

2007

SEL 13/98 Annual Report



Great South Land
Minerals Limited

Great South Land Minerals

August 2007

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Annual Report

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Exploration Summary

The last year has been a very busy and successful year for GSLM. We have moved offices from Murray Street to Macquarie Street and re-established a Geoscience section at our old Murray Street offices. Our new Geoscience section is fitted-out with state-of-the-art equipment and software - making our whole exploration program more efficient and productive.

Our Exploration program was advanced with the planning and execution of an extensive seismic program in central Tasmania. The amount of work involved in planning, surveying, permitting, land-owner negotiation, pegging and de-pegging, overseeing and remediation work is usually not appreciated and adds very substantially to the time and cost of such surveys (**Appendix I, XIX, XX, XXII, XXIII**). At the time of writing, the seismic results are still being processed by FUGRO SEISMIC IMAGING in Perth Western Australia. However, some preliminary results are included in this report (**Appendix II**). Our staff and consultants have reinterpreted much of the seismic data from our 2001 and 2006 surveys and these are also included in this report (**Appendix III**). The combined results from 1350 line km of 2D seismic allow us to define over 20 potential petroleum traps ranging from modest to very large. These have been prioritised for drilling, drill plans prepared and will form the basis of our upcoming drilling program.

Dr David Leaman was engaged to help in the planning of the seismic survey, to suggest seismic line locations and to develop and interpret an extensive gravity survey in order to complement the seismic survey. The gravity survey was completed by SOLO GEOPHYSICS and provides valuable help in deciphering the geology of the central highlands.

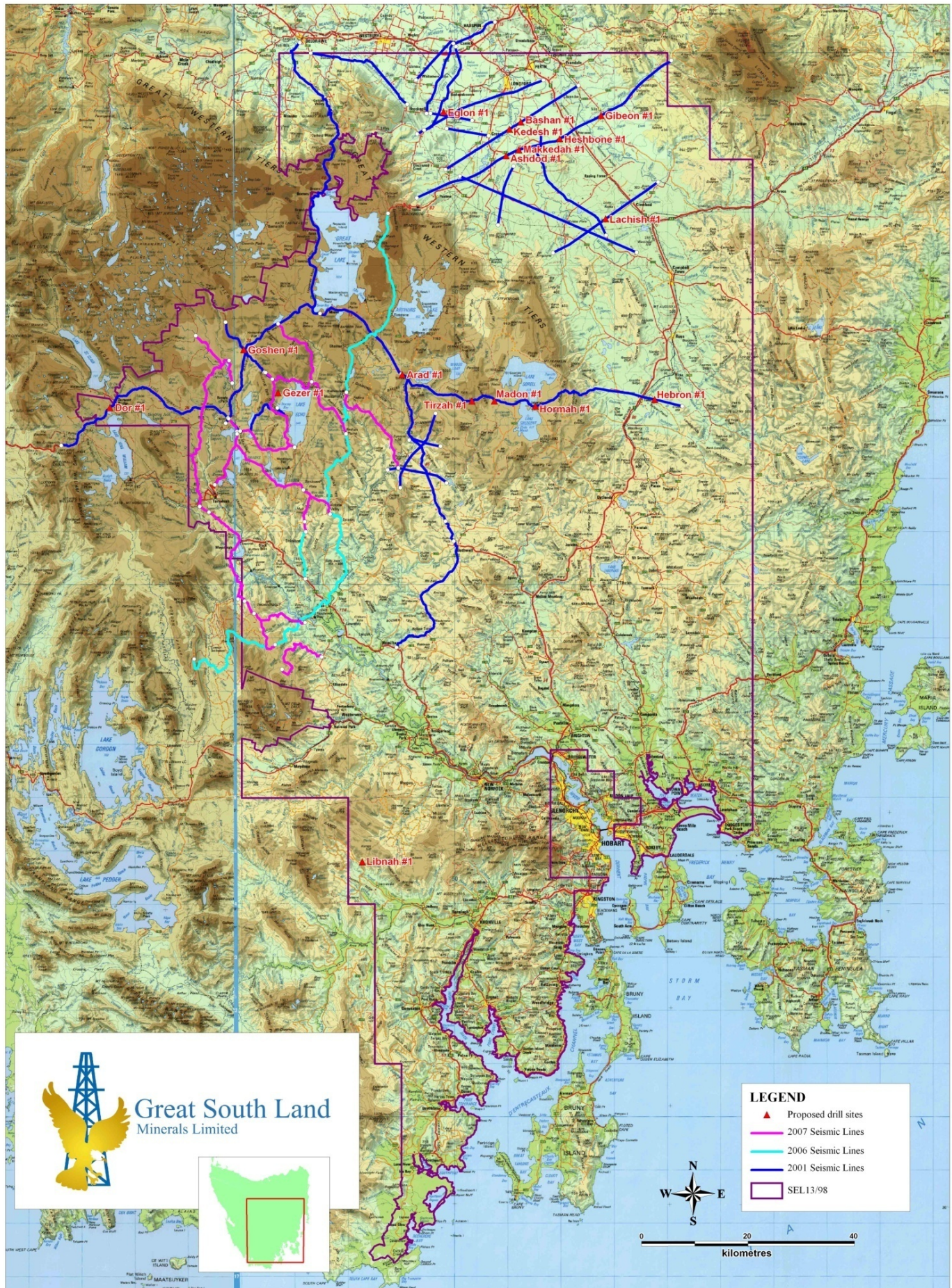
A Gefco SpeedStar 185K rig was purchased from the USA and is being modified to Australian specifications at our rented facility in Devonport on the north coast of Tasmania. This rig, when certified, will be used in our upcoming drilling program. Preliminary drilling at one site established the near surface stratigraphy and engineering integrity of the site and a water bore completed, to provide water for drilling operations.

