Introduction

The IDP contained in this Attachment 4 is one of two proposed IDPs for ATP 1025 and is intended to cover multiple PL application areas within the Blackwater CSG Field. A second IDP will cover multiple PL application areas within the Comet CSG Field to the North.

It is not necessary for Bow Blackwater to lodge a separate IDP for each application area within the Blackwater CSG Field. Section 136 of the P&G Act states that a development plan may "relate to another petroleum lease or proposed petroleum lease if the other lease or proposed lease relates to the relevant lease". The PLAs covered by this IDP are all related to the same underground reservoir, being the Blackwater CSG Field, and will be developed in stages in accordance with the coordination arrangement discussed in **Attachment 5** and **Appendix 8**.

This plan is intended to satisfy the requirements for an IDP of the P&G Act and the P&G regulations. The Applicant has had regard to the Department's "Guidelines for preparing initial and later development plans under the Petroleum and Gas (Production and Safety) Act 2004 and the Petroleum Act 1923" in preparing this IDP.

1. Term [s 139(1) & (3)]

The term sought for the lease is 30 years. The Applicant regards this as essential to fully exploit the resource in the Application Area, and enable the development of the Project.

The term of this IDP is 5 years.

2. Overview of activities during the Whole Term [s138(1)(a)]

The proposed activities associated with the production of CSG under the proposed PL comprise the drilling of exploration and appraisal wells; the drilling and completion of pilot wells and production wells; the construction of gas and water gathering and processing systems; and the construction of power distribution, road networks and compression facilities.

Exploration and appraisal wells will be designed to test gas contents, permeability, stress regimes and will allow for a continuing improved understanding of the gas field.

Pilot testing will initially comprise five single vertical under-reamed wells targeting the Rangal coal measures (CM) with gas and water production being monitored for an extended period of time. Pending early results the pilot will be expanded to total approximately 14 wells. The expanded pilot will continue to be monitored for an extended period of time. Seams of the Burngrove CM will ultimately be the target of stimulation and pilot testing at a future date.

Development is envisioned to trend parallel to geological strike and progress down-dip with time. Later development plans will be determined by test results. These continuing activities will fully develop economic gas resources within the tenement.

Produced gas will be metered and piped for distribution into a new network. The pipe and gas gathering system will ultimately require associated infrastructure, including nodal and main compression stations, to pressurise the gas to required levels.

Produced water will be gathered for processing and beneficial use where possible.

Additional infrastructure comprising roads, power lines, transformers, pump drives, well measurement and control systems will be largely determined by field development, topography and environmental considerations.

These planned activities during the PL term will ensure that the petroleum sought under the PL will be optimised in the best interests of the State, having regard to the public interest [s 141(d)]. This will be achieved through the long-term development of the gas resource providing both security of domestic gas supply in addition job creation.

The wells and related facilities will be abandoned and rehabilitated in full compliance with governmental regulations and best industry practice as determined during the life of the Project.

3. Activities proposed to be carried out during the initial five year plan period [s 138(1)(b)(i), (ii), (iii), (g), s 305(2)(e)(v) & Regulation 14(1)(a) & (b)]

(a) Nature and extent of Activities [s 138 (1)(b)(i)]

Principal Activities

The dominant activities will comprise well drilling and completion; low pressure gas production; gathering, compression and distribution; water gathering and treatment; road construction, electrical distribution and metering systems.

Initial Activities

Initial activities will comprise detailed ground reconnaissance, planning and landholder consultation. The area is semi-cleared open cattle country and particular emphasis will be directed towards adequate fencing, cattle grids and minimising disturbance to all land owners and/or occupiers and identifying Water Act bores.

Drilling

Initial drilling, in the shallower areas of the tenement will comprise vertical wells, under-reamed in the coal measures. Other vertical and SIS well configurations will be investigated. Vertical options currently include water and proppant fracture stimulated wells. Variations including cavitation might also be tested. In terms of SIS wells options range from single to multiseam laterals. Ultimately the reservoir characteristics will govern the actual drilling approach chosen over the tenement and it is probable that a combination of drilling methodologies will be implemented.

Production profile modelling indicates 128 wells are required in the Rangal CM to reach a minimum target of 50 TJ/d in year 5.

Appraisal of the development of the Burngrove Formation will continue, and if testing results are positive, then additional development activities may target these seams. However as their production potential is still uncertain, they are not included in the IDP.

Well Completion

Initial completion will involve the under-reaming of the coal measures and hanging a slotted liner. A down-hole progressive cavity pump will be run and operated to reduce hydrostatic pressure in the target coal seams. The reduced hydrostatic pressure will enable methane desorption into the wellbore.

Water Gathering System

Produced water will be gathered and pumped into temporary water storage infrastructure. Local coal mines have indicated their desire to utilise produced water. Options are being evaluated to establish 'beneficial use' of the minor amounts of expected produced water. Water pumping and metering systems will also be installed.

Gas Gathering & Compression

Produced gas will be gathered via a low pressure HDPE pipe network and may initially be piped into existing low pressure infrastructure in an adjacent lease, or the gas may be compressed at a nodal compression facility on the tenure.

Depending on the final location of centralised compression facilities the gas may be further compressed on the lease or piped to the nearest centralised compression facility to be compressed to pipeline pressure.

The layout of the nodal compression and centralised compression will be determined at a later date taking into account the coordinated development of the PLs forming part of the broader project.

Road Construction

Road construction will enable access for drilling and completion rigs, and maintenance of the production and distribution systems.

