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apa

Buried Services Relocation

December 15, 2023

Business Case

document control

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Table 1.1: Revision Record

Version	Changes Made
0.1	*Initial draft*
0.2	*Feedback received from document review*

Table 1.2: Review and Distribution

Name	Role	Action	Sections
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This document requires the following approvals. Approvals are inserted as an object in the table below (preferred) or stored with the approved document in electronic version on the Project Site in Project Server.

Table 1.3: Approvals

Name	Role	Approval	Date Approved
[redacted]	[redacted]	*Approval*	*07 Dec 2023*
[redacted]	[redacted]	*Approval*	*15 Dec 2023*

Other project specific approvers can be added if required.

Delegation Policy

Contents

1. Executive Summary

1.1. Action Requested

In response to and in consideration of recent failures and environmental incidents, this business case seeks the approval of $7.4 million (CY$2023) to relocate buried station piping and equipment for chemicals, chemical waste storage and transfer systems at compressor stations along the Goldfields Gas Pipeline (GGP).

Site works have commenced in CY2023 at Yarraloola compressor station are intended to continue across the remaining stations until CY2027.

$4.7 million (CY$2023) will be incurred in AA5 of which $2.1 million (CY$2023) will be allocated to the covered pipeline.[1]

1.2. Options Considered

1. Option 1 – Continue to undertake the buried service relocation works at compressor stations only. (**Recommended Option**)
2. Option 2 – Defer remaining buried service relocation works at compressor stations by five years.

- Option 3 – Undertake relocation works at both compressor and scraper stations.

1.3. Project Overview

In response to recent equipment failures, we seek to relocate buried piping, systems, and equipment for chemical and chemical storage to above ground. We will also undertake additional site rectification works to minimise overall operability and environmental risk.

This business case considers whether to relocate the buried pipework at compressor stations only (Tier 1 sites), whether to delay relocation by five years, or whether to relocate pipework at both Tier 1 and Tier 2 locations on the GGP (compressor stations and scraper stations).

Key considerations include cost, current operability, compliance with regulatory requirements, accepted good industry practice, as well as risk and the effectiveness of existing controls.

We find that relocation of buried pipework at scraper stations on the GGP adds considerable scope to the project that cannot be justified based on the limited reduction in risk. Deferring work on compressor sites introduces an unacceptable level of risk in terms of environmental failure and non-compliance as we cannot implement effective controls without an engineering solution.[2]

As a result, the recommended option is to only undertake pipework relocation works at compressor stations. This option aligns with both regulatory requirements and industry best practices, providing a balanced approach to managing both risk and cost.

[1] The allocation of costs to covered and uncovered pipelines has been made on a site-by-site basis.
[2] In contrast the risk at scraper stations is low or negligible.

2. Background

APA have recently reported three environmental incidents to the state regulator, the Department of Mines, Industry Regulation and Safety (DMIRS), that have occurred at compressor sites on the GGP.

While design was to industry standard at the time of construction, internal investigations have identified several issues relating to the design of buried assets that store or transfer chemicals and chemical waste including condensate, lube oil and oily water systems.

Examples of recent incidents include:

- Turee Creek belowground stainless-steel lube oil piping failure with 23 cubic metres of soil contamination reported (Figure 2.1 and Figure 2.2)
- Wiluna belowground concrete oily water holding tank leak with 160 cubic metres of soil contamination reported.
- The Yarraloola belowground concrete oily water holding tank leak was leaking from grout resulting in minor soil contamination with approximately 0.5 cubic metres of contaminated soil (Figure 2.3)

Figure 2.1 Turee Creek: Steel lube oil piping failure

Figure 2.2 Turee Creek - Oil transfer line after excavation

Figure 2.3 Yarraloola compressor station: Oily water tank showing evidence of overflow

2.1. Incident Investigation Findings

Internal investigations were held for each incident and the root causes related to a combination of design, operability and maintenance of chemical waste storage and transfer systems. There is an ongoing risk of environmental harm, non-compliance and prosecution if these issues are not addressed.

