



ELLIOTT METER STATION HAZARDOUS AREA DOSSIER



FYFE REFERENCE: 18756-6-HAD-007

APA REFERENCE: HAD DATA REPOSITORY/ EEP_3_ELL

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Reviewed by:	Tony Bird Principal Process Engineer - Fyfe	Date:	8-Nov-2011
Client Accepted:	Anthony Comerford Pipeline Engineer – APA Group	Date:	
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Credential Exposure

PERSONNEL

Tony Bird from Fyfe Pty Ltd is a principal process engineer with over ten years of experience in hazardous area classifications of new and existing projects. His experience in the development of retrospective hazardous area classifications includes Palm Valley gas plant, Torrens Island power station, Pelican Point power station and numerous Santos facilities.

His experience covers oil and gas pipeline and facility projects during all stages of design from concept, feasibility, and FEED through to detailed design. He also has experience in procurement, construction supervision, commissioning and operations support of pipeline facilities.

Tony's responsibilities for this project included the examination of site, confirmation of installed equipment, and development of hazardous area classification and hazardous area mapping drawings.

Neville Green from Sitzler Pty Ltd is an electrical engineer with over ten years of experience in the design, construction, commissioning and inspection of installation in hazardous environment in the oil and gas industry. Neville has the following competencies in accordance to AS/NZS 4761(Refer attachments):

UTE NES 010 A Report on integrity of explosion protected equipment in hazardous areas UTE NES 107 Install explosion-protected equipment and wiring systems (Ex) UTE NES 707 Design electrical installations in hazardous areas (Ex)

Neville's role was to perform close inspection of all electrical equipment in accordance to AS/NZS 60079 series on site to verify installation. His role was also to review inspection sheets and provide recommendations for remedial actions to ensure compliance.

David Bourke from Fyfe Pty Ltd is the surveyor who completed three dimensional (3D) scanning and photography of the facilities. The 3D images were used by Fyfe drafters to update site arrangement drawings. The 3D scan data is retained by Fyfe for future use if required by APA Group.

METHODOLOGY

The Hazardous Area Verification Dossier is produced to ensure that the installation complies with the appropriate certification documents as well as with AS/NZS 2381.1 and any other relevant part of the AS/NZS 2381 and AS/NZS 60079 series. In addition equipment and installations where hazardous areas exist are required to comply with the applicable regulations of the applicable Australian State or Territory. It should be borne in mind that an installation can come under the jurisdiction of several authorities with different areas of responsibility, e.g. mining, electrical safety, handling and transport of flammable materials and occupational health and safety.



This dossier has been prepared in accordance with the following codes and standards:

- Dossiers AS 2381.1:2005 Electrical equipment for explosive gas atmospheres -Selection, installation and maintenance Part 1: General requirements
- Hazardous area AS/NZS 60079.10.1:2009 Explosive atmospheres: Classification of areas - Explosive gas atmospheres (IEC 60079-10-1, Ed. 1.0 (2008) MOD) (2009)
- AS/NZS 60079.17:2009 : Explosive atmospheres Electrical installations inspection and maintenance (IEC 60079-17, Ed.4.0 (2007) MOD)

Note that a Hazardous Area Verification Dossier is a living document and should be updated by APA and / or its contractors. Any modifications to electrical equipment, including removing an instrument cover should be recorded and stored within the Dossier. Changes to the operation or equipment installed within the station will require a review of the hazardous area classification and may require revision of the classification, hazardous area mapping drawings, hazardous area equipment lists and associated certificates of conformity. An extract from AS 2381.1 (2005) is included to provide guidance to APA.

Equipment requires conformity to the following standards:

- AUS Ex
- IEC Ex

Previously AS / NZS Ex and FLP have been recognised certification standards for equipment in hazardous areas and may have been applicable at the time of construction / installation. Equipment that was identified as having any of the certification to show conformity to the above standards was deemed to be acceptable. Where no certification was available or certification was available to standards not recognised in Australia, a conformity assessment document (CAD) is required. The CAD shall be completed by a suitably qualified organisation and the associated residual risk shall be accepted by the head of APA. For new installations, equipment with the correct certificates of conformity should be used unless no item exists and then a CAD should be produced. No information on the date of installation/ of equipment purchase/manufacturer has been provided of the site. Therefore no checking has been undertaken to determine the currency of the certificate at the time of installation.

DISCLAIMER

Opportunities for improvements (OFI) are provided for items associated with hazardous area and general engineering. The scope of work for the project was to identify hazardous area and provide visual inspection of the equipment. The visual inspection did not include opening of equipment and the OFIs are limited to the level of inspection. General engineering OFIs are non-exhaustive and require APA to confirm the OFI and the recommendation.



Extract from AS 2381.1 (2005)

1.6 DOCUMENTATION

It is necessary to ensure that any installation complies with the appropriate certification documents as well as with this Standard and any other requirements specific to the plant on which the installation takes place.

To achieve this result, a verification dossier shall be prepared for every plant and shall be either kept on the premises or stored in another location in which case a document shall be left on the premises indicating who the owner or owners are and where that information is kept, so that when required, copies may be obtained. This dossier should contain the information detailed in the appropriate Parts of this series of Standards for the types of protection concerned.

Up-to-date information typically required is as follows:

- a) Where applicable a statement of the identity of the person(s) having legal ownership of the installation or parts thereof and where the verification dossier is located.
- b) The classification of hazardous areas and the Standards used for the classification.
- c) Equipment group and temperature class.
- d) Installation instructions.
- e) Documentation/certification for electrical equipment, including those items with special conditions, for example, equipment with certificate numbers that have the suffix 'X'.
- f) Descriptive system document for the intrinsically safe system.
- g) Documentation relating to the suitability of the equipment for the area and environment to which it will be exposed, e.g. T rating, Ex rating, IP rating, corrosion resistance.
- h) Documentation certifying that the equipment is rated for the voltages and frequency applied during normal operation.
- i) Manufacturer's/qualified person's declaration, e.g. tradesperson's documentation and inspector's inspection reports.
- j) Records sufficient to enable the explosion-protected equipment to be maintained in accordance with its type of protection (for example, list and location of equipment, spares, technical information).
- k) Records covering any maintenance, overhaul and repair of the equipment.
- I) Records of selection criteria for cable entry systems for compliance with the requirements for the particular explosion technique.
- m) Drawings and schedules relating to circuit identification (see Clause 3.8.16).
- n) In New Zealand, the Hazardous Area Statement of Periodic Verification on completion of a periodic inspection. (Refer to Appendix B).



Where alternative methods of equipment identification are used for inspection in accordance with Clause 4.3 then additional documentation to support the traceability of the equipment shall be provided.

It shall be the responsibility of the person(s) having legal ownership of the installation or parts thereof to ensure that the relevant information is produced but the preparation of the document may be delegated to expert bodies/organizations. The dossier may be kept as hard copy or in electronic form.

1.7 QUALIFICATIONS OF PERSONNEL

The design, construction, maintenance, testing and inspection of installations covered by this Standard shall be carried out only by competent persons whose training has included instruction on the various types of protection and installation practices, relevant rules and regulations and on the general principles of area classification. The competency of the person shall be relevant to the type of work to be undertaken.

Appropriate continuing education or training should be undertaken by personnel on a regular basis.

Competency may be demonstrated in accordance with AS/NZS 4761, Competencies for working with electrical equipment for hazardous areas (EEHA), or equivalent training and assessment framework.



This is a Statement that

Neville Owain Green

has been assessed as having fulfilled the following requirements

UTE NES 010 A	Report on the integrity of explosion-protected equipment in hazardous areas
UTE NES 107 TA	Install explosion-protected equipment & wiring systems (Ex mixed)
UTE NES 107 WA	Install explosion-protected equipment & wiring systems (Ex n)
UTE NES 107 XA	Install explosion-protected equipment & wiring systems (Ex i)
UTE NES 107 YA	Install explosion-protected equipment & wiring systems (Ex e)
UTE NES 107 ZA	Install explosion-protected equipment & wiring systems (Ex d)
UTE NES 707 TA	Design electrical installations in hazardous areas (Ex mixed)
UTE NES 707 WA	Design electrical installations in hazardous areas (Ex n)
UTE NES 707 XA	Design electrical installations in hazardous areas (Ex i)
UTE NES 707 YA	Design electrical installations in hazardous areas (Éx e)
UTE NES 707 ZA	Design electrical installations in hazardous areas (Ex d)

in partial completion of the following qualification Certificate IV in Electrotechnology (Explosion-protection) UTE 4 07 99

> Prepared by Sarah Petrides Administration Assistant

Approved by Sam Zacha Managing Director

Date of Issue: 5 December 2007

National Provider Code 51160

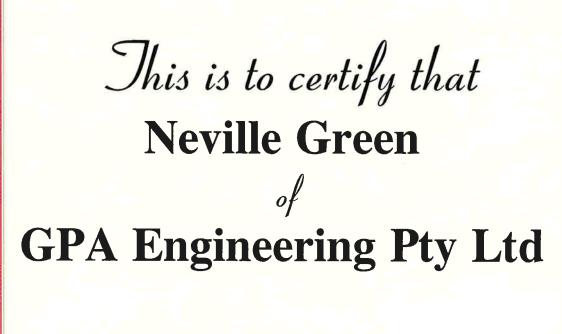






This statement of attainment is recognised within the Australian Qualifications Framework

Certificate No.: 1089-1-07 Page 1 of 1



Completed the 3 day

Electrical Safety in Hazardous Areas

Training Course
26th to 28th February 2001

Signed:

CR Baker

Colin Baker CEng, MIEE, MInstMC, FIICA
Partner, Principal Consultant & H-Class Electrical Inspector

Certificate Number: 2001.02.26-28/05

This 24 hour short course is recognised by
The Institution of Engineers, Australia, for Continuing Professional Development (CPD) purposes

Explosion Protection Technology, 8 Kirkfell Court, Berwick, Victoria 3806, Australia



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Revision History:

Rev.	Status	Date	Prepared	Reviewed	Approved
Α	Preliminary issue for client's review	31-Oct-2011	CEK	TCB	
0	Original Issue	8-Nov-2011	AZP	TCB	EZG



1 Site Information

An inspection on the Elliott meter station site was performed on 6th October 2011 by Tony Bird, a principal process engineer from Fyfe, Neville Green, an electrical engineer from Sitzler and David Bourke a surveyor from Fyfe.

The Elliott Meter Station (EE 0003) receives gas from a DN 50 lateral from the ADP. The lateral is approximately 4 km long and provides gas for the Elliott power generation site. The station consists of a scraper receiving vessel, dry gas filter, filter separator, knock out pot, two stages of pressure regulation, a catalytic heater, metering run, slop tank, atmospheric vent stack and the associated pipe work, valves and instrumentation.

At the inlet to the station is a scraper receiving vessel. The scraper vessel is fitted with local vent, PSV, pressure indicator and associated pipe work and valving. The closure on the vessel is a blind flange.

The main gas flow to the skid passes to an actuated valve. The gas is then filtered in a dry gas filter. The filter is horizontal and fitted with a quick opening closure, differential pressure gauge, PSV and vent.

The gas then passes to a temperature gauge and then two parallel pressure regulators that operate in duty and standby that reduce the gas pressure to 3,000 kPag.

The gas passes to a filter separator fitted with a differential pressure gauge with inductive high differential pressure switch, level gauge, pneumatic liquid level controller and control valve and high liquid level switch, pressure relief valve.

The gas from the filter separator passes to a knock out pot and then to a catalytic heater. The catalytic heater is decommissioned and has not operated for some time.

From the heater the gas passes to the second stage pressure regulators. The gas is reduced in pressure to 500 kPag in the parallel pressure regulators, operating in a duty-standby arrangement.

The gas is then metered in a rotary positive displacement meter that is corrected for temperature and pressure. Upstream of the meter is a second pressure relief valve.

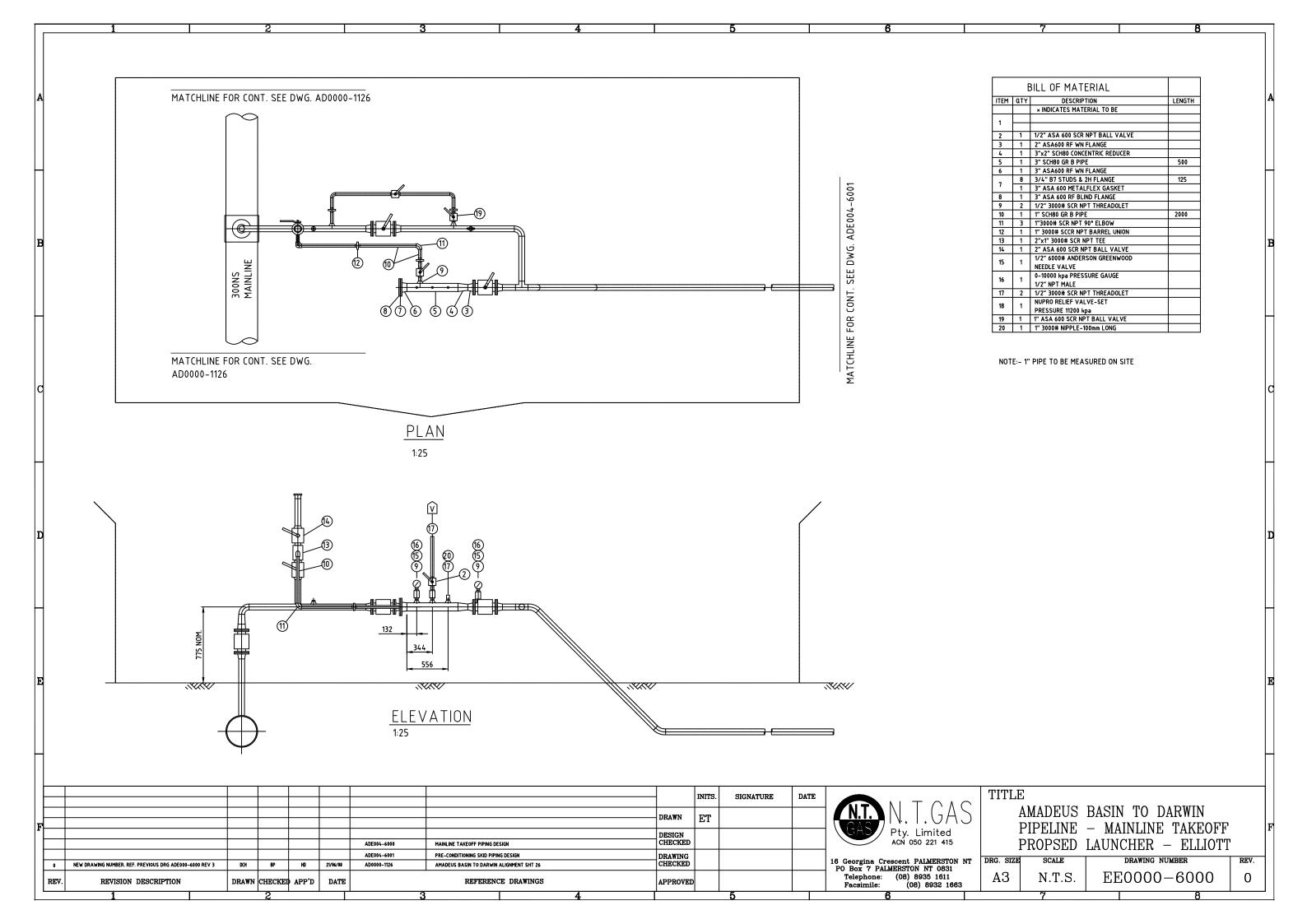
Instrument gas for the site instrumentation and fuel gas for the catalytic heater are conditioned in an off take from the outlet of the skid and distributed as required.

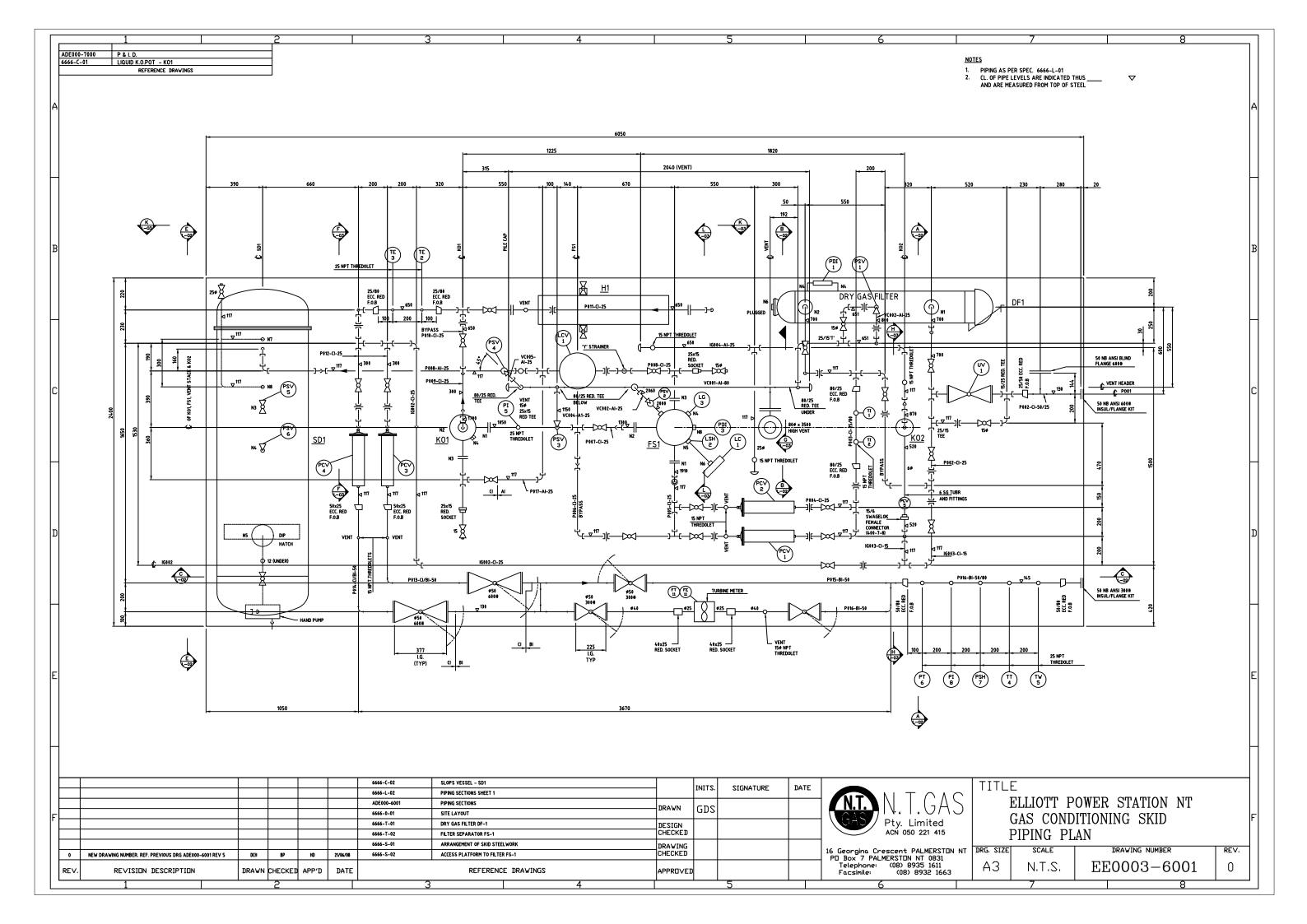
A control system provides control and telemetry for the various process measurement parameters. The control system provides flow control and high pressure automatic shutdown functionality and allows remote operator shutdown. The control system is powered by single phase 230 VAC power supply, with back up batteries.

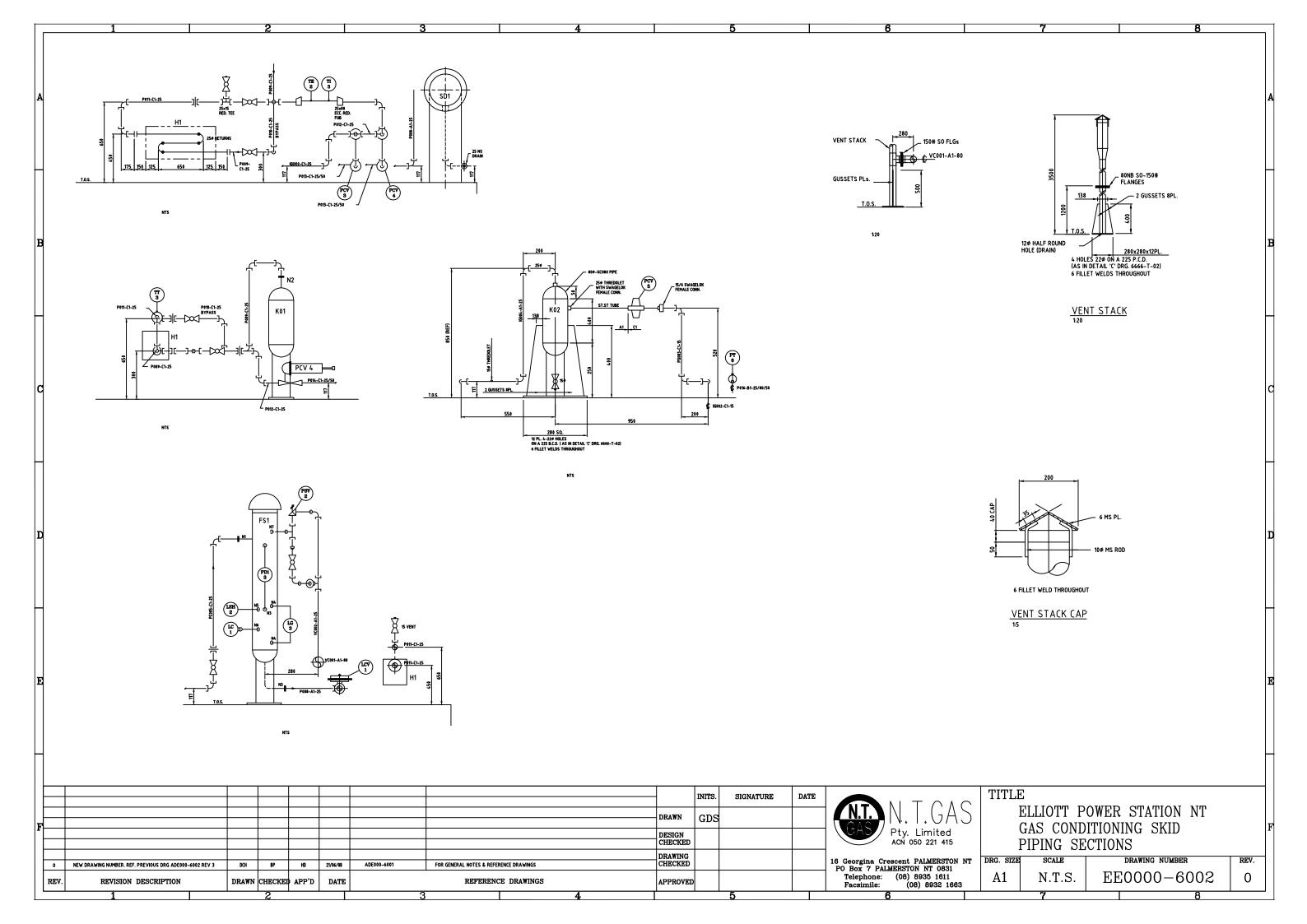


The site arrangement drawings and P&IDs for Elliott meter station can be found overleaf.

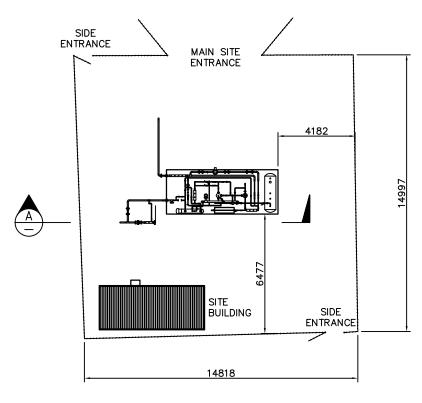
Drawing Number	Description	Revision				
APA Group Arran	APA Group Arrangement Drawing					
EE 0000-6000	Elliott Meter Station Mainline Takeoff Proposed Launcher	0				
EE 0003-6001	Elliott Meter Station Piping Arrangement	0				
EE 0003-6002	Elliott Meter Station Gas Conditioning Skid Piping	0				
Fyfe Updated Plo	t Plan					
EE 0003-6003	Meter Station- Elliott MS	0				
P&ID						
EE 0003-7001	Elliott Meter Station Takeoff and Receiver	0				
EE 0003-7005	Elliott Meter Station Gas Conditioning Skid (Sheet 1 of 2)	0				
EE 0003-7006	Elliott Meter Station Gas Conditioning Skid (Sheet 2 of 2)	0				



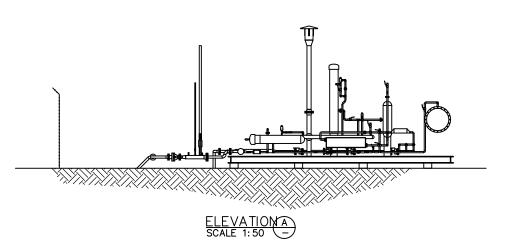








PLAN VIEW01 SCALE 1:100 -



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SCALE	1:100				METRES

FIFE Earth Partners
ACRIGICAL STORY

APA Group

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ACRIGICAL STORY

APA Group

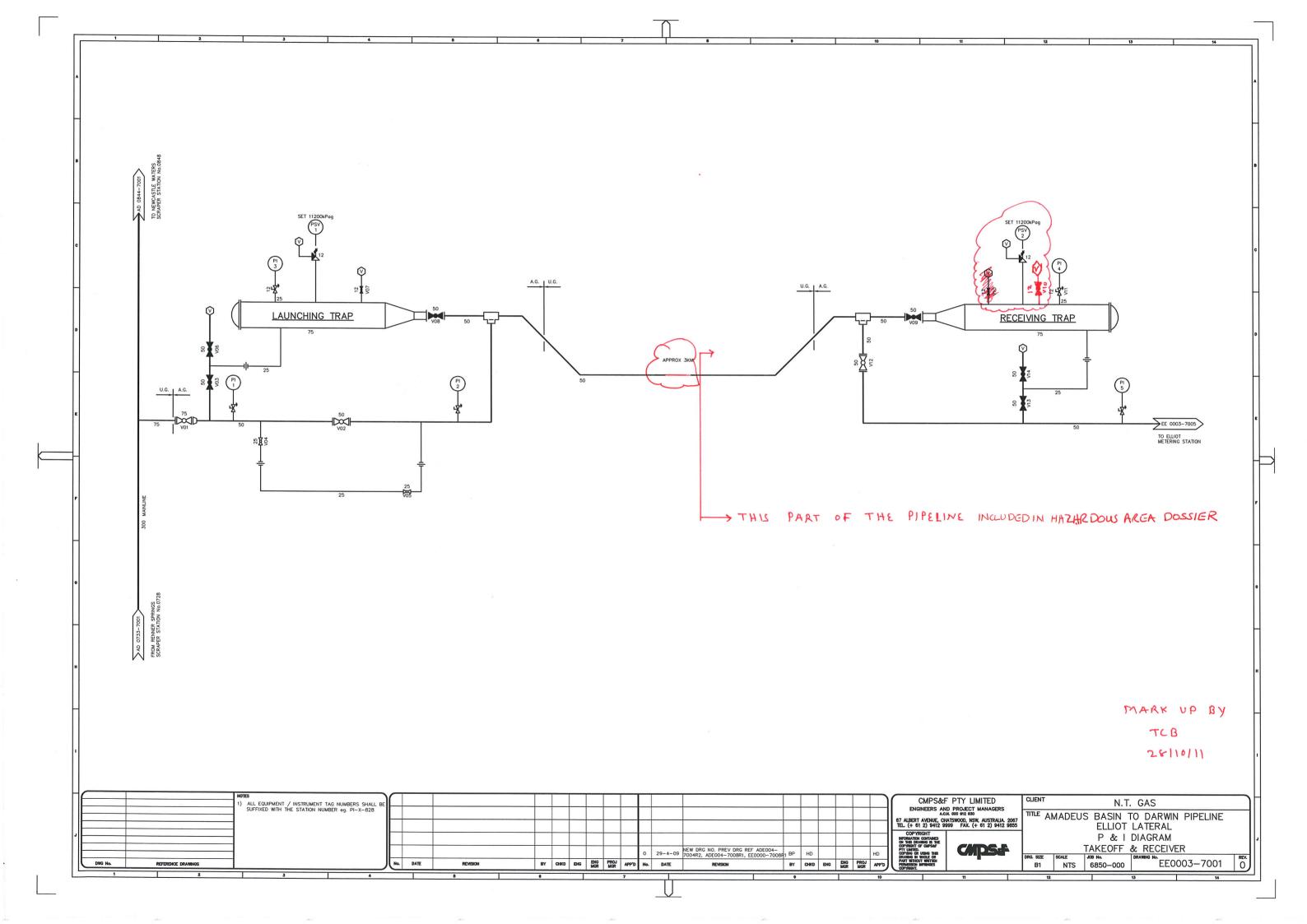
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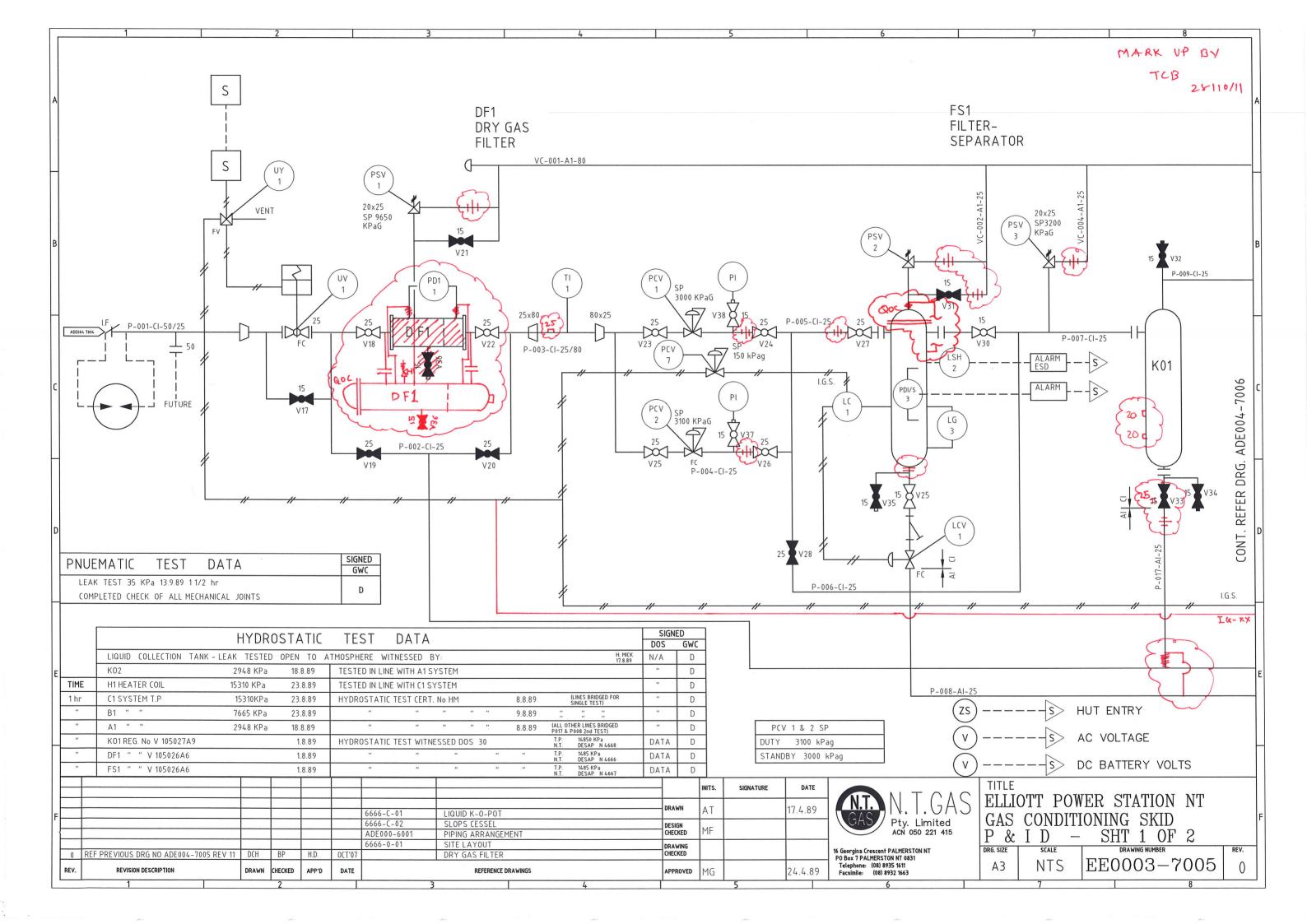
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ALL COCATION OF UNDERGROUND SERVICES NOT CONFIRMED AND NOT SHOWN ON THIS DRAWING.

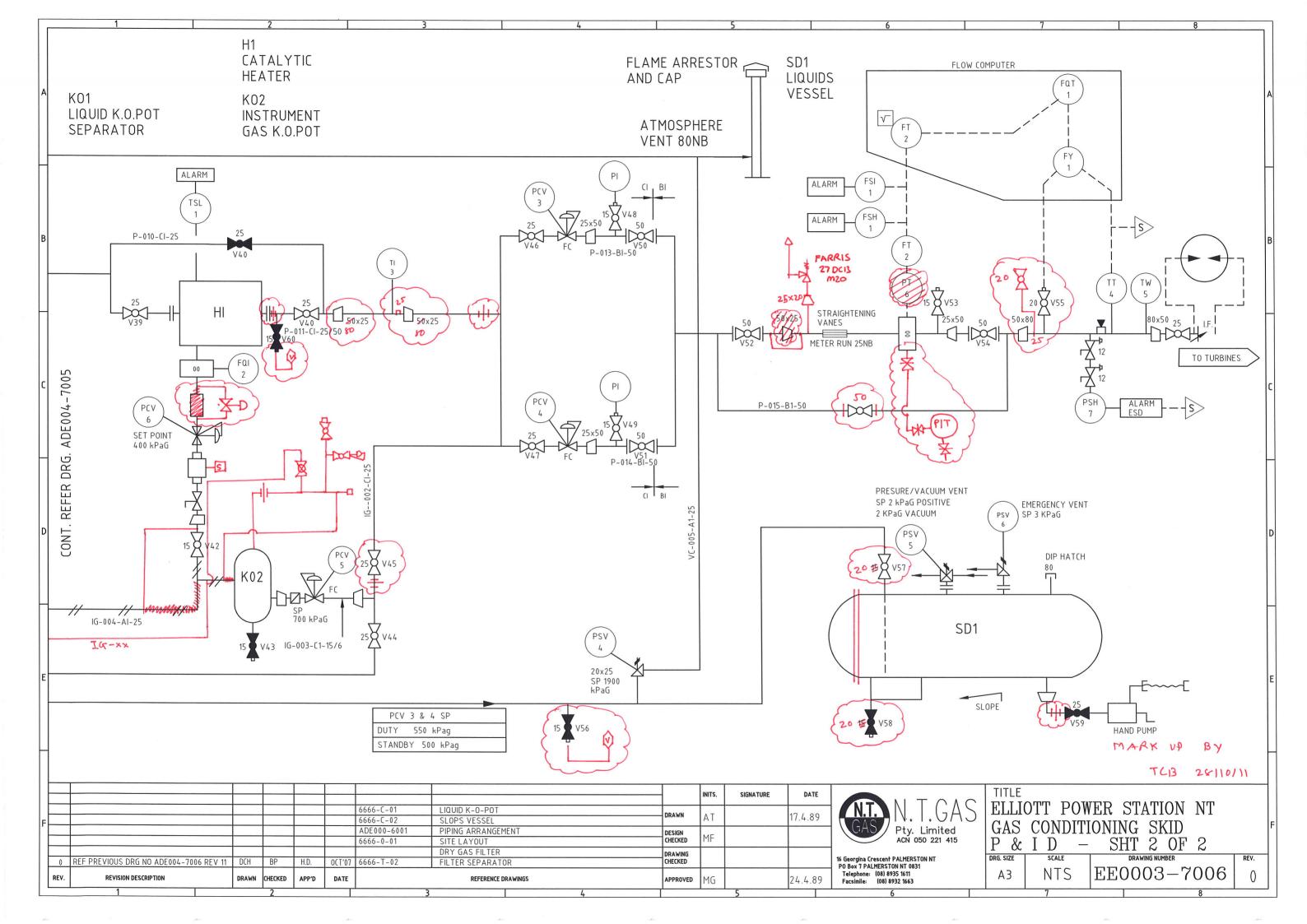
SIGNIFICATION

FIFE BOOK

FI









2 Hazardous Area Classification Report

This section contains the hazardous area classification report written for the Amadeus Basin to Darwin pipeline facilities.

