/136 Rev 0 - Information Security Policy - 32-85 Rev 0
- Integrated Business improvement – prevention and improvement Standard - 6-366 Rev 0

### 3.3 Definitions

Definition	Explanation
<b>Hot tapping</b>	The technique of attaching a mechanical or welded branch fitting to piping or equipment in service, and creating an opening in that piping or equipment by drilling or cutting a portion of the piping or equipment within the attached
<b>Hot work</b>	An operation that can produce heat from flame, spark, or other source of ignition with sufficient energy to ignite flammable vapors, gases, or dust Hot work includes such things as electric arc and gas welding, chipping, flaming, grinding, cutting, abrasive blasting, brazing and soldering Special procedures and permits are required when hot work is to be performed in certain areas (Appendix D of ANSI Z49 1 lists more than 90 welding and allied processes that can qualify as "hot work")
<b>Permit</b>	A written document authorizing a work activity and defining the conditions under which the work shall be conducted Normally signed by both the recipient and an issuing competent person with authority to allow the activity
<b>Personal Protective Equipment (PPE)</b>	Equipment (such as protective clothing, respiratory devices, protective shields or barriers) worn or used by individuals to protect eyes, face, head and extremities
<b>Line stopping</b>	Technique used to temporarily isolate a section of a pipeline, with mechanically inserted and activated stopple head, to undertake maintenance activity or repair works on downstream pipeline

### 3.4 Abbreviations

Abbreviation	Explanation
AIA	Approved Inspection Authority
IWE	International Welding Engineer
IWT	International Welding Technologist
NDT	Non-Destructive Testing
PWHT	Post Weld Heat Treatment
QA	Quality Assurance
QC	Quality Control
RP	Responsible Person

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WPQR	Welding Procedure Qualification Record
WPS	Welding Procedure Specification
WQR	Welder Qualification Record

### 3.5 Process for Monitoring

- The contractor to provide QCP prior to execution for approval
- The contractor shall supply a Project Plan with clear schedule taking into consideration that this work will be executed on the live production plant

### 3.6 Related/Supporting Documents

- Standard for Welding Requirements on Eskom Plant **240-106628253**.
- Eskom NDT Personnel Approval (NPA) for Quality Related Special Processes on Eskom Plant Standard **240-83539994**

### 3.7 Non-destructive Testing (NDT)

- Eskom Plant NDT 240-83540088 standard must be adhered to during NDT activities
- Prior to welding, the hot tap location shall be verified for thickness and checked for laminations and other defects using ultrasonic examination methods
- After completion of welding, the final weld shall be visually examined and subjected to magnetic particle or dye penetrant examination
- All Hot Tap connections will be subjected to a pressure test prior to the cutting out of the coupon
- Hot tap connections to be redox painted to prevent corrosion

### 3.8 Skills required

- Registered Professional Engineer, IWE or IWT, pipe fitter, certified welder, cutter, supervisor and all other necessary skills not mentioned which might be required to make to the works complete successfully
- The contractor shall submit certificates of personnel performing special activities (NDT, welding, e t c)

### 3.9 Tools and equipment requirements

- Contractor shall supply all necessary tools and equipment for satisfactory completion of the project

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#### 4. Acceptance

This document has been seen and accepted by

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#### 5. Revisions

- N/A

#### 6. Development Team

The following people were involved in the development of this document

- Seshego Mmola

#### 7. Acknowledgement

- N/A

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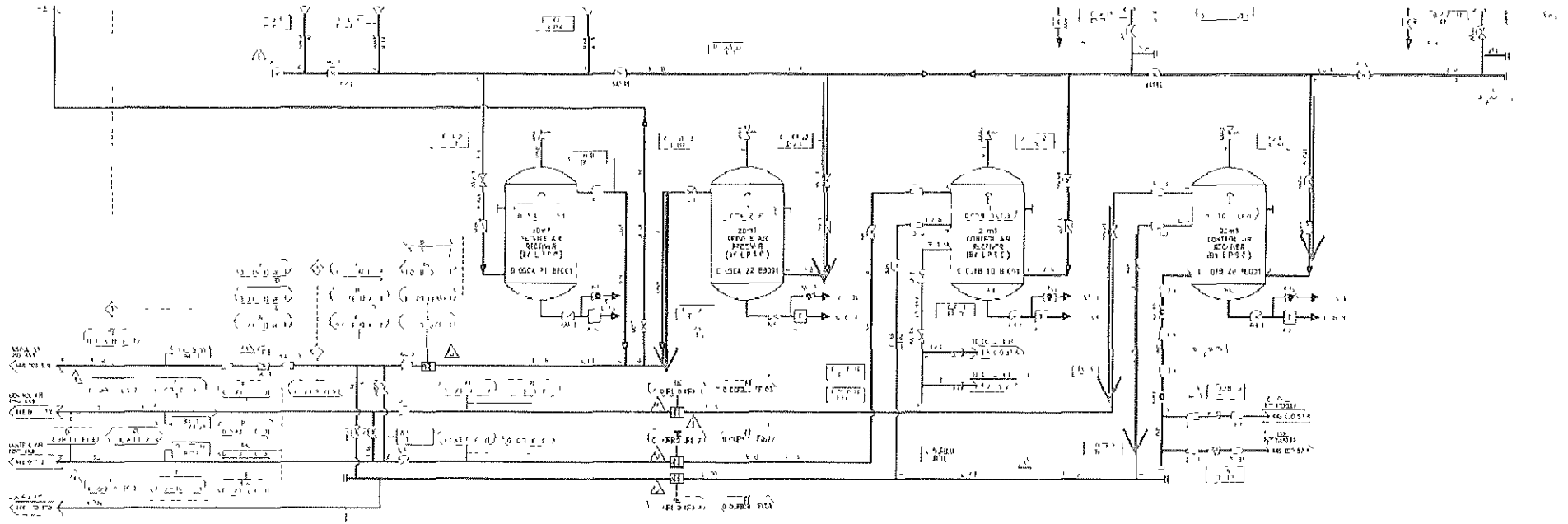


Figure 1 0 64/30473 Kendal Power Station Low Pressure Services Control & Service Air System