Ongoing Activities

Ongoing activities will be largely managed by Blackwater based employees of the Operator and local contractor support, comprising the management and maintenance of existing infrastructure, continue land owner and occupier consultations; and the monitoring and metering of produced gas and associated water.

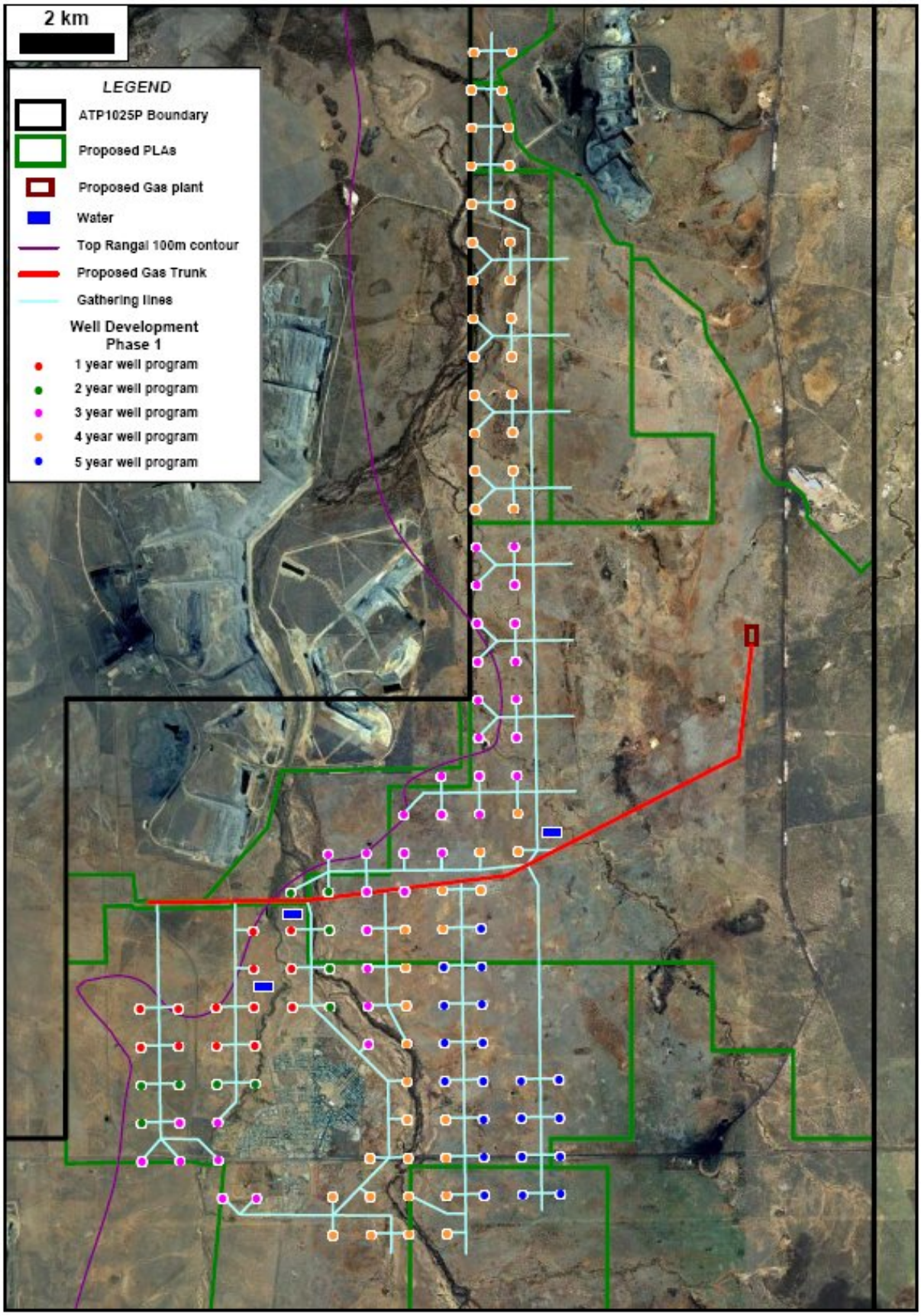
Water Monitoring [s 15 P&G Reg]

All drilled production wells will have an associated water production monitoring schedule which will comprise the continuous collection of real time data of produced associated water volumes and routine conductivity and pH measurements. The collected information will be incorporated into a regional Underground Water Management program.

(b) Location and Timing of Activities [s 138(1)(b)(ii)]

The IDP map in Figure 7 details the proposed areal extent, timing and distribution of the planned activities in relation to the proposed PL area. The well layout of the vertical wells is colour coded for each year of the five year plan. The idealised infrastructure plans for gas gathering lines are also depicted.

Figure 7: IDP Well program



The locations of the compression facilities, any required storage ponds and water observation bores have not been selected at this stage.

Temporary infrastructure will be largely restricted to drilling rig-site offices.

The following summarises the dominant activities for each year of the plan period.

Year 1

Commence surface access infrastructure to selected well locations. Drill, complete and test 13 wells in the Rangal CM.

Construct water gathering and temporary water storage ponds. Commence construction planning of the nodal gas compression and pipelines.

Year 2

Continue developing surface access infrastructure including water and gas gathering systems. Drill, complete and test 10 well in the Rangal CM. Commence construction of nodal gas compression station and pipeline to regional distribution network.

Year 3

Drill and complete 35 wells in the Rangal CM. Test wells. Connect all wells to gas gathering, nodal compression and regional distribution system.