Yarraloola compressor station investigation and risk assessment

This investigation and subsequent risk assessment identified 11 risks. Of these, eight risks were rated low or negligible and therefore not requiring immediate action under APA's stated risk tolerances. The remaining three risks, described below, were rated moderate or high:

- The closed drains blowdown pits are constructed of concrete and set below-ground. No leak detection or secondary containment is in place and the pits store up to 2000 L of natural gas liquid hydrocarbons. Blowdown pit levels are manually monitored and emptied and have a risk of loss of containment, as shown by staining around the Apache inlet pit. Underground leaks could go unnoticed for many years.
- The oily water treatment systems comprising of 11 oily water separation sumps (OWSS) and one triple interceptor trap (TIT) have not been functioning as intended due to a combination of inappropriate design, misuse and poor maintenance. There are six oily water catchments ("systems") on-site and five have a risk that are moderate or high.
- All of the TITs and OWSS are located below-ground and have no secondary containment. Where these sumps are being used to store large volumes of oil (nominally >100L of pure oil or the equivalent in oily water) the lack of secondary containment represents a potentially significant risk.

Wiluna Compressor Station investigation and risk assessment

The investigation and subsequent risk assessment identified nine risks. Of these, seven risks were rated low or negligible and therefore not requiring immediate action under APA's stated risk tolerances. The remaining two risks, described below, were rated moderate or high:

- The stainless-steel lube oil lines which feed the GEAs, and compressor header tank run underground for approximately 10 m and pose a risk of long term uncontrolled and unidentified leakage should they lose integrity underground.
- Oily water from the two GEAs, compressor and oil store bund all feed into a single oily water junction pit which is undersized compared to the former oil water storage pits it replaced. This single pit also lacks secondary containment. The junction pit size is significantly smaller than the original design capacity and therefore at increased risk of overflow. The storage of hydrocarbon wastes underground in a concrete structure also poses a risk of long term uncontrolled and unidentified risk of leakage should it lose integrity underground.

2.2. Actions following Incident Investigations

APA have engaged a qualified contractor to undertake an investigation and conceptual study of existing and potential environmental health, human health and regulatory risks associated with underground piping, systems and equipment and opportunities for improvements.

The contractor visited all the GGP compressors stations and developed individual conceptual study reports for each site.

APA also assessed the technical requirements for existing buried station piping on the following sites:

- Compressor stations
- Offtake, Scraper, or Delivery Stations

The Technical Assessment recommended that, where possible, compressor station facilities' buried steel station pipework should be relocated to above ground. Above ground pipework, together with an AS3788 consistent 4-yearly inspection regime reduces the risk of compromised pipework leading to environmental contamination.

A buried steel station pipework rectification program commenced at the Yarraloola Compressor Station in 2023. The six remaining compressor stations on the GGP have been assessed and based on site criticality and condition piping relocation works are proposed between 2024 to 2027.

Development work has been carried out to validate the existing assets and systems that store, transfer separate and discharge bulk chemical and chemical waste; included but not limited to:

- Aboveground tanks
- Belowground tanks and sumps
- Buried piping (stainless steel and plastic piping)
- Discharge points
- Leach drains
- Bund systems
- Oily water separators
- Washdown systems

Works have commenced to identify and assess technical risks associated with the design, construction, operability, and maintainability of the facilities as well as identify environmental risks such as contamination and unauthorised discharge.

3. Options Considered

Three options have been considered:

1. Continue to undertake the buried service relocation works at compressor stations only.
2. Defer remaining buried service relocation works at compressor stations by five years.
3. Undertake relocation works at both compressor and scraper stations.

3.1. Option 1 – Continue to undertake the buried service relocation works at compressor stations only

Under this option we continue to undertake relocation works from 2024 to 2027 based on site criticality as well as condition assessment and risk assessments already performed.

Relocating the buried services to aboveground at compressor sites ensures that the residual risk of unidentified integrity issues remains low as in future we can operate in accordance with APA's Pressure Piping Integrity Management Plan and Pressure Pipework Guidelines. This option is consistent with accepted good industry practice.

The total cost of this option is $6.7 million (CY$2023) in present value terms.

Table 3.1 below shows the preferred rectification program of works along the GGP.

Table 3.1 Proposed relocation program of works ($CY2023, millions)

Site	Cost
Wiluna Compressor Station	1.2
Turee Creek Compressor Station	1.0
Ilgarari Compressor Station	1.3
Wyloo Compressor Station	0.8
Paraburdoo Compressor Station	1.0
Neds Creek Compressor Station	0.7

3.2. Option 2 – Defer remaining buried service relocation works at compressor stations by five years.

In this option the relocation of buried piping at remaining compressor sites is delayed until CY2030.

