

## Galilee showing potential

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*Brisbane (Barlow Jonker)* -Long seen as the poor cousin to the hothouse Bowen Basin coal export region, Queensland's Galilee Basin is quietly being proved up as a major energy province.

Lying over 400km west of Rockhampton, the Galilee Basin's distance from the coast and limited transport infrastructure has always posed a considerable handicap to its development as an export thermal coal district.

The basin covers about 247,000km<sup>2</sup> to the west of the Bowen Basin in Central Queensland, and contains extensive, thick Permian age coal seams. The seams are mainly at depth except at the eastern margin of the basin.

Until recently many industry observers believed the Galilee's coal resources were unlikely to be exploited until Bowen Basin reserves begin to decline. But that hasn't stopped four companies from launching exploration projects, lead by Brisbane-based Waratah Coal currently drilling on tenements in the basin's south. Underground coal gasification and coal seam gas projects are also in the early stages of resource definition.

In the 1970s, Bridge Oil and Australian-based subsidiaries of Total, Cogema and Charbonnage de France, identified a pre-JORC measured and indicated thermal coal resource of 2.1Bt in an area now held by Hancock Prospecting. The tenements include Kevin's Corner (MDL 333) and Alpha (EPC 570/MDLA 285), which host resources of 910Mt and 1,195Mt respectively, along a 37km strike.

The coal is in four seams at thicknesses of 3m, 3m, 15m and 10m. Hancock Prospecting is currently in the process of upgrading the previous exploratory work and undertaking a pre-feasibility study.

Privately-held Bandanna Coal holds four contiguous tenements, EPCs 1048, 1049, EPCA's 1179 and 1180 covering the extent of the southern Galilee Basin from Emerald to Alpha, and also referred to as the Alpha project. The company is actively exploring and recently put down its first drillhole. Vale (previously CVRD) also holds three tenements and two EPC applications in the northern and central parts of the basin with exploration at an early stage.

Toronto-Stock Exchange-listed Waratah has established total inferred resources of 2.145Bt. Its five EPCs extend 185km along a strike to the north and south of the Hancock tenements, as well as adjacent and down dip to the west; Waratah Coal has an additional four EPC applications covering a further 2,730km<sup>2</sup>.

In March 2007 Waratah began a 50-hole drilling program covering 110km<sup>2</sup> at its South Alpha EPC 140 to prove the continuity of the four known seams of Hancock's Alpha tenement immediately to the north. Drilling results showed the seams at South Alpha to have an average total thickness of 34m, with the thickest seam being 15m. The seams, lying at depths of 20m to 200m, gently dip to the west at about half a degree.

In October 2007, analysis of data from 26 open core and 14 partially-cored drill holes provided Waratah with 1.47Bt of inferred coal resource on the northern portion of South Alpha permit.

Seam	Inferred Resources South Alpha October 2007		
	Seam thickness (m)	Tonnage (Mt)	Coal Area (km <sup>2</sup> )
B	6.14	515	59.7
C	1.49	210	99.5
DT	2.28	340	106.6
DB1	0.80	105	95.5
DB2	1.93	300	110.4
<b>Total</b>		<b>1,470</b>	

Coal quality tests show that the seams average 0.5% sulphur, with an average calorific value of 26MJ/kg on a washed or beneficiated basis. The upper A seam is only 0.5m thick and is not considered economically viable. The strike and dip of the strata indicates the seams extend to the south where Waratah is continuing drilling on 2km-spacing to expand its resource base.

Quality Analysis - South Alpha	
Raw Coal	
Moisture (air-dried)	8% -12%
Ash (ad)	14% -33%
Sulphur (ad)	0.5%
Energy (ad)	24 MJ/kg
Washed Coal F1.60	
Yield	75% -95%
Ash (ad)	8%
Volatile matter (ad)	34%
Sulphur (ad)	0.5%
Energy (ad)	26 MJ/kg

In March last year, Waratah was granted a second licence, the 42km<sup>2</sup> Pocky Creek EPC 1039. Located 60km north of Waratah's South Alpha tenement and on the

northern boundary of Hancock’s Kevin’s Corner permit, the EPC will allow Waratah to drill test the extensions of the four targeted seams along the strike to the north.

Waratah’s third Galilee Basin EPC was granted in August. The 300km<sup>2</sup> North Alpha EPC 1053, which adjoins the Pocky Creek EPC, hosts an inferred resource of 675Mt of thermal coal.