Year 4

Drill and complete 50 wells in the Rangal CM. Test wells. Connect all wells to gas gathering, nodal compression and regional distribution system.

Year 5

Drill and complete 20 wells in the Rangal CM. Test wells. Connect all wells to gas gathering, nodal compression and regional distribution system.

Table 7: Well development Program

Year	Wells	Coal Measures
Year 1	13	Rangal
Year 2	10	Rangal
Year 3	35	Rangal
Year 4	50	Rangal
Year 5	20	Rangal

(c) Estimated Costs of Activities [s 138(1)(b)(iii)]

The 5 year approximate IDP costs are detailed in Table 8 below.

Table 8: Drilling, completion, connection and associated costs ($million)

Year	Well Costs	Compression Costs	Project tie in costs	Water disposal costs	Operating Costs	Total Annual Cost
1	10	-	1.5	1.5	1	14
2	8	4	1.5	1.5	1	16
3	28	13	5.5	5	2	53.5
4	40	23	8	8	4	83
5	16	10	3.5	3	5	37.5
Total Costs: Drilling, Completion, Connection & Associated expenditure over five year period						$204

The anticipated total cost of the 5 year IDP is $ 214 million.

5. Reservoir Description [s138(1)(c)]

(a) Geology

Regional Geology - Bowen Basin Geological Setting

The Bowen Basin represents a major rifting event that took place in the Late Permian along the eastern part of the current Australian continental landmass. The 'rift valley' extended from northern Queensland, south of Townsville, and extended southward, approximately parallel to the current coastline, through Queensland and New South Wales, intersecting the current coast around Sydney.

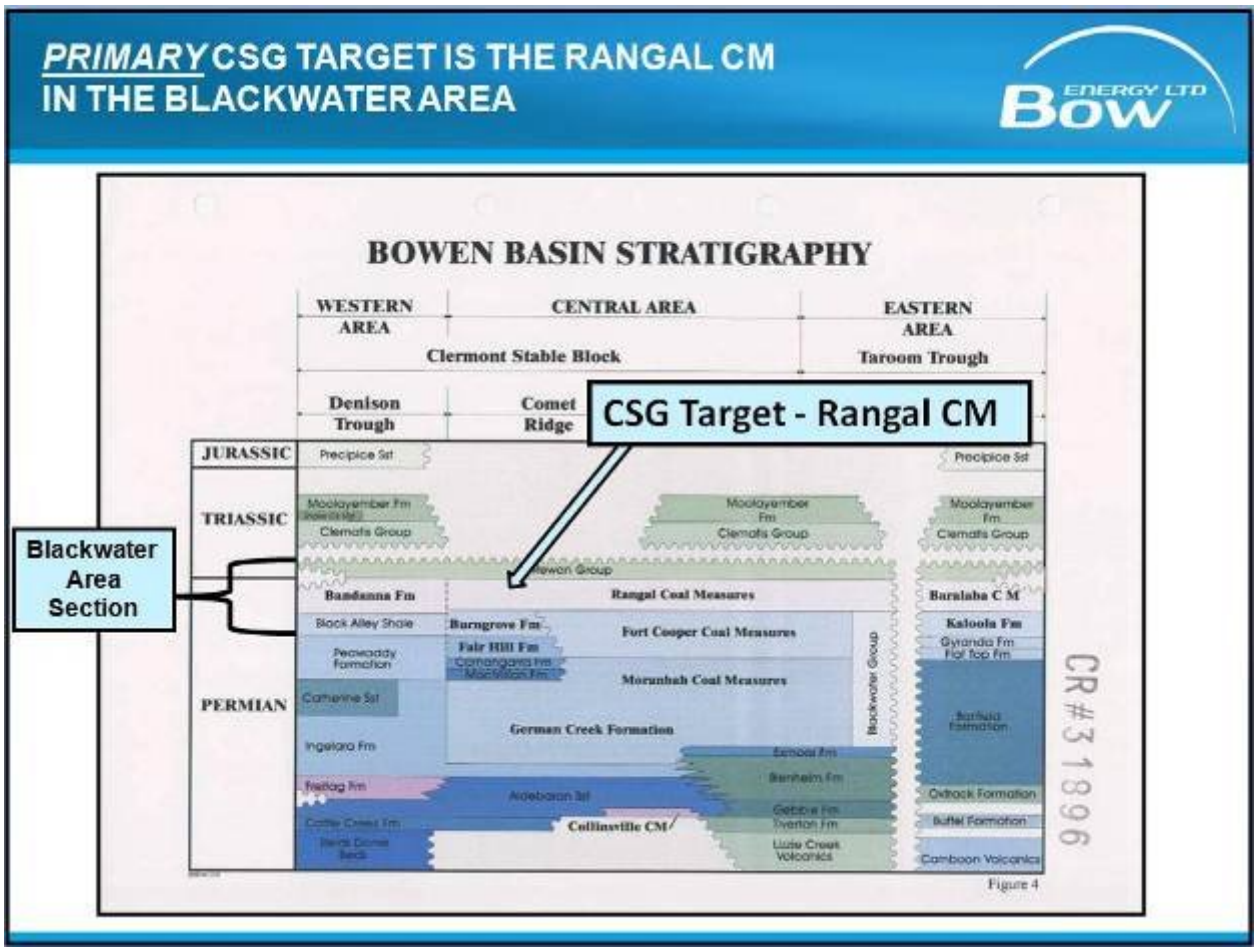
This was an environment characterized by major coal measure development in several basins along the length of this large rift valley. During this time, the major Late Permian coal measure sequences were deposited in the Bowen Basin in central Queensland and the Bowen Basin sequence underlying the Surat Basin in southern Queensland. Across into New South Wales, analogous coal measures were deposited in the Gunnedah Basin, and across the Sydney Basin from the Hunter to the Illawarra regions.

