Business Case – Capital Expenditure

Isolation Valve to LNG upgrade

Business Case Number 275

1 Project Approvals

TABLE 1: BUSINESS CASE – PROJECT APPROVALS

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Reviewed By	Glenn Ogilvie, *Pipeline 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	The project is to replace the existing isolation valve with a superior valve: • The existing valve does not seal correctly and is of wrong type • This valve affects a downstream Major Hazard Facility (MHF) • The impact is the inability to isolate supply to the MHF • The completed project will have a ball valve with actuator, valve protection and valve loading
Options Considered	The following options have been considered: 1. Option 1: Do Nothing Option 2. Option 2: No alternative identified 3. Option 3: Upgrade the existing isolation valve with ball and fully protected
Estimated Cost	$649,022
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 are • Australian Energy Market Operator • MHF operator; APA Group • Energy Safe Victoria • Worksafe Victoria (MHF technical regulator)

3 Background

The VTS is connected directly to Liquefied Natural Gas storage facility at Dandenong through multiple connection points. APA has progressively upgraded the integrity of the isolation valves that connect to the LNG facility and there is one isolation valve remaining that was constructed in 1980.

This valve is no longer fit for purpose for the following reasons:

- The valve is of plug type which does not produce the sealing capability required of an isolation valve

- The valve has no loading system to prevent damage from opening during high pressure differential
- The valve has no means of automatic protection from the controlling system to prevent opening during high pressure differential
- The actuator is designed for 'Fail Last' operation, this is no longer permitted and 'Fail Safe' is required
- The valve and actuator are almost 40 years old and past their technical life

The design of the LNG facility incorporated isolation valves and actuator from the inlet pipeline with "Fail-Last" positioning. This allows supply to be maintained regardless of a failure of the actuation system. This arrangement leaves the downstream MHF exposed to unsafe operating conditions in the event of actuator or total control system failure.

The Fail Safe operation of these valves is required for the downstream LNG facility that is a Licensed MHF. The other isolation valves to the LNG facility have been upgraded to Fail Safe in the last few years.

The AER has approved expenditure of this nature in the past for the other isolation valves between the VTS and LNG facility.

4 Risk Assessment

The valve is a 300mm diameter plug valve operating at 700 kPa which can transmit large volumes of gas when open.

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**

The dominating effect of the existing valve arrangement is the consequence escalation from a valve remaining open when the LNG facility is experiencing a major failure. The secondary risk is the inability of the existing valve from sealing effectively, reducing the ability for maintenance and other project work to be performed downstream in the safest possible manner.

5 Options Considered

5.1 Option 1 – Do Nothing

The Do Nothing option is to accept the existing arrangement of Fail Last positioning when the control system fails or the control system requires the valve to be shut but cannot implement the command. This will result in consequence escalation during a major failure downstream.

5.1.1 Cost/Benefit Analysis

The only benefit of the Do Nothing option is delayed capital expenditure.

5.2 Summary of Cost/Benefit Analysis

TABLE 4: SUMMARY OF COST/BENEFIT ANALYSIS

Option	Benefits (Risk Reduction)	Costs
Option 1	Do Nothing	Indeterminate
Option 2	No alternative identified	
Option 3	Upgrade to Fail Safe actuation and ball valve	$649,022

5.3 Proposed Solution – Upgrade to Fail Safe with Ball Valve

5.3.1 What is the Proposed Solution?

The proposed solution is to replace the existing valve with an actuated ball valve with fail safe positioning, loading system and differential pressure protection.

5.3.2 Why are we proposing this solution?

The new valve arrangement will prevent consequence escalation, permit downstream maintenance and project work to occur safely and without further isolation, and to ensure the integrity of the valve in the future is maintained by the loading and protection system.

The existing Fail Last positioning of the actuator prevents the valve from closing during emergency and other circumstances when the actuation power signal is lost. This results in further escalation of emergency consequences and delays the ability of APA to isolate the VTS pipeline from the downstream MHF in such circumstances. In addition, the return to safe operation is delayed.

The VTS is governed by Pipeline License, Gas Safety Act, Pipelines Act, Pipeline Regulations and Gas Safety Regulations. They refer to Australian Standard 2885. With reference to AS2885.1:2012 Section 4.6.4 Isolation Valves: “Valves shall be provided to isolate the pipeline in segments for maintenance, operation, repair and for the protection of the environment and the public in the event of loss of pipeline integrity.” This section and others that refer to station maintenance require the valves to be in fit condition for their purpose. Currently the last remaining isolation valve between the VTS and the MHF is not meeting this requirement fully.

5.3.3 Consistency with the National Gas Rules

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 maintain and improve the safety of services and maintain the integrity of services to customers and personnel and is of a nature that a prudent service provider would incur.
- Efficient – The field work will be carried out by the external contractor that has been used to date, who has demonstrated specific expertise in completing the installation of the facilities in a safe and cost effective manner. The expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur
- Consistent with accepted and good industry practice – Addressing the risks associated with the poor condition of a number of below ground transmission system regulators and replacing assets that have

reached the end of their useful life is accepted as 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 Standard AS2885.

- To achieve the lowest sustainable cost of delivering pipeline services – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply.

5.3.4 Forecast Cost Breakdown

The most recent similar work of this nature was the upgrade of UV325 in 2014. The total cost of this project was $381,000. Since then valve protection systems have been installed at a cost of approximately $20,000.

The forecast estimate for this project is anticipated at $649,022 as there is need for additional cable laying for actuator control.

TABLE 5: PROJECT COST ESTIMATE,

	Total
Internal Labour	$185,435
Materials	$185,655
Contracted Labour	$277,922
Other Costs	$0
Total	**$649,022**