Our Geoscience staff have been busy in fieldwork and in planning our seismic, gravity and drilling programs. Consolidation of all previous geological, geochemical and geophysical data and integration with our newly acquired knowledge has been a major task. New geological mapping around possible drill sites and within the seismic survey area and geochemically sampling seeps and possible seeps has also been carried out.

Our previous estimates of the possible potential resource onshore Tasmania have used the standard Source Potential Index (SPI). This has resulted in estimates of about 3 billion barrels of recoverable oil. Our new study has used the ZETAWARE software package and, for the first time, provides us with an estimate of potential recoverable gas resources. After inputting rather conservative figures of source rock distributions and recovery factors we estimate a total potential recoverable resource of 6 trillion cubic feet (tcf) of gas and 346 million barrels of oil.

The establishment of an efficient team, the equipping of new offices and our work in the last year puts us in a strong position to move into an exciting drilling program and to find commercial petroleum during the next 12 months.

Great South Land Minerals - Seismic and Drilling Operations



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Seismic Program

The 2007 GSLM seismic exploration program, carried out by TERREX Seismic, was conducted between the 28th of March and the 4th of May of this year. A total of 270.5 line km of 2D seismic was obtained in the Central Highlands and in the Mt Thunderbolt region (east of the Florentine Valley). New seismic acquisition parameters were used which resulted in a considerable increase in the quality of data obtained, compared with previous surveys. Favourable weather conditions enabled a good rate of progress and also contributed to an increase in data quality, compared with results obtained in wet and windy weather in 2006.

Seismic Imaging Processing was carried out by FUGRO Seismic Imaging and final results are being archived and delivered at the time of submission of this report. The use of a "crooked line" grid (shooting along existing roads) and the vibroseis method has enabled GSLM to acquire an extensive regional data set whilst minimising cost.

GSLM has now completed 1350 line km of 2D seismic. The 2001, 2006 and 2007 seismic programs identified and clarified several major structures and many minor structures. Further 2D seismic work is being planned to continue the seismic program in November/December 2007.

Seismic has identified several fault block traps and small anticlines with shallow targets (2000m to 1500m) in the Gondwana Petroleum System. Deeper targets are in the Larapintine Petroleum System mainly in the Central Highlands with Ordovician targets at depths of 3500m to 4000m. Pre-Tasmanian Basin Anticlinal Traps such as the Bellevue Dome structure and the Thunderbolt Anticline were targeted

for most attention because of their size and prospectivity. Enough information was collected to allow the definition of several new structures for potential drill sites to be identified. GSLM seismic surveys have provided reliable and consistent data for the completion of a list of prospects and leads for future drilling. Pre-Early Jurassic anticlinal traps were defined such as Steppes, Scotts Tier Fault Block, Scotts Tier Anticline and the Interlaken Anticline. Early Tertiary anticlines, domes and fault block traps were also defined such as the Bracknell Dome, Cressy Anticline, Macquarie River Anticline, Nile River Fault Block and Hummocky Hills Half Graben.

