Business Case – Capital Expenditure

Critical Spares

Business Case Number BC314 AA23-27

1 Project Approvals

TABLE 1: BUSINESS CASE – PROJECT APPROVALS

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Reviewed By	Adam Newbury	Asset Lifecycle Specialist, Asset Management
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2 Project Overview

TABLE 2: BUSINESS CASE – PROJECT OVERVIEW

Description of Issue/Project	APA endeavours to maintain adequate critical spares inventory to enable prompt recovery from critical compressor station equipment failures and avoid prolonged Victorian Gas Transmission System capacity impacts. However, due to recent reductions in critical spare availability (i.e. increased procurement lead-times), the availability of critical spares has dramatically reduced. The aim of this business case is to ensure to the extent practicable that Victorian Transmission System compressor stations remain able to recover in a timely manner after critical equipment failures. The objective of this business case is address long lead critical sparing vulnerabilities to reduce the consequence of compressor station equipment failures.
Options Considered	The following options have been considered: Option 1: Do Nothing Option Option 2: Engage Third Parties (OEMs/Suppliers) to hold spares for the VTS Option 3: Increase In-House Inventory of Critical Spares (Preferred option)
Estimated Cost	$2,100,000
Relevant Standards	The acquisition of additional critical spares will ensure that the risks of transmission service loss in unplanned failure situations is reduced to as low as reasonably practical.
Consistency with the National Gas Rules (NGR)	The acquisition of equipment for emergency response 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)).

Key Stakeholders	The primary stakeholders affected by this project are: • Energy Safe Victoria • Australian Energy Market Operator
Benefits to Customers and Consumers	Customers and consumers will benefit from APA VTS having critical spare parts on hand in the event of equipment failure. Critical spare parts inventory will reduce period of equipment being out of service and reduce the likelihood of supply interruptions. The program will allow equipment defects to be addressed in a timelier and more cost-effective manner.

3 Background and Project Need

This business case is associated with mitigation of consequences in the event of major equipment failures with regards to compressor station equipment, including but not limited to, station and unit valves, gas turbines and compressors. This equipment is complex in nature made up of components with some parts often having longer lead and/or high cost. Historically these type of parts have not always been held in stock by the original equipment manufacturers (OEMs) in Australia warehouses, or are manufactured to order.

With the state of the current world economies and manufacturing hubs, APA Group has observed changes in logistics and manufacturing resulting in concerning increases in lead times. APA have also experienced logistical delays with air freight when failures have occurred. APA does not expect the state of global logistics to materially improve or stabilise in the near term and anticipate the Victorian Transmission System compressor stations are exposed to this risk for an extended period.

This business case is concerned with critical spares which are differentiated from insurance and operational spares.

Critical Spares include:

- Component items (e.g. Dry Gas Seals, Control Valves, Bellows Assembly, Large Couplings) required to minimise significant business impact in the event of unplanned component failure.

Operational Spares include spare parts used in the ongoing normal maintenance of assets and are not considered in this business case. Insurance spares are major components typically of high valve and long lead that we would not normally expect to be used in the lifecycle of the plant. They are normally complete assemblies or redundant units which insure against catastrophic events.

The VTS operates a fleet of Solar Turbines compressors and gas turbine engines (compressor units) that are similar models and vintages. As a result, the units have a high level of commonality between equipment and sub-components. Where compressors are similar, station valves have been selected at different times for different operating conditions and often do not have the same level of commonality across the VTS as the compressor units. Spares are currently held in inventory at different compressor stations as well as at a central warehouse in Dandenong to allow for easy access to components for the fleet when required.

4 Risk Assessment

The risk associated with inadequate critical sparing is the inability to avoid consequence escalation or reinstate normal compressor station operation in an efficient timely manner. Whilst the VTS has gas supplied from multiple sources, the capacity of the network can become severely constrained depending on the network flow requirements when compressors (or compressor stations) are not available after failure when the required spares are not freely available. When this occurs, it can potentially lead to a loss of supply of gas to major customers and consumers.

