Burdekin Falls to Wivenhoe Raw Water Pipeline

Outline Concept and Cost Submission

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1 INTRODUCTION

The Belyando, Jericho and Emerald Shires were the only Shires in Queensland south of Mackay and west of the Great Divide not drought declared as of 30th June this year. The Wivenhoe Dam was at 16% capacity. Little has changed since.

The Burdekin Falls Dam is 220 km North West of Mackay and it has spare capacity of 170,000ML/a. In July 2006 the Queensland Government indicated it was studying a proposal to run a $7.5 Billion water pipeline from Burdekin Falls to Brisbane in a corridor to the east of the Great Divide. This pipeline would have supplied much needed water to Brisbane but nothing to drought stricken inland areas. The estimated annual running cost was $250M. This was a typical example of the use of outdated water industry design practices that have led to the excessive cost of large diameter water pipelines built recently or currently under construction in Queensland.

This submission outlines a concept proposal for a 1,017km 1.2m diameter pipeline linking the Burdekin Falls and Wivenhoe Dams based on concepts used in the design and construction of oil and gas pipelines. There are major capital and operating cost savings. The proposed pipeline would join major centres and water storage facilities to the west of the Great Divide at an estimated cost of $2.97 Billion. This pipeline would lift water from and deliver water to each of the five reservoirs along its path. At full capacity it could pump 200ML/d from Burdekin to Wivenhoe at an annual operating cost of $46M or $640/ML.

2 PROPOSED PIPELINE ROUTE

Under normal circumstances a pipeline runs from one point to another and the ideal route minimises the combined capital cost and present value of the anticipated operating costs over the life of the project. For this pipeline it will also be necessary to select a route which considers the utility value of the pipeline to the surrounding community. The route described below might be improved.

Initiating with a pump station at Burdekin Falls Dam the proposed route follows the Rosetta Creek Road south to Mount Douglas Station where it will join the Gregory Development Road to head south east for Springsure via Blair Athol, Clermont, Capella, Emerald and the Fairburn Dam. At Springsure the pipeline will join the Dawson Highway heading for Rolleston and the Expedition Range (KP540 or 540km from the start). At this stage, the route will have occupied established easements for more than 90% of its length.

From the Expedition Range road pass the route continues south east leaving the comfort of established highway easements to traverse country not served by conveniently located major roads. There are, however,

roads in the area and more detailed reconnaissance than that undertaken to date will establish a route to maximise the use of established easements. The next route objective is the Glebe Weir (KP 680) on the Dawson River approximately 30km north east of Taroom. From KP540 to KP680 the line will cross the Bigge Range via an established road pass approximately 31km east of Coorada. From Glebe Weir the route continues to its final destination, Caboonbah (KP 1,017) on the western shore of Wivenhoe Dam, via Boondooma Reservoir, Kingaroy, Nanango, Tarong Power Station and Harlin avoiding the Bunya Mountains to the north.

Caboonbah is the site of a pump station which currently extracts water from the Wivenhoe Dam for the Tarong Power Station. It is also the destination of a 1.5m diameter pipeline currently under construction as part of the Queensland Governments Western Corridor Recycled Water Project.

3 ENGINEERING ISSUES

Carbon steel water pipelines are usually cement lined and installed in trenches along tightly controlled vertical profiles with rubber ring joints. There are strict padding requirements in the trench which is often deep and therefore requires shoring for practical and safety purposes. Oil and gas pipelines are usually installed along the existing vertical alignment in a trench deep enough to provide 1m of nominal cover. The pipeline is fabricated in long strings welded above ground, lowered into the trench and tied in with a welded connection. Padding requirements are not so strict, there is rarely a man in the trench and the process is up to 3 times as fast.

This water pipeline is to be designed as a welded joint carbon steel pipeline.

3.1 Pipeline Diameter

In 2004/2005 SE Queensland's water demand was 780ML/d. The proposed 48" diameter provides an additional 25% of that quantity or 200ML/d. There would be many practical difficulties constructing a larger diameter pipeline.

3.2 Pipeline Wall Thickness

As a rule of thumb, the diameter/wall thickness ratio for a pipeline should not be less than 100 to avoid transportation and welding problems. The proposed pipeline wall thickness will therefore be 0.5". This conveniently allows for a maximum pressure of 4.83Mpa or 48 Atmospheres for Grade X52 line pipe.

3.3 Two Way Flow

The pipeline and its pump stations will be designed to facilitate bi-directional flow. Preliminary analysis of the route indicates that for flow

from the North the pipeline will require 9 pump stations rated at 69 MW in total. This analysis has been confirmed by manufacturers Sulzer who have suitable pumps for the service. For bi-directional flow extra pump stations may be necessary however there would be no increase in the overall pumping power.

3.4 Pump Station Fuel

This proposal has yet to be studied in sufficient detail to identify suitable power sources for the pump stations however for the stations proposed at Mount Douglas, Barcombe, Emerald and Rollestone it is thought that there may be ready sources of coal seam gas.

3.5 Internal Corrosion Mitigation

This proposal is priced on the basis a factory applied solvent free epoxy will be used to prevent internal corrosion in the pipeline. There are a number of products that comply with the relevant Australian Standards and have proven service lives in Europe up to 40 years.

3.6 Air Pocket Removal

The pipelines will incorporate bi-directional pigging facilities. These will be used to launch soft pigs to remove free air from the line if necessary. They will also be used to launch internal inspection pigs.

4 COST ESTIMATE

The author has undertaken an aerial reconnaissance survey of the route and there are no apparent obstacles that can't be negotiated by a competent pipeline contractor. In 2004 such a contractor estimated the installation cost for the proposed 940km 406mm diameter Trans Territory Pipeline at $630 Million or $30.9/meter length/inch diameter. This is a metric that can be readily applied to the subject pipeline and with allowances for recent inflation is now assumed to be $35/meter length/inch diameter.

This and the other key assumptions required for the estimation of pipeline capital and operating cost are tabled below and on this basis the capital cost estimate is $2.97 Billion and the operating cost is $46M/a.

Line Pipe Cost	1800	$/tonne
Pipe Corrosion Coat	100	$/sq m
Materials Transportation Cost	100	$/tonne
Pipeline Installation Cost	35	$/"Dia/m
Pump Station Cost	2000	$/kW
Operating Costs	0.09	$/kWh