GSLM currently has a geoscience team of 5 professionals. The company is headquartered in Macquarie Street, with its geoscience section housed in Murray Street. Seismic interpretation has been carried out utilising the latest version of Kingdom Suite - 2d/3dPAK seismic interpretation software which is the industry-wide leader for Windows®-based seismic interpretation.

Seismic Acquisition and Processing

In March 2001 GSLM acquired 659 line kilometres of seismic reflection data across the Central Highlands and in the Northern Midlands areas (see **Appendix IV**, or map at end of section). The data were acquired for GSLM by Trace Terracorp using the vibroseis method and 'crooked line' type grid (shot mainly along roads) and the processing of the data was done by Robertson Research.

In 2006, limited amounts of seismic data (150 line kilometres) were acquired due to extreme weather conditions. Field data was acquired by TERREX Seismic crew in May/June 2006 using the vibroseis method and 'crooked line' type grid (shot mainly along roads) and the processing of the data was done by FUGRO Seismic Imaging (**Appendix V**).

In 2007, TERREX Seismic following new seismic acquisition parameters to cope with the special conditions of the Tasmania Basin, acquired 270.5 line kilometres of vibroseis seismic data across the Central Highlands area (Table 1. TERREX Seismic - 2007 Acquisition Parameters). Acquisition parameters were changed from previous Tasmanian surveys by increasing the frequency range from 6-140 Hertz with 12 second sweeps, 6 second listens and using 3 vibroseis trucks. These changes have successfully helped in acquiring high quality data in terrain dominated by dolerite (which has seismic velocities of about 6500m/s). Refer to **Appendix VI** for Terrex Operations Report and **Appendix VII** for Dynamic Satellite Surveys Operations Report.

Seismic Imaging Processing was carried out by FUGRO Seismic Imaging and final results are being archived and delivered at the time of submission of this report. FUGRO weekly status reports are contained in **Appendix VIII**.

Processing techniques generally assume a straight line profile with uniform fold and even offsets, crooked line acquisition results in variable fold and uneven offsets. Specialised processing with careful initial and residual statics corrections and frequent velocity analysis were requested for the 2007 seismic processing. During the mid-processing phase, Dr Clive Burrett and Diego Gonzalez of GSLM visited FUGRO's offices in Perth and helped their processors with exact geological and seismic velocity input, in order to improve the quality of the final processed product.

The presence of flat spots, bright spots or Direct Hydrocarbon Indicators (DHI) at Bellevue and Thunderbolt had been remarked on by several independent geophysicists and as a result, GSLM contracted FUGRO to carry out an AVO (Amplitude Versus Offset) analysis of these possible DHI's

(Appendix IX). This analysis was completed at the end of July 2007.

GSLM visited FUGRO again earlier in August for quality assurance purposes before final archive of results. The quality of the seismic data remains, though, is still highly variable with individual sections containing zones of strongly coherent events as well as zones of noise. It is generally much better than data obtained in previous years which will help in an a much more accurate interpretation. The variability in the data is likely to result from the "crooked-line" grid employed during acquisition, outcropping dolerite and from the velocity picks applied during processing.

RECORDING PARAMETERS	
<u>Vibroseis Source</u>	
Acquisition Type:	Sercel 388 - 24 Bit Telemetry System
Energy Source:	3 x Input-Output 42,000lb Peak Force
	6x6 Truck mounted Vibrators Online
Vibrator Point Interval:	20 metres
Vibrator Array:	15 m Pad-Pad / No Moveups
Vibrator Array Location:	Centred on Station Pegs (Centred at SP 100)
Receivers:	12 x 10 Hz SM24 Geophones / Group
Receiver Interval:	20 metres
Receiver Array:	20 metres (12 phones with 1.67m phone spacing)
Receiver Array Location:	Centred between Stations (Centred at SP 100.5)
Sweep Length:	12 sec Sweeps
Number of Sweeps:	2 x 12 second sweeps / VP
Sweep Type:	Monosweep
Sweep Frequencies:	6-140 HZ
Sweep Taper:	200 msec Taper
Sweep Energy per Km:	1200 sec/km or 800 sec/km (see GSLM)
Sweep Control:	Pelton Advance 2 Model 5
Accelerometers:	Pelton M5 High Performance
Similarity System:	Pelton VIBRA-SIG
Peak Force:	44,000 lbs

