Assets Planning and Delivery Group
Engineering

HA-ST-07

Electrical Equipment in Hazardous Areas (EEHA) Maintenance Standard

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REVISION 5

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FOREWORD

Electrical Equipment in Hazardous Area (EEHA) Standards are prepared to ensure that the Water Corporation's staff, consultants and contractors are informed as to the Water Corporation's EEHA standards and recommended practices. EEHA standards are intended to promote uniformity so as to simplify selection, installation and maintenance practices; their ultimate objective is to provide safe and functional plant, at minimum whole of life cost.

The Water Corporation EEHA standards and recommended practices described in this EEHA standard have evolved over a number of years as a result of capital project delivery, plant operation and maintenance experience gained through the selection, installation and maintenance of electrical equipment in our hazardous area facilities.

Deviation, on a particular project, from the EEHA standards and recommended practices maybe permitted in special circumstances but only after consultation with and endorsement by the Senior Principal Electrical Engineer, Mechanical & Electrical Assets, Engineering.

Users are invited to forward submissions for continuous improvement to the Senior Principal Electrical Engineer, Mechanical & Electrical Assets who will consider these for incorporation into future revisions.

Head of Engineering

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Users should use and reference the current version of this document.

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REVISION STATUS

The revision status of this standard is shown section by section below:

REVISION STATUS						
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CONTENTS

Section *Page*

1 INTRODUCTION....6
1.1 Scope....6
1.2 Exclusions....6
1.3 Abbreviations....6
1.4 Technical Integrity Custodian....6
1.5 Referenced Documents....6
2 GENERAL....7
3 MAINTENANCE....7
3.1 Maintenance Vs Overhaul/ Modification....7
3.2 Safety during Maintenance....8
3.2.1 General....8
3.2.2 Test Equipment....8
3.2.3 Removal and Re-Instatement of Covers....8
3.3 Replacement Parts....9
3.4 Inspection after Maintenance....9
3.5 Hazardous Area Verification Dossier....9
3.6 Competency....9
APPENDIX A: EXAMPLES OF MAINTENANCE ACTIVITIES....10

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1 INTRODUCTION

1.1 Scope

This Standard specifies the general maintenance requirements for explosion-protected electrical equipment on the Water Corporation's facilities to ensure its continued safe use in hazardous areas. The intention of this Standard is to expand upon the requirements of AS/NZS 60079.17, and to specify additional Water Corporation requirements.

This Standard covers both planned and breakdown maintenance of new and existing installations. It covers all explosion-protected electrical equipment, including those located in non-hazardous areas.

The requirements of this Standard are in addition to the general requirements for maintenance of electrical equipment.

1.2 Exclusions

This Standard does not apply to the maintenance of non-explosion-protected electrical equipment.

This Standard does not apply to Overhaul (refer to Water Corporation's Electrical Equipment in Hazardous Areas (EEHA) - Overhaul Standard: HA-ST-08).

1.3 Abbreviations

EEHA Electrical Equipment in Hazardous Areas

TIC Technical Integrity Custodian

1.4 Technical Integrity Custodian

The Technical Integrity Custodian (TIC) for this Standard is the Senior Principal Electrical Engineer, Mechanical & Electrical Assets.

1.5 Referenced Documents

The following documents are referenced in this Standard. If a referenced standard has been superseded, the user shall notify the TIC and utilize the latest edition of the standard unless advised otherwise in writing by the TIC.

AS/NZS 60079.17:2017	Explosive atmospheres Part 17: Electrical installations inspection and maintenance
AS/NZS 3800:2020	Electrical equipment for explosive atmospheres – Overhaul and repair
HA-ST-04	Electrical Equipment in Hazardous Areas (EEHA) - Competency Standard
HA-ST-05	Electrical Equipment in Hazardous Areas (EEHA) - Inspection Standard
HA-ST-06	Electrical Equipment in Hazardous Areas (EEHA) - Testing Standard
HA-ST-08	Electrical Equipment in Hazardous Areas (EEHA) - Overhaul Standard
-	Flammable Gas Area (FGA) Procedure

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2 GENERAL

All explosion-protected electrical equipment installed on Water Corporation's facilities regardless of whether or not it is located in a hazardous area, shall be maintained in accordance with the requirements of AS/NZS 60079.17 and this Standard, unless it has been formally de-certified. Maintenance of non-decertified explosion-protected equipment located in a non-hazardous to AS/NZS 60079.17 and this Standard will enable this equipment to be later safely relocated to a hazardous area, if required.

