CBM 107-002

WELL COMPLETION REPORT

Interpretive

EP 107

Northern Territory

1st – 15th May 2010

Central Petroleum Limited

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1.0 Introduction and Summary

CBM 107-002 was the fourth coal bed methane exploration well to be drilled during the Central Petroleum Limited 2009/2010 Pedirka Basin drilling programme. The well was programmed to follow the drilling of the CBM 107-001 well.

CBM 107-002 is located in EP-107, about 37 km south-southwest of CBM93-001 drilled in 2008. The well will target the Permian Purni Formation coals which have been regionally mapped using limited seismic data coverage. The CBM107-002 exploration well is located in Central Australia, in the Pedirka Basin, approximately 310km southeast of Alice Springs. The well is situated in permit EP-107 at 549153mE, 7237622mN (see figure 1).

CBM 107-002 spudded on the 1st May 2010 after considerable delay due to wet weather conditions. Spud was taken to be the drilling of the 8 ½" pilot conductor hole to 17.5m, and the well reached a total depth (TD) of 604mRT on the 15th of May 2010.

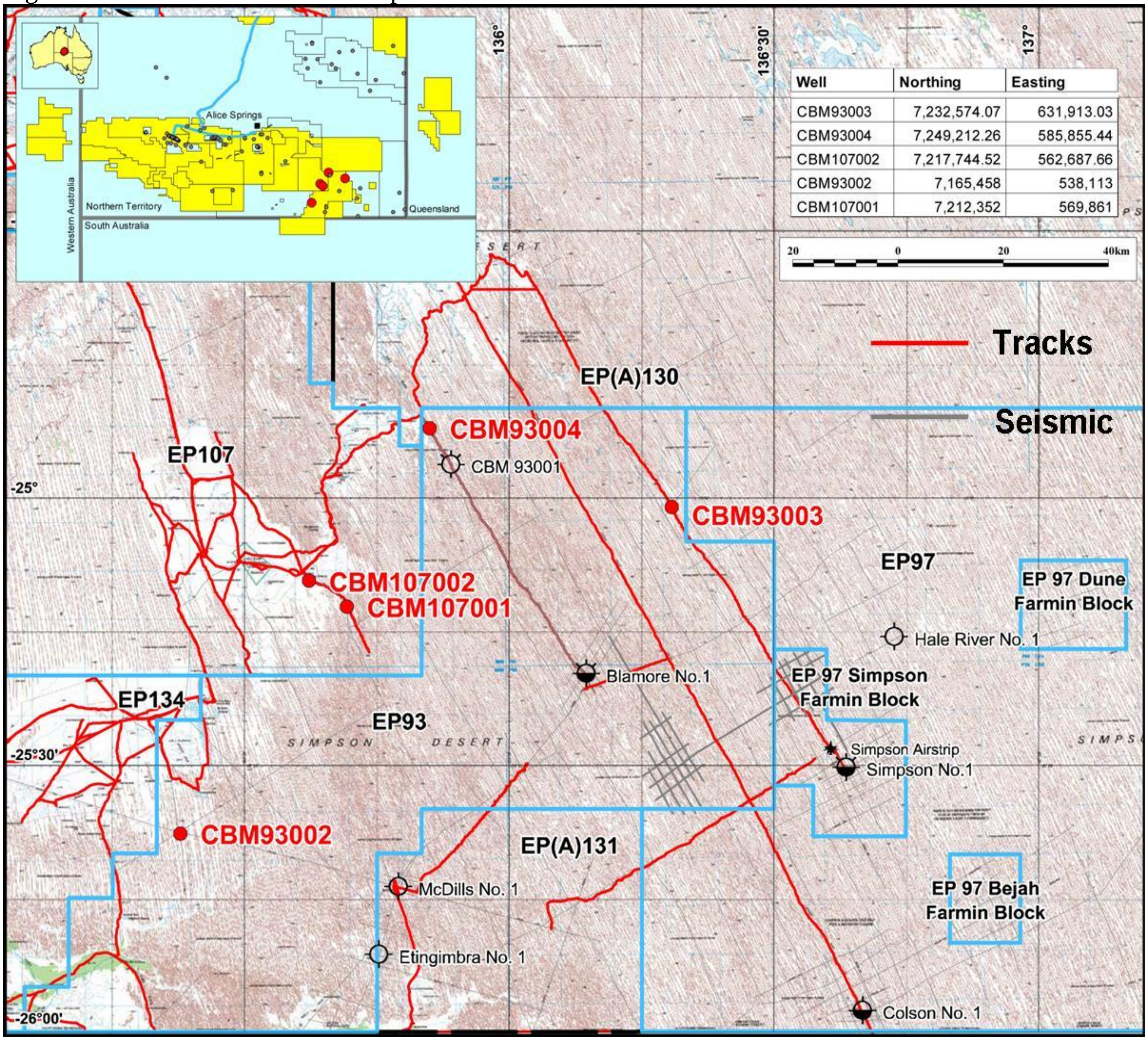
The principal objective of CBM 107-002 was the Purni Formation coal measures and this section was continuously cored in the well. The well was drilled to investigate the potential for CBM (Coal Bed Methane) and UCG (Underground Coal Gasification) gas production from the Permian Purni Formation coal seams.

CBM 107-002 intersected a number of thick coals in the Purni Formation with a net cumulative coal thickness of 63.5m for coal seams greater than 1m thickness; with a total thickness of 65m for all coals including thin beds. The thickest coal seam was 21.4m.

56 6m length HQ (63.5mm diameter) cores were cut using a continuous wireline retrievable coring system. One Water Injection Falloff Test on wireline was conducted over the interval 306m to 318m.

The well was plugged and abandoned at total depth. The rig was released from CBM107-002 at 08:00hrs on the 17th of May 2010.

Figure 1: CBM 107-002 location map



2.0 General Data

Table 1: CBM 107-002 Well Index Sheet

WELL NAME: CBM 107-002 **OPERATOR:** Central Petroleum Limited	CLASSIFICATION : Exploration

Location: Latitude: 24° 58’ 33.599″ S Longitude: 135° 29’ 13.2″ E Australian Map Grid Zone 53, MGA 94	Rig Details: Rig Name: Wallis D 39 Contractor: Wallis Drilling Rig Type: Land – Core Rig	Dates: Spud Date: 1st May 2010 TD Date: 15th May 2010 Rig Released: 17th May 2010
Basin: Pedirka **Permit:** EP 107	Depths: Surface Elevation (AHD): 184m Rig Datum, DF (AHD): 185m Total Depth: 604 m (Wireline 606.6m)	Status: P&A
Casing/Liner Details: Size (inches) Depth (m) 10” (254mm) 17.5 7” (178mm) 239.8 4 ½” (114mm) 279.2	Mud Details: Mud Type: Gel/Polymer	Trajectory: Vertical
Coring Details: Continuous Coring from 280.2m to 604m	Sidewall Cores: Nil	Cuttings: Interval Sample Rate 17.5m to 279 m 6m 280.2m to 604m (core)

FORMATION	MD (m)	Isopach (m)	Subsea (MD)	Comments
Namba Formation	1	2	+184	Quaternary
Winton Formation	3		+182	Cretaceous
Bulldog Shale	98		+87	Cretaceous
Cadna Owie Formation	141	43	+44	Jurassic
Algebuckina Sst	154	109.5	+31	E. Jurassic
Poolowanna Fmn	263.5	10.5	-78.5	Late Permian? softer sequence
Purni Formation,	274	19.5	-89	Consolidated Purni Fm, Permian
Purni Fm. Top Coal	293.5	250	-108.5	Permian
Crown Point Formation	543.5	60.5+	-358.5	Base coal 498.7m
Total Depth	604.2		-419.2	

LOGGING

Date	Depth (m) From	Depth (m) To	Description
16th May 2010	5	606.6	DLL-SLL-Sonic-Neutron-Density-GR-SP-Caliper (Neutron and GR only above 279.2m casing shoe)
16th May 2010			Check shot Survey 19 shots

Well Testing

Date:	Method:	Interval:	Description:
11th May 2010	Wireline Falloff Testing	308 – 319m	Wireline tool, injection phase followed by relaxation phase for measurement of coal permeability.

Well Name:	CBM 107-002
Well Classification:	Wildcat
Interest Holders:	Central Petroleum Limited (80%) Petroleum Exploration Australia (20%)
Petroleum License:	EP 107, Northern Territory
Location:	Latitude 24° 58’ 33.599″ S Longitude 135° 29’ 13.2” E Australian Map Grid Zone 53, MGA 94
Ground Level (GL):	184.0m
Kelly Bushing (KB):	185m
Total Depth:	604m (driller’s depth)
Drilling Contractor:	Wallis Drilling
Drilling Rig:	Wallis Rig No. 39
Contractors:	
Drilling Fluids:	RMN Drilling Fluids
Coring:	Wallis Drilling
Mud Logging:	Weatherford
Wireline Logging:	Weatherford
Cementing:	Viking
Earth Works:	Crown Point Pastoral
DST Testing:	Weatherford
Spud Date:	1st May 2010
Total Depth Reached:	15th May 2010
Rig Released:	17th May 2010
Well Status:	Plugged and Abandoned

3.0 Drilling

3.1 Summary of Drilling and Related Operations

The Wallis Rig No. 39 was 100% moved onto the CBM 107-002 location on the 27th of April 2010. There was a 64 day wait on bad weather conditions (rain) before the rig could be moved from the CBM 107-001 location.