APA Group



AMADEUS BASIN TO DARWIN PIPELINE HAZARDOUS AREA CLASSIFICATION



FYFE REFERENCE: 18756-4-HAD-001

APA REFERENCE: HAD DATA REPOSITORY/ADP_18756_HADC

Prepared by:	Tony Bird Principal Process Engineer - Fyfe	Date:	24-Nov-2011
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Client Accepted:	Anthony Comerford Pipeline Engineer – APA Group	Date:	
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Revision History:

Rev.	Status	Date	Prepared	Reviewed	QA
Α	Preliminary Issue	30/08/2010	YZW	TCB	
В	Revised to Incorporate Information from 2011 Part 1 Site Inspection	24/08/2011	TCB	RDK	
С	Revised to Incorporate Comments from Client	19/09/2011	TCB	RDK	
D	Revised to following 2011 Part 3 and Part 4 site inspections	26/09/2011	TCB	RDK	
Е	Revised following 2011 Part 2 site inspections	10/10/2011	ТСВ	RDK	
0	Original Issue	24/11/2011	ТСВ	RDK	EZG



2.1 INTRODUCTION

2.1.1 OBJECTIVE

The hazardous area classification covers the above ground gas regulating and metering stations, scraper stations and mainline valves in the Northern Territory Gas Network.

The pipeline and facilities were originally constructed in 1985 with the additional facilities added to supply new users and supply points. No hazardous area documentation was completed at the time of the construction as there were no Australian Standards for hazardous area classification in 1985. The selection, installation and maintenance of electrical equipment were covered by AS 1076 series (1977).

This report documents the results of a Hazardous Area Classification undertaken for the facilities mentioned in Section 2.4.

The interpretation and application of this classification should take into account that Hazardous Area Classifications are inherently "imprecise" and involve assumption based estimates, code interpretation and engineering judgement.



2.1.2 SCOPE OF STATIONS

The scope of stations covered by this hazardous area classification is shown below:

Station	Description	KP
Palm Valley	Meter Station	0000
Palm Valley Alice Springs	Meter Station	0000
Mereenie	Meter Station	0000*
Tylers Pass	Transfer Station	0045
Tanami Road	Scraper Station	0161
Aileron	Mainline valve	0241
Ti Tree	Scraper Station	0316
Barrow Creek	Mainline Valve	0401
Wauchope	Scraper Station	0458
Kelly Well	Mainline Valve	0546
Tennant Creek	Meter Station	0025†
Warrego	Scraper Station ONLY	0610
Morphett Creek	Mainline Valve	0660
Renner Springs	Scraper Station	0733
Fergusson	Mainline Valve	0791
Elliott Meter Station	Meter Station	0003‡
Daly Waters	Meter Station	0982
Newcastle Waters	Scraper Station	0844
Katherine Offtake	Scraper Station	0000**
Katherine	Meter Station	0005**
Larrimah	Mainline Valve	1053
Mataranka	Scraper Station ONLY	1108
Tindal	Mainline Valve	1209
Helling	Scraper Station	1243
Pine Creek	Meter Station	1317
Ban Ban Springs	Scraper Station	1378
Batchelor	Mainline Valve	1441
Acacia	Mainline Valve	1465
Berry Springs	Mainline Valve	1486
Darwin City Gate	Meter Station	1498
Channel Island	Meter Station	1510

^{*} On Mereenie to Tylers Pass Pipeline

- † On ADP to Tennant Creek Pipeline
- ‡ On ADP to Elliott Pipeline

^{**} On ADP to Katherine Pipeline



2.1.3 EXCLUSIONS

The following stations are excluded from this hazardous area classification

- Alice Springs facilities (owned and operated by Envestra),
- McArthur River Mine pipeline lateral facilities,
- Warrego compression facilities (scraper facilities are included),
- · Tenant Creek offtake.
- Helling scraper station training pipework,
- · Cosmo Howley facilities,
- Mt Todd facilities.
- · Weddell facilities.
- Mataranka meter station.

The hazardous area classification does not consider the hazardous area associated with equipment not included in the pipeline licence, e.g. gas plants at Mereenie and Palm Valley, and the gas reticulation facilities at Darwin.

2.1.4 REVISION HISTORY

2.1.4.1 Revision A

The hazardous area classification was raised and issued following the inspection of four sites on the Amadeus Basin to Darwin Pipeline in 2010, as listed below:

- Darwin City Gate Station
- · Channel Island Station
- Helling Scraper Station
- · Pine Creek Station

2.1.4.2 Revision B

Further inspection of sites was undertaken in August 2011 and the hazardous area classification updated to incorporate sources of hazardous release from the equipment at these sites. The additional sites inspected were:

- Mereenie Station
- Palm Valley Meter Station
- Palm Valley Interconnect / Alice Springs Meter Station
- Tylers Pass Station
- Tanami Road Scraper Station
- Aileron Valve Site
- Ti Tree Scraper Station

2.1.4.3 Revision C

The hazardous area classification updated to incorporate comments and recommendations from APA.



2.1.4.4 Revision D

Further inspection of sites was undertaken in September 2011 and the hazardous area classification updated to incorporate sources of hazardous release from the equipment at these sites. The additional sites inspected were:

- Katherine Meter Station
- Mataranka Scraper Station
- Ban Ban Springs Scraper Station
- · Batchelor Valve Site
- Berry Springs Valve Site

In addition there were some revisions to site descriptions for the stations included at revision to ensure consistency.

2.1.4.5 Revision E

Further inspection of sites was undertaken in October 2011 and the hazardous area classification updated to incorporate sources of hazardous release from the equipment at these sites. The additional sites inspected were:

- Wauchope Scraper Station
- Tennant Creek Meter Station
- Warrego Springs Scraper Station
- Renner Springs Scraper Station
- Elliott Meter Stations
- Newcastle Waters Scraper Station
- · Daly Waters Meter Station

2.1.4.6 Revision 0

· Original Issue for use.



2.2 METHODOLOGY

This Hazardous Area Classification has been carried out in accordance with the "source-by-source" guidance taken from AS/NZS 60079.10.1 (Standards Association of Australia and New Zealand), in association with IP Code Part 15 (Institute of Petroleum – UK) and API RP 505 (American Petroleum Institute – USA).

The potential leaks that can be anticipated in both normal and abnormal operations have been considered, such as the failure of a valve gland and the partial failure of a gasket flange. The application of explosion proof (Ex) equipment will make sure that ignition does not take place. The classification does not allow for catastrophic failure of pipework or equipment where the associated mechanical effects are almost certain to cause ignition.

The extent of Zone 0, 1 and 2 areas has been identified by investigating each relevant source or type of source.

Due to the imprecision inherent in hazardous area classification, the designation of small non-hazardous area within larger hazard areas has been avoided.

Natural boundaries have been used to define zone limits where reasonably practical. In some cases, where believed adequate, this has reduced the assigned area to some extent. In other cases, where there is no economic disadvantage, the zone areas have been extended to simplify their arrangement.

The equipment and pipework in the stations are installed in open outdoor (all sides of the compounds are open and the stations are not installed in natural depressions), therefore they are considered adequately ventilated. This classification assumes that all stations on the ADP covered by this report are well maintained at all times.



2.3 REFERENCES

2.3.1 AUSTRALIAN STANDARDS

AS/NZS Explosive atmospheres

60079.10.1:2009 Part 10.1: Classification of areas - Explosive gas

atmospheres

(IEC 60079-10-1, Ed.1.0(2008) MOD)

AS/NZS Electrical apparatus for explosive gas atmospheres 60079.20:2000 Part 20: Data for flammable gases and vapours,

relating to the use of electrical apparatus

2.3.2 INTERNATIONAL STANDARDS

IP 15 Model code of safe practice

Third Edition, 2005 Part 15: Area classification code for installations

handling flammable fluids

API RP 505 Classification of locations for electrical installations at

First Edition, 1997 petroleum facilities classified as Class I, Zone 0, Zone

1, and Zone 2



2.4 PROCESS DESCRIPTION AND OPERATIONS

2.4.1 PROCESS DESCRIPTION

2.4.1.1 Overview

The Amadeus Darwin Pipeline (ADP) was constructed to deliver gas from the Palm Valley and Mereenie gas plants in the south of the Northern Territory to Darwin in the north of the territory. Several offtakes have been added to supply users along the length of the pipeline. The pipeline is approximately 1,513 km long.

Currently, the majority of the gas is supplied to the ADP from Wadeye via the Bonaparte pipeline. The Bonaparte pipeline connects in to the ADP at Ban Ban Springs.

Typically drains and vents in the facilities are fitted with plugs or caps and therefore are not a source of release during normal operation. Drains are operated only when then the pipeline is depressured and do not require further consideration, vent points marked with BD on the P&IDs are assumed to be operated during routine operation and maintenance of the station and require consideration as a source of release.

2.4.1.2 Mereenie

Gas to the Mereenie station comes from the Santos operated Mereenie gas plant. Currently there is no contract for the supply of gas from Mereenie, however the station remains pressurised and can be returned to operation if required.

The station consists of DN 200 above ground connection to the Mereenie gas plant. Close to the connection point are temperature and pressure transmitters and high temperature and pressure trips and a station limit valve (SLV). The SLV is pneumatically actuated from instrument gas conditioned locally. The instrument gas system is provided with a local PSV that vents to atmosphere.

The gas then passes to two parallel filter separators. The filter separators are horizontal and fitted with quick opening closures to allow removal of the filter elements. The filter separators have been swapped with the filters originally installed at Palm Valley and this required some pipework modifications. The liquids removed from the gas are collected in a drain boot underneath the filter separator. The liquids are drained back to the Mereenie production facility. The filter separators are fitted with the following instrumentation; pressure indicator, differential pressure transmitter, level glasses, high level switches and a PSV.

From each filter separator the gas flows to a meter run. The flow meters are orifice meters that are fitted with flow conditioners, pressure transmitter, a low range and a high range differential pressure transmitter and a temperature transmitter. A blowdown point is provided on each meter run that can blow down the meter run and filter separator.

The pipework downstream of each meter run joins to a common line. There is a DN 20 blowdown point and an insertion sample probe installed to provide gas samples for the gas chromatograph and dew point analyser.

The gas then passes underground through a manual station limit valve to the Mereenie to Tylers Pass pipeline. There is a scraper launcher installed with quick opening closure, pressure indicator, blow down vent and associated valving for the launching of pigs.



2.4.1.3 Palm Valley

The Palm Valley metering station receives gas from the Magellan Petroleum operated Palm Valley gas plant.

The station consists of DN 300 above ground connection to the Palm Valley gas plant. Close to the connection point are temperature and pressure transmitters and high value trips and a station limit valve (SLV). The SLV is pneumatically actuated from instrument gas conditioned locally. The instrument gas system is provided with a local PSV that vents to atmosphere.

The gas then passes to two parallel filter separators. The filter separators are horizontal and fitted with quick opening closures to allow removal of the filter elements. The filter separators have been swapped with the filters originally installed at Mereenie; the filters are installed in the same location and have required minimal pipework modifications. The liquids removed from the gas are collected in a drain boot underneath the filter separator. Liquids are removed to temporary containers. The filter separators are fitted with the following instrumentation; pressure indicator, differential pressure transmitter, level glasses, high level switches and a PSV.

From each filter separator the gas passes to a meter run. The flow meters are orifice meters that are fitted with flow conditioners, pressure transmitter, a low range and a high range differential pressure transmitter and a temperature transmitter. A blowdown point is provided on each meter run that can blow down the meter run and filter separator.

The pipework downstream of each meter run joins to a common line. There is a DN 20 blowdown point and an insertion sample probe installed to provide gas samples for the gas chromatograph and dew point analyser.

The gas then passes underground through a manual station limit valve to the Palm Valley to Tylers Pass pipeline. The underground section of pipe is fitted with a blowdown point. A connection point and additional valve has been installed on the blowdown stack to provide gas to the Palm Valley to Alice Springs station. The connection point for the gas analyser has been relocated to this section of pipework to allow measurement of the gas that passes from the Amadeus Darwin Pipeline to the Alice Springs Pipeline. The pipework to the Palm Valley to Alice Springs Pipeline passes underground to a point adjacent to the Palm Valley to Alice Springs compound. There is a flanged connection to the compound fence line.

There is a scraper launcher installed with quick opening closure, pressure indicator, blow down vent and associated valving for the launching of pigs to the ADP.

2.4.1.4 Palm Valley Alice Springs

The Palm Valley Alice Springs site, also referred to as the Palm Valley Interconnect receives gas from either the Magellan operated Palm Valley gas plant or from the ADP via the Palm Valley metering station.

The gas supply from the ADP is fed to a skid. The skid has recently been modified by APA, although no information is available. From the existing P&IDs and inspection; the pipe from the Palm Valley station is DN 100. The pipe decreases to DN 80 on the skid. At the inlet to the skid there is a pressure transmitter and indicator. The gas passes to a flow meter with pressure and temperature correction. Isolation valves and a manual bypass are provided. The skid is supplied with two pressure control valves, the main one is electro-pneumatic and the stand-by one is pneumatic controlled and actuated. Downstream of the control valves is an actuated valve fitted with pressure pilots and solenoids. The instrument gas for the control valves is conditioned from the transmission gas. The instrument gas is fitted with dual pressure regulators, knock out pot, filter, a PSV and high and low pressure pilots that close the actuated valve. The vents from all two valve instrument manifolds are tubed to a location at the edge of the skid roof.



The line from the Palm Valley gas plant is DN 100 which increases to DN 200. The gas then passes to a restriction orifice (RO). Upstream of the RO is the DN 50 kicker line connection to the scraper launcher. Downstream of the RO is the connection from the ADP. Next there is a station limit valve (SLV) that isolates Palm Valley to Alice Springs pipeline from both gas feeds. The SLV is pneumatically actuated from instrument gas conditioned locally and closes when a low pressure is sensed in the pipeline.

The scraper launcher is fitted with a quick opening closure, a pressure indicator, pressure relief valve and valves to allow operation.

Parallel to the scraper launcher is a wall. The wall is 1.8 m away from the centre line of the scraper launcher. The impact of the wall on the hazardous zones will be to extend the size of the hazardous area zone (refer section 2.7.12).

2.4.1.5 Tylers Pass

At Tylers Pass the gas from Mereenie and Palm Valley are commingled and odorant is added. The DN 250 pipeline from Mereenie passes to an above ground scraper receiver, fitted with pig sig, vent, pressure indicator, quick opening closure and valving to allow operation. During normal operation the gas bypasses the scraper vessel via underground pipework. A pipeline riser is fitted with pressure transmitter, pressure indicator and high pressure trip. Downstream, there is a buried valve with above ground pneumatic actuator. The actuator is powered by instrument gas conditioned locally from the transmission gas.

The gas from Palm Valley is similar to the Mereenie connection but does not have a scraper receiver. The pipeline is DN 350 and includes a riser with pressure transmitter and pressure indicator upstream of a buried valve with above ground pneumatic actuator. The actuator is powered by instrument gas conditioned locally from the transmission gas.

There is a DN 200 vertical blowdown stack fitted with quick opening closure. The stack has buried connections and valves to the pipeline sections to Mereenie, Palm Valley and Tanami Road, as well as the scraper receiver.

Downstream of the two actuated valves the two pipeline sections join and are fitted with a temperature transmitter, pressure transmitter, pressure indicator, instrument gas offtake and odorant injection point.

The odorant injection package consists of an odorant storage pressure vessel, instrument gas conditioning and control and odorant dosing pumps. The storage vessel is fitted with a pressure relief valve, pressure indicator, two level glasses, a level transmitter and a continuous vent fitted with adsorption vapour filter. The vent from the tank is fitted with a cap so that the discharge point is vertically downwards. The instrument gas conditioning equipment comprises two regulators to reduce the pressure to 400 kPag. The tank blanket instrument gas is regulated to 15 kPag by a pressure regulator / over pressure shut off (OPSO) valve. The injection pump instrument gas is regulated to 400 kPag by a regulator. Control of the odorant injection pumps is by solenoid valves. The odorant dosing pumps suction is connected to the bottom of the odorant storage vessel. The discharge of each odorant dosing pump is fitted with a flow switch and pressure relief valve. The odorant injection point is fitted with an averaging chamber and a site flow indicator.

Note that there is no gas supply from Mereenie or Palm Valley and the gas flow through Tylers Pass is in the reverse direction. At the time of inspection the odorant plant was not operating.



2.4.1.6 Tennant Creek Metering Station

The Tennant Creek pressure reduction and metering station receives gas from ADP to Tennant Creek Pipeline, approximately 25 km long, and supplies the Tennant Creek power generation site. The Tennant Creek Station comprises of two filter separators, two water bath heaters, an atmospheric slop tank, control valves, pressure regulators, pressure relief valves, and the related pipework, instrumentation and valving.

The inlet to the station is DN 100 and consists of a scraper receiver vessel. The scraper vessel is fitted with local vent, PSV, pressure indicator and associated pipework and valving. The closure on the vessel is a blind flange.

The piping in parallel to the scraper receiver is fitted with a pressure transmitter, pressure gauge and a buried mainline valve. The valve has an aboveground gas over oil hydraulic actuator.

The gas then passes through two parallel filter separators. Upstream of both filter separators are temperature control valves that reduce the pressure to 5,200 kPag / 17°C [based on operating conditions at the time of the site visit]. The temperature control valves are provided with cascade control for pressure and temperature. The filter separators are fitted with a differential pressure transmitter, pressure indicator, high liquid level switches and high-high liquid level switches. The liquids are drained manually to an elevated slops tank. The slop tank is fitted with a liquid level glass and hose to allow emptying.

Gas from the filter separators is then heated by indirect fired water bath heaters to approximately 60 °C. The water bath heaters are operated as duty - standby, with the standby heater remaining 'hot' to allow quick change over, controlled by the actuated valves on the inlet to each heater.

The heated gases from heaters pass through two parallel regulator / meter runs. The regulator / meter runs are operated in duty - standby and each contains active - monitor pressure regulators. The meter skids are provided with two actuated valves that close on high pressure downstream of the regulators. Additional high pressure switches at the station outlet initiate a station ESD. Further over pressure protection is provided by a PSV at the station outlet. A meter is provided in each run. The meters are orifice meters with upstream flow conditioners, temperature transmitters, pressure transmitters and high and low range differential pressure transmitters. Each run is provided with a local blowdown point, pressure indicators and valving.

The station outlet is provided with a temperature indicator, temperature transmitter and low temperature switches. There is also provision for the installation of a future gas sampler. The connection to the Tennant Creek power generation site is DN 100.

Pipework downstream of the heater is fitted with insulation up to the station outlet.

Instrument gas is conditioned locally for each actuated valve and temperature control valve. Gas is conditioned at each water bath heater to provide fuel gas for the pilot and main burners. The fuel gas conditioning trains comprise of a pre-heat coil, strainer, primary pressure regulating valve, actuated ESD valves, secondary pressure regulating valve, meter and a temperature control valve.

A control system provides control and telemetry for the various process measurement parameters. The control system provides flow control and high pressure automatic shutdown functionality and allows remote operator shutdown. The control system is powered by single phase 230 VAC power supply, with back up batteries.



2.4.1.7 Elliott Meter Station

The Elliott Meter Station receives gas from a DN 50 lateral from the ADP. The lateral is approximately 4 km long and provides gas for the Elliott power generation site. The station consists of a scraper receiving vessel, dry gas filter, filter separator, knock out pot, two stages of pressure regulation, a catalytic heater, metering run, slop tank, atmospheric vent stack and the associated pipework, valves and instrumentation.

At the inlet to the station is a scraper receiving vessel. The scraper vessel is fitted with local vent, PSV, pressure indicator and associated pipework and valving. The closure on the vessel is a blind flange.

The main gas flow to the skid passes to an actuated valve. The gas is then filtered in a dry gas filter. The filter is horizontal and fitted with a quick opening closure, differential pressure gauge, PSV and vent.

The gas then passes to a temperature gauge and then two parallel pressure regulators that operate in duty and standby that reduce the gas pressure to 3,000 kPag.

The gas passes to a filter separator fitted with a differential pressure gauge with inductive high differential pressure switch, level gauge, pneumatic liquid level controller and control valve and high liquid level switch, pressure relief valve.

The gas from the filter separator passes to a knock out pot and then to a catalytic heater. The catalytic heater is decommissioned and has not operated for some time.

From the heater the gas passes to the second stage pressure regulators. The gas is reduced in pressure to 500 kPag in the parallel pressure regulators, operating in a duty-standby arrangement.

The gas is then metered in a rotary positive displacement meter that is corrected for temperature and pressure. Upstream of the meter is a second pressure relief valve.

Instrument gas for the site instrumentation and fuel gas for the catalytic heater are conditioned in an offtake from the outlet of the skid and distributed as required.

A control system provides control and telemetry for the various process measurement parameters. The control system provides flow control and high pressure automatic shutdown functionality and allows remote operator shutdown. The control system is powered by single phase 230 VAC power supply, with back up batteries.

2.4.1.8 Daly Waters Scraper and Meter Station

The Daly Waters Scraper and Meter Station is located at KP 0982 on the ADP and consists of a scraper receiver, scraper launcher and a filter, meter and pressure regulator station. The scraper part of the station is on the ADP and is the same as the scraper stations described in section 2.4.14. The meter part of station provides filtration and metering for the McArthur Mine River Pipeline. The meter station consists of gas over oil hydraulically actuated mainline, filter separators, metering, pressure regulation, a scraper launcher and associated pipework, valving and instrumentation.

The connection to the meter station is from the underground future compressor connection on the southern side (nominally upstream) of the scraper station. An above ground DN 350 blank flange has been provided for future connections. The connection to the meter station is DN 150 and consists of a ball valve with pressurising bypass and a downstream blank flange. The connection to the meter skid is by approximately 50 m of DN 150 welded pipe across the station.

The metering station is installed on two skid frames. The first comprises of an actuated valve, two dry gas filters, two meters, pressure control valves, instrument gas conditioning system and a scraper launcher.



The actuated valve is gas over oil actuated. Downstream of the actuated valve are two dry gas filters. Each dry gas filter is fitted with a differential pressure transmitter, manual vent and a drain. The gas from each filter passes to a meter run that comprises of a flow conditioner, orifice plate and thermowells. One of the meter runs is not fitted with instruments. The other is fitted with pressure transmitter, differential pressure transmitter and temperature transmitter.

2.4.1.9 Katherine Offtake

The Katherine Offtake is installed on the ADP at approximately KP 1,221. The site consists of a take-off from the mainline. The offtake is fitted with a DN 100 buried valve. The valve is manual operated and has above ground gear box, maintenance ports and a cavity bleed. The valve has DN 50 risers either side of the valve, fitted with manual valves. A scraper launcher is installed at the site. The scraper vessel is fitted with pressure indicator, PSV and local vent. An above ground DN 100 valve with DN 50 bypass is also provided at the station. The valve may be a plug valve, a ball valve or a globe valve in accordance with the P&ID, details drawing or site photographs respectively.

2.4.1.10 Katherine Meter / Regulating Station

The Katherine Meter/Regulating Station includes two filter separator, two water bath heaters, a slop tank, main line valve, control valves, pressure relief valves and the related pipework, instrumentation and valving.

The inlet to the station is DN 100 and consists of a buried station limit valve (MLV 11) with above ground actuator, maintenance ports and cavity bleed. A scraper receiver vessel is installed in parallel to MLV 11. The scraper vessel is fitted with a local vent, PSV, pressure indicator and associated pipework and valving. The closure on the vessel is a blind flange.

The following instrumentation is installed at the inlet; pressure indicator, a pressure transmitter and a temperature indicator.

The gas then passes through two parallel filter separators. Upstream of both filter separators are temperature control valves that reduce the pressure to 4,400 kPag / 16°C [based on operating conditions at the site visit]. The temperature control valves are provided with cascade control for pressure and temperature. One valve is fitted with a pneumatic controller to continue supply during outage of the electronic control system. The filter separators are fitted with differential pressure transmitter, pressure indicator, high liquid level switches and high-high liquid level switches. The liquids are drained manually to an elevated slops tank. The slop tank is fitted with a liquid level glass and a hose to allow emptying. Gas from filter separators is then heated by indirect fired water bath heaters up to approximately 60 °C. The water bath heaters are operated as duty - standby, with the standby heater remaining 'hot' to allow quick change over of the that is controlled by actuated valves on the inlet to each heater.

The heated gases from the heaters pass through two parallel regulator / meter runs. The regulator / meter runs are operated in duty - standby and each contains active - monitor pressure regulators. The meter skids are provided with two actuated valves that close on high pressure downstream of the regulators. Additional high pressure switches at the station outlet provide a station ESD. Further over pressure protection is provided by a PSV at the station outlet. A meter is provided in each run. The meters are orifice meters with upstream flow conditioners, temperature transmitters, pressure transmitters and high and low range differential pressure transmitters. Each run is provided with a local blowdown point, pressure indicators and valving.



The station outlet is provided with a temperature indicator, temperature transmitter and low temperature switches. There is also provision for the installation of a future gas sampler. The connection to the Katherine power generation site is DN 100.

Instrument gas is conditioned locally for each actuated valve and temperature control valve. Gas is conditioned at each water bath heater to provide fuel gas for the pilot and main burners. The fuel gas conditioning trains comprise of pre-heat coil, strainer, primary pressure regulating valve, actuated ESD valves, secondary pressure regulating valve, meter and temperature control valve.

The gas released in emergency directs to the vent stack that discharges to atmosphere and the liquid removed from the gas flows to the slop tank. The maximum PSV set point is 3,200 kPag and the temperature limit is set at 60 °C in the station.

A control system provides control and telemetry for the various process measurement parameters. The control system provides flow control and high pressure automatic shutdown functionality and allows remote operator shutdown. The control system is powered by single phase 230 VAC power supply, with back up batteries.

2.4.1.11 Pine Creek

The Pine Creek pressure reduction and metering station receives gas from ADP to supply the Pine Creek power generation site. The Pine Creek Station comprises of a dry gas filter vessel, a filter separator, a knockout pot, two water bath heaters, an atmospheric slop tank, control valves, pressure relief valves, and the related pipework, instrumentation and valving.

The Pine Creek station is located close to the ADP and a mainline valve is located within the station. The inlet connection to the station has two DN 80 manual valves. One valve is fitted with an insulation flange and a surge arrestor, the second is fitted with a pressurising bypass. Downstream of the manual valves is an actuated valve that is also fitted with a pressurising bypass. The gas then passes to a dry filter vessel that is fitted with a pressure indicator, PSV, a vent valve, pressurising line and a bypass line to allow maintenance of the filter. From the filter, the gas passes to a duty standby temperature control valve that drops the gas pressure from 7,800 to 4,200 kPag and a temperature of 16°C [based on observations during the site visit]. The gas then passes to a filter separator that is fitted with level gauge, level controller, level control valve, high level switch, pressure indicator, PSV, vent valve and differential pressure transmitter. In parallel to the filter separator is a knock out pot to allow maintenance on the filter separator. The knock out pot is fitted with level gauge, pressure indicator, PSV, vent valve and drain valve.

Gas from filter separator / knock out pot is then heated by indirect fired water bath heaters up to approximately 60 °C. The water bath heaters are operated as duty - standby, with the standby heater remaining "hot" to allow quick change over of the that is controlled by actuated valves on the inlet to each heater.

The heated gas then passes to parallel pressure control valves. The valves are operated as duty and standby. The valves are pneumatically controlled. Over pressure protection is provided by a PSV downstream of the pressure control valves. Gas metering is by a single orifice meter fitted with a pressure transmitter; high and low range differential pressure transmitters and a temperature transmitter. A bypass is provided around the meter for maintenance.

Metered gas then passes to a second knock out pot fitted with a drain valve, PSV and level gauge. The piping from the knock out pot contains a temperature transmitter, temperature indicator, high pressure switches and a pressure transmitter. A double block and bleed valving arrangement is provided. The connection to the Pine Creek power generation site is via an underground pipework and the above ground flange is provided with an insulation



gasket. A spare flange is provided at the connection point for a future connection to the Pine Creek power generation site, the flange is fitted with a blind flange, insulation gasket and a surge arrestor.

Liquids collected from the dry filter, filter separator and knock out pots is sent to an elevated slops tank. The slops tank is fitted with a safety relief valve (SRV, pressure vacuum vent valve, flame arrestor, pressure indicator, high liquid level switch and hose for emptying.

Vents and PSV discharges from the dry filter, filter separator and knock out pots and vents from instrument manifolds and pneumatic controllers are sent to a local vent stack. The vent stack is fitted with a flame arrestor.

Instrument gas is conditioned centrally for the site from a connection from the outlet knock out pot.

Gas is conditioned at each water bath heater to provide fuel gas for the pilot and main burners. The fuel gas conditioning trains comprise of pre-heat coil, strainer, primary pressure regulating valve, actuated ESD valves, secondary pressure regulating valve, meter and temperature control valve. A control system provides control and telemetry for the various process measurement parameters. The control system provides flow control and high pressure automatic shutdown functionality and allows remote operator shutdown. The control system is powered by single phase 230 VAC power supply, with back up batteries.

2.4.1.12 Darwin City Gate

Darwin City Gate receives gas from the ADP. Gas flows to three locations, Wickham Point, Channel Island and Trunk Package Offtake Station (TPOTS). The Wickham Point (Corroco Philips, Darwin LNG plant) pipeline can be reversed to ensure gas supply to Darwin/Channel Island. The gas supply to Wickham point is fitted with an actuated valve. The gas supply to Channel Island and TPOTS is filtered, reduced in pressure to 5,800 kPag and the gas composition and moisture dew point is analysed. The gas to TPOTS is regulated to a 850 kPag and metered.

The Darwin City Gate Station comprises of scraper vessels, a multicyclone, two filter separators, an atmospheric slop tank, gas chromatograph system, moisture analyser, control valves, pressure regulator, pressure relief valves, blowdown stack and the related pipework. Liquids (condensate, water and compressor lube oil) removed from the gas is stored in the slop tank for batch treatment.

The station consists of DN 300 above ground connection. A scraper receiver is installed with buried hydraulically actuated valve. The actuated valve includes electric solenoids to allow remote operation. During normal operation gas bypasses the scrapers and flows through the actuated valve, the scraper vessels are closed and isolated from the pipeline. At the station inlet, the pipeline divides in two, with one supplying gas to Weddell interconnect and one supplying to the City Gate station. The main line is installed with DN20 blowdown, temperature transmitter and pressure transmitter. The line then divides in to two, the normal flow is through the multi-cyclone to remove solids. The multicyclone is fitted with a PSV with a set point of 9,650 kPag. Both parallel streams include a temperature control valve and a filter separator. The filter separators are horizontal and fitted with quick opening closures to allow removal of the filter elements. The liquids removed from the gas are collected in a drain boot underneath the filter separator and flow under level control to a slop tank. The filter separators are fitted with the following instrumentation and connections; pressure indicator, differential pressure transmitter, level glasses, high level switches, high high level switches, local drains and level controllers. The



temperature and level control valves are pneumatically controlled and actuated. Local instrument gas conditioning skid is provided with PSV to provide over pressure protection.

Common line of the outlet from the filter separators is installed with temperature indicators, temperature transmitter, pressure indicators, and pressure transmitters. The connection point for the gas chromatograph and dew point analyser has been installed to this section of pipework to allow analysis of the gas. The gas chromatograph and dew point analyser are installed in a shelter adjacent to the filter skid. The chromatograph receives a sample of the transmission gas at a pressure of approximately 140 kPag from an insertion regulator installed in the pipe. The carrier and calibration gases are stored in gas bottles and regulated for use at 140 kPag. The chromatograph vents gas to exhaust vents above the analyser shelter roof. The mainline then passes through a mainline valve. Downstream of the mainline valve is installed with pressure indicator and transmitter before the pipeline directed to Channel Island meter station.

A separate offtake to TPOTS passes gas to a DN 50 pressure regulation and metering skid. The skid has duty and standby arrangement with each containing active and monitor pressure regulators and turbine meters. A high pressure trip is provided that closes an actuated valve at the inlet. The meter runs, with one serving as duty run and other as standby run. The gas is then directed to Berrimah Road.

A control system provides measurement and telemetry for the various process instruments. The control system allows remote operator shutdown. The control system is powered by single phase 230 VAC power supply, with back up batteries.

2.4.1.13 Channel Island

Channel Island regulating and metering station receives gas from Darwin City Gate meter station. The Channel Island Regulating Meter Station consists of two water bath heaters, solids filter, four filter separators, slam shut valves, active and monitor regulators, meters, pressure relief valves, local vent points and the associated valving and pipework.

The gas passes to a solids filter. The filter is fitted with a pressure indicator, differential pressure transmitter, local vent point and local drain. The filter has a quick opening closure and a bypass, with manual valving. The filtered gas is then heated to approximately 60°C in two parallel water bath heaters. One water bath heater is operating and the other is in hot-standby. Actuated valves at the heater inlets control the gas flow.

The combined outlet line from the water heaters as a high temperature switch, temperature indicator and temperature transmitter. The line then passes to one of two filter, regulation and metering runs to supply gas to either Unit 1 or Unit 7 at the Channel Island Power Generation Site.

