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# **AusNet Gas Services Pty Ltd**

## **Gas Access Arrangement Review 2018–2022**

### **Appendix 7C: Details of Intelligent inspections project - Public**

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# Details of Intelligent Inspections Project

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## 1 Objective

AusNet Services will carry out an in-line inspection of DN450 Licence 203 Gas Transmission Pipeline in 2021-2022. An intelligent assessment of the pipeline integrity is required to be undertaken on this pipeline at 10-yearly intervals to monitor pipeline condition, ensuring continuity of supply and maintaining public safety in accordance with AS 2885.3<sup>1</sup>, the *Victorian Pipelines Act 2005* and AusNet Services' Pipeline Integrity Management Plan (PIMP). The last inspection was undertaken in 2009-2010. As the entire pipeline also traverses geographically across Australian Gas Networks and MultiNet Gas' network areas, an alliance is necessary to complete the pigging works.

## 2 Introduction

The 82km long Dandenong to Docklands pipeline (the 'Ringmain') was commissioned in 1970 and circles around metropolitan Melbourne. It supplies gas to several distribution networks across three different distributors and one transmission owner. Table 1 below indicates the pipeline sections (in kilometres) which are owned by each of the pipeline licensees:

Table 1: Sections of Ringmain owned by Victorian Gas Transmission Licensees

Licensee	Ownership Length (km)
APA Group	0.6 km
MultiNet Gas	36.8 km
Australian Gas Network	19.7 km
AusNet Services	25.1 km

AusNet Services' 25.1km portion of the pipeline supplies gas to approximately 200,000 gas distribution customers and traverses through areas classified as T1 (Residential), T2 (High Density) and S (Sensitive) Location Classes as per AS 2885.1-2012<sup>2</sup>. Due to the diversity of surrounding location classes of the Ringmain and the number of customers it supplies, the consequence of any supply interruption or damage to this pipeline is considerably higher than any other AusNet Services' gas transmission pipeline.

## 3 Project

### 3.1 Schedule

AusNet Services will carry out the in-line inspection (pigging) of DN450 Licence 203 Gas Transmission Pipeline in 2021-2022 instead of 2019-2020 (i.e. 10 years after previous pigging). The schedule is extended by a year to accommodate the required pipeline relocation works due to the impact of the proposed Metro Tunnel works being conducted by the Melbourne Metro Rail Authority (MMRA).

<sup>1</sup> 2885.3 – 2012: Pipelines – Gas and liquid petroleum – Operation and maintenance, Section 6.6 Inspection Activities.

<sup>2</sup> 2885.1 – 2012: Pipelines – Gas and liquid petroleum – Design and construction.

## Intelligent Pipeline Inspection

### 3.2 Pigging Tool Description

An intelligent pigging tool uses sensors to gather data as it passes through the pipeline. It records data which is used to determine internal and external corrosion, as well as metal loss features. This enables asset owners to ascertain the integrity of the pipeline, especially at locations where access is restricted for direct inspections such as railway crossings, river or creek crossings. The intelligent inspections also ascertain whether there are any defects present along the pipeline (e.g. laminates, cracks, wall loss etc.) which are not able to be identified through non-destructive indirect coating integrity inspection (DCVG or Pearson<sup>3</sup>).

## 4 Rationale

The *Victorian Pipelines Act 2005* requires licensees to manage pipeline operation so as to minimise hazards and risks to the safety of the public and the environment as far as is reasonably practicable<sup>4</sup>.

### 4.1 Long Term Sustainability and Public Safety

The Ringmain was commissioned in 1970 and the areas surrounding the pipeline have since experienced an extensive change in demographic. Along with an ever growing population, the density of other utilities within the vicinity of the pipeline location has increased. This has resulted in an increased threat of third party incidents and induction of stray current on to pipeline assets.

There are two potential reasons for integrity threat on a transmission pipeline:

1. Pipeline condition.
2. Third-party interference.

The deterioration of pipeline condition is usually due to induction of stray current, or weld damage due to combination of internal and external stresses. This is dependent on the age of the pipeline and its operating pressure.

In contrast, third party incidents on the transmission network are a function of the change in surrounding population growth and subsequent infrastructure development. Incidents are mitigated by having each licenced pipeline patrolled daily. However there is still a small potential for a third party to compromise the integrity of a pipeline and for it to remain undetected.