The well spudded at 11:30hrs on the 1st of May 2010 with an 8 1/2" hole from surface to 17.5m. The 8 ½" hole was drilled with gel/polymer mud and a Pendulum type 8 ½" BHA (using a Reed Hycalog Mill tooth 8 ½" bit). They then proceeded to POOH, make up, and then pick up the 12 1/4" hole opener BHA, in order to open up the 8 ½" hole to a 12 ¼" hole from surface to 17.5m. After POOH and laying out the 12 ¼" hole opener BHA, they RIH with a wiper trip from 17.5m to surface, and the hole was circulated clean. They then POOH and RIH with a 10" PVC conductor from surface to 17.5m, and cemented the conductor in place. A 7" casing string was prepared while waiting on cement (WOC). After the cement was set, they RIH with the previous 8 1/2" BHA and drilled ahead from 17.5m to 237.6m. At 237.6m coal cuttings were observed coming to surface, therefore the wellsite geologist instructed the driller (via the wellsite representative) to commence controlled drilling.

Controlled drilling continued from 237.6m to section TD at 240.6m, as per the wellsite geologist instructions. The wellsite geologist called the section TD depth of 240.6m, after observing a significant percentage of coal in the samples from the mud stream. The 8 ½" surface hole was drilled through shallow Cretaceous claystones, which were underlain by the Algebuckina Sandstone aquifer. The drilling programme instructed that the 7" casing was set below the Algebuckina, within the top of the Permian section.

The hole was then circulated clean and a wiper trip was conducted from 240.6m to 17m. RIH to 240.6m, and circulated the hole clean again and spotted 17 barrels of Hi-Vis pill on the bottom. Then POOH from 240.6m to surface to enable rigging up of 7" casing, and also to hold a PJSM for the casing run. A float and shoe track was then made up and they then continued to RIH with the 7" casing (K-55) to the shoe depth at 239.75m.

They then circulated the equivalent of 1.5 times the casing volume while rigging down the bell nipple and flowline. They then installed the cement head and pressure tested the surface lines to 1800psi/5mins (which is a good test result) and conducted the cement job as per the program. They then successfully pressure tested the casing string to 1500psi/10mins. After rigging down the surface lines and WOC for 2 hours, they realised that they needed to pump down 2bbl of cement to finish the cement job, then WOC for a further 4 hours. After which they successfully pressure tested the BOP as per program, held a PJSM and then landed out and nippled up the BOP on the wellhead.

As the rig was sinking on the soft ground they lowered the mast and raised back the jacking legs, and installed wooden sleepers to act as supports for the rig jacking legs. After which, they raised the mast and RIH with the cup tester and attempted to test the wellhead connection to no avail. They then troubleshot the leak and found the cup tester element responsible for the leak. Unfortunately there was no suitable replacement element on site. Therefore they waited an hour for the correct cup tester (19-26ppf). After this they RIH with the 6 1/8" "slick" type BHA and drilled out both cement plugs (tagged cement at 232.3m) to the float collar, circulated the hole clean at 232.8m, and POOH from 232.8m to surface.

RIH with the 4 1/2" “Ozcom Vam” liner to 220m, the 4 ½” liner was run in the hole with a centralizer run every 10th joint. The running of this liner centralised, but uncemented, was carried out to provide string stability for the impreg HRQ core string.

After this, they successfully pressure tested the casing string against the annular. They then continued to RIH with the 4 1/2" liner from 220m and landed out on the float collar.

After preparing to run the coring assembly (coring BHA), they RIH with it from surface to float collar, and drilled out the float and shoe track, and 3m of new formation to 243.9m with KCl Polymer mud (no core was recovered).

After this, they circulated the hole clean and pulled the coring assembly back inside the shoe before completing the formation integrity test (FIT). They then conducted the FIT and achieved a result of 10.4ppg EMW, using 8.6 ppg MW, at a maximum pressure of 100 psi.

After successfully completing the FIT, they continued to core ahead from 243.9m to 247.1m. The coring string became stuck at 247.1m; however it was successfully worked free and the coring string was POOH.

After POOH, they changed over the handling equipment before attempting to retrieve the 4 1/2" liner. They then RIH with the retrieval joint and engaged the 4 ½” liner at 8.00mRT. After which, they POOH and laid out the liner and changed over the handling equipment prior to RIH with the 6 1/8" slick rotary BHA.

Whilst freeing the coring string the rig sunk, therefore, they needed to lower the carrier jacking legs and support the rear legs of the drilling rig with cement mix. After the cement had set they RIH with the 6 1/8" slick BHA to float collar using gel-polymer mud. They then opened out the float and shoe track and opened the hole from 3 ¾” to 6 1/8” from 239.8m to 247.1m. The wellsite geologist then instructed to proceed ahead under controlled drilling parameters from 247.1m to 269.5m, circulating bottoms up every single drill pipe down (approximately every 6m), as the section TD was approaching.

At 269.5m they POOH to surface, as the drilling parameters indicated possible blocked jets. When the BHA was at surface it was observed that the Bit and the first Drill Collar was fully blocked with coarse sand cuttings. They then unblocked the string and RIH to 269.5m and circulated the hole clean. They then conditioned the mud with KCL and various other additives (increasing the mud weight to 8.6 ppg), due to the increased formation water in the mud system, as a result of the highly permeable unconsolidated coarse sands. They then continued to control drill ahead from 269.5m to 279.2m, at which the 6 1/8” section TD was called. Therefore, they circulated the hole clean and conducted a wiper trip to the 7" casing shoe. After which, they RIH to 279.2m, circulated the hole clean again, pumped in 10bbls of Hi-Vis (to increase mud viscosity to 40 s/qt) on the bottom, and then POOH to surface.

They then rigged up to run the 4 1/2" Ozcom Vam 10.8ppf 5-LB liner, made up the float and shoe track, and then RIH the liner from surface to 279.2m. The hole was then circulated clean and they rigged up for the cement job. After pressure testing the surface lines, they mixed, pumped, and then displaced the cement. After which they bumped the plug with 1200psi for 3mins, and then slowly increased the pressure to 1500psi. While attempting to increase the pressure to 1500psi, it was observed that the casing string jumped in the slips and total pressure loss occurred with 1390psi on the casing string. In addition, strong flow was detected when bleeding pressure back to the cement unit, indicating that the casing string had parted. Therefore, the decision was made to circulate the cement out of the hole from the upper parted section of the casing string, flush the annulus with 6bbl of water, and retrieve the casing. Then proceed to POOH 8 joints of casing (47.27m), leaving the top of the casing at 47.3m.

After making up the replacement 4 1/2" casing string, they RIH and landed out the casing in the top of the parted box. After this, they WOC for 4 hours, and then RIH with the mandrel and successfully established that it was possible to re-enter the liner. They then POOH to surface, then RIH with the 4 1/2" casing to 47.3m and engaged the parted casing string (top of casing at 2.90m). After this, they changed the handling equipment and RIH to the float collar with the HRQ coring assembly and drilled out the cement plugs, float and shoe track, and 3m of new formation. They then circulated the hole clean and pulled back inside the casing shoe before the FIT. The FIT was successfully conducted to 10.4ppg EMW, with 8.6ppg MW, at a maximum pressure of 70 psi. After the FIT, they continued to cut and retrieve cores from 282.2m to 319.0m.

At 319m, it was decided to conduct the falloff injectivity test (DST 1); therefore they circulated the hole clean, pulled back to test the depth at 308m, and set the bottom packer at 306m. After the PJSM had been held they RIH with the falloff injectivity (DST) tool string, conveyed by wireline, and conducted the falloff injectivity test no. 1 at an average of 1.2l/min at 100-110psi. The test interval was 306m to 318m. The injectivity phase lasted 8 hours and the falloff phase lasted 10 hours. However, one valve failed shortly after the falloff started, which interrupted the normal pressure drop, and the test was stopped earlier than planned. The data obtained after the valve failure should be excluded from the analysis. Therefore, the confidence of the analysis of the results was low due to the paucity of pressure data. Therefore, all results presented in appendix 9 should not be regarded as conclusive until they are validated by data from other analysis (e.g. core analysis and production data).