The Unit 1 filter, regulation and metering run comprises of two parallel runs each containing actuated valve, active-monitor pressure regulators, filter separators and meters. The actuated valves are both normally open and are closed on either signal from the control system or high pressure downstream of the regulators. The pressure regulators are self acting and externally sensed. The gas of each regulator pair flows to the corresponding filter separator. The filter separators are horizontal and fitted with quick opening closures to allow removal of the filter elements. The liquids removed from the gas are collected in a drain boot underneath the filter separator. No slops tank is installed at site at liquids are drained from the filter separators manually. The filter separators are fitted with the following instrumentation and connections; pressure indicator, differential pressure transmitter, level glasses, high-high level switches, local drains and level controllers. The filtered gas is metered in orifice meters, each meter is fitted with flow conditioner, pressure transmitter, high and low range differential pressure transmitters and temperature transmitters. Additional overpressure protection is provided by a PSV. The combined outlet from the Unit

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1 regulation, filter and metering runs is fitted with low pressure switch and high pressure switches that all initiate an ESD, and a pressure transmitter, pressure indicator, temperature transmitter, temperature indicator, low temperature switch connection for future gas analysis and an isolation valve.

The Unit 7 filter, regulation and metering run comprises of two parallel runs each consisting of filter separator, pressure regulators, metering and associated instrumentation and valving. There is an actuated valve at the inlet before a split to two filters. The filters are fitted with pressure indicator and differential pressure transmitter. Downstream of each filter is an actuated valve. The valves are normally open and are closed on signal from the control system or high pressure downstream of the pressure regulators. Metering is provided by a Coriolis meter and a AVT turbine meter. The primary duty meter is the Coriolis meter, but the turbine meter can be operated in series or parallel. Both meters are provided with temperature and pressure correction. Downstream of the meters the combined outlet has a PSV, local manual vent, temperature transmitter and pressure transmitter.

Instrument gas is conditioned locally for each actuated valve.

A control system provides measurement and telemetry for the various process instruments. The control system allows remote operator shutdown. The control system is powered by single phase 230 VAC power supply, with back up batteries.

2.4.1.14 Scraper Stations

The scraper stations are provided along the length of the pipeline to allow cleaning and inspection of the pipeline. The scrapers stations are installed at Tanami Road, Ti Tree, Wauchope, Renner Springs, Newcastle Waters, Helling and Ban Ban Springs. Additionally scraper vessels are included at some of the stations along the pipeline. A scraper receiver and launcher are installed at each site along with a buried hydraulically actuated valve. The actuated valve includes electric solenoids to allow remote operation. During normal operation gas bypasses the scrapers and flows through the actuated valve, the scraper vessels are closed, isolated from the pipeline and depressured.

The pipeline is provided with buried isolation valves. A pressure transmitter and indicator are installed on a pipe riser either side of the actuated valve. A temperature transmitter is installed downstream of the actuated valve.

The scraper vessels are fitted with quick opening closures, a DN 25 local vent, a pressure gauge and connections with valves to allow operation. The vessels also include connections for pressure relief valves that have been removed on some / all scraper vessels. Pig passage indicators are installed on the pipeline and scraper vessels.

There is also a pipeline vent installed at the site within a separate compound. During normal operation the vent is closed with a quick opening closure.

2.4.1.15 Ban Ban Springs Scraper Station

The scraper station at Ban Ban Springs also includes an off take connection to Cosmo-Howley and a supply connection from the Wadeye pipeline. The off take to Cosmo Howley is a blind flange on a pipeline riser. The pipeline is decommissioned and the meter station has been removed. The connection from the Wadeye pipeline is underground pipework from the Ban Ban Springs meter station. The pipeline connections is to the upstream connection for a future compressor. There is an above ground valve with bypass installed adjacent to the connection.



At the Helling scraper station there are pipework and vents that are used for training The training pipework is not connected to the station pipework during normal operation of the pipeline and the training pipework is unpressurised. No records have been provided for the training pipework and it is not included in the hazardous area classification.

2.4.1.16 Warrego Scraper Station

The scraper station at Warrego is also the site of a compressor. The compressor is connected to underground connections either side of the mainline valve. An actuated valve with manual bypass / pressuring line is installed at each connection. The actuated valves are provided with an instrument gas connection from the Warrego compressor site.

The remainder of the Warrego compressor site is not considered within this hazardous area classification.

2.4.1.17 Mainline Valves

There are several mainline valve sites located at Aileron, Barrow Creek, Kelly Well, Morphett Creek, Fergusson, Larrimah, Tindal, Acacia and Berry Springs. The data used for classifying the mainline valves' hazardous area is obtained solely from the Aileron site. Each of the sites is assumed to be identical and comprises of a buried valve with an above ground bypass and vent points with no instrumentation installed on the mainline valve. The buried valve has a manual actuator and gear box, injection ports and cavity bleed extended above ground. This is shown in the photograph below.





2.4.1.18 Bachelor Mainline Valve

The Batchelor mainline valve site is located at KP 1441 between Ban Ban Springs and Darwin City Gate. The Batchelor Mainline valve site is similar to other mainline valve sites but the mainline valve has an actuator, similar to the scraper stations. The mainline valve consists of a DN300 underground valve with an above ground actuator, maintenance ports and cavity bleed. The valve has an above ground DN100 bypass. Pressure transmitters are fitted either side of the valve. The site also has a control room.

2.4.2 OPERATING CONDITIONS

The maximum operating pressures and temperatures at the stations are summarised in Table 1.

Table 1 Operating pressures and temperatures

Temperature	Pressure (Process)	Pressure	Pressure
		(Fuel gas)	(Instrument gas)
Max. (°C)	Max. (kPag)	Max. (kPag)	Max. (kPag)
60	9,650	≤ 650	770

2.4.3 VENTILATION

Each of the sites is in the open air and is considered to have good ventilation. Some equipment is installed in open-sided shelters. These are not considered to have any impact on ventilation.



2.5 PROPERTIES OF HAZARDOUS MATERIALS

2.5.1 GASES HANDLED

The gas processed through the regulating and metering stations contains mainly methane (typically 87 mol%) and nitrogen (about 8 mol%), along with small quantities of hydrocarbons (C2+) and carbon dioxide (totally < 5 mol%). The specific gravity of the gas is 0.62, which is lighter than air (SG=1.0). It is classified as a Category G(i) fluid in accordance with IP15 Section 1 (Table 1.2 – fluid categories) and as a Group IIA in accordance to AS/NZS 60079.20 section 4.6. The composition of the gas is shown in Table 2.

Note that the gas composition in the pipeline can vary from the typical figures shown in Table 2. However, methane will remain the predominant component and the properties of the gas will remain the same and will be the same as methane. Australian standard AS 4564 (AG 865) Specification for general purpose natural gas, provides information of the allowable properties of natural gas. Similarly, APA will have a Sales / Shippping Agreement for the injection of gas into the pipeline that should be observed. The limitations are summarised in Table 3.

Note that on release from high pressure, the gas will be cooled due to Joule-Thomson cooling. At lower temperatures the gas is less dense and the dispersion in air will be slightly impacted, but the flammable range is reduced. Similarly, for higher temperatures the flammable range is increased, but the dispersion is increased. At the dilute concentrations at the lower explosive limit, the gas-air mixture temperature will be close to ambient temperature therefore, there will be no additional consideration for temperature effects.

Table 2 Typical Gas Composition

Component	Symbol	mol%
Methane	CH₄	87.0
Ethane	C ₂ H ₆	2.6
Propane	C₃H ₈	0.8
i-Butane	C ₄ H ₁₀	0.1
n-Butane	C ₄ H ₁₀	0.2
i-Pentane	C ₅ H ₁₂	0.07
n-Pentane	C ₅ H ₁₂	0.05
n-Hexane	C ₆ H ₁₄	0.07
n-Heptane	C ₇ H ₁₆	0.02
n-Octane	C ₈ H ₁₈	0.004
n-Nonane	C ₉ H ₂₀	0.004
Carbon Dioxide	CO ₂	0.95
Nitrogen	N ₂	8.2
Total		100
Specific Gravity (r	nixture)	0.62



Table 3 Gas specification limits

Characteristic	APA Schedule 4 Limits	AS 5654 Limits
HHV	Minimum 33.0 MJ/Sm ³	-
	Maximum 42.0 MJ/Sm ³	
Wobbe Index	Minimum 44.0 MJ/Sm ³	Minimum 46.0 MJ/m ³
	Maximum 51.0 MJ/Sm ³	Maximum 52.0 MJ/ ^{m3}
Oxygen	Maximum 0.2 mol%	Maximum 0.2 mol%
Hydrogen Sulphide	Maximum 10.0 ppmw	Maximum 5.7 mg/m ³
Total Sulphur	Maximum 50 mg/Sm ³	Maximum 50 mg/ ^{m3}
Water Content	Maximum 80 mg/Sm ³	Maximum – Dewpoint 0°C at the highest MAOP in the relevant transmission system (in any case, no more than 112.0 mg/m³)
Cricondentherm	Maximum 10.0°C	
Hydrocarbon Dewpoint		Maximum 2.0°C at 3,500 kPa
Total inert gases	Maximum 12.0 mol%	Maximum 7.0 mol%
Nitrogen	Maximum 11.0 mol%	-
CO ₂	Maximum 7.5 mol%	-
Mercury	Maximum 0.2 mg/Sm ³	
Methanol	Maximum 1.0 mg/Sm ³	
Glycols	Maximum 1.0 mg/Sm ³	
Radioactivity	Maximum 8,000 Bq/Sm ³	
Notes		m³ refers to dry gas at standard conditions (15°C and 101.325 kPa)

The chromatograph used for gas composition analysis requires carrier and calibration gases. The carrier gas (helium) is not flammable, while the calibration gas (mainly methane) is classified as a Category G(i) fluid with similar compositions as process gas.



2.5.2 LIQUIDS HANDLED

2.5.2.1 Filter Separator Drains

The liquids handled at the facilities may consists of condensate, compressor lubrication oil or water, which is removed from the gas by the filter separators. The condensate is considered to be flammable liquid and based on hexane is considered to be a group IIA liquid in accordance to AS/NZS 60079.20. The compressor lube oil used in the stations is combustible, but not flammable, with a typical flash point (closed cup) over 60 °C. Therefore, it is treated as a non-hazardous material for the purpose of the hazardous area classification. Water is considered to be non-hazardous liquid.

2.5.2.2 Odorant

Odorant is injected into the pipeline at Tylers Pass. The odorant is SpotLeak 1005 and is a flammable liquid. It consists of Thiophene, Propanethiol and methyl as per the product specification. The odorant is classified as group IIA in accordance to AS/NZS 60079.20 and category C fluid in accordance with IP15 Section 1 (Table 1.2 – fluid categories).



2.6 EQUIPMENT SELECTION

The general requirements for selection, installation and maintenance of explosion proof (Ex) electrical equipment are described in AS/NZS 2381.1:2005.

To ensure the Ex electrical equipment performs satisfactorily, without the risk of ignition, the data shown in Table 3 must be used as area specification requirements.

Table 4 Gas Group and Temperature Class

Performance Criterion	Requirement	Reference
Ambient temperature	0 - 50 °C	Bureau of Meteorology
Auto-ignition temperature (Methane)	537 °C	AS/NZS 60079.20
Apparatus Group	IIA	AS/NZS 60079.20
Temperature Class	T1 / T3	AS/NZS 60079.20

The recommendations on equipment group and temperature class should be regarded as **minimum** requirements. Equipment selection must take into account local conditions, such as the presence of hot surfaces close by and electrical equipment design.



2.7 CLASSIFICATION

2.7.1 PIPING

2.7.1.1 Process Piping

Welded piping at the stations is designed and constructed to ANSI/ASME B 31.3 and is not considered as a source of release. However, the possible release of flammable material occurs at flanges, valves and fittings due to the possible leakage from a gasket or seal. A majority of process gas service pipework installed in the stations is flanged. The screwed connections are limited to the small bore piping with a nominal size less than DN25. The screwed piping has tapered threads with similar leakage integrity to the flanged connections. The piping in the facilities is a permanent fixture and not subject to vibration.

All flanges and infrequently used valves are considered to be well maintained and located in an adequately ventilated area in the gas regulating and metering stations. Leakage of the flammable material at connection points is considered abnormal and the quantity of the hazardous material released is considered minor. Consequently, they are regarded as sources of *Secondary* grade release and a hazardous Zone 2 within a sphere area with 2 m radius from the potential leakage points is claimed around the piping with flanges or threaded joints, meters or regulators and valves other than relief valve in accordance with AS/NZS 60079.10.1 Clause ZA.6.6.2.4 for high pressure gas transmission system.

As a worst case the liquid piping is assumed to carry condensate which is a flammable liquid in accordance with AS/AZS 60079.10.1 clause ZA 5.2.8 that claims a hazardous area of Zone 2 of 1.5m in all directions of potential release points. However the liquid drain lines may contain sufficient quantities of dissolved and entrained. Since this hazardous area classification must account for a number of installations with a range of process conditions, liquid piping is classified as gas piping.

All process drains and vents used infrequently for maintenance or start-ups are normally plugged. Similarly, the sample points are taken on an infrequent or as required basis (maximum once every six months). To simplify hazardous area management, the classification for process gas piping will be assigned to the uncommonly operated process drains, vents and sample points, meaning a Zone 2 area of radius 2 m is declared around those potential leakage points.

The hazard zones adopted for the process piping, flanges, joints, valves and fittings are summarised below:

Zone 2 2 m radius from the edge of the process piping routes, including infrequently used process drains, vents and sample points

2.7.1.2 Instrument Gas Piping

The instrument gas pipework is fabricated from screwed pipe and tube with compression fittings. Similar to process gas piping, the instrument gas piping has potential leakage points at connection points. The leakage is considered abnormal with minor quantities of flammable material. Hence, they are regarded as sources of *Secondary* grade release and the associated hazardous area zone will be classified as Zone 2.

According to AS/NZS 60079.10.1 Clause ZA.6.4.2.3c, for the lighter-than-air flammable gas operating with a pressure between 700 and 2,000 kPag, a hazardous Zone 2 within a sphere area with 1 m radius from the potential leakage points is assigned to the piping with flanged and screwed joints.

The hazard zone adopted for instrument gas piping is summarised below:

Zone 2 1 m radius from the edge of the instrument gas piping routes



2.7.1.3 Fuel Gas Piping

Fuel gas piping is fabricated with screwed connections, except those pipes with a nominal diameter less than DN25 and with flanges for larger diameters. The screwed piping has tapered threads with similar leakage integrity to flanged connections. The leakage is considered abnormal with the presence of minor quantities of flammable material. Hence, they are regarded as sources of *Secondary* grade release and the associated hazardous area zone will be classified as Zone 2.

According to AS/NZS 60079.10.1 Clause ZA.6.4.2.3c, for the lighter-than-air flammable gas operating with a pressure between 100 and 700 kPag, a hazardous Zone 2 within a sphere area with 0.5 m radius from the potential leakage points is declaimed around the piping with flanged and screwed connections.

The hazard zone adopted for fuel gas piping is summarised below:

Zone 2 0.5 m radius from the edge of the fuel gas piping routes

2.7.1.4 Control Valves

There are several shut down valves, pressure / temperature control valves and level control valves installed in the stations. Similar to process piping, the process connections of control and actuated valves are considered well maintained and leakage is considered abnormal. Therefore connection points are considered the same as process pining as described in Sections 2.7.1.1, 2.7.1.2 and 2.7.1.3.

In addition, the control valves are in regular use and leakage is more likely due to wear on the packing. An additional *Primary* grade of release (Zone 1) with a nominal hazard radius of 0.3 m around the glands is claimed in accordance with IP15 Section 5.4.5.1.

Control valves will release minor amounts of flammable gas with a small continuous bleed from the positioners or exhausts at a low discharge velocity in normal operation. It contributes a *Continuous* grade of release and in accordance with AS/NZS 60079.10.1 clause ZA 6.6.2.5, a Zone 1 area with a 0.5m radius will be claimed. A larger region that represents infrequent higher gas velocities that may exist surrounding the Zone 1 area due to abnormal operation or failure of the valves. A Zone 2 area within 1 m radius in all directions is assigned to the low velocity vents.

The additional hazard zones adopted for the control valves are summarised below:

Zone 1 0.5 m radius around the control valve positioners and exhausts

0.3 m radius around the control and actuated valve glands

Zone 2 1 m radius around the control valve positioners and exhausts

2.7.1.5 Pressure Relief and Safety Relief Valves

Pressure relief valves (PSVs) and safety relief valves (SRVs) are mounted on the multicyclone, filters, process gas piping, fuel gas and instrument pipework to provide the protection against operational overpressure for the piping and equipment.

Note that SRVs in Pine Creek Station piped to the vent stack do not contribute to the extent of the hazardous classification except as discussed under Section 2.7.1.1 for process piping.

PSVs and SRVs venting directly to atmosphere are normally treated as a *Secondary* grade of release due to no action on normal operating conditions, and as a result the associated hazard zone will be classified as Zone 2. In accordance with AS/NZS 60079.10.1 Clause ZA.6.6.2.9, a Zone 2 area is assigned within 6 m diameter cylinder with its axis on the line



of discharge from 1 m behind the points of discharge to a distance 8 m in front of the points of discharge.

The seats on the PSVs and SRVs will be metal to metal and tight shut-off, which will contribute to a small leakage at the vent tips during the normal operation. In line with the specification described in IP15 Section 5.4.4.5, a Zone 2 area of nominal 1 m radius should be placed around the end of the discharge point to account for any small leakages. It is recommended to upgrade the *Secondary* grade of release to a *Primary* grade of release accounting for the presence of the flammable material in the normal operating. Hence, an additional Zone 1 area with a nominal hazard radius of 1 m is claimed around the PSV and SRV discharge points to account for the minor leak through the valve seats.

The hazard zones of the PSVs and RSVs are considered to be the same due to lack of the discharge rates, which actually affect the extending zone of hazardous area.

The hazard zones adopted for the PSVs and RSVs are summarised below:

Zone 1 1 m radius from the vent tips

Zone 2 6 m laterally, 8 m above and 1 m below the discharge points

2.7.1.6 Mainline Valves

Some of the actuated mainline valves (MLV) installed at the scraper stations as shown in the following photographs include an enclosure containing the solenoids and a hand pump for the valve. The solenoids vent to a location outside of the enclosure, however the tubing connections to the solenoid are a *Secondary* source of release. The enclosure has minimal ventilation and released gas can accumulate within the enclosure. Therefore a Zone 1 hazardous area is claimed within the enclosure.

Body bleeds valves maintenance ports and instrument gas connections from the buried valve are brought above grade. These provide potential leak sources and are treated the same as process piping connections as per section 2.7.1.1.

The hazard zone adopted for the actuated valve enclosures is summarised below:

Zone 1 Within the solenoid valve enclosure

Zone 2 2m radius from point of discharge





2.7.1.7 Local Vent Point

There are several local vent points installed in the facilities to allow the purging of gas from the stations following isolation. Each manual vent generally consists of a ball valve to control blow down rate. The ball valve provides high integrity isolation and wear is not considered on the valves. Hence, no leak is taken into account during the normal operation.

The hazardous area classification for those points is considered to be the same as PSVs and RSVs due to the similar operation which happens only during the period of system depressurisation. Therefore, they are treated as a *Secondary* grade of release and a Zone 2 area within 6 m diameter cylinder with its axis on the line of discharge from 1 m behind the points of discharge to a distance 8 m in front of the points of discharge are declared in accordance with AS/NZS 60079.10.1 Clause ZA.6.6.2.9.

Note: Majority of the vents are fitted with a cap and have a hole drilled in the vent pipe.

The hazard zone adopted for the local vent points is summarised below:

Zone 2 6 m laterally, 8 m above and 1 m below the discharge points

2.7.1.8 Pine Creek Vent Stack

There is a vent stack installed in the Pine Creek Station. Gas released from the PSVs, instrument manifold vents and vented instrument gas from the pneumatic controllers is sent to the vent stack. During normal operation, there is minimal flow from the vent stack from the pneumatic controllers. The vent stack is fitted with a flame arrester that offers protection against fire and explosion from outside sources of ignition. The flame arrestor is fitted with a cover to prevent rain ingress but also acts to direct gas downwards. and will increase the diameter of the hazardous area.

The hazardous area is increased to a Zone 2 area within 12 m diameter cylinder and 6 m below the discharge point is claimed, compared with 8 m distance stated for vertical up discharge.

Furthermore, minor leakage of flammable mixture may occur through the PSV seats under normal operation as analysed in Section 2.7.1.5. As a result, it contributes to a *Primary* grade of release and an additional Zone 1 hazardous area with a nominal radius of 1 m is claimed around the vent stack discharge point to account for any small leakages from safety relief valve seats.

The continuous bleed from the pneumatic controllers also vents through the vent stack. As per Section 2.7.1.4, a 0.5 m Zone 1 hazardous area is claimed. This is within the hazardous area claimed for leakage through PSV seats.

The pipework to the vent stack is flanged and will generally be at close to atmospheric pressure. However for continuity the claimed hazardous area will be claimed to be as for process pipework, refer section 2.7.1.2.

The hazard zones adopted for the vent stack are summarised below:

Zone 1 1 m radius from the vent tip

Zone 2 12 m laterally, 6 m below and 8 m above the vent tip

2.7.1.9 Pipeline Blowdown

There are pipeline blowdown points at the scraper stations and meter stations. The vents are approximately 2.4 m tall, discharge vertically upwards and are fitted with quick opening closures. Pipeline blowdowns have the potential to release large volumes of gas to atmosphere and to obtain a representative hazardous area zone it would be required to



undertake plume analysis based on the blowdown conditions. An estimate of the extent of the plume from previous experience for pipeline blowdown vents is a cylinder with a radius of 15 m and a length of 30 m extending in the direction of the discharge and 1 m below the discharge point to account for the localised turbulence at the vent tip. Pipeline blowdowns are a done infrequently and therefore a *Secondary* release that results in a Zone 2 hazardous area. The discharge is vertically upwards and therefore no ground effect would occur.

During normal operation a quick opening closure in the closed position is considered to provide similar containment as a pipe flange or fitting. Therefore the associated release would be *Secondary* providing a Zone 2 hazardous area of 2 m as per AS/NZS 60079.10.1 Clause ZA.6.4.2.4.

Zone 2 A cylinder of radius 15 m extending 30 m vertically upwards and 1 m downwards from the point of discharge

HOLD The exact shape of the hazardous area zone should be determined using plume dispersion modelling based on the blowdown operation and conditions.

2.7.1.10 Low Velocity Vents

There are numerous pressure relief valves installed on instrument gas systems, for example on the station limit valves. The relief from these pressure relief valves are similar to low velocity vents in accordance with AS/NZS 60079.10.1 ZA.6.6.2.8 that has an associated Zone 1 hazardous area of 0.5 m in all directions surrounded by a Zone 2 hazardous area of 1.0 m from the point of discharge. The pressure relief valves will not typically be relieving gas and the release will be *Secondary*, therefore the Zone 1 area is not appropriate. Therefore a Zone 2 hazardous area of 1 m radius from the point of discharge is claimed.

The hazard zone adopted for the instrument gas relief and vent points is summarised below:

Zone 2 Radius of 1 m extending in all directions from the point of discharge

2.7.2 SCRAPER VESSELS

The scraper vessels shall be operated such that it is normally isolated from the pipeline. There are no regular pigging operations. It is expected that the scraper vessels are opened at approximately yearly intervals and the small quantities of flammable gas may occur at the closures. Accordingly, they are treated as sources of *Secondary* grade release and a hazardous Zone 2 within a radius of 3 m centred at the closure is claimed as indentified in AS/NZS 60079.10.1 ZA.6.6.2.2b for the equipment located at an adequately ventilated area.

The scraper vessels are enclosed vessels containing nozzle connections with piping, valves and fittings, which are also potential release sources. These are classified as piping as per section 2.7.1.1.

The hazard zone adopted for the pig receivers and launchers is summarised below:

Zone 2 3 m radius in all directions from quick opening closure
As per section 2.7.1.1 for piping for remainder of the vessel



2.7.3 MULTICYCLONE AND FILTER SEPARATORS

Similar to receiving traps, the multicyclone and filter separators have quick opening closures that are operated at approximately yearly intervals under normal operation. The hazard zone assigned to the receiving traps in accordance with AS/NZS 60079.10.1 ZA.6.6.2.2b is also applicable to the filter coalescers, resulting in a hazardous Zone 2 area within 3 m radius around the discharge points is claimed.

Since the multicyclone and filter coalescers are enclosed vessels which handle process gas and liquids removed from the gas, the nozzle connections with piping, valves and fittings are also potential release points. To simplify hazardous area management, the classification for process gas piping will be applied to the vessels meaning a Zone 2 area of radius 2 m will be declared from the shell of the vessels.

The hazard zone adopted for the multicyclone and filter coalescers is summarised below:

Zone 2 3 m radius around the quick opening closures and 2 m radius from the edge of the vessels

2.7.4 SLOP TANKS

The slop tank installed at some stations are above ground storage tank used to collect condensate, compressor lube oil and water from the filter separators. The liquids in the tank are treated as a flammable fluid. The capacity of the tanks are approximately 1 kL. The tanks are provided with a vent that discharges to atmosphere. During the short period of the drainage from the filter coalescers to slop tank, the liquids may form a flammable mist and additionally the gas may break through into the drain tank. The freely vented tank allows vapour/air mixtures to be released during the normal operation.

Therefore, the slop tank will contain flammable vapours and a range of hazard zones is required. As such, it is likely that a small amount of flammable gas mixture would continuously exist in the tank and within close proximity of the tank vent, surrounded by a larger region that may sometimes exist due to occasional higher gas quantities and an even larger region that represents very infrequent high gas quantities.

The slop tank installed at the Pine Creek Station has a pressure vacuum vent set at 2 kPa pressure / vacuum. The vapour or released gas is directed to atmosphere though the vent that installed in conjunction with an inline flame arrester and a cap. The flame arrester is required to provide protection against internal fire and explosion from outside sources of ignition. The vented gas will be discharged vertical downwards to the surrounding equipment or pipework due to the installation of the cap. However, the additional extent zones are not claimed considering the relatively low operating pressure in the tank.

In accordance with API RP 505 Section 8.2.1, a Zone 0 area within 0.5 m radius, a Zone 1 area within 1.5 m radius and a Zone 2 area within 3 m radius of the vent point are declared. It is also stated in API RP 505 Section 8.2.1, a Zone 0 area should be claimed inside the tank above the liquid level due to the possibility of the continuous presence of the flammable mixture and a Zone 2 area with radius of 3 m should be placed around the shell of the equipment.

The hazard zones adopted for the slop tanks in the stations are summarised below:

- **Zone 0** Inside the tanks above the liquid level and 0.5 m radius from the tank discharge points
- **Zone 1** 1.5 m radius from the tank discharge points
- **Zone 2** 3 m radius around the shell of the tanks and from the tank discharge points



2.7.5 WATER BATH HEATERS

The indirect fired water bath heaters are fitted in some stations to heat the high pressure gas up to a temperature of 60 °C prior to pressure reduction, which prevents hydrate formation that may occur due to the Joule-Thomson effect when the temperature drops. The water bath heater consists of an insulated shell, removable process coils, removable fire tubes, stack burners, fuel gas conditioning train and control system.

During normal operation, a flame is projected into a submerged "fire-tube" located at the bottom of a horizontal cylindrical shelf. Energy is transferred through the tube wall to the surrounding bath fluid water. By means of natural convection, the water then transfers the required amount of energy into a series of process coils located at the top of the heater shell.

The water bath burners are continuously flaming and provided with burner elements to ensure that the flame is maintained. On loss of flame the fuel gas supply is shut down. Therefore it no hazardous area zones are claimed from the stacks.

The process tube within the water bath is fully welded with no potential points for release and would not normally provide a hazardous area. If there was a history of failure of the process coils leading to corrosion or erosion of the tubes, then a hazardous area should be claimed on the vent of the water bath heater. APA has not indicated that there have been failures of the process coils. Further, the maximum operating temperature of the water bath heaters is 95°C, the pH and the nitrate content of the water in the baths is checked frequently and APA has confirmed that the water bath heaters are treated with oxygen scavenger. Therefore no hazardous area is claimed from the water bath vent.

The potential release points on the vessels are process connections to the heaters. The classification for process piping will be applied to the process connections resulting in a *Secondary* grade of release and a related Zone 2 area with 2 m radius from the connection points in accordance with AS/NZS 60079.10.1 Clause ZA.6.4.2.4.

The hazard zone adopted for the water bath heaters is summarised below:

Zone 2 2 m radius from the high pressure gas connections of the vessel.

2.7.6 CATALYTIC HEATER

A catalytic heater is installed at the Elliott meter station. The heater consists of a section of pipe contained in a compartment. The inside of the compartment is surrounded by heating elements that heat the gas by radiant heat. The heat is generated by the combustion of gas in catalytic elements. The manufacturer's information indicates that the catalytic elements ensure that the gas is combusted at a lower temperature. The heating unit is approved for installation in hazardous areas and has Factory Mutual certification.

The pipework has no additional source of release and will be classified the same as the process pipework as described in section 2.7.1.1 and a 2 m Zone 2 hazardous area is claimed from the outside of the of the heater.

Additionally, there is a possibility of fuel gas not being combusted inside the heater. The manufacturer's literature indicates that there is a protection to prevent uncombusted gas being released. However the configuration of the heater is not well defined and to be conservative a primary grade of release is claimed. There is minimal ventilation in the compartment and the claimed zone is increased from Zone 1 to Zone 0 within the compartment.



The heater compartment is not considered to be gas tight and an additional hazardous area zone is claimed that will surround the heater compartment. The release will be a primary grade of release. The heater has good ventilation and a Zone 1 hazardous area is claimed. The released gas will be fuel gas and will be close to atmospheric pressure. In accordance with section 2.7.1.3 the extent of the hazardous area will be 0.5 m from the outside of the box.

The hazard zone adopted for the catalytic heater is summarised below:

Zone 0 Inside the heater compartment

Zone 1 0.5 m from the edges of the heater box

Zone 2 2 m radius from the high pressure gas connections of the vessel

2.7.7 KNOCKOUT POTS

The knockout pots are enclosed vessels which do not contribute to the hazardous area classification. However, the nozzle connections with piping, valves and fittings on the vessels are potential release points where small amounts of flammable mixture may present. To simplify hazardous area management, the classification for process gas piping will be applied to the vessels meaning a Zone 2 area of radius 2 m will be declared from the shell of the vessels.

The hazard zone adopted for the knockout pots is summarised below:

Zone 2 2 m radius from the edge of the vessels

2.7.8 GAS CHROMATOGRAPH SYSTEM

Gas chromatograph (GC) system is a specific analyser to determine natural gas stream composition and anticipated concentration of the selected components.

The chromatograph system comprises of several components: the analyser, sample tubing, process vents, pressure control valve, pressure safety valve, carrier gas cylinders and tubing, calibration gas cylinder and tubing. The chromatograph system is located under a shelter with open sides, therefore it is considered as being adequately ventilated.

The process tubing and analyser contain gas at approximately 140 kPag. The tubing will be well maintained and minor release of the flammable gas may occur at the connections due to leakage, and as a result the grade of release is considered to be *Secondary*. Therefore, a Zone 2 hazardous area with 0.5 m radius is assigned around the whole chromatography system to cover the process tubing potential leakage points according to AS/NZS 60079.10.1 Clause ZA.6.4.2.3c, for the lighter-than-air flammable gas operating at a pressure between 100 and 700 kPag.

The carrier gas is helium that is a non-hazardous material and therefore the carrier gas cylinders and tubing do not contribute to the hazardous zone.

The calibration gas comprises mainly methane and stores in a gas cylinder with an approximate volume of less than 10 L. AS/NZS 60079.10.1 Clause ZA.6.4.2.6d states that cylinder located in ventilated area, whether in storage or installed for use, is not associated with a hazardous zone when the gas capacity is less than 30 m³. Therefore, no hazardous zone is claimed around the calibration gas cylinder. The calibration gas tubing is at the same operating pressure as the process tubing and will have the same Zone 2 hazardous with 0.5 m radius around the calibration gas tubing connections.

The chromatograph system has several vent points that release the sample line contents at low velocity during the normal operation. The amount of the released gas will be small and the discharge rate will be slow and readily dispersed. Consequently, they are regarded as sources of *Primary* grade release and a hazard Zone 1 within a sphere area with 0.5 m

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radius is declared from the vent tips in accordance with AS/NZS 60079.10.1 Clause ZA.6.6.2.8 for the low velocity vents in adequately ventilated area.

In addition, a larger region that represents infrequent higher gas quantities may exist surrounded the Zone 1 area due to the failure of pressure regulator or PSV. It results a *Secondary* grade of release and an additional Zone 2 area with 1 m radius is considered around the vents in accordance with AS/NZS 60079.10.1 Clause ZA.6.6.2.8.

The pressure relief valve will be activated in emergency. To simplify the hazardous area arrangement, it is treated the same as a vent as described above.

The hazard zones adopted for the chromatograph system are summarised below:

Zone 1 0.5 m radius from the vent tips

Zone 2 0.5 m radius around the gas chromatograph system, excluding the cylinders

1.0 m radius around the vent tips

2.7.9 WATER DEW POINT ANALYSER / GAS SAMPLER

The water dew point analyser uses a chilled mirror to determine the dew point of the gas. The analysers receive gas from the sampler as shown in the photographs below. The gas sampler consists of an insertion regulator installed in the pipework, a heated capillary tube a sample cylinder, solenoid valve, further regulators and pressure relief valves. A solenoid valve is installed inside a box with a removable cover. The box prevents ventilation and therefore the declared hazardous area zone is increased to Zone 1 for the interior of the box.

The water dew point analyser comprises of several components: the analyser, sample tubing, process vents, pressure control valve, pressure safety valve, gas cylinders and tubing, calibration gas cylinder and tubing. The analyser system is located under a shelter with open sides, therefore it is considered as being adequately ventilated.

The process tubing and analyser contain gas at approximately 140 kPag. The tubing will be well maintained and minor release of the flammable gas may occur at the connections due to leakage, and as a result the grade of release is considered to be *Secondary*. Therefore, a Zone 2 hazardous area with 0.5 m radius is assigned around the whole analyser system to cover the process tubing potential leakage points according to AS/NZS 60079.10.1 Clause ZA.6.4.2.3c, for the lighter-than-air flammable gas operating at a pressure between 100 and 700 kPag.

The water dew point analyser and gas sampler have local vents that will frequently vent gas at low velocity to atmosphere during the normal operation. The amount of the released gas will be small and the discharge rate will be slow due to the characterisation of the systems. Consequently, they are regarded as sources of *Primary* grade release and a hazard Zone 1 within a sphere area with 0.5 m radius is declared from the vent tips in accordance with AS/NZS 60079.10.1 Clause ZA.6.6.2.8 for the low velocity vents in adequately ventilated area.







The hazard zone adopted for the water dew point analyser / gas sampler is summarised below:

Zone 1 0.5 m radius from the vent tips

Inside the sampler box

Zone 2 0.5 m radius around the water dew point analyser system

1.0 m radius around the vent tips

2.7.10 ODORANT INJECTION SYSTEM

2.7.10.1 Odorant Pipework

A majority of the odorant pipework is tubing fitted with compression fittings, these are considered to be well maintained and infrequently operated. This provides a *Secondary* source of release and a Zone 2 hazardous area. In accordance with AS/NZS 60079.10.1 Clause ZA.5.2.8 the associated hazardous area is 1.5 m in all directions down to ground level.

