



PART 4

BE08 INJUNE SEISMIC SURVEY

SEISMIC SURVEY REPORT

ATP 854P – QUEENSLAND

Lines
BE08-13
BE08-14
BE08-15

Blue Energy Limited
A.C.N. 054 800 378
Suite 15A
Central Brunswick
421 Brunswick Street
Fortitude Valley QLD 4006

October 2009

TABLE OF CONTENTS

1.0	INTRODUCTION	2
2.0	LOCATION	2
3.0	GEOLOGY.....	2
3.1	SURAT BASIN.....	2
3.1.1	Walloon Coal Measures	3
3.2	BOWEN BASIN	3
3.2.1	Bandanna Coal Measures.....	4
4.0	ATP 854P	8
4.1	PREVIOUS SURVEYS	8
4.2	WELL CORRELATION	8
5.0	OPERATIONS.....	10
5.1	ACQUISITION	10
5.2	BIRD DOGGING.....	10
5.3	PROCESSING.....	10
5.4	INTERPRETATION	10
6.0	PROSPECTS AND LEADS	11
7.0	REFERENCES	18
8.0	INTERPRETED SECTIONS	20

TABLE OF FIGURES

Figure 1	- Startigraphy of the Surat and Bowen Basins (Korsch & Toterdel 2009)	5
Figure 2	ATP 854P on structural setting of the Surat and Bowen Basins	6
Figure 3	Bowen Basin top of coal time structure map.....	7
Figure 4	Shotpoint basemap displaying nearby well positions and BE08 Injune seismic survey	13
Figure 5	Shotpoint basemap showing BE08 Injune and existing seismic surveyus and wells within ATP854P	14
Figure 6	Top Bandanna time map	15
Figure 7	top Hutton time map	16
Figure 8	top Taroom Coal Measures time map.....	17

1.0 INTRODUCTION

During the period from the 27th to the 28th of October in 2008 Terrex Seismic of Bibra Lake, WA, acquired 28.98km of seismic data consisting of three lines. The data was recorded using a 20m station interval and 120 live channels. Vibroseis was used as the data source and these conducted sweeps between pegs at every second station creating 30 fold data. This seismic was the second phase of seismic acquired by Blue Energy Limited in ATP 854P.

Surveying, chaining and pegging was conducted by Dynamic Satellite Surveys of Yeppoon Qld between the 17th and 20th of October. Their operations report has been included as Appendix C of this report.

The survey was processed by Fugro Seismic Imaging Pty Ltd., 69 Outram Street, West Perth WA 6005 between November 2008 and January 2009.

2.0 LOCATION

The survey is located within 30km to the east of the town of Injune which is approximately 100km north of Roma in Central Queensland. The survey area overlies a portion of the Bowen and Surat Basins. It lies at the southern limit of the Denison Trough where it merges with the Roma shelf.

The main objective of the survey is to determine the depth and structure of the coals of the Bandanna Coal Measures.

3.0 GEOLOGY

The BE08 Injune Seismic Survey was conducted in the south-western Denison Trough, Central Queensland. The target was the Bandanna Formation, which is located in the southern part of the Bowen Basin and underlies the formations of the Surat Basin. Formations from both basins were imaged by the BE08 Injune Seismic Survey.

3.1 SURAT BASIN

The Surat Basin is a large intracratonic basin of Mesozoic age covering approximately 300,000km² of southeastern Queensland and northern New South Wales. The basin forms part of the larger Great Australian Basin (Green et al, 1997), and interfingers westward across the Nebine Ridge with the Eromanga Basin, and eastward across the Kumberilla Ridge with the Clarence-Moreton Basin (Exon, 1976). Basement blocks consisting of the Central West Fold Belt and the New England Fold Belt limit the basin to the south, while in the north the basin has been eroded and

unconformably overlies Triassic and Permian sediments of the Bowen Basin.

Structurally, the Surat Basin is relatively simple, with the area of maximum deposition, the Mimosa Syncline, overlying the thickest Permian-Triassic rocks in the Taroom Trough of the underlying Bowen Basin (Day et al., 1983). Major faulting within the basin predominantly mirrors basal boundary faults of the underlying Bowen Basin. There is substantial folding across the basin, which is due to compaction and draping, as well as some rejuvenation of older pre-Jurassic structures and faults. Formations outcrop along the northern erosional boundary and dip gently to the south and southwest at less than 5 degrees.

The Surat Basin contains up to 2,500m of sedimentary rocks deposited during the Latest Triassic to Early Cretaceous periods. The succession consists of five fining-upwards sedimentary cycles dominated by fluvio-lacustrine deposits (Exon, 1976; Exon and Burger, 1981; Day et al, 1983). The lower part of each cycle typically comprises coarse-grained mature sandstone, grading up into more labile sandstone and siltstone, with mostly siltstone, mudstone and coal in the upper part. In the Cretaceous, inundation of the land through an increase in sea level led to deposition of predominantly coastal plain and shallow marine sediments in three cycles (Hoffman et al 2009). The Walloon Coal Measures forms the upper part of the middle cycle (Supersequence K).

3.1.1 Walloon Coal Measures

Supersequence K includes the Walloon Coal Measures including the Eurombah Formation and the underlying Hutton Sandstone. The Middle Jurassic Walloon Coal Measures (WCM) forms part of the Injune Creek Group and is developed throughout the Surat Basin, ranging in thickness from less than 50m to greater than 700m Scott et al. (2004). In the northeast Surat Basin, the formation was raised by Jones and Patrick (1981) to subgroup status and, in stratigraphic order, was divided into the Taroom Coal Measures, Tangalooma Sandstone and Juandah Coal Measures.

Hoffman et al 2009 picked a seismic sequence boundary S40 at the top of the Walloons and S30 at the base of the Hutton sandstone. A further seismic sequence boundary S35 was picked at the base of the Walloon Coal Measures. The S35 horizon reflection was variable from weak to strong due to rapid lateral facies changes.

It has been attempted here to pick further subdivision at the top of the Taroom Coal Measures and pick the top of the Hutton Sandstone

3.2 BOWEN BASIN

The Permo-Triassic Bowen Basin forms the northern extension of the Bowen-Gunnedah-Sydney Basin System in Queensland and New South Wales. The Bowen Basin is unconformably overlain by the sedimentary sequences of the Surat Basin as previously mentioned. The Bowen Basin comprises several sub-basins; the Taroom Trough (50,000km²) along the eastern margin, the Denison Trough (15,000km²) along the western margin and the Comet Ridge which separates

them both (Anthony, 2004).

