

4. GEOLOGY

4.1. Pre-Spud Geological Well Prognosis

Well Name: Cow Lagoon 1

Target Formation: Barney Creek Formation

Elevation: 74.3 KB

Table 4: Geological description of the formations.

Formation	Top [m]	Probable Content
Lynott Formation - Donnegan Mbr	Surface	Dolomitic siltstone, fine to coarse grained dolomitic sandstone and dolarenite; thin-bedded, commonly rippled and cross-bedded; small botryoidal quartz nodules (cauliflower chert and enterolithic chert).
Lynott Formation - Hot Spring Mbr	100	Thin-bedded dolomitic siltstones and silty dololutite with interbeds of fine-grained sandstone, certified stromatolitic dolostone, dolarenite, sandy dolarenite and dolomitic sandstone; siltstone and dololutite commonly contain chert pods; sandstones rippled and cross-bedded; stromatolites mainly stratiform and domal; common desiccation cracks, tepee structures and pseudomorphs after sulphate evaporates and halite.
Lynott Formation - Carabirini Mbr	150	Thin bedded dolomitic siltstone and shale, in part carbonaceous and pyritic; silty dololutite, dololutite; minor fine grained dolarenite and lenses of slump breccia; uncommon ripples and evaporate mineral casts.
Umbologa Subgroup Reward Dolomite	260	Dololutite, stromatolitic dololutite, silty dololutite and dolarenite with lesser sandy dolarenite, dolorudite and sandstone; laminated, thin to massive bedded, cross-bedded, brecciated and slumped; pseudomorphs softer sulphate evaporates; onkoids, ooids, small silica spheroids; pseudomorphs after pyrite (pyritohedron).
Barney Creek Formation	620	Thin bedded to laminated, dolomitic, carbonaceous and pyritic shale and siltstone, dololutite, rare breccia and sandstone; occasional gypsum casts; talus slope breccia adjacent to Emu Fault.
Teena Dolomite	900	Grey crystalline dololutite with radiating, needle-like gypsum crystal pseudomorphs normal to bedding; rare conical stromatolites; thin intervals of dolomitic shale and siltstone.

4.2. Along Hole and True Vertical Depth of Seismic Marker and Reservoir Horizons

Table 5: Well Log formation tops for Cow Lagoon 1, TD= 1805 m.

Geologic Tops	Drilling Depth [m]	Structural Tops
Lynott Formation - Undifferentiated	Surface	
Reward Dolomite	817	-742.7
Barney Creek Formation – HYC Member	1245	-1170.7
Coxco Dolomite	1308	-1233.7
Lower Teena Dolomite	1388	-1313.7
Mitchell Yard Dolomite	1528	-1453.7
Mara Member	1631	-1556.7
Myrtle Shale	1673	-1598.7
Leila Sandstone	1739	-1664.7

4.3. Geological Interpretation of the Well Data

4.3.1. Log Adjusted Lithology Description

Lynott Formation

The Lynott Formation, a unit of dololutite, dolarenite and dolomitic siltstone and sandstone, is generally the thickest and most widespread of the formations which make up the Batten Subgroup. This formation is comprised of the Donnegan, Hot Spring and Caranbirini Members as you progress down stratigraphy, respectively. The Lynott Formation is seen as a regressive sequence.

Donnegan Member: Typically comprises buff to red-brown, thin bedded, often ferruginous, fine-grained dolomitic sandstone with interbeds of dolomitic siltstone and dololutite. A characteristic feature of the Donnegan Member is the presence of botryoidal quartz nodules (cauliflower chert) which have probably formed by replacement of anhydrite nodules. The quartz nodules range from a few millimetres up to 10 cm in diameter, often have an enterolithic structure, and exhibit displacive growth along fractures and bedding planes. Pseudomorphs after gypsum and mud cracks are common at various levels.

Hot Spring Member: The base of the member is taken to be either the first coarse sandstone bed or prominent stromatolitic dolostone bed in the conformable succession with the Caranbirini Member. It ranges up to about 350 m in thickness, although exposures in the southeast are poor and shallow-dipping, making it difficult to estimate true thickness. The Hot Spring Member is a variable unit including dolomitic siltstone, silty dololutite, stromatolitic dolostone, dolarenite, sandy dolarenite and dolomitic quartz

sandstone and thin beds of intra-clast breccia. The most common rock type is thin-bedded dolomitic siltstone which is often deeply weathered and silicified. Sedimentary structures include cross-bedding, ripple marks and rare mud cracks. Stromatolitic horizons are silicified and form prominent beds of blue-grey, often banded, chert.

