

## Business Case – Capital Expenditure

# Pipe Support Replacement

Business Case Number BC263 AA23-27

## 1 Project Approvals

**TABLE 1: BUSINESS CASE – PROJECT APPROVALS**

<b>Updated By</b>	Adam Newbury	Asset Lifecycle Specialist, Asset Management
<b>Cost Updated By</b>	Prasoon Premachandran?	Victorian Team Lead Project Delivery, Engineering & Planning
<b>Reviewed By</b>	Nicholas King	Mechanical Engineer, Engineering & Planning
<b>Approved By</b>	Daniel Tucci	Victorian Asset Manager, Asset Management

## 2 Project Overview

**TABLE 2: BUSINESS CASE – PROJECT OVERVIEW**

<b>Description of Issue/Project</b>	Replacement of inferior pipe supports with modern design to prevent corrosion at locations: <ul style="list-style-type: none"> <li>• Dandenong City Gate (100% complete)</li> <li>• Various compressor and city gate stations (Brooklyn complete)</li> <li>• Pig traps (75% complete)</li> </ul>
<b>Options Considered</b>	The following options have been considered: Option 1: Do Nothing Option Option 2: Replace Pipe Supports
<b>Estimated Cost</b>	\$850,000
<b>Consistency with the National Gas Rules (NGR)</b>	The replacement of these assets complies with the new capital expenditure criteria in Rule 79 of the NGR because: <ul style="list-style-type: none"> <li>• 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</li> <li>• 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)).</li> </ul>
<b>Key Stakeholders</b>	<ul style="list-style-type: none"> <li>• Australian Energy Market Operator</li> </ul>

## 3 Background and Project Need

Project resubmitted – ongoing program of work

Pipe supports provide a means for heavy pipe and components to be supported during operation. Over time changes to standard designs have improved the long term performance of supports. In particular the new designs reduce crevice corrosion, lateral loads and subsidence.

Ineffective supports will promote crevice corrosion or excessive pipe strain leading to failure. These failures can be prevented by periodic inspections and rectification where necessary.

PIPE SUPPORT REPLACEMENT



The above photo shows a pipe support on the right that has an interface between the concrete and the steel pipe. This support design is acceptable until the coating (paint) deteriorates and allows moisture and direct contact between steel and concrete. When this occurs is unknown as it cannot be inspected. The support on the left demonstrates a support with similar performance but longer life.



The above photo demonstrates the localized pitting corrosion where a pipe support has been removed. Note that either side of where the pipe support attached to the pipe is free from corrosion and paint in reasonable condition.

## Risk Assessment

**TABLE 3: RISK RATING**

Risk Area	Risk Level
Health and Safety	Low
Environment	Low
Operational	Moderate
Customers	Moderate
Reputation	Moderate
Compliance	Moderate
Financial	Low
<b>Final Untreated Risk Rating</b>	Moderate

The environment within some pipe supports promotes corrosion once the coating system deteriorates. In some conditions this corrosion is not able to be identified without either removing the support (replacement) or until a loss of containment. A loss of containment will likely result in a small, manageable gas leak, but difficult to repair.

The cost of a loss of containment at most facilities is high as the pipeline will need to be shutdown to enable repairs or replacement of pipe to take place.

## Options Considered

### 5.1 Option 1: Do Nothing

The Do Nothing option is to risk pipe failure in order to delay the inevitable expenditure.

#### 5.1.1 Assessment

Most pipe supports will be fit for purpose for at least 30 years in good conditions and replaced on a condition monitoring basis. Some pipe supports create otherwise preventable pipeline failure and the do nothing option must accept that risk.

### 5.2 Summary Assessment

**TABLE 4: SUMMARY**

Option	Benefits (Risk Reduction)	Costs
Option 1	Do Nothing	Indeterminate
Option 2	Replace pipe supports	\$850,000

### 5.3 Option 2: Proposed Solution - Replace Pipe Supports

The proposed solution is to replace supports that are not of suitable design to the standards of the day. The identified locations are:

**TABLE 5: PIPE SUPPORT LOCATIONS**

Location	Support Type	Required	Complete	Year	Status
Dandenong City Gate	Fully Sleeved	6	6	2018-2022	Complete
Pig Traps	Contemporary	8	8	2018-2022	Complete
Compressor Stations	Contemporary	20	4*	2018-2027	In Progress
Dandenong to West Melbourne Pig Traps	Fully Sleeved	4	0	2023-2027	
Pressure limiters and city gates	Contemporary	20	0	2023-2027	
<b>Total</b>		<b>58</b>	<b>18</b>		

The supports types are separated by design as associated cost/complexity to rectify is more for fully sleeved supports than contemporary design.

\*estimated

#### 5.3.1 Why are we proposing this solution?

The older design of pipe supports often used wide concrete supports with the pipe contacting the concrete with minimal interface protection. When the pipe begins to corrode, it cannot be inspected and thus corrosion can continue unidentified. Recent replacements of some supports of this design have shown corrosion.

#### 5.3.2 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 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 a suitably qualified external contractor. The expenditure will be conducted consistent with the APA procurement policy. 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 corrosion 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.

#### 5.3.3 Forecast Cost Breakdown

Unit Rates

Fully Sleeved or complex supports

- The average cost of replacing one support is approximately \$30,000 for the fully sleeved support type.

## PIPE SUPPORT REPLACEMENT

- This unit rate is based on recent experience on the Dandenong City Gate project and the Brooklyn Lara pig trap support replacement project

Contemporary or simple supports

- The unit rate for contemporary design of support is approximately \$2,300 for steel work only.

The above unit rates are excluding costs for design, supervision, footing complexity, Permit Issuing Officers and project management but these have been allowed for in the project cost estimate provided in table 6.

**TABLE 6: PROJECT COST ESTIMATE,**

	<b>Total</b>
Internal Labour	\$75,000
Materials	\$200,000
Contracted Labour	\$500,000
Other Costs	\$75,000
<b>Total</b>	<b>\$850,000</b>

## 6 Acronyms

<b>Acronym</b>	<b>Definition/Description</b>
<b>AEMO</b>	Australian Energy Market Operator
<b>AGA</b>	Australian gas association – Type B compliance governing body
<b>API</b>	American Petroleum Institute – publisher of standards
<b>CHAZOP</b>	Control system HAZOP – study of the control system functions to identify logic vulnerabilities
<b>ESD</b>	Emergency shutdown – control system-initiated shutdown designed to prevent incident escalation if operating parameters are breached
<b>ESV</b>	Energy Safe Victoria
<b>HAZOP</b>	Hazard and operability study
<b>HMI</b>	Human machine interface
<b>ILI</b>	Inline inspection – pipeline internal inspection
<b>OEM</b>	Original Equipment Manufacturer
<b>RA</b>	Risk Assessment
<b>RBI</b>	Risk Based Inspection – a process used to prioritise maintenance or inspection activities based on risk of failure.

## PIPE SUPPORT REPLACEMENT

<b>SIL</b>	Safety Integrity Level – an assessment used to rank control systems by their ability to fail safely
<b>SMS</b>	Safety Management Study
<b>VTS</b>	Victorian Transmission System