Business Case – Capital Expenditure

Lara CG Controls

Business Case Number 247

1 Project Approvals

TABLE 1: BUSINESS CASE – PROJECT APPROVALS

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Reviewed By	Brian Reynolds, *Senior Electrical and Instrumentation Engineer, APA Group*
Approved By	Craig Bonar, *Manager East Coast Grid Engineering, APA Group*

2 Project Overview

TABLE 2: BUSINESS CASE – PROJECT OVERVIEW

Description of Issue/Project	A brief summary of the project is: • The Lara City Gate facility is ageing and contains old and outdated equipment. This creates issue with reliability and maintainability of the station. • Impact: The site provides gas flow from the Lara-Iona Pipeline into the Brooklyn-Corio Pipeline. Failure of this facility will result in loss of flow into the Geelong area and requirement to bring gas from Brooklyn to Geelong via compression or regulation. • Successful solution will: Improve the reliability and maintainability of the station and provide ongoing operation with reduced likelihood of failure.
Options Considered	The following options have been considered: 1. Option 1: Do Nothing Option 2. Option 2: Demolish the City Gate (CG) and upgrade Brooklyn – Corio Pipeline (BCP) 3. Option 3: Replacement of RTU, Battery system and valve control mechanisms
Estimated Cost	$619,258
Consistency with the National Gas Rules (NGR)	The replacement of these assets complies with the new capital expenditure criteria in Rule 79 of the NGR because: • it is necessary to maintain and improve the safety of services and maintain the integrity of services (Rules 79(2)(c)(i) and (ii)); and • it is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (Rule 79(1)(a)).
Stakeholder Engagement	The stakeholders affected by this project: • Australian Energy Market Operator • Energy Safe Victoria • Transmission Operations Personnel

3 Background

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 kPa and the T24 pipeline from Brooklyn to Corio has an MAOP of 7,390 kPa. Therefore, the facility provides an over pressure protection function for the downstream pipeline, T24.

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 Australian Energy Market Operator (AEMO) use the Lara CG to efficiently manage intraday line pack and implement this by changing set points and flow rates through the Lara CG.

3.1 Remote Telemetry Unit

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 by not allowing AEMO to control the site when the RTU has failed.

3.2 Battery Charger

The condition of the existing Battery Chargers has deteriorated since installation and 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 and would result in extended duration of the outage while fault finding and sourcing spare parts.

3.3 Valve Panel

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. This "tracking" feature is unique to Lara CG.

The present configuration of three of the four runs that are 'Fail Open' needs to be reviewed. These 'Fail Open' regulators will be pushed closed if electrical power is lost. This will leave one run open during pneumatic control, however that run is 'Fail Close' should pneumatic control be lost in addition to electrical failure. This arrangement may require change to 'Fail Close' to provide suitable level of safety for over pressure protection.

3.4 Hazardous Area Equipment

As part of the proposed upgrade, existing instrumentation will be replaced as required to maintain compliance with hazardous area regulations and improving reliability.

3.5 Pneumatic Control and Actuator

Presently the ability to diagnose faults during fault conditions is very difficult with the existing pneumatic controller.

The replacement of the pneumatic control is one of the most necessary upgrades of the Lara CG. The new control of the active valves provides for easier maintenance and fault recovery.

3.6 Valve Positioners

The positioners are an electro/pneumatic device and can be subject to wear of electrical components as well as the mechanical components inside, resulting in erratic performance or total failure of the positioner and loss of gas flow. The installed DVC5000 series positioners are now obsolete and reached end of life and the new model is the DVC6200 series is preferred. See business case 225 for further information and capital expenditure.

3.7 Slam Shut Panels

The existing Slam Shut Panels do not follow the standard APA Slam Shut Panels. The ability to recover from failure quickly is improved with the APA standard design. In addition, by upgrading the panel to the current standard design, maintenance should be simpler and reliability improved due to use of standard procedures.

3.8 Building Improvement

The building improvements include the electrical distribution board and lighting, work station and benches and physical security improvements. The existing building is not fit for purpose.

3.9 Instrumentation Replacement

Some of the instrumentation (such as Pressure and Temperature Transmitters) on the regulator runs and general site are old models which are no longer supported. New instrumentation will provide improved reliability.