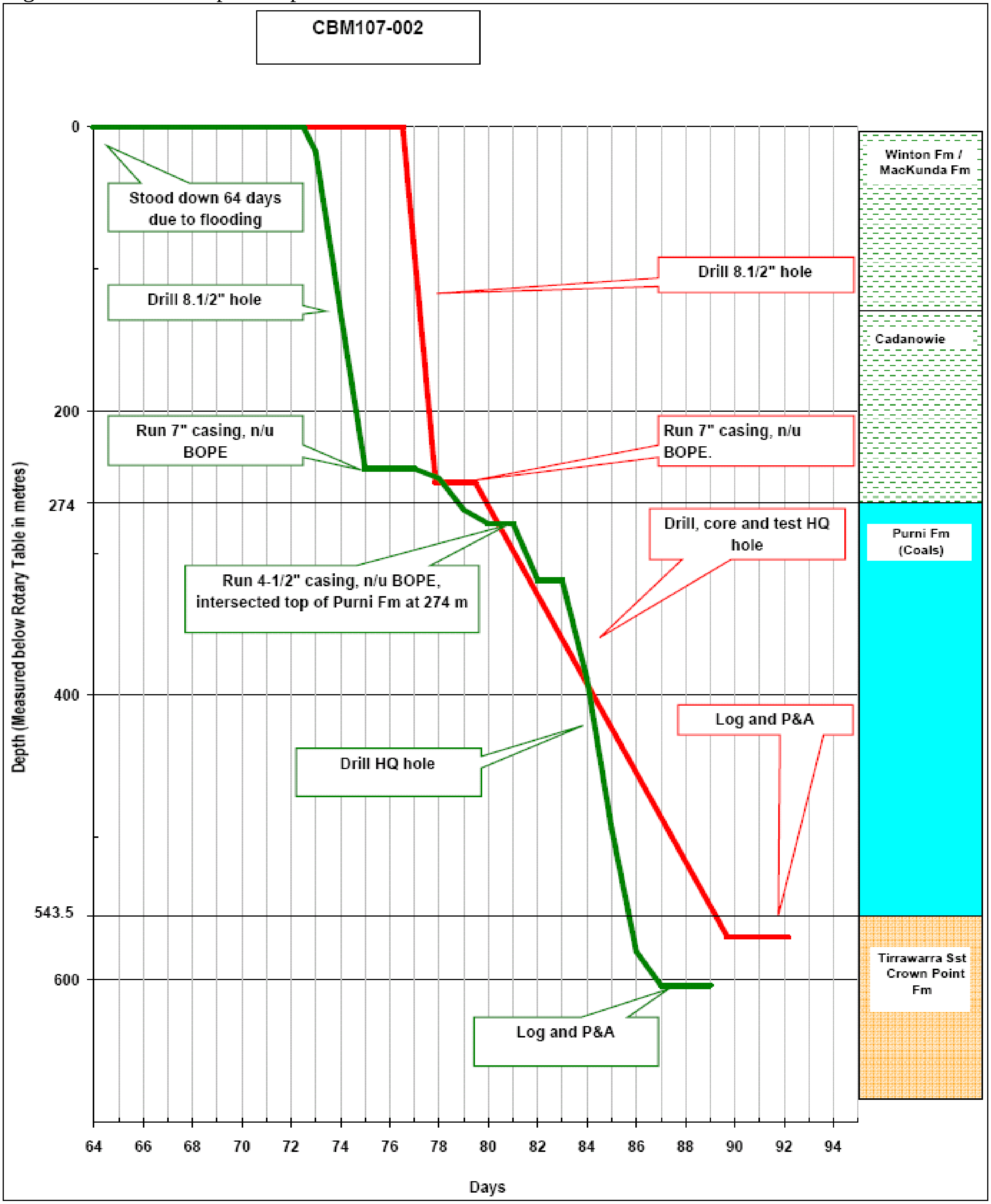
After the DST, they brought the injectivity tool string to surface, rigged down the surface equipment, pulled back to the casing shoe, and installed the BOP test plug. They then pressure tested the BOP four times to 200/1500psi for 5/10mins. After which, they rigged down the testing equipment and removed the test plug from the coring string. They then RIH from the 4 1/2" casing shoe to 319m and continued to cut and retrieve cores from 319m to 331m. POOH at 331m to the casing shoe to conduct a full rig service. They then RIH from the casing shoe to 331.0m, circulated for 10mins, and continued to cut and retrieve core from 331.0m to 604.0m TD.

At 604m, they pumped a hi-vis pill, circulated the hole clean, and conducted a wiper trip from TD to the 4 1/2" casing shoe. They then RIH to TD, pumped a hi-vis pill again, and circulated the hole clean. After this, they POOH to surface, rigged up the Weatherford wireline logging equipment, and made up the wireline toolsting for run no. 1.

After conducting the wireline and checkshot survey operations, they rigged down the logging equipment, RIH to TD, and circulated the hole clean. They then rigged up the Viking cement truck, pressure tested the surface lines, and mixed, pumped, and displaced the 15.6ppg bottom plug from 604m to 404m. After which, they rigged down, POOH to 396m, and circulated bottoms up, then RIH to 404m, rigged up the Viking cement truck, and pressure tested the surface lines. After this, they mixed, pumped, and displaced the 15.6ppg top plug from 404m to 249m. They then rigged down the Viking cement truck, POOH from 404m to 196m and circulated bottoms up. They then WOC for 4 hours, then RIH from 196m and tagged the TOC @ 245m. They then POOH to surface and nippled down the BOP. They then RIH with the haul plug to 2.9m, engaged the 4 1/2" casing fish, and POOH 8 joints of casing, leaving the top of the 4 1/2" casing at 47.2m. After which they RIH to 30m, rigged up the Viking cement truck, and pressure tested the surface lines to 500psi. They then mixed, pumped, and displaced 5 bbls of 15.6ppg slurry, and set the surface plug from 30m to surface.

The rig was released from CBM107-002 at 08:00hrs on the 17th of May 2010.

Figure 2: Time vs. Depth Graph for CBM 107-002



3.2 Particulars of Drilling

3.2.1 Particulars of the equipment installed in or on the well

The Wallis Drilling Contractors rig Delta 39 was used to drill the CBM 107-002 well. This rig is a 330 HP hydraulic rig with a 226kn (50,700lbf) pull capacity and capable of drilling to 1500m with HQ drill rods. The rig pumps are an FMC Q1832 Five Piston Pump powered by a 300 HP diesel engine driven hydraulic motor. The Diamond coring pumps are 2 x FMC Bean Model L1118SC pumps rated 246litres/min at 1800 psi. The mud system is a trailer mounted 2 mud tank unit rated at 8000 litres complete with agitators and mixing hoppers. This system is used in conjunction with 3 earth settling pits. The BOP system comprises a Hydril GK 7-1/16" x 3K Annular (double acting) with a 5 bottle Sanyi Model FK 125-3, 3000psi, 3 station, Accumulator Unit with a 3 station remote driller's control panel.

3.2.2 Casing and equipment installed in or on the well

- 10" PVC conductor from surface to 17.5m.

- 7" 23 lb/ft K55 BTC casing from surface to 232.7m.

- 4 ½" Ozcom Vam casing surface to 279.2m

3.2.3 Cementing operations carried out, including details of abandonment

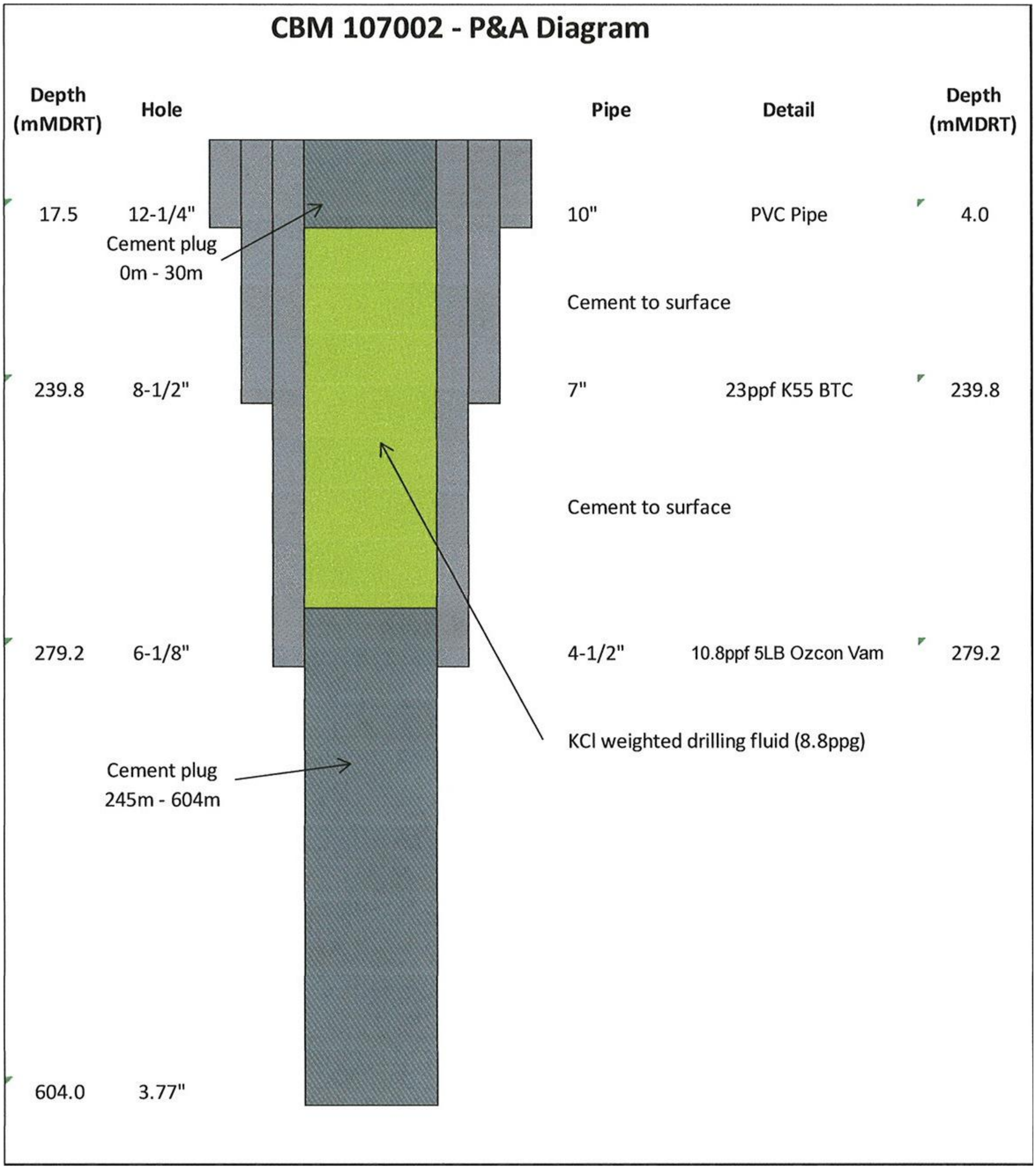
The surface hole was opened up to 12¼" from surface to 17.5m and 10" PVC conductor pipe was run and cemented at 4m. A surface cement plug was set from 30m to surface.