Caranbirini Member: The Caranbirini Member is typically a poorly exposed unit of very thin-bedded to laminated, buff to yellow and grey, dolomitic siltstone and shale with interbeds of massive and laminated dololomite, similar in appearance to the Barney Creek Formation. It is usually deeply weathered and leached and occurs in low, rubbly, often flaggy outcrops. Pink to dark red and purple weathered pyritic shales, sometimes with small nodules of iron oxides after pyrite, form in the upper parts of the unit, whereas white, weathered, bituminous shales are common lower in the unit. There are rare, thin inter-beds of fine-grained, cross-bedded sandstone and dolarenite, but coarse sandstone and stromatolitic dolostone are absent. The upper part of the unit is more dolomitic and is characterised by small, vertical to inclined, chert and calcite-filled irregular fenestrae which may represent evaporate casts. Emergent, evaporitic conditions at this level are indicated by the presence of ripple marks, mud cracks, hopper halite casts, small chert spheroids and tepee structures.

In Cow Lagoon 1 the Lynott Formation appears to be undifferentiated. At surface grey-green dolomitic grainstones show typical botryoidal quartz nodules (cauliflower cherts) which have probably formed by replacement of anhydrite nodules. Low amplitude ripple structures are common.

The upper section consists of light grey to light brown, very hard, microcrystalline calcareous cemented, blocky, waxy siltstone with minor calcareous bands, inter-bedded with dark grey, very hard, blocky dolomitic mudstone with NFSOC from 120 m to 160 m. The unit began to become micro-crystalline, contain silica spheroids and contain calcareous bands from 160 m to 240 m down hole.

Below this, the unit consists of dolomitic mudstones and packstones - very dark grey, blocky, with no oil fluorescence and dominant dolomitic siltstones light brown to grey, hard, blocky, dolomitic, with trace calcite veins, no oil fluorescence and minor visible porosity present as small vugs with iron oxide stained grains. Dull, even, yellow fluorescence of some siltstone fragments, possible calcite, was seen around 360 m. Fine bedded pyrite was seen in the dolomitic packstones and claystones between 432 m and 446 m.

The next unit is characterised by wavy-laminated and stromatolitic dolostones as seen in core taken from 587.15 m to 587.75 m (Photo 1: Cow Lagoon 1 core section 587.15 m to 587.75 m.) – which contained ripple bedding, sag structures, finely laminated <1 mm up to 35 mm bedding thickness of dolomitic mudstone and siltstone layers, wavy-laminated and stromatolitic.

Clean gas was encountered in the Cow Lagoon 1 well at 394.6 m (DTG) of 1.2% (PASON gas detection system), connection gas at 498.7 m of 6.3% (PASON gas detection system) and at 546 m of 2.1% (PASON gas detection system). At 394 m, air compressors were shut down for 1.5 hours then started. Compressors were run to 250 psi and drilling fluid unloaded - a 5-6 min 2 m clean burning flare was observed out of the 8" blooie line.

At 546 m the hole was left with no compressor air for 30 mins (9:33pm - 10.03pm) then the compressors turned back on resulting in a flare 5 m long that ran for 15 s. In a second test the hole was left with no compressor air for 60 mins (11.10pm - 12.10am) then the compressors were turned back on, applied 1000 cfm air at 245 psi, flame build up was 7 min for a vertical flare 3 m long that burned for 3.5 min.

Connection gas was encountered in the Cow Lagoon 1 well at 698 m of 1.1% (PASON gas detection system).

In Cow Lagoon 1 well the base of the Lynott Formation consists of dominant dolomitic to calcitic mudstones black, hard, blocky with trace quartz grains, minor calcite fragments and no oil fluorescence and no visible porosity. It is accompanied by dolomitic to calcitic light grey packstones, hard, with minor quartz grains with no oil fluorescence and no visible porosity. Abundant bedded pyrite exists between 808 m-816 m towards the base of the Lynott Formation.

Umbolooga Subgroup

The top of the Umbolooga Subgroup consists of the Reward Dolomite, Barney Creek Formation (HYC Pyritic Shale Member, W-Fold Shale Member), Coxco Dolomite and Teena Dolomite progressing down stratigraphy, respectively.

Reward Dolomite

The Reward Dolomite is a widespread, highly variable dolostone unit which marks the top of the Umbolooga Subgroup. The thickness ranges from a few tens of metres in the west to several hundred metres in the vicinity of the McArthur River mine. The contact with the Barney Creek Formation is generally conformable and often gradational. The lower part of the formation consists of pink, buff and grey, laminated and thin bedded dololite with interbeds of dolomitic siltstone and sandstone, sandy dolarenite and sandy intraclast breccia. Dolomitic beds often contain small chert spheroids. Thin beds of potassium-rich, pink, siliceous, possibly tuffaceous material occur at some levels. The upper part of the formation is marked by a zone of intense silicification. In the west it is deeply weathered, silicified, chaotic breccia containing large, unsorted, angular dolostone clasts in a coarse, poorly sorted sandstone matrix with thin interbeds of dololite and dolomitic sandstone. The Reward Dolomite often contains minor base metal mineralisation along the disconformity where the dololite is black and has a bituminous odour when broken. The Reward Dolomite was deposited in an environment similar to the Barney Creek Formation, very shallow water to emergent conditions under which sediments accumulated in small bodies of standing water.

