07COB COBALT SEISMIC SURVEY

SEISMIC SURVEY REPORT

ATP 854P – QUEENSLAND

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1.0 INTRODUCTION

During the period from the 6th of November to the 16th of November in 2007 Terrex Seismic of Bibra Lake, WA, acquired 84.975km of seismic data consisting of six lines. The data was recorded using a 15m station interval and 260 live channels. Vibroseis was used as the data source and these conducted sweeps between the each peg creating 130 fold data. This seismic was the initial seismic acquired by Blue Energy Limited in ATP 854P.

Surveying, chaining and pegging was conducted by Dynamic Satellite Surveys of Yeppoon Qld between the 4th and 16th of November.

The survey was processed by Velseis Processing of Sumner Park Qld between December 2007 and March 2008.

2.0 LOCATION

The survey is located within 30km to the east and south east of the town of Injune approximately which is 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. A secondary objective is to determine the nature of the structure of the Walloon Coal Measures.

3.0 GEOLOGY

The 07COB 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 07COB seismic survey.

3.1 SURAT BASIN

The Surat Basin is a large intracratonic basin of Mesozoic age covering approximately 300,000km^2 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 Kumbarilla 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 basinal 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

Spuersequence 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 (50,000km^2) along the eastern margin, the Denison Trough (15,000km^2) 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 in-filled 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 impeadance 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).