Hold Down Weight:	44,200 lbs
Vibrator Drive Level:	Force Control On - 80% Peak Force
Phase Lock:	Ground Force Phase Lock
No. of Channels:	300 Channels
Spread Geometry:	Symmetric Split Spread
Maximum Offset:	2990 - 10 – 0 – 10 – 2990 metres
Fold:	150 Fold with 10m CDP interval
Record Length:	6.0 seconds
Correlation Sample Rate:	2 milliseconds
Written to Tape S.R.:	2 milliseconds
Output Data Format:	SEG D

Table 1. TERREX Seismic - Acquisition Parameters used for 2007 GSLM Seismic Survey

Seismic Interpretation

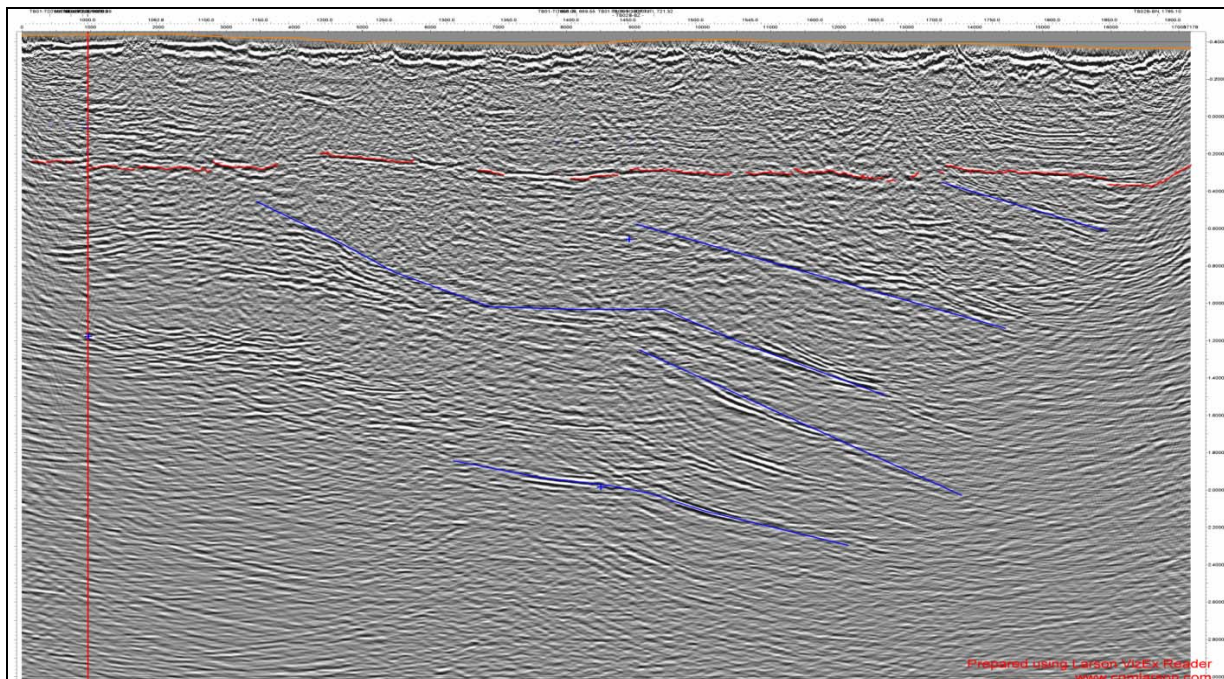
The existence of very extensive sheets of Jurassic dolerite has discouraged others from exploring for oil and gas in Tasmania. It was thought that dolerite would prevent seismic surveys and would be difficult to drill. It was also thought that dolerite would have destroyed reservoir porosity and source rocks. GSLM has shown that all of these problems can be overcome and that seismic can be used to define the top and bottom of the dolerite and show their proximity to source and reservoir rocks. Indeed the dolerite acts as an effective regional seal.