Zone 2 1.5 m in all directions extending down to ground level



2.7.10.2 Odorant Storage Tank

The odorant storage tank is a pressure vessel supplied with a natural gas blanket and a pressure relief valve.

AS/NZS 60079.10.1 Clause ZA.5.2.1.2c describes the hazardous area associated with the above ground vent on a storage tank as Zone 1 within 1.5 m radius in all directions from point of discharge and Zone 2 within the cylindrical volume below the Zone 1 area. This is applicable for a vent on a storage vessel. There will be a constant release from the vent however the volume of release is small and is considered to be a *Primary* and a Zone 1 area is claimed.

The connections on the pressure vessel will have the same Zone 2 hazardous area as the odorant pipework.

The tank pressure relief valve will provide a *Secondary* release. This will result in a Zone 2 hazardous area. The extent of the hazardous area will be as the Zone 1 area for the vent, but without the additional Zone 2 area.

Zone 1 1.5 m in all directions from vent tip

Zone 2 Cylindrical volume below the Zone 1 area

1.5 m in all directions extending down to ground level for tank connections

2.7.10.3 Odorant Injection Pumps

The odorant injection pumps are pneumatically powered from instrument gas that is derived from the transmission gas. During operation of pumps there will be a continuous vent of gas. There will be a *Continuous* release from the pump discharge through a bug screen located on the pump, refer photograph below. The minimum diameter of the instrument gas is small. It is reasonable to assume that the solenoid valve has a reduced bore, and a typical size is 1/8" (3.2 mm). Based on Table C9(a) from IP15 for a G(i) gas, a pressure of 5 bar(a) (400 kPag) and a 5 mm hole the hazard radius is <1 m. Therefore a hazardous radius of 0.5 m is claimed around the pump.

The pump is a high integrity positive displacement pump capable of developing high discharge pressures to the odorant, therefore it is assumed that any hazardous area associated with leakage from the pump seals would be small and within the hazardous zone associated with the gas vent.



Zone 1 0.5 m radius from the pump



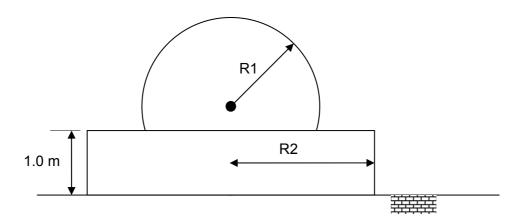
2.7.11 GROUND EFFECT

IP 15 Section 5.5 states that the determination of the full three dimensional envelope of the hazardous area zone shall consider the location of the release. The shape factor depends on height and orientation of the release. The key factors are:

- 1. For sources of release that are higher from grade than the hazardous radius, there is no impact due to ground effect.
- 2. For sources of release that are higher than 1 m from grade but less than the hazardous radius, there is a ground effect, up to 1 m above grade.
- 3. For sources of release that are 1 m or less from grade, there is a ground effect up to 1 m above grade.

The main process pipework has a hazardous area of radius 2 m, and is located less than 2 m above grade. The direction of release from flanged joints and screwed fittings could be in any direction, therefore ground effects are to be considered. Other hazardous area zones will be sufficiently above grade so that there is no ground effect, or the direction of release will be upwards and therefore ground effect is negligible.

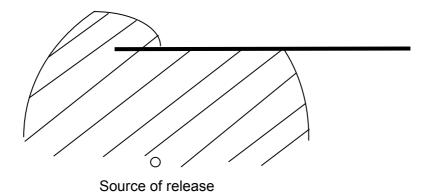
The ground effect increases the hazardous radius in accordance with IP 15 Table C9(b). A majority of the pipework in the facilities is to be located less than 1 m above grade. Interpolation of IP 15 Table C9(b) shows that the hazardous area for ground effect is 0.5 m larger than the hazardous area radius defined above, from the figure below, R2 = R1 + 0.5. Therefore the hazardous area at grade for gas pipework at transmission pressure will be 2.5 m to a height of 1 m.





2.7.12 VAPOUR BARRIERS

At Palm Valley Alice Springs and Mereenie the hazardous area zone impacts on a wall and the control hut, respectively. At these locations the hazardous area zone will extend around the barrier as shown in the diagram below. This is in accordance with AS/NZS 60079.10.1 Clause ZA.2 for measurements of distances.



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APPENDIX A HAZARDOUS AREA CLASSIFICATION DATA SHEET

Part I: Flammable material list and characteristics

Part II: List of sources of release

Part I - Sheet 1 of 1

Flammable material list and characteristics

Amadeus Basin to Darwin Pipeline

Surface facilities



Revision:	0			
Author:	ТСВ			
Checked:	RDK			
QA:	EZG			
Date:	24/11/2011			

Material	Phase	ADG Class	IP 15 Fluid Category	Boiling Point °C	ASTM D86 5%(vol) Point of Stabilised Liquid at Atmospheric Pressure	Relative Density Of Fluid Vapour (Air SG=1) Liquid (Water SG=1)	Flash Point of Stabilised Liquid at Atmospheric Pressure	Vapour LEL (Vol %) In Air	Vapour UEL (Vol %) In Air	Ignition Temperature °C	Temperature Class	Equipment Group	Source Of Data
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Process gas and calibration gas (mixture)	Vapour	2.1	G(i)	-162	-	0.62	Gas	4.4 (Methane)	17 (Methane)	537 (Methane)	T1	IIA	AS/NZS 60079.20
Odorant (tetrahydrothiophene and tertiary butyl mercaptan)	Liquid	3	С	82	-	0.939 (liquid) 3.06 (vapour)	-8	1.1*	12.1*	224	T3*	IIA	AS/NZS 60079.20 MSDS
Condensate	Liquid	3	С	69 [†]	-	2.97 [†]	-21 [†]	1.0 [†]	8.4 [†]	233 [†]	T3 [†]	IIA	AS/NZS 60079.20

^{*} Values obtained for Tetrahydrothiophene

[†] Based on Hexane

Part II - Sheet 1 of 4

List of sources of release

Amadeus Basin to Darwin Pipeline

Surface facilities



Revision:	0			
Author:	ТСВ			
Checked:	RDK			
QA:	EZG			
Date:	24/11/2011			

F	Process Equipme	ent Item	Flammable	Operating Conditions	Description of Flammable	Ventilation	Source Of R	telease	Dis	tance From So	urce To	Equipment Group and	Section
No.			Material	Pressure and Temperature	Material Containment		Description	Grade*	Boundary of Zone 0	Boundary of Zone 1	Boundary of Zone 2	Temperature Class	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Process piping		Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Closed system with flanges, piping joints and valves	Natural (open air)	Flanges, joints, valve seals, drains and vents	S	N/A	N/A	2 m radius from the edge of piping routes	IIA, T1	2.7.1.1
2	Instrument gas piping		Vap. Cat "G(i)"	<u><</u> 770 kPag <u><</u> 60 °C	Closed system with flanges, piping joints and valves	Natural (open air)	Flanges, joints, valve seals, drains and vents	S	N/A	N/A	1 m radius from the edge of piping routes	IIA, T1	2.7.1.2
3	Fuel gas piping	Amadeus	Vap. Cat "G(i)"	≤ 700 kPag ≤ 60 °C	Closed system with flanges, piping joints and valves	Natural (open air)	Flanges, joints, valve seals, drains and vents	S	N/A	N/A	0.5 m radius from the edge of piping routes	IIA, T1	2.7.1.3
4	Control valves	Basin to Darwin Pipeline surface facilities	Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Valves with packed gland / positioner / exhaust	Natural (open air)	Valve glands, positioners and connections	C&P&S	N/A	0.5 m radius around control valve positioners and exhaust	1 m radius around control valve positioners and exhausts;	IIA, T1	2.7.1.4
5	Pressure relief and safety relief valves		Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Valves and piping discharging vertically upwards	Natural (open air)	Pipe vent to atmosphere	C&P	N/A	1 m radius from vent tips	6 m laterally, 8 m above and 1 m below discharge points	IIA, T1	2.7.1.5
6	Mainline valves		Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Closed system with flanges, piping joints and valves	Natural (open air)	Connections and valve seals	S	N/A	Within solenoid valve enclosure	As Piping	IIA, T1	2.7.1.6
7	Local Vent Points		Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Valves and piping discharging vertically upwards	Natural (open air)	Pipe vent to atmosphere	S	N/A	N/A	6 m laterally, 8 m above and 1 m below discharge points	IIA, T1	2.7.1.7

* C – Continuous; S – Secondary; P – Primary

Part II - Sheet 2 of 4

List of sources of release

Amadeus Basin to Darwin Pipeline

Surface facilities



Revision:	0			
Author:	TCB			
Checked:	RDK			
QA:	EZG			
Date:	24/11/2011			

Process Equipment Item		Flammable	Operating Conditions	Description of		Source Of	Release		Distance From	Source To	Equipment		
No.	Description	Location	Material	Pressure and Temperature	Flammable Material Containment	Ventilation	Description	Grade*	Boundary of Zone 0	Boundary of Zone 1	Boundary of Zone 2	Group and Temperature Class	Section
1	2	3	4	5	6	7	8	9	10	11	12	13	14
8	Pine Creek vent stack	Pine Creek	Vap. Cat "G(i)"	Atmospheric pressure Ambient temperature	Valves and piping discharging vertically upwards	Natural (open air)	Pipe vent to atmosphere	P&S	N/A	1 m radius from the vent tip	12 m laterally, 6 m below and 8 m above vent tip	IIA, T1	2.7.1.8
9	Pipeline blowdown		Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Valves and piping discharging vertically upwards	Natural (open air)	Pipe vent to atmosphere	S	N/A	N/A	A cylinder of radius 15 m extending 30 m vertically upwards and 1 m downwards from discharge point HOLD – To be confirmed	IIA, T1	2.7.1.9
10	Low velocity vents	Amadeus Basin to	Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Valves and piping discharging vertically upwards	Natural (open air)	Pipe vent to atmosphere	S	N/A	N/A	Radius of 1 m extending in all directions from the point of discharge	IIA, T1	2.7.1.10
11	Scraper vessels	Darwin Pipeline surface facilities	Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Enclosed system with closures	Natural (open air)	Flanges, joints, valve seals, drains and vents	S	N/A	N/A	3 radius in all directions from quick opening closure As per section 2.7.1.1 for piping for remainder of the vessel	IIA, T1	2.7.2
12	Multicyclone and filter separators		Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Enclosed vessels with quick opening closures	Natural (open air)	Flanges, joints, valve seals, drains and vents	S	N/A	N/A	3 m radius around the closures and 2 m radius from the edge of the vessels	IIA, T1	2.7.3
			Liq. Cat "C"	≤ 9,650 kPag ≤ 60 °C	Liquid drain pipework	Natural (open air)	Piping connections	S	N/A	N/A	2 m in all directions down to ground level	IIA, T3	2.7.1.1

* C – Continuous; S – Secondary; P – Primary

Part II - Sheet 3 of 4

List of sources of release

Amadeus Basin to Darwin Pipeline

Surface facilities



Revision:	0			
Author:	ТСВ			
Checked:	RDK			
QA:	EZG			
Date:	24/11/2011			

Process Equipment Item No. Description Location			Flammable	Operating Conditions	Description of Flammable		Source	Of Release	Dis	tance From Sοι	ırce To	Equipment Group and					
No.	Description	Location	Material	Pressure and Temperature	Material Containment	Ventilation	Description	Grade*	Boundary of Zone 0	Boundary of Zone 1	Boundary of Zone 2	Temperature Class	Section				
1	2	3	4	5	6	7	8	9	10	11	12	13	14				
13	Slop tanks		Vap. Cat "G(i)"	Atmospheric pressure Ambient temperature	Open vessels	Natural (open air)	Piping connections and vents	C&P&S	Inside the tank above liquid level and 0.5 m radius from tank discharge points	1.5 m radius from tank discharge points	3 m radius from around shell of tanks and from tank discharge points	IIA, T1	2.7.4				
14	Water bath heaters		Vap. Cat "G(i)"	≤ 9,900 kPag ≤ 60 °C	Enclosed vessels	Natural (open air)	Piping connections	S	N/A	N/A	2 m radius from high pressure gas connections of vessel	IIA, T1	2.7.5				
15	Catalytic heater	Amadeus Basin to Darwin	Vap. Cat "G(i)"	≤ 9,900 kPag ≤ 60 °C	Enclosed vessels	Natural (open air)	Piping connections	S	Inside the heater compartment	0.5 m from the edge of the heater compartment	2 m radius from high pressure gas connections of vessel	IIA, T1	2.7.6				
16	Knockout pots	Pipeline surface facilities	Pipeline surface	Pipeline surface	Pipeline surface	surface	Vap. Cat "G(i)"	≤ 9,900 kPag ≤ 38 °C	Enclosed vessels	Natural (open air)	Piping connections	S	N/A	N/A	2 m radius from edge of vessels	IIA, T1	2.7.7
17	Gas chromatograph systems		Vap. Cat "G(i)"	≤ 140 kPag ≤ 60 °C	Closed tubing systems with joints and vents	Shelter with open sides (open air)	Tubing joints, drains and vents	P&S	N/A	0.5 m radius from vent tips	0.5 m radius around system, excluding cylinders 1.0 m radius around vent tips	IIA, T1	2.7.8				
18	Water dew point analysers / gas samplers		Vap. Cat "G(i)"	≤ 140 kPag ≤ 60 °C	Closed tubing systems with joints and vents	Shelter with open sides (open air)	Tubing joints, drains and vents	P&S	N/A	0.5 m radius from vent tips Inside sampler box	0.5 m radius around the system, 1.0 m radius around vent tips	IIA, T1	2.7.9				

Part II - Sheet 4 of 4

List of sources of release

Amadeus Basin to Darwin Pipeline

Surface facilities



Revision:	0			
Author:	ТСВ			
Checked:	RDK			
QA:	EZG			
Date:	24/11/2011			

Process Equipment Item		Flammable	Operating Conditions	Conditions Description of		Source	Source Of Release		Distance From Source To				
No	Description	Location	Material	Pressure and Temperature	Material Containment	Ventilation	Description	Grade*	Boundary of Zone 0	Boundary of Zone 1	Boundary of Zone 2	Group and Temperature Class	Section
1	2	3	4	5	6	7	8	9	10	11	12	13	14
19	Odorant injection system pipework		Vap. Cat "C"	≤ 9,650 kPag ≤ 60 °C	Closed system with flanges, piping joints and valves	Natural (open air)	Flanges, joints, valve seals, drains and vents	S	N/A	N/A	1.5 m in all directions down to ground level	IIA, T3	2.7.10.1
			Vap. Cat "C"	15 kPag ≤ 60 °C	Enclosed vessel	Shelter with open sides (open air)	Connection s	S	N/A	N/A	1.5 m in all directions down to ground level	IIA, T3	2.7.10.2
20	Odorant injection system storage tanks Tylers Pass odorant injection station	Odorant Pass odorant injection			Blanket gas vent		Pipe vent to atmosphere	Р		Radius of 1.5 m in all directions from vent tip	Within cylindrical volume below Zone 1		
		station			Pressure relief valve and piping discharging vertically upwards		Pipe vent to atmosphere	S		N/A	Radius of 1.5 m in all directions from vent tip		
21	Odorant injection system pumps		Vap. Cat "G(i)"	≤ 400 kPag ≤ 60 °C	Pneumatic pump instrument gas exhaust	Shelter with open sides (open air)	Piping connections and vents	С	N/A	N/A	Radius of 0.5 m	IIA, T1	2.7.10.3
22	Ground effect	Amadeus Basin to Darwin Pipeline surface facilities	Vap. Cat "G(i)"	≤ 9,650 kPag ≤ 60 °C	Closed system with flanges, piping joints and valves	Natural (open air)	Flanges, joints, valve seals, drains and vents	S	N/A	N/A	2.5 m laterally and extending to 1 m above grade for all process piping less than 2 m above grade	N/A	2.7.12



APPENDIX B HAZARDOUS AREA MAPPING DRAWINGS

For hazardous area mapping drawings, refer to Section 4 of the Hazardous Area Dossiers for each site.



3 Observation for Improvement (OFI)

OFI No.	Description	Proposed Remedy	
	Junction box is not required.	Remove solenoid valve with junction box and replace with new solenoid valve only with adequate support.	
EE 0003-OFI-1	Equipment and circuit ID required.	Provide equipment and circuit ID.	
Solenoid Valve EE 0003-UY-1	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.	
	Nil evidence of equipment explosion protection.	Donloos the continues of	
	Replacement is required due to poor condition and age.	Replace the equipment.	
	Instrument mounted within a plastic junction box with nil evidence of explosion proof rating. Manufactures literature suggest American certification.	Replace the instrument or get the certificate of conformity as per Australian standard.	
EE 0003-OFI-2 Pressure	Equipment and circuit ID required.	Provide equipment and circuit ID.	
Differential Indicator	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.	
EE 0003-PDI-1	Conformity/fitness for purpose assessment required.	Get conformity/fitness for purpose assessment.	
	Nil evidence of equipment explosion protection.	Replace the equipment or get equipment explosion protection labels.	
	Equipment and circuit ID required.	Provide equipment and circuit ID.	
EE 0003-OFI-3 Solenoid Valve	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.	
EE 0003-SV	Replacement of the equipment is required due to poor condition and age.	Replace the equipment.	



OFI No.	Description	Proposed Remedy		
	Equipment and circuit ID required.	Provide equipment and circuit ID.		
EE 0003-OFI-4 Junction Box	Nil support to cable/mechanical protection.	Provide cable support/mechanical protection.		
EE 0003-JB	Nil certification for the use in Australia.	Replace the instrument or get		
	Nil evidence of equipment explosion protection.	the certificate of conformity as per Australian standard.		
	Equipment and circuit ID required.	Provide equipment and circuit ID.		
	Cable glands are loose.	Tighten loose cable glands.		
EE 0003-OFI-5 Junction Box	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.		
EE 0003-JB	Nil evidence of equipment explosion protection.	Replace the equipment or get equipment explosion protection labels.		
	Provide lid bolts to enclosure.	Review as per description.		
	Equipment and circuit ID required.	Provide equipment and circuit ID.		
	Blue sheath to cabling required.	Provide the cable with a blue sheath.		
EE 0003-OFI-6 Junction Box	Cable sheath is UV damaged.	Repair as described.		
EE 0003-JB	Cable glands are loose.	Tighten loose cable glands.		
22 0000 02	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.		
	Nil evidence of equipment explosion protection.	Replace equipment explosion protection labels.		
	Equipment and circuit ID required.	Provide equipment and circuit ID.		
FF 0002 OFL 7	Blue sheath to cabling required.	Provide the cable with a blue sheath.		
Gas Meter (volume)	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.		
EE 0003-GM	Nil evidence of equipment explosion protection.	Replace the equipment or get explosion protection labels.		
	Follow-up inspection required to verify I.S installation for simple device.	Review as per description.		



OFI No.	Description	Proposed Remedy
	Equipment and circuit ID required.	Provide equipment and circuit ID.
EE 0003-OFI-8	Blue sheath to cabling required.	Provide the cable with a blue sheath.
High Level Switch	Nil evidence of equipment explosion protection.	Replace equipment explosion protection labels.
EE 0003-LSH-2	Conformity/fitness for purpose assessment required.	Get conformity/fitness for purpose assessment.
	Replacement of the equipment is required due to poor condition and age.	Replace the equipment.
EE 0003-OFI-9 Pressure	Equipment and circuit ID required.	Provide equipment and circuit ID.
Transmitter EE 00003-PT-6	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.
	Equipment and circuit ID required.	Provide equipment and circuit ID.
EE 0003-OFI-10	Blue sheath to cabling required.	Provide the cable with a blue sheath.
High Pressure Switch EE 0003-PSH-7	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.
22 0000 1 011 1	Follow-up inspection required to verify method of protection i.e. flameproof or intrinsically safe.	Review as per description.
	Equipment and circuit ID required.	Provide equipment and circuit ID.
EE 0003-OFI-11	Cable glands are loose.	Tighten loose cable glands.
Temperature Transmitter EE 00003-TT-4	Nil support to cable/mechanical protection.	Provide cable support/ mechanical protection.
	Nil evidence of equipment explosion protection.	Replace equipment explosion protection labels.



Additional OFIs

OFI No.	Description	Proposed Remedy
EE 0003-OFI-12 Catalytic Heater	There is a catalytic heater installed on the site, the heater is not operated. The heater has Factory Mutual certification but does not have IECEx or AusEX rating. Refer additional comments.	Remove heater Or Obtain Conformity Assessment Document.
EE 0003-OFI-13 Slops Tank	The slops tank is not provided with a bund in accordance with AS 1940	Provide compliant bund
EE 0003-OFI-14 Pyrophoric Iron	Pipeline corrosion products collected in the filter elements can spontaneously combust on exposure to the atmosphere. This can be rectified by immersing the elements in water as they are removed from the filter vessel	Install a water trough close to the filter vessels with drain point and update filter change out procedures
EE 0003-OFI-15 Data Manuals	Data manuals are not current with the equipment installed at site. The manuals appear to be generic and include information for all sites.	Review manuals and update to reflect current equipment at that site.
EE 0003-OFI-16 Vent Covers	Themain vent is provided with a rain cap. The cap will direct vented gas horizontally and will increase the size of the hazardous area.	Replace the cap with a canvas rain cover
EE 0003-OFI-17 PSV Vent Covers PSV vent flapper covers		Replace the flapper with a canvas rain cover



OFI No.	Description	Proposed Remedy		
EE 0003-OFI-18 Corroded Pipe work	There is corroded pipe work on the skid.	Replace or recoat pipe work		
EE 0003-OFI-19 P&ID (Drawings)	The P&IDs are not drawn to industry P&ID standards	Update P&ID		
	P&IDs are not up to date in accordance with the installed equipment. Plant modifications do not appear to be accurately monitored.			
EE 0003-OFI-20 P&ID	The P&IDs did not reflect the installed equipment at the site. Only one generic P&ID of the water bath heaters was provided and was only relevant to the fuel gas conditioning train.	Update P&IDs		
EE 0003-OFI-21 Piping Layout	The piping layout is poor and valve placement can lead to confusion.	Comment only		
EE 0003-OFI-22 Flow meter Bolting	The bolting on the flow meter has bolts (that may be machine bolts) with spring washers. The preference is to not use spring washers as they can come loose.	Replace bolts with stud bolts and nuts		
EE 0003-OFI-23 Pressurising Lines	There are no pressurising lines on the filter and filter separator	Comment only		



Additional Information

EE 0003-OFI-12 - Catalytic heater

The catalytic heater works by "combusting" the gas using a catalyst which occurs at lower temperatures that conventional combustion. It is considered that the catalyst would provide a potential ignition point for any gas released from other sources.

The heater is provided with a pre-heater that is used at start-up to heat the catalyst to the operating temperature 107°C (225°F), at lower temperatures the catalyst will not "combust" the gas. In this instance, the heater could produce a gas release.

In summary, following review of the manufacturer's information, Fyfe consider the heater provides an ignition point and a source of release and is not suitable for use in a gas metering station.

EE 0003-OFI-17 - Vent caps

Rain cap on the main vent will direct vented gas outwards and will increase the size of the hazardous area. It is recommended to remove the cap and install a canvas rain cover.

In the back ground is a flapper type vent cover. These can detach from the connection and become a projectile. It is recommended to remove the flapper and install a canvas rain cover





EE 0003-OFI-22 - Meter bolting

Replace bolts with studs and nuts, do not include spring washers

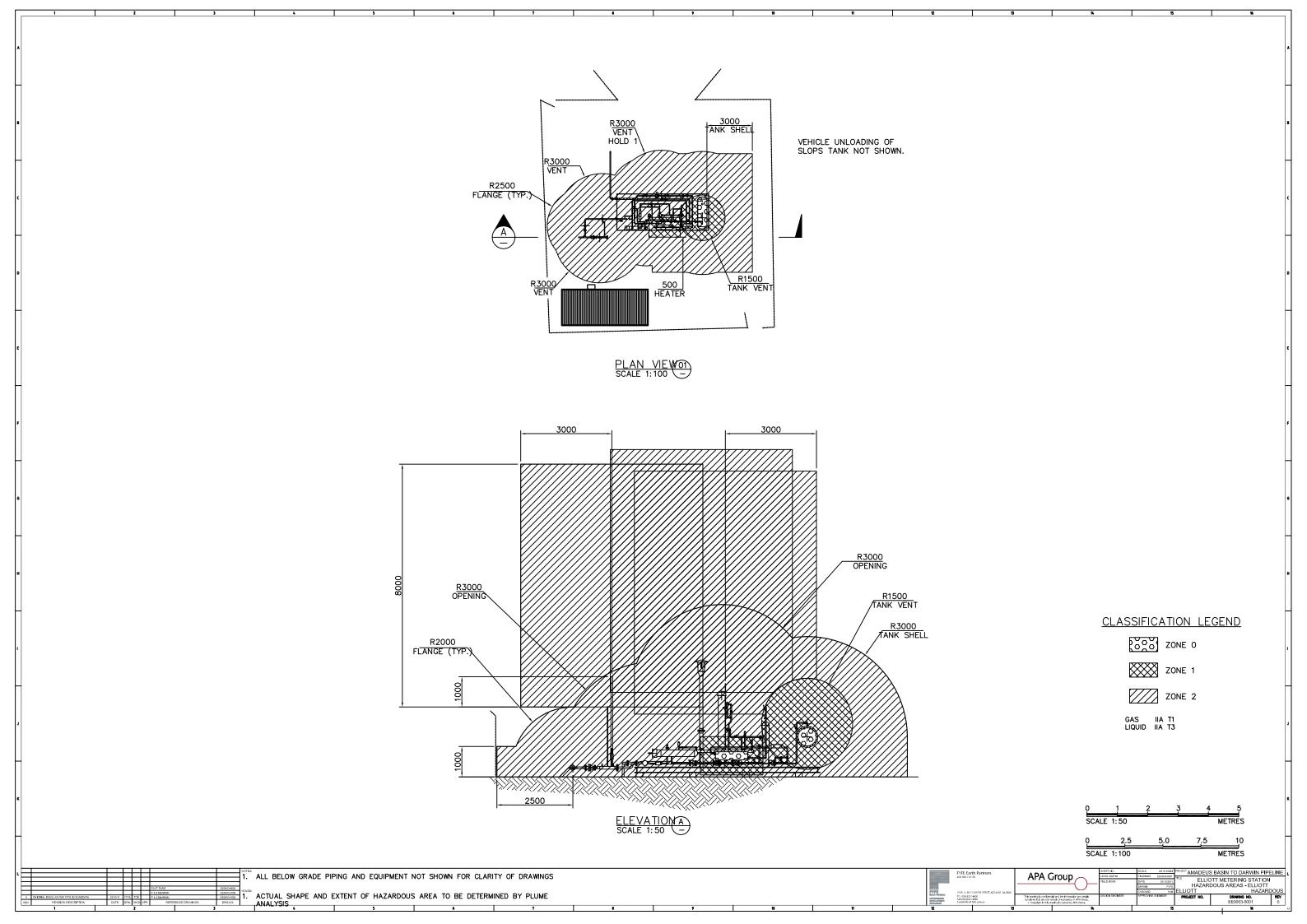




4 Hazardous Area Mapping Drawings

This section contains the hazardous area mapping drawings.

Drawing Number	Description	Revision
EE 0003-5001	Elliot Meter Station Hazardous Area	0





5 Hazardous Area Equipment Register and Certificates of Conformity

This section contains the hazardous area equipment register and associated certificates of conformity.



Haz

Elliott Meter Station zardous Area Equipment Register		APA Group
register	Doc No.: 18756-6-70-007	
	Rev: 0	
	Date: 7/11/2011	

Tag	P&ID No.	Location	Instrument Type	Manufacturer	Model	Serial No.	Hazard Area Drawing No.		Area Classific		Ex Protection	Certification
TAKEOFF AND RECEIV	/FR STATION P&	ID (FE0003-7001)						20116	Oas Gloup	Temp.		
EE 0003-PI-1	EE 0003-7001	Launching Trap	Pressure Indicator		<u> </u>		<u> </u>			l	Ι	
EE 0003-PI-2	EE 0003-7001	Launching Trap	Pressure Indicator									
EE 0003-PI-3	EE 0003-7001	Launching Trap	Pressure Indicator									
EE 0003-PI-4	EE 0003-7001	Receiving Trap	Pressure Indicator									
EE 0003-PI-5	EE 0003-7001	Receiving Trap	Pressure Indicator									
GAS CONDITIONING S	<u> </u>		1 resource majoritor								<u> </u>	
EE 0003-UY-1	EE 0003-7005	Upstream of DF1	Solenoid Valve	Asco	FA80033	D5080					T5?	
EE 0003-PDI-1	EE 0003-7005	DF1	Pressure Differential Indicator		Model 120							-
EE 0003-TI-1	EE 0003-7005	Downstream of DF1	Temperature Indicator	a troot mortamoniation								
EE 0003-PI	EE 0003-7005	Valve V38	Pressure Indicator									
EE 0003-PI	EE 0003-7005	Valve V37	Pressure Indicator									-
EE 0003-PDI/S-3	EE 0003-7005		Pressure Differential Indicator/Sensor									
EE 0003-LSH-2	EE 0003-7005	FS1	High Level Switch	F W Murphy	L-1200AG						CL 1 GR C, D	
GAS CONDITIONING S			Thight Level Cititen	T TT Marphy	2 1200/10				<u> </u>	<u> </u>	02 : 0:: 0; 0	
EE 0003-TSL-1	EE 0003-7006	Heater 1	Low Temperature Switch					<u> </u>		<u> </u>		
EE 0003-PI	EE 0003-7006	Valve V48	Pressure Indicator									
EE 0003-PI	EE 0003-7006	Valve V49	Pressure Indicator									
EE 0003-FSI-1	EE 0003-7006	Meter Run	Flow Indicator Switch									
EE 0003-FSH-1	EE 0003-7006	Meter Run	High Flow Switch									
EE 0003-PT-6	EE 0003-7006	Meter Run	Pressure Transmitter	Rosemount	3051 TG4A2B21BB4K7M5	01575648					Ex ia IIC T4 IP 66	AUS EX 1249x
EE 0003-FT-2	EE 0003-7006	Meter Run	Flow Transmitter	Rosemount	OOOT TOWNED TERMINO	01070040					2/10/110/11/11/00	AGO EX 1240X
EE 0003-TT-4	EE 0003-7006	Downstream of Meter Run	Temperature Transmitter	Rosemount	3144 D117B4M5F5	0640266					NEMA 4x IP 65/68	
EE 0003-PSH-7	EE 0003-7006	Downstream of Meter Run	High Pressure Switch	United Controls	H122361	0010200					EX d IIC T6 IP 66	AUS Ex 542
EE 0003-FQI-2	EE 0003-7006	Downstream of Heater	I light recours Switch	Childa Controlo	11122001							7,00 27,012
EE 0003-SV	22 0000 7000	Downstroam of Floator	Solenoid Valve	Asco	FA80033	61642A					Class II, Gr A + B ? T5?	
EE 0003-JB	EE 0003-7006	H1 - Catalytic Heater	Junction box		GUA	0.10.12/					CL I GR C, D, GR II GR E, F, G NEMA 4	
EE 0003-JB	EE 0003-7006	H1 - Catalytic Heater	Junction box	Wilco Electrical Pty Ltd.	FJB3A/E001						Ex d IIB T6 IP 66	AUS Ex 1168
EE 0003-JB			Junction box	Weidmuller	TB11EX	5524					Ex e IIC T6 IP 67	AUS Ex 615x
EE 0003-GM			Gas Meter (volume)	Romet Ltd	RM85	74593						
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Elliott Meter Station lazardous Area Equipment Register		APA Group
Register	Doc No.: 18756-6-70-007	
	Rev: 0	
	Date: 7/11/2011	

_	Hazard Ar		Hazard Area Haz Area Classifi			ssification		0 110 11				
Tag	P&ID No.	Location	Instrument Type	Manufacturer	Model	Serial No.	Drawing No.		Gas Group		Ex Protection	Certification
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Elliott Meter Station lazardous Area Equipment Register		APA Group
register	Doc No.: 18756-6-70-007	
	Rev: 0	
	Date: 7/11/2011	

Tag	P&ID No.	Location	Instrument Type	Manufacturer	Model	Serial No.	Hazard Area		Area Classific		Ex Protection	Certification
Tag	PAID NO.	Location	Instrument Type	Manufacturer	Model	Seriai No.	Drawing No.	Zone	Gas Group	Temp.	EX Protection	Certification

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Certificate of Conformity

Certificate No:

AUS Ex 1249X

Issue 0:

Original Issue 17/7/1991

Issue 5:

30/05/2003 (Revalidation)

Date of Expiry:

30/05/2013

Certificate Holder:

Fisher-Rosemount Pty Ltd

471 Mountain Highway

BAYSWATER Victoria 3153

Electrical Equipment:

Model 3051-series Pressure Transmitter and Model 3001-series Hydrostatic Pressure

Transmitter, including optional Fieldbus/Profibus outputs, LCD indicator and T1 Transient-

protection Terminal Board.

Type of Protection:

Ex ia

Ex n

Marking Code:

Ex ia IIC T4 ($T_{amb} = 70$ °C) / T5 IP66 (for non-Fieldbus)

Ex ia IIC T4 ($T_{amb} = 60$ °C) / T5 IP66 (for Foundation Fieldbus/Profibus)

Ex n IIC $T4(T_{amb} = 70 \, ^{\circ}C) / T5 \, IP66$

AUS Ex 1249X

Manufactured By:

Rosemount Inc

8200 Market Boulevard

Chanhassen MN 55317 USA

Emerson Process Management

1-10236261-00/

PDC No.:....

Rev: O Date

ORDER NUMBERS

Customer: 626923

Emorgon 7

20,52856

Issued by:



919 Londonderry Road Londonderry NSW 2753 Phone: (02) 4724 4900 Fax: (02) 4724 4999 C

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EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

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This certificate is granted subject to the conditions as set out in Standards Australia Miscellaneous Publication MP 69 and the Procedures (Doc Q7134) of the scheme.

The electrical equipment and any acceptable variation to it specified in the schedule to this certificate and the identified documents, was found to comply with the following standards:

AS 2380.1-1989 Electrical equipment for explosive atmospheres - Explosion-protection techniques - General requirements (incorporating Amendment 1)

AS 2380.7-1987 Electrical Equipment for explosive atmospheres - Explosion-protection techniques - Intrinsic safety 'i'

AS 2380.9-1991 Electrical Equipment for Explosive atmospheres - Explosion-protection Techniques - Non-sparking Apparatus - Type of protection 'n'

AS 1939-1990 Degrees of protection provided by enclosures of electrical equipment (IP Code)

This certificate does not ensure compliance with electrical safety requirements and performance other than those included in the Standards listed above.

The equipment listed has successfully met the examination and test requirements as recorded in

Test Report No.: LOSC 11812; 16864; 16910 and TestSafe 20320, 21599 and 22468

File Reference: TestSafe 94/5985-TSA 0007

Signed for and on behalf of issuing authority
Laboratory Systems Manager

TestSafe Australia

Position 30/05/2003

Date of issue

Ex 1249X-5

This certificate and schedule may not be reproduced except in full.

