Eskom	Tutuka Power Station	Boiler Engineering File 12E

Title: **Scope of Work for Installation of Cat Ladders Including the Relocation of Secondary Air and Core Air Damper Actuators Splitter Boxes**

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CONTENTS

Page

FIGURES

TABLES

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1. INTRODUCTION

The secondary air dampers for the lower PF burners at each level have no cat ladders to access the actuator platforms. The secondary air dampers for the upper PF burners have cat ladders to access the actuator platforms but however one has to crawl under the PF burners to get to these cat ladders. A project was initiated to provide cat ladders for the lower PF burners and also to access the cat ladders for the upper PF burners without having to crawl under the PF burners. The solution that was chosen was to design one cat ladder to access both the lower and upper PF burner secondary air damper actuator platforms. The cat ladders were manufactured and delivered to site. It was found that the installation of the cat ladders would make it impossible to open and work some of the splitter boxes in the existing positions because of limited space. Because of the limited space and the different setups on the different units, it became necessary to relocate some of the secondary air and core air damper splitter boxes in order to accommodate the cat ladders. The original contract for the cat ladders also expired.

2. SUPPORTING CLAUSES

2.1 SCOPE

The scope of work is for installation of cat ladders to access the secondary air damper actuator platforms including the relocation of some of the secondary air and core air damper actuator splitter boxes. The installation of cat ladders includes modification of 144 platforms (24 per boiler). The 216 existing splitter boxes (36 per boiler) will be reused but they will be relocated. The scope of work includes the procurement of cabling and accessories and laying and termination of cables.

2.1.1 Purpose

The document defines the scope of work for installation of cat ladders to access the secondary air damper actuator platforms and relocation of some of the secondary air and core air damper actuator splitter boxes.

2.1.2 Applicability

This document shall apply throughout Tutuka Power Station unit 1-6 secondary air and core air dampers.

2.2 NORMATIVE/INFORMATIVE REFERENCES

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

2.2.1 Normative

[1] ISO 9001 Quality Management Systems.

2.2.2 Informative

[1] C.GTU0497 ERA Rev. 2

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2.3 DEFINITIONS

2.3.1 Classification

a. **Controlled disclosure:** controlled disclosure to external parties (either enforced by law, or discretionary).

2.4 ABBREVIATIONS

Abbreviation	Description
COC	Certificate of Compliance
C&I	Control & Instrumentation
NDT	Non-Destructive Test
PF	Pulverised Fuel
QCP	Quality Control Plan

2.5 ROLES AND RESPONSIBILITIES

- Boiler Plant Engineering in conjunction with C&I Engineering and Electrical Engineering shall identify the suitable position to install the splitter boxes and Boiler Plant Engineering shall include the installation of cat ladders in the outage scope of work
- Project Manager shall use this scope of work to go out on tender for the relocation of some of the secondary air and core air damper actuator splitter boxes.

2.6 PROCESS FOR MONITORING

(Refer from the detailed content below)

2.7 RELATED/SUPPORTING DOCUMENTS

N/A

3. SCOPE OF WORK FOR RELOCATION

The scope of work consists of mechanical, electrical and C&I parts. In summary the mechanical scope of work entails installation of cat ladders and the relocation of the splitter boxes (mountings will need to be welded) and the electrical and C&I scope of work entails disconnecting, cabling including cable trays, terminations and commissioning. The cat ladders were delivered to site and just need to be installed.

3.1 SCOPE OF WORK FOR INSTALLATION OF CAT LADDERS (MECHANICAL)

The cat ladders will be erected/ installed in the small pathways leading to each of the secondary air damper actuator platforms of the lower PF burner. The grating above these pathways (grating of upper PF burner landings) will be removed to give access to the cat ladders. There are 24 secondary air damper actuator platforms per boiler; 12 secondary air damper actuator platforms for the lower PF burners (D_1, D_2, D_3 and D_4, E_1, E_2, E_3 and E_4 and F_1, F_2, F_3 and F_4) and 12 secondary air damper actuators for the upper PF burners (A_1, A_2, A_3 and A_4, B_1, B_2, B_3 and B_4 and C_1, C_2, C_3 and C_4). Since the secondary air actuator platforms for each pair of the lower and upper PF burners at each level (18m, 26m and 33m levels) will accessed using one cat ladder, this means that there will be 12 cat ladders that will be installed per boiler.