The Bowen, Hunter and Illawarra areas are world class coal mining regions. During the last few years, the Bowen Basin has become recognized as a world class coal seam gas region.

The tectonic/depositional model for the Bowen basin consists of a narrow NNW-SSE striking depocentre, rapidly subsiding during the Late Permian, with thick sequences of organic rich, argillaceous and lithic, sediment wedges prograding southward into marine environments. A nearby volcanic arc and associated intrusive activity to the east provided both high geothermal gradients and a source of lithic and occasionally tuffaceous sediment input.

The three cycles of sedimentation most relevant to Bowen Basin coal deposition, from oldest to youngest, are the Moranbah-German Creek Coal Measures, the Fort Cooper Coal Measures, and the Rangal Coal Measures. This stratigraphy is summarized on the Figure 8 below.

Figure 8: Bowen Basin Stratigraphy



The Late Permian Moranbah-German Creek Coal Measures (Moranbah in the north, German Creek in the south) experienced a southerly progradation from fluvial and upper delta plain sedimentation to paralic or marginal marine sedimentation that formed during a period of foreland loading in the Bowen Basin. Together they form a clastic wedge intercalated with laterally continuous coal seams that split and coalesce for some 250 km along the strike of the basin. The coal measures are underlain by and pass laterally to the south into sequences of marine-derived sandstones and siltstones. The MacMillan Fm records a marine transgression that ingressed partially into the basin prior to the main phase of foreland loading and southerly progradation of terrestrial conditions that resulted in the accumulation of the thick, occasionally tuffaceous coal seams of the Fort Cooper Fm and its equivalents during the Late Permian.

Thrusting built up the cratonic basin margin in the east, providing abundant clastic input to the basin and continued burial of the coal measures. Foreland loading was maintained by further emplacement of major thrust sheets from the east and sedimentation was characterised by non-marine, lithic sediments with widespread

development of the Rangal Coal Measures prior to basin closure and subsequent deformation in the Triassic. Coal measures achieved maximum burial during this time, with relatively high geothermal gradients.

PLA Geology

ATP1025P is located in the central Bowen Basin and is positioned off the eastern flank of the Comet anticline which is a major structural basin feature. The geological strata present in ATP1025P consists of Triassic and Permian sediments outcropping and then dipping easterly from the Comet Ridge high. This is shown in Figures 9 and 10 below.

