APA GROUP

LARA SWP CITY GATE

CONTROL SYSTEM UPGRADE FEED STUDY

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A	11/06/15	Issued for Review	P. Premachandran E&I Engineer	B. Reynolds Senior E&I Engineer	R. Lourensz Engineering Services Mgr
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1. INTRODUCTION

The Lara SWP City Gate is located south west of metropolitan Melbourne, close to Geelong, and was built and commissioned early 1999. The regulator facility controls the flow of gas from the Lara – Iona Pipeline, T92, into the Brooklyn – Corio Pipeline, T24. The facility consists of five regulator runs, a process gas heater and a reverse flow run.

The T92 pipeline from Lara to Iona has an MAOP of 10,200 kPag and the T24 pipeline from Brooklyn to Corio has an MAOP of 7,390 kPag. Therefore the facility provides an over pressure protection function for the downstream pipeline, T24.

2. PURPOSE

As Lara SWP City Gate has been in operation since 1999, much of the equipment has past the end of its useful life cycle, continued operation of this equipment is likely to result in increased rate of equipment failure along with increasingly difficult maintenance and repair of the outdated equipment.

The purpose of this document is to outline the equipment that should be considered for replacement and provide recommendations for potential upgrades throughout the site. The document will also provide budget costings for the various options.

The document will be focused more on the High Priority Items that require an upgrade/review. The remaining items have also been listed in this document with justification and details of the upgrade requirements.

3. SITE AREAS AND ITEMS

The following table details the equipment which are related to different areas of the site.

AREA	EQUIPMENT
Control Hut	RTU Cabinet
	RTU
	Battery Charger
	Meter Cabinet
	Distribution Board
	Lighting
	Communications
	Hut Refurbishment
	Review Current Control Philosophy
	HMI requirement
Regulator Runs	Monitor Valves - control

	Active Valves - control
	Slam Shut Panels
	Instrumentation
Heater	Control Panel
	Heater Bypass
	Flow Meter
General Site	Hazardous Area Audit Repairs
Line Valve	BLP Line Valve 4

4. HIGH PRIORITY ITEMS

4.1 RTU

The site is presently monitored and controlled by a pair of 3330 series RTUs configured as a redundant pair, sharing common input and output modules.

The Bristol 3330 RTU's are past the end of their life cycle and are no longer supported by the manufacturer, they are being phased out throughout APA sites and being replaced by either Control Wave Micro RTUs or if required Triconex/Trident PLC's.

The requirement of changing the existing RTU is of high priority as a failure of the RTU hardware can cause disruption to the operation of the site and restriction of gas supply to customers.

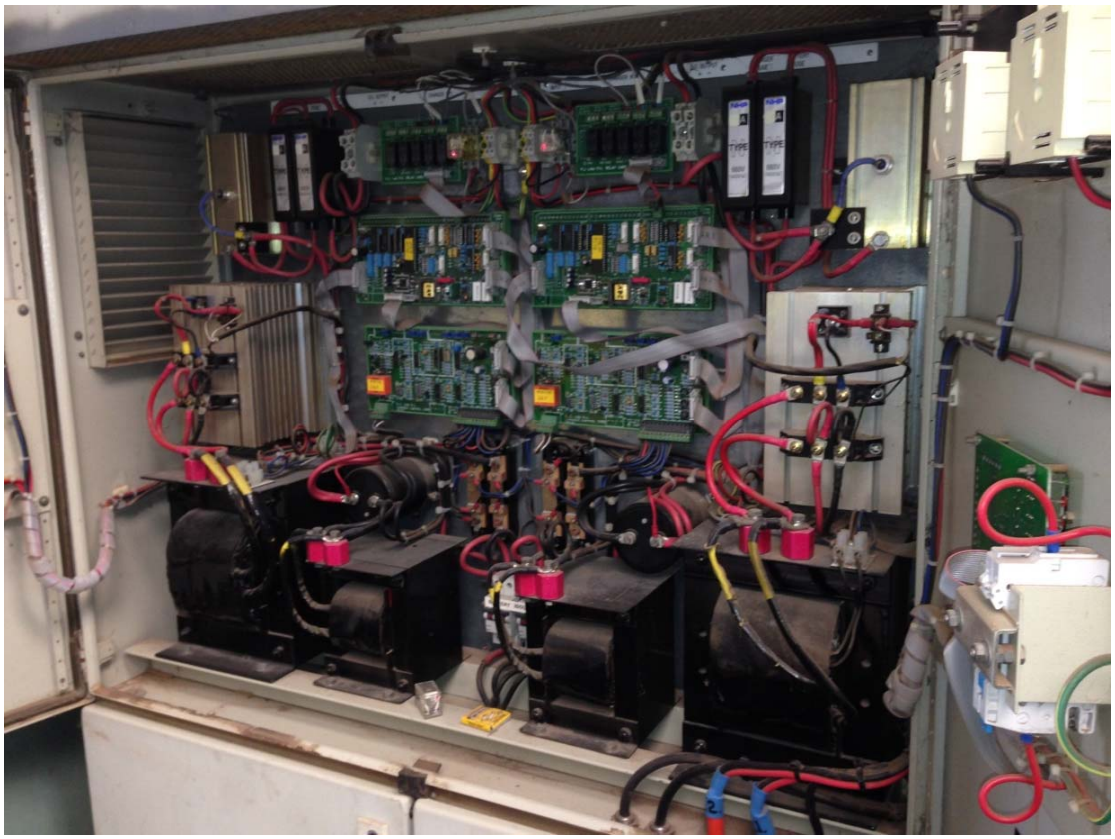
The following image shows the existing RTU's in the cabinet.