Seam	Inferred Resources North Alpha August 2007		
	Seam Thickness (m)	Tonnage (Mt)	Coal Area (km <sup>2</sup> )
AB	10.10	65	4.7
C	8.70	430	35.5
D1	0.91	5	2.4
D2	2.35	145	43.9
E1	0.78	15	15.6
E2	0.86	10	9.9
E3	1.53	5	1.1
<b>Total</b>		<b>675</b>	

Drilling on the permit is focused on expanding the North Alpha resource by infilling the southern area of the EPC and will be extended west into Pocky Creek EPC 1039. It shows North Alpha has the potential for both open cut and underground mining.

In November, Waratah was granted a further two tenements – EPC 1079 (Alpha Extended) and EPC 1080 (Laglan) – which flank the western boundaries of South Alpha, Pocky Creek and North Alpha. Waratah currently has three rigs drilling on EPC 1040 and two on EPC 1053. A further three rigs will be deployed at Alpha Extended and Laglan to expand the size of the two known resources of South Alpha and North Alpha to the west.

As Waratah continues the expansion of the known resource of its Galilee Basin permits, it’s also undertaking a scoping study for the development of the coal province, which includes the construction of a new standard-gauge railway to a proposed Port Clinton bulk coal terminal at Shoalwater Bay, as well as for “coal-to-oil” and domestic power generation.

### Coal gasification

Underground coal gasification provides another option for the exploitation of the Galilee Basin’s deeper lying coals. Queensland-based Linc Energy holds the Galilee EPC 854 tenement and has made an application for Pentland MDL 361. Galilee EPC 854 is in the eastern part of the Galilee Basin, 120km north-west of Clermont and consists of 166 sub-blocks bordered by Waratah’s Laglan EPC 1080. Between 1971 and 1978, 34 boreholes were drilled on the permit, with most holes coring some part of the Late Permian coal sequence. The EPC hosts an estimated inferred coal resource of

326Mt, although Linc believes additional exploration is likely to expand the resource.

EPC 854 contains three identified prospective coal bearing areas – Moray Downs, Laglan and Degulla. The best geological information is available for the Moray Downs area where 19 boreholes were drilled in two phases. It was found to contain the majority of the coal occurrences in the EPC. The Degulla and Langlan prospect areas contain smaller and isolated identified coal occurrences.

Coal seams in the Moray Down area occur in three groups: A-B seams; C and D seams; and E and F seams. Linc says A-B seams of the Bandanna Formation are the most prospective potential resource. The seams have an average thickness of 11.46m, an ash content of 24.1% and lie at depths ranging between 100m and 500m. The Bandanna Formation is correlative in the Bowen Basin with the coal bearing formations at the Blackwater, Moura and Newlands mines.

Pentland MDL 361 is situated in the northern Galilee Basin near Pentland, 220km south-west of Townsville. The underlying title to this application is EPC 526 held by Xstrata Coal. Linc Energy expects MDL 361 to be granted via an agreement with Xstrata.

Shell Coal Development Company drilled 81 open holes and 11 cored holes in the Elimeek Deposit between 1979 and 1982, but subsequently surrendered the licence when it found the relatively low quality and depth of the coal could not be viably exploited by open cut mining methods.

The licence is estimated to contain indicated coal resources of 161Mt and inferred resources of 78Mt. Linc says, within the Pentland Lower seam series, the thickness and quality of the PL2 and PL4 seams meet the criteria for UCG exploitation. Coal-seam gas exploration

Several coal seam gas companies also have tenements in the Galilee. Eastern Corporation's 67%-owned Galilee Energy begun exploratory drilling program in May last year on the 12,000km<sup>2</sup> ATP 529P near Longreach. In November, the company reported encouraging preliminary results from its Rodney Creek No. 8 well in the southern part of the tenement. It encountered an aggregate 24.77m of coal from the Betts Creek and Aramac coal measures which had a median gas content value of 4.4m<sup>3</sup>/t on a raw data basis, a permeability reading of 50MD and a gas composition of 97-98% methane.

The Barcaldine power station, 80km to the south east, could provide an initial market for CSG produced from Rodney Creek. Galilee also holds the smaller, nearby ATP 799P permit. Junior oil and gas explorer, Blue Energy, has planned a CSG drilling program in the eastern part of its 6,240km<sup>2</sup> ATP 813P, 70km north of the Barcaldine power station, where coals have similar properties to those of Rodney Creek.

CSG developer, Comet Ridge, has applied for oil and gas permits, ATP 743 and ATP

744P, covering 13,000km<sup>2</sup> in the eastern part of Galilee Basin, which it says has the potential for CSG from the Betts Creek coals and for conventional oil and gas in the deeper Permian and Carboniferous formations. Queensland-based energy company, Origin Energy, also has an interest in exploring for CSG in the Galilee Basin and is awaiting the transfer of ATPs 666P, 667P and 668P, covering an area of 18,794km<sup>2</sup>, from Tri-Star Petroleum.