The inspection of the pipeline using an intelligent tool is the best and most unrestrictive methodology to identify any metal loss or crack around the entire 360 degree perimeter of the pipeline. Whilst identified anomalies provide opportunity to repair the faults, the positive results provide assurance for continued supply to the community and public safety.

The results of the inspection will be compared with the results obtained from the pigging operations in 2009 in order to establish a pipeline condition trend. This trend will become a basis for developing cost effective and safe operational and maintenance programs, consequently ensuring safe and sustainable supply to consumers.

### 4.2 Compliance

AS 2885.3, Section 6.6.1 states that;

*“As specified in the PIMP, periodic inspections shall be carried out to identify actual or potential factors that could affect the integrity of the pipeline. The Licensee shall consider the use of an inline inspection tool capable of detecting the flaws that may exist in the pipeline. Any decision not to use the inline inspection tool shall be consistent with the safety management study and PIMP, and shall be documented.”*

AusNet Services recently conducted a Safety Management Study (SMS) on the Ringmain and identified that there is a threat to pipeline integrity associated with encased crossings. However since the Ringmain is piggable, the data obtained via in-line inspection can be used to determine the integrity of the pipeline.

<sup>3</sup> Direct Current Voltage Gradient (DCVG) and Pearson Survey are pipeline survey techniques used to assess the effectiveness of corrosion protection on buried steel.

<sup>4</sup> *Victorian Pipelines Act 2005*, s124, Part 9-Management Plans, Paragraph 124 - Duties of licensee for safety and environment protection.

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The risk of not inspecting the pipeline using in-line inspection may lead to undetected wall loss or corrosion. This may result in a major gas leak in a high density residential area and delayed interruption of gas supply to thousands of domestic and commercial customers.

### 5 Process

The pig will be launched at Henty Street (Dandenong) and will be retrieved at Docklands (former West Melbourne outstation site) with a pig speed of between 1 – 4 m/s<sup>5</sup>.

AusNet Services has engaged with the other licensees (AGN and MultiNet Gas) and agreed to form an alliance to engage an independent consultant to deliver project management responsibilities.

In 2009, a similar alliance was formed with project management responsibilities delegated to APA Group considering their significant expertise in transmission pipeline intelligent assessment. They also had a strong relationship with Rosen (then Pigging Services Provider) and a thorough understanding of the Victorian transmission pipeline network.

Verification of the pigging results will be carried out to ascertain the pipeline condition. The verification will involve excavating the pipeline at locations observed with anomalies by the intelligent pig.

#### 5.1 Learnings from 2009 Pigging

In 2009, five separate pigs were launched as part of the pigging project. The runs included two cleaning pigs, one electronic gauging pig (to measure the extent and location of dents in the pipeline) and two corrosion detection pigs (to measure the extent and location of any loss of wall thickness of the pipe). The corrosion detection pig was launched twice due to an incomplete data set being obtained in the first run.

The pigging operation was undertaken during off-peak times to reduce the consequence of customer outages should the pig become stuck and cause a blockage of the gas flow. For each pig run, the pig was launched at the Dandenong end of the pipeline at 8:00PM. The first pig run took 26 hours against an expected time of 11 hours. The longer than predicted travel time was due to lower than expected demand on the gas network. Consequently, low gas flow was experienced through the inner ring main and caused the pig to travel at lower than expected velocities. With each pigging run, adjustments to the system were made in an attempt to divert more demand to the inner ring main downstream of the pig to pull it along. This caused a greater pressure differential across the pig, resulting in an increased velocity. Each subsequent run was shorter in duration and with the last run completed in 8.5 hours.

The learnings from the 2009 pigging will be applied to the one proposed in 2021-2022. The demand and flow data will be shared with AEMO and other licensees to ensure that a consistent pigging strategy and procedure is developed.

### 6 Cost

Both direct and indirect costs will be incurred during the pigging project. Direct costs relate to the works undertaken by service providers to execute the project and carry out verification dig ups. The indirect costs will be incurred by AusNet Services' planning and integrity engineers to ensure that the pipeline pigging project remains compliant with AusNet Services' licence conditions.

#### 6.1 Direct Pigging Costs

The following vendors are required to be engaged in order to offer specific services for completion of the pigging of Licence 203 gas transmission pipeline. The vendors are required to be engaged for the following works:

- 1) Pigging Company: To provide pigging equipment, pigging operation services and delivering the detailed report. The pigging company will be selected based on their capability of providing services, availability and competitive tender process.

<sup>5</sup> AEMO (Australian Energy Market Regulator) report 'Ringmain Pigging 2009', Document Number: 291637.