This certificate is not transferable and remains the property of Standards Australia Quality Assurance Services and must be returned in the event of its being revoked or not renewed.

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EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Schedule

Certificate No: AUS Ex

1249X

sue:

Date of Issue:

30/05/2003

Certified Equipment:

The range of transmitters is designed to convert signals from a pressure transducer into an electrical signal. The electronics provide an analogue 4-20 mA output with HART, or optionally a d.c. output for low power applications or Foundation Fieldbus, or Profibus output for Fieldbus applications. The transmitter is intended for connection to separately certified apparatus having a source of potential not exceeding 30 Volts d.c. and a short circuit current not exceeding 200 mA for the low power and analog/HART output or 300 mA for the Fieldbus output.

The equipment may be manufactured in a number of combinations from the ranges of optional boards according to the configurations, and they are tabulated in the following tables.

	(a) Foundation Fieldbus/Profibus Transmitter Configuration						
Ref.	Description	Drawing No.					
Any one of t	he following terminal boards:						
Ter.e	Standard 3051 Fieldbus	03031-0467					
Ter.f	Transient Protection 3051 Fieldbus (T1 Option)	03031-0486					
Micro-board	assembly:						
Micro.a1	3051 Fieldbus Analog	03031-0477					
Micro.a2	3051 Fieldbus Digital	03031-0481					
Optional LC	D Indicator assembly:						
Dis.c	CCA, Vortex Shrouded, LCD Board, 2 Line	08800-7611					
Any one of t	he sensor boards can be used: (Refer to Sensor Board Lis	st below)					

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EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Ex 1249X-5

Certified Equipment: (Continued)

Addendum to Certificate No.....

(b) Low Power Transmitter Configuration					
Ref	Description	Drawing No.			
Any one of t	he following terminal boards can be used:				
Ter.a	Potted Low Power Terminal Block Assembly	03031-0607			
Ter.b	Transient Protection Terminal Brd, 3-Wire (T1 Option)	03031-0506			
Microboard	assembly:				
Micro.b	Low Power Microboard Conformal Coated	03031-0275			
Optional LC	D Indicator assembly:				
Dis.a	Coated CCA Meter/LCD Board	03031-0162			
Any one of t	he sensor boards can be used: (Refer to Sensor Board List be	elow)			

	(c) Analog/HART Transmitter Configuration				
Ref.	Description	Drawing No.			
Any one of th	e following terminal boards can be used:				
Ter.c	4-20mA Standard Terminal Block Assembly	03031-0657			
Ter.d	Standard Transient Protection Terminal Block Assembly (T1 Option)	03031-0665			
Microboard A	ssembly:				
Micro.c	Micro Brd 5, Coated & Spot Potted, 3051/3001 & Probar	03031-0584			
Optional LCI	Indicator assembly:				
Dis.b	Shrouded/Spot-Potted/Labelled LCD Board, 2 Line	03031-0591			
Any one of th	Any one of the sensor boards can be used: (Refer to Sensor Board List below)				

	Sensor Boards List					
Ref.	Description	Drawing No.				
Sen.a	Low Cost Sensor Card Conformal Coated	03031-0283				
Sen.b	Sensor Board 3, Uncoated, 3051C	03031-0587				
Sen.c	Sensor Board IV Coated, 3051C	03031-0817				
Sen.d	AP Sensor Card Conformal Coated	03031-2011				
Sen.e	Sensor Board, Coated, 3051T	03031-0923				
Sen.f	Sensor Taconite, Coated, 3051/2088	03031-0929				

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EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

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Addendum to Certificate No... Ex 1249X-5

Variations Permitted By Issue 5:

The complete range of the equipment has been classified as documented in the Certified Equipment.

Conditions of Certification relating to Variations Permitted by Issue 5:

- 1. It is a condition of manufacture that the 3051 or 3001 pressure transmitters that do not include the transient protection on the terminal board assembly must be capable of withstanding a test voltage of not less than 500 Volts, 48 Hz to 62 Hz applied between input terminals and case for a period not less than 1 minute.
- 2. It is a condition of safe use that the following parameters are to be taken into account for Intrinsic Safety applications:

(a)	(a) Foundation Fieldbus/Profibus Transmitter Configuration					
Entity Parameters	Withorw	ithout transient protected T1 o	ption			
Ui		30 V				
li li		300 mA				
Pi		1.3 W				
Ci	·	0 μF				
Li		0 μΗ				

(b) Low Power Transmitter Configuration							
Entity Parameters	Without transient profested T1 option	With transient protected T1 option					
Ui	30 V	30 V					
Ti.	200 mA	200 mA					
Pi	0.9 W	0.9 W					
Ci	0.042 μF	0.042 μF					
Li	10 uH	0.75 mH					

	(c) Analog/HART Transmitter Configuration							
Entity Parameters	Without transient protected T1 option	With transient protected T1 option						
Ui	30 V	30 V						
Ii	200 mA	160 mA						
Pi	0.9 W	0.9 W						
Ci	0.01 μF	0.01 μF						
Li	10 μΗ	1.05 mH						

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EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

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Addendum to Certificate No... Ex 1249X-5

Conditions of Certification relating to Variations Permitted by Issue 5: (continued)

- 3. It is a condition of safe use that the apparatus may only be used with a passive current limited power source for Intrinsic Safety applications. The power source parameters must be such that $Po \le (Uo \times Io) / 4$.
- 4. It is a condition of safe use that for models using transient protection in the terminal assembly (T1 transient protection models) the apparatus enclosure is to be electrically bonded to the protective earth. The conductor used for the connection shall be equivalent to a copper conductor of 4 mm² minimum cross-sectional area.
- 5. It is a condition of safe use that the Fieldbus option is to be supplied from a voltage source not exceeding 35.0 V dc for Non-Sparking applications. The Low Power and Analog/HART options are to be supplied from a voltage source not exceeding 55 V dc for Non-sparking applications
- 6. It is a condition of safe use that where the equipment is installed such that there is an unused conduit entry, the entry must be sealed with a suitable blanking plug to maintain the minimum degree of protection of IP66 for Non-Sparking applications.
- 7. It is a condition of safe use that upon completion of commissioning the apparatus with a label plate with more than one marking on it, the irrelevant marking code(s) shall be permanently scribed off.

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Addendum to Certificate No... Ex 1249X-5

Drawings Relating to Variations Permitted by Issue 5

Document	Document Litle	Sheets	Issue	Date
No. 100268-0031	Index of I.S. Barrier System for MOD.268 Smart Family	1 to 7	M	08/04/1993
00200 0021	Interface			
03031-0059	Label, Nameplate / Customer Tag	1 to 16	AY	17/12/2001
03031-0060	Label, Approvals, 3051C	1 to 8	BG	04/04/2002
03031-0087	Schematic Diagram, 3051/3001 CENELEC LS. Approval	1 of 1	AC	10/10/1997
03031-0160	Schematic Diagram, Meter/LCD Board	1 of 1	H	07/05/1990
03031-0161	Printed Wiring Board LCD/Meter Board	1 to 4	U	05/08/1996
03031-0162	Coated CCA Meter/LCD Board	1 of 1	AC	22/11/1999
03031-0272	Schematic Diagram 3051C Low Power	1 of 2	AA	17/02/1999
03031-0273	Printed Wiring Board Low Power Microboard	1 to 4	J	06/08/1996
03031-0275	Circuit Card Assy Low Power Microboard Conformal Coated	1 to 3	AB	10/11/1999
03031-0280	Schematic Diagram Low Cost Sensor BRD	1 of 1	F	12/01/1995
03031-0281	Printed Wiring Board Low Cost Sensor Card	1 to 4	G	06/08/1996
03031-0283	Circuit Card Assy Low Cost Sensor Card Conformal Coated	1 of 1	F	21/03/1991
03031-0464	Schematic Drawing Standard Terminal Block, 3051 Fieldbus	1 of 1	AA	20/03/1998
03031-0467	Terminal Block Assy, Standard 3051 Fieldbus	1 to 2	AC	12/1998
03031-0475	3051 Fieldbus Analog Electronics	1 to 2	AC	12/1998
03031-0476	Printed Wiring Board - Fieldbus Analog	1 to 3	AC	10/06/1998
03031-0477	Circuit Card Assy 3051 Fieldbus Analog	1 to 2	AH	29/05/2001
03031-0479	3051 Fieldbus Digital Electronics	1 of 1	AB .	12/1998
03031-0480	Printed Wiring Board - 3051 Fieldbus Digital	1 to 3	AC	12/1998
03031-0481	Circuit Card Assy - 3051 Fieldbus Digital	1 to 3	AD	01/2000
03031-0483	Schematic Drawing Transient Terminal Block, 3051 Fieldbus	1 of 1	AB	22/02/2001
03031-0484	Printed Wiring Board Transient Protection 3051 Fieldbus	1 to 3	AC	22/02/2001
03031-0486	Terminal Block Assy, Transient Protection, 3051 Fieldbus	1 to 2	AC	12/1998
03031-0488	Ass'y Output Electronics, Fieldbus	1 of 1	AG	29/05/2001
03031-0504	Schematic Diagram Terminal Block 3-wire Configuration	1 of 1	С	21/05/1991
03031-0505	Printed Wiring Board Terminal Board, 3-Wire Configuration	1 to 2	E	23/06/1995
03031-0506	Circuit Card Assy, Transient Protection Terminal BRD, 3-Wire	1 to 3	AA	24/08/1998

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Addendum to Certificate No...Ex 1249X-5

Drawings Relating to Variations Permitted by Issue 5 (Continued)

Document	Document Title	Sheets	Issue	Date
No.		1 to 8	AG	10/08/2001
03031-0519	3051P Label, Nameplate / Customer Tag		AJ	06/01/2000
03031-0520	Label, Approvals, 3051P	1 to 8	AH	15/02/2001
03031-0521	Label, Nameplate / Customer Tag 3051C-Low Power	1 to 7	F	19/05/1995
03031-0535	Label, Nameplate / Customer Tag 3051P-Low Power	1 to 3	ļ	
03031-0581	Schematic Drawing Micro Board #5 3051C	1 to 3	AD	01/03/2002 17/07/2000
03031-0582	Printed Wiring Board, Micro BRD 5, 3051C	1 to 3	AD	
03031-0584	Shrouded Assembly Micro BRD 5, Coated & Spot Potted, 3051/3001 & Probar	1 to 4	AK	04/03/2002
03031-0585	Schematic Sensor Board 3	1 to 2	В	13/11/1995
03031-0586	Printed Wiring Board Sensor Board 3 3051C	1 to 4	AA	08/10/1997
03031-0587	Circuit Card Assy Sensor Board 3, Uncoated, 3051C	1 to 2	AC	25/06/1998
03031-0589	Schematic Diagram 160 Segment LCD Board	1 to 1	A	31/01/1995
03031-0590	Printed Wiring Board LCD Board, 2 Line	1 to 4	AA	30/11/1998
03031-0591	Circuit Card Assembly Shrouded/Spot-Potted/labeled LCD	1 to 3	AF	19/06/2000
	Board, 2 Line			
03031-0604	Schematic Diagram 3051C Low Power Terminal Block	1 of 1	A	12/02/1996
03031-0605	Printed Wiring Board, Low Power, Terminal, Block, 3051C	1 to 3	A	12/02/1996
03031-0607	Potted Low Power Terminal Block Assembly	1 of 1	AC	15/11/2001
03031-0655	Schematic Diagram 4-20mA Standard Terminal Block	1 of 1	AB	15/10/2001
03031-0656	Printed Wiring Board, Standard 4-20mA, Terminal Block, 3051C	1 to 3	AD	20/06/2000
03031-0657	4-20mA Standard Terminal Block Assembly	1 to 2	AF	15/11/2001
03031-0663	Schematic Diagram Standard Trans. Protection Terminal Block	1 of 1	AB	10/2001
03031-0664	Printed Wiring Board, Transient Protection Standard, Term.	1 to 3	AC	07/08/1997
	Block, 3051C			
03031-0665	Standard Transient Protection Terminal Block Assembly	1 to 2	AD	15/11/2001
03031-0687	Schematic Diagram, 3051 Fieldbus CENELEC I.S. Approval	1 of 1	AB	16/08/2001
03031-0815	Schematic Sensor Board IV	1 to 2	AE	13/01/1999
03031-0816	Printed Wiring Board Sensor Board IV, 3051C	1 to 3	AE_	11/06/1998

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Addendum to Certificate No... Ex 1249X-5

Drawings Relating to Variations Permitted by Issue 5 (Continued)

Document	Document Title	Sheets	Issue	Date Date
No.				
03031-0817	Circuit Card Assy Sensor Board IV Coated, 3051C	1 to 2	AH	13/01/1999
03031-0920	Schematic Sensor, 3051T	1 to 2	G	13/12/1995
03031-0921	Printed Wiring Board, Sensor Board 3051T	1 to 3	С	25/02/1997
03031-0923	Circuit Card Assy Sensor Board Coated, 3051T	1 of 1	AA	07/10/1997
03031-0926	Schematic Sensor, 3051TAC	1 to 3	AE	01/04/2001
03031-0927	Printed Wiring Board Sensor Taconite, 3051/2088	1 to 3	AF	25/05/2001
03031-0929	Circuit Card Assembly Sensor Taconite, Coated, 3051/2088	1 of 1	AJ	01/04/2001
03031-1017	Approval Drawing For Module Housing Ass'y, Intrinsically	1 to 6	AH	30/11/2000
	Safe			
03031-1022	Model 3051C/L/P/H, 3001C/S Intrinsically Safe and Type N	1 to 10	AG	28/05/2003
	Configuration, SAA			
03031-1026	SAA LS. Index For 3051 and 3001	1 to 4	AB	26/04/1999
03031-2008	Schematic Diagram AP Sensor Brd	1 of 1	L_	23/09/1996
03031-2009	Printed Wiring Board AP Sensor Card	1 to 4	K	23/09/1996
03031-2011	Circuit Card Assy AP Sensor Card Conformal Coated	1 of 1	AA	07/10/1997
03031-2041	3051T Sensor Board Standoff	1 of 1	AC	05/09/2000
08800-7609	Schematic Diagram, Vortex LCD Board	1 of 1	AA	15/10/1997
08800-7610	Printed Wiring Board, LCD 2 Line	1 to 3	AA	15/10/1997
08800-7611	CCA, Vortex, Shrouded, LCD Board, 2 Line	1 to 2	AE	06/07/2000

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CONFIDENTIAL AND PROPRIETARY INFORMATION IS CONTAINED HEREIN AND MUST BE HANDLED ACCORDINGLY REVISIONS APP'D DATE CHG. NO. DESCRIPTION REV RTC1002910 UPDATE ENTITY PARAMETERS J.D.J. 12/2/97 AA RTC1006448 J.D.J. 4/26/99 FIELDBUS AND AB PROFIBUS

SAA ENTITY CONCEPT APPROVALS

3051C 3001C 3051L 3001CL 3051P 3001CH 3051H 3001S 3051CA 3051T

OUTPUT CODE A (4-20 mA HART) SEE SHEETS 2 OUTPUT CODE M (LOW POWER) SEE SHEETS 3 OUTPUT CODE F / W (FIELDBUS, PROFIBUS) SEE SHEETS 4

TestSafe Australia
This drawing forms part of certification documents under Certificate Number

AUS Ex. L. L. L. G. 9. X. L. L. S. S. Austrantary

Leafficialism

THE ROSEMOUNT PRESSURE TRANSMITTERS LISTED ABOVE ARE INTRINSICALLY SAFE WHEN USED IN THE CURCUIT WITH SAA APPROVED BARRIERS WHICH MEET THE LIST ENTITY PERAMETERS.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM, THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURER'S FIELD WIRING INSTRUCTIONS AND THE APPLICABLE CIRCUIT DIAGRAM.

CAD Maintained, (MICROSTATION)

		ROSEMOUNT MEASUREMENT Rosemount Inc.
UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES [mm], REMOVE ALL BURRS AND	CONTRACT NO.	FISHER-ROSEMOUNT 12001 Technology Drive Eden Prairie, MN 55344 USA
SHARP EDGES, MACHINE SURFACE FINISH 125	DR. Mike Dobe 12/30/91	SAA I.S. INDEX FOR
-TOLERANCE-	CHK'D	3051 & 3001
.X ± .1 [2,5] .XX ± .02 [0,5] .XXX ± .010 [0,25] FRACTIONS ANGLES ± 1/32 ± 2	APP'D. GLEN MONZO 5/8/92	
		SIZE FSCM NO DWG NO. 03031-1026
DO NOT SCALE PRINT	APP'D. GOVT.	SCALE N/A WT SHEET 1 OF 4

	<u> </u>			
	REVI	SIONS		
REV	DESCRIPTION	CHG. NO.	APP'D	DATE
AB		RTC1006448		

OUTPUT CODE "A" (4-20MA / HART) SAA ENTITY CONCEPT APPROVALS

THE ROSEMOUNT PRESSURE TRANSMITTERS LISTED BELOW ARE INTRINSICALLY SAFE WHEN USED IN THE CIRCUIT WITH SAA APPROVED BARRIERS WHICH MEET THE LISTED ENTITY PARAMETERS.

APPROVED TRANSMITTERS

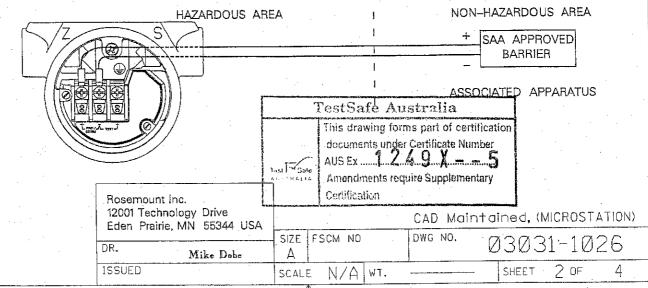
3051C 3051H 3001C 3001S 3051L 3051T 3001CL 3051P 3051CA 3001CH

ENTITY PARAMETER FOR Ex ia IIC T5 CLASS I, ZONE 0 PROTECTION:

APPARATUS PARAMETER	BARRIER PARAMETER
Vmax = 30V lmax = 200mA Pmax = 0.9W	Voc IS LESS THAN OR EQUAL TO 30V ISC IS LESS THAN OR EQUAL TO 200mA Voc * ISC IS LESS THAN OR EQUAL TO 0.9W
$Ci = 0.01 \mu F$ $Li = 10 \mu H$	Ca IS GREATER THAN 0.01 MICROFARADS La IS GREATER THAN 10 MICROHENRIES
FOR TI OPTION ONLY	
lmax = 160mA Li = 1.05mH	Isc IS LESS THAN OR EQUAL TO 160mA La IS GREATER THAN 1.05 MILLIHENRIES

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURERS FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN BELOW.



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REVISIONS

REV DESCRIPTION CHG. NO. APP'D DATE.

AB RTC1006448

OUTPUT CODE "M" (LOW POWER) SAA ENTITY CONCEPT APPROVALS

THE ROSEMOUNT LOW POWER CONFIGURED PRESSURE TRANSMITTERS LISTED BELOW ARE SAA APPROVED AS INTRINSICALLY SAFE WHEN USED IN THE CIRCUIT WITH SAA APPROVED BARRIERS WHICH MEET THE LISTED ENTITY PARAMETERS.

APPROVED TRANSMITTERS WITH LOW POWER CONFIGURATION

3051C

3051T

3051L

3051CA

3051P

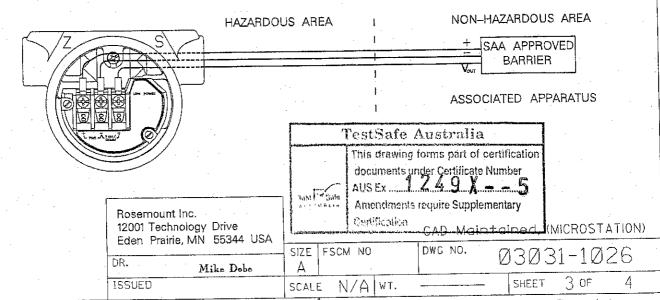
3051H

ENTITY PARAMETER FOR Ex ia IIC T5 CLASS I, ZONE 0 PROTECTION:

APPARATUS PARAMETER	BARRIER PARAMETER
$Vmax = 30V$ $Imax = 200mA$ $Pmax = 0.9W$ $Ci = 0.042\mu F$ $Li = 10\mu H$	Voc IS LESS THAN OR EQUAL TO 30V ISC IS LESS THAN OR EQUAL TO 200mA Voc * ISC IS LESS THAN OR EQUAL TO 0.9W Ca IS GREATER THAN 0.042 MICROFARADS La IS GREATER THAN 10 MICROHENRIES
FOR TI OPTION ONLY Li = 0.75mH	La IS GREATER THAN 0.75 MILLIHENRIES

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURERS FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN BELOW.



Electronic Master - PRINTED COPIES ARE ONCONTROLLED - Rosemount Proprietary

	. N	V				
			REVISIONS			·
REV		DESCRIPTION		CHG. NO.	APP'D	DATE
AB				RTC1006448		

OUTPUT CODE F/W (FIELDBUS, PROFIBUS) SAA ENTITY CONCEPT APPROVALS

THE ROSEMOUNT PRESSURE TRANSMITTERS LISTED BELOW ARE INTRINSICALLY SAFE WHEN USED IN THE CIRCUIT WITH SAA APPROVED BARRIERS WHICH MEET THE LISTED ENTITY PARAMETERS.

APPROVED TRANSMITTERS

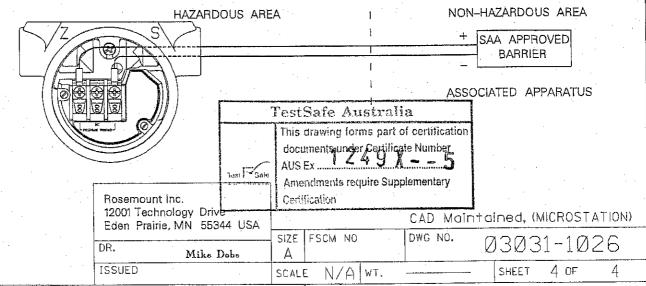
3051C 3051H 3001C 3001S 3051L 3051T 3001CL 3051P 3051CA 3001CH

ENTITY PARAMETER FOR Ex is IIC T5 CLASS LZONE 0 PROTECTION:

APPARATUS PARAMETER	BARRIER PARAMETER
Vmax = 30V Imax = 300mA Pmax = 1.3W $Ci = 0 \mu F$ $Li = 0 \mu H$	Voc IS LESS THAN OR EQUAL TO 30V ISC IS LESS THAN OR EQUAL TO 300mA Voc * ISC IS LESS THAN OR EQUAL TO 1.3W Ca IS GREATER THAN 0 MICROFARADS La IS GREATER THAN 0 MICROHENRIES

THE ENTITY CONCEPT ALLOWS INTERCONNECTION OF INTRINSICALLY SAFE APPARATUS NOT SPECIFICALLY EXAMINED IN COMBINATION AS A SYSTEM.

TO ASSURE AN INTRINSICALLY SAFE SYSTEM THE TRANSMITTER AND BARRIER MUST BE WIRED IN ACCORDANCE WITH THE BARRIER MANUFACTURERS FIELD WIRING INSTRUCTIONS AND THE CIRCUIT DIAGRAM SHOWN BELOW.



Electronic Master - PRINTED COPIES ARE ONCONTROLLED - Rosemount Proprietary



11-06-2003

Emerson Process Management 471 Mountain Highway BAYSWATER VICTORIA 3153

Attention: Mr. Joe Ruggles

Dear Sir.

286 Sussex Street
Sydney NSW 2000 Australia
Postal Address
GPO Box 5420
Sydney NSW 2001 Australia
Phone (61-2) 8206 6060
Fax (61-2) 8206 6061

Head Office

Email assurance@sai-global.com
training@sai-global.com
Web www.sai-global.com

Our Ref: AUS Ex 1347X Contact: N.Baker Phone: 61-2 8206 6614 Fax. 61-2 8206 6032 Email:noel.baker@gas.com.au

RE: Further Extension of Expiry Date for Certificate AUS Ex 1347X

I am pleased to inform you that your request for a further extension of the expiry date for the above Certificate of Conformity is granted on the basis of the ongoing revalidation process at TestSafe Australia.

I confirm that the expiry date for Certificate of Conformity No. AUS Ex 1347X is now 1 August 2003.

Yours sincerely,

Noel Baker

Project Coordinator

ELECTROTECHNOLOGY GROUP



Incorporated by Royal Charter

STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

CERTIFICATE FOR EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

No. Ex 542

Hazardous Location

Class I Zone 1

AS 1939-1981

Effective Date

Date of Issue 1984-10-30

\$AA File Reference P/3: 82153/M117 (Sheet

of 3)

This certifies that the equipment described hereunder has been examined and tested in accordance with the requirements of the Australian standard(s) specified herein, and such equipment has been found to comply with these requirements.

This certificate may be withdrawn at any time if in the opinion of SAA Committee P/3, Certification of Electrical Equipment for Hazardous Locations, the relevant standard has been altered or revised to a degree that the equipment is no longer considered suitable for installation in the hazardous location stated, or if the certificate holder has breached any of the terms or conditions under which this certificate was issued.

Controls, 120 Series. Type of Protection As detailed in Schedule 1 Ex d IIB T6 IP66 Certificate Holder United Electric Controls (Aust) Pty Ltd 83 Murphy Street RICHMOND VIC 3121. Manufacturer Drawing No(s) United Electric Controls Co 83 School Street Refer Schedule 2 Watertown MASSACHUSETTS USA Test Report No(s) Londonderry Centre TR NO: 974 Certification Conditions Australian Standard(s) Refer Schedule 1 AS 2480-1939 and

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Remarks

Description of Equipment

A range of Pressure and Temperature

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STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

CERTIFICATE FOR EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Continuation of Certificate No: Ex 542

(Sheet 2 of 3

SCHEDULE 1

Description of Equipment cont'd

PRESSURE AND TEMPERATURE CONTROLS, 120 SERIES

- (a) Pressure controls, Types J120, J120H, J120K, J120KH, H121, H122, H121K and H122K
- (b) Temperature controls, Types B121, B122, C120, C120H, F120, F120H, E121, E122, 820E and 822E.

Each control comprises one or two snap switches and externally attached temperature or pressure sensor.

Each control may be provided with one ormore of the following options:

M315 enclosure with expoxy coating

M430 cover lock option

M440 cover chain option

M505 overtravel actuating plunger

XXXX other options which may occur and will have no bearing on explosion-protection nor electrical properties.

Certification Conditions cont'd

- 1. As the threaded entries are NPT, flameproof thread adaptors shall be used to permit the use of SAA certified flameproof cable glands.
- 2. Controls equippped with the manual reset arrangement, as detailed in Drawing No: E6296-185 Issue C, shall not be marked 'IP66'.
- 3. Shell petroleum jelly EDP code 82287 may be used for the lid thread

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CERTIFICATE FOR EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Continuation of	Certificate No.	Ex 542	(Sheet 3	of	3)

SCHEDULE 2	Drawing No	(s) cont d
	E6296-185	Issue C
	E6296-186	Issue C
	E6296-187	Issue B
	E12259	Issue A
	E12260	Issue A
	E12261	Issue A
	E12262	Issue B
	E12263	Issue B
	E12264	Issue B
	E12265	Issue A
	E12266	Issue A
	E12267	Issue A
	E12198	Issue A
	E12200	Issue A
	D6201-167	Issue B
	D6201-203	Issue A
	D6201-204	Issue A
	UEA-1200G	Original
	UEA-1200L	Revision 2

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STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Continuation of Certificate No: Ex 542-1

This is to certify that SAA Certificate Nos Ex 542 issued to:

United Electric Controls (Aust) Pty LTd 83 Murphy Street RICHMOND VIC 3121

for the 120 series range of Pressure and Temperature controls, is hereby extended to include modifications as detailed in the following schedule.

Schedule

Description of Modifications

- Addition of various pressure sensors to the J120K, H121, H121K, H122 and H112K.
- 2. Addition of the weather protected junction or indication box, fitted externally to flameproof control enclosure.
- Removal of an unused second adjustment shaft hole from type H121 control enclosures.
- 4. Addition of option 1010, which includes replacement of DPDT switch for controls type C120, F120, J120, E121, B121 and H121.
- 5. Removal of the flat gasket type B, and replacement with the uniform O-ring gasket type A for the fitting of pressure sensors.

Drawings

E-6296-277 Sheets 1 & 2, Issue C E-6296-278 Sheets 1 & 2, Issue B E-6296-279 Issue B E-12559 Sheet 1 Issue B E-12559 Sheet 2 Issue D E-12262 Sheet 1 Issue C E-12262 Sheet 2 Issue D E-12263 Issue A E-12264 Issue A E-12265 Sheet 1 Issue B E-12265 Sheet 2 Issue C UEA-1200G Issue B UEA-1201G Issue A

Page 1 of 2



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STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Continuation of Certificate No:

Ex 542-1

Certification Conditions

The conditions specified in certificate Ex 542 shall apply to Ex 542-1

Type of Protection: Ex d IIB T6 IP66

Test Report: LOSC 2010 to AS 2480-1986 and 1939-1986

File: P/3: 85015/M137

Date of Issue: 28 July 1987

Page 1 of 2





Certificate of Compliance

This is to certify that Standards Australia Certificate Nos Ex 542 and Ex 542-1 issued to:

United Electric Controls (Aust) Pty Ltd 83 Murphy Street Richmond Vic 3121

for the <u>120 Series Temperature and Pressure Controls</u> are hereby extended to include modifications as detailed in the following schedule.

SCHEDULE

Description of modifications:

Change of gas group to IIC

Models in the range

Temperature controls

B121 series: 119,120,121, E121 E122 C120 B122 E12

E121, E122, C120, B122, F120 series: 2ACA, 2ASA, 2BCA, 2BSA, 2CCA, 2CSA, 2ACB, 2ASB, 2BCB, 2BSB, 2CCB, 2CSB, 3AC, 3AS, 3BC, 3BS, 3CC, 3CS, 4AC, 4AS, 4BC, 4BS, 4CC, 4CS, 5AC, 5AS, 5BC, 5BS, 5CC, 5CS, 8AC, 8AS, 8BC, 8BS, 8CC, 8CS, M9AA, M9BA, M9CA, M9BB, M9CB, 1BS, 2BS, 6BS, 7BS, M9B

Pressure controls (non-vented)

J120, J120K, H121, H122 series: 126, 137, 144, 134, 152, 156, 164, S126, S137, S144, S134, S152, S156, S164, S126B, S137B, S144B, S134B, S152B, S156B, S164B, 450, 451, 452, 453, 454

Pressure controls (vented)

J120, J120K, H121, H122, H121K, H122K series: 270, 274, 358, 361, 376, 550, 551, 552, 553, 554, 555, 612, 614, 455, 456, 457, 559, 701, 702, 703, 704, 705, 190, 191, 192, 193, 194, 147, S147, S147B, 157, S157, S157B, 36, 37, 38, 39, 40, 183, 184, 185, 186, 188, 189, 612, 616, 50, 51, 52, 53, 54, 55

Page 1 of 2

Signed for and on behalf of Standards Australia

General Manager Displey Assurance Services

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Certificate of Compliance

Drawings:

E-6296-277 Sh	eet 1	Revision	D	28 January 1992
E-6296-277 Sh	eet 2	Revision	C	12 February 1986
E-6296-278 Sh	eet l	Revision	C	28 January 1992
E-6296-278 Sh	eet 2	Revision	В	2 July 1985
E-6296-279		Revision	С	28 January 1992
E-12259 Sheet	. 1	Revision	C	28 January 1992
E-12259-Sheet	. 2	Revision	E	29 January 1992
E-12262 Sheet	: 1	Revision	D	28 January 1992
E-12262 Sheet	. 2	Revision	D	12 February 1986
E-12263		Revision	В	28 January 1992
E-12264		Revision	В	28 January 1992
E-12265 Sheet	. 1	Revision		28 January 1992
E-12265 Sheet		Revision		12 February 1986
EUA-1200 G		Revision	В	5 July 1985
UEA-1201 G		Revision	A	8 July 1985
UEA-1200 L		Issue E		undated
E-12260		Revision		29 January 1992
E-12261		Revision		29 January 1992
E-12266		Revision		29 January 1992
E-12267		Revision		29 January 1992
				we wanted

TYPE OF PROTECTION: Ex d IIC To IPoo Class I Zone 1

Test Report No: NET 92/024 to AS 2380.1-1989 and AS 2380.2-1991

File: P/3: 91193.M165

Date of Issue: 21 April 1992

Date of Expiry of Validity: 21 April 2002

Page 2 of 2

Signed for and on behalf of Standards Australia

Seneral Manager
Quality Assurance Services

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Cartificate No.

Ex 542-3

Certificate of Compliance

This is to certify that Standards Australia Certificate No Ex 542, Ex 542-1 and Ex 542-2 issued to:

United Electric Controls (Aust) Pty LTd

for the 120 series Temperature and Pressure Controls are hereby extended to include changes as detailed in the following schedule.

SCHEDULE

Description of changes:

Change of Address of Certificate Holder to:

Unit 2, 615 Warrigal Road Ashburton Vic 3147

File: P/3: 92220

Date of Issue: 21 December 1992

Date of Expiry of Validity: 21 April 2002

Page 1 of 1

Signed for and on behalf of Standards Australia

General Marrager

Gently Assurance Services

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Standards Australia

Home Equipment Certification Service Facility Certification Certificate Database Contacts

AUSEx_1168

Price: \$27.50 (incl 10 % GST)

 Certificate #:
 AUSEx_1168
 Issue Date:
 7/08/1991

 Issue #:
 0
 Expiry Date:
 7/08/2001

Status: EXPIRED

Certificate Holder: Gerard Industries Pty Ltd

Address: 12 Park Terrace Adelaide South Australia 5007 Australia

Manufacturer: Wilco Electrical Pty Ltd

Product Description: " | Cat No. WFJB 1616, 2516 and 2525 Series Weatherproof, Flameproof Junction Boxes."

Equipment Category:Junction boxes

Protection Type: d

Gas Group: I IIB

Marking Group:

IP Rating: IP 66

Test Report #: LOSC4431 Issued by: Quality Assurance Services

Standards: AS 1939-1990 AS 2480-1986

Notes: N/A

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AUSEx_615X

Price: \$27.50 (incl 10 % GST)

Certificate #: AUSEx_615X **Issue Date:** 11/04/1995

Issue #: 12 **Expiry Date:** 31/12/2007

> Status: **EXPIRED**

Certificate

Weidmuller (Klippon Products) Pty Ltd Holder:

Address: 43 Huntingwood Drive HUNTINGWOOD NSW 2148 AUSTRALIA

Manufacturer: Weidmuller (Klippon Products) Pty Ltd

Product

TB Ex | Terminal enclosures. Description:

Equipment

Enclosures Category:

Protection

e ia Type:

Ι Gas Group:

Marking Group:

IP Rating: IP 66 Test Report #: " 12842A, 14293 " Issued by: TestSafe Australia

Standards: AS 2380.1-1989 AS 1939-1990 AS 2380.6-1988

An extension of the Expiry Date of Issue 12 of this Certificate of Conformity is gra

the authority of the Standards Australia Limited P008 Management Committee. T

date was 31-12-2007.