The basin began as an extensive north-south trending back-arc, resulting from continent-ocean plate convergence (Veever et al., 1982). Early Permian back-arc extension on the western margins of the basin produced a series of half grabens, including the Denison Trough, where initial deposition commenced. Transgression of the sea westwards allowed delta systems to develop around the western and northern margins of the basin which continued into the Late Permian (Fielding et al., 1990a).

Compression in the Late Permian caused uplift and deformation of the eastern region of the basin containing alluvial volcano-lithic sediments. By the end of the Permian, the prograding deltas infilled the remaining land-locked sea westwards forming the Black Alley Shale and resulting in peat-forming swamps forming the Bandanna Formation, Rangal Coal Measures and the Baralaba Formation (Fielding et al., 1990a).

The Bandanna Formation was deposited on the western margin of the Bowen Basin in a deltaic system infilling a large lake (represented as the Black Alley Shale) during the Late Permian. The formation has been correlated southward from the Denison Trough to the Roma Shelf (Paten & Groves, 1974) and consists of dominantly labile sandstone and coal with interbeds of siltstone and mudstone, ranging between 50 to 100m thick. The basal part of the formation is finer grained, coarsening upward to predominantly sandstone and, finally, coal (Exon, 1976).

3.2.1 Bandanna Coal Measures

The Bandanna Formation conformably underlies the Late Permian to Early Triassic Rewan Group which are eroded alluvial volcano-lithic sediments and were deposited across the basin. This thick succession consists mainly of quartzose sandstone and is known as the Clematis Formation and the Showgrounds Sandstone (subsurface equivalent of the upper Clematis Group) on the western side of the Bowen Basin (Butcher, 1984).

This forms the seismic sequence boundary B70 of Brakel et al 2009 which is a well defined because of the very strong reflection events. These high amplitude reflections are generated by the acoustic impedance contrast of the coal within the Bandanna Formation This horizon was mapped here as the top of the Bandanna Formation.

Major compression during the Mid to Late Triassic resulted in fault reversal and regional uplift, allowing the erosion of up to 3000m of section from the Bowen Basin (Fielding et al., 1990b). The present eastern margin of the Bowen Basin is bounded by a series of north-south trending faults, which are generally westward directed thrusts (Murray, 1985).

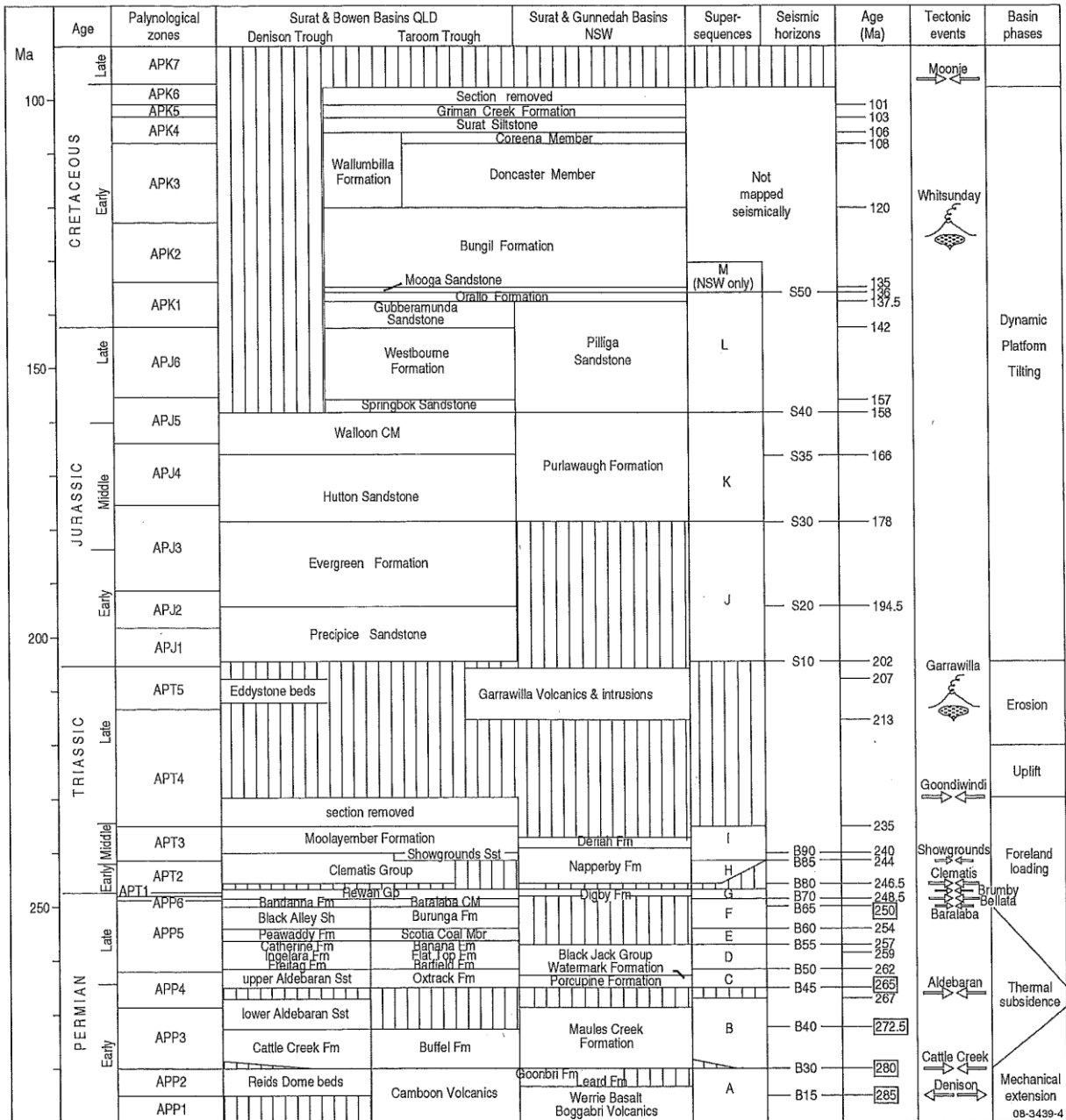


Figure 1 - Stratigraphy of the Surat and Bowen Basins (Korsch & Toterdehl 2009)

