Wickham Point Pipeline – Augmenting Northern Territories Natural Gas Supply

The Wickham Point Pipeline (WPP) transports natural gas from the Wickham Regulating Station to the Weddell Power Station and then onto Darwin City Gate (refer to map), connecting with Amadeus Basin to Darwin Pipeline. The Wickham Regulating Station receives gas from the Darwin Liquefied Natural Gas (LNG) Plant. The Darwin LNG Plant sources gas from the Bayu-Undan field in the Timor Sea. The WPP is designed to normally operate on an emergency supply basis.

Key components of the WPP include:

- The Wickham Regulating Station providing pressure regulation from 14,000 kPa at the inlet, down to the pipeline operation pressure of 9,650 kPa, with a maximum flow capability of 100 TJ/day.
- The pipeline was constructed in two sections: the initial 1.2 km section was to provide gas from Darwin City Gate to the Weddell Power Station, and the second 10.4 km section between the Wickham Regulating Station to the Weddell Metering Station.
- The Weddell Metering Station which supplies the 80MW Weddell Power Station.
- Pig launching and receiving facilities at Wickham Regulating Station and Darwin City Gate to allow in-line inspection.
- The WPP assets are owned by Energy Infrastructure Investments comprising 19.9% APA Group, 49.9% Marubini Corporation and 30.2% Osaka Gas. APA Group performed the Engineer-Procure-Construct (EPC) role and NT Gas (96% owned by the APA Group) provides operation and maintenance services for the pipeline and the associated facilities. The section of the WPP from Darwin City Gate to Weddell Power Station has been in operation since early 2008. The remainder of the pipeline between the Weddell Power Station and the Wickham Regulating Station was commissioned in May 2009 and first gas was received from Darwin LNG in July 2009.

**Pipeline Environment**

Darwin experiences high temperatures, humidity and rainfall. High amounts of lightning activity occur in the wet season. The pipeline also crosses under 132 kV transmission lines and parallels them for 4.5 km. The WPP crosses various vegetation types including tropical savanna, vine forest and tidal mangroves. Horizontal directional drilling (HDD) was used in three locations to avoid tidal mangrove disturbance. The lengths of the three HDD’s were 580 m, 1280 m and 690 m (22% of total pipeline length).

**Corrosion Mitigation**

The corrosion design of the pipeline is in accordance with AS 2832.1. During the design phase of the project a number of potential corrosion threats were identified. These corrosion threats are mitigated by a number of engineering design controls and maintenance practices.

The pipeline section from Darwin City Gate to the Weddell Metering Station is constructed from API 5L X42 ERW line pipe of wall thickness 9.53 mm. The external coating is a dual layer fusion bonded epoxy (FBE) and the internal coating is high build epoxy (HBE). The remainder of the pipeline from the Weddell Metering Station to the Wickham Regulating Station is constructed from API 5L X70 ERW line pipe of wall thickness 6.5 mm, except at HDD and hot formed bends where the wall thickness is increased to 8.7 mm. The external coating for this section is also dual layer FBE but with no internal lining. All field joint coatings are high build epoxy (HBE). The pipeline transports dry gas and there is no internal corrosion allowance.

Continuous sacrificial zinc anode beds have been used to provide external corrosion mitigation at locations where coating defects may occur. Zinc anodes were chosen based on design requirements and total life costs.

During construction, the integrity of the coating was assured through holiday inspection before lowering along with bedding and padding in the trench. The coating integrity of the HDD sections was assessed by current leakage measurement. After construction of the pipeline was complete, a direct current voltage gradient (DCVG) survey was performed to detect any coating defects that may have occurred during backfilling and settlement.

The pipeline is isolated from the Weddell Regulating Station and Darwin City Gate by monolithic insulating joints (MIJ). Surge protection is installed over the MIJ’s to allow energy to dissipate from high voltage surges.

Test points have been installed at each anode bed to facilitate the measurement of pipe to soil potentials. Test points have also been installed at future planned pipeline crossing locations to facilitate interference testing. Earth potential rise (EPR) and low frequency induction (LFI) is mitigated by the continuous zinc anode beds, lockable test point boxes and equipotential grids where the pipeline runs parallel to the high voltage power line.