The 8 ½" hole was drilled from 17.5m to 239.8m and the 7" 23 ppf K55 BTC casing was run and cemented at 239.8m.

The 6 1/8" hole was drilled from 239.8m to 279.2m and the 4 ½"10.8 ppf 5LB Ozcon Vam casing was run and cemented at 279.2m.

The 3.77" hole was drilled from 279.2m to 604m and a bottom cement plug was set from 604m to 245m. See figure 3 for the P&A diagram.

Figure 3: CBM 107-002 P & A Diagram



3.2.4 Bit Records

Comprehensive details of bit records and drilling parameters are contained the IDS Final Well Report in Appendix 3.

3.2.5 Deviation Surveys

No surveys were conducted in CBM 107-002 and the hole is assumed to be vertical.

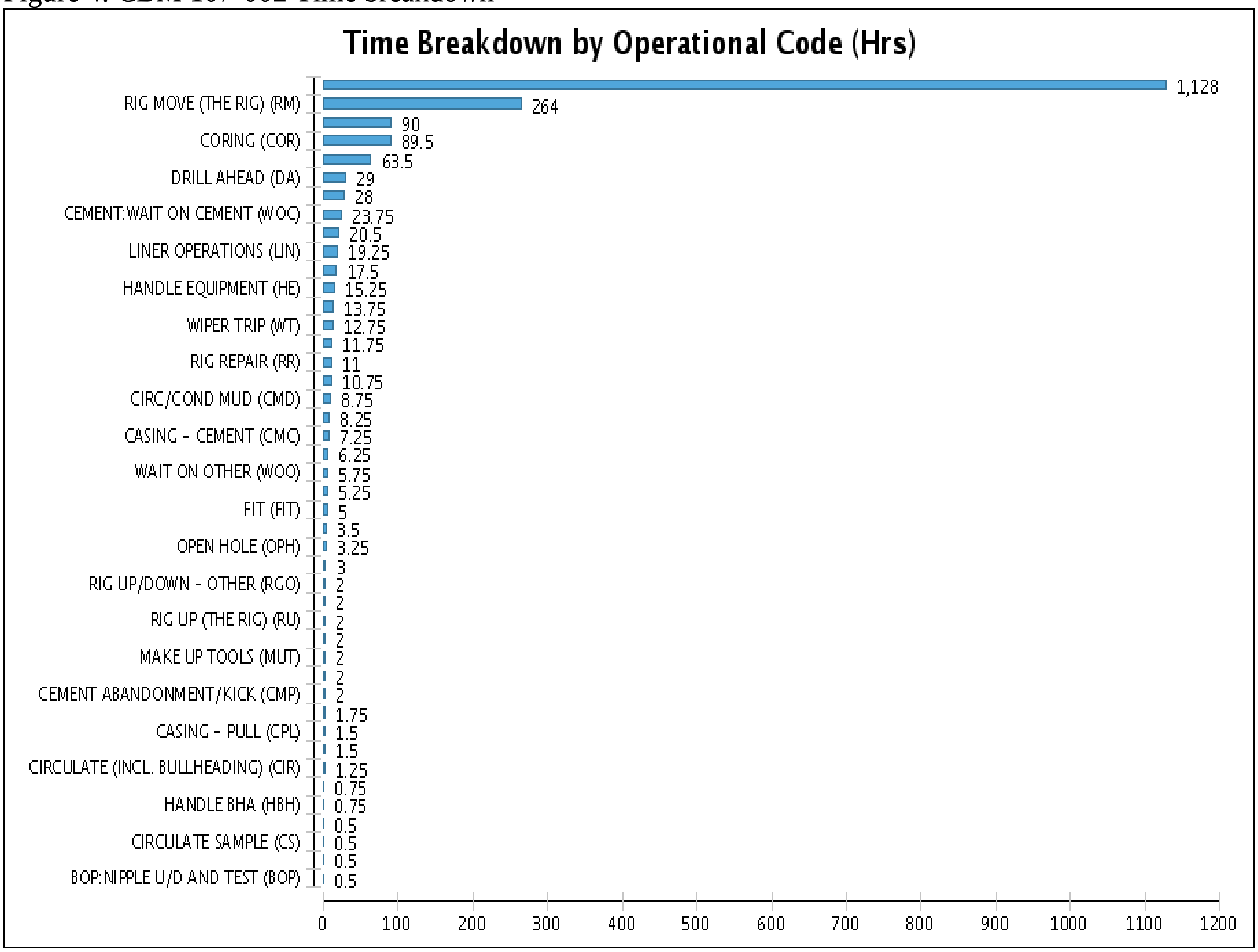
3.2.6 Drilling Fluids

RMN Drilling Fluids were contracted to supply and maintain drilling fluids. After initially using gel water spud mud for the surface hole, a KCl/ Polymer mud system was utilized while drilling the 8.5" and 6 1/8" hole sections. A KCl and CR 650 mud system was utilized for the coring section (280.2m to 604m). Drilling fluids parameters can be found in the IDS Final Well Report in Appendix 3.

3.2.7 Breakdown of Operational Activities and Lost Time

A breakdown of operational time and lost time is summarized in Figure 4 below. Further information on lost time during the drilling of CBM 107-002 can be found in the IDS Final Well Report in Appendix 3.

Figure 4: CBM 107-002 Time breakdown



3.2.8 Water Supply

Water for drilling and consumption was sourced from the Bravo Bore (NTGNR17966) located nearby.

4.0 Logging, Sampling and Testing

4.1 Cuttings Samples Collected

Cuttings samples were collected and bagged at 6m intervals from 17.5m to 279m.

4.2 Coring

The well was continuously cored from 280.2m to the Total Depth of 604m. The Wallis D 39 drilling rig was a heavy duty coring rig well equipped to core and to recover cut cores with a wireline retrievable system. Core recovery was excellent for the majority of the cores; however, poor recovery was experienced in the Upper Purni Formation while coring very fine to medium, friable to firm, sandstone. Core no.1 only recovered 0.3m out of a possible 6m, and core no.2 only recovered 0.6m out of a possible 6m.

A total of 56, 6m cores were taken and detailed records of the cores are contained in the IDS Final Well Report in Appendix 3 and within the Daily Geological Reports in Appendix 2.

Various samples of core were selected for Palynological, Petrological and Geochemical analyses, discussed below.

Detailed records of these runs are contained in the Core report in Appendix 4 and within the Daily Geological Reports in Appendix 2.

4.3 Mudlogging

Basic mudlogging services were provided by Weatherford (WFT), collecting and bagging samples and monitoring gas and drilling parameters. A mudlog was produced with lithological descriptions provided by the Wellsite geologists. WFT also provided laboratory facilities for measurement of gas desorption of coal core samples. Results obtained were used to assess the gas potential of the Primary Objective, Purni Formation Coal measures. Mudlogs and data are provided in Appendix 7 and 8.

4.4 Wireline Logging

Wireline logging services were provided by Weatherford.

Run the super combo DLL-SLL-Sonic-Neutron-Density-GR-SP-Caliper (Neutron and GR from 279.2m casing shoe to 5m) from 606.2 to 5m.

The Laterolog tool returned poor quality data from 365m to the casing Shoe. Therefore, after the Checkshot Survey, the Laterolog-GR tool was re-run and the data quality received was much better.

The checkshot survey was run by SGS, which comprised of 19 shots.

The entire logging program was completed in 11 hours.

