Business Case – Capital Expenditure

VTS Waterbath Integrity

Business Case Number BC328 AA23-27

1. Project Approvals

TABLE 1: BUSINESS CASE – PROJECT APPROVALS

Created By	Adam Newbury Stephen Otto	Asset Lifecycle Specialist, Asset Management Facilities Integrity Engineer
Costed By	Stephen Otto	Facilities Integrity Engineer
Reviewed By	Damian Lynch	Team Lead Inspection, Engineering & Planning
Approved By	Daniel Tucci	Victorian Asset Manager, Asset Management

2. Project Overview

Description of Issue/Project	**Problem of / opportunity to:** The aim of this project is to ensure compliance with APA integrity policy and maintain the waterbath heater equipment to a safe and dependable standard. Waterbath heaters require periodic internal inspection to meet Type B requirements and ensure safe reliable operation. The objective of this project is to schedule waterbath heater internal inspections that verify condition and identify risks and manage accordingly, which in turn improves certainty of remaining life and related supply confidence. Note: Previously these inspections were treated as operational expenditure but recent reviews identified that they should be capitalised.

TABLE 2: BUSINESS CASE – PROJECT OVERVIEW

Options Considered	The following options have been considered: Option 1: Do nothing – ALARP assessment required Option 2: Assess waterbath heaters to fixed schedule Option 3: Assess waterbath heaters to RBI schedule (Preferred)			
Estimated Cost	**Equipment Type**	**CY18-CY22**	**CY23-CY27**	**CY18-CY27**
	Total	**$600,000**	**$2,000,000**	**$2,400,000**
Consistency with the National Gas Rules (NGR)	Periodic inspection 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	Each facility may require differing stakeholder engagement; • Landowners impacted by the project will be consulted for noise, visual, third party encroachment etc. • AER, AEMO, Stakeholders and Consumers are consulted in the round table presentations.			

3. Background

Understanding and managing the integrity of Victorian Transmission System facilities is critical to the safe, compliant and reliable operation of APA assets. To ensure this occurs, Facilities Integrity Team apply a national approach to consistently assess the integrity of facilities infrastructure and where required recommend remedial actions.

For waterbath heaters, major internal inspections are being conducted 6 yearly using a Type B compliant risk based inspection philosophy to achieve the following;

- Provide asset condition information that either triggers urgent remedial actions or provides timing for next remaining life inspection.
- Ensure the ongoing reliable and safe operation of the VTS waterbath heaters.
- Ensure that VTS gas quality commitments are met and maintained.
- Ensure that APA meets Type B gas appliance requirements.

Note:

1. Actual timing for major waterbath heater inspections is based on risk assessment (RA) and risk based inspection (RBI) considerations.
2. APA Finance recommend that pressure vessel internal inspections not be considered in this business case, they may however may be introduced during the next access arrangement submission.

Problem:

The Victorian Transmission System has 8 facilities with a total of 12 waterbath heaters, to remain Type B compliant regular internal inspection of the heater is required. If a waterbath heater did not receive the required internal inspections, it would eventually lead to a pinhole leak failure at the process tube which would be easily detected during site inspections but would render the asset out of service until resolved.

Affected Stakeholders:

The outage would generally constrain supply capacity and impact AEMO and customers until resolved.

Impact:

Upon failure the waterbath heater would remain out of service until the issue was resolved.

Successful solution will:

Enable physical condition verification which will identify risks and allow the actual condition to be known and managed accordingly. This will in turn improve certainty of remaining life and related supply confidence.

Timing of the issue:

For how long has the issue existed?
Waterbath heaters require regular inspection to meet Type B requirements, this is an ongoing requirement.

Why are we proposing to address the issue now?
Waterbath heaters require regular inspection to meet Type B requirements, this is an ongoing requirement.

Have we commenced the project in the current period?
Waterbath heaters require regular inspection to meet Type B requirements, this is an ongoing activity that remains in place for the life of the asset.

Will this issue take longer to rectify than just the next AA period?
This should be considered a preventative maintenance program and as such will continue for the life of each facility.

Are there any relevant technical standards that apply to this issue?
AGA Type B is the applicable standard for waterbath heaters.

TABLE 3: GEOGRAPHIC LOCATION / TECHNICAL DETAILS:

Waterbath Heater Locations:
Barnawartha
Brooklyn
Dandenong Terminal Station
Lara
Maryvale
Somerton
Wandong
Wollert

General:

Have we done anything in the current period to rectify this issue/in relation to this project?
Inspections have been conducted but the facilities integrity team have recently developed a more in-depth national strategy to perform inspections of waterbath heaters more consistently with a risk based inspection approach.