The benefit of this option is the time value of money achieved in deferring the spend five years.

This option would delay the identification of any defects which have arisen or changes in defect growth rate. This approach increases the residual risk of corrosion to high and is not consistent with APA's Pressure Piping Integrity Management Plan and Pressure Pipework Guidelines, nor does it comply with AS3788 or good industry practice. The total cost of this option is $5.2 million ($CY2023) in present value terms however the risk of further environmental incident that may occur due to lack of rectification works is high and outside of APA's risk appetite.

3.3. Option 3 – Undertake relocation works at both compressor and scraper stations

In this option we undertake relocation of buried piping at all remaining compressor stations as well as three additional Tier Two sites along the GGP.

Whilst only adding three sites to the scope, relocation of buried pipework at Tier 2 sites adds considerable scope to the project on sites which have risk considered low or negligible. It was identified that some of these sites included large bore major process piping which indicate that the buried pipework may be part of the structural station design and may require extensive site works. This type of work could compromise the structural integrity of the existing facilities therefore the benefits were not found to outweigh the risk. As a result, this option has been excluded on the basis that it is not feasible.

The additional cost of these sites has not been quantified.

3.4. Preferred option

The preferred option is option 1 which is consistent with the recommendations made following three separate incident investigations as well as APA's technical assessment. Relocating these buried services also allows conformity with APA's Pressure Piping Integrity Management Plan and Pressure Pipework Guidelines.

While option 2 (defer works for five years) led to no immediate capital expenditure, the risk of further integrity issues and subsequent environmental incidents was too great to make option 2 feasible. The lack of visibility and cost of excavating all underground piping and services on a periodic basis would, longer term, lead to higher overall cost.

In contrast, option 3 (relocate buried piping and services on both Tier One and Tier Two sites) would incur a higher cost without material change to the residual risk to the asset.

Under this option we continue to undertake relocation works from 2024 to 2027 based on site criticality as well as condition assessment and risk assessments already performed.

Table 3.2 Cost comparison ($millions, $2023)

Option and Description	Cost estimate	Present value of costs[3]
1. Continue to undertake the buried service relocation works at compressor stations only.	7.4	6.7
2. Defer remaining buried service relocation works at compressor stations by five years.	7.4	5.2
3. Undertake relocation works at both compressor and scraper stations	Not quantified	Not quantified

Table 3.3 Risk comparison ($millions)

Option and Description	Risk
1. Continue to undertake the buried service relocation works at compressor stations only.	Low
2. Defer remaining buried service relocation works at compressor stations by five years.	High
3. Undertake relocation works at both compressor and scraper stations	Low

[3] 5.18% WACC discounted the capex incurred in CY25 back to CY23.

Appendix A Site Review Summary

Site	Lube Oil Storage and Reticulation	Oily Water	Closed Drains	Compressed Air
Yarraloola	Install a new 20 ft Self-bunded containerised Module within existing oil store bund. 4 pneumatic pumps internal to the container. ROT drain and Lube oil pressure relief will be re-directed into the onboard Waste Oil IBC. Main bund sump will be fitted with isolation valve and a hydrocarbon stop valve to the discharge. Install removable Colourbond 'spray screens' around the corner of the 'Recyclable Oil Tank' (ROT).	OWSS03/OWSS04: Amend the Oil store bund as described. OWSS will be cleaned and retained to capture minimal hydrocarbons as intended. OWSSs and TIT will be cleaned and retained to capture minimal hydrocarbons as intended.	Replace pits with new above-ground self-bunded tank including level indication and large vent and flame arrestor as appropriate for blowdown	Replace U/G section of stainless-steel piping with HDPE piping. Install a trafficable culvert.
Wiluna	Replace single skin below-ground pipes with above-ground pipes of same (SS) type. Have flanges at crossings, with pipe bridge or otherwise below-ground pipe through trafficable culverts at crossings only.	Retain junction pit and install pneumatic diaphragm pump to transfer to new above-ground self-bunded tank or tank-in bund, with level indication.	No unacceptable risks have been identified.	No unacceptable risks have been identified
Wyloo	Piping: Replace single skin below-ground pipes with above-ground pipes of same (SS) type. Have flanges at crossings, with pipe bridge or otherwise below-ground pipe through trafficable culverts at crossings only. Oil Store: Install level monitoring and a high-level alarm on SCADA to be implemented via a LIT or switch.	Retain inground tank/pit and convert into a junction pit by installing a pneumatic diaphragm pump to transfer to new above-ground self-bunded tank or tank-in bund, with level indication.	No unacceptable risks have been identified.	Replace single skin below-ground pipes with above-ground pipes of same (SS) type. Have flanges at crossings, with pipe bridge or otherwise below-ground pipe through trafficable culverts at crossings only

