BHP Coal Pty Ltd
Technical Services Department

CONFIDENTIAL

NORTH BOWEN GAS PROJECT

WELL COMPLETION REPORT
BURTON No.1

February 1998

BHP

CONTENTS

SUMMARY

BHP Burton No. 1 borehole was drilled on the crest of the Burton Anticline, a prominent anticline lying on the upthrown (east) side of a major thrust fault. Its purpose was to evaluate the methane potential of the Moranbah Coal Measures in an anticlinal setting at prospective depths.

The borehole had drilled into the middle of the Moranbah Coal Measures when drill pipe parted. Recovery operations were abandoned after seven days. The borehole was abandoned and redrilled ten metres to the west (BHP Burton No. 1A).

No geophysical logs or drill stem tests were run.

INTRODUCTION

BHP Burton No. 1 is 33 kilometres south of Glenden, approximately 2 kilometres west of the Burton Coal Mine. Figure 1 shows the borehole location and geological setting. Table 1 summarises pertinent borehole details.

Table 1: Borehole Data

Borehole	BHP Burton No. 1
Operator	BHP Coal
Titleholder	BHP Petroleum (100%)
Exploration Title	A to P 364P
Topographic Map	8554 Harrybrandt 1:100,000
Location	Latitude: 21° 37' 54" South Longitude: 148° 09' 47" East Easting: 620,350 Northing: 7,607,484
Seismic Location	MGCRA Line 1191-5 CDP 707
Elevation	323.2 metres, ground level
Total Depth	Driller: 485 metres
Spud	21st May, 1997
Depth at Bottom	16th June, 1997
Abandonment Date	25th June, 1997
Rig Release	25th June, 1997
Borehole Status	Plugged and Abandoned

Drilling was conducted by Ausdrill Limited. Cutting and mud gas logging were performed by Halliburton Australia. No other testing was conducted.

GEOLOGY

BHP Burton No. 1 was drilled on the crest of the Burton Anticline to evaluate the production potential of the Moranbah Coal Measures in a broad anticlinal setting.

The Burton Anticline lies on the upthrown (east) side of the Burton/Jellinbah Fault, a major thrust fault trending NNW. The geological structure was seismically mapped in 1991 by the previous tenement operators MGC Resources Australia (MGCRA). Curtin University of Technology reprocessed and reinterpreted the data in 1997.

The Moranbah Coal Measures contain thick, low ash seams with a range of gas content and permeability. Previous exploration had found that where permeability was high, gas content was low and vice versa. A trapping mechanism, eg an anticlinal structure at moderate depth, is required to achieve a suitable combination of high gas content and high permeability.

Prior work in the area focused on tight geological structures. We believe these structures have high residual stress and hence, low permeability. Our studies indicate that broad gentle folding could relieve the stress and improve permeability.

The Burton Anticline was selected as a main target area as it is a gentle anticlinal structure with pre-existing coal quality and gas content data. The referenced data is from North Ellensfield No. 1 (NE1). This borehole was drilled by MGCRA on the flanks of the Burton Anticline, 4.5 kilometres south-southeast of BHP Burton No. 1. The prospective seams in NE1 were encountered at depths from 670 to 1000 metres, had measured gas content exceeding ten cubic metres per tonne (air dried basis) in the lower ash seams, and very low permeability. The same seams at the crest of this structure would be approximately 400 metres shallower and thus should have higher permeability. It was assumed that the gas content would be comparable.

BHP Burton No. 1 spudded in the upper Fort Cooper Coal Measures and reached the middle of the Moranbah Coal Measures. The hole was targeted to drill the full Moranbah Coal Measures sequence but was abandoned when drill rods parted. Because no geophysical logs could be run, it was not possible to identify individual seams. BHP Burton No. 1A (redrill) established stratigraphy.

DRILLING OPERATIONS

BHP Burton No. 1A was drilled by Ausdrill Limited. A Universal Drill Rig (UDR) 650 was used to pre-collar, ie spud and set surface casing. The steps were as follows.

1. Drilled to 3 metres with a 5.5 inch bit.
2. Set PW casing at 3 metres.
3. Cemented in place.
4. Drilled to 60 metres using 124 millimetre PCD bits.
5. Set HW casing at 54 metres.
6. Cemented in place with cement to surface.
7. Rigged down the UDR650 and moved off location (23rd May, 1997).

Ausdrill then moved in a VK 1000 to drill to target depth. No cores were scheduled for this borehole given the data provided NE1. The steps were as follows.

1. Drilled out cement and casing shoe to 257 metres with 99 millimetre PCD bits and NQ rods[1,2].
2. Drilled to 485 metres with 99 millimetre tungsten carbide insert blade bits[3].

The drill string parted at 485 metres. Fishing operations were suspended after 7 days. The borehole was abandoned 24th June, 1997.[4]

A drilling progress chart is included as Figure 2.

LITHOLOGY AND MUD GAS LOGGING

Halliburton Australia collected ditch cuttings and performed mud gas and gas chromatography measurements.

Significant methane kicks were recorded while drilling through the coal seams.

Cutting descriptions and a copy of the formation evaluation are enclosed.

WIRELINE LOGGING

Given that drilling operations were suspended due to an irretrievably stuck drill string, no geophysical logs were run.

DRILL STEM TESTING

Given that drilling operations were suspended due to an irretrievably stuck drill string, no drill stem tests were run.

PLUG AND ABANDONMENT PROGRAMME

As stated earlier, the drill string parted while drilling through the Moranbah Coal Measures. The parted drill string was irretrievable thereby necessitating borehole abandonment. The abandonment procedures approved per conversations between BHP and Department of Mines and Energy representatives, follow.

1. Set cement plug atop the irretrievable fish, 345 to 360 metres.

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[1] Note that KCl polymer mud was used throughout.
[2] Experience with the concurrent BHP Leichhardt Range No. 1 indicated that PCD bits required a larger annulus than provided by HQ rods. Hence, NQ was used for BHP Burton No. 1.
[3] The tungsten carbide inserts of the PCD bits continually dislodged from the bit, became lodged in the borehole and ate through subsequent bits. It was felt that blade bits would be more effective.
[4] We were not able to establish a reason for the parted string.

2. Set cement plug at the surface from 0 to 15 metres.
3. Welded a steel cap over the casing with the borehole name and date of abandonment inscribed.
4. Installed a steel marker peg.
5. Rehabilitated the site to original condition.