Figure 9: Comet Block Geology

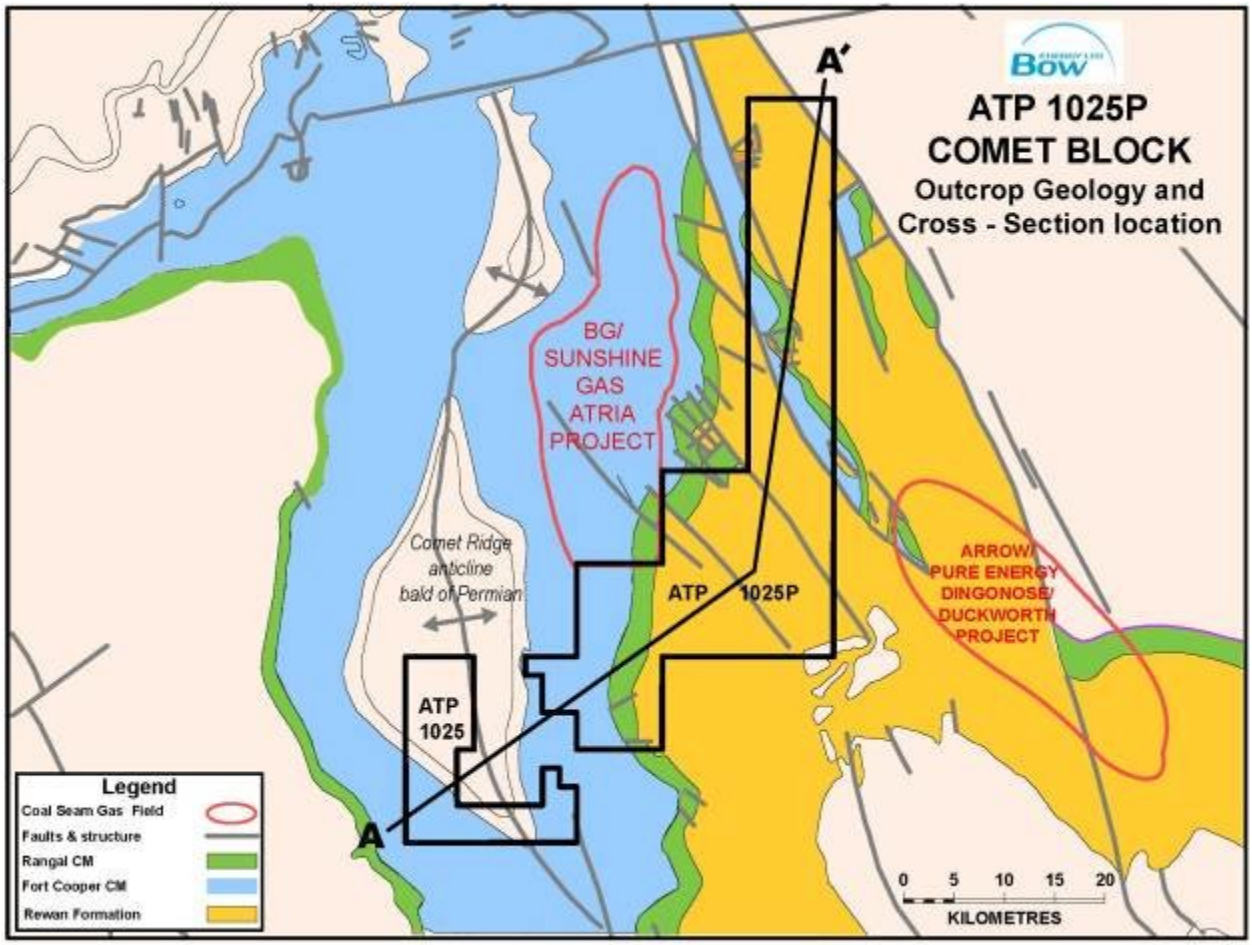
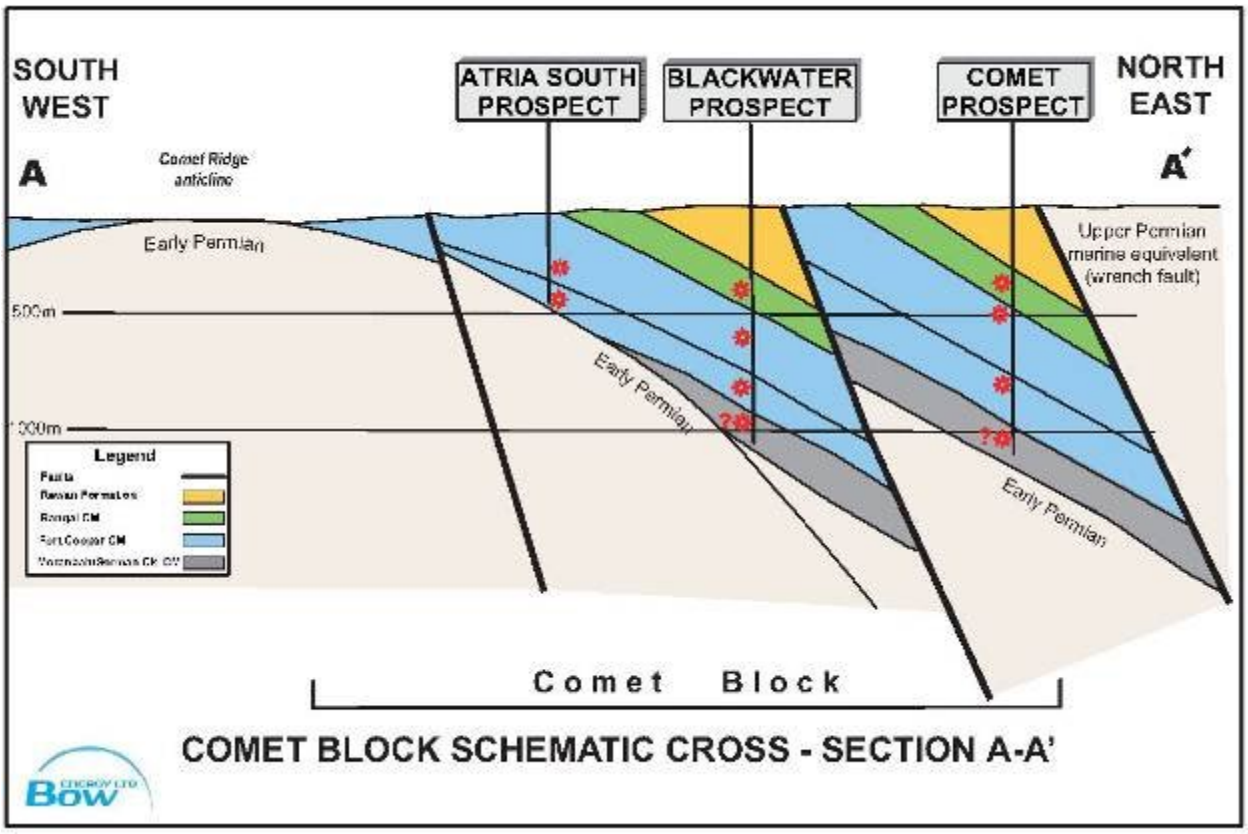