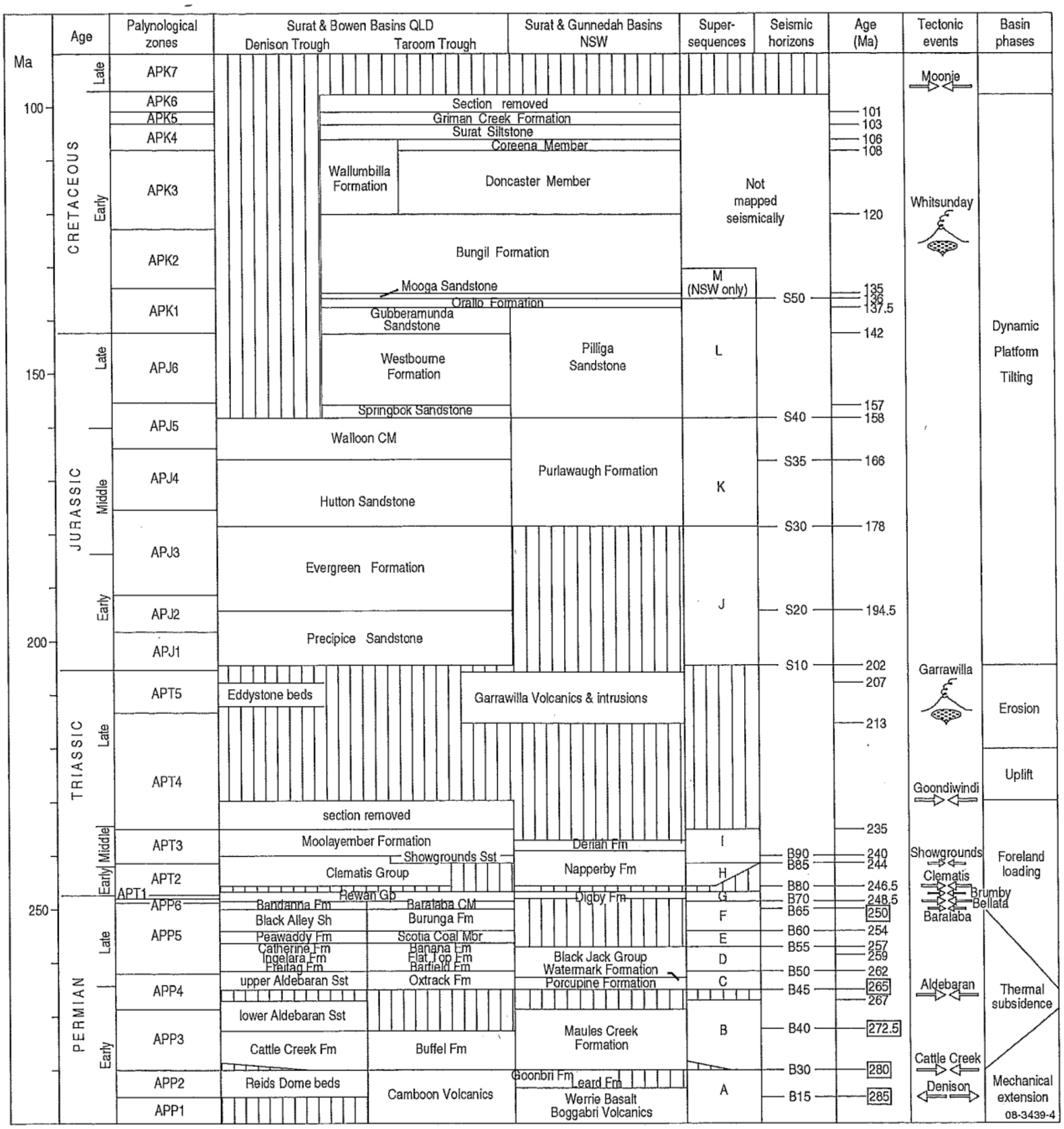

Figure 1 – Stratigraphy of the Surat and Bowen Basins (Korsch & Toterdell 2009)