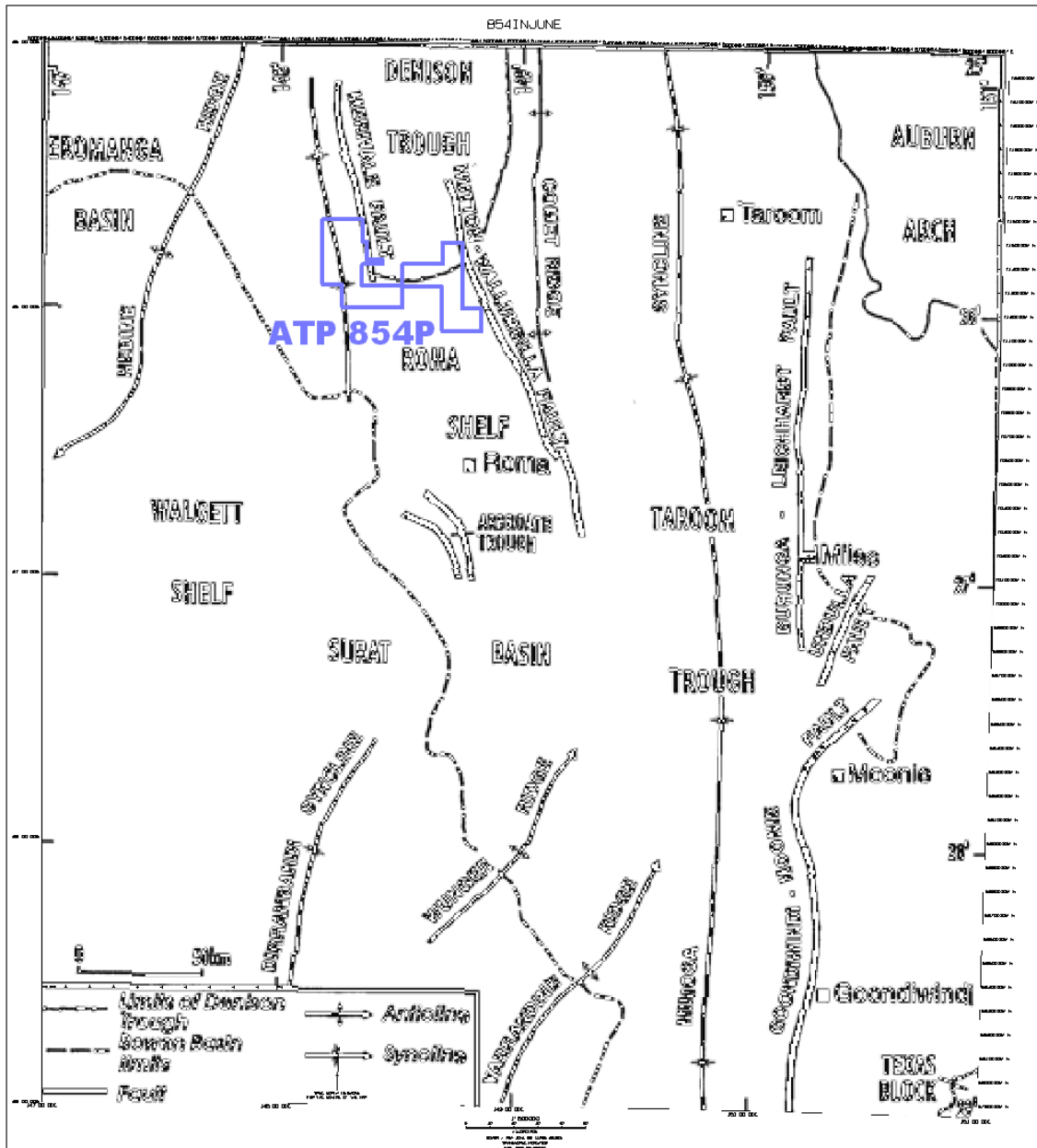


Figure 2 ATP 854P on structural setting of the Surat and Bowen Basins

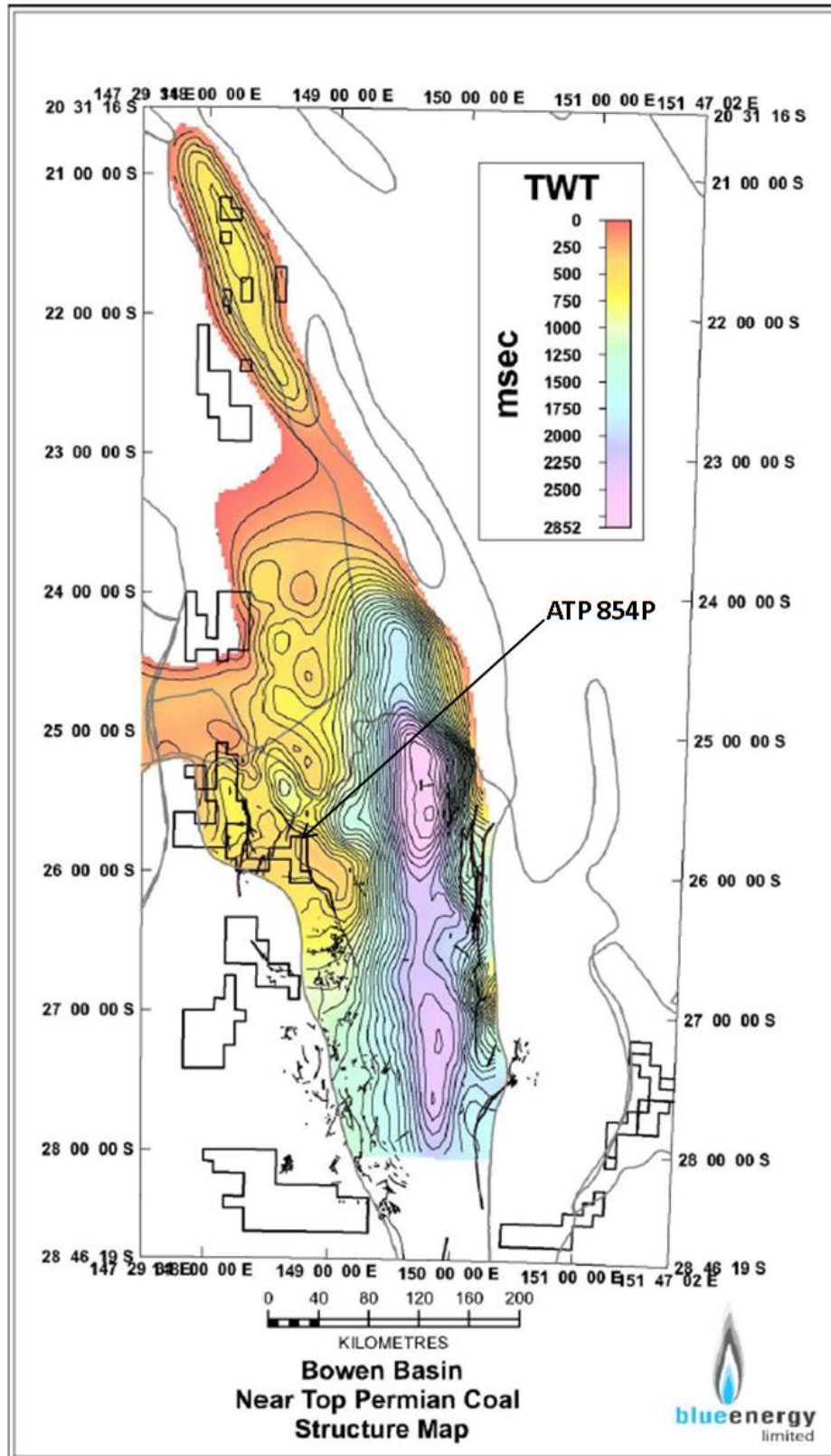


Figure 3 Bowen Basin top of coal time structure map

4.0 ATP 854P

The BE08 Injune Seismic Survey consisted of three lines and was conducted in the eastern portion of ATP 854P.