RTU Cabinet

4.2 BATTERY CHARGER

The condition of the existing Battery Chargers has reached its end of life. From visual inspection it is evident that the battery charger cabinet is not safe to maintain due to lack of suitable isolation of live equipment inside the cabinet. There are live terminals exposed and the cabinet shell has rust damage. The circuitry for the battery charger is obsolete and any possible failures cannot be supported by the manufacturer, fault finding within the cabinet is not safe for the maintenance personnel.

The following images show the existing Battery Charger and Battery Compartments.



Battery Charger

Battery Compartment

Battery Charger Cabinet

4.3 REVIEW CURRENT CONTROL PHILOSOPHY

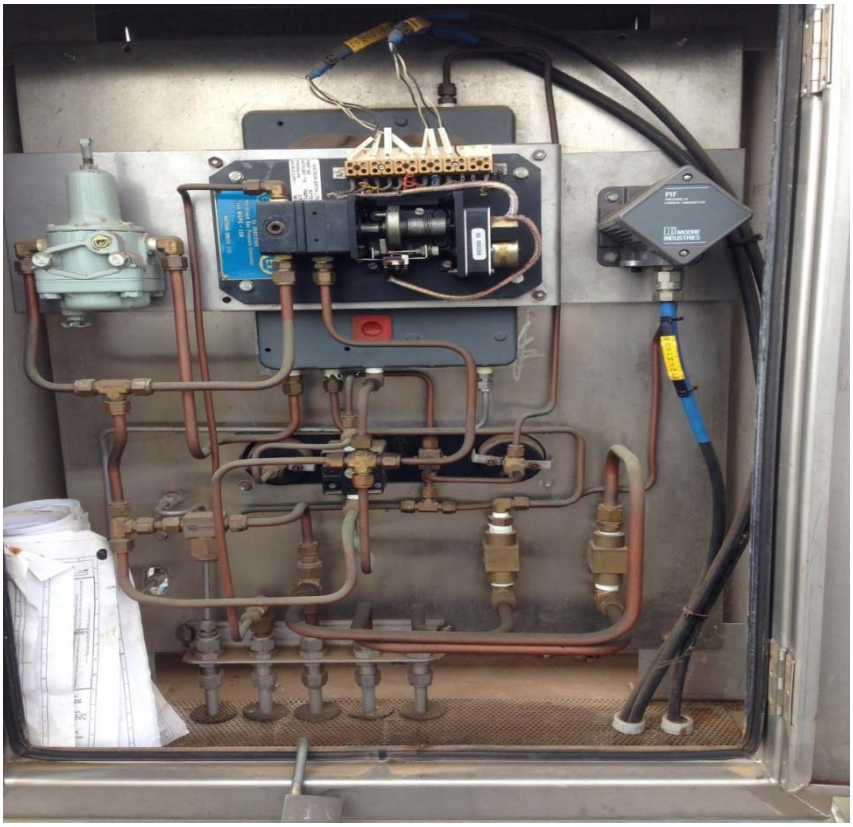
A review of the current control philosophy is required to determine the operation of the site and the interface with the control system. This will enable a better understanding of the requirements for a new RTU, develop a more standard control software and if possible remove redundant interfaces. The original operational requirements of the site may have changed since its installation in 1999, hence a review of the current control philosophy will further clarify the site operation needs.