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Notes:

ANZEx Certificates AUSEx Certificates Vintage SAA Certs Workshop

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STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

CERTIFICATE FOR EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

No. Ex 638

(Sheet 1 of 3)

This certifies that the equipment described hereunder has been examined and tested in accordance with the requirements of the Australian standard(s) specified herein, and such equipment has been found to comply with these requirements.

This certificate may be withdrawn at any time if in the opinion of SAA Committee P/3, Certification of Electrical Equipment for Hazardous Locations, the relevant standard has been altered or revised to a degree that the equipment is no longer considered suitable for installation in the hazardous location stated, or if the certificate holder has breached any of the terms or conditions under which this certificate was issued.

Description of Equip	mont

'Crouse-Hinds' DP SeriesControl Stations

As detailed in Schedule 1

Drawing No(s)

48-148-GA1 Issue 2, 48-148-GA2 Issue 2 and 48-148-GA3 Issue 3

Certification Conditions

Remarks

This equipment is certified for use only in dust atmospheres where both the cloud ignition temperature and the glow temperature of the dusts concerned are greater than 135°C

Hazardous Location

ClaSS II Divisions 1 & 2

Type of Protection

DIP T6 Refer Schedule 1 for IP classification

Certificate Holder

Crouse-Hinds (Aust) Pty Ltd 31 Moxon Road PUNCHBOWL NSW 2196

Manufacturer

Crouse-Hinds (Aust) Pty Ltd 31 Moxon Road PUNCHBOWL NSW 2196

Test Report No(s)

SCC TR NO: 60142

Australian Standard(s)

AS 2236-1985

SAA File Reference

P/3:84197/M122

Effective Date 1985-04-04

Date of Issue

1985-04-11

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STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

CERTIFICATE FOR EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Continuation of Certificate No:

Ex 638

(Sheet 2 of 3)

SCHEDULE 1 Description of Equipment (cont'd)

(i) Push Button & Pilot Light Control Stations

Cat. No.	Description
DP00	Junction Box
DP01	Start or stop push button station
DP02	Mushroom head push button (spring return)
DP03	Mushroom head push button (maintained)
	(turn to release)
DP04	Mushroom head push button (maintained)
	Key reset
DP05	Key switch
DP06	Selector Switch
DP07	Illuminated push button - specials
DP08	Pilot light
DP09	Rotary switch (see dwg 48-148-GA2)
Suffix	IM or N for 20 mm or $\frac{1}{2}$ " NPT entry
	2M or N for 25 mm or 3/4" NPT entry

Any 2 hole cover incorporating combinations of push button or pilot lights as listed above

e.g. DP18-1M = Start push button in top position Pilot light in bottom position Base entry 20 mm

NOTE: IP classification IP65 or IP66 as per operator used (refer Drawing No. 48-148-GA1 Issue 1)

(ii) Isolating Switches

Cat No.	Pole	Current Rating	Description
DP9-201	2	15 amps at 600V	Lighting Switch
DP9-203	4	20 amps at 600V	Isolating Switch
DP9-212	3	20 amps at 600V	3 Pos Change Over with Off
DP9-222	3	20 amps at 600V	2 Pos Change Over
DP9-401	3	20 amps at 600V	Reversing Centre Off
DP9-178	1	20 amps at 600V	Stop/Start Spring Return to Centre Isolate Off
DP9-007	3	20 amps at 600V	Voltmeter Switch Phase to Phase and Phase to Neutral
DP9-244	1	20 amps at 600V	6 Position and Off

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Julia change

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STANDARDS HOUSE, 80 ARTHUR STREET, NORTH SYDNEY, N.S.W.

CERTIFICATE FOR EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Continuation of Certificate No: Ex 638

(Sheet 3 of 3)

SCHEDULE 1	Description of Equipment (cont'd)
Cat No	
DP9-101	10 ama Sinala Dala
	10 amp Single Pole
DP9-102	10 amp Double Pole
DP9-201	20 amp Single Pole
DP9-202	20 amp Double Pole
DP9-204	20 amp Four Pole
DP9-254	25 amp Four Pole
Suffix	1M or N for 20 mm or $\frac{1}{2}$ " NPT entry
	2M or N for 25 mm or 3/4" NPT entry

NOTE: IP classification IP65 or IP66 as per operator used (refer Drawing No 48-148-GA2 Issue 1)

(iii) Junction Boxes

Cat No	Description
DPJ 12	2 way x 20 mm
DPJ 14	4 way x 20 mm
DPJ 22	2 way x 25 mm
DPJ 24	4 way x 25 mm

NOTE: IP classification is IP66

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Director—Administration & Approvals

Standards Association of Australia

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Certificate of Conformity

Certificate No: AUS Ex

638

Issue 0:

Original Issue 11/4/1985

Issue 1:

3/7/1996

Date of Expiry:

3/7/2006

Certificate Holder:

Crouse Hinds Australia Pty Limited

391 Park Road

REGENTS PARK NSW 2143

Electrical Equipment:

DP Series Control Stations and Enclosures

Type of Protection and Marking Code:

DIP T6 IP65/IP66

AUS Ex 638

Manufactured By:

Crouse Hinds Australia Pty Limited

391 Park Road

REGENTS PARK NSW 2143

Issued by:



Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY NSW 2753 Phone: (047) 244 900 Fax: (047) 244 999

Explosion Protected Electrical Equipment

Administered by: Standards Australia Quality Assurance Services

Ex 638-1

This certificate is granted subject to the conditions as set out in Standards Australia Miscellaneous Publication MP 69 and the Procedures (Doc Q7134) of the scheme.

The electrical equipment and any acceptable variation to it specified in the schedule to this certificate and the identified documents, was found to comply with the following standards:

AS 2236-1994 Electrical Equipment for Explosive Atmospheres - Dust-excluding Ignition-proof (DIP) Enclosures AS 1939-1990 Degrees of Protection Provided by Enclosures of Electrical Equipment (IP Code)

The equipment listed has successfully met the examination and test requirements as recorded in

Test Report No:

LOSC 14228

File Reference:

LOSC 95/7184

Signed for and on behalf of issuing authorit

Position

3/7/1996

Date of issue

This certificate and schedule may not be reproduced except in full.

This certificate is not transferable and remains the property of Standards Australia Quality Assurance Services and must be returned in the event of its being revoked or not renewed.

Issued by:



Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY NSW 2753 Phone: (047) 244 900 Fax: (047) 244 999

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Schedule

Certificate No: AUS Ex

638

Issue:

1

Date of Issue:

3/7/1996

Certified Equipment:

The DP series Enclosures and Control Stations are constructed from cast aluminium and have provisions for electrical access by either glands or conduits. An 'O'-ring seal between the cover and body affords a degree of protection against the ingress of dust and water.

Optionally the cover may accommodate a range of operators and pilot lights to form control stations and/or switch units.

The range of equipment covered is listed in the Table 1.

Table 1: Equipment Summary

Enclosure Configuration	Maximum Dissipation	IP Rating	Equipment Summary
DP Series Push Button and Pilot	23 watts	IP65/IP66	Table 2
Light Control Stations	25 watts	11 03/11 00	Table 2
DP9 Series Isolating Switches	23 watts	IP65/IP66	Table 3
DPJ Series Junction Box	18 watts	IP66	Table 4
DPJL Series Junction Box	23 watts	IP66	Table 5

Issued by:



Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY NSW 2753 Phone: (047) 244 900 Fax: (047) 244 999

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Addendum to Certificate No.... Ex 638-1

Table 2: 'DP' Series Push Button & Pilot Light Control Stations

Cat No	Description		
DP00	Junction Box		
DP01	Start or stop push button station		
DP02	Mushroom head push button (spring return)		
DP03	Mushroom head push button (maintained) - turn to release		
DP04	Mushroom head push button (maintained) - key reset		
DP05	Key switch		
DP06	Selector switch		
DP07	Illuminated push button - specials		
DP08	Pilot Light		
DP09	Rotary switch		

Table 3: 'DP9' Series Isolating Switches

Cat No	Poles	Current Rating	Description
DP9-201	2	15 amps	Lighting Switch
DP9-203	4	20 amps	Isolating Switch
DP9-212	3	20 amps	3 Position Change Over with Off
DP9-222	3	20 amps	2 position Change Over
DP9-401	3	20 amps	Reversing Centre Off
DP9-178	1	20 amps	Stop/Start Spring Return to Centre Isolate Off
DP9-007	3	20 amps	Voltmeter Switch Phase to Phase & Phase to Neutral
DP9-244	1	20 amps	6 Position and Off
DP9-101	1	10 amps	Control Switch
DP9-102	2	10 amps	Control Switch
DP9-201	1	20 amps	Control Switch
DP9-202	2	20 amps	Control Switch
DP9-204	4	20 amps	Control Switch
DP9-254	4	25 amps	Control Switch

Issued by:



Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY NSW 2753
Phone: (047) 244 900 Fax: (047) 244 999

Explosion Protected Electrical Equipment

Administered by: Standards Australia Quality Assurance Services

Addendum to Certificate No... Ex 638-1

Table 4: 'DPJ' Series Junction Boxes

Cat No.	Description
DPJ 12	2 way by 20 mm
DPJ 14	4 way by 20 mm
DPJ 22	2 way by 25 mm
DPJ 24	4 way by 25 mm

Table 5: DPJL Series Junction Boxes

Cat No	Description
DPJL	4 way by 50 mm
DPJL	4 way by 40 mm
DPJL	4 way by 32 mm
DPJL	8 way by 25 mm
DPJL	8 way by 20 mm

Drawing Schedule

	Drawing Schedule		
Drawing No	Drawing Title	Issue	Date
31-148-GA1	DIP Junction Box - Cat No DPJL	6	26/6/96
48-148-GA1	DIP Push Button & Pilot Light Control Station	3	26/6/96
48-148-GA2	DIP Isolating Switch	3	26/6/96
48-148-GA3	DIP Junction Box - CatNo DPJ	4	26/6/96

Issued by:



Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY NSW 2753 Phone: (047) 244 900 Fax: (047) 244 999

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Certificate of Conformity

Certificate No.

Ex: 157

Issue 0:

Original Issue 24/2/1993

Issue 1:

21/9/1982

Issue 2:

30/6/1988

Issue 3:

15/12/1993

Date of Expiry:

15/12/2003

Certificate Holder:

Govan Drewburn Pty Ltd

156 Bamfield Road

WEST HEIDELBERG

Victoria 3081

Electrical Equipment:

FW Range of Flameproof Enclosures

Type of Protection and Marking Code:

Ex d IIB T6 IP65 Class I Zone 1

Manufactured By:

Govan Drewburn Pty Ltd

156 Bamfield Road

WEST HEIDELBERG

Victoria 3081

Issued by:



Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY Phone: (047) 244 900 Fax: (047) 244 999 NSW 2753

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

This certificate is granted subject to the conditions as set out in Standards Australia Miscellaneous Publication MP 69 and the Procedures (Doc Q7134) of the scheme.

The electrical equipment and any acceptable variation to it specified in the schedule to this certificate and the identified documents, was found to comply with the following standards:

AS 2380.1-1989, AS 2380.2-1991(incorporating Amendment No 1) and AS 1939-1990

The equipment listed has successfully met the examination and test requirements as recorded in

Test Report No:

LOSC 9955

File Reference:

93/5071

Signed for and on behalf of issuing authority

Position

Date of issue

This certificate and schedule may not be reproduced except in full.

This certificate is not transferable and remains the property of Standards Australia Quality Assurance Services and must be returned in the event of its being revoked or not renewed.

Issued by:



Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY Phone: (047) 244 900 Fax: (047) 244 999 NSW 2753

EXPLOSION PROTECTED ELECTRICAL EQUIPMENT

Administered by: Standards Australia Quality Assurance Services

Schedule

Certificate No.

Ex: 157

Issue:

3

Date of Issue:

15/12/1993

Equipment:

A range of Flameproof Enclosures designated Series FW. The range includes both control stations and junction boxes in various configurations and having up to 5 entries, as required.

Allowable Variations:

Alterations to the range of certified equipment.

This supplementary certificate also covers revalidation of the entire range of enclosures.

Drawing Schedule

C2031 C2359 C2353 C0774-Rev.2 C1510 Revision 1 Original Original Revision 2 Original 28 July 1993 8 February 1993 3 February 1993 21 June 1991 22 October 1992

Issued by:



Londonderry Occupational Safety Centre

132 Londonderry Road LONDONDERRY Phone: (047) 244 900 Fax: (047) 244 999 NSW 2753



6 Equipment Datasheets and Electrical Drawings

Documentation in relation to this section is to be included and maintained by APA Group.



7 Calculations

Documentation in relation to this section is to be included and maintained by APA Group.

Calculations need to be confirmed for equipment installed in hazardous areas. These include heat dissipation calculation for Ex e and intrinsically safe barrier assessment for Ex i, which are relevant for the ADP sites.

This section contains sample calculation sheet for intrinsically safe barrier assessment and extracts from AS 2381.6-1993 and AS 2381.7-1989.

Intrinsically Safe Barrier Assessment Sheet



							1
Document No					Prepared By:		
Site	-				Checked:		
Loop Description	:				QA:		
					Approved:		
Loop Drawing Number	:				Date:		
Hazardous Area:							
nazardous Area.	H. A. Repo	ort:			Area Class:		
н.	A. Drawing N				Gas Group:		
					Temperature Class:		
					٠ .		!
Repeate	Power Supply / B	arrier			Se	nsor	
Cable Screens shall be							
connected to		<u> </u>				_	
intrinsically safe earth	H					-	
at the Intrinsically	I.S. Earth	M.	Cable	1	V -	_	
Safe Barrier end.		•	D1		─		
I.S. Device details (Hazardous A	rea) [Note 2]						
		_			r		•
Tag					Max Voltage Um:		V
Type of instrument					O/C Voltage Uo:		V
Manufacturer					S/C Current Io:		mA
Model Number					Power Po:		mW
Serial No					Allowable Cap. Co:		uF
Certificate Number					Allowable Ind. Lo:		mH
Certifying Authority					L/Ro:		uH/Ohm
Protection Type	:						
Cablas							
Cables: Cable 1:		Cable 2:			Total Cable:		
Cable 1:		Cable 2: Tag:			Total Cable:		
	uF/m	-		ıF/m	Total Cable:		uF
Cable 1: Tag:	uF/m mH/m	Tag:		ıF/m nH/m	_		uF mH
Cable 1: Tag: Capacitance:	_	Tag: Capacitance:	r		Capacitance:		
Cable 1: Tag: Capacitance: Inductance:	mH/m	Tag: Capacitance: Inductance: L/R _c :	r	mH/m	Capacitance: Inductance:		mH
Cable 1: Tag: Capacitance: Inductance: L/R _c : Length(D1):	mH/m mH/Ohm m	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance:		mH
Cable 1: Tag: Capacitance: Inductance: L/R _c :	mH/m mH/Ohm m	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance:		mH
Cable 1: Tag: Capacitance: Inductance: L/R _c : Length(D1): I.S. Apparatus Parameters (Haz	mH/m mH/Ohm m	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc		mH mH/Ohm
Cable 1: Tag: Capacitance: Inductance: L/R _c : Length(D1): I.S. Apparatus Parameters (Haz	mH/m mH/Ohm m ardous Area):	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui:		mH mH/Ohm
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz	mH/m mH/Ohm m ardous Area):	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc Max L/Rc O/C Voltage Ui: S/C Current li:		mH mH/Ohm V mA
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Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number	mH/m mH/Ohm m ardous Area): :: ::	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current li: Power Pi: Capacitance Ci:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No	mH/m mH/Ohm m ardous Area): :: :: ::	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current li: Power Pi:		mH mH/Ohm V mA mW
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number	mH/m mH/Ohm m ardous Area): : : : : : : : : : :	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current li: Power Pi: Capacitance Ci:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current li: Power Pi: Capacitance Ci:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current li: Power Pi: Capacitance Ci:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag: Capacitance: Inductance: L/R _c : Length(D2):	r	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current li: Power Pi: Capacitance Ci:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority Protection Type	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag: Capacitance: Inductance: L/R _c : Length(D2):		nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current Ii: Power Pi: Capacitance Ci: Inductance Li:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority Protection Type	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag: Capacitance: Inductance: L/R _C : Length(D2): 1 U0 <= Ui 2 lo <= li	<== <=	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current Ii: Power Pi: Capacitance Ci: Inductance Li:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority Protection Type	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag: Capacitance: Inductance: L/R _c : Length(D2):		nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current Ii: Power Pi: Capacitance Ci: Inductance Li:		mH mH/Ohm V mA mW uF
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Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority Protection Type	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag:	<= <= <= <= <=	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current Ii: Power Pi: Capacitance Ci: Inductance Li:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/R _C : Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority Protection Type	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag:	<= <= <= <=	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current Ii: Power Pi: Capacitance Ci: Inductance Li:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority Protection Type	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag:	<= <= <= <= <=	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current Ii: Power Pi: Capacitance Ci: Inductance Li:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority Protection Type	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : : : : : :	Tag:	<= <= <= <= <=	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current Ii: Power Pi: Capacitance Ci: Inductance Li:		mH mH/Ohm V mA mW uF
Cable 1: Tag: Capacitance: Inductance: L/Rc: Length(D1): I.S. Apparatus Parameters (Haz Tag Type of instrument Manufacturer Model Number Serial No Certificate Number Certifying Authority Protection Type	mH/m mH/Ohm m ardous Area): : : : : : : : : : : : : : :	Tag: Capacitance: Inductance: L/R_c : $Length(D2)$: 1	<= <= <= <= <=	nH/m nH/Ohm	Capacitance: Inductance: Max L/Rc O/C Voltage Ui: S/C Current Ii: Power Pi: Capacitance Ci: Inductance Li:		mH mH/Ohm V mA mW uF

Notes

- $1- Calculation is based on AS.NZS\ 2381.1:2005, AS2381.7-1989\ \&\ AS/NZS\ 60079.25:2004 for a single power supply loop in an intrinsically safe system.$
- $\ensuremath{\text{2-}}$ The I.S. Barrier is an integral part of the discrete input wireless transmitter.
- 3- The above calculation, check and conclusion are also applicable to wireless transmitter LSL and LSLL level switch I.S. circuits used for pump 1161C/D, 1162C/D, 1163C/D and 1164C/D sealoil pots.
- $\mbox{\ensuremath{4-}}$ The level switch in this I.S. Circuit is classified as simple device.

Accessed by Fyfe Pty Ltd on 19 Sep 2011

APPENDIX A

DETERMINATION OF EXTERNAL CIRCUIT PARAMETERS FOR INTRINSICALLY SAFE SYSTEMS

(This Appendix forms an integral part of this Standard.)

- **A1 CERTIFICATION METHODS.** As specified in Clause 1.4, intrinsically safe electrical equipment may be certified under one of three categories as follows:
- (a) Self-contained equipment. Since this equipment has no external cabling, there are no external parameters to be specified, and hence, such equipment will not be considered further in this Appendix.
- (b) Entity concept equipment.
- (c) Integrated systems.

A2 PARAMETERS TO BE DEFINED.

- **A2.1 Entity concept equipment.** For certified entity concept equipment the following parameters should be defined:
- (a) Associated electrical equipment.
 - (i) Maximum open circuit voltage (U_0) .
 - (ii) Maximum output current (I_0) .
 - (iii) Maximum external capacitance (C_0) .
 - (iv) Maximum external inductance (L_0) .
 - (v) Maximum external connected inductance to resistance ratio (L/R).
- (b) Intrinsically safe equipment.
 - (i) Maximum input voltage (U_i) .
 - (ii) Maximum input current (I_i) .
 - (iii) Maximum internal capacitance (C_i).
 - (iv) Maximum internal inductance (L_i) .

The parameters are marked on the equipment or specified in the accompanying documentation.

- A2.2 Integrated systems. For integrated systems, either one of the following cable parameters should be defined:
- (a) Maximum capacitance, inductance, and inductance to resistance ratio.
- (b) Maximum cable lengths for defined cable types.

These parameters are specified in the system documentation or the certificate.

- A3 INSTALLATION OF ENTITY CONCEPT EQUIPMENT. For entity concept equipment to be installed, the total of the cable parameters and those for the intrinsically safe equipment shall be less than those permitted to be connected to the associated electrical equipment, i.e.
- (a) $C_i + C_{cable} < C_o$; and
- (b) either $L_i + L_{cable} < L_o$, or $L/R_{cable} < L/R$.

Also, the voltage and current allowed for the intrinsically safe equipment shall be greater than those available from the associated electrical equipment, i.e. $U_i > U_o$; $I_i > I_o$.

Where shunt diode safety barriers are being used and their capacitance, inductance and L/R ratio parameters have not been specified in the documentation, the values specified in Table A1 may be used.

A4 INSTALLATION OF INTEGRATED SYSTEMS. For an integrated system to be installed correctly, the cable characteristics shall be below those specified in the system certification, i.e. the total cable capacitance and either the total lumped cable inductance or the L/R ratio must be less than those shown in the certificate or installation diagram. Cable characteristics may be obtained from the manufacturer or the values specified in Tables A2 and A3 may be used.

Alternatively, the following cable characteristics represent probable maximums:

- (a) $C = 0.11 \, \mu F/km$.
- (b) L = 0.8 mH/km.
- (c) $L/R = 56 \mu H/\Omega$.

If the parameters are only specified in the system certification for Group IIC they may be multiplied by 3 for Group IIB, by 8 for Group IIA, or by 10 for Group I installations.

Where the system documentation specifies cable types and corresponding lengths it is simply a matter of adhering to those specific requirements.

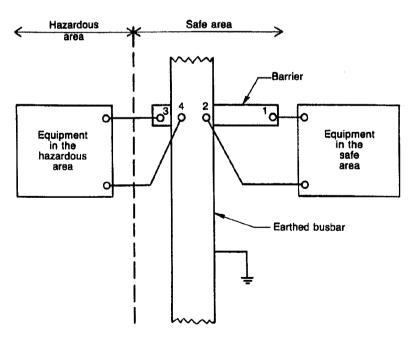
TABLE A1
EXTERNAL PARAMETERS
MAXIMUM VALUES FOR GROUP IIC (HYDROGEN)*

Barrier type	Permissible configuration	Max. permissible capacitance μF	Max. permissible inductance mH	Max. permissible L/R ratio $\mu H/\Omega$
27 V 270 Ω	Figure A1	0.15	3.7	55
22 V 150 Ω	Figure A1	0.2	1.5	40
15 V 100 Ω	Figure A1	0.8	1.5	60
	Figure A2	0.8	1.5	60
10 V 47 Ω	Figure A1	3.0	1.0	80
	Figure A2	3.0	1.0	80
	Figure A3	0.2	1.0	40
47 V 10 Ω	Figure A1	>1 000	0.16	100
	Figure A2	>1 000	0.16	100
	Figure A3	3.0	0.16	50
Ι V 2 Ω	Figure A1	>1 000	0.16	320
	Figure A2	>1 000	0.16	320
	Figure A3	>1 000	0.16	160

^{*} For most practical purposes, the value for gases of Group IIB are 3 times these values, and for gases of Group IIA are 8 times these values.

† The L/R ratio of the cable is defined as follows:

L/R ratio = $\frac{Inductance}{Resistance}$ per unit length (μ H)



NOTE: Barrier can be either positive or negative.

FIGURE A1 INSTALLATION CONFIGURATION 2-WIRE SYSTEM WITH SINGLE BARRIER

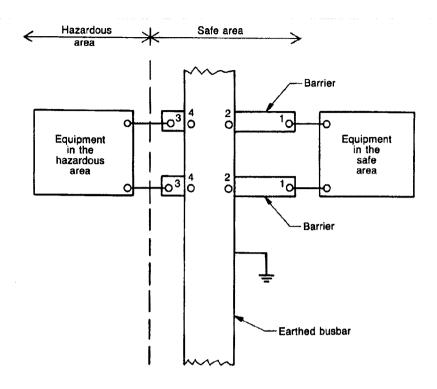


FIGURE A2 INSTALLATION CONFIGURATION 2-WIRE SYSTEM WITH TWO BARRIERS OF LIKE POLARITY

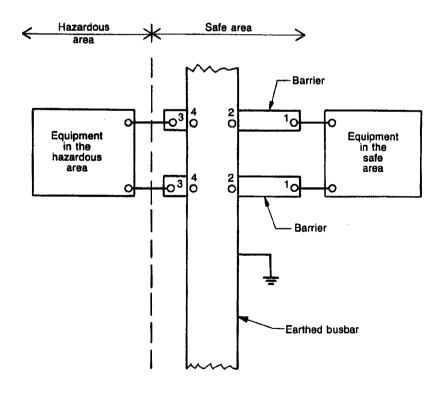


FIGURE A3 INSTALLATION CONFIGURATION 2-WIRE SYSTEM WITH TWO BARRIERS OF OPPOSITE POLARITY

TABLE A2 TYPICAL CABLE CHARACTERISTICS FOR PVC CABLES WITH 0.3 mm RADIAL THICKNESS

Nominal conductor size, number and dia. of wires	7/0.3 mm	(0.5 mm ²)	7/0.5 mm (1.5 mm²)		
Screening	Screened	Unscreened	Screened	Unscreened 1.4	
Conductor resistance at 20°C (Ω/100 m)	3.8	3.8	1.4		
Capacitance of pairs (µF/km)	0.145	0.090	0.2	0.12	
Inductance at 1 kHz (mH/km)	0.9	0.9	0.8	0.8	
L/R ratio (μH/ohm)	12	12	31	31	

TABLE A3 TYPICAL CABLE CHARACTERISTICS FOR 2-CORE MICC CABLE

Nominal conductor size (mm²)	1
Conductor resistance single core (Ω/100 m)	3.45
Capacitance of pairs (µF/km)	0.1194
Capacitance, conductor to earth (µF/km)	1.1612
Inductance at 1 kHz (mH/km)	0.684
L/R ratio (µH/ohm)	20

APPENDIX C

SELECTION OF Ex e COMPONENTS

(Normative)

C1 GENERAL Each enclosure is allocated a permissible maximum dissipating power, expressed in watts, taking into account—

- (a) the dissipation per component for a given cable conductor size;
- (b) the size of each cable used and the resistance of its length, equal to the diagonal of the enclosure;
- (c) the maximum allowable current for the Ex e component or the maximum current allowable for each cable, if below the maximum allowable for the terminal block; and
- (d) the bunching of cables within each enclosure and the effect this has in producing 'hot spots'.

The selection of an acceptable combination in any assembly is based upon the requirement that enclosures shall not exceed a specified total dissipation of power (in watts) from the cables and the components which are to be housed within each enclosure.

The permissible maximum dissipating power (MDP) for the temperature classification of the enclosure, determined by test, will appear on the manufacturer's rating plate, e.g. 15.5 W.

Having established maximum dissipation of power from the enclosures, the wired assembly may be expressed in power loss in the following way:

Dissipation per terminal:
$$P = I^2[R_t + L \times R_c]$$
 E(1)

$$P = I^2[R_{\scriptscriptstyle 1} + R_{\scriptscriptstyle d}] \qquad \dots \quad E(2)$$

where

P = power dissipation, in watts

I = current through terminal (max. allowable or limited by cable size)

 R_1 = internal resistance of terminal, in ohms

 R_c = cable resistance per metre, in ohms

L = length of cable equal to the diagonal of the enclosure, in metres

MDP = maximum dissipating power, in watts—the sum total of all terminals and wiring within the enclosure

 $R_{\rm d}$ = resistance of a length of cable equal to the diagonal of the enclosure

Therefore, for a combination of terminals and cables the watts loss can be calculated from the basic test information and cable data as follows:

$$MDP = aP_1 + bP_2 + cP_3 \dots + zP_n$$
 E(3)

where

 aP_1 ; bP_2 ; cP_3 , ... zP_n represent the heat dissipation of different combinations and numbers (a; b; c ...z) of terminals and cables.

C2 EXAMPLE: SELECTION OF TERMINAL BLOCKS FOR COMPLIANCE WITH T6 CLASSIFICATION

Assume that the following is derived from tests:

Enclosure MDP = 15 watt

Terminal block TBK2.5 = 15 A max. Terminal block TBK16 = 47 A max. L = 270 mm

A. *P* (TBK2.5) for

 P_1 3 amps 0.5 mm² cable = 0.092 W

 P_2 12 amps 1.0 mm² cable = 0.763 W

 P_3 15 amps 2.5 mm² cable = 0.530 W

B. *P* (TBK16) for

 P_4 47 amps 16 mm² cable = 0.790 W

Maximum number of allowable terminals:

$$P_1$$
 only = $\frac{15.0}{0.092}$ = 163; or

$$P_2$$
 only = $\frac{15.0}{0.763}$ = 19; or

$$P_3$$
 only = $\frac{15.0}{0.530}$ = 28; or

$$P_4$$
 only = $\frac{47.0}{0.790}$ = 59;

Now assume the following combination of terminals—

$$(60 \times P_1) + (6 \times P_2) + (3 \times P_3) + (3 \times P_4)$$

$$(60 \times 0.092) + (6 \times 0.763) + (3 \times 0.530) + (3 \times 0.790)$$

Total Heat Dissipation is—

$$5.52 + 4.578 + 1.590 + 2.37 = 14.058$$
 Watt

It is concluded that the combination of terminals and cables does not exceed MDP of 15 W and is therefore satisfactory for T6.

NOTE: The cables should not be bunched in quantities greater than the number of cores from each cable or conduit entering the enclosure and in any case should not exceed six per bunch.

C3 CABLE SELECTION v TERMINAL SELECTION The maximum current density permitted in any conductor inside or outside the enclosure is to be established as though the conductors are insulated with V75 material and enclosed in conduit in air and derated according to the ambient temperature and in any case not less than 50°C as established according to AS 3008.1. Additional derating factors may be necessary where bunching of cables occurs.

However, where the cables are run in situations that allow an increase of current-carrying capacity, the Ex e installation is placed at risk, particularly when the cable enters the terminal enclosure.

It is important to keep in mind that—

- (a) the Ex e terminal block rated current must not be exceeded; and
- (b) the cable connected to each terminal block is of a size acceptable to that block and the current carried by that cable complies with the requirements of Clause 2.7.2.

C4 FACTORS TO BE CONSIDERED IN SELECTING EQUIPMENT CERTIFIED

- **TO** Ex e The establishment of criteria which can lead to practical installation of terminal boxes for use in Class I, Zones 1 and 2 hazardous areas can only be made by testing and from the tests a manufacturer can tabulate and mark—
- (a) maximum power for each enclosure to meet the temperature class—generally T6 or as certified;
- (b) maximum current per Ex e terminal—marked thereon, in amps;
- (c) resistance per terminal, in ohms;
- (d) average length per conductor—box diagonal in metres;
- (e) resistance per conductor length, in ohms;
- (f) actual load current per terminal for the installation in amps; and
- (g) maximum current per conductor, in amps in accordance with AS 3008.1.

For a particular manufacturer's terminal box, these criteria lead to the following tabulations:

TABLE C1
CONDUCTOR RESISTANCE PER BOX FOR EACH CONDUCTOR SIZE

Size mm²	Enclosure types No. 1 No. 2 No. 3 No. 4 No. 5
0.5	
1.0	
2.5	ohms/1000 $m \times L$
4.0	1000
6.0	
10.0	
16.0	
25.0	
35.0	
50.0	where L is in metres
70.0	
95.0	

TABLE C2
TERMINAL/COMPONENT RESISTANCE (R_i)

Component type	Average resistance (ohms)
TBK 2.5 TBK 4 TBK 6 TBK 10 TBK n	Determined by test

From Tables C1 and C2, details for each enclosure can be derived:

Assume Enclosure type box No. 1. MDP = 15 watt

Ex	e compo	Cable	Total		
Туре	Qty	Load or rating	mm²	W	
TBK 2.5	60 3.0		0.5	5.52	
TBK 2.5	6	12.0	1.0	4.578 1.590	
TBK 2.5	3	15.0	2.5		
TBK 16	3	16.0	2.37		
		Fuelegu	ro Total -	14.058	

Enclosure Total =

It is possible to determine a large variety of enclosure combinations for different components, given-

- conductor resistance; (a)
- (b) component resistance;
- current drawn through each cable and component; and (c)
- (d) enclosure MDP.

The manufacturer should be able to supply details of certified components and enclosures. Cable resistances are readily available from tables or the enclosure manufacturer may provide the values for each enclosure size and each cable length, equal to the enclosure diagonals.

C5 ENCLOSURE CONTENTS AND LABEL Having established the contents for each enclosure for a known application, it is important that any spare space within is not filled at some later stage with equipment which-

- exceeds the certified MDP;
- (b) is not certified Ex e; or
- (c) arcs or sparks.

The user or the supplier should attach to the inside of the enclosure a label showing—

- certified MDP;
- (ii) original component contents; and
- (iii) calculated total power dissipation of original installed components.

If the user changes the contents, it would be his responsibility to secure a revised list, having first established that the enclosure temperature class and certified MDP will not be exceeded by the proposed changes.



8 Manufacturer's Data Reports (MDR) and Installation, Operation and Maintenance (IOM) Manual

Documentation in relation to this section is to be included and maintained by APA Group.



9 Maintenance Register

Documentation in relation to this section is to be included and maintained by APA Group. This section includes sample maintenance sheet.

FYFE Earth Partners	MAINTENANCE REGISTER		APA Group
ENVIRONMENT DEVELOPMENT RESOURCES		Site:	

		DOSSIER UPDATE AS REQUIRED (YES / NO / NA)							
DATE DESCRIPTION	ASSOCIATED TAGS	P&ID	DATASHEET	HA EQUIPMENT REGISTER	CERTIFICATE OF CONFORMITY			HA CLASSIFICATION	REMARKS
				+					
				+					
			1	İ	I		l	1	

FYFE Earth Partners	MAINTENANCE REGISTER		APA Group
ENVIRONMENT DEVELOPMENT RESOURCES		Site:	

			DOSSIER UPDATE AS REQUIRED (YES / NO / NA)								
DATE	DESCRIPTION	ASSOCIATED TAGS	P&ID	DATASHEET	HA EQUIPMENT REGISTER	CERTIFICATE OF CONFORMITY	INSTALLATION CHECK LIST	REPAIR & EXAMINATION REPORT	HA CLASSIFICATION	HA DRAWING REMARKS	
											$\overline{}$
							_				
	-										

FYFE Earth Partners	MAINTENANCE REGISTER		APA Group
ENVIRONMENT DEVELOPMENT RESOURCES		Site:	

			DOSSIER UPDATE AS REQUIRED (YES / NO / NA)							
DATE	DESCRIPTION	ASSOCIATED TAGS	P&ID	DATASHEET	HA EQUIPMENT REGISTER	CERTIFICATE OF CONFORMITY		REPAIR & HA EXAMINATION REPORT CLASSIFICATION		REMARKS
					1					
					ļ				1	



10 Inspection Register

Close visual inspection to confirm equipment installations was performed by Neville Green, an electrical engineer from Sitzler during a site visit on 6th October 2011.