Has the AER approved any expenditure in relation to this issue/project before?
Yes, however previously this was treated as a major expenditure job (MEJ) so was not submitted as part of the CAPEX budget.

If the work has been approved by the AER previously, have we conducted this work?
APA manage the work, but contractors are utilised for cranage non-destructive testing.

If not, why not?
Not applicable

If so, what has been the outcome? How successful has the work been in addressing the issue?
The work has been a success as it helps to ensure that facility pipework incidents are avoided and the assets at the facilities remain available. What is being proposed in this business case is to adjust our maintenance philosophy to monitor condition in a way that ensures waterbath heaters remain compliant whilst decreasing operating and maintenance costs.

4. Risk Assessment

Risk Scenario:

Waterbath heaters consist of a process gas tube which is immersed in a gas burner heated tank of corrosion inhibited water. Natural gas is heated prior to a pressure cut (e.g. at a custody transfer meter station) to ensure the natural gas temperature remains in specification. Option 2-3 both address the risk, however Option 1 – do nothing is applying a run to failure approach.

Most likely failure scenario is a pinhole leak in process tube releasing into the waterbath vessel, this would discovered during routine inspections. Due to being immersed in the waterbath, a leak from the process tube is

unlikely to ignite and can vent safely from the waterbath. However, when discovered the asset would immediately be taken out of service until the waterbath heater is repaired or replaced.

Table 4 shows the risk assessment for the do nothing approach, a likelihood setting of remote (every 20 years) has been selected as this would be similar to the corrosion allowance for waterbath heaters.

TABLE 4: RISK RATING

Risk Area	Consequence	Likelihood	Risk
Health and Safety	No health and safety consequences identified	N/A	N/A
Environment	No environmental consequences identified.	N/A	N/A
Operational	Unplanned interruption of ≥ 1 day but < 1 month to the delivery of firm services	Remote [every 20yrs]	Low
Reputation & Customers	Some decline in customer satisfaction recoverable in <12 months	Remote [every 20yrs]	Negligible
Compliance	Non-compliance reportable to a regulator with potential for regulatory investigation or fines	Remote [every 20yrs]	Low
Financial	≤ $15M	Remote [every 20yrs]	Negligible
Final Untreated Risk Rating			**Low**

5. Options Considered

Costs for each option are provided in table 4, as is often the case the costs are indeterminate for the do nothing option as ALARP requirements cannot be met. Costs for fixed and RBI schedule would be similar, however the benefit realised from the RBI approach is that it assesses the priority based on the risk of integrity related failure to schedule inspections. For example, newer assets that are operating well below their rating would tend to be given lower priority than older assets that are operating at or near their rated pressure.

TABLE 5: SUMMARY OF COST/BENEFIT ANALYSIS

Option	Benefits (Risk Reduction)	Costs
Option 1	Do nothing – ALARP assessment required	Indeterminate
Option 2	Assess facility waterbath heaters to fixed 4 yearly schedule	$3,000,000 Assumed 1.5 times option 3:
Option 3:	Assess facility insulated/buried pipework and waterbath heaters to RBI schedule	$2,000,000 $200,000 per 6 year inspection has been applied with 10 scheduled for the 2023-2027 period.

1.1 Option 1: Do Nothing – ALARP assessment required

This option involves operating waterbath heaters without periodic inspection and instead rely on numerical modelling for remaining life predictions.

APA facilities integrity engineers recommend this as non-viable for this option as run to failure is not an accepted strategy for any process containing equipment. In addition, an ALARP assessment would be required to allow continued operation and it would be difficult to state that we are meeting our objective to reduce the risk level to as low as reasonably practicable.

1.1.1 Cost/Benefit Analysis

What are the costs/risks involved with doing nothing or deferring the project?
Costs below what we incur currently, however the solution is not-viable due to the ALARP requirement.

What are the benefits of doing nothing?
The only benefit of doing nothing is initial cost savings, however this is insignificant if considering ALARP requirement.

Due to the ALARP requirement for this option it was rated as non-viable as it would lead to MOP reductions and potentially end of life decommissioning.

1.2 Option 2: Assess waterbath heaters to fixed schedule

Schedule physical inspection of APA waterbath heaters which ensures all assets get 4 yearly inspection of the waterbath heaters regardless of risk, asset criticality or waterbath condition.

1.2.1 Cost/Benefit Analysis

Cost/Benefit Analysis

What are the benefits of this option?