4.4 MONITOR VALVES – CONTROL

The current controls for the monitor valves on each of the regulator runs feature a “tracking” setpoint for the pneumatic controller, involving a stepper motor to adjust a pressure regulator supplying the setpoint signal to the pressure controller. Although this may be a useful feature, Operations group have reported reliability issues with the equipment, causing interruption to the operation of the regulator runs.

The valve panel also needs to be upgraded to the current APA standards and ensure reliability and hazardous area compliance. The upgrade of these valve panels will include removal of the “tracking” feature presently installed. The present configuration of ‘Fail Open’ needs to be reviewed and the actuator may require change to ‘Fail Close’ to provide suitable level of safety for over pressure protection.

The following are photos of the monitor valves and the control panels.



Monitor Valve Pneumatic Controller

Monitor Regulator Valve

4.5 ACTIVE VALVES – CONTROL

The Active control valves are fitted with a pneumatic valve positioner and are controlled by the RTU via an I to P converter. A solenoid valve is installed to supply instrument gas pressure directly to the actuator in the event of RTU or control system failure, causing the control valve to close.

A review is required as part of this upgrade to determine if this response to control system failure is appropriate. The review will also consider replacing the existing I to P converter and pneumatic positioner with a new DVC valve positioner to provide improved control of the valve.

Active Regulator Valve

4.6 HAZARDOUS AREA AUDIT AND RELIABILITY ISSUES

From the site visit it is evident that a hazardous area compliance audit is required for the site. Items such as glands, instrumentation etc needs to be reviewed and checked for compliance.

From visual inspection it is evident that some of the equipment, such as instruments and transmitters, are older models that are no longer supported, these may require replacement for ongoing reliability.

5. DETAILS OF WORKS & JUSTIFICATION

The table below details the remaining items in each area and the recommended works:

AREA	EQUIPMENT	DETAIL OF WORKS	JUSTIFICATION	PRIORITY LEVEL	APPROX. UPGRADE COST $
Control Hut	RTU Cabinet Upgrade	• Upgrade RTU Cabinet with new back plate for new RTU's. • Change 3330 Series RTUs to new Bristol Control Wave Micro RTU's. • Keep all the existing terminals and barriers where appropriate.	The existing 3330 series RTU is no longer manufacture and supported. APA are presently executing upgrade projects to replace existing 3300 series RTU's with Control Wave Micro RTUs. This is the standard throughout APA sites.	High	$100,000
	Battery Charger and Cabinet	Change Battery Charger to new Eaton Battery Charger or similar. The Battery Banks will also be replaced with suitable battery bank arrangement for the proposed new Battery Charger.	The existing Battery Charger Circuitry is obsolete and not supported by the manufacturer. The Battery Charger Compartment is not safe for personnel to work on due to exposed to live terminals etc. The Cabinet has been damaged by rust and environmental factors.	High	$35000
	Meter Cabinet	Minimal changes required. Possibly remove HMI screen from inside the cabinet.	HMI screen inside meter cabinet can be removed as it is not generally used and is prone to	Low	$2,000