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1) The Contractor shall modify each of A, B and C PF burner landing platforms and secondary air damper actuator platforms and each of D, E and F secondary air damper actuator platforms in order to erect the fabricated cat ladders.
2) The modification entails removal of landing platform grating next to the existing cat ladders to access A, B and C secondary air damper platforms and extending the secondary air damper actuator platforms (A_1, A_2, A_3 and A_4, B_1, B_2, B_3 and B_4 and C_1, C_2, C_3 and C_4) (upper PF burners).
3) The contractor shall remove the existing cat ladders for accessing A, B and C secondary air damper actuator platforms to pave way for the new cat ladders as one cat ladder will be used to access the actuator platforms for both the lower and upper PF burners for each area (A_1, A_2, A_3 and A_4, B_1, B_2, B_3 and B_4 and C_1, C_2, C_3 and C_4).
4) The modification of D, E and F secondary air damper actuator platforms entails addition of landing platforms to the existing platforms (D_1, D_2, D_3 and D_4, E_1, E_2, E_3 and E_4 and F_1, F_2, F_3 and F_4). The extensions or landing platforms were already fabricated.
5) The contractor shall grind out or cut off of the mounting brackets for the splitter boxes from where they are currently welded onto the structural beams for those that are welded and unbolt others that are bolted. The mounting brackets to be re-used as far as possible.
6) The contractor shall install the mounting brackets at the identified locations. The installation entails alignment of the brackets to ensure that they are vertical, tack welding, inspection and welding of the brackets.
7) Where welding is required, all welding shall meet the requirements of 240-106628253, Standard for Welding Requirement on Eskom Plants. Accreditation to ISO 3834 is a requirement for all welding work and therefore the main contractor or subcontractor shall have ISO3834 accreditation.
8) The contractor shall paint all the ground areas (from where mounting brackets are removed) and new welds for modifications of platforms, installation of cat ladders and mounting brackets for splitter boxes.
9) The contractor shall transport the cat ladders from the storage area to boiler for installation. The rigging of the cat ladders during erection forms part of the installation contract.
10) The contractor shall erect the fabricated cat ladders and firmly secures them to the existing structures with bolts (A_1-D_1, A_2-D_2, A_3-D_3 & A_4-D_4, B_1-E_1, B_2-E_2, B_3-E_3 & B_4-E_4 and C_1-F_1, C_2-F_2, C_3-F_3 & C_4-F_4).
11) The new cat ladders must be erected or constructed in such a way that they do not block the way to access other plant areas or cause difficulties for personnel operating or maintaining other plant equipment around the PF burners.
12) The Contractor shall be expected to correct the cat ladders should it be found that they block or cause difficulties for personnel working on other plant equipment around the PF burners.
13) The Contractor supplies transport, equipment, tools and consumables for the works.
14) The Project Manager or his representative shall carry out visual inspection on the workmanship and installation of the works at regular intervals determined by Project Manager. Any defect or poor workmanship will be rectified by the contractor at his own expense.
15) Where scaffolding is required Eskom shall, under third party, erect the access scaffolding necessary for the works and the Contractor shall be required to submit his request scaffolding at least 2 days in advance for planning purposes.
16) A data book consisting of welding procedures, certificates of welders, signed QCP's, NDT results etc. will be submitted for each boiler.

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3.2 SCOPE OF WORK FOR ELECTRICAL & C&I

The erection of the cat ladders in the pathways leading to the secondary air damper actuator platforms for the lower PF burners means that there will be no room to open the splitter boxes for maintenance work/troubleshooting for the secondary air and core air damper actuators of the lower PF burners and the secondary air damper actuators for the upper PF burners. Hence it is necessary that the affected splitter boxes (**36 per boiler** and **216 for the 6 boilers**) be relocated. The intention is to use the existing mounting brackets and splitter boxes. The scope of work for the relocation of some of the secondary air and core damper actuator splitter boxes shall include the following:

1) The contractor shall disconnect the electrical and C&I cables into and out of the affected secondary air (A_1, A_2, A_3, A_4, B_1, B_2, B_3, B_4, C_1, C_2, C_3, C_4, D_1, D_2, D_3, D_4, E_1, E_2, E_3, E_4, F_1, F_2, F_3, F_4) **(24)** and core air (D_1, D_2, D_3, D_4, E_1, E_2, E_3, E_4, F_1, F_2, F_3 and F_4) **(12)** damper actuator splitter boxes per boiler (**36** per boiler).
2) The contractor shall remove the splitter boxes from the mounting brackets to enable the removal and the relocation of the brackets.
3) The contractor shall mount the splitter boxes on the brackets. The intention is to mount the secondary air and core air damper actuator splitter boxes for the lower PF burners on one mounting bracket for each burner where possible and to move the secondary air splitter boxes for the upper PF burners to a position next to the splitter boxes of the secondary air actuators for the lower PF burners.
4) The contractor shall install cable conduits necessary to carry the cables to affected secondary air and core air actuators.
5) The contractor shall install the electrical (power supply) and C&I (field) cables to the actuators (outgoing) and terminate them in the splitter boxes and actuator plug pins and label the cables. No joining of cables will be allowed between the splitter boxes and the actuators.
6) The contractor shall terminate power supply and field cables to splitter boxes (incoming cables) – these are existing cables that had been disconnected to enable the relocation of the splitter boxes. Some of the cables might need to be shortened.
7) The contractor shall commission the secondary air and core air damper actuators with the associated splitter boxes which shall include loop checks and operating the dampers.
8) All the electrical work and C&I work on cabling must comply with the relevant Eskom standards and must be properly labelled. The current numbering of cable must be maintained.
9) Label all the splitter boxes as per approved QCP / ITP on completion. The labels should include the description and AKZ numbers.
10) The contractor shall issue a certificate of compliance (COC) on completion of the scope of work.