The maximum bottom-hole temperature recorded was 53 degrees Celsius.

Wireline log data and the check shot survey data are provided in Appendix 6 and 10 respectively.

4.5 Water Injection Falloff Tests

One Water Injection Fall Off test was conducted in the well. The test was conducted over the interval 306m to 318m, with an 8 hour injection at 1.2 l/min (at 100-110 psi), and a 10 hour falloff. The test was carried out to measure coal permeability. The test was conducted using a wireline conveyed test tool with two flexible tubes run with the tool from the surface. One provided pressure to set the packer and the other pumped water into the coal seam being tested. On setting the packer a water injection phase of 8 hours commenced, followed by a falloff phase of 10 hours, during which the coal zone being tested relaxes back towards static formation pressure. From these pressure measurements, certain reservoir parameters of the coal zone (interest zone) can be deduced, in particular, coal permeability can be calculated. Reports on the results of these tests are included in Appendix 9.

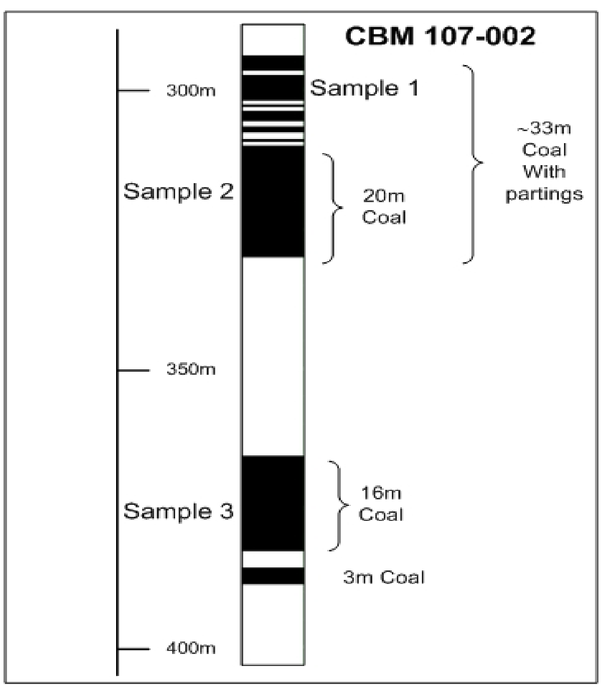
However, one valve failed shortly after the falloff phase started, which interrupted the normal pressure drop, and the test was stopped earlier than planned. The data obtained after the valve failure should be excluded from the analysis. Therefore, the confidence of the analysis of the results was low due to the paucity of pressure data. Results should not be regarded as conclusive until validated by data from other analysis (e.g. core analysis and production data).

4.6 Coal Desorption Sampling

Coal desorption sampling was carried out by Weatherford. A total of 56 coal samples were placed in desorption canisters and desorbed on site. Results are provided in Appendix 5.

4.7 Coal Sample Analysis

CBM107-002 samples have NOT been analysed by Bureau Veritas, since they were taken from mineral leases out of CP’s control. The CBM107-002 stratigraphic column however does show an interesting coal occurrence at relatively shallow depth. If this depth was reduced to say 200m in future exploration with similar seam thicknesses, thus achieving stripping ration of 7 or less, then mining using dredging technology (see note: Monetising Pedirka Coal Basin Energy Resources – August 6, 2010), may be choice for exploitation, if hydrological conditions were suitable.



CBM 107-002 has 33m of coal at around 300m depth. The sample did have some partings, with perhaps these representing around 20% of the entire sample.

In a dredging operation, an onboard washery consisting of jigs, teeter columns and/or spirals would remove most of the extraneous mineral matter. Note: Only the upper coal occurrence would be mined in this scenario.

The washing should also remove some of the iron, sodium and potassium contained in the coal, making the coal less likely to have fouling and/or slagging behaviour.

5.0 Geology and Formation Evaluation

5.1 Regional Geological Setting and discussion of the prospect

The Pedirka area occupies the Simpson Desert and encompasses four vertically stacked sedimentary basins, namely the Palaeozoic Warburton Basin, the Permo-Carboniferous Pedirka Basin, the Triassic Simpson Basin, and the Jurassic-Cretaceous Eromanga Basin. The basins are superimposed to some extent and over wide areas reflect a structural footprint controlled by Palaeozoic structuring and palaeo-depositional facies. Figures 5, 6 and 7 show the Pedirka Basin structural elements, Stratigraphic units and schematic cross section respectively.

The sequence subdivision appears, based on limited data, to be valid on a regional scale and thick individual coal seams do have wide lateral continuity although they appear to split and condense fairly rapidly. The thicker coal seams on the Andado Shelf were deposited in high latitudes on Arctic style coal mire where periodic freezing, dry out phases, fires and refreezing took place. Maceral content is variable between mainly vitrinite (woody organic matter) and inertinite (charcoal). Oil prone liptinites average 5-10% and where mature these coals would provide good oil source rocks (Ambrose, 2007).

The thicker coal seams in the well, which are up to 15 m thick, show marked lateral continuity having been deposited via large scale cyclic sedimentation on the Andado Shelf. Sedimentation was largely allocyclic (i.e. related to changes in cyclothemic deposition caused by factors such as climatic variation and changes in eustatic sea level). On a smaller scale, deposition of thinner peat mire coals was auto-cyclic and decoupled from the constraint of available accommodation space in the basin. Autocyclic sedimentation of clastics and thin coal seams within the subunits occurred via processes such as channel migration and river avulsion (Ambrose, 2007).

The CBM 107-002 well is located on the Andado Shelf, which is blanketed by a Permian sequence, including coal measures containing up to 63.5m of coal in seams greater than 1 m thick (thickest seam 21.4m). Ambrose (2011) has divided the coal sequence on a regional basis into 3 units, Units A, B and C. The nearest well to this location is CBM 107-001, which is located approximately 4 km to the southeast and intersected 134 m of coal. CBM 107-002 intersected a total of 65.2m of coal.

Overall the well was a positive result and confirmed the presence of widespread coal seams in this general area. However the coals registered very low gas contents and future development will concentrate on coal stratigraphy exploration holes to define a resource for possible underground coal gasification and/or mining, as the coal bed methane resource appears minimal.