Site	Lube Oil Storage and Reticulation	Oily Water	Closed Drains	Compressed Air
	Bund dewatering pump to be installed in the sump with some rigid and flexible piping leading to a waste storage container. External bund valve to be locked.			
Turee Creek	Replace single skin below-ground pipes with above-ground pipes of same (SS) type. Have flanges at crossings, with pipe bridge or otherwise below-ground pipe through trafficable culverts at crossings only	Retain inground tank/pit and convert into a junction pit by installing a pneumatic diaphragm pump to transfer to new above-ground self-bunded tank or tank-in bund, with level indication.	No unacceptable risks have been identified	No unacceptable risks have been identified
Ilgarari	Install a new 20 ft Self-bunded containerised module within existing oil store bund. 4 pneumatic pumps internal to the container. ROT drain and Lube oil pressure relief will be re-directed into the onboard Waste Oil IBC. Main bund sump will be fitted with isolation valve and a hydrocarbon stop valve to the discharge. Install removable Colourbond 'spray screens' around the corner of the 'Recyclable Oil Tank' (ROT).	OWSS07/OWSS08: Amend the Oil store bund as described. OWSS will be cleaned and retained to capture minimal hydrocarbons as intended. OWSS05/OWSS06: The GEA waste oil and drip trays will gravity drain to the new waste oil IBC/Tank and pump package. IBC/Tank will be fitted with level indication. The new pump attached to the IBC/Tank will be manually activated to return waste oil back to the waste oil IBC at the oil store. New pipework to return waste oil back to oil store, installed on existing pipe corridor and supports. Clean and maintain existing OWSS system to	Replace in-ground blowdown pits with new above-ground self-bunded tank including level indication and large vent and flame arrestor as appropriate for blowdown	No unacceptable risks have been identified

Site	Lube Oil Storage and Reticulation	Oily Water	Closed Drains	Compressed Air
		manage discharge of stormwater from the bunds, with greatly reduced oil load. OWSS1/OWSS2 and OWSS3/OWSS4: Install new industrial grade oil mist eliminator. The captured oil will manually be drained to a new waste oil container. Retrofit a tube/belt oil skimmer to OWSS. This oil skimmer will slowly transfer captured oil back into the new waste oil container. The new waste oil container will come with a transfer pump and level indication. The discharge of the transfer pump will tee into the suction of the existing return lube oil pump. Together the pumps will operate in series to carry waste oil back to the waste oil IBC at the oil store. Clean and maintain existing OWSS system to manage discharge of stormwater from the bunds, with greatly reduced oil load		
Ned's Creek	Replace single skin below-ground pipes with above-ground pipes of same (SS) type. Have flanges at crossings, with pipe bridge or otherwise below-ground pipe through trafficable culverts at crossings only.	Retain inground tank/pit and convert into a junction pit by installing a pneumatic diaphragm pump to transfer to new above-ground self-bunded tank or tank-in bund, with level indication.	No unacceptable risks have been identified	Replace single skin below-ground pipes with above-ground pipes of same (SS) type. Have flanges at crossings, with pipe bridge or otherwise below-ground pipe through trafficable culverts at crossings only

Site	Lube Oil Storage and Reticulation	Oily Water	Closed Drains	Compressed Air
Paraburdoo	Replace single skin below-ground pipes with above-ground pipes of same (SS) type. Have flanges at crossings, with pipe bridge or otherwise below-ground pipe through trafficable culverts at crossings only.	Retain inground tank/pit and convert into a junction pit by installing a pneumatic diaphragm pump to transfer to new above-ground self-bunded tank or tank-in bund, with level indication.	No unacceptable risks have been identified	Replace single skin below-ground pipes with above-ground pipes of same (SS) type. Have flanges at crossings, with pipe bridge or otherwise below-ground pipe through trafficable culverts at crossings only