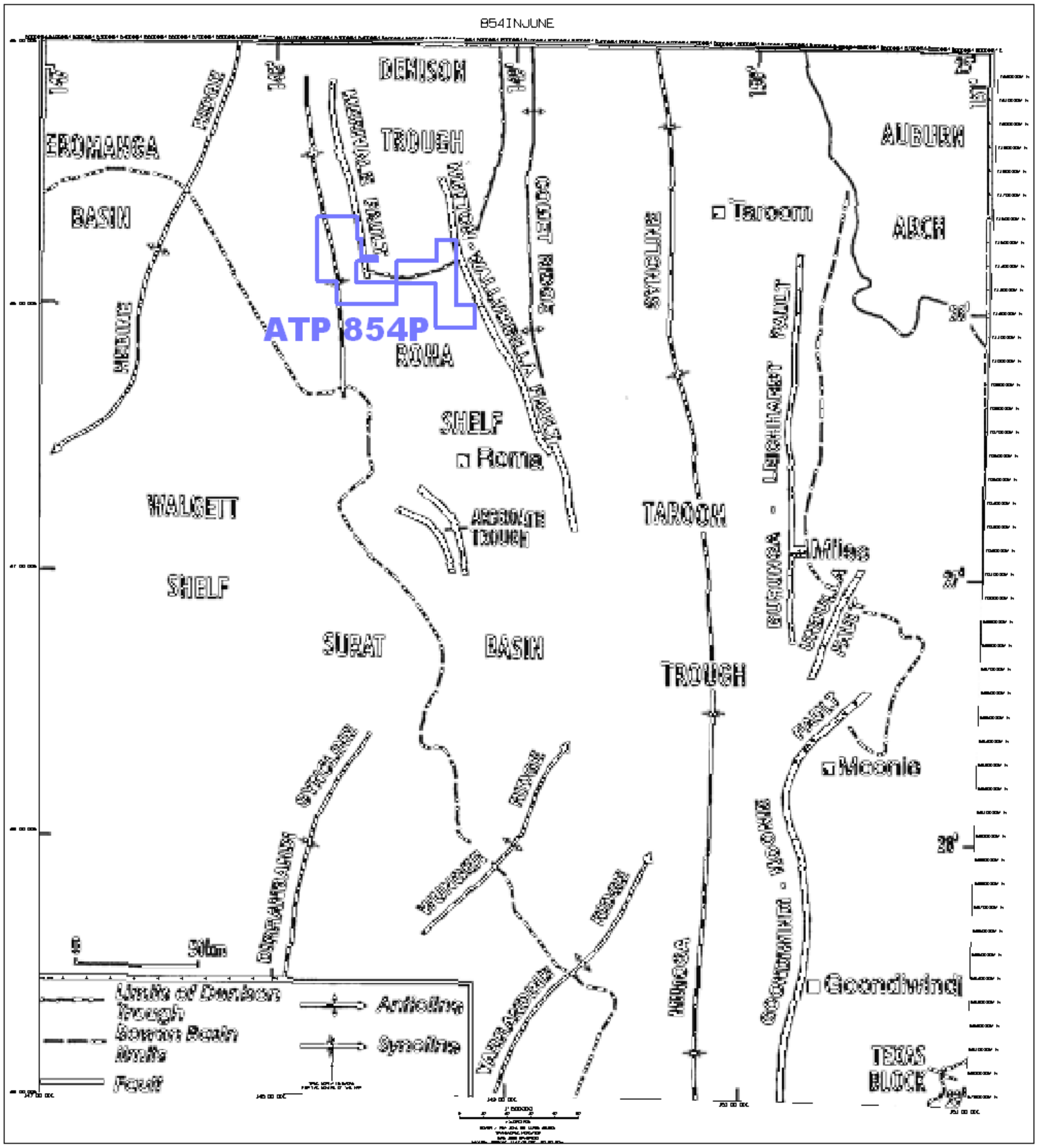

Figure 2 – ATP 854 on Structural setting of the Surat and Bowen Basins

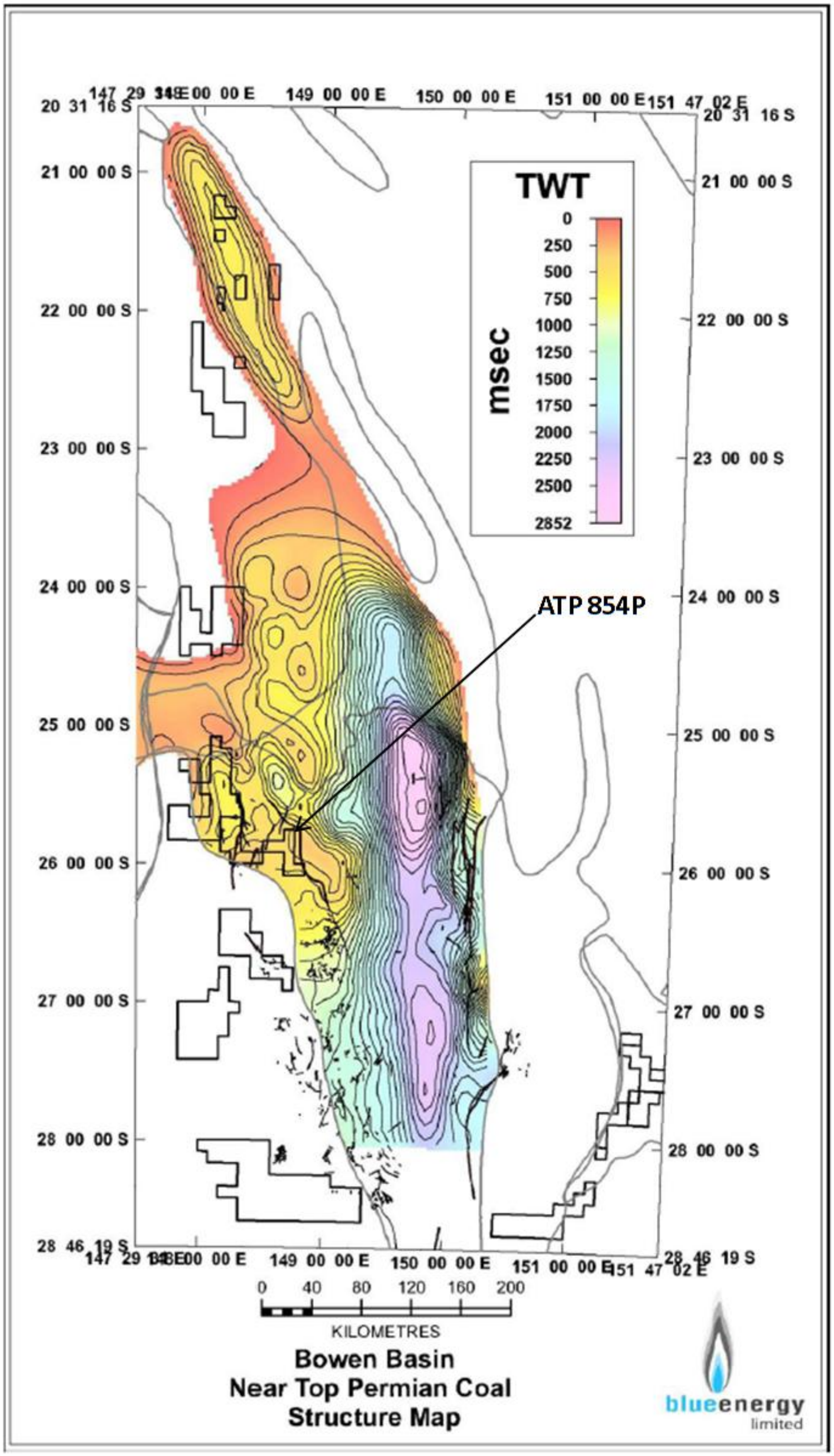

Figure 3 – Bowen Basin Top of Coal Structure Map

4.0 ATP 854P

The 07COB seismic survey consisted of six 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

Table 1 Previous surveys

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 to1200m 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 drille4d 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 drille4d 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 between the 6th and 17th of November 2007 by Terrex Seismic of Bibra Lake WA. They have provided an operations report which is included as an appendix.

