

Project Profile



Client:	Department of Defence
Location:	Port Augusta and Woomera, South Australia
Value:	\$0.6 million
Duration:	July 2019 to October 2020
Type:	Lump Sum Construct Only

Project Overview

The Woomera Prohibited Area is a military testing range covering 122,000km² in northwest South Australia, about 450km northwest of Adelaide. It is the largest land testing range in the world. The Woomera Prohibited Area is mainly South Australia Crown land covered by pastoral leases, exploration and mining tenements, and native title.

Federal legislation regulates the Area as a Defence premises used for the testing of war materiel under the management of the Royal Australian Air Force. The Woomera Prohibited Area is an important Defence site for evaluating assets that play a significant role in Australia's national security.

RAAF Base Woomera is within the Woomera Prohibited Area and provides essential operational support to the Range, and includes the Woomera airfield, hangars, technical areas and village. No. 20 Squadron (20SQN), a command unit of Combat Support Group, operates from RAAF Base Woomera.

RAAF Base Woomera Port Augusta Water Pipeline Telemetry System



Defence required replacement and upgrade works to the Port Augusta Water Pipeline that supplies water to the Woomera Prohibited Area and neighbouring communities. These works allowed for remote monitoring and control of the pipeline and the pumping stations.

Innovations

Non-Standard Pipe Size

The outside diameter of the Port Augusta to Woomera cement line pipeline is 293mm, which is a non-standard size in Australia. With the limited stocks available and suppliers unwilling to manufacture the product in small quantities, the project faced significant risk of delay.

While the project team could secure some pipe lengths from suppliers, this was not in sufficient quantities to match project requirements. Inspections of the existing pipeline identified structurally compliant sections suitable for reuse, making up the shortfall in pipe lengths.

This approach required additional onsite fabrication, and inspection and testing to ensure integrity, disinfection and compliance with SA technical standards. These additional onsite works did not result in additional downtime of the pipeline, and the team mitigated any overrun in the program through additional night shift works.

Offsite Hydrostatic Testing and Disinfection for Minimised Pipeline Downtime

The project team developed a construction method that allowed for offsite hydrostatic and disinfection, minimizing downtime of the pipeline for commissioning.

Multiple work crews allowed for simultaneous works at multiple locations, including the installation of new pipe elements and mechanical systems. This reduced the downtime of water supply to Woomera and the five other communities dependent on the water pipeline.

Scope of Work

Works comprised replacement and upgrades to the existing radio telemetry system to allow for remote monitoring and control of the pumping stations on the Port Augusta to Woomera Pipeline, including supply, installation, configuration and commissioning of magnetic flowmeters, remote terminal units (RTUs), networked 3G/4G telemetry system and associated equipment, uninterruptible power systems, supervisory control and data acquisition SCADA workstation complete with application development, and integration of existing instruments.

Additional works included the installation and replacement of new gate valves and automatic air-bleed valves requiring both offsite and onsite fabrication of 250mm diameter mild steel cement lined (MSCL) pipe to specified welding procedures. Testing of all fabrication works met the project's specification and SA Water technical standards.

The works required a complete shutdown of the 190km 250mm inside diameter Port Augusta Water Pipeline on two occasions, the first for five days and the second for four days. During these shutdowns, works comprised the draining, bleeding and re-energising of the pipeline. The project team completed shutdowns within the approved shutdown periods allowed by SA Water and Defence.

Project Challenges

Unexpected Dismantling Joint Failure Causing Water Leakage During Charging Up of the Pipeline

The project team scheduled tie-in works to occur concurrently with an upstream SA Water planned shutdown of Pump Station 1, minimising overall downtime of water supply to Woomera. On Sunday 20 October 2019, SA Water opened the upstream valve charging up the pipeline through to the pump station which caused an old dismantling joint, outside the Company's scope of works, to fail.

RAAF Base Woomera Port Augusta Water Pipeline Telemetry System



The project team took immediate action to prevent further pipeline damage and delays to Woomera's water supply. These actions included preventing the leak from filling pits in the pump station and avoiding damage to the pipeline and associated instrumentation and infrastructure inside the pits.

Two submersible pumps installed to de-water the pits proved insufficient to disperse the leak flow rate. The team contacted SA Water to shut the upstream valve, and this allowed for immediate repair works.

The team undertook various repair methods including re-tightening of the dismantling joint bolts as per specified tightening patterns, replacing O-rings and cleaning mating flanges, but none of these methods were successful.

To replace the leaking section, the onsite team quickly fabricated a new pipe spool. However, the existing gaskets had deteriorated and required immediate replacement. As the leak had occurred on a Sunday and because of the uncommon flange pattern, replacement parts were not readily available. The project team quickly cut replacement gaskets from EPDM sheets sourced locally to suit each flange pattern.

The team completed the repair works by that evening. This allowed for charging of the waterline and enabled the bleeding of the pipeline from Port Augusta Pump Station 1 through to Woomera Tank Farm, a distance of 180km.