In the Cow Lagoon 1 well the Reward Dolomite consists of clean limestones, lime packstones, argillaceous limestones, dolomitic packstones and argillaceous dolomites with minor sandstone and claystone stringers. The limestones, lime packstones and argillaceous limestones are light grey to dark grey, hard, blocky, very calcareous, micritic in part, cryptocrystalline to microcrystalline, micro sucrosic to sucrosic in texture, dense, with common calcite fragments suggesting fracture fill, and no sedimentary structures. Only minor fluorescence was encountered at 1129 – 1135 m: weak milky fluorescence when cut. A weak oil stain was observed on calcite fragments. Traces of oolites were

present between 837 m and 855 m, and between 1114 m and 1120 m. No visible porosity was observed. The dolomitic packstones and argillaceous dolomites are grey to dark grey, hard, blocky, microcrystalline, dense, carbonaceous in part, with minor calcite veining and no sedimentary structure, no fluorescence, no visible porosity.

Barney Creek Formation

The Barney Creek Formation is a unit of dolomitic shale, siltstone and dololomite which is usually only poorly exposed in low, discontinuous rubble ridges in the west, northeast and southeast of the McArthur River Region. The formation is usually less than 150 m thick but thickens to about 700 m near the Emu Fault Zone near the McArthur River deposits. The formation is divided into three members: the HYC Pyritic Shale Member, W-Fold Shale Member and the Cooley Dolomite Member. The Cooley Dolomite is restricted to the HYC Sub-basin to the west of the Western Fault, and 20 km north, near the Caranbirini Waterhole so is unlikely to be found in this well.

HYC Pyritic Shale Member: The HYC Pyritic Shale Member mainly consists of very thin-bedded to laminated dolomitic siltstone characterised by high carbonaceous content. pyrite is the major sulphide component with galena and sphalerite present in the HYC deposit. Sedimentary structures include scour marks, flame structures, soft sediment slumping and graded bedding. Sedimentary breccias are recognised in the areas around the HYC deposit in close proximity to the Emu Fault Zone.

W-Fold Shale Member: The lowermost member, W-Fold Shale Member, consists of green and red, dolomitic siltstone and shale with interbeds of green vitric tuff. The proportion of tuffaceous material increases toward the top of the member.

In the Cow Lagoon 1 well the top of the Barney Creek Formation, around 1245 m, consisted of a argillic limestone which is dark grey, carbonaceous, hard, partly dolomitic increasing, blocky, microcrystalline, dense, minor calcite veins, no fluorescence, no visible porosity, minor weak bedding, massive, recrystallized calcitic/dolomitic cement, increasing clay content with minor banded pyrite. The limestone is interbedded with argillic dolomites that are dark grey, hard, blocky, microcrystalline, dense, carbonaceous in part, minor calcite vein, no sedimentary structure, no fluorescence with no visible porosity. Trace galena which is very fine grained on fracture surfaces and as “massive” pieces to 2 mm+ at 1249-1255 m with very fine grained disseminated pyrite.

No indication of the W-Fold Shale Member exists in the Cow Lagoon 1 well.

Teena Dolomite

The Teena Dolomite is a recessive dolostone unit with the upper part of the formation called the Coxco Dolomite Member. The Formation is up to 70 m thick in the southern McArthur River Region.

Coxco Dolomite Member

The Coxco Dolomite Member is almost certainly evaporitic and is a massive, dark grey, sometimes vaguely bedded dololomite unit. It contains numerous interbeds of pink, buff or orange-weathering, potassium rich, possibly tuffaceous, and mudstones in the area adjacent to the McArthur River deposits. The Coxco Dolomite Member is characterised by

the presence of acicular crystal casts which typically take the form of radiating aggregates of needles, rarely more than 2 mm in diameter and up to 6 cm long. Minor disseminated sphalerite, galena and chalcopyrite have been noted at several localities in the Coxco Dolomite Member.

In the Cow Lagoon 1 well the top of the Coxco Dolomite Member is around 1308 m. The member consists of lime packstone which is light grey to grey, very hard, dense, cryptocrystalline, dolomitic in part, trace disseminated pyrite and galena, with no sedimentary structure, minor calcite fragment, minor mineral fluorescence, no visible porosity, 0-5% dull to moderate yellow to purple direct fluorescence, no cut fluorescence and no visible porosity. Dolomitic packstone exist towards the bottom of the member that is white to grey, cryptocrystalline to microcrystalline, very hard, blocky, dense, calcareous in part, trace pyrite and galena, minor natural mineral fluorescence, no visible porosity.