Table 3 summarises the untreated risks rating associated with VTS maintaining their current equipment, tools and fittings for emergency response and recovery purposes.

TABLE 3: RISK RATING

Risk Area	Risk Rating
Health and Safety	Moderate

Environment	Low
Operational	Moderate
Customers	Moderate
Reputation	Moderate
Compliance	Moderate
Financial	Moderate
Final Untreated Risk Rating	Moderate

5 Identification of Options and Assessment

1.1 Identification of Options

There are three options identified for this issue.

Option 1 – Do Nothing

This option involves VTS not proceeding to acquire additional critical spares.

Option 2 – Engage Third Parties (OEMs/Suppliers) to Hold of Spares for the VTS

This option involves evaluating the spares held in a critical spares review and then working with third parties (OEMs or suppliers) to have them hold and manage additional inventory on behalf of the VTS to ensure minimum quantities can be supplied within agreed timeframes, or that local stock would be held on behalf of the VTS.

Option 3 – Increase In-house inventory of critical spares

This option involves evaluating the spares held in a critical spares review and increasing holdings to compensate for expected issues with manufacturing and logistics related increases in lead time.

1.2 Assessment of Options

1.2.1 Summary of assessment

Table 4 below summaries the benefits of the three options explained in the previous sections as well as the associated cost estimates for each option.

TABLE 4: SUMMARY

Option	Benefits (Risk Reduction)	Risks/Costs/Unknowns
Option 1	• VTS is not required to purchase any additional critical spare inventory	• Increased repair times for resolving unplanned failures with VTS compressor stations. • The repair components that are not fit for purpose and when they would not normally be returned to service or considered repairable.
Option 2	• VTS does not incur administrative costs required to store and maintain additional stock of critical spares.	• Long term cost greater than initial CAPEX • Less operational control and potential delays in acquiring capital spares when needed, depending on terms and conditions with suppliers/OEMs • Uncertainty around what terms and conditions would be placed on such an arrangement with supplier/OEM.
Option 3	• VTS is self-reliant and has improved response time to unplanned equipment failures. • Adequate critical spares available near where they would be used if needed.	• $2,100,000 • Estimate of storage, administration, and preservation cost (OPEX) of additional critical spares would be a minimum of 5% compared to total CAPEX.

Option 1 Do nothing is not recommended as it could result in situations where compressor stations that have failed and needed parts to repair would be unable to be repaired in a timely fashion. This would lead to loss of supply or restrictions around parts of the VTS as well as impacting other stakeholders that contract VTS for their operational services due to:

- Increased repair times for resolving unplanned failures with VTS compressor stations.
- The repair components that are not fit for purpose and when they would not normally be returned to service or considered repairable.

Option 2 Engage Third Parties (OEMs/Suppliers) to Hold of Spares for the VTS is more beneficial that Option 1. The benefit of this option is that VTS will have more timely access to necessary critical spares in the event of an unplanned failure where we do not have necessary parts in stock already.

In APA's experience, existing suppliers and OEMs currently have issues with holding stock in Australia. This means that we would be charged a premium for them to increase and manage a local inventory holding.

The potential detriment of Option 2 includes the possibility that spares intended for VTS are used by other OEM customers, depending on the arrangement and conditions that are established with OEMs/suppliers, which may also impact critical spare availability. This option may also be a costly insurance arrangement depending on what agreement and conditions are negotiated with OEMs/suppliers. APA VTS is concerned that there is no guarantee that spares will be held in locations that are easily accessible to the VTS when compared with having them in our own inventory located on sites or centrally in Dandenong.

It is not recommended that we attempt to negotiate third party holding of critical spares due the likely complexity and cost of the agreements and likely longer times to access spares than if held in VTS inventory. Option 2 is not preferred for these reasons.

Option 3 involves APA VTS maintaining its own critical spares. The benefit of this option is that VTS improves its access to critical spares in the event of an unplanned failure reducing response and recovery times which have been increasing due to logistical and manufacturing delays in obtaining parts on as needed or just in time basis.