Line	Start VP	End VP	Km	Days
07COB01	266	1500	18.510	6th - 8th
07COB02	233	1300	16.005	8th – 9th
07COB03	242	800	8.370	10th – 12th
07COB04	764	200	8.460	12th – 13th
07COB05	200	1482	19.230	13th - 14th
07COB06	200	1160	14.400	15th – 16th
TOTAL			**84.975**	

Table 1 line statistics

5.2 PROCESSING

The data was processed between December 2007 and Mrach 2008 by Velseis Processing of Sumner Park Qld. They have provided a processing report which is included as an appendix.

Velseis provided examples of field records in order to select parameters for spherical divergence, airblast attenuation and prestack FK filter. Stacked sections were provided to select parameters for deconvolution, nmo mute, cdp trim, AGC, migration velocity, bandpass filter tests and eigenvector filter

Velseis provided a 1st pass residual static stack on all lines as well as a final, bandpass filtered and unfiltered stack, and a migrated final section, also bandpass filtered and unfiltered.

5.3 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 500m with a replacement velocity of 3000m/sec. The data 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 2007 Blue Energy data. 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.

5.3.1 The top of the Bandanna Formation

The top of the Bandanna formation is well defined. The Bandana formation contains thick coal seams where as 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).

5.3.2 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 seimic 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).

5.3.3 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.