Figure 10: Comet Block Cross-section

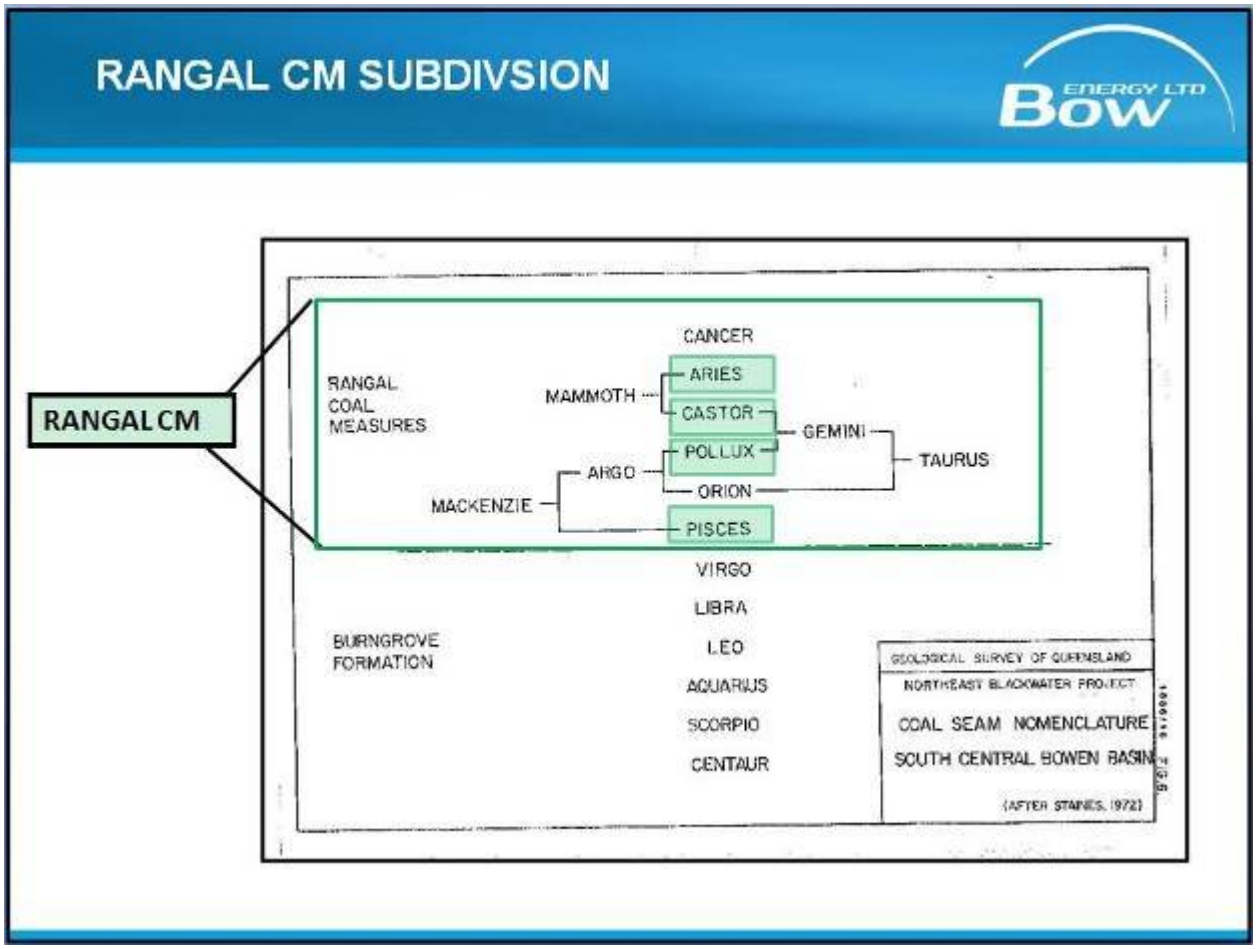


The Comet Ridge was a stable shelf which formed the eastern margin of sedimentation into the Denison Trough during the Early Permian. The Comet Ridge was then eventually overlapped by late early Permian sediments, which were subsequently overlain and overlapped by a largely uniform thickness of Late Permian and Triassic sediments.

The Early Permian Reid's Dome Beds and Cattle Creek Formation thin and eventually cease, as they overlap onto the elevated basement of the Comet Ridge. Subsequent Late Permian strata such as the Fair hill Formation thin and are partially eroded across the Comet Ridge with no Permian or younger sediments being present on the Comet Ridge anticline (as shown in the above A-A' cross section).

The Upper Fair Hill and Rangal Coal Measures outcrop in the western side of ATP1025P and dip towards the southeast. The Rangal Coal Measures represent the main Coal Seam Gas target, with four main correlatable coal seams being present (Figure 11).

Figure 11: Rangal CM subdivision



Within ATP1025P, the Rangal Coal Measures deepen up to 1000m in the south east of the permit and have approximately 8-10m of coal with gas contents ranging up to 19m^3/t (on a dry ash free basis).

(b) Reserve Estimates [s 138(1)(c)(i)]

The Blackwater CSG Field currently has 886.2 PJ of certified 3P reserves within the Rangal CM. The Rangal CM consists of four separate seams; the 3P Reserves break down is shown in Table 9.

Table 9: Reserves breakdown Coordinated Area

Seam	**3P Reserves**
ARIES COAL SEAM	168.9 PJ
CASTOR COAL SEAM	208.8 PJ
POLLUX COAL SEAM	314.5 PJ
PISCES COAL SEAM	194 PJ
TOTAL RESERVES	**886.2 PJ**

(c) Standards and procedures used to make estimate [s 138(1)(c)(ii)]

The reserves calculated within this document were calculated using the data obtained from Bow Energy's seven core-hole program within the Blackwater CSG Field. Each core hole gave the following detailed information on each individual coal seam within the Rangal Coal Measures.

- Coal Thickness
- Coal Quality (Ash, Moisture and Density)
- Gas Content
- Gas Composition
- Gas Saturations (Isotherm data)

Using this data, the amount methane in place was shown in the PLA area. Using a 75% recovery factor for the Rangal CM the amount of 3P reserves were calculated.

All the above interpretation and volumetric calculations were performed using the Geological Kingdom Software Package, run by Seismic Micro-Technology.

MHA has prepared the reserves estimates in accordance with the definitions and guidelines set forth in the 2007 Petroleum Resource Management System and the 'Standards pertaining to the Estimating and Auditing of Oil and Gas Reserve Information', published by the Society of petroleum Engineers (SPE). Current pilot exploration wells within the Rangal seams are anticipated to confirm approximately 50 PJ of 2P Reserves.