Option 3 is the proposed solution to address the inadequacy of critical spare availability in the face of a changing global logistics and manufacturing environment.

1.2.2 Why are we proposing this solution?

By selecting Option 3 as the proposed solution, VTS improves its capability to respond to unplanned failure of major equipment within the VTS in a timely manner, to minimise the impact of any failure. We would maintain an ability to rectify unplanned failures in a self-reliant manner rather than relying on third parties.

The complexity, potential terms and conditions that could still contribute to delays and potential unknown costs associated with working with third parties to hold additional critical spares make that Option 2 less desirable.

6 Consistency with the National Gas Rules

The proposed solution is consistent with Rule 79(1) of the National Gas Rules and APA considers the expenditure to be:

- **Prudent** – The expenditure is necessary to maintain and improve the readiness in response and recovery to unplanned failure of major equipment within the VTS. This is especially the case with the ongoing problems with logistics being experienced worldwide. Maintaining critical spares is consistent with the actions of a prudent operator.

- **Efficient** – By acquiring the additional critical spares, the long-term costs will be minimised compared to utilising a third party and more efficient that ordering critical spares on demand given logistical issues.

- **Consistent with accepted good industry practice** – Addressing the risks associated with having inadequate critical spares for response to unplanned failures is considered as good industry practice.

- **Achieves the lowest sustainable cost of delivering pipeline services** – The acquisition of additional critical spares will ensure that the risks of transmission service loss in unplanned failure situations is reduced to as low as reasonably practical. Thus, maintaining reliability and security of supply to our customers and ensuring safety of people and the environment.

7 Forecast Cost Breakdown

Below is a cost breakdown for the additional critical spares in accordance with the proposed solution.

TABLE 5: FORECAST **COST** ESTIMATE (ESCALATED)

	Gas Compressor	Unit & Station	Total
Internal Labour	$80,000	$20,000	$100,000

Materials	$1,900,000	$100,000	$2,000,000
Contracted Labour	$0	$0	$0
Other Costs	$0	$0	$0
Total	**$1,980,000**	**$120,000**	**$2,100,000**

Gas Compressor Critical Spares

Table 5 above has a forecast cost estimate for gas compressor critical spares. This high-level estimate is based on an initial critical spares study for solar compressors that was completed by the APA Reliability Centred Maintenance (RCM) team considering APAs national fleet. Considering this existing information the table contains a high level estimate for internal labour and predicted additional spare acquisition costs. The internal labour hours would be used to further refine this critical spare holding information in relation to only the VTS compressor stations to recommend appropriate spares holding quantities to mitigate risk of unplanned failure.

Unit and Station Critical Spares

Table 5 above has a forecast cost estimate for unit and station valves. Large station and unit valves have a good track record of reliability in the VTS and are often unique and selected for specific process conditions. Due to the unique configurations it is not justified to acquire additional spares for the large valves. Some compressor unit recycle valves and other smaller associated unit valves are similar or multiples of the same valve exist across multiple units at each site. An estimate has been made to perform a review of existing unit valves and identify where it is justified to hold a valve as a critical spare as well as some funding for the spares themselves.

8 Acronyms

Acronym	Definition/Description
AEMO	Australian Energy Market Operator
AGA	Australian gas association – Type B compliance governing body
API	American Petroleum Institute – publisher of standards
CHAZOP	Control system HAZOP – study of the control system functions to identify logic vulnerabilities
ESD	Emergency shutdown – control system-initiated shutdown designed to prevent incident escalation if operating parameters are breached
ESV	Energy Safe Victoria
HAZOP	Hazard and operability study
HMI	Human machine interface
ILI	Inline inspection – pipeline internal inspection
OEM	Original Equipment Manufacturer

RA	Risk Assessment
RBI	Risk Based Inspection – a process used to prioritise maintenance or inspection activities based on risk of failure.
SIL	Safety Integrity Level – an assessment used to rank control systems by their ability to fail safely
SMS	Safety Management Study
VTS	Victorian Transmission System