ATP 854P consists of 16.5 graticular blocks or 1,265km² and was granted to Blue Energy as the sole title holder, for a twelve year term in July 2007. The acquisition of the 07COB survey complies with a work commitment made under ATP854P to the Queensland Department of Mines and Energy to undertake 200km of seismic survey.

4.1 PREVIOUS SURVEYS

The proximity to the Denison Trough and the conventional fields of that region have resulted in ample previous seismic coverage to the north and west of this survey. The seismic shot point basemap shows how these surveys integrate with the existing surveys. These surveys are listed below:

Year	Survey	Prefix	Operator
1979	Eddystone	79-E	AAR Limited
1981	Huttonvale	81-H	CSR
1983	Merrivale Detail	83-E	CSR
1985	Killoran	85-K	CSR
1988	Marengo	88-M	CSR
1990	AD90	AD90	AGL
1991	AD91	AD91	AGL
2007	Cobalt	07COB	BUL

Table 1 Previous Surveys in ATP854

4.2 WELL CORRELATION

At the time of conducting the survey Rosewood 1 was the only conventional or Coalbed Methane well drilled within the survey area. There are other wells on existing seismic lines adjacent to the survey area, these are listed below:

TOG Taringa 1 was drilled to 1150m depth to intersect the Bandanna Coal Measures at 1040m. This well was drilled as a coal bed methane well. A sonic log was run from 194 m to 1038m. The well is on seismic line AD90-23 at station 1455.

TOG Euroa East 1 was drilled to 1200m depth to intersect the Bandanna Coal measures which were encountered at 1001m. This well was drilled as a coal bed methane exploration well. The well was drilled near station 608 on seismic line AD90-23. A sonic and Density log have been run

AAO Rosewood 1 was drilled to 632m depth to intersect granitic basement at 628m overlain by Moolayember Formation. The well was a conventional petroleum exploration well a minor oil show in the Precipice Formation was noted. The well was drilled in 1962 prior to any seismic viewed here

but is near station 296 on line 07COB-05

AGL Upson 1 is a conventional petroleum exploration well drilled near station 314 on seismic line AD91-39 in the western portion of ATP 854P. Being a conventional well it was drilled on a structural high where Bandanna Formation Coal has been eroded. A sonic and density log has been run. The well reached a depth of 699m.

AGL Reben Downs 1 is a conventional petroleum exploration well drilled to a total depth of 947m into granitic basement. It is situated near station 175 on seismic line 83-E324. The well is situated on a structural high where the Bandanna Formation has been eroded. A sonic and Density log has been run.

AAO Killoran 1 is a conventional petroleum exploration well drilled prior to seismic that is viewed here being recorded. It is located near station 427 on seismic line 83-E324. The well was drilled to a depth of 716m and was completed in the basement Timbury Hills Formation.

TOG Round Mountain 1 was drilled to a depth of 1362m to encounter the Bandanna Coal Measures as a coal bed methane exploration well. The well is situated near the end of line 07COB-01 and can be used as depth guide

AGL Chesney 1 was drilled as a conventional petroleum exploration well and reached 1055m depth in granitic basement. The Bandanna Formation and Hutton Sandstone were present in this well. It is situated near station 196 on seismic line 79-E5. A check shot survey was run by Schlumberger

BUL Cobalt 1 was drilled to a depth of 959m to intersect the Bandanna Coal Measures. This well was drilled as coal bed methane exploration well. A sonic log was run from 181 to 944m depth as well as density from near surface to total depth. This well is situated near station 981 on line 07COB-05.

BUL Cerulean 1 was drilled to a depth of 1110m to intersect the Bandanna Coal Measures. This well was drilled as coal bed methane exploration well. A sonic log was run from near surface to 1105m depth as well as density from near surface to 1103m. This well is situated near station 1003 on line 07COB-02.

BUL Cerulean 2 was drilled to a depth of 1147m to intersect the Bandanna Coal Measures. This well was drilled as coal bed methane exploration well. A sonic log was run from 416m to 1139m depth as well as density from near surface to 1136m. This well is situated near station 956 on line 07COB-02.

5.0 OPERATIONS

5.1 ACQUISITION

The data was acquired on the 27th and 28th of October 2008 by Terrex Seismic of Bibra Lake WA. They have provided an operations report which is included as an appendix. These operations have been included as Appendix G of this report

Line	Start VP	End VP	Km	Date Shot
BE08-13	533	200	6.66	28 th
BE08-14	297	851	12.88	27 th
BE08-15	679	201	9.56	28 th
TOTAL			29.10	

Table 2 line statistics

5.2 BIRD DOGGING

Field operations were conducted with the help of field supervisor Mark Kneipp. His report on operations has been included in Appendix J of this report

5.3 PROCESSING

The data was processed by Fugro Seismic Imaging Pty Ltd., 69 Outram Street, West Perth WA. They have provided a processing report which is included as Appendix K of this report.

5.4 INTERPRETATION

Three time structure maps have been prepared; the top of the Taroom Coal Measures, the near top of the Hutton Sandstone and top of the Bandanna coal measures.

Static shifts were calculated for processing the data using a datum elevation of 200m with a replacement velocity of 2500m/sec. A bulk shift of 200msec was also applied to this data during processing. The BE08 Injune Seismic Survey was tied to the 07COB Seismic Survey which has been corrected to a sea level datum for interpretation. This was done by integrating the sonic log from Blue Energy Wells Cerulean 1 and Cobalt 1 and then matching the top Bandanna pick to the prominent reflector on the seismic. To correct sea level to zero time, a shift of -.315 seconds was applied to the 07COB Seismic Survey. The BE08 Injune Seismic Survey was shifted by -500msec to tie to the 07COB Seismic Survey. Data from previous work has been included to the west and north and south. To tie the AGL/CSR/AAR data a bulk shift of -.515 was applied.