(d) Petroleum Production and Reservoir Modelling [s 138(1)(c)(iii)&(iv)]

Preliminary gas reservoir modelling of the Application area was undertaken to generate indicative well production profiles. Basic parameters along with other parameters being specific to the area were utilised (Table 10). The modelled well is a well established design. The nominal well spacing's used are based upon current permeability and gas saturation data for the area.

Table 10: Reservoir Modelling Parameters

Seam	Average Thickness (m)	Average Gas Content (m3/t)	Permeability (mD)	Ash %	Well Spacing (m)	GIP per Well (PJ)	Peak Production (GJ/d)	Recovery Factor %	Well Life (yrs)	Gas Recovered per Well (PJ)
Aries	2.0	14.4	260	20	800	-	-	75	-	-
Castor	2.0	15.4	100	19	800	-	-	75	-	-
Pollux	2.7	15.3	20	16	800	-	-	75	-	-
Pisces	2.1	16.2	5	27	800	-	-	75	-	-
Total Well	8.8	15.3	5-260	20	800	2.2	600	75	17	1.6

Production modelling indicates ~130 wells in the Rangal CM are required to reach a minimum target of 52 TJ/d in year 5 and maintain this production for an extended period (Figures 12 to 13).

Figure 12: CBM wells drilled per year

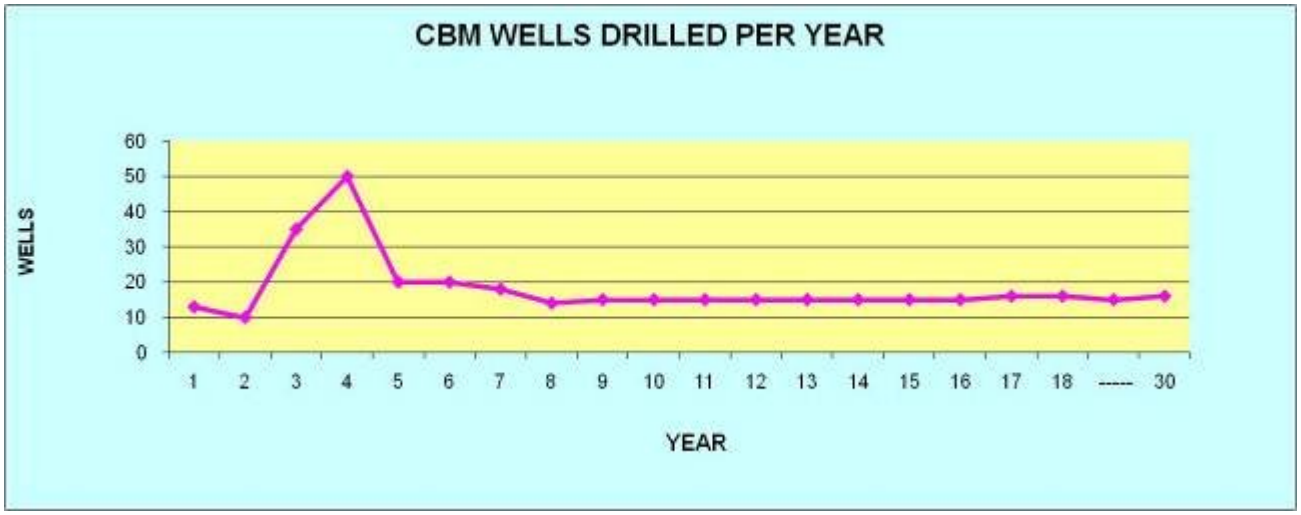
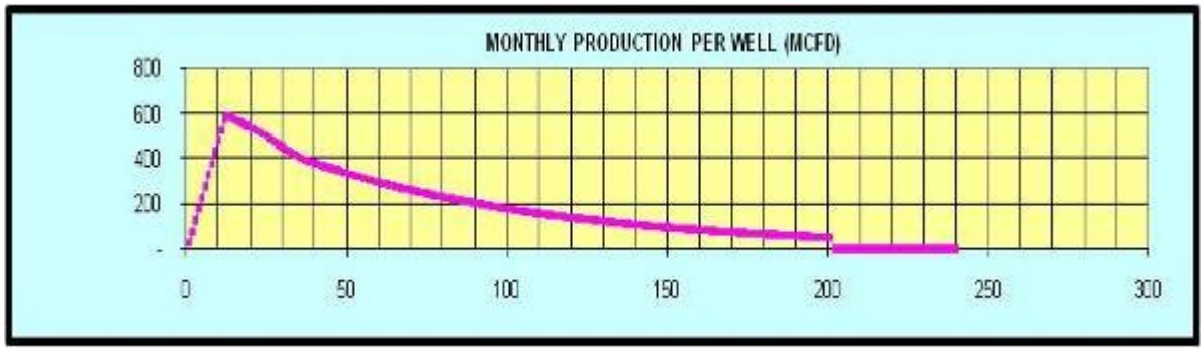