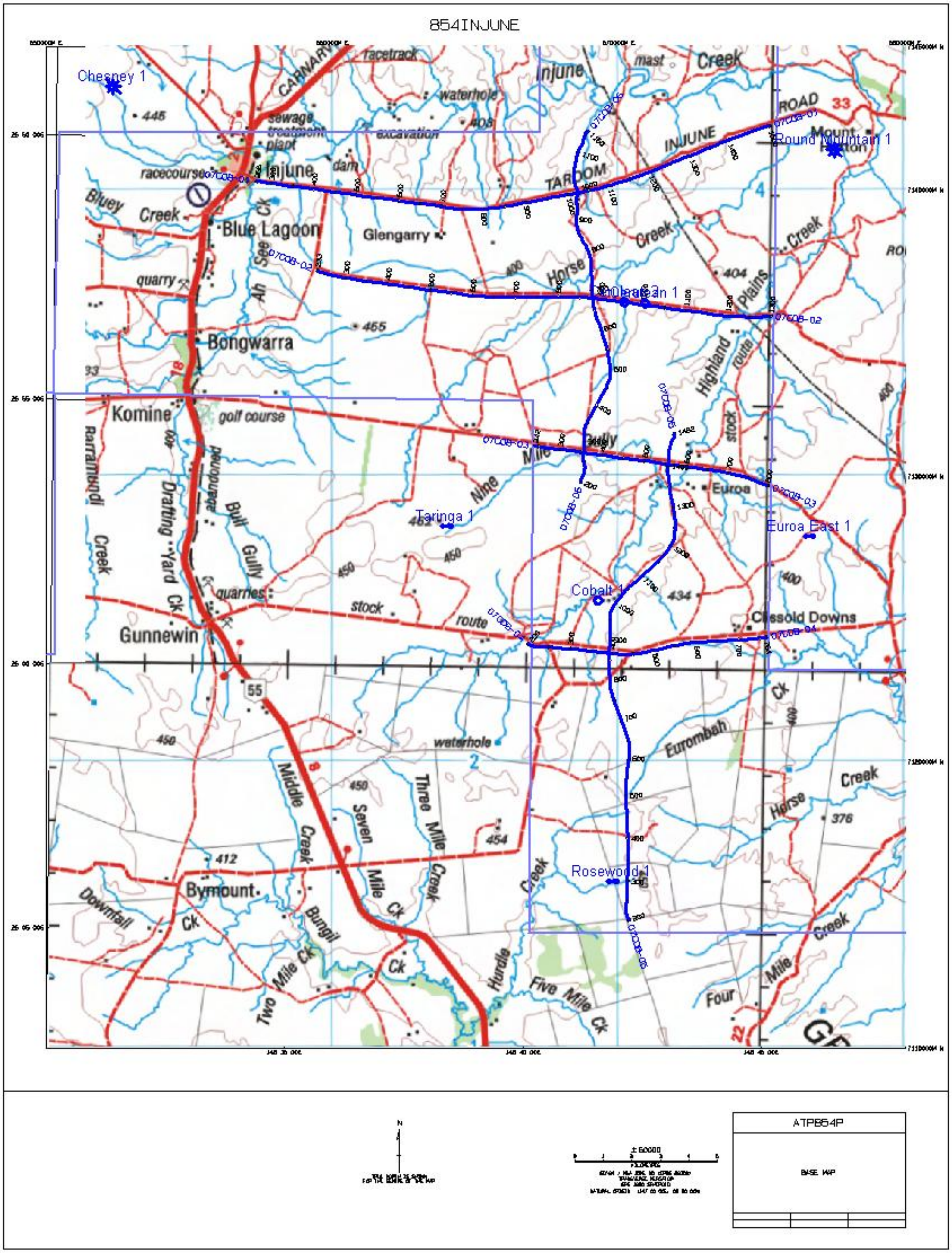

Figure 4 Shotpoint Base Map displaying nearby well positions and 2007 Cobalt seismic Survey