Lower Teena Dolomite: The lower Teena Dolomite was probably deposited in a hyper saline lacustrine environment in which very shallow water and emergent conditions alternated. It consists of very thin bedded, massive, dark pink and grey dolomite. To the east near the McArthur River, the unit has greater sand and silt content and contains beds of ooids and intraclast breccia including flake breccia. Some of the sandy intervals contain cross-beds and ripple marks. Thin beds of stromatolites including conical, domal, columnar and stratiform types are often present near the top and bottom of the unit. Thin beds of pink, cryptocrystalline, possibly tuffaceous siliceous rock are present at some levels.

In the Cow Lagoon 1 well the top of the Lower Teena Dolomite is at 1388 m. The member consists of argillaceous dolomites and dolomitic packstones. The argillaceous dolomites are grey to dark grey, hard, blocky, microcrystalline, dense, carbonaceous in part, minor calcite veins, with no sedimentary structures, no fluorescence, no oil visible porosity. The dolomitic packstones are white to grey, cryptocrystalline to microcrystalline, very hard, blocky, dense, calcareous in part, with minor natural mineral fluorescence, no visible porosity, trace chert and contains minor brecciated fragments.

Emmerugga Dolomite

The Emmerugga Dolomite reaches a maximum thickness of 620 m. It shows considerable thickness variations, mainly due to post-depositional erosion: the Mitchell Yard Dolomite Member is commonly not present; and erosion has, in many places, removed the upper part of the Mara Dolomite Member. It is suggested that the Emmerugga Dolomite was deposited in a variety of marginal-marine environments: the Mitchell Yard Dolomite Member was interpreted by them as wholly subtidal; the Mara Dolomite Member was stated to contain subtidal, sheltered intertidal, lagoonal, and ephemeral salt-lake deposits, and that much of it could have been deposited in shallow lagoonal and saline lacustrine environments.

Mitchell Yard Dolomite: The Mitchell Yard Dolomite Member, where present, is conformably overlain by the Teena Dolomite. The Mitchell Yard Dolomite Member may represent extensively altered lower Teena Dolomite and not a separate stratigraphic unit. The boundary between the two formations is inferred to be at a level where thick bedding

(massive character) of the Mitchell Yard Dolomite Member gives way to thin bedding of the Teena Dolomite.

In the Cow Lagoon 1 well the top of the Mitchell Yard Dolomite is estimated at 1528 m. The formation consists of argillaceous dolomite and dolomitic packstone.

Argillaceous dolomite is grey to dark grey, hard, blocky, microcrystalline, dense, silty & calcareous as well as carbonaceous in parts, calcite vein, no sedimentary structure, trace pyrite, no fluorescence & no visible porosity was observed. Dolomitic packstone varies from light brown grey to grey, grey to brown, cryptocrystalline to crystalline, granular in parts, very hard, blocky, dense, calcareous in parts, minor natural mineral fluorescence with no visible porosity.

Mara Member: The Mara Dolomite Member overlies the Myrtle Shale, apparently conformably, and in most places is conformably overlain by the Mitchell Yard Dolomite Member. Unit 4 - comprises a few metres of grey dolostone and chert with fine grained pink to buff potassium-rich mudstone (with up to 12% K₂O). Unit 3 - of thin to thick-bedded dololomite and dolarenite containing intraclast conglomerates, oolites, oncolites, and stromatolites of a variety of forms and sizes. Unit 2 - mainly laminated dololomite with a few stratiform and small domal stromatolites. Unit 1 - Thin beds or discontinuous wedges of medium-grained cross-bedded sandstone.

In the Cow Lagoon 1 well the top of the Mara Member is estimated at 1631 m. The dominant lithology of Mara Member consists of dolomitic packstone, dolomitic mudstone & argillaceous dolomite. Dolomitic packstone is light brown grey to grey, cryptocrystalline to microcrystalline, very hard, angular, dense, calcareous vein in parts, minor natural mineral fluorescence with no visible porosity observed. Traces of pyrite and galena were seen.

Dolomitic mudstone (20%) composed of light pink to brown, tuffaceous with shards and crystalline fragments in matrix observed. Argillaceous dolomite is grey to dark grey, brown in parts, hard, blocky, angular in parts, microcrystalline, dense, silty as well as carbonaceous in parts, traces of calcite veins, traces of pyrite were observed. No fluorescence and no visible porosity were seen.

Myrtle Shale

The Myrtle Shale as a largely lacustrine and/or low gradient alluvial plain deposit with a possible evaporite solution collapse breccia near the contact with the overlying Emmerugga Dolomite. The Myrtle Shale is a red bed, continental facies containing a range of evaporite pseudomorphs and desiccation cracks and was deposited in a saline playa-mudflat type of environment.

In the Cow Lagoon 1 well the top of the Myrtle Shale is estimated at 1673 m. The main lithology of the formation composed of dolomitic mudstone & dolomitic packstone.