5.4.1 The top of the Bandanna Formation

The top of the Bandanna formation is well defined. The Bandanna formation contains thick coal seams whereas the overlying Rewan Group sediments contain thick succession of often homogeneous overbank deposits and poorly interconnected channel deposits. This boundary produces very strong reflection events (Brakel et al 2009).

5.4.2 The near top of the Hutton Sandstone

Below the strong parallel and bifurcating reflectors representing the coal measure sequences of the Walloons is a zone of weak reflectors. Within this weak zone lie the Hutton Sandstone and the base of the Walloon Coal Measures. This boundary is indistinct as there is a gradual change from the overlying Eurombah Formation and the lower coal measure sequences to the Hutton Sandstone. The top of the Hutton Sandstone has been picked as the top of the weak reflection zone. This pick needs to be correlated from drill holes. In this case it was correlated from the wells above which intersected the top of the Hutton and were positioned on or near seismic lines such as Taringa 1, Euroa East 1 and Chesney 1, and the Blue Energy wells Cobalt 1, Cerulean 1 and Cerulean 2. (This is seismic reflector S35 within supersequence K of Hoffman et al 2009).

5.4.3 The top of the Taroom Coal Measures.

The Taroom Coal Measures form the basal coal measure sequence of the Walloon Coal Measures. This is separated from the upper Juandah Coal Measures by the Tangalooma Sandstone. The Taroom Coal Measure sequence can be seen on seismic as increase in seismic amplitudes.

This top has been picked from coal exploration wells that occur on or near seismic lines. The pick is quite often within the near surface zone and hence less reliable. However beneath this and before the start of the Hutton are some coherent reflectors that may or may not be indicative of coal seams in this near surface horizon.

6.0 PROSPECTS AND LEADS

The survey is based on Coal Bed Methane exploration requirements where potential closures with potential for free flowing gas are not the targets. What is required is to determine the structural nature of the top coal surface.

The Bandanna Formation onlaps the Roma Shelf along the south of ATP 854P at around 750m depth, from there it dips toward the north into a graben bound by the Omeo-Chesney-Upson Fault Trend and the Hutton-Wallumbilla Fault Trend. It reaches its greatest depth against the Hutton Wallumbilla Fault Trend where it exceeds 1300m.

In the western portion of ATP 854P The Bandanna Coal Measures have been uplifted with the structural inversion of the Denison Trough and have been eroded from the crest of this high.

Further to the west the Merivale Syncline holds the coal at a depth of 1500m in the east where it gradually dips upward to where it is eroded at around 800m depth.

The Walloon Coal Measures dip gradually and unevenly to the south. The outcrop zone runs east west through ATP 854P. The Surat Basin sequence is not faulted but forms drape structures that reflect the underlying Bowen Basin Structure. The top of the Taroom Coal Measures occur at shallow depths less than 270m in ATP854P.

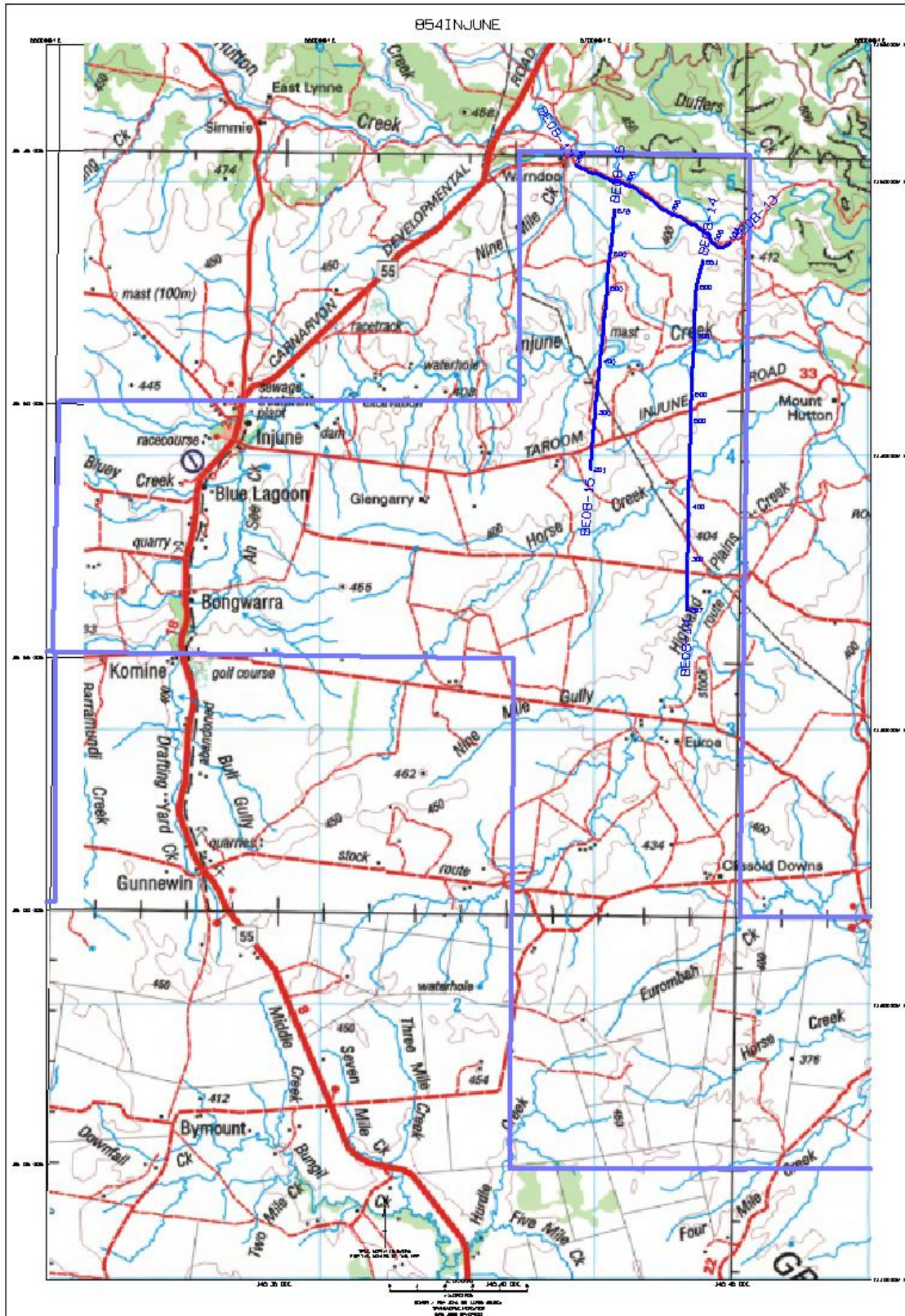


Figure 4 Shotpoint basemap displaying nearby well positions and BE08 Injune seismic survey