This Section contains the inspection sheets. The Section also contains sample inspection sheet(s) for future inspection.

Documentation in relation to this section is to be maintained by APA Group.

Ref: It\data\sitz\encontracts\danwin\sbsj12\fyf1 fyfe pty\td hazardous areas reporting award 28.07.11\fyf2 fyfe mid pipeline\reports\elliott\electrical equipment for hazardous area summary report - elliott 14.10.11.docx

14 October 2011

FYFE PTY LTD Level 3, 80 Flinders St Adelaide SA 5000

Attention: Tony Bird

Dear Tony,

RE: AMADEUS PIPELINE - ELLIOTT METER STATION

HAZARDOUS AREA ELECTRICAL INSPECTION REPORTING

Please find attached hazardous area device inspection sheets for the above site as part of the visual grade of inspection reporting completed on October 7th 2011. A broad range of findings have been identified and documented within the 'action required' section of each check sheet in order to identify the non compliance of the equipment/installation with respect to current standards.

We list the items of deliverables requested by FYFE below and trust the scope of work delivered is in accordance with the specified requirements.

- 1. Preparation of hazardous area device inspection check-sheets
- 2. Attend sites and inspect all electrical equipment at each site
- 3. Complete inspection check-sheets for each instrument
- 4. Production of a memo stating what work was done and a summary of rectification work
- 5. To provide ongoing support to the client, it is recommended that a cost estimate is provided for any rectification work.

The level of electrical inspections were carried out in accordance with the Australian/New Zealand Standard AS/NZS 60079 series for explosive atmospheres and in particular parts 14 and 17 relating to electrical installations, design, selection, inspections and maintenance.

The grade of inspection completed was a combination of visual and close techniques only as defined within the above standards. Detailed equipment/installation inspections in accordance with the above standards were not performed however it is a requirement that detailed inspections be performed prior to initial energising of equipment installed within hazardous classified areas and in the absence of any information it is assumed this has been completed by others.

The visual inspections were conducted on energised equipment with emphasis on the condition reporting of the equipment and installation techniques applicable to the hazardous area classification and associated environment. It is also acknowledged that at the commissioning date of the original installation the Australian standards have since been revised which has been taken into consideration in the compliance evaluation of each device.

In some cases the nameplate detail of the installed equipment was illegible and hence the equipment method of protection and associated certification could not be identified.



A compilation of the inspection findings/actions across the installation is provided as follows:

- 1. Re-termination of cabling at equipment with exposed cable armour.
- 2. Tighten loose cable glands and accessories.
- 3. Provide bolts to equipment lid to maintain ingress protection rating.
- 4. Equipment and cable identification labelling required (where not provided) and alteration of existing where incorrectly labelled in accordance with the piping and instrumentation diagrams and electrical loop drawings.
- 5. Application of blue cable sheathing and/or labelling to clearly identify intrinsically safe installations.
- 6. Replace/remediate cabling where long term ultraviolet damage has occurred.
- 7. Provide cable support system to unsupported cabling.
- 8. Verification of installed explosion proof equipment, not certified to Australian standards, by performing conformity and/or fitness for purpose assessments to Australian standards. Alternatively replace with certified equipment.
- 9. Provide approved vendor replacement labels to poorly legible explosion proof equipment.
- 10. Provide appropriate segregation between intrinsically safe I.S. and non I.S. cabling within control hut.
- 11. Verification of explosion-proof installation & design techniques (flameproof versus I.S.) with respect to non-certified components/equipment. Rectify installation as required.
- 12. Replacement of equipment impending failure due to the age and poor condition.

It is evident that the lifetime expectancy of some equipment installed would be considered approaching a nominal design life of 30 years. Where nil evidence of Australian hazardous area certification exists, and nameplate details are illegible, we recommend replacement with Australian certified equipment. Where evidence of Australian certification was valid at the time of installation, and the general condition is acceptable for use within the hazardous area, minor remediation works can be completed with minimal operational impacts. The establishment of a regular periodic maintenance regime with respect to hazardous area compliance is also recommended as a minimum in accordance with AS/NZS 60079 Part 14/17.

We look forward to providing further advice and discussions with FYFE in order to assist the client with a remediation plan and associated cost estimating of the works. Trusting the above is satisfactory, please do not hesitate to contact the undersigned should you require any further information on the above or attached.

Yours faithfully,

Neville Green

Engineering Services Manager Encl. Device Inspection Sheets.



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Ref: I:\data\sitzler\contracts\darwin\sbsj12\lyf1 fyfe pty ltd hazardous areas reporting award 28.07.11\lyf1 fyfe southern end pipeline\inspection forms\hazardous area device inspection sheet for ex-d,ex-e,ex-i,ex-n,ex-p and other ex devices rev 1.doc

Specifi	cations						\		
Equipment ID/Tag:					Plant/Asset: (041	?) GAS CO	ono, ekio	
Circuit I	D: NOWE		_	- (Site Location: Full				
Apparat	us type: (light, JB, Motor)	SOLENDIO	VALVE		Environment: (h				
Manufac				-	Type of protection: (d,e, i, n, p etc)				
Full mod		0031			Gas group: (IIA/I		7		
	-	0033	15000		Temp class: (T1		+ == 3		
Serial n)5080		` `		15 !		
IP Class	· · · · · · · · · · · · · · · · · · ·				Certificate number: Test authority: (BAS, PTB, SAA				
Number	of cables:				etc)	3A3, F1B, 3	5AA		
Area cla	assification : Zone:	Gas Group:	Tem	p.Class					
Cable	entries	gland 1		AGGAR	@ gland 2	0	thers JR		
	nanufacturer:	7		1			CTOUAN	FW4W	
Model:	pe of protection: (d,e)							B 76	
Glaridity	pe or protection, (d,e)							Ex 157	
Inspecti	A Equipment				Applicable to protection type:	External	Notes		
1	Equipment (incl group and	d temp class) is app	ropriate for area	а	all	X			
2	classification Equipment ID is available				all	6	NIL		
3	Equipment ID is correct				all	6			
4	Equipment circuit ID is av				all	0	NIL		
5	Equipment circuit ID is co Enclosure, sealing gasket		naticfactory		all all	Ø			
7	There is no evidence of u				all	Ø			
8	Bolts, cable entry devices			correct	ail	100			
	type and are complete an								
9	Installation clearly labelled Safety barriers/isolators in		ication and sec	urely	<u> </u>	X			
10	earthed where required				i	X			
11	Entity calculation/ equipm	ent documentation i	s available		i	X			
	B Installation The cables are adequatel	v supported and the	re is no obvious				- 12man	11	
1	damage to cables	y supported and the			all	Ø	SUMAN	<u> </u>	
2	Sealing of trunking, ducts				all	100			
3	Earthing and bonding con sufficient cross section	nections are tight, in	n good condition	n and of	all	<i>⊗</i>			
4	No obstructions adjacent	to flameproof flange	d joint		d	X			
	C Environment								
1	Apparatus adequately pro and other adverse factors		on, weather, vib	ration,	all	6			
2	No undue accumulation o				all	\bigcirc			
Action r	ound? (circle as appropequired to make device	e compliant (base						Yes/No	
Provid	e equipment identificat	ion?		Provide	e equipment of	cover/UV	protection?		
Provid	e circuit identification?	•	\square	Sealing	of conduit/d	lucts requ	ired?		
Provid	e blue cable sheath?			Provide	e/test equipor	tential bor	nding?		
Remed	liate damaged cable sh	eath?		Eviden	ce of equipm	ent explos	sion protectio	n? 🗆/🕽	
Tighte	n loose cable gland(s)?)		Replac	e equipment	explosion	protection la		
	minate cabling at equip			Confor	mity/Fitness ment require	for Purpor	se		
Termir	nate and earth exposed	cabling?			e equipment		e or poor		
Provid	e cable support/mech.	protection?							



Additional comments:	Abe(1746) 277(1)
- Recommend removal of some of some value with new solutions. New value to be installed	denoid value / JB enoid value only. Suggest- with adequate support.
Contractor (write): Inspector Supervisor D. W. C. Harry Date: 7. 60 (1	Client (write): Inspector Date:
Reviewed by: N. GREEN Date: 13/10/11 Priority:	
Comments:	
All action items now completed:	
Device now fully compliant, spreadsheet register has been updated Supervisor (write): Date:	



SKID

Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Specifications
Equipment ID/Tag:

Circuit ID:

Ref: I:\data\sitzler\contracts\darwin\sbsj12\fyf1 fyfe pty ltd hazardous areas reporting award 28.07.11\fyf1 fyfe southern end pipeline\inspection forms\hazardous area device inspection sheet for ex-d.ex-e,ex-i,ex-n,ex-p and other ex devices rev 1.doc

Plant/Asset:

Site Location:

Apparatus type: (light, JB, Motor) PKESSVKE (DIFFERENTIAL)				Environment: (hot, dusty?)					
				Type of protection: (d,e, i, n, p etc)					
Full model number: MODEL 120				Gas group: (IIA/B	/C)	~			
Serial nu	ımber:		-		Temp class: (T1-	T6)			
IP Class	_				Certificate numbe	er:			
Number	of cables:				Test authority: (Ba	AS, PTB	, SAA		
Area clas	ssification : Zone:	Gas Group:	Tem	o.Class					
Cable e	entries	gland 1	`		gland 2	į.	others 38		
Gland m	anufacturer:	7							
Model:		·							
Gland ty	pe of protection: (d,e)	1							
Inspectio				/	Applicable to protection	e as ch			
	A Equipment	d tame alone) in conses	viata for area		type:	Externa	al Notes		
1	Equipment (incl group and classification	o temp crass) is approp	mate for area	1	all	X			
2	Equipment ID is available				all	K	NIL.		
3	Equipment ID is correct				all	Ø			
4	Equipment circuit ID is av				all	8	NIC		
5	Equipment circuit ID is con Enclosure, sealing gasket		atisfactory		all all	Ø			
7	There is no evidence of u				all	- 2			
8	Bolts, cable entry devices			orrect	all	Ø			
	type and are complete an								
9	Installation clearly labelled Safety barriers/isolators in		tion and soor	iroly	i	Х			
10	earthed where required	istalied aş bel certilica	lion and Sect	шегу	i	X			
11	Entity calculation/ equipm	ent documentation is a	vailable		i	Х			
	B Installation								
1	The cables are adequatel damage to cables	y supported and there	is no obvious	5	all	Ø			
2	Sealing of trunking, ducts	s, pipes and/or conduits	s is satisfacto	ory	all	Ø			
3	Earthing and bonding con				all	Ø			
4	sufficient cross section No obstructions adjacent	to flamenroof flanged i	nint		d d	X			
4	C Environment	to hameproor hanged j	<u> </u>						
1	Apparatus adequately pro	etected from corrosion,	weather, vib	ration,	all	6			
	and other adverse factors								
2	No undue accumulation o	t dust or dirt			all				
Faults fo	ound? (circle as approp	oriate): <u>No lées</u> e compliant (based	on visual/o	close in	spection techn	niques o	only):		
			Yes/No					Yes/No	
Provide	e equipment identificat	ion?	\square	Provid	le equipment c	over/U\	/ protection?		
Provide	e circuit identification?	•	र्वा□	Sealin	g of conduit/du	ıcts req	uired?		
Provide	e blue cable sheath?			Provid	le/test equipote	ential be	onding?		
Remed	iate damaged cable sh	eath?		Evider	nce of equipme	nt expl	osion protection?		
	n loose cable gland(s)?				<u>-` · ·</u>	<u> </u>	on protection labels		
Po terminate publing at aguinment?					rmity/Fitness for sment required		ose		
Termin	ate and earth exposed	cabling?			ce equipment o		ge or poor		
Provide	e cable support/mech.	protection?	र्षा□						



Additional comments:	ASH 17 on 773 D15
	T2
- Instrument mounted within	JB with nil evidence
of Explosion proof rating.	
- Instrument does contain	American certification
in accordance to manufaction	Wel Itentula
	a meanie.
Contractor (write): Inspector Supervisor	Client (write): Inspector
D.W. CLIANS	
Date: 7//0///	Date:
Reviewed by: N, GREEN	
Date: (3/10/11	
Priority:	
Comments:	
All action items now completed:	
Device now fully compliant, spreadsheet register has been update Supervisor (write): Date:	ed



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Ref: It\data\s\tz\end{align="right" light | Ref: It\data\s\tz\end{align="right" | Ref: It\data\s\tz\end{alig

Specifications								
Equipment ID/Tag:	Plant/Asset:	GAS_C	DND' SKI	0				
Circuit ID:				Site Location: Eurot				
Apparatus type: (light, JB, Motor)	SELIZNDIO			Environment: (ho				
Manufacturer: ASCO				Type of protection	n: (d,e, i, r	n, p etc)		_
	mo-12			Gas group: (IIA/E	_ `			3
Serial number: 6/6	1008 3 42A		-	Temp class: (T1-	T6)	EII GRA	4 / 4	-
			_	Certificate numb		13 1	-	
IP Class			-	Test authority: (E		244		
Number of cables:				etc)				
Area classification : Zone:	Gas Group:	Tem	p.Class					
Cable entries	gland 1			gland 2		others A	DAPTOV.	<u> </u>
Gland manufacturer: Model:								
Gland type of protection: (d,e)				G.		po	wit	
Inspection ————				- Circ	le as che	ecked		
				Applicable				
				to protection				
A Equipment Equipment (incl group and	d temp class) is appr	noriate for area	<u> </u>	type:	Externa	Notes		
1 classification	z temp class) is appr			. all	X			
2 Equipment ID is available				all	8	NIC		
3 Equipment ID is correct 4 Equipment circuit ID is av	ailahle			all all	8	MIC		
5 Equipment circuit ID is co				all	*			
6 Enclosure, sealing gasket				all	8			
7 There is no evidence of u Bolts, cable entry devices			arroot -	all all				
type and are complete an		its are of the c	onect	all	(Q)			
9 Installation clearly labelled				i	X			
Safety barriers/isolators in earthed where required	istalled as per certific	cation and secu	urely	i	Х			
11 Entity calculation/ equipm	ent documentation is	available		i	X			
B Installation								
The cables are adequated damage to cables	y supported and ther	e is no obvious	5	ali	Ø	RESTING	000 0	PEWORK
2 Sealing of trunking, ducts				all	Q			
3 Earthing and bonding con	nections are tight, in	good condition	and of	all	Ø			
sufficient cross section No obstructions adjacent	to flamenroof flanged	Linint		d	X			
C Environment							100	
Apparatus adequately pro		n, weather, vib	ration,	all	R	CORROS	10 10	
and other adverse factors No undue accumulation o				all ·	8			
Faults found? (circle as appropagition required to make device	compliant (base	Yes/No			niques o			Yes/No
Provide equipment identificat				de equipment o		<u> </u>		
Provide circuit identification?	·		Sealin	g of conduit/d	ucts req	uired?		
Provide blue cable sheath?			Provid	de/test equipot	ential bo	onding?		
Remediate damaged cable sh	eath?		Evide	nce of equipme	ent explo	osion protecti	on?	
Tighten loose cable gland(s)?	•		Repla	ce equipment	explosio	n protection l	abels?	
Re-terminate cabling at equip	ment?		asses	rmity/Fitness t sment require	d?			
Terminate and earth exposed	cabling?		Repla	ce equipment (tion?	due to a	ge or poor		MIT
Provide cable support/mech.	protection?							



			ADV 17 (9) 273 083
Additional comments:			
	Olizant for the State of		
Contractor (write): Inspector Supervisor	Client (write): Inspector		
Contractor (write): Inspector Supervisor Date: 7/10/u			
Date: 7/10/U	Date:		
,			
Dudawalla.	٦		
Reviewed by: N. GREEN Date: 13/10/11			
Data: 18/10/11			
Date. 1071-111			
Priority:			
Comments:			
All action items now completed:			
All action items now completed:			
UUD GIUSEU.	<u> </u>		
Device now fully compliant, spreadsheet register has been update	d		
Supervisor (write):			
Date:			
		-	



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Ref: I\data\sitz\er\contracts\darwin\sbsj12\fyf1 fyfe pty Itd hazardous areas reporting award 28.07.11\fyf1 fyfe southern end pipeline\inspection forms\hazardous area device inspection sheet for ex-d,ex-e,ex-i,ex-p, and other ex devices rev 1.doc

Specifi	cations					GAS	CHAZ 'OURD
Equipme	ent ID/Tag:				Plant/Asset:	#1 - 0	CATALYTIC HEATER
Circuit II					Site Location:	ELLI	
Apparat	us type: (light, JB, Motor)	JUNCTION	Box x 2	off.	Environment: (ho	t, dusty?)
Manufac	cturer: 0-3	GENEY	***************************************		Type of protection	n: (d,e, i,	n, p etc)
Full mod	del number: GUA				Gas group: (IIA/B	3/C) CL ((4RC, D, UL11 (R E, G.4
Serial no					Temp class: (T1-	T6)	1000
IP Class	Nema 4				Certificate number	er:	
Number	of cables:				Test authority: (B etc)	AS, PTB	, SAA
Area cla	assification : Zone:	Gas Group:	Tem	p.Class	etc)		
7 17 0 0 1 1 1	entries	gland			gland 2		others ELROWS
	nanufacturer:	?	-				CLASAL
Model:		?					1245 120
Gland ty	pe of protection: (d,e)	7.					_
Inspecti 1	A Equipment Equipment (incl group and classification	temp class) is app	propriate for area	3	Applicable to protection type:	Externa	DIL AUSEX CEATS.
2	Equipment ID is available				all	₩	
3	Equipment ID is correct				aíl	\otimes	
5	Equipment circuit ID is av Equipment circuit ID is co				all all	8	
6	Enclosure, sealing gasket		e satisfactory		all	8	
7	There is no evidence of u	nauthorised modific	ations		all	000	
Boits, cable entry devices and blanking elements are of the correct type and are complete and tight				orrect	all	8	REMOVE/REPLACE ELBONS
9	Installation clearly labelled				i	Х	
10	Safety barriers/isolators in earthed where required	stalled as per certif	fication and secu	urely	i	X	
11	Entity calculation/ equipm B Installation	ent documentation	is available		i	X	
1	The cables are adequatel	supported and the	ere is no obvious	3	all	Ø	SUPPORT REQUIRED
2	damage to cables Sealing of trunking, ducts	pipes and/or cond	luits is satisfacto	orv	all	X	Total Medical
3	Earthing and bonding con				all	X	
4	sufficient cross section No obstructions adjacent	o flameproof flange	ed joint		d	X	
	C Environment						
1	Apparatus adequately pro and other adverse factors	tected from corrosi	on, weather, vib	ration,	all	X	
2	No undue accumulation o	dust or dirt			all	X	
	ound? (circle as appropequired to make device			close ir	nspection techr	nigues c	only): Yes/No
Provid	e equipment identificat	ion?	V D	Provi	de equipment c	over/U\	
	e circuit identification?		₫/□	-	ng of conduit/du		
				Provi	de/test equipote	ential bo	onding?
Remed	diate damaged cable sh	eath?		Evide	nce of equipme	ent expl	osion protection?
Tighte	n loose cable gland(s)?			Repla	ce equipment e	explosio	on protection labels?
Re-terr	minate cabling at equip	ment?		asses	ormity/Fitness formations for second required	!?	▼ (□
Termir	nate and earth exposed	cabling?		Repla condi	ce equipment of tion?	lue to a	ge or poor □/□
Provid	e cable support/mech.	orotection?	⋈ ⊓				



			ABN 17-091 273 013
Additional comments:			
ás.			
22.5			
Contractor (write): Inspector Supervisor	Client (write	e): Inspector	
N. GREEN			
Date: (2/10/1)	Date:		
Date. (2) (0)	Date.		
Decisioned how			
Reviewed by: N. CREEN			
Date: 13/18/11			
Date: 13/10/11			
D. J. J. J.			
Priority:			
Comments:			
All action items now completed:			
Job closed:			
Device now fully compliant, spreadsheet register ha	is been undated		
Supervisor (write):	o been apaatea		
Date:			
Date.			



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Ref: I:\data\sitzler\contracts\darwin\sbsj12\fyf1 fyfe pty Itd hazardous areas reporting award 28.07.11\fyf1 fyfe southern end pipeline\inspection forms\hazardous area device inspection sheet for ex-d,ex-e,ex-i,ex-p and other ex devices rev 1.doc

Specifications			GAS (COND SKID				
Equipment ID/Tag:				Plant/Asset: HI - CATACUTIC HEATER				
Circuit ID:				Site Location: ELCIDIT				
Apparatus type: (light, JB, Motor)				Environment: (hot, dusty?)				
				Type of protectio	n: (d.e. i.	n. p.etc)		
Manufacturer: WILO ELECTRICAL PTY LTO. Full model number: FJ 83A / FOOI				Type of protection: (d,e, i, n, p etc) Gas group: (IIA/B/C)				
	7/2001							
Serial number:				Temp class: (T1-		76		
IP Class IP 66				Certificate number		5 Ex 1168		
Number of cables: 5				Test authority: (BAS, PTB, SAA etc)				
Area classification : Zone:	Gas Group:	Tem	p.Class					
Cable entries	gland 1			gland 2		others		
Gland manufacturer:	?							
Model:	3,							
Gland type of protection: (d,e)	5							
Inspection ————				→ Circ	le as ch	ecked		
				Applicable	Ţ			
A Facilianian A				to protection	V	.l. Natas		
A Equipment Equipment (incl group and	d temp class) is app	ropriate for area	a	type:	Externa	I Notes		
1 classification	d temp class) is appi	ropriate for area	a	all	X			
 Equipment ID is available 	3			all	(8)			
3 Equipment ID is correct				all	8			
4 Equipment circuit ID is av				ail	N N			
5 Equipment circuit ID is co				all	8			
6 Enclosure, sealing gasker 7 There is no evidence of u				all all	<u> </u>			
Bolts, cable entry devices			correct					
	Bolts, cable entry devices and blanking elements are of the correct type and are complete and tight			all	8	ENCLOSURE	Doubling IT was	
9 Installation clearly labelled				i	X			
Safety barriers/isolators installed as per certification and securely				ì	X			
earthed where required 11 Entity calculation/ equipm		i	X					
B installation	tent documentation is	3 available		'	1 /			
The cables are adequately supported and there is no obvious				all	8	SURPORT	CHOOSEN ADMA	
damage to caples	damage to cables					SOFFORT	EXPOSED ARMO	
 Sealing of trunking, ducts, pipes and/or conduits is satisfactory Earthing and bonding connections are tight, in good condition and of 				all	Х			
3 sufficient cross section	mections are tight, in	r good condition	ii and oi	all	X			
4 No obstructions adjacent		d	X					
C Environment								
Apparatus adequately pro and other adverse factors		on, weather, vib	ration,	all	X			
2 No undue accumulation of				all	X			
Faults found? (circle as appropaction required to make device		ed on visual/	close ir	spection techr	niques o	nly):	Yes/No	
Durantela a sustana a sust	4ia=2	Yes/No ☑/ز	Durant	do anulum est :		(protostic=2		
Provide equipment identificat				de equipment c		-		
Provide circuit identification? ✓/□ Se			Sealing of conduit/ducts required?					
Provide blue cable sheath?				Provide/test equipotential bonding?				
Remediate damaged cable sheath?				Evidence of equipment explosion protection?				
				Replace equipment explosion protection labels?				
Re-terminate cabling at equip	oment?	Ø/O		Conformity/Fitness for Purpose assessment required?				
Terminate and earth expected cabling?			Replace equipment due to age or poor condition?					
C				IDE LID BO	LTS T	D ENLOSU	ee Mi	
Provide Cable Supportmech, protection:				The state of the s		The second secon		



	ABN 17 091 273 013
Additional comments:	
Contractor (write): Inspector Supervisor	Client (write): Inspector
N. GREEN	
Date: 13/10/11	Date:
Date: 18/10/11	Date.
Davioused has at Co. and	
Reviewed by: N. GREEN	
Date: (3/10/11	
Date. 12/10/11	
Priority:	
Priority.	
Comments:	
Comments.	
All action items now completed:	
Job closed:	
Device now fully compliant, spreadsheet register has be	en undated
Supervisor (write):	on apaditu
Date:	
Buto.	



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Ref: I\\data\sitzler\contracts\\darwin\sbs\f12\\forall fyle pty Itd hazardous areas reporting award 28.07.11\\forall fyle southern end pipeline\inspection forms\hazardous area device inspection sheet for ex-d, ex-e, ex-i, ex-n, ex-p and other ex devices rev 1.doc

1590 - 1597

Specific	cations									
Equipment ID/Tag:					Plant/Asset:	iAS C	COND' SKID			
Circuit ID:					Site Location: EULIDIT					
Apparatus type: (light, JB, Motor)					Environment: (hot, dusty?)					
Manufacturer: KLIPPON										
					Type of protection: (d,e, i, n, p etc) Gas group: (IIA/B/C)					
Full model number: 73:11 EX Serial number: 5524							71			
Serial nu		> 24			Temp class: (T1-		16			
IP Class 67				Certificate number: AUS Ey 615 ¥						
Number	of cables:	3			Test authority: (BAS, PTB, SAA etc)					
Area cla	ssification: Zone:	Gas Group:	Temp	o.Class						
Cable 6	entries	gland 1			gland 2 others BUNG					
	anufacturer:			7						
Model:	one of protection; (d.e.)				NO VIZIO					
Glario ty	pe of protection: (d,e)						100 -1210			
Inspecti	on ———				—→ Circ	le as ch	ecked			
•										
					Applicable	↓				
	A Equipment				to protection type:	Externa	al Notes			
	Equipment (incl group and	temp class) is approp	riate for area		all	X	110(05			
1	classification									
2	Equipment ID is available				all	2	N/~			
3	Equipment ID is correct Equipment circuit ID is av	ailable			all		NIV			
5	Equipment circuit ID is co			_	all	2				
6	Enclosure, sealing gasket	s or compounds are sa			all	0				
7	There is no evidence of un				all	Ø				
8	8 Bolts, cable entry devices and blanking elements are of the correct				all	Q	LOOSE GO	LADOS		
9	type and are complete and tight Installation clearly labelled				i	(X)	NEW LABEL RE	COMMO		
Safety barriers/isolators installed as per certification and securely				irely	i	Х				
11	earthed where required Entity calculation/ equipm	ent documentation is a	vailable		i	X				
	B Installation									
1	The cables are adequatel	y supported and there i	s no obvious	3	all	Ø				
2	damage to cables Sealing of trunking, ducts	nings and/or conduits	ic caticfacto		all	8				
	Earthing and bonding con					R				
3	sufficient cross section				all					
4	No obstructions adjacent	o flameproof flanged jo	oint			Χ				
	Apparatus adequately pro	tected from corrosion.	weather, vib	ration.		6				
1	and other adverse factors				all	6				
2	No undue accumulation o	f dust or dirt			all	Ø				
	ound? (circle as approp equired to make device		on visual/ Yes/No	close in	spection techn	niques c		Yes/No		
Dravid	a aquiament identificat	ion?		Drovid	o oguinment s					
				Provide equipment cover/UV protection? Sealing of conduit/ducts required?						
			Provide/test equipotential bonding?							
							VI IS			
	Be terminate achling at aguipment?				Conformity/Fitness for Purpose					
Ke-terr	Re-terminate capling at equipment?			assessment required?						
Termin					condition?					
Provide cable support/mech. protection?				22.7410						



Additional comments:	
ζ-	
Contractor (write): Inspector Supervisor	Client (write): Inspector
Contractor (write): Inspector Supervisor O, WILLIAMS Date: 7/10/11	
Date: נְוֹטְנוֹן	Date:
	7
Reviewed by: N. GREEN	
Date: /3/10/1(
Priority:	
Comments:	
All action items now completed:	
Device now fully compliant, spreadsheet register has been update	ed
Supervisor (write): Date:	



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Specifications

Ref: I:\data\sitzler\contracts\darwn\sbsj12\fyf1 fyfe pty ltd hazardous areas reporting award 28.07.11\fyf1 fyfe southern end pipeline\inspection forms\hazardous area device inspection sheet for ex-d,ex-e,ex-i,ex-n,ex-p and other ex devices rev 1.doc

1598 - 1604

Equipment ID/Tag: 7					Plant/Asset: GAS COND' SICIO				
Circuit ID:					Site Location: BLIGT.				
Apparatus type: (light, JB, Motor) UAS METERE (VOLUME				NOLUME)					
Manufacturer: ROMET LTD.					Type of protection: (d,e, i, n, p etc)				
Full model number: PM 85					Gas group: (IIA/B/C)				
Serial number: 074593					Temp class: (T1-T6)				
IP Class				(Certificate numbe	er:			
Number	of cables:				Test authority: (B.	AS, PTB	, SAA		
					etc)				
Area classification : Zone: Gas Group: Temp.Class						.4.00.00	-th		
Gland ma	anufacturer:	gland 1			gland 2 N	The	others JD	UD4	
Model:		PLPV	203				(ROVER-141)		
Gland typ	pe of protection: (d,e)				NI COC	7	PIP AUS Ex 6.	00	
Inspection	on ———				- Circl	e as ch		20	
					P 01101		CORCU		
					Applicable	. ↓			
	A Equipment				to protection type:	Externá	al Notes		
1	Equipment (incl group and	temp class) is appro	priate for area	<u> </u>	all	Х			
2	classification Equipment ID is available				all	Ø	NIL		
3	Equipment ID is correct				all	Q			
4	Equipment circuit ID is ava				all	Ø	NH		
5	Equipment circuit ID is cor Enclosure, sealing gasket		eaticfactory		all all	Ø Ø			
7	There is no evidence of ur				all	Ø		_	
8	Bolts, cable entry devices	and blanking elemen		orrect	all	Ø			
9	type and are complete and Installation clearly labelled				i	B			
Safety harriers/isolators installed as per certification and securely						- Q			
earthed where required					i				
11 Entity calculation/ equipment documentation is available B Installation					<u>i</u> i	X			
1	The cables are adequately supported and there is no obvious					R			
	damage to cables	ninna andlas acadul	to in antinfanta		all	- R			
2	Sealing of trunking, ducts, pipes and/or conduits is satisfactory Earthing and bonding connections are tight, in good condition and of				all				
3	sufficient cross section				all	&			
No obstructions adjacent to flameproof flanged joint C Environment					d	X			
1	Apparatus adequately pro	tected from corrosion	, weather, vib	ration,		<i>a</i>			
1	and other adverse factors				all	8			
2	No undue accumulation of	aust or airt			all	Ø			
Faults fo	und? (circle as approp	riate): No / (es:)							
Action re	equired to make device	compliant (based		close ins	pection techn	iques o			
			Yes/No					Yes/No	
					ovide equipment cover/UV protection?				
Provide circuit identification?				Sealing	ealing of conduit/ducts required?				
Provide blue cable sheath? ✓/☐ Provi				Provide	rovide/test equipotential bonding?				
Remediate damaged cable sheath?			Eviden	vidence of equipment explosion protection?					
			Replac	Replace equipment explosion protection labels?					
Re-terminate cabling at equipment? Conformity/Fitness for Pu assessment required?					or Purp	<u> </u>			
Terminate and earth exposed cabling?				ace equipment due to age or poor					
Provide cable support/mech. protection?									
	To vide capie supportunient. Protection:								



		ASH 17 091 373 613
Additional comments:		
- Followop inspection reg installation for simple	unied to verify I.s.	
E () // 1° C .5		
Installation to simple	device.	
	``	
	·	
Contractor (write): Inspector Supervisor	Client (write): Inspector	_
P. Williams		
Date: 7/ιο/ιγ	Date:	
Reviewed by: N. GREEN		
Date: /3/10/11		
Priority:		
Comments:		
All action items now completed:		
don closed.		
Device now fully compliant, spreadsheet register has been	en updated	
Supervisor (write): Date:		



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Ref: I:\data\sitzler\contracts\darwin\sbsj12\fy1 fyle pty lld hazardous areas reporting award 28.07.11\fy1 fyle southern end pipeline\inspection forms\hazardous area device inspection sheet for ex-d,ex-e,ex-i,ex-n,ex-p and other ex devices rev 1.doc 16 0 0 16 0

Specifications										
Equipment ID/Tag: (LSH 2) ?		F	Plant/Asset:	FILTER	SORARATOR F.	5 12				
Circuit ID:	S	Site Location:								
Apparatus type: (light, JB, Motor)	SWITCH	E	nvironment: (ho	t, dusty?)						
Apparatus type: (light, JB, Motor) LEVEL SWITCH Environment: (hot, dusty?) Type of protection: (d,e, i, n, p etc)										
Full model number: L-1200A G	0	Gas group: (IIA/B/C) CLI, 4&C+O								
Serial number:			emp class: (T1-							
IP Class		C	Certificate number	er:						
Number of cables: /		est authority: (8	AS, PTB. S	SAA						
Area classification : Zone: Gas Group:		p.Class	etc)							
Cable entries gland		1	gland 2		others					
Gland manufacturer:			giana z		7111013					
Model:										
Gland type of protection: (d,e)										
Inspection —————			- Circ	le as che	cked					
			Applicable	\downarrow						
A Equipment			to protection type:	External	Notes					
Equipment (incl group and temp class) is a	ppropriate for area	a	all	X						
classification				Ô	1//.					
2 Equipment ID is available 3 Equipment ID is correct			all all	(B)	NIL					
4 Equipment circuit ID is available			all	2	WIL					
5 Equipment circuit ID is correct			all	6						
6 Enclosure, sealing gaskets or compounds a 7 There is no evidence of unauthorised modi			all all	X						
Bolts cable entry devices and blanking ele		correct								
type and are complete and tight										
9 Installation clearly labelled			i	单						
Safety barriers/isolators installed as per cer earthed where required	rtification and secu	urely	í	@						
11 Entity calculation/ equipment documentatio	n is available		ì	×						
B Installation										
The cables are adequately supported and t damage to cables	there is no obvious	\$	all	@						
Sealing of trunking, ducts, pipes and/or contains	nduits is satisfacto	ory	all	B						
Earthing and bonding connections are tight			all	@						
sufficient cross section No obstructions adjacent to flameproof flan	and inint		d	X						
C Environment	ged Joint		u		<u> </u>					
Apparatus adequately protected from corro	sion, weather, vib	ration,	all	12						
and other adverse factors No undue accumulation of dust or dirt			all	\$						
Faults found? (circle as appropriate): No / Ye Action required to make device compliant (ba		close ins			ılv):					
	Yeş/No		,			Yes/No				
Provide equipment identification?		Provide	equipment c	over/UV	protection?					
Provide circuit identification?	Sealing	ealing of conduit/ducts required?								
Provide blue cable sheath?	Provide	ovide/test equipotential bonding?								
Remediate damaged cable sheath?	Evidend	vidence of equipment explosion protection?								
Tighten loose cable gland(s)?		Replace equipment explosion protection labels?								
Re-terminate cabling at equipment?		assess	nity/Fitness f ment required	i?		M /D				
Terminate and earth exposed cabling?	\square / \square	Replace	e equipment on?	due to age	e or poor					
Provide cable support/mech, protection?										