Dolomitic mudstone varies from light brown to greyish brown, reddish brown to brown, cryptocrystalline, very hard, angular to blocky, silty & tuffaceous in parts, vitreous shards and crystalline fragments in tuff with calcareous veins in parts are observed. No fluorescence or visible porosity could be seen.

Dolomitic packstone varies from light green grey to cream, very hard, angular, cryptocrystalline, argillaceous & ferruginous in parts, minor fluorescence observed while no visible porosity was observed.

Leila Sandstone

The Leila Sandstone consists of quartz rich and dolomitic sandstones. The base of the unit is clearly erosional as it scours into the underlying shaly carbonates of the Tooganinie Formation.

In the Cow Lagoon 1 well the top of the Leila Sandstone is estimated at 1739 m. Leila Sandstone mainly comprises of dolomitic mudstone & dolomitic packstone.

Dolomitic mudstone consists of red brown to purple, cryptocrystalline, very hard, angular, blocky, silty, tuffaceous in parts with trace vitreous shards & crystalline fragment inch tuff. No fluorescence and/or visible porosity have been observed.

Dolomitic packstone comprises light green grey to cream, very hard, angular, cryptocrystalline, waxy, argillaceous in parts, minor fluorescence was seen but no visible porosity was observed.

4.3.2. Reservoir Quality

The reservoir quality is considered good at this location based on mud-log shows, electric-logs, intermittent flares and needs to be further delineated down-dip or with a highly deviated hole.

4.3.3. Source Rock Quality

Not determined.

4.3.4. Hydrocarbon Indications

Table 6: Gas shows were reported on mud-logs in the Lynott, Reward and Barney Creek Formations.

Drilling Depth (m)	Description of Show	Projected Formation at Time of Show
394	Downtime Gas 1.2%; 2 m Flare Observed	Lynott Fm
499	Connection Gas 6.3%; No Flare Observed	Lynott Fm
546	Downtime Gas 2.1%, 3 m and 5 m Flare Observed	Lynott Fm
698	Connection Gas 1.1%; No Flare Observed	Lynott Fm
1049	Downtime Gas <1.0%; 2 m Flare Observed	Reward Dolomite
1069	Downtime Gas <1.0%; <1 m Flare Observed	Reward Dolomite
1081	Connection Gas <1.0%; 2 Quick Flares Observed	Reward Dolomite
1428	Downtime Gas 5.1%; No Flare Observed	Teena/Coxco Dolomite

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1569	Downtime Gas 7.84%; Trace to 0.05% C2, C3 and C4+n – C4; No Flare Observed	Mitchell Yard Dolomite
1598	Downtime Gas 6.6%; No Flare Observed	Mitchell Yard Dolomite

4.3.5. Trap integrity

The trap integrity is sealing with four-way closure with a spill-point at 1308 m in the Coxco Dolomite.

4.4. Relevance of the Well Data to the Evaluation of the Hydrocarbon Potential of the Area

Estimate of Petroleum-in-Place, Cow Lagoon West Accumulation, EP176

In accordance with Part V- Drilling and Workover Operations, Division 2- Reporting and Data Submission, Clause 533- Discovery of Petroleum and Estimate-of In-Place Petroleum of the “Schedule of Onshore Petroleum Exploration and Production Requirements 2012” Armour Energy is submitting an Estimate of Petroleum-in-Place discovered at the “Cow Lagoon West Accumulation” located in EP176 that is based on the results of the Cow Lagoon 1 well.

In addition to fulfilling the requirements of the Act with respect to reporting a discovery to the Minister from the Cow Lagoon West Accumulation in EP176 and conveying in writing to the Director within three (3) months of the discovery date, Armour Energy has compiled under Clause 533, Sub-Clause 4- Part A, Map (**See Figure 2**) that identifies the location of the Cow Lagoon West Accumulation.