4 Risk Assessment

The following risks with the current city gate and controls:

- Due to exposed circuits presents a risk to maintenance personnel. There is potential for electrocution resulting in a loss time injury and in extreme circumstances resulting in a fatality.
- Failure of supply due to failure of MCC, battery chargers or other control equipment leading to inability to monitor and operate critical equipment's in the plant for an extended period.
- Failure to apply current standards in terms of safe operation.

TABLE 3: RISK RATING

Risk Area	Risk Level
Health and Safety	**Moderate**
Environment	**Low**
Operational	**Moderate**
Customers	**Moderate**
Reputation	**Moderate**
Compliance	**Moderate**
Financial	**Moderate**
Final Untreated Risk Rating	**Moderate**

5 Options Considered

5.1 Option 1 – Do Nothing

The Do Nothing option is to maintain the existing equipment and wait for failure. The RTU hardware is obsolete and requires replacement, the batteries are reaching end of life and the design is not appropriate to today's standards, the valve panel design prevents expedient diagnostics possible from a control failure.

5.1.1 Cost/Benefit Analysis

The cost of the Do Nothing option is the costs an event that could have been averted. These risks are protracted recovery time from failure, inefficient operation pipeline system and reduced reliability. For example, the battery system is installed to provide an uninterruptible power supply should mains power fail. Reliability will be adversely affected if the batteries are not serviceable. This station is actively utilised by the AEMO to control gas flow and maintain customer demand requirements in the Brooklyn – Corio pipeline system. The efficient operation of the Lara CG enables efficient utilisation and capacity of the Brooklyn Compressor Station.

5.2 Option 2 – Demolish the Lara CG

The only feasible means of removing the need for the Lara CG is to enable the downstream pipeline, the Brooklyn – Corio pipeline to be upgraded to a Maximum Allowable Operating Pressure equivalent to the upstream pipeline. This approach will require extensive engineering work and the replacement of the 50km pipeline. The estimate for this work is approximately $150m.

This option is not considered prudent.

5.3 Summary of Cost/Benefit Analysis

TABLE 4: SUMMARY OF COST/BENEFIT ANALYSIS

Option	Benefits (Risk Reduction)	Costs
Option 1	Do Nothing	$ 0
Option 2	Demolish the CG and upgrade the BCP	$150,000,000
Option 3	Replacement of RTU, Battery system and valve control	$ 619,258

5.4 Proposed Solution- Option 3

5.4.1 Replacement of RTU, Battery System, Valve Panel and Control System

The preferred option is to complete all the work as detailed in the FEED report.

The multiple tasks listed in the report are prioritised and will be completed in a phased approach respective of their risk level.

5.4.2 Why are we proposing this solution?

There are multiple components in need of replacement and many are due to obsolescence. Other reasons are the control design is not the APA standard and is difficult to maintain or fix after a failure.

The most significant upgrade is a change to the control philosophy. Currently a control system failure will force the system into pneumatic control that will close three of the four the regulator runs (shut off supply). The alternative is for pneumatic positioners to be installed for pneumatic control that will permit supply to continue during a control system failure, at a predefined outlet pressure. This will result in a higher security of supply for the city gate and be the same as the newly installed Dandenong City Gate.

The solution is consistent with the requirements of Rule 79 of the National Gas Rules, APA considers that the capital expenditure is:

- Prudent – The expenditure is necessary in order to improve the safety of personnel and is of a nature that a prudent service provider would incur.

- Efficient – The change of the control philosophy will enable a more efficient form of operation and mitigates shut off supply during a control system failure. The work will be undertaken consistent with the APA procurement policy.

- Consistent with accepted and good industry practice – In addition the reduction of risk to as low as reasonably practicable in a manner that balances cost and risk is consistent with Australian Standards and the Occupational Health and Safety Act.

5.4.3 Forecast Cost Breakdown

TABLE 5: PROJECT COST ESTIMATE,

	Total
Internal Labour	**$ 176,931**
Materials	**$ 354,632**
Contracted Labour	**$ 87,695**
Other Costs	**$**
Total	**$ 619,258**