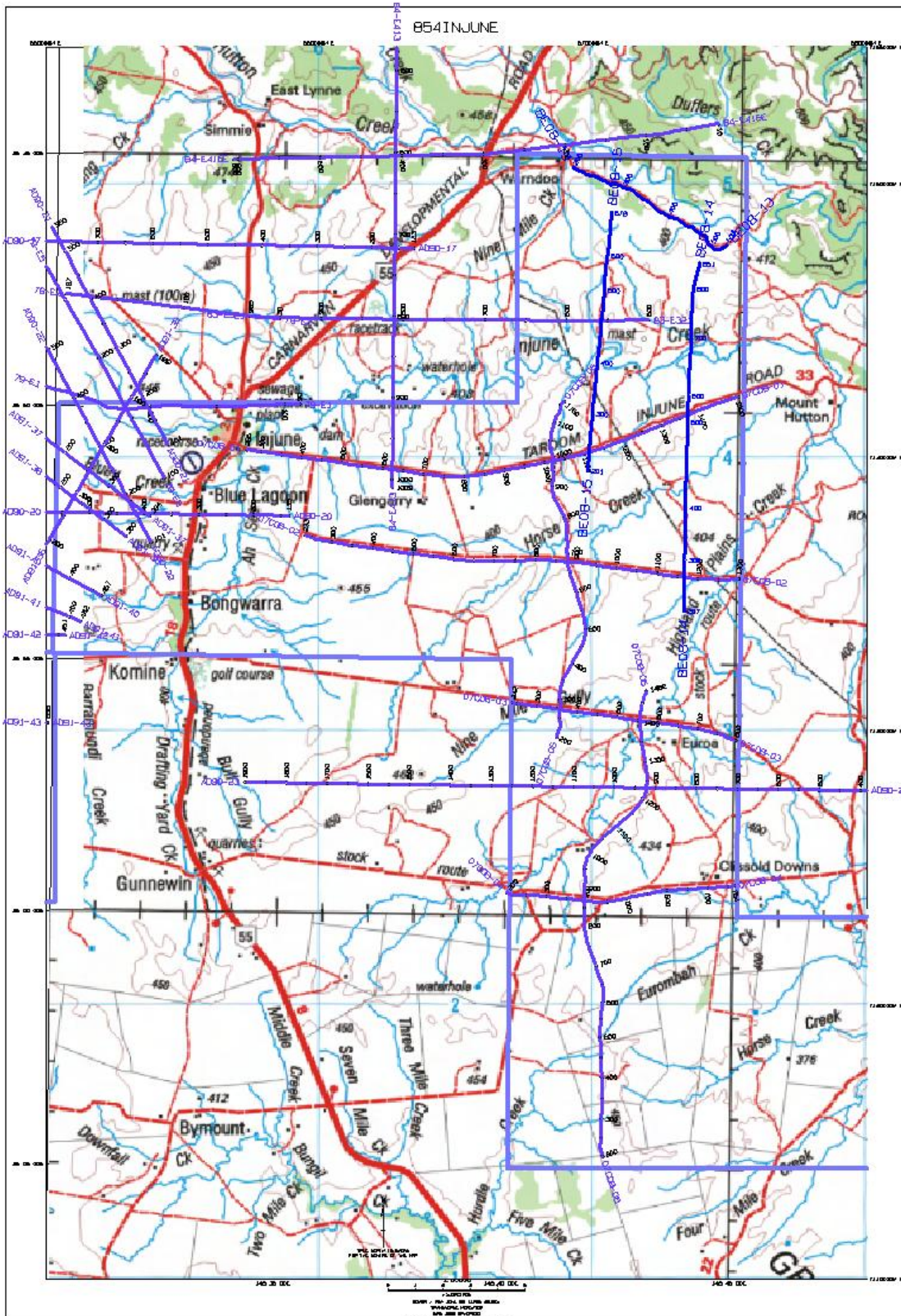


Figure 5 Shotpoint basemap showing BE08 Injune and existing seismic surveys and wells within ATP854P