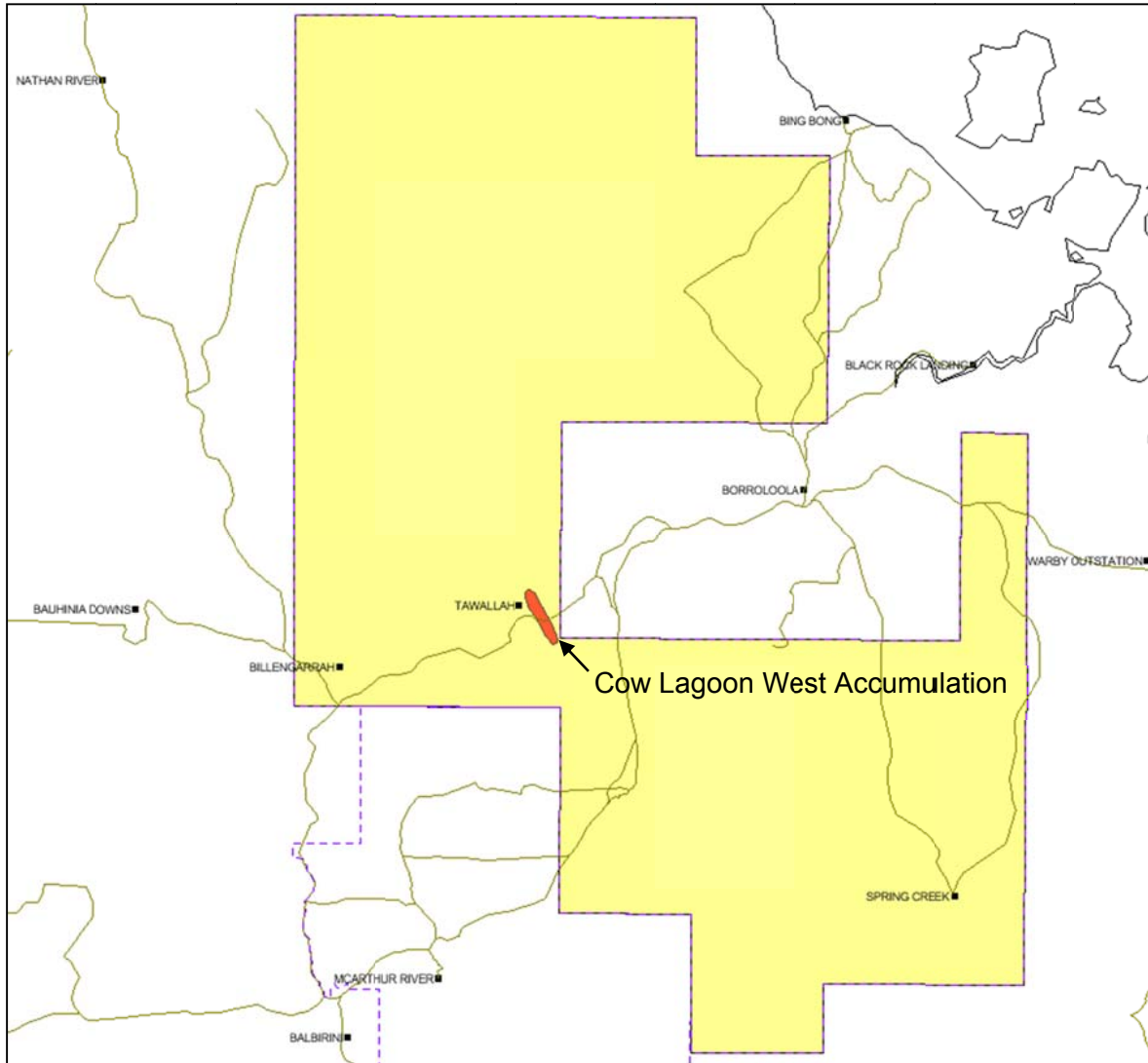


Figure 2: Location Map of the Cow Lagoon West Accumulation.

Document Title

Well Completion Report, Cow Lagoon 1, EP176

Under Clause 533, Sub-Class 4- Part B, the quantity of gas-in-place in the pool by formation at the 50% and 90% probabilities is outlined in Table 7Table 7.

Table 7: Clause 553, Sub-Clause 4 "Probability Table. Part B- Cow Lagoon West Accumulation.

Formation	Area [km ²]	P-50	P-90
Lynott Formation	5.83	23.8	7.4
Reward Dolomite	5.83	4.3	1.1
Total		28.1	8.5

Document Title	Well Completion Report, Cow Lagoon 1, EP176
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Under Part C, the data upon which the estimate is based; the Cow Lagoon West Accumulation located in EP176 covers a mean area 5.83 km² and consists of a tabular shaped anticline structure that has an accumulation of gas around the Cow Lagoon 1 wellbore in the Lynott and Reward Formations (See Figure 2 and Table 8).

Table 8: Assumptions Table.

Variables	Symbol	Units	Distribution	Data Source - Cow Lagoon 1
Area	A	km ²	Uniform	Surface Mapping/GIS Studies/Seismic
Average Pay	H	meters	Triangular	Electric Logs, specifically the Image, Anisotropy, Neutron-Density & Resistivity Logs
Matrix porosity	ϕ_m	fraction	Triangular	Electric Logs, specifically the Image, Anisotropy, Neutron-Density & Resistivity Logs
Water Saturation of matrix porosity	Sw_{i-m}	fraction	Uniform	Electric Logs, specifically the Image, Anisotropy, Neutron-Density & Resistivity Logs
Fracture porosity	ϕ_f	fraction	Uniform	Electric Logs, specifically the Image, Anisotropy, Neutron-Density & Resistivity Logs
Water Saturation of fracture porosity	Sw_{i-f}	fraction	Uniform	Electric Logs, specifically the Image, Anisotropy, Neutron-Density & Resistivity Logs
Initial gas expansion factor	B_{gi}	Rbbls/scf	Uniform	Estimated Gas Composition from Gas Chromatograph Readings
Initial gas expansion factor	E_{gi}	scf/Rscf	Uniform	Estimated Gas Composition from Gas Chromatograph Readings

The Cow Lagoon West Accumulation was identified by recent surface mapping by Armour Energy, the 2002 Batten Trough Seismic Reflection Survey main seismic line 02GA-BT1 and confirmed by the Cow Lagoon 1 well drilled by Armour Energy in May-June 2012 (**See Figure 2 and Figure 3**).