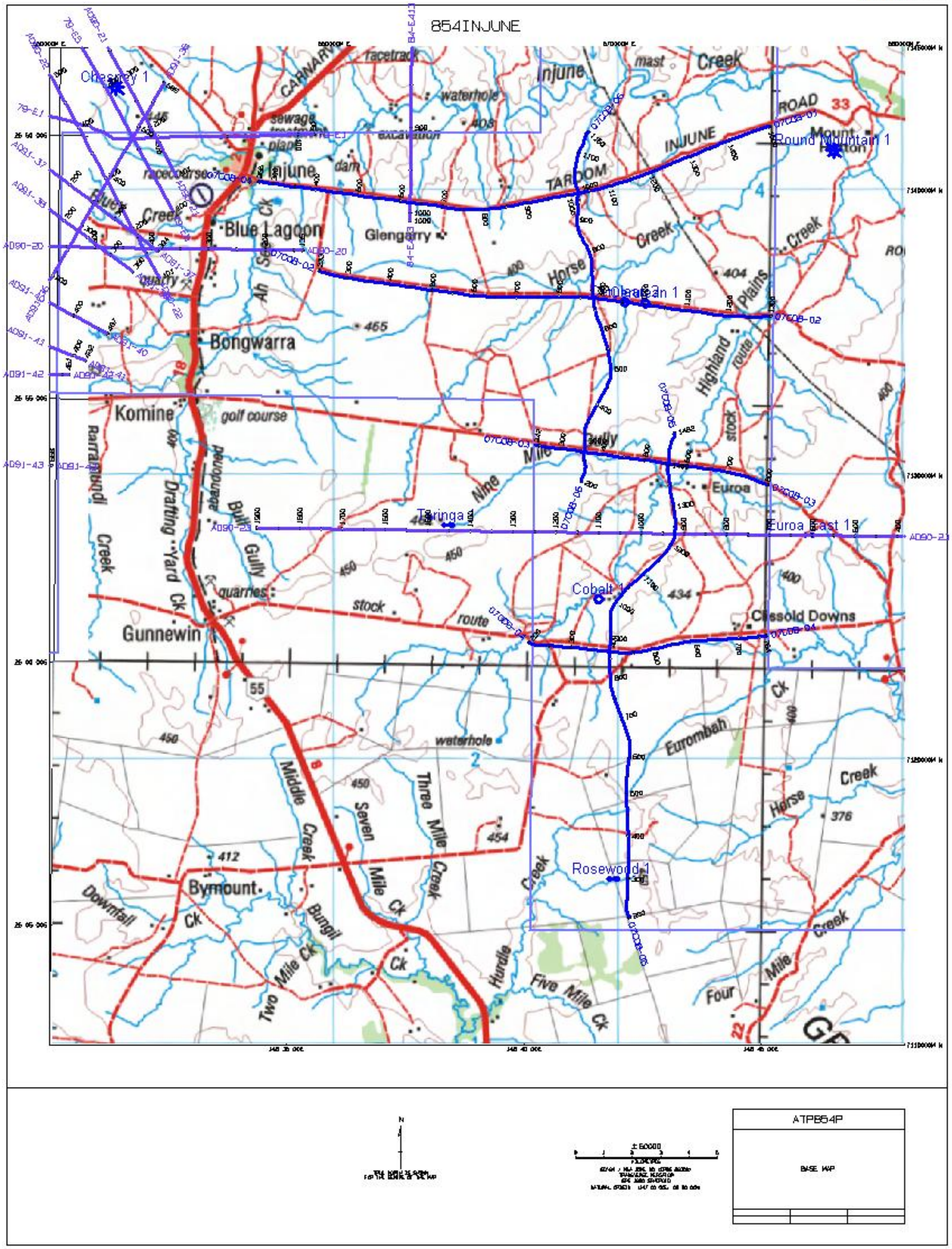

Figure 5 Shot Point basemap showing other seismic surveys and wells within ATP 854P

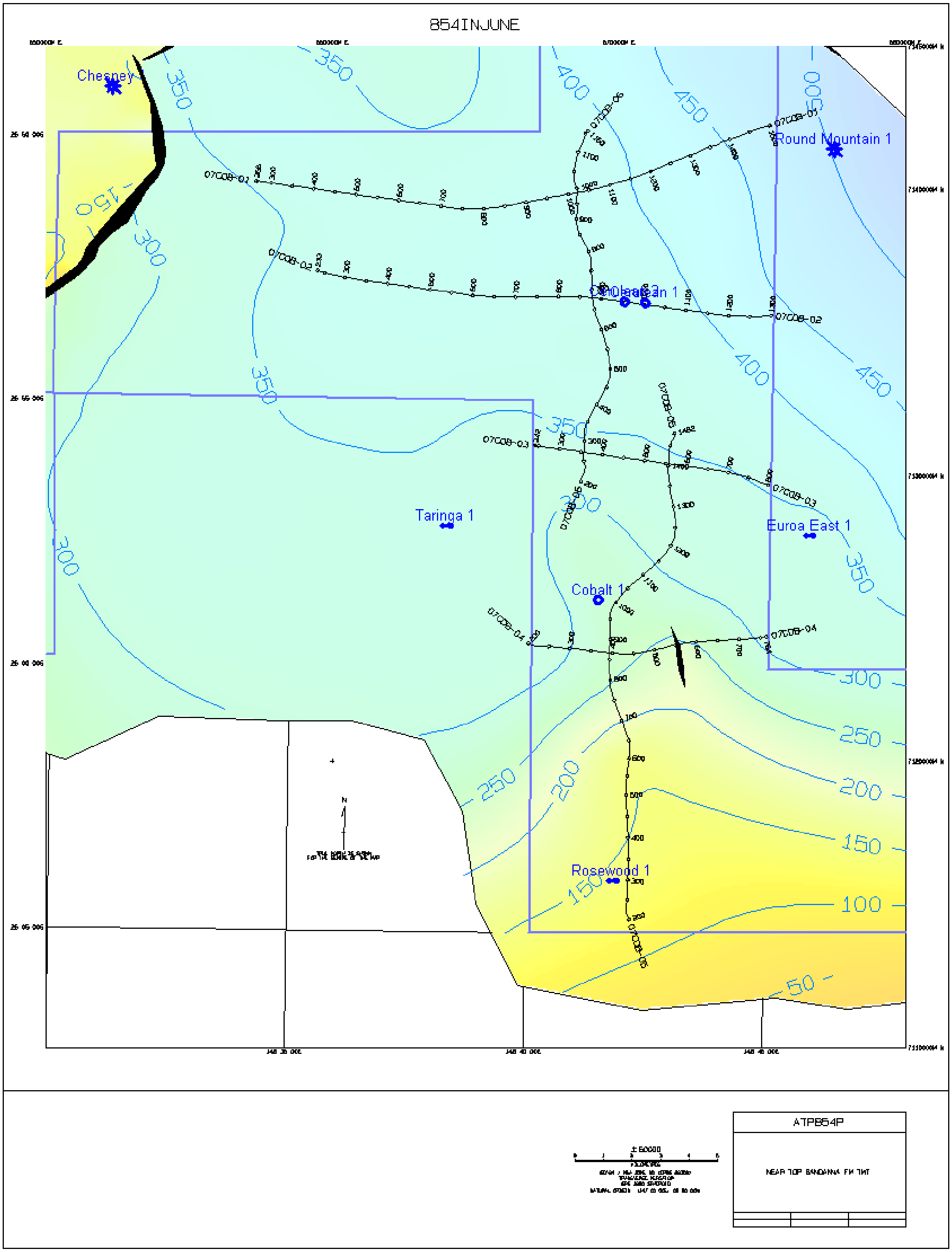
854INJUNE
Chesney
Round Mountain 1
Taringa 1
Euroa East 1
Cobalt 1
Rosewood 1
07COB-01
07COB-02
07COB-03
07COB-04
07COB-05
07COB-06
ATP854P