Contractor (write): Inspector Supervisor Client (write): Inspector Date: 7/10/11 Date: Reviewed by: N. GRZZN Date: 13/10/11 Priority: Comments:
Reviewed by: N. GREEN Date: 13/10/11 Priority:
Reviewed by: N. GREEN Date: 13/10/11 Priority:
Reviewed by: N. GREEN Date: 13/10/11 Priority:
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Reviewed by: N. GREEN Date: 13/10/11 Priority:
Priority:
Priority:
Priority:
Comments:
Comments:
All action items now completed:
Job closed:
Device now fully compliant, spreadsheet register has been updated
Supervisor (write):
Date:



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

		Plant/Asset: 4	AS CO	00' 5K10						
Circuit ID:										
E TX		Environment: (hot, dusty?)								
		Type of protection	n: (d,e, ì, n,	petc) sa O	1					
2100612										
5210047	(~)		<u> </u>	110 15						
	-+			14 15	A T					
IP Class 66										
Number of cables:										
Temp	p.Class	Class								
1		gland 2		10070						
				KENKIPT						
				— Marie						
		→ Circl	e as che	cked						
		A # 1 # 1								
			\forall							
		type:	External	Notes						
propriate for area	а	all	X							
		all	Ø	N/L						
		all								
		all 🧪	×	1011						
tinfo-stary										
7 There is no evidence of unauthorised modifications 8 Bolts, cable entry devices and blanking elements are of the correct										
type and are complete and tight Installation clearly labelled										
ification and secu	uraly									
inication and sect	Dr Ciy	į	*							
is available		i	X							
ora is no obvious				1 4 0 7 7 1						
iere is no obvious	5	all	7							
		ali	1							
in good condition	n and of	all	8							
ped joint		d	X		· · ·					
sion, weather, vib	ration,	all	Ø							
		all	*							
sed on visual/ Yes/No	close in:			nly):	Yes/No					
Z(Provid	e equipment c	over/UV	protection?						
Provide circuit identification?										
					? 🗆 🗀					
	Confor	mity/Fitness f	or Purpo	<u> </u>						
			oue to ag	e or poor						
	Tem 1 propriate for area re satisfactory cations nents are of the control of t	Temp.Class Temp.C	Environment: (ho Type of protection Type of protection Type of protection Temp class: (T1- Certificate number Test authority: (Betc) Temp.Class 1 gland 2 Circl Applicable to protection type: propriate for area all all all all all all all all all a	Environment: (hot, dusty?) Type of protection: (d,e, i, n B 218347765 Gas group: (IIA/B/C) Temp class: (T1-T6) Certificate number: Test authority: (BAS, PTB, Setc) Temp.Class Temp.Class Circle as chere to protection type: External all All All All All All All All All A	Site Location: Environment: (hot, dusty?) Type of protection: (d,e, i, n, p etc) i.q. or Type of protection: (d,e, i, n, p etc) i.q. or Type of protection: (d,e, i, n, p etc) i.q. or Type of protection: (d,e, i, n, p etc) i.q. or Temp class: (T1-T6)					



		XXX 17 071 971 013
Additional comments:		
Contractor (write): Inspector Supervisor	Client (write): Inspector	
Contractor (write): Inspector Supervisor D. WILLIAM Date: 7 10 11	List (Wiles), mopeotor	
7/1/R///	Detai	
Date: /[/ / ti	Date:	
Reviewed by: N. GREEN Date: (3/10/11	7	
ALI		
Date: (2/16/11		
Priority:		
Frionty.		
	_	
Comments:		
All action items were accepted to		
All action items now completed:		
oon crosed.		
Device now fully compliant, spreadsheet register has been update	ed	
Supervisor (write):		
Date:		•



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Ref: I:\data\sitzler\contracts\darwin\sbsj12\fy11 fyle pty ltd hazardous areas reporting award 28.07.11\fy11 fyle southern end pipeline\inspection forms\hazardous area device inspection sheet for ex-d, ex-e, ex-i, ex-n, ex-p and other ex devices rev 1.doc

15 - ### 19

Specifications			_								
Equipment ID/Tag: 7	Plant/Asset:	GAS	COND'	CKIO.							
Circuit ID:				Site Location: ELLIOTT							
Apparatus type: (light, JB, Motor)	PRELLUR	17UH									
Manufacturer: UNI7	PRELEURS		Type of protecti	on: (d,e, i,	n, p etc)	d					
Full model number: H12	2 361	-5.		Gas group: (IIA			10				
Serial number:	361			Temp class: (T							
IP Class 66				Certificate num		Alte	r 6 Ex 54	<u>~</u>			
				Test authority: (. SAA	FX 34				
Number of cables:	<u> </u>		- 1	etc)							
Area classification: Zone:	Gas Group:	Temp	p.Class								
Cable entries	gland 1		_	gland 2		others	BOMPI	oves XI			
Gland manufacturer: Model:	FLEW 20	_									
Gland type of protection: (d,e)	74,000					^	50 00	WUTS			
Inspection ———					cle as ch	ecked					
				Applicable	}						
				to protection							
A Equipment Equipment (incl group an	nd temp class) is appro-	oriate for area		type:	Externa	al Notes					
classification				all	X						
2 Equipment ID is available	e			all	↓ Ø	NI	<u></u>				
3 Equipment ID is correct 4 Equipment circuit ID is as	vailable			all all	Ø	NI	$\overline{\mathcal{L}}$				
5 Equipment circuit ID is co	orrect		-	all	8						
6 Enclosure, sealing gaske			all	B							
7 There is no evidence of u		orrect	all								
type and are complete an	nd tight	ali	8								
9 Installation clearly labelle			.wali	i	X	VER	FM.				
Safety barriers/isolators i earthed where required	nstalled as per certifica	ition and sect	ureiy	ì	X	7					
11 Entity calculation/ equipm	nent documentation is	available		i	X						
B Installation The cables are adequate	ly supported and there	ie no obvious									
damage to cables		13 110 00 11003		all	#						
2 Sealing of trunking, duct				all	Ø						
3 Earthing and bonding con sufficient cross section	nnections are tight, in g	loog coudition	n and of	all	Ø						
4 No obstructions adjacent	to flameproof flanged	oint		d	0						
C Environment		athan sila									
Apparatus adequately pro		weather, vib	ration,	all	Z Z						
2 No undue accumulation of				all	(X						
Faults found? (circle as appro Action required to make devic			close in	spection tecl	niques	only):		N - / N -			
Day 13 and 14 and 15 and	41 0	Yes/No	Dunista		/I IV	1		Yes/No			
Provide equipment identifica				le equipment		<u> </u>	n'? ————				
Provide circuit identification	?		ealing of conduit/ducts required?								
Provide blue cable sheath?	Provid	rovide/test equipotential bonding?									
Remediate damaged cable sh	Evider	nce of equipm	nent expl	osion prot	ection?	⊡/□					
Tighten loose cable gland(s)	Replac	ce equipment	explosio	n protecti	on labels'	? 🔲 🗀					
Re-terminate cabling at equip			assess	rmity/Fitness sment require	ed?						
Terminate and earth exposed	d cabling?		Replac condit	ce equipment ion?	due to a	ge or poor					
Provide cable support/mech.	protection?	Z/O									



Tolloway intention required to restly nathook of protection is. Flamepool or intintically safe. Contractor (write): Inspector Russian Supervisor Russian Date: 7 [10 [1] Priority: Comments:	Additional comments:	ABY 17 DH 271 EU 3
Contractor (write): Inspector Contractor (write): Inspector Client (write): Inspector Date: 7 (to (t		1 de secific and
Contractor (write): Inspector Contractor (write): Inspector Client (write): Inspector Date: 7 (to (t	- Tollowop inspection required	to strong method
Contractor (write): Inspector Contractor (write): Inspector Client (write): Inspector Date: 7 (to (t	of protection is Flamep	roof or intradically sate.
Reviewed by: NGPEEN Date: 18/16/11 Priority: Comments: All action items now completed:		
Reviewed by: NGPEEN Date: 18/16/11 Priority: Comments: All action items now completed:		
Reviewed by: NGPEEN Date: 18/16/11 Priority: Comments: All action items now completed:		
Reviewed by: NGPEEN Date: 18/16/11 Priority: Comments: All action items now completed:		
Reviewed by: NGPEEN Date: 18/16/11 Priority: Comments: All action items now completed:		
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Reviewed by: NGPEEN Date: 18/16/11 Priority: Comments: All action items now completed:		
Reviewed by: NGPEEN Date: 18/16/11 Priority: Comments: All action items now completed:	Contractor (write): Inspector Supervisor	Client (write): Inspector
Reviewed by: NGPEEN Date: 18/16/11 Priority: Comments: All action items now completed:	P.Willems	
Date: 3 / 10 / 11 Priority: Comments: All action items now completed:	Date: 7/[8/[1]	Date:
Date: 3 / 10 / 11 Priority: Comments: All action items now completed:	Reviewed by:	
Priority: Comments: All action items now completed:		
Comments: All action items now completed:	Date: /3/16/11	
All action items now completed:	Priority:	
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Device now fully compliant, spreadsheet register has been updated		ted
Supervisor (write):	Supervisor (write):	, sou
Date:	Date:	



Based on AS/NZS 60079 part 17 (Visual/Close External Only)

Specific	cations						CESIEVE NAM	EPLATE.			
Equipme	ent ID/Tag:	TT 4	F	Plant/Asset: GAS COND'SKID							
Circuit ID); 7			S	Site Location: ELLISTT						
Apparatu	us type: (light, JB, Motor)	TEMP F	<u> </u>	E	Environment: (hot, dusty?)						
Manufac	turer: R05E	Magnit	Т	ype of protection	n: (d,e, i, n,	p etc)					
Full mod	el number: 2144	+P11734		Sas group: (IIA/E	3/C)						
Serial nu	omher:	+0117B4			emp class: (T1-						
IP Class					Certificate numb						
		JP6516		est authority: (E		SAA					
Number	of cables:			tc)							
Area clas	ssification : Zone:	Gas Group:	Temp	.Class							
Cable e		gland 1	,		gland 2		the <u>rs</u>				
Model:	anufacturer:	FLP	N 2015								
	pe of protection: (d,e)		2								
					C:	lb	ما مما				
Inspection	on ————				Circ	le as ched	скео				
					Applicable	1					
	A Equipment				to protection type;	▼ External	Notes				
4	Equipment (incl group and	d temp class) is appr	opriate for area		all	X	14000				
1	classification						NIL				
3	Equipment ID is available Equipment ID is correct			<u> </u>	all all	B	7-10				
4	Equipment circuit ID is av	ailable			all	6	NU				
5	Equipment circuit ID is co		a a Massackan		all	P					
7	Enclosure, sealing gasket There is no evidence of un			all all	8						
8	Bolts, cable entry devices	and blanking eleme	orrect	all	Q	V0056					
9	type and are complete an Installation clearly labelled			i	Ø	000112					
	Safety barriers/isolators in		rely	i	1						
10	earthed where required	<u>~</u>			'						
11	Entity calculation/ equipm B Installation	ent documentation is	s available		<u> </u>	X					
1	The cables are adequatel	y supported and the	re is no obvious		all	0	SUPPORT.				
2	damage to cables Sealing of trunking, ducts	nines and/or condu	uite is satisfacto	r\/	all	180	Surprett				
	Earthing and bonding con				all	6					
3	sufficient cross section		d inink			$\frac{\lambda}{x}$					
4	No obstructions adjacent C Environment	to nameproor nange	u joint		<u>d</u>						
1	Apparatus adequately pro	tected from corrosio	n, weather, vibr	ation,	all	8					
	and other adverse factors	f dust or dirt			all	8					
Paults found? (circle as appropriate): No lives: Action required to make device compliant (based on visual/close inspection techniques only): Yes/No Yes/No											
Provide	e equipment identificat	ion?	Provide	equipment of	cover/LIV	nrotection?					
	e circuit identification?					<u> </u>					
	e blue cable sheath?										
		ooth?		<u>-</u>		sion protection?					
	iate damaged cable sh										
righter	n loose cable gland(s)?			mity/Fitness		protection labels?	<u> </u>				
Re-tern	ninate cabling at equip	ment?			mity/Fitness ment require		3 C				
Termin	ate and earth exposed	cabling?		Replac	e equipment		e or poor				
	e cable support/mech.		Z	conditi	on (
		1	<u>ب</u> . ب								



			AB(1:00) 3/16(1
Additional comments:			*
	•		
		The second secon	
		• • • • •	
Contractor (write): Inspector	Supervisor	Client (write): Inspector	
D.William	U Super Visor	Offent (Write), hispector	
Contractor (write): Inspector		Date:	
			_
Reviewed by: // CPERA			
Reviewed by: N. GREEN Date: 13/10/16			
Date: 13/10/11			
Priority:			
Comments:			
· ·			
All action items now completed:			
All action items now completed: Job closed:			
Device now fully compliant, spreads Supervisor (write):	neet register has	been updated	
Date:			

INSPECTION CHECK SHEET Intrinsically Safe Ex i



TAG/IDENTIFICATION DESCRIPTION									
Area Classification - Zone 0 1 2 20 21	22 Non Hazardous - Group	ΙΙΙΔ	IIR	IIC - T	emn	T1 T2	2 ТЗ .	T4 T5 T	6
Record Name Plate Details									nameplate information that may be
Manufacturer		Vin Chin relevant							
Serial No.		Lin		Lin					
Model									
Certificate no.		Т		IP					
Certifying authority		<u>I</u>							
Inspection Type Performed (I=Initial, P=Pe	riodic, S=Sample)				ı	Р	S		
Inspection Grade Performed (D=Detailed, C=Close, V=Visual) D C V Detailed requires de-energization									
Equipment Y=OK, N=Not Acceptable, N/A	=Not Applicable, N/C=Not Che	ecked			•		•	Inspect Grade	Remarks
Equipment is Australian or IEC Certified				Υ	N	N/A	N/C	DCV	
EX markings are suitable for the area				Y	N	N/A	N/C	DCV	
Equipment is clearly marked and has appro	onriate tag/identification detail	ls		У	N	N/A	N/C	DCV	
Enclosure is not damaged and maintains it:				· Y	N	N/A	N/C	DCV	
Terminations are tight	Wedtherproofing			Y	N	N/A	N/C	DC	
All unused conductors terminated				Y	N	N/A	N/C	DC	
Bolts, bungs, plugs/blank plates installed a	nd tight			· Y	N	N/A	N/C	DCV	
Fuses and lamps are correct rating				Y	N	N/A	N/C	DCV	
No unautorised modifications (Y=OK)				Υ	N	N/A	N/C	DCV	
Installation								Grade	Remarks
Cable type is as per the documentation				Υ	N	N/A	N/C	D	133113
IS Entity and cable parameters are suitable	for installation			Y	N	N/A	N/C	D	
The device is securely mounted				Y	N	N/A	N/C	DC	
Cables/conduits in acceptable condition				Y	N	N/A	N/C	D	
Cables/conduit entry correct, complete, an	d tight			Y	N	N/A	N/C	DCV	
No excessive vibration present that may ca	-	(Y=OK)		Υ	N	N/A	N/C	DCV	
Segregation between IS and non IS circuits		·		Υ	N	N/A	N/C	DCV	
Segregation between IS and non IS circuits				Υ	N	N/A	N/C	DCV	
Earthing and equipotential bonding satisfa				Υ	N	N/A	N/C	D	
Insulation resistance is satisfactory (NB Da	nger of MEGGER testing HA)			Υ	N	N/A	N/C	D	
Cable screens earthed as per documentation	on (normally one point only)			Υ	N	N/A	N/C	D	
Barriers								Grade	Remarks
Record Safety Barriers manufacturer and n	nodel no. (available on device :	= Y)		Υ	N	N/A	N/C	DC	133113
Equipment is Australian or IEC Certified (Er	•			Υ	N	N/A	N/C	DCV	
Record Safety Barriers certification details				Υ	N	N/A	N/C	DC	
Safety Barriers are the correct type as per	the drawings			Υ	N	N/A	N/C	DC	
Safety Barriers are securely connected to t	he earth bar			Υ	N	N/A	N/C	DCV	
Barrier/Isolator terminations are tight				Υ	N	N/A	N/C	DCV	
Maximum voltage on the safe side of the b	arrier/isolator is 240V			Υ	N	N/A	N/C	DCV	
IS circuits are all free from external power	circuit infiltration			Υ	N	N/A	N/C	DCV	
No energy storing devices in excess of the	max energy permitted			Υ	N	N/A	N/C	DC	
Relays acting as safety barriers are in good	condition			Υ	N	N/A	N/C	DCV	
Earth continuity from barrier bar to the tra	nsformer neutral point is <10h	nm		Υ	N	N/A	N/C	D	Check one connection at a time
Environment								Grade	Remarks
Equipment adequately protected against c		tc		Υ	N	N/A	N/C	DCV	
Dust and dirt on the equipment and cable	are within acceptable limit			Υ	N	N/A	N/C	DCV	
Special conditions								Grade	Remarks
Special conditions on certificate are satisficate	Υ	N	N/A	N/C	D				
				•	•	•		•	•
Notes:									
Inspected:	Date:		Cho	cked:					Date:



INSPECTION CHECK SHEET - Increased Safety Ex e

TAG/IDENTIFICATION		DESCRIPTION													
Area Classification - Zone 0 1 2 Non Ha	azardous	- Group	ı	IIA	IIB	IIC	- T	emp	T1	T	2 T3	T	4 T5	Т6	
Record Name Plate Details		,											Reco	rd other nan	neplate information that may
Manufacturer		KW						FLC							be relevant
Serial No.		Volts						RPN	Л						
Model															
Certificate No.		Т						IP							
Certifying authority															
Inspection type performed (I=Initial, P=Periodic, S=Sample)															
Inspection Grade Performed (D=Detailed,										D	С		V	Detaile	d requires de-energization
Equipment Y=OK, N=Not Acceptable, N/A=	Not App	licable, N	I/C	=Not	Che	ecke	d							Inspect Grade	Remarks
Equipment is Australian or IEC Certified								Υ	N	1	N/A		N/C	DCV	
EX markings are suitable for the area								Υ	N	1	N/A		N/C	DCV	
Equipment is clearly marked and has appro	priate tag	z/identifi	cati	on d	letai	ls		Υ	N	1	N/A		N/C	DCV	
Enclosure is not damaged and maintains its								Υ	N	1	N/A		N/C	DCV	
Enclosure gaskets are in a satisfactory cond		<u> </u>	(,			Υ	N	1	N/A		N/C	D	
Bolts, bungs, plugs/blank plates installed an								Υ	N	1	N/A		N/C	DCV	
Terminals are sized correctly for the rating								Υ	N	1	N/A		N/C	D	
Conductors > 0.5mm2 for multistranded an	d 1mm2	for single	str	and				Υ	N	 	N/A		N/C	D	
No chafing parts that may cause local hot s								Υ	N	1	N/A		N/C	D	
Guards are correctly fitted	pots (mo	101 101137	(1-	OK)				Υ	N	1	N/A		N/C	D	
No unautorised modifications (Y=OK)								Υ	N		N/A		N/C	DCV	
Lamp rating, type and position are correct								Υ	N	-	N/A		N/C	D	
Installation											-,	<u> </u>	, -	Grade	Remarks
Equipment carries correct circuit identificat	ion at sw	itchboar	d ar	nd lo	cal			.,		Ι.	/^		N /C	Grade	Remarks
isolator								Υ	N	ľ	N/A		N/C	D	
Effective means of isolation of all live conductors (including neutral)							Υ	N	1	N/A		N/C	D		
Installation is in compliance with document	ation							Υ	N	1	N/A		N/C	DC	
Cable type is as per the documentation								Υ	N	1	N/A		N/C	D	
The device is securely mounted								Υ	N	1	N/A		N/C	DCV	
Cables/conduits in acceptable condition								Υ	N	1	N/A		N/C	DCV	
Cables/conduit entry correct, complete, and	d tight (E	xd or Exe	gla	nds	use	d)		Υ	N	1	N/A		N/C	DCV	
Exd glands have additional weatherproofing	g							Υ	N	1	N/A		N/C	DCV	
Electrical connections are tight								Υ	Ν	1	N/A		N/C	D	
Creapage and clearance distance are maint	ained							Υ	N	1	N/A		N/C	D	
All unused conductors terminated in Exe te	rminals							Υ	N	1	N/A		N/C	D	
Earthing and equipotential bonding satisfac	ctory							Υ	Ν	1	N/A		N/C	DCV	
Insulation resistance is satisfactory (NB Dar	ger of M	EGGER te	estii	ng H.	A)			Υ	N	1	N/A		N/C	D	
Motor parameters (la/ln and te) and TOLs of	oordinate	e (record	то	L mf	r/m	odel)	Υ	N	1	N/A		N/C	D	
Cable Glands and adaptors														Grade	Remarks
Cable glands details available, record (available	able=Y, n	ot record	ed=	=N/C	:)			Υ	N	1	N/A		N/C	DCV	
Cable glands certificate details available, re recorded=N/C)	cord (ava	ilable=Y,	not	t				Υ	N	1	N/A		N/C	DCV	
Adaptors and plugs details available, record	l (availab	le=Y, not	rec	orde	ed=N	1/C)		Υ	N	1	N/A		N/C	DC	
Glands and adaptors Ex markings are suitab								Υ	N	1	N/A		N/C	DCV	
Environment													Grade	Remarks	
Equipment adequately protected against co	orrosion,	weather,	vib	ratio	on, e	etc		Υ	N	1	N/A		N/C	DCV	
Dust and dirt on the equipment and cable a	re within	accepta	ble	limit				Υ	N	1	N/A		N/C	DCV	
Special conditions														Grade	Remarks
Special conditions on certificate are satisfie	d							Υ	N	1	N/A		N/C	D	
Notes:													L.		
Inspected: D	ate:			Chec	ked	:								Date:	

Hazardous Area Check Sheet Flameproof Ex d



TAG/IDENTIFICATION DESCRIPTION												
TAG/IDE	ENTIFICAT	IION				U	ESCRI	PHON				
Area Classification - Zone 0 1 2 Non Hazardous - Group I IIA IIB IIC - Temp T1 T2 T3 T4 T5 T6												
Record Name Plate Details Record other nameplate information that may												
									Reco	rd other i		
Manufacturer				KW		FLC					be relevant	
Serial No.				Volts		RPM						
Model												
Certificate No. T IP												
Certifying authority Inspection Type Performed (I=Initial, P=Periodic, S=Sample) I P S												
Inspection Type Performed (I=Initial, P=Periodic, S=Sample) Inspection Grade Performed (D=Detailed, C=Close, V=Visual) D C V Detailed requires de-energization												
Equipment Y=OK, N=Not Acceptable, N/A=Not Applicable, N/C=Not Checked Inspection Grade Performed (D=Detailed, C=Close, V=Visual) D												
Remarks												
Equipment is Australian or IEC Certified Y N N/A N/C DCV												
EX markings are su						Y	N	N/A	N/C	DCV		
_			ropriate tag/identification	n details		Υ	N	N/A	N/C	DCV		
			its flameproof characteris			Υ	N	N/A	N/C	DCV		
			type certified by manufac			Υ	N	N/A	N/C	DCV		
			e correctly and are tight			Υ	N	N/A	N/C	DC		
Bolts, bungs, plugs						Υ	N	N/A	N/C	DCV		
Sealing gaskets and	•					Υ	N	N/A	N/C	DCV		
Flange faces are cle						Υ	N	N/A	N/C	D		
Flange gap dimens			mm			Υ	N	N/A	N/C	DC		
No unauthorised m						Υ	N	N/A	N/C	DCV		
Equipment is clear of obstructions (minimum dimensions 40mm)								N/A	N/C	DCV		
	t spots (motor fans) (Y=OI		Υ	N N	N/A	N/C	D					
Guards are correctly fitted								N/A	N/C	D		
Lamp rating, type and position are correct								N/A	N/C	D		
Installation Grade Remarks Equipment carries correct circuit identification at switchboard and local isolator Y N N/A N/C D												
						Y	N	N/A	N/C	D		
			nductors (including neutra	11)		Y	N	N/A	N/C	D		
Cable type is as per						Y	N	N/A	N/C	D		
The device is secur						Y	N	N/A	N/C	DCV		
Cables/conduits in			and tight with sufficions th			Y	N	N/A	N/C	DCV		
		-	and tight with sufficient th	ireaus		Y	N	N/A	N/C	DCV		
			ctions is satisfactory stem interface satisfactor			Y	N	N/A N/A	N/C N/C	D D		
- ,				У		1	N					
Earthing and equip			Panger of MEGGER testing	. П V)		Y	N	N/A	N/C N/C	DCV		
				; па)		Y	N N	N/A	N/C	D D		
Protection devices	(LIIIII SW	s, phase rot,	TOLs) operate correctly			ľ	IN	N/A	N/C	L D		
Cable Glands and a	adaptors									Grade	Remarks	
Cable glands detail	s availabl	e, record (av	ailable=Y, not recorded=N	I/C)		Υ	N	N/A	N/C	DCV		
Cable glands certifi	icate deta	ils available,	record (available=Y, not r	ecorded=N/C)		Υ	N	N/A	N/C	DCV		
Adaptors and plugs	s details a	vailable, rec	ord (available=Y, not reco	rded=N/C)		Υ	N	N/A	N/C	D		
Adaptors and plugs	s have suf	ficient engag	ged threads			Υ	N	N/A	N/C	DCV		
Glands and adapto	rs Ex mar	kings are sui	table for area			Υ	N	N/A	N/C	DCV		
Environment										Grade	Remarks	
Equipment adequately protected against corrosion, weather, vibration, etc							N	N/A	N/C	DCV		
						Y	N	N/A	N/C	DCV		
Special conditions Grade Remarks Special conditions on certificate are satisfied Y N N/A N/C D									Kemarks			
Special conditions	on certific	cate are satis	ned			Υ	N	N/A	N/C	D		
Notes:												
Inspected:			Date:	(`hecked						Date:	

'Uncontrolled' Form HAD 2.3 Rev_0



11 Overhaul, Repair, Modification and Replacement Register

Documentation in relation to this section is to be maintained by APA Group. This Section contains the sample repair and examination report(s).

REPAIR AND EXAMINATION REPORT FOR ENCAPSULATED EQUIPMENT (EX 'm')



Gene	ral	DEVELOPMENT RESOURCES	
Tag no		Site:	
P&ID:		Area Classification:	
	oment Details	7 II ou o la comouncim	
	ment type:	Gas group (IIA/B/C):	
	facturer:	Temp class (T1-T6):	
Model		Certificate no.:	
Serial		Test authority:	
Opera	ator	,	
Name		Identification no.:	
Comp		Company registration:	
	ition upon receipt:		
Old re	epair label details:		
Repo	rted fault (if any):		
Repa	ir action:		
	replaced: performed:		
Resu			
Item	Description of check	Remarks	
(a)	Cracks in compound		
(b)	Crazing		
(c)	Exposure of encapsulated parts		
(d)	Flaking		
(e)	Shrinking		
(f)	Swelling		
(g)	Decomposition		
(h)	Discoloration		
(i)	Failure of adhesion		
(j)	Change in hardness		
Certific	cation drawing no(s).:		
Remar	rks:		
I,			

Sign:....

Date:...../.....

REPAIR AND EXAMINATION REPORT FOR INTRINSICALLY SAFE EQUIPMENT (EX 'i')



	ENVIRONMENT DEVELOPMENT PESCUIPES				
General	THE ACCUSAGE OF THE ACCUSAGE O				
Tag no.:	Site:				
P&ID:	Area Classification:				
	1				
Equipment Details					
Equipment type:	Gas group (IIA/B/C):				
Manufacturer:	Temp class (T1-T6):				
Model no.:	Certificate no.:				
Serial no.:	Test authority:				
Competent Operator					
Name:	Identification no.:				
Company:	Company registration:				
Condition					
Condition upon receipt:					
Old repair label details:					
Reported Fault (if any):					
Action					
Repair action:					
Remarks:					
Nomano					
1	confirm that the above equipment.				

REPAIR AND EXAMINATION REPORT FOR INCREASED SAFETY ENCLOSURES (EX 'e')



General

Tag no.:		Site:			
P&ID:		Area Classification:			
Equipment Details					
Equipment type:		Gas group (IIA/B/C):			
Manufacturer:		Temp class (T1-T6):	<u> </u>		
Model no.:		Certificate no.:			
Serial no.:		Test authority:			
Competent Operator		•			
Name:		Identification no:			
Company:		Company Registration:			
Enclosure Condition					
Old repair label no.:					
External surface cleaned for inspec	ction - Yes / No				
Covers and fasteners:		Base of enclosure:			
Threaded holes:		External corrosion:			
Surface coating:		Gland entries and gland	ds:		
General external condition:					
Enclosure dismantled:		Degree of protection: IP	1		
Internal Condition - Dust/Liquid	ds:	Corrosion:	Heat:		
Missing parts:					
Cables and terminations:		Terminal blocks:			
Earth terminals:		Insulation:			
Windows and seals:		Actuators and seals:			
Ex 'de' parts:		Meters:			
Lamps:		Transformers:			
Switches:		Others:			
Relays:		Interlocks:			
Luminaire:		Lamp power (W):			
Transparent part:		Lampholders:			
Ballasts:	Capacitors:		Batteries:		
Action					
Repair					
Remarks:					
I,repaired/overhaul/modified (strik not comply with the relevant req by Appendix D) and AS the service facility.	e out whichev Juirements of A	er is not applicable) as AS/NZS 3800 (includin	s above, complies/does g markings as required		
Sign:		Da	ate:/		

REPAIR AND EXAMINATION REPORT FOR ELECTRICAL EQUIPMENT INSTALLED WITHIN FLAMEPROOF ENCLOSURE (EX'd')



Co	n	_	ra	ı
176	111	e	17	п

Gene	eral			
Tag n	0.:	Site:		
P&ID:		Area Classification:		
Equi	oment Details			
	ment type:	Gas group (IIA	/B/C):	
	facturer:	Temp class (T1		
Model		Certificate no.:	- /	
Serial		Test authority:		
Oper		, ,		
Name		Identification no	D.:	
Comp		Company regis		
	oment Condition Checklist	, ,		
Item	Description of check	No work	Repaired	Replaced
(a)	Isolator mechanism and switch operation			
(b)	Earthing device and operation			
(c)	All auxiliary mechanisms, trip bars, latching			
(-)	arrangements, etc.			
(d)	All locking devices, function and operation			
(e)	All parts for mechanical condition			
(f)	All insulation checked – no heat, cracks, etc.			
(g)	Phase barriers fitted correctly and functional			
(h)	Oil levels and/or gas pressure			
(i)	Gas pressure-sensing devices			
(J)	All wiring and terminations			
(k)	Earth continuity; phase/earth fault lock units			
(l)	Overcurrent, overload and earth-fault devices			
(m)	Earth-fault trip devices			
(n)	Timing devices			
(o)	Temperature-sensing devices			
(p)	Transformer connections, bolts, tapes. bracing, insulators and fittings, etc.			
(q)	Installation			
(r)	Machine cables and glands			
	s of repair or modification (attach extra pages s of insulation resistance tests on transformer	. ,		
	ormers ratio: Capacity:			
	acturer:Type of	_		
Tested	d with: V (megohmme	ter)		
Primar	ry winding to secondary winding:	ΜΩ		
Primar	ry winding to earth:	ΜΩ		
Secon	dary winding to earth:	ΜΩ		
Earth (continuity of earth screen to core:			
				Continued

REPAIR AND EXAMINATION REPORT FOR ELECTRICAL EQUIPMENT INSTALLED WITHIN FLAMEPROOF ENCLOSURE (EX'd')



Assembled unit tested for insulation resistance with: V megohmmeter, and power frequency tested on the following circuits:

Test

Test

Insulation

	Circuit description	resistance MΩ	voltage kV	frequency Hz	Result
<u> </u>		L	<u>I</u>	<u>I</u>	<u>I</u>
Cert	ification no(s)				
	narks:				
l			confirm tha	at the abo	ove equipment
	ired/overhaul/modified (strik				
•	comply with the relevant red			•	•
	ppendix D) and AS	-		•	•
-	service facility.				9
	- ,				
Sign				Date:	./

REPAIR AND EXAMINATION REPORT FOR FLAMEPROOF ENCLOSURE (EX'd')



Gene	eral	RESOURCES
Tag n		Site:
P&ID:		Area Classification:
Equi	pment Details	
	ment type:	Gas group (IIA/B/C):
	facturer:	Temp class (T1-T6):
Mode	I no.:	Certificate no.:
Serial	no.:	Test authority:
Oper	ator	
Name): :	Identification no.:
Comp	eany:	Company registration:
Equi	pment Condition Checklist	
Item	Description of check	Remarks
(a)	Check of external and internal damage	
(b)	Dimensional check	
(c)	Corrosion on flamepaths	
(d)	Result of static pressure test	
(e)	Check of flanged joint surfaces	
(f)	Check of all threaded holes	
(g)	Check of all windows and lenses	
(h)	Check of breathers	
(i)	Check of all bolt holes, studs, screws,	
(J)	Check of all gland entries and fixing	
(k)	Check of all cables glands	
(I)	Check of all handhole and inspection	
(m)	Check of all mechanical interlocks	
(n)	Check of all flamepath gaps	
Main d	control panel	
	•	
3.	Max. flameproof gap when bolted up:	
4.	Max. diametral clearance of spindles:	
5.	Max. diametral clearance of gland to	gland apertures:
6.	Static pressure test – pressure:	
	·	Capacity:
Certific	cation drawing no(s).:	
Rema	rks:	
repaire not co by App	mply with the relevant requirements of	confirm that the above equipment, ever is not applicable) as above, complies/does f AS/NZS 3800 (including markings as required his Report has been recorded in the logbook of
Sign:		Date: / /



12 Schedule of Equipment and Conditions Requiring Compliance Status Attention

Tag	P&ID No.	Location	Reason for non-compliance
		Upstream of DF1	Nil evidence of equipment explosion protection.
EE 0003-UY-1	EE 0003-7005		Replacement of the equipment is required due to poor condition and age.
EE 0003-PDI-1 EE 0003-7005 DF1		Instrument mounted within a plastic junction box with nil evidence of explosion proof rating. Manufactures literature suggest American certification.	
	22 0000 7000		Conformity/fitness for purpose assessment required.
			Nil evidence of equipment explosion protection.
EE 0003-SV			Replacement of the equipment is required due to poor condition and age.
EE 0003-JB	EE 0003-7005	H1 - Catalytic	Nil certification for the use in Australia.
EE 0003-3B	EE 0003-7003	Heater	Nil evidence of equipment explosion protection.
EE 0003-JB	EE 0003-7005	H1 - Catalytic Heater	Nil evidence of equipment explosion protection.
EE 0003-JB			Nil evidence of equipment explosion protection.
EE 0003-GM			Nil evidence of equipment explosion protection.
	-LSH-2 EE 0003-7005	FS1	Nil evidence of equipment explosion protection.
EE 0003-LSH-2			Conformity/fitness for purpose assessment required.
			Replacement of the equipment is required due to poor condition and age.
EE 00003-TT-4	EE 0003-7006	Downstream of Meter Run	Nil evidence of equipment explosion protection.