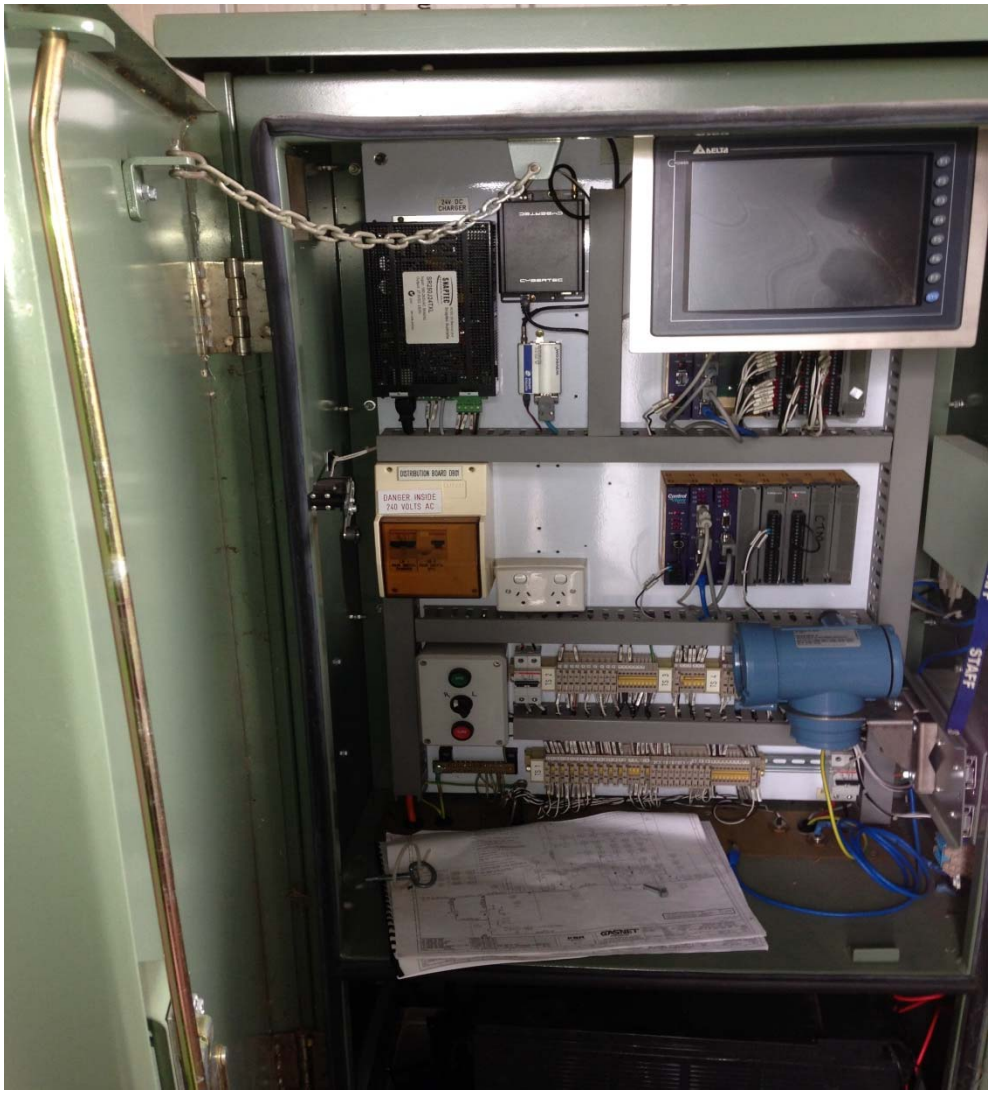
			failure. A new HMI may be more appropriate.		
	Distribution Board	Minimal changes required. Possibly install additional circuit breakers for Hut Lighting.	Additional circuit breakers need to be installed if lights are to be provided for the hut.	Low	$2,000
	Lighting	Install Fluorescent lights and emergency lights for personnel.	Currently there is no lighting provided in the hut, which causes a safety issue for personnel to work in low light conditions.	Low	$5,000
	Communications	Reconfiguration of communications links to site.	Currently there are multiple communication modes to site. The upgrade will require a change on the communications link and remove redundant links, including conversion to Ethernet IP communications.	High	$5,000 - $8,000
	Hut Refurbishment	Refurbish the existing hut	The existing hut needs to be refurbished to provide an adequate work setting for maintenance personnel.	Low	$20,000
	Review Current Control Philosophy	The current control philosophy needs to be reviewed as there have been changes made to the site controls due to the site	Since the site installation, the control philosophy of the site has changed. Due to the changes there is no adequate documentation / description detailing the controls of the site and the operational requirements. This review will assist in creating an up-to-date control philosophy.	High	$25,000
	HMI requirement	Provide HMI desktop PC for local monitor for personnel which includes	Currently there is no HMI to monitor the regulator facility. Providing a	Medium	$17,000

		SCADA licence (assuming ClearSCADA).	HMI will allow for improved monitoring and fault finding by maintenance personnel.		
Regulator Runs	Monitor Valves - control	Will involve the change in actuator for the monitor valves and installation of new valve panel.	The controls of the monitor valves needs to be upgraded. The existing control valve panel is not reliable and it has been identified by the operations to be an issue. An upgrade will help make the control of the run more reliable.	High	$75,000 per valve for five regulator runs.
	Active Valves - control	Replace pneumatic positioner with DVC positioner.	Improved control of the active valves, easier maintenance.	Low	$75,000
	Slam Shut Panels	Installation of new Slam Shut Panels	The existing Slam Shut Panels are not reliable and do not follow the standard APA Slam Shut Panels. By upgrading the panel to the current standard design, maintenance should be simpler and reliability improved due to use of standard procedures.	Medium	$120,000
	Instrumentation	Installation of new instrumentation.	Some of the instrumentation (such as Presssure and Temperature Transmitters) on the regulator runs and general site have been identified to be old models which are no longer supported. New instrumentation will provide improved reliability.	Low	$10,000
Heater	Control Panel	No works required		Low	