Figure 6 Top Bandanna Time map

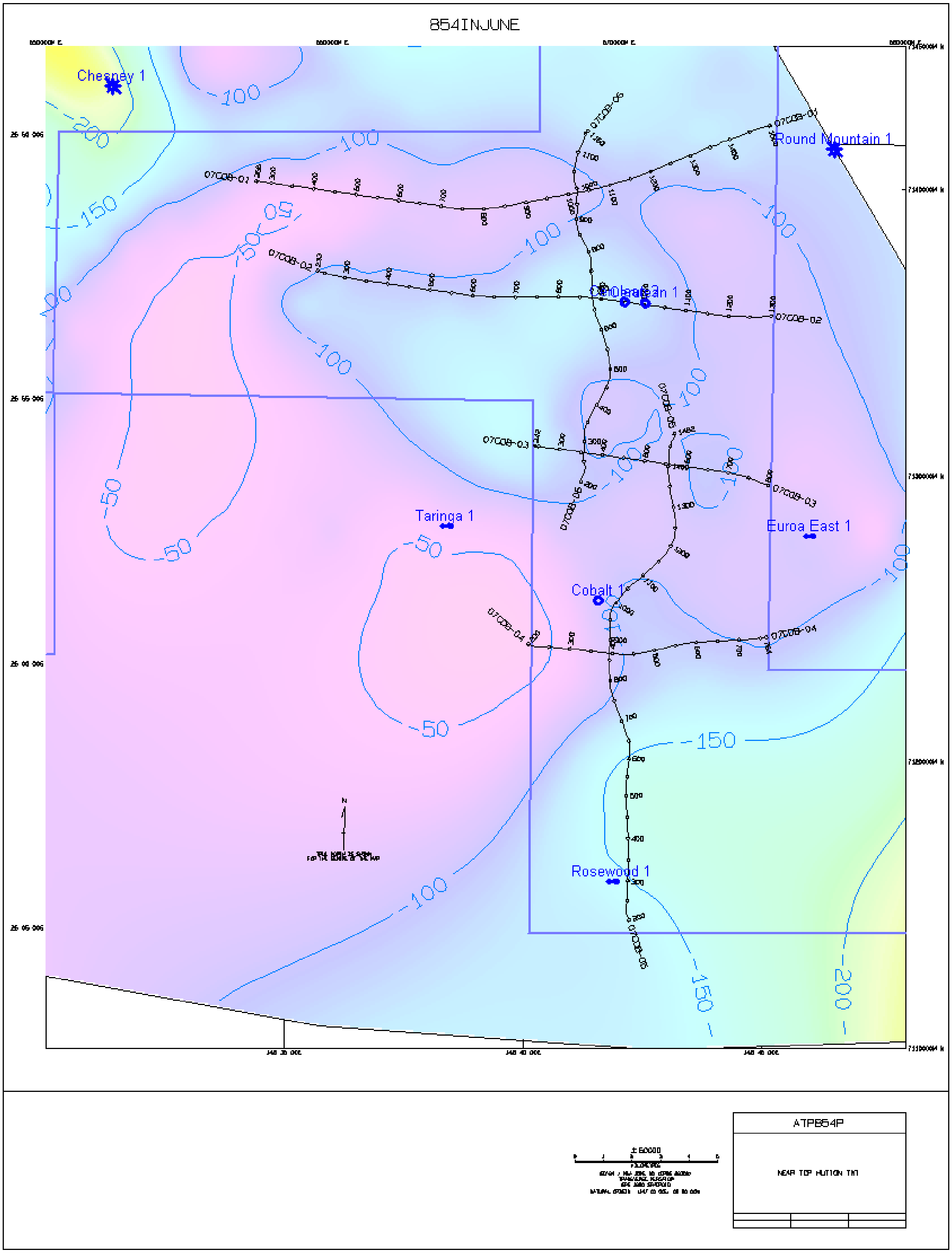

Figure 7 Top Hutton time map

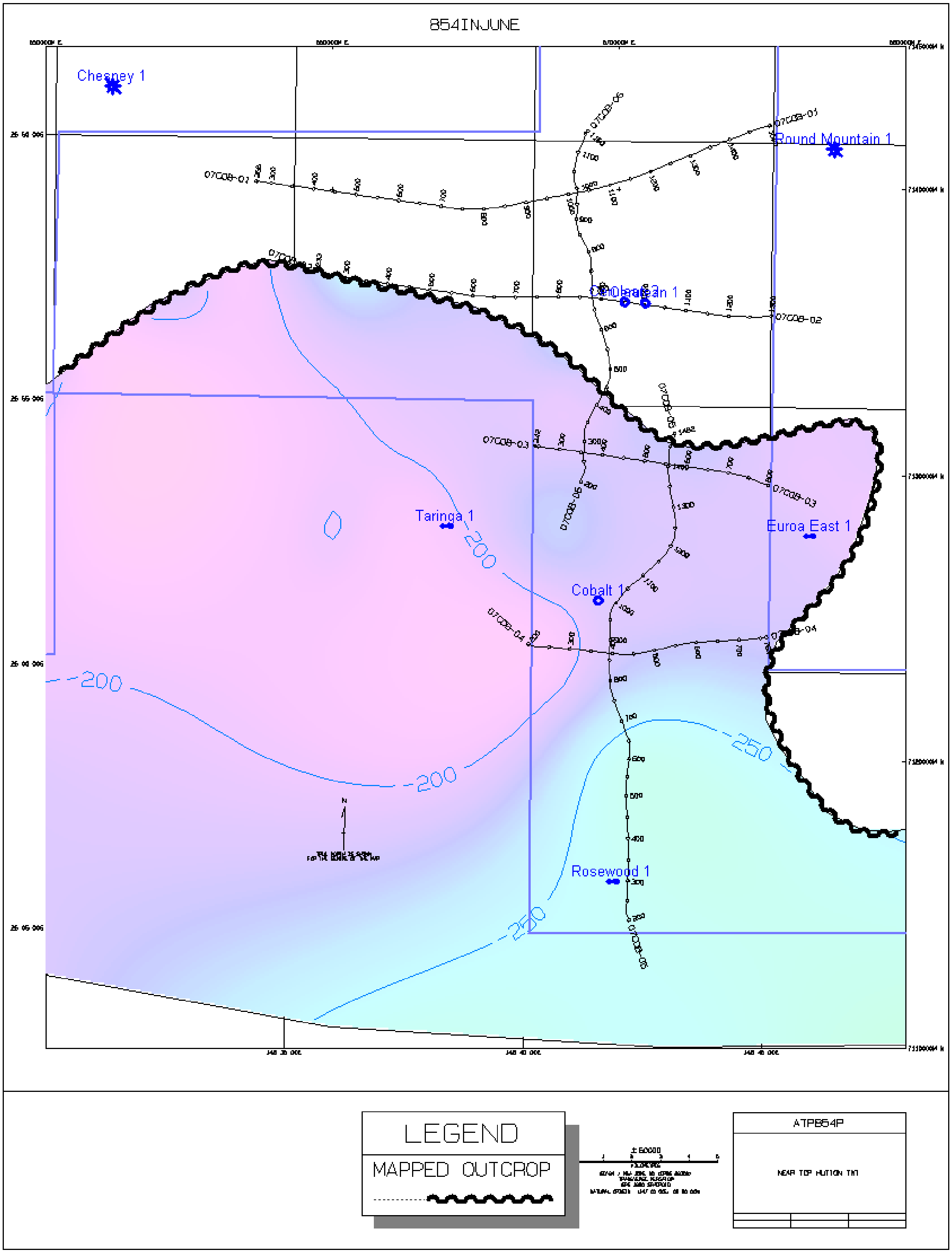

Figure 8 topTaroom time map

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APPENDIX 1 OPERATIONS REPORT DYNAMIC SATELITE SURVEYS

APPENDIX 2 OPERATIONS REPORT TERREX SEISMIC

APPENDIX 3 DATA PROCESSING REPORT VELSEIS PROCESSING

APPENDIX 4 INTERPRETED SEISMIC SECTIONS