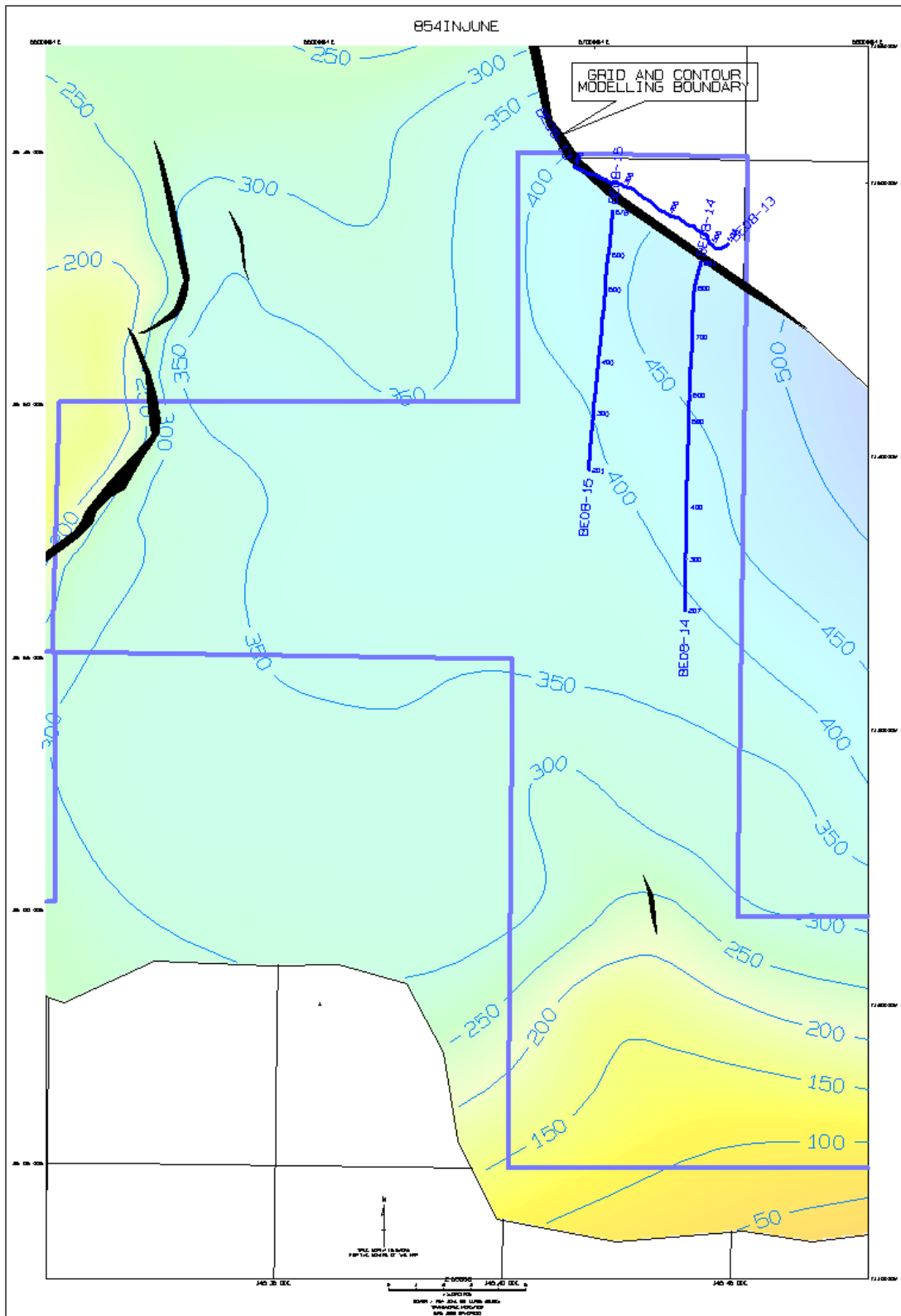


Figure 6 Top Bandanna time map

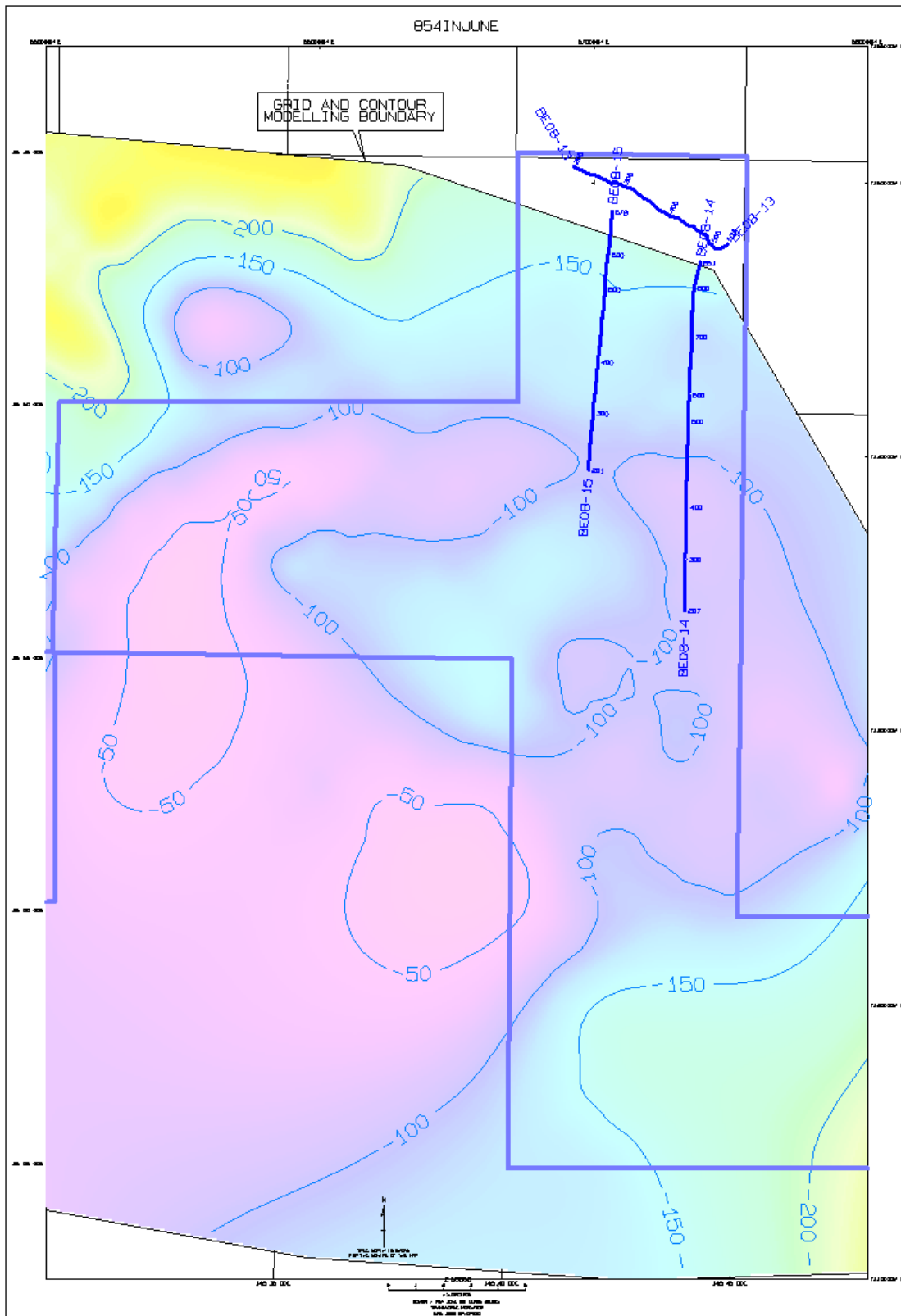


Figure 7 top Hutton time map

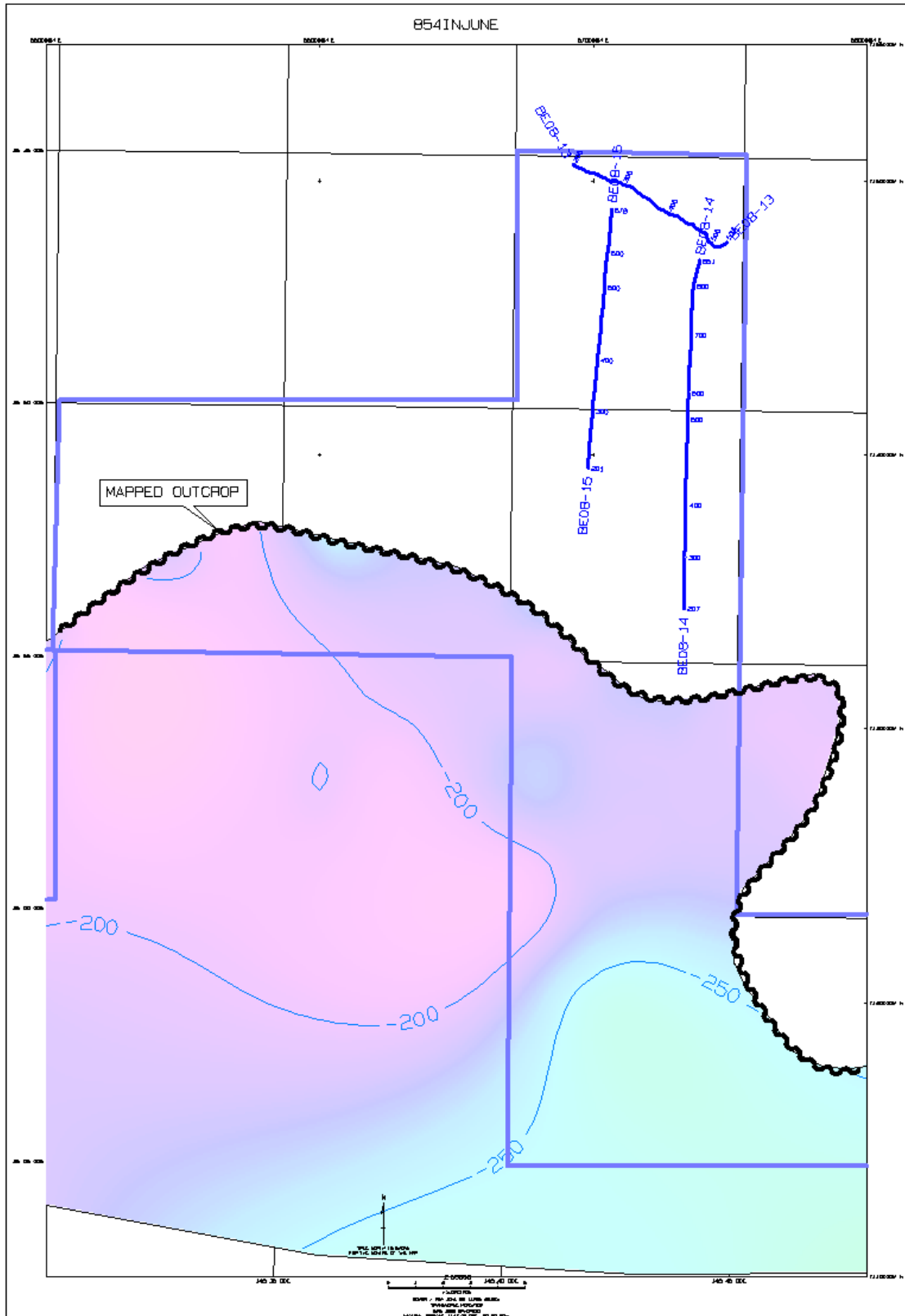


Figure 8 top Taroom Coal Measures time map

7.0 REFERENCES

- ANTHONY, D.P., 2004: A review of recent conventional petroleum exploration and in-field gas reserves growth in the Denison Trough, Queensland. *In: Boulton, P.J., Johns, D.R., Lang, S.C. (editors), PESA's Eastern Australasian Basins Symposium II: Conference Proceedings, Adelaide, South Australia, 19th – 22nd September 2004, Petroleum Exploration Society of Australia, 277-296.*
- BRAKEL, A.T., TOTTERDELL, J.M., WELLS, A.T. & NICOLL, M.G., 2009: Sequence stratigraphy and fill history of the Bowen Basin, Queensland: *Australian Journal of Earth Science*, **56**, 401-432.
- BUTCHER, P.M., 1984: The Showgrounds Formation, its setting and seal, in ATP 145P Queensland. *The APEA Journal*, **24**, 336-357.
- DAY, R.W., WHITAKER, W.G., MURRAY, C.G., WILSON, I.H., AND GRIMES, K.G., 1983: Queensland Geology. *Geological Survey of Queensland Publication*, **383**.
- EXON, N.F., 1976: Geology of the Surat Basin, Queensland. *Bureau of Mineral Resources, Geology and Geophysics, Bulletin*, **166**.
- EXON, N.F. AND BURGER, D., 1981, Sedimentary cycles in the Surat Basin and global changes of sea level. *BMR Journal of Australian Geology and Geophysics*, **6**, 153-159.
- FIELDING, C.R., FAULKNER, A.J., KASSAN, J., & DRAPER, J.J., 1990a: Permian and Triassic depositional systems in the Bowen Basin. *In: Beeston, J.W. (compiler): Proceedings of the Bowen Basin Symposium, Mackay, Queensland, September 1990, GSA (Queensland Division), 21-25.*