- This approach does comply with AS3788 and APA facilities integrity policy.
- All piping and waterbath heaters will be inspected regardless of risk or condition.

What are the costs/risks involved with this option?

- No prioritisation of inspections based on risk increases risk of piping failure before inspection is achieved.
- Findings and results will take longer to achieve due to the additional work required.
- Unnecessary over inspection of pipework and waterbath heaters (poor use of resources, inefficient use of funds, significant increase in cost).

Therefore, this option meets ALARP but not deemed optimal as it is less efficient use of preventative maintenance funds and resources.

1.3 Option 3: Assess facility waterbath heaters to RBI schedule – recommended option

Where appropriate, 4 yearly waterbath heater inspection timings are refined based on assessment of variables such as equipment age, condition uncertainty (risk) and resource or asset availability. The APA facilities integrity team consider variables holistically and apply a risk-based inspection methodology that not only ensures asset reliability but also guarantees APA can demonstrate compliance.

1.3.1 Cost/Benefit Analysis

The RBI approach efficiently identifies and targets waterbath heater inspections based on a Risk Assessment / Risk Based Inspection approach.
Substantial cost savings can be realised with this approach but more importantly, locations that have the highest risk of failure or the greater consequences should a failure occur are the ones that get prioritised which makes the actual savings difficult to quantify.

Why are we proposing this volume?
These are the 8 Victorian Transmission System facilities with waterbath heaters that require regular physical assessment to remain complaint with Type B / AS 5601 and in line with APA facilities integrity policy.

Cost/Benefit Analysis

What are the benefits of this option?

- Provides a transparent decision process that justifies the selected action.
- Provides the best balance of risk reduction and cost.
- Meets ALARP requirements.
- Improves certainty of the remaining life on these facilities.
- Ensures APA continue to operate in a safe and reliable manner.

What are the costs/risks involved with this option?

- The risks of this option are low, basically it is a more intelligent way of doing what we must do to remain complaint.
- Costs are difficult to predict as there are many variables in place, however the approach taken has been to apply a fixed budget of $200,000 per waterbath heater major inspection noting that this will be an ongoing program of work.

1.3.2 Consistency with the National Gas Rules

Consistent with the requirements of Rule 79 of the National Gas Rules, APA considers that this 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 selection of the appropriate timing for each facility uses a consistent and transparent decision process that balances risk, operating context and pipeline features to ensure that the best solution is implemented. Progress to date has demonstrated specific expertise in completing the inspection 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 – RBI and physical inspection are proven tools used worldwide for prioritising and assuring waterbath heater integrity. To achieve the lowest sustainable cost of delivering pipeline services – RBI is the most cost-effective solution and a common approach for integrity programs. The proposed option uses a combination of risk assessment and RBI to prioritise the facilities and in doing so reduces cost and addresses integrity risk for assets with high failure consequences.

1.3.3 Forecast Cost Breakdown

Volume:

Volume is based on the scheduled program of work maintenance listed in table 7, during the 2023-2027 period there are 10 waterbath heater inspections scheduled in the APA maintenance schedule.

TABLE 7: WATERBATH HEATER INSPECTION SCHEDULE

Waterbath Heater	Target Date
Barnawartha 6650-H-1600	2023
Maryvale H-XC001	2024
Maryvale H-XB001	2024
Lara SWP 2631-H-001	2025
Somerton B-001	2025
Brooklyn BCP 1221-H-001	2026
Brooklyn BLP 1222-H-001	2026
Brooklyn BCP 1221-H-002	2026
Brooklyn BLP 1222-H-002	2026
Wollert City Gate H-001	2026
CY23-CY27 Total	**10**

Assumptions:

Costs have been set at $200,000 per waterbath heater, this is an average cost based on recent waterbath heater internal inspections which includes allowances for associated costs including but not limited to mobile crane and Type B qualified inspector resources. An average cost has been used as inspection costs are influenced by mobilisation and demobilisation costs, locations with one waterbath are anticipated to cost more per heater than sites with multiple waterbath heaters but on average $200,000 per waterbath inspection is a reasonable estimate assumes modest repair but if critical defects are found during the inspection cost escalation is anticipated. Overall project cost estimate breakdown provided in table 6.

TABLE 6: PROJECT COST ESTIMATE

Cost Category	CY23-CY27
Internal Labour	$200,000
Materials	$400,000
Other Costs	$200,000
Contracted Labour	$1,200,000
Total	**$2,000,000**

6. 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