Pre-Tasmanian Basin Anticlinal Traps such as the Bellevue Dome structure and the Thunderbolt Anticline were targeted for most attention because of their size and prospectivity. Enough information was collected to allow the definition of several new structures for potential drill sites to be identified. GSLM seismic surveys have provided reliable and consistent data for the completion of a list of prospects and leads for future drilling. Pre-Early Jurassic Anticlinal Traps were defined such as the Steppes and Scotts Tier Fault Blocks; Scotts Tier and Interlaken Anticlines. Early Tertiary anticlines, comes and fault block

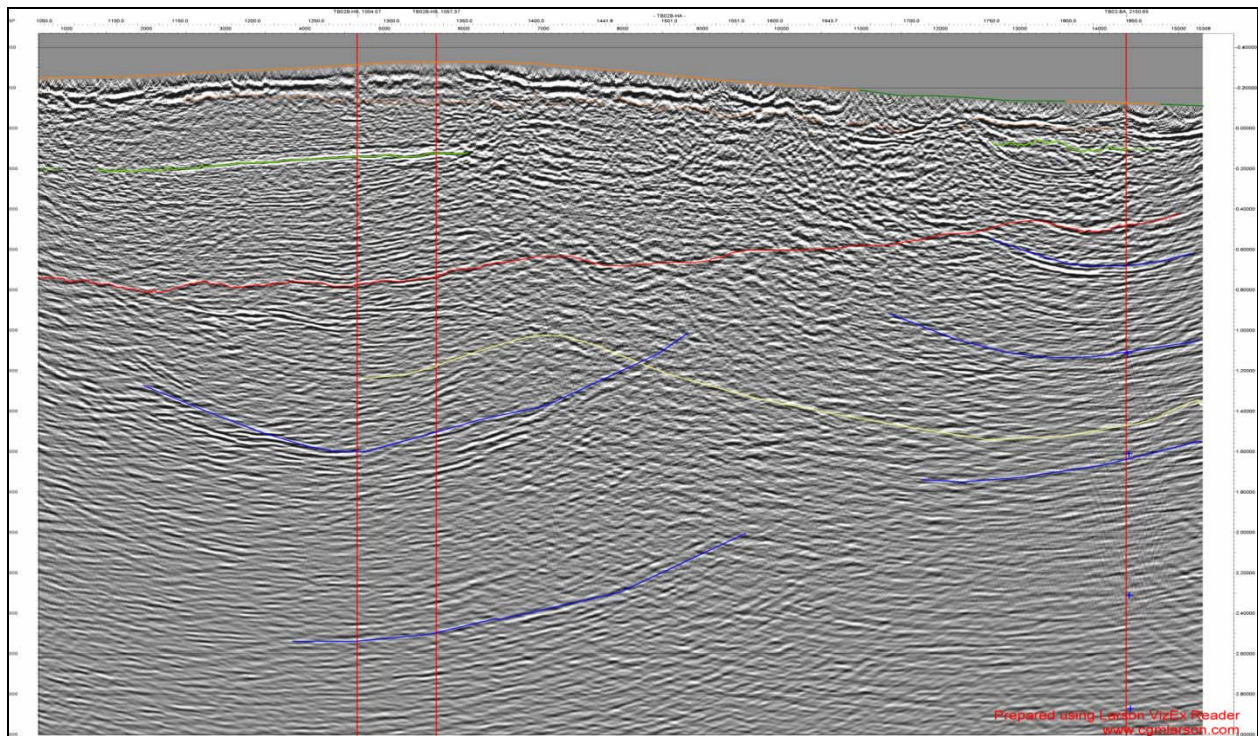
traps were also defined such as the Bracknell Dome, Cressy Anticline, Lachish Fault Block, Macquarie River Anticline, Macquarie River Fault Block, Nile River Fault Block and Hummocky Hills Half Graben.

Results are being interpreted and horizons and faults mapped by in-house geologists Andrew Stacey, Diego Gonzalez and Dr Clive Burrett using Kingdom Suite - 2d/3dPAK software in our Murray Street offices. 2d/3dPAK is the industry-wide leader for Windows®-based seismic interpretation. Kingdom Suite - 2d/3dPAK has facilitated the creation and management of horizons, faults and well information, as well as providing time to depth conversions, animations, contouring, gridding, horizon attribute calculations and volume calculations. This has made interpretation more efficient and reliable.

These interpretations are being checked by experienced geophysicists and geologists including Dr. David Leaman, Dr. Bob Findlay and Dr. Greg Blackburn and other external consultants.