- FIELDING, C.R., GRAY, A.R.G., HARRIS, G.I., & SALOMON, J.A., 1990b: The Bowen Basin overlying Surat Basin. *In: Finlayson, D.M. (compiler/editor): The Eromanga-Brisbane Geoscience Transect: A guide to basin development across Phanerozoic Australia in southern Queensland. Bureau of Mineral Resources, Geology and Geophysics Bulletin*, **232**, 133-151.
- GREEN, P.M., HOFFMANN, K.L., BRAIN, T.J., AND GRAY, A.R.G., 1997: Project aims and activities, exploration history and geological investigations in the Bowen and overlying Surat Basins, Queensland. *In: Green, P.M. (Editor.), 1977: The Surat and Bowen Basins, south-east Queensland. Queensland Minerals and Energy Review Series, Queensland Department of Mines and Energy, 1-11.*
- HOFFMANN, K.L., TOTTERDELL, J.M., DIXON, O., SIMPSON, G.A., BRAKEL, A.T., WELLS, A.T. & MCKELLAR, J.L., 2009: Sequence stratigraphy of the Jurassic strata in the lower Surat Basin succession, Queensland: *Australian Journal of Earth Science*, **56**, 461-476.
- KORSCH, R.J. & TOTTERDELL, J.M., 2009: SUBSIDENCE HISTORY AND BASIN PHASES OF THE BOWEN GUNNEDAH AND Surat Basins, eastern Australia. *Australian Journal of Earth Science*, **56**, 335-353.

MURRAY, C.G., 1985: Tectonic setting of the Bowen Basin. *Bowen Basin Coal Symposium, November 1985, Geological Society of Australia Coal Geology Group. GSA Abstracts*, **17**, 5-14.

PATEN, R.J. & GROVES, R.D., 1974: PERMIAN STRATIGRAPHIC NOMENCLATURE AND STRATIGRAPHY, ROMA AREA, QUEENSLAND. *Queensland Government Mining Journal*, **75**, 344-354.

VEEVERS, J.J., JONES, J.G. & POWELL, C.MCA., 1982: TECTONIC FRAMEWORK OF AUSTRALIA'S SEDIMENTARY BASINS. *APEA Journal*, **22**, 283-300.

8.0 INTERPRETED SECTIONS