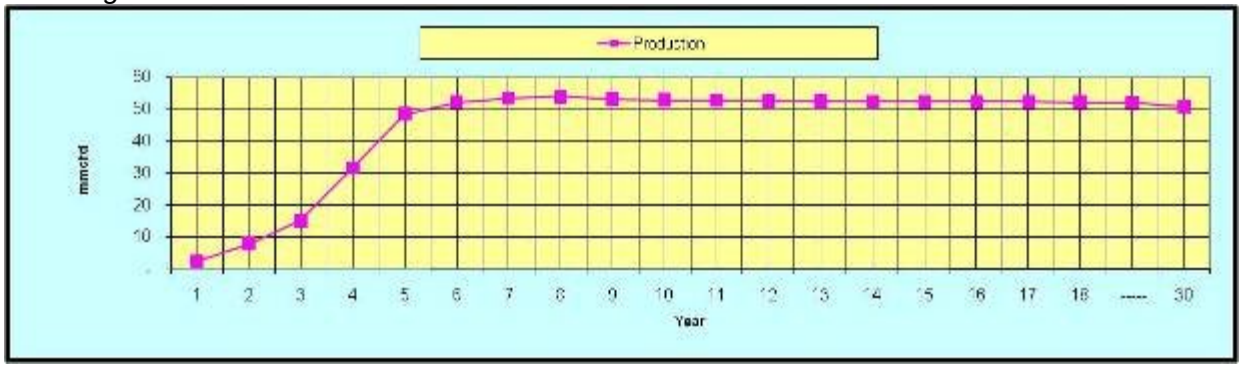
Figure 13: Rangal CM Seam Production Profile.



(e) Proposed Production Schedule During the Plan Period [s 38(1)(c)(iv)-(v)]

Initial petroleum production is anticipated to be in year 2 after grant and ramping up to a stabilized 52 TJ:/d by year 5.

Figure 14: Production Forecast



6. Reasons why the IDP is appropriate for the proposed PL [s 138(1)(f) & s141(a))

The IDP is a fully costed plan to commence the initial development of the CSG resources. It demonstrates an intention to fully utilise the whole Application Area for CSG production and required infrastructure. However, full development of the Application Area cannot occur within the IDP period for both technical and commercial reasons.

The IDP proposes the development of areas of greatest geological and CSG production certainty first. As these activities are completed, and with continuing exploration and appraisal, the requisite knowledge of the resources will be increased to a level that allows development to extend to cover greater areas of the proposed PL. The petroleum will be produced utilizing 'state of the art' production technology and as such will be produced in the most efficient and economically viable way and will not adversely impact upon the future of the State's coal resources.

Also, as discussed above, this application is planned to be a supplemented with a submission of certified reserves in compliance with s 121(1)(b)(ii) of the P&G Act and s 152(1)(b)(i)-(ii) of the P&G Reg when further exploration has been completed.

The appropriateness of this IDP for the proposed PL must also be considered in view of the Applicant's intentions for coordinated production across multiple leases as part of the Project. This coordination requires that some areas will not have as high levels of production occurring within the first 5 year IDP period as others. Nevertheless these areas are still intended to be developed over the term of the PL and are required to allow the Applicants to commit to the Project and future domestic supply contracts. This is further detailed in Attachment 5.3: Entry into Coordination Agreement.

7. Statement about the effects on overlapping and adjacent and overlapping Coal Mining Tenement holders [s 381(a) & (b)]

Although coal seams within the Application Area form coextensive natural reservoirs with adjacent coal tenement holders, the style and orientation of the production wells ensures that the petroleum is solely sourced from within the Application Area reservoir and should not prejudice the interests of the adjacent coal mining tenure holders with respect to incidental gas.

The target resource of overlapping coal tenement holders will also not be adversely affected. Coal seams within the Application Area are also the target resource of overlapping coal mining tenement holders, whereas they are the source and reservoir of the CSG resource targeted by the Applicants. There is no direct evidence that dewatering and degassing of coal will significantly adversely affect the coal mining resource. In contrast, the degassing of coal prior to underground mining has become an industry standard, and typically, where gas contents are high enough to support CSG petroleum production.

The potential impacts of CSG extraction upon coal mining are detailed in the P & G Act 2004. Bow will develop a Principal Hazard Mining Plan (PHMP) which addresses and presents plans, procedures and monitoring systems to mitigate the potential impacts.

The attached proposed Safety Management Plan (SMP), Enclosure 5, includes provision to perform authorised activities in a safe manner that are consistent with the P&G 2004 Act.

8. Optimisation of petroleum production [s 382(1) & (2)]

The authorised activities of the IDP will be conducted in accordance with the Application SMP (**Appendix 5**). This document and the associated Occupational Health and Safety Management System is in full compliance with the safety requirements of the P&G Act 2004 and ensures that Bow will produce petroleum in a safe manner.

Bow is a public company that is staffed with personnel with significant CSG expertise. Personnel have industry expertise in all facets of CSG. It is this expertise that has been utilised in developing this IDP and will ensure that petroleum production is optimised in a safe and efficient manner.

Furthermore Bow personnel also have expertise in carrying out production operations within areas overlapping coal mines. Those personnel have worked on behalf of petroleum operators and coal miners. Personnel have found that those operations within areas overlapping coal mines have not adversely affected the safe and efficient mining of coal where it is commercially and technically feasible not to do so. Bow will be proactive in not conducting operations that may affect the safe and efficient mining of coal in the future.

The Applicants have the skill-set and equipment to enable the harvesting of open-cut coal and underground mine methane and the commercialisation of that methane for the maximum benefit for all Queenslanders.

The production of petroleum from coal prior to mining fully develops the value of the resource through the commercial use of the produced methane. Additionally, the extraction of methane prior to underground mining significantly increases safety by reducing the risk to miners of fire and explosion.

Consequently the production of petroleum is optimized in the best interests of the State, having regard to the public interest.

9. Public interest considerations [s 141(d)]

This is discussed in more detail in **Appendix 6**.