Figure 5: Pedirka Basin Structural Elements

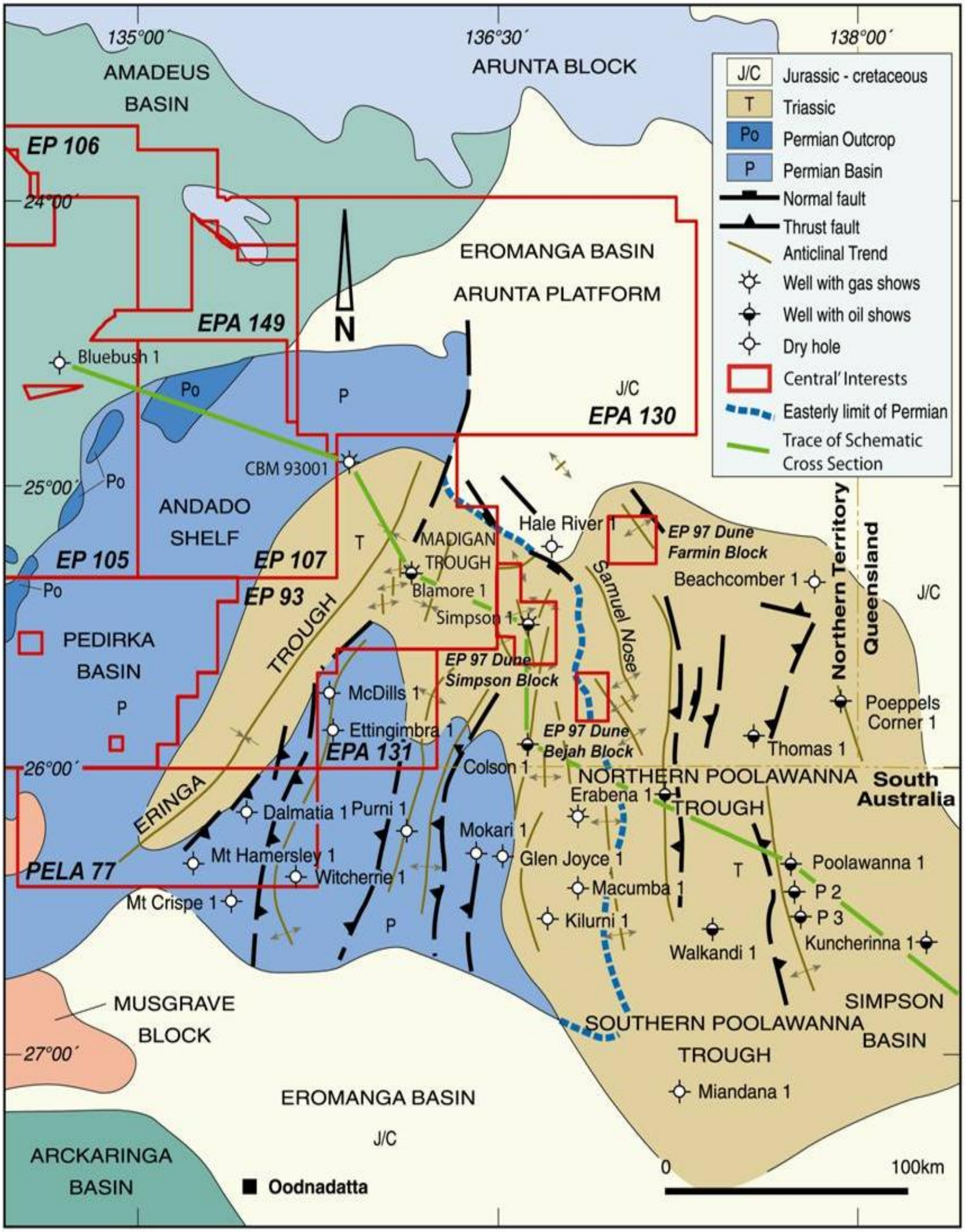


Figure 6: Padirka Basin Stratigraphic units

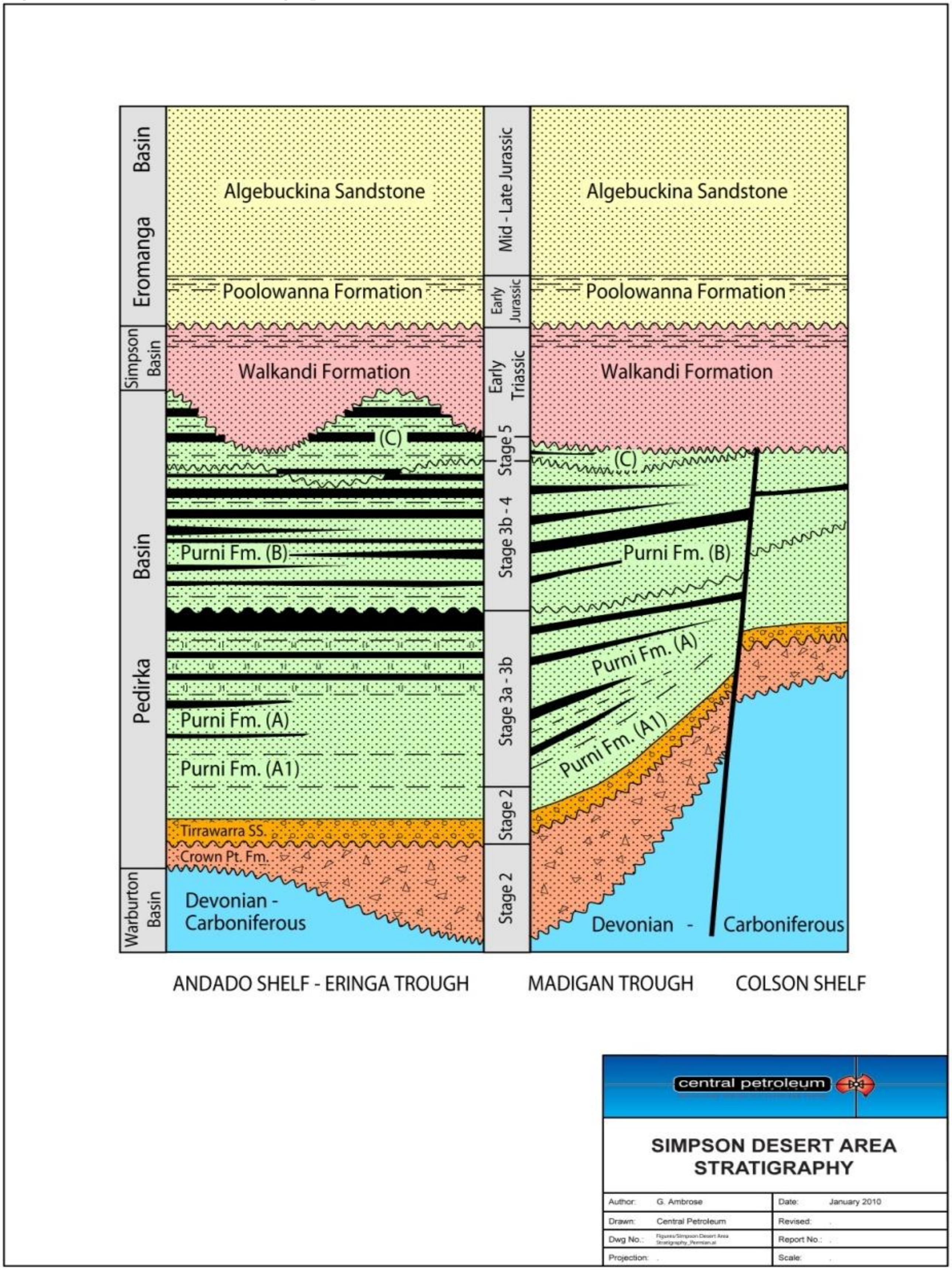
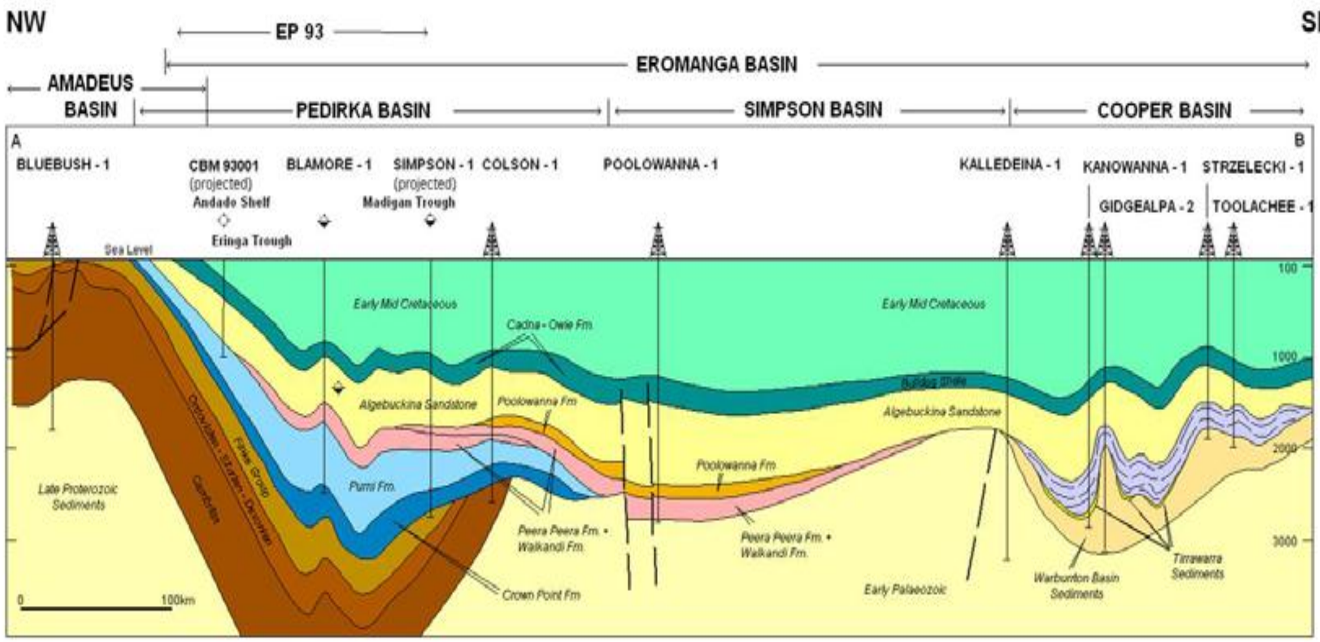


Figure 7: Schematic cross section Pedirka Basin



5.2 Lithology and Formation Tops

The following is a comparison of predicted vs. actual formation tops.

Table 2: CBM 107-002 predicted vs. actual tops

Formation Tops CBM 107-002	Prognosed Depths		Final Depths		Difference High / Low To Prognosis
	(mKB)	(mSS)	(mKB)	(mSS)	
Namba Fm			1	+184	Not prognosed
Winton Fm			3	+182	Not prognosed
Bulldog Shale			98	+87	Not prognosed
Cadna-owie Fm	120	-49	141	+44	21m Low
Algebuckina Sst			154	+31	Not prognosed
Poolowanna Fm	207	101	263.5	-78.5	56.5m Low
Purni Fm			274	-89	Not prognosed
Crown Point Fm			543.5	-358.5	Not prognosed
Total Depth	570	385	604.2	-419.2	34.2m Low

The lithologies observed from cuttings and core samples of the Formations penetrated by the well are summarized.

5.2.1 Namba Formation (Holocene/Quaternary): 1m to 3m

CBM 107-002 was drilled in an interdune corridor with dunes approximately 5m high flanking the location to the east and west.

A thin layer of loose fine orange stained quartz sand partly covered irregular blocks of lateritic and silicified sandstone, including billy, silcrete and chalcedony.