TB02b-BZ Preliminary Stacks Bellevue Anticline



TB02b-HA Preliminary Stacks Thunderbolt Anticline

Central Highlands

❖ TB01-PA

The line is 6.20 km long, and was acquired west to east commencing at 491 462.23E, 5 327 251.92N and ending at 497 347.78E, 5 326 096.35N (see **Appendix IV**, or map at end of section). The line is positioned along with lines TB01-PB, PD and TA to define an inferred geological structure known as the Hunterston Dome. This line is important to the overall interpretation as the Hunterston #1 DDH was located to tie to the line and target the crest of the Hunterston Dome. The overall quality of the seismic data is good.

Line TB01-PA is the only location in the survey area where accurate lithological and velocity data have been acquired in a drill hole adjacent to a seismic line. A velocity survey was conducted at the Hunterston 1 DDH. The data obtained is used to establish the position of lithological boundaries within the drill hole, and this information has then been extrapolated to the seismic section. This line is

essentially the “seismic type-section” for the survey, where the many of the correlations between litho- and seismic stratigraphic events were initially made.

The position, in TWT of the top of the dolerite sill in the drill hole is calculated using the velocity survey data and correlates with a strong (high amplitude), positive reflector (black) when projected onto the seismic section. Similarly, the positions of the other lithologic boundaries identified in the drill hole are recalculated in TWT and based on the velocity information, projected onto the seismic section.

❖ **TB01-PB**

Seismic line TB01-PB is the longest line in the survey at 92.84 km long and confined to the Central Highlands region of Tasmania. The line begins in the town of Bothwell (499 837.65 mE, 5 308 231.68 mN), follows the Lake Highway north then north-west to Miena (475 800.47 mE, 5 351 123.55 mN) where the line diverts south-west then south along the Marlborough Highway finishing at Bronte Park (456 971.83 mE, 5 330 405.06 mN) (see **Appendix IV**, or map at end of section). The quality of the data along this line is highly variable, which considering the length of the line is to be expected.

Between shot-points 2800 and 3800, numerous dipping reflectors are identified within the basement. The interpretation shows a group of steeply dipping events (dark blue) between shot-point 2800 and 3000 and a faulted anticline between shot-points 3000 and 3650.

Events within the basement are picked by changes in seismic character. The steeply dipping events, shown in dark blue between shot-point 2800 and 3000 are picked on a change from incoherent, confused reflectors to coherent, higher amplitude reflectors. These events truncate the light blue events of the anticline. The events in the hanging-wall of the anticline (shot-points 3000 – 3500, light blue) are picked at the boundary between incoherent, weak reflections and sets of coherent, high amplitude reflectors in the crests of the interpreted anticlines. The boundary indicates a small amount of rollover to the left and more extensive rollover to the right. To the right the interpreted events are extrapolated,

following the trend of the event most confidently picked event. The best example of the pick for this event is seen at 1.4 seconds TWT. Changes in character in the footwall section of the anticline are more subtle than those in the hanging wall, and events are picked on laterally coherent reflectors.

❖ **TB01-PD**

Seismic line TB01-PD has been acquired across the window in the outcropping dolerite. The northern end of this window contains a geological structure interpreted from surface mapping and known as the Hunterston Dome (Fairbridge, 1948). The line is 11.93 km in length and has been recorded roughly in a southwest to northeast direction. The line begins adjacent to Howells Sugarloaf (489 779 mE, 5 319 321 mN) and heads towards the northeast along Southernfield Road, across private property and along Glovers Road, finishing near Shannon Tier (495 465 mE, 5 329 313 mN) (see **Appendix IV**, or map at end of section).

The line is fairly straight and the overall quality of the seismic data is reasonable. The interpretation is well constrained by ties with lines TB01-PA, PB and TA.

❖ **TB01-ST**

Line TB01-ST is a key line in the interpretation of this dataset, this is because of its proximity to a number of deep drill holes and other constraining data and since it traverses of the number of different structural domains. The line is 59.9 km long, beginning in the Highlands near the intersection of the Lake Highway and Interlaken Road (459 960.60E, 5 339 672.35N) and finishing east of the settlement at Tunbridge (542 783.93E, 5 333 613.82N) (see **Appendix IV**, or map at end of section).

The line has been acquired across the Central Highlands, the Great Western Tiers and the Northern Midlands. The line drops approximately 650 m over 6.5 km towards the east, from the Great Western Tiers to the Northern Midlands across the Tiers Fault System. The overall quality of the seismic data is

relatively good, however there are many areas where the interpretation has been limited by the quality of the data. The line has been acquired roughly west to east making it sub-orthogonal to the inferred strike of the basement structure. The