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- 2) Other Licensees: To fabricate and install the pig launcher and receiver facility at Dandenong and Docklands facilities respectively. The ends of the 82km pipeline systems are owned by MultiNet Gas and Australian Gas Networks.
- 3) Project Management: A Project Management consultant will be engaged to deliver the project, to act on behalf of all the licensees and achieve safety and efficiency objectives.
- 4) AusNet Services' Operational Contractor: Downer will be engaged during the pigging to provide operational support and emergency management. Downer's field crew will be required to track the pig along the pipeline during pigging and to operate branch valves preventing liquids or waste material entering in AusNet Services' distribution networks.
- 5) Legal Consultant: To draft and execute a legal agreement amongst the licensees and to engage pigging contractor and project management consultant.

In 2009, AusNet Services' share of the direct cost was \$297,837 (excl. GST). The cost break down of expenditure in 2009 is shown in Appendix A. Considering that similar costs will be incurred for the proposed pigging in 2021-22 and with a 2.5 % p.a. rate of inflation the direct costs in \$2016 are estimated to be \$354,034<sup>6</sup>.

## 6.2 Indirect Costs

Indirect costs will be incurred as a result of AusNet Services' planning and pipeline engineers being involved in preparing and planning the framework and procedures prior to the pigging. During pigging, AusNet Services' engineers will be subsequently reviewing the procedures during the pigging process to ensure the pigging project complies with the requirements of AusNet Services' licence conditions. Post pigging, verification dig-ups will be carried out by Downer.

The following tasks will be undertaken by AusNet Services personnel during the course of the project:

### Planning

- Stake holder meetings with AEMO, ESV, other licensees, pigging service provider;
- Preliminary demand and flow modelling;
- Preliminary Risk Assessment;
- Development of Preliminary Execution Plan and Schedule; and,
- Provide advice on the development of project contracts.

### Preparation

- Development of detailed pigging procedures;
- Detailed flow modelling and coordination with AEMO and with other licensees;
- To carry out detailed risk assessment with key stakeholders;
- Provide technical and contract advice to other licensees on pig launcher and receiver installation;
- Creation of purchase requisitions and purchase orders; and,
- Development of Emergency Management Plan.

### Project Works

- Attending fortnightly progress meetings with other asset owner representatives;
- Reviewing and approving invoices;
- Provide technical direction to the Project Management Consultant; and,
- Emergency Management Plan implementation.

### Reporting

- Analysis of Pigging reports

<sup>6</sup> Today's Cost Formula: Amount \* (1 + Inflation Rate) ^ Number of Years.

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- Preparing and delivering verification dig ups.

A total of 160hrs of work will be required by the senior pipeline/asset management engineer, principal planning engineer, administration officer and corporate lawyer for the duration of the project. The following table shows the number of hours required by each personnel and their charges towards the project:

Table 2: Estimated costs for internal resources incurred by AusNet Services for pigging

AusNet Services Personnel	Estimated no. of hours during the project	Unit Rate (\$2016 / hr)	Cost (\$2016) (Hrs x Unit Rate) \$'000
Principal Planning Engineer	50	0.2	10
Senior Pipeline / Asset Management Engineer	80	0.2	16
Corporate Lawyer	10	0.2	2
Administration Officer	20	0.15	3
TOTAL (excl.)	160		31

### Verification Dig Ups

Post pigging operation, Downer will be engaged to carry out excavations to verify the results of the intelligent pig run within AusNet Services' section of the pipeline. In 2010, AusNet Services carried out four dig ups to verify the pigging results.

Table 3: Estimated Costs for verification dig ups post pigging operation

Item	Unit Cost \$000s	No. of Dig Ups	Cost (\$2016) (No. x Unit Rate) \$'000
Verification Dig Ups	6	4	24

The total of \$55,000, shown in Table 4, has been estimated as indirect costs which will be incurred during the pigging of Licence-203 pipeline.

Table 4: Summary of indirect costs

Item	Cost \$000s (2016)
Internal Resources	31
Verification dig ups	24
TOTAL (excl.)	55

## 6.3 Total Cost

The total estimated cost (\$2016) required to undertake the pigging of DN450 Licence 203 pipeline is \$409,034 as shown in Table 5.

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Table 5: Estimated Total Costs for pigging

<b>Item</b>	<b>Cost (\$2016)</b>
Direct Costs	354,034
Indirect Costs	55,000
TOTAL (excl.)	409,034