Surficial and near surface sandstone is light yellowish brown, fine to coarse, with a clay matrix, in part silicified, and occasional irregular patches of cream to light olive chalcedony

5.2.2 Winton Formation (Cretaceous): 3m to 98m

The Winton Formation is a non-marine sequence of Early to Late Cretaceous age. In CBM 107-002 the sequence is dominated by medium to dark grey, predominantly soft to occasionally firm, non-calcareous claystone, rarely silty, with rare very fine sand grains, and rare specks of carbonaceous fragments and coal. The claystone was generally as above, however, it occasionally graded to silty claystone and was interbedded with light grey, very fine to medium grained, slightly calcareous, glauconitic sandstone.

5.2.3 Bulldog Shale: 98m to 141m

The top of the Bulldog Shale was picked at 98m from the first appearance of medium to dark greenish grey glauconitc claystone. The claystone had very common dark green to black glauconite, occurring as a thin bed.

This glauconitic bed appears to be correlative with the Coorikiana Sandstone, which is glauconitic sandstone, and lies conformably at the top of the Bulldog Shale. This thin glauconitic bed is a useful marker of the top of the Bulldog Shale and was also seen in Blamore-1 and CBM 107-001.

The Bulldog Shale below the glauconitic zone consists of medium dark grey soft non-calcareous claystone, grading to siltstone, sandy in part. The glauconite percentage decreases to zero with depth.

5.2.4 Cadna-owie Formation: 141m to 154m

The Cadna-owie Formation was distinguished by a positive drill break (from ~22.5m/hr to ~33m/hr), and, as in CBM 93-001, a thin clean quartz sandstone immediately below the claystones of the Bulldog Shale. It was very thin and hard to separate from the below Algebuckina Sandstone whilst drilling. However, the top of the Cadna Owie is clearly defined on wireline logs by a conspicuous low Gamma Ray response (appendix 6). This Formation consisted of sandstone, clear to translucent, light grey, loose, unconsolidated, coarse, occasionally very coarse, subangular to well rounded, well sorted, and trace pale yellow and pale orange grains, with excellent inferred porosity.

5.2.5 Algebuckina Sandstone: 154m to 263.5m

The Algebuckina Sandstone was picked by the occurrence of a negative fast drilling break at ~157.8m from ~38.5m/hr to ~17m/hr.

In the Pedirka Basin, the Algebuckina Sandstone is a series of stacked braided fluvial sandstone beds, generally very coarse at the base, and fining upwards to medium grained. The sandstones are typically light or medium grey, loose, medium to very coarse, and subangular to angular.

However, in CBM 107-002, from 154m to 217.6m the sandstone is clear to translucent, light grey, loose, fine to very fine, subangular to subrounded, poorly sorted, with common grey and translucent milky quartz.

From 217.6m to 253.6m, the sandstone is generally as above, however it is fine to coarse grained.

From 247.1m to 258m, the sandstone becomes, medium grey, loose, unconsolidated, medium to very coarse grained, predominantly very coarse grained, subangular to subrounded, occasionally well rounded, with trace grey and milky quartz, and very rare muscovite, pyrite, and coal grains.

From 258m to 269.5m, the sandstone becomes, light grey, loose, unconsolidated, fine to coarse grained, predominantly medium grained, occasionally coarse grained, subangular to subrounded, occasionally well rounded, common clear, milky white, grey grains, trace yellow orange stained, trace to rare black, dull, soft, occasionally moderately hard ,coal grains, very rare muscovite, pyrite, and quartz grain.

5.2.6 Poolowanna Formation: 263.5m to 274m

In the Eromanga Basin, the Early Jurassic Poolowanna Formation is an important target for hydrocarbons. To the east of CBM 107-002, in the Poolowanna Trough and beyond, this unit can be subdivided into two vertically stacked upward-fining cycles, each being 50 to 100m in thickness. This sequence, which relates to distal sea-level change, may be present in the Eringa Trough, but probably pinches out down-dip of the well location.

The Poolowanna Formation was picked by a negative drill break (from ~22.5 m/hr to ~6m/hr) and an increase in gamma ray response, followed by a steady decrease in gamma ray response, as the sequence was upward fining.

The Poolowanna Formation consists of sandstone light grey, loose, unconsolidated, fine to coarse grained, predominantly medium grained, subangular to subrounded, occasionally well rounded, common clear to milky white, occasionally grey, trace yellow orange stained, rare to trace black, dull, soft occasionally moderately hard coal, very rare muscovite and pyrite. In addition, it contains trace claystone, light grey to medium grey, soft to firm, and slightly carbonaceous.

5.2.7 Purni Formation (Permian): 274m to 543.5m

The Purni Formation, which was the prime target in CBM107-002, conformably overlies the Crown Point Formation, being a depositional continuum following the termination of glaciation in Sakmarian time. The upper part of the Purni Formation consists of paludal/floodplain deposits, comprising very fine to fine-grained carbonaceous sandstone and interbedded siltstone, shale and coal. The coals and shales contain up to 10% exinite, and were expected to be rich in vitrinite and inertinite, thus providing excellent source rocks for oil and gas.

The Permian part of the sequence in CBM 107-002 consists of stacked upward fining sequences of coarse to medium sandstones grading upwards to coals. The entire interval is identified with the Purni Formation and correlates well to similar intervals in CBM 93-001, CBM 93-002, and CBM 93-004.

The sandstones of the Purni Formation differ significantly from those higher in the sequence, such as the Algebuckina Sandstone. The Purni Formation sandstones possess considerably higher gamma ray values and greater density (i.e. it is quite radioactively “hot” due to the presence of radioactive minerals such as feldspar), and the sandstones are considerably more compacted than the overlying Jurassic sandstones.

As in adjacent wells, the Purni Formation has been informally divided into the Upper Purni, with numerous thick coal seams, and a Lower Purni where coals are still present but are thinner and comprise a lower proportion of the sequence. The boundary is transitional and arguable, but is here placed at the base of the coal at 388m. This pick could be reviewed after correlation with other wells.

Upper Purni Formation: 274m to 388m

The Purni Formation was picked by the increase in coal percentage in the cuttings, and the overall decrease in the rate of penetration. The Upper Purni Formation (274m to 388m) consists of upward fining sequences of fine to coarse grained sandstones grading upwards to coals, interbedded with claystones.

The sandstone in CBM 107-002 consists of predominantly light to medium grey, occasionally light olive grey, soft to hard, very fine to coarse grained, predominantly medium grained, predominantly angular, occasionally argillaceous, occasionally with a kaolin matrix, occasional thin coaly laminae and coal fragments, rarely micaceous, and fair to good porosity.

The coal was dark grey to black, soft to moderately hard, occasionally hard, silty in part, occasionally fibrous textured, cleavage developed in part, with interbeds of claystone, dark grey brown, brown, to medium dark grey, grey black, soft to moderately hard, highly carbonaceous.

The claystone occasionally graded to light olive grey to medium grey, very fine grained, friable to firm, angular, sandstone thin beds, and also graded to light to medium grey, hard, siltstone, which in turn graded to very fine sandstone with depth.

There is a change in the lithological characteristics from 355.5m to the bottom of the upper Purni formation (388m). The sandstone becomes predominantly grey black, very fine grained, hard, moderately to very silty (grading to silty sandstone), pyritic, minor kaolin matrix, rarely micaceous, with poor porosity and grading to coaly (highly carbonaceous) siltstone.

Lower Purni Formation: 388m to 543.5m

The Lower Purni is an informal term that seeks to define the sandstone predominant section with only few and generally thin coal seams. The lower part of the Purni is also typified by upward fining sequences but the coarser basal sandstones are thinner as are the coals at the top of each sequence, and the transition from sandstone to coal is thicker and more gradual. Leafy plant material is frequently present on bedding planes and the proportion of bright components in the coals increases downwards, such that the lower coals contain fairly equal proportions of bright and dull coal. Discontinuous bright laminae are more common, but still have the appearance of wood or rush fragments on bedding planes.

Basal sandstones in these predominantly upward fining sequences are usually similar to those in the upper part of the Purni, although a little finer overall. Quartz is white to grey in colour, and black lithic and carbonaceous fragments are a little more common. Pink garnet is still present in finer sandstones, but dark mica occurs in equal or sometimes greater amounts than muscovite.

White or light grey clay matrix is usually pervasive, and consists of varying proportions of softer white kaolinitic clay and more structured light grey clay, often in booklets.

Below 388m interbedded siltstones, claystones, and sandstone become more prevalent. The sandstone is light grey, fine to very fine, and the siltstone is dark grey, interbedded and interlaminated, with minor cross laminations.

Between 397.4m to 415.5m the sandstone becomes grey, predominantly coarse grained, friable, predominantly sub-angular, kaolin matrix, common milky quartz, trace disseminated biotite, muscovite and pyrite, with intermittent coal stringers.

Below 415.5m, the upwards fining sequences continue. For example, from top to bottom, the sequence is silty claystone, siltstone, and then fine sandstone to medium grained sandstone, with occasional coal bands (much thinner and less frequent coal seams than the upper Purni Formation). 494.2m to 499.2m consists of interbedded coal and silty claystone.