	Heater Bypass	No works required		Low	
	Flow Meter	No works required		Low	
General Site	Hazardous Area Audit and Rectification	Changeout non compliant equipment, which will include site review and dossier preparation.	The facility has been in operation for more than 15 years. The visual inspection showed parts such as glands and junction boxes require Hazardous Area Certification Compliance. Hence these parts need to be changed to meet requirements.	High	$6,000
Line Valve	BLP Line Valve 4	No works required		Low	

Note: The figures in the table above is an approximate only.

6. OTHER SITE PHOTOS

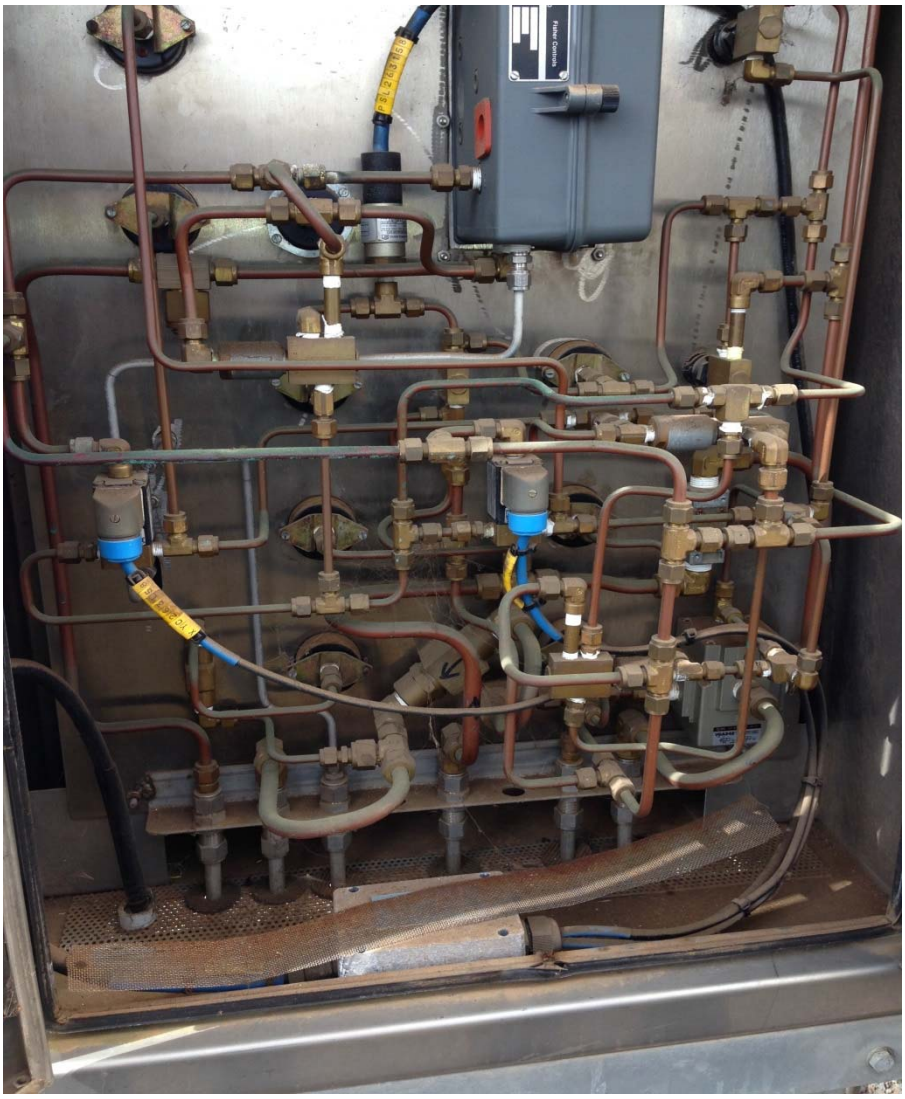


Metering Cabinet

Distribution Board

Regulator Run, Active Regulator

Regulator Run, Slam Shut Valve and filter



Slam Shut Panel

Heater Flowmeter Arrangement

Heater Fuel Gas Flow Meter

Heater Fuel Gas

Old Instrumentation