3.3 SCOPE OF WORK FOR SUPPLY

The scope of supply of materials shall include the following (the quantities serve as a guideline) **per boiler:**

1)	Power supply cable (BVV04DCM):	350m (guideline)
2)	Field cable (UVG08ACM):	350m (guideline)
3)	C&I Harting plug pins:	36
4)	Electrical plugs pins:	36
5)	Galvanised steel conduits & accessories (25mm x 4m):	120

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6) Cable glands C&I: 72
7) Cable glands Electrical: 72
8) Cable terminal connectors C&I: 540
9) Cable terminal connectors Electrical: 216
10) Cable joint kits: 36

Table 1: N/A

Figure 1: N/A

4. AUTHORIZATION

This document has been seen and accepted by:

Name	Designation
G Ledwaba	Manager C&I Engineering
K Moiloa	Manager Projects
N Ramonotsi	Manager C&I Maintenance
R Hector	Manager Electrical Engineering
S Thabethe	Manager Electrical Maintenance

5. REVISIONS

Date	Rev.	Compiler	Remarks
November 2018	1	P Chauke	Scope of work compiled to define work required on the relocation of secondary air and core air damper actuator splitter boxes
September 2020	2	P Chauke	Scope of work revised to include the mechanical work for installing cat ladders
January 2022	3	P Chauke	Scope of work revised to add the details of the C&I and Electrical consumables

6. DEVELOPMENT TEAM

N/A

7. CKNOWLEDGEMENTS

N/A

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8. APPENDIX: ACTIVITIES FOR GUIDELININT THE COSTING

No.	Description	Quantity per Boiler	Total for 6 boilers
1	Disconnect the electrical and C&I cable from the secondary air and core air damper actuator splitter boxes	36	216
2	Remove the secondary air and core air damper actuator splitter boxes (bolted)	36	216
3	Remove the mounting brackets for the secondary air and core air damper actuator splitter boxes	36	216
4	Remove existing cat ladders to access secondary air damper actuator platforms for upper (A, B & C) PF burners	12	72
5	Modify the landing platforms by removing grating for upper PF burners and extending secondary air damper actuator platforms (A, B & C PF burner)	12	72
6	Modify/ extend secondary air damper actuator platforms for lower PF burners (D, E & F PF burners)	12	72
7	Install cat ladders and secure them firmly to existing structures ensuring the cat ladders are not in the way of PF burners	12	72
8	Paint the welded areas (welds for platforms and new cat ladders) and ground areas (after removing mounting brackets) as part of corrosion protection and blend with the rest of the plant	12	72
9	Install secondary air and core air damper actuator splitter boxes mounting brackets	36	216
10	Mount the secondary air and core air damper actuator splitter boxes onto the mounting brackets	36	216
11	Lay conduits from secondary air and core air actuators to splitter boxes	36	216
12	Lay cables from secondary air and core air actuators to splitter boxes and terminate them in the splitter boxes and actuator plug pins and label the cables.	36	216
13	Terminate the electrical and C&I cables in the splitter boxes (existing incoming cables that had been disconnected)	36	216
14	Commission the secondary air and core air damper actuators after completing the installation	36	216
15	Label the splitter boxes on completion. The label to include description and AKZ number	36	216
16	Issue a certificate of compliance (COC) on completion of the scope of work	1	6
17	Submit Data Books on completion of the project for each unit. Proof of all QA/QC information should be part of the Data Books.	1	6

Supply

No.	Description	Quantity per Boiler	Total for 6 Boilers
1	Power supply cable (BVV04DCM)	350m	2 100m
2	Field cable (UVG08ACM)	350m	2 100m
3	C&I Harting plug pins	36	216
4	Electrical plugs pins	36	216
5	Galvanised steel conduits & saddles (25mm x 4m)	20	120
6	Cable glands C&I	72	432
7	Cable glands Electrical	72	432

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8	Cable terminal connectors C&I	540	3 240
9	Cable terminal connectors Electrical	216	1 296
10	Cable joint kits	36	216

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