From 505.2m to 538.2m the sandstone becomes more massive. The sandstone is light to medium grey, moderately hard, friable in part, medium to very coarse grained, predominantly subangular to subrounded, trace angular and well-rounded grains, predominantly medium grey clay matrix, slightly carbonaceous, with less common kaolin (less original feldspar), dark grey lithic grains in part, trace muscovite and biotite, intermittent thin coal beds, and poor porosity.

From 538.2m to 543.5m, the sequence returns to predominantly upwards fining. The sandstone is light grey, medium to coarse grained, friable to moderately hard, subangular to angular, very argillaceous, with poor porosity. At the very bottom of the lower Purni Formation (543.2 to 543.5m), the sandstone becomes light grey, very fine to coarse grained, friable to loose, occasionally firm, poorly sorted, subangular to angular in part, occasionally well rounded grains, with fair to good porosity.

5.2.8 Crown Point Formation: 543.5m to 604m

The basal Permian unit, the Crown Point Formation, is dominantly glacial succession, comprising extensive diamictite, glacial-fluvial outwash sandstone and ripple laminated sandstone, siltstone, together with thick shale and varved successions. Coarse sandstone, conglomerate and diamictite are common around palaeo-highs, whereas basinal areas focussed shale and varve sedimentation (Ambrose and Heugh, 2010). The succession is thickest in the Eringa Trough believed to represent glacio-lacustrine deposits. The glacial outwash sandstones at the top of the Crown Point Formation are believed to be equivalent to the Tirrawarra Sandstone of the Cooper Basin. The thickest known development of this sandstone is 200m in Mt Hammersley-1 in South Australia where the sequence comprises glacial outwash sandstone, displaying both fining-upward and coarsening-upward GR log motifs.

In CBM 107-002, the Crown Point Formation was picked by the appearance of obviously glacial sediments (i.e. diamictite). The gamma ray response also shows a marked decrease, as the felspathic radioactive sandstones of the Purni Formation are no longer present. In addition, there is also a significant overall decrease in the rate of penetration.

The diamictite was light to medium grey, to light to medium greenish grey, friable to hard, very fine to coarse grained, subangular to well rounded, poorly sorted, with a silty to argillaceous matrix, occasional siliceous cement, common to very common scattered hard and uniform pebbles (occasionally indurated), mostly less than 2cm in diameter, with a few pebbles up to 12cm in diameter, with poor porosity.

From 572.4m to 580.2m, the lithology was predominantly claystone, medium greenish grey to medium dark grey with depth, silty to sandy in part, with some very fine to fine grained sandstone thin beds, and trace scattered irregular rock fragments.

From 580.2m to TD (604m), the lithology is predominantly diamictite as above, with thin beds of silty claystone as above.

5.3 Hydrocarbon Indications and Sample Analysis

5.3.1 Hydrocarbon Shows

No significant gas readings were recorded. No oil shows were recorded. Indeed, very low gas readings were recorded during drilling, from on-site Q1 gas desorption of the coal, and from Q2 and Q3 gas desorption in the lab. See appendix 1 and appendix 5 for details.

5.3.2 Gas Detection whilst Drilling

As in CBM 93-002, the gas readings for CBM 107-002 were possibly spurious due to ongoing problems with the Weatherford mudlogging gas equipment and crew.

Nevertheless, the highest value recorded at the gas sensor for the entire well was 11 units total gas (1100 ppm), at 307.7m, whilst drilling light olive grey, firm to moderately hard, very fine to fine grained, occasionally medium grained, angular grained, sandstone (with a kaolin rich matrix and poor porosity), from the upper Purni Formation. This gas value was recorded against a background gas reading of 1.5 units (150 ppm), with the gas chromatograph reading 4.79 units (479 ppm). The CO_2 was 942.6 ppm (9.4 units) at this depth. C1 was 45.8 ppm, C2 was 11.9 ppm, C3 was 0 ppm, iC4 was 1.7 ppm, nC4 was 2.1 ppm, iC5 was 3.9 ppm, and nC5 was 3.7 ppm.

However, the gas desorption report (appendix 5) gives a very low raw total desorbed gas value of 0.01 scc/g from core sample no. 11 (307.66m to 308.66m).

The Water Injection Falloff test (appendix 9) was carried out at this depth (between 306m and 318m) because of the above, relatively high (and possibly spurious), gas readings from the mudlogging gas equipment.

From surface to 274m (the upper Purni Formation boundary) the highest total gas reading maximum from the gas sensor was 3 units at 30.2m, whilst drilling in the Winton Formation (uncertain lithology, just sludge in the cellar). Likewise, the highest total gas reading maximum from the gas chromatograph was 7.6 units at 254.2m, whilst drilling, medium grey, loose, unconsolidated, medium to very coarse grained, predominantly very coarse grained, subangular to subrounded, sandstone (with rare muscovite, pyrite, and coal specks), in the Algebuckina Sandstone.

Likewise, from surface to 274m, the average total gas value from the gas sensor was 1.8 units, and 4 units from the gas chromatograph.

In the same interval, from the gas chromatograph data, C1 ranged from 0 to 2.85 ppm, C2 ranged from 0 to 1 ppm, C3 was 0 ppm, iC4 ranged from 0 to 0.9 ppm, nC4 ranged from 0 to 0.8 ppm, iC5 ranged from 0 to 0.6 ppm, nC5 ranged from 0 to 0.5 ppm, and CO_2 ranged from 0 to 1515 ppm (maximum CO_2 at 254.2m, which correlates with the highest total gas reading depth from the gas chromatograph).

Purni Formation gas values: 274m to 543.5m

As discussed above, the highest gas value recorded at the gas sensor for the entire well was 11 units total gas (1100 ppm), at 307.7m, within the upper Purni Formation. This gas value was recorded against a background gas reading of 1.5 units (150 ppm), with the gas chromatograph reading 4.79 units (479 ppm). The CO_2 was 942.6 ppm (9.4 units) at this depth. C1 was 45.8 ppm, C2 was 11.9 ppm, C3 was 0 ppm, iC4 was 1.7 ppm, nC4 was 2.1 ppm, iC5 was 3.9 ppm, and nC5 was 3.7 ppm.

For the Purni Formation, the average total gas value from the gas sensor was 0.9 units, and 3 units from the gas chromatograph.

From the gas chromatograph data, C1 ranged from 0 to 45.8 ppm (maximum at 307.7m), C2 ranged from 0 to 12 ppm (maximum at 307.7m), C3 was 0 to 6 ppm (maximum at 418.7m), iC4 ranged from 0 to 11.3 ppm (maximum at 418.7m), nC4 ranged from 0 to 12.5 ppm (maximum at 418.7m), iC5 ranged from 0 to 15.1 ppm (maximum at 418.7m), nC5 ranged from 0 to 16.4 ppm (maximum at 418.7m), and CO_2 ranged from 322.7 ppm to 1292 ppm (maximum at 313.7m).

Crown Point Formation gas value: 543.5m to 604m

The highest gas value recorded at the gas sensor for the Crown Point Formation was 1.5 units total gas, and 3 units from the gas chromatograph. The gas sensor maximum, 1.5 units, occurred over the interval 559.2m to 562.2m, whilst drilling a diamictitic sandstone, light greenish grey, hard, very fine to medium grained, predominantly medium grained, common rounded grains, with siliceous cement, and poor visual porosity. The gas sensor maximum of 1.5 units also occurred over the interval 577.2m to 604m, whilst drilling in claystone and diamictitic sandstone interbeds.

The gas chromatograph maximum for the Crown Point Formation, 3 units (300 ppm), occurred at 601.7m, whilst drilling light to medium grey, very fine, moderately hard to hard, fine to medium grained, diamictitic sandstone with poor visual porosity.

For the Crown Point Formation, the average total gas value from the gas sensor was 1.25 units, and 2.5 units from the gas chromatograph.

From the gas chromatograph data, C1 was 0 ppm, C2 ranged from 0 to 0.1 ppm (maximum at 570.7m), C3 was 0 ppm, iC4 ranged from 0 to 0.04 ppm (maximum at 586.2m), nC4 ranged from 0 to 0.06 ppm (maximum at 549.2m), iC5 ranged from 0 to 0.54 ppm (maximum at 561.7m and 584.7m), nC5 ranged from 0 to 0.5 ppm (maximum at 562.2m), and CO_2 ranged from 333 ppm to 601 ppm (maximum at 601.7m).

For further information on the gas detection while drilling, see Appendix 5 (Desorption Report) and Appendix 8 (Mudlog and Mudlogging Data).

5.4 Source Rock analysis

Numerous coal samples were evaluated for Maceral composition and Vitrinite Reflectance; and others were subjected to Rockeval Pyrolysis. These results are not discussed in great detail herein. However, the results deserve to be considered in a regional sense, in particular in considering the oil generative potential of the Purni Formation Coals in the deeper more thermally mature part of the Madigan Trough. CBM 93-004 is located west of the Madigan Trough in an area where the Purni Formation coals have never been deeply buried as demonstrated by low Vitrinite Reflectance values. The analyses of coal samples are included in Appendix 11.

6.0 References

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