Armour Energy has also defined a Greater Cow Lagoon Structure (**See Figure 4**), which is a broader area around the Cow Lagoon West Accumulation that may have similar prospective resources. The estimated mean prospective resources, for the Greater Cow Lagoon Structure is 100.4 Bscf. At this time Armour Energy is only able to report to a higher level of certainty up the boundaries of the Cow Lagoon West Accumulation.

Initial surface geological interpretations indicate a potentially larger structure of up to 40.5 km² in EP176 with reasonable depth and structural setting to the Cow Lagoon West Accumulation, noted as the Greater Cow Lagoon Structure (**See Figure 4**). The mean Prospective Resources for this area is 100.4 Bscf using the same parameters and assumptions as the Cow Lagoon West Accumulation and based on SPE-PRMS definitions. However, further drilling and testing is required before a more definitive discovery area or higher certainty in gas-in-place estimates can be made for the Greater Cow Lagoon Structure, as this area defines a large volume of undiscovered resources. Thus, when any revision to the quantity of in-place-gas, resources, or data provided herein is revised, a report of these revised estimated results will be sent to the Director in accordance with Clause 533.

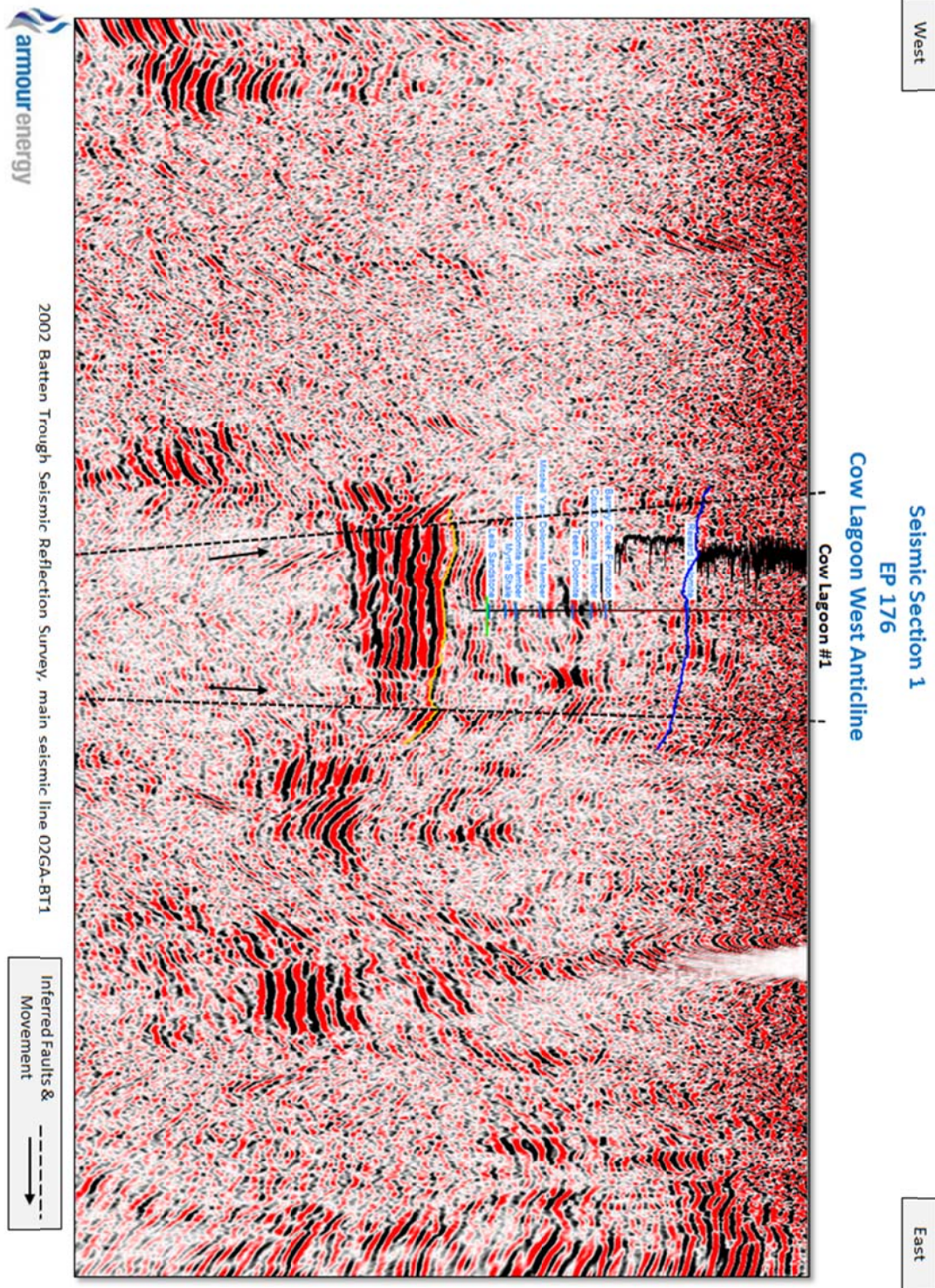


Figure 3: Seismic Section 1- 2002 Batten Trough Seismic Reflection Survey, main seismic line 02GA-BT1.

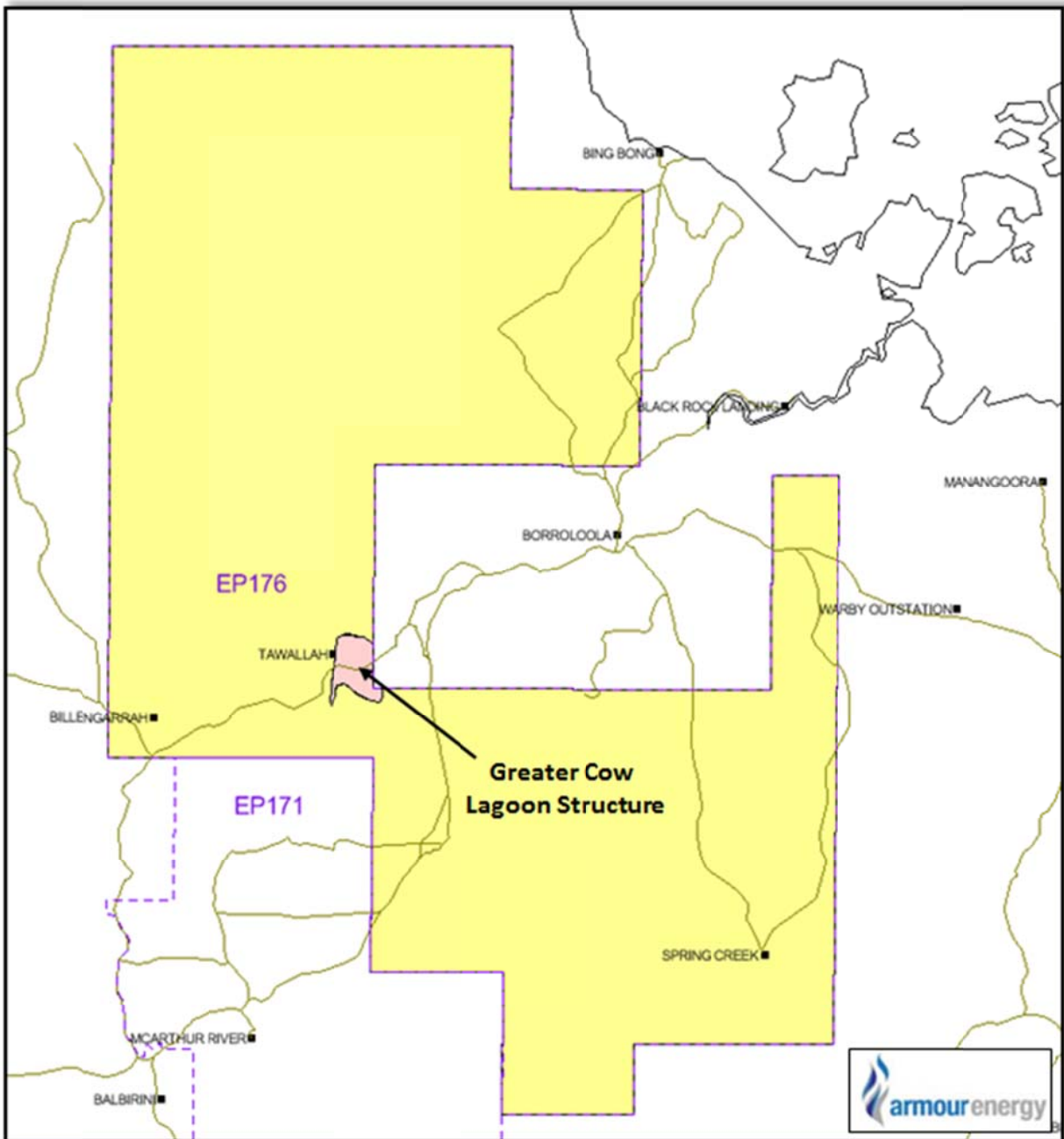


Figure 4: Location Map of the Greater Cow Lagoon Structure.