NOTE 1: The detailed inspection after relocation will not identify covert changes to the equipment content that could result if the equipment was not maintained in accordance with its original certification.

NOTE 2: It is the Water Corporation's preference that explosion-protected electrical equipment installed in a non-hazardous area be formally de-certified.

To ensure that explosion-protected equipment maintains compliance with its certification, regular planned maintenance of the equipment is required. Planned maintenance work instructions are contained in Nexus. These work instructions ensure that all explosion-protected equipment is adequately maintained so that its explosion-protection properties are not compromised due to 'wear and tear'.

3 MAINTENANCE

3.1 Maintenance Vs Overhaul/ Modification

It is vitally important to distinguish between maintenance and overhaul/modification because different competencies and different Australian Standards apply to these activities. AS/NZS 60079.17 covers the maintenance of explosion-protected equipment whilst overhaul and modification are covered by AS/NZS 3800.

Prior to commencing any work, the maintenance technician shall confirm that the activity required to restore the equipment to correct operation is 'maintenance'. Maintenance work may be actioned by the technician in accordance with this Standard.

Work that is deemed to be overhaul or modification must be passed to a Water Corporation approved repair facility for actioning in accordance with the Water Corporation's Electrical Equipment in Hazardous Areas (EEHA) - Overhaul Standard: HA-ST-08.

The following definitions are based on those stated in AS/NZS 3800.

Maintenance: Routine actions taken to preserve the fully serviceable condition of the installed equipment.

Guidance on determining which activities are deemed by the Water Corporation to be maintenance is given in Appendix A of this Standard.

Overhaul: Action to restore to a fully serviceable condition equipment which has been in use or in storage for a period of time but which is not faulty.

Modification: Change to the design of the equipment which affects material, fit, form or function.

Guidance on determining which activities are deemed by the Water Corporation to be overhaul or modification is given in Appendix A of this Standard.

Repair: action to restore faulty equipment to its fully serviceable condition complying with the relevant standard.

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3.2 Safety during Maintenance

3.2.1 General

To ensure that there are no ignition capable sparks when performing maintenance, no equipment other than intrinsically safe equipment shall be opened in a hazardous area unless the equipment has been electrically isolated in accordance with the relevant Water Corporation Electrical Isolation Work Instruction. However, when specific maintenance on non-intrinsically safe equipment requires that the equipment be live during maintenance, the work shall be performed under a relevant Water Corporation Permit to Work that verifies both initially and periodically that an explosive atmosphere is not present whilst the work is in progress. In addition, minimum acceptable work practices applying to Hazardous Areas at metropolitan WWTPs are described in the Water Corporation document 'Flammable Gas Area (FGA) procedure'.

Caution is needed to ensure that isolated equipment is not live after the isolation of the supply. This can occur if: capacitors have not discharged, there is back EMF from rotating equipment, emergency batteries are not isolated, etc.

3.2.2 Test Equipment

Testing required during maintenance shall be performed in accordance with the Electrical Equipment in Hazardous Areas (EEHA) Testing Standard: HA-ST-06.

3.2.3 Removal and Re-Instatement of Covers

3.2.3.1 General

Covers shall be carefully protected whilst removed to ensure that seals and mating surfaces are not damaged.

Covers shall always be replaced – or temporary covers fitted - prior to work breaks (e.g. lunch, shift change etc.) to prevent the ingress of moisture and other foreign matter.

Prior to reinstalling covers, they shall be checked for seal damage. Seals shall be in good condition.

3.2.3.2 Flameproof

The removal and re-instatement of covers on flameproof equipment shall comply with Section 3.2.3.1, and the additional requirements of this Section.

Flameproof covers shall be wrapped in a clean cloth/plastic to protect the flamepath from damage and contamination by foreign matter.

All old grease should be removed so that the flamepaths can be inspected properly. The flamepath on the covers and housing shall be checked for corrosion and scratches. If a flamepath is scratched or corroded, the item shall be repaired or replaced. If the flamepath is required to be scraped to remove foreign matter, a non-metallic tool must be used to prevent scratching the surfaces of the flamepath.

A thin smear of suitable grease specifically nominated by the enclosure manufacturer can be applied to both flamepath surfaces before reassembly.

3.2.3.3 Pressurisation

The removal and re-instatement of covers on pressurised equipment shall comply with Section 3.2.3.1, and the additional requirements of this Section.

Prior to opening the covers of pressurised equipment that will trip on loss of pressure; the impact of tripping shall be determined and communicated to the relevant parties. If the trip is to be temporarily defeated to enable live work, a Job Safety Analysis shall be performed to determine a suitable methodology to manage the risk whilst the pressurisation is not present, and to ensure that trips are reinstated as soon as practicable.

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3.3 Replacement Parts

All replacement parts used during maintenance must be per the certification documents. Parts shall be obtained from the original equipment supplier. Written authority is required from the TIC when parts are not available from the original supplier.

NOTE: Component parts in most certified equipment are not individually certified and marked, however specific parts are often required by the overall certification documentation. Therefore, extreme caution is needed when selecting replacements parts, especially if they are not being sourced from the original supplier. For example, the ballast in an Ex n fluorescent luminaries may not be Ex marked, but it may be an integral part of the luminaries' certification. The use of different ballast could therefore be unsafe.

3.4 Inspection after Maintenance

A detailed inspection shall be performed after any maintenance work, in accordance with the Water Corporation's Electrical Equipment in Hazardous Areas (EEHA) Inspection Standard: HA-ST-05.

3.5 Hazardous Area Verification Dossier

The results of all maintenance activities shall be recorded in the Water Corporation site specific hazardous area verification dossier.

3.6 Competency

All persons maintaining electrical installations in hazardous areas shall comply with the relevant requirements of the Water Corporation's Electrical Equipment in Hazardous Areas (EEHA) Competency Standard: HA-ST-04.

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APPENDIX A: EXAMPLES OF MAINTENANCE ACTIVITIES

This Appendix provides some common examples of activities that on the Water Corporation's facilities will be deemed 'maintenance' and can therefore be actioned by persons with a current Water Corporation Electrical Technician EEHA Competency in accordance with this Standard. It also gives some examples of activities that are deemed to be overhaul or modification and must be actioned by a repair facility in accordance with the Water Corporation's Electrical Equipment in Hazardous Areas (EEHA) - Overhaul Standard: HA-ST-08. The TIC should be consulted whenever the Electrical Technician is not sure if the activity is maintenance.

Maintenance generally involves adjusting settings, or replacing parts that are complete sub-assemblies (rather than individual components on sub-assemblies).

Definitions of the terms: maintenance, overhaul, repair, replacement, and modification, are given in Section 3.1 of this Standard.

The following activities on Water Corporation facilities are deemed to be **maintenance**:

- The replacement of a circuit board, switch assembly, or similar, in a certified
- instrument with an identical board or switch assembly manufactured by the original equipment manufacturer. The TIC shall be consulted if an identical board, switch assembly, etc. is not available.
- The replacement of gaskets seals and bolts.
- The replacement of a fluorescent tube in a luminarie.
- The adjustment of a pressure switch set point.
- The calibration of an instrument.
- The replacement of a terminal block in a junction box or on a barrier.
- The cleaning and lubrication of moving parts.

The following activities on the Water Corporation's facilities are not deemed to be maintenance and must only be carried out by a Water Corporation approved repair facility.

- The rewinding of a motor would be overhaul.
- Replacement of a bearing on a motor is overhaul
- The addition of an extra entry to an Ex d junction box would be a modification.
- The re-drilling and tapping of an existing entry to an Ex d junction box would be a modification.
- The replacement of a component on a circuit board in an intrinsically safe
- instrument with an identical component would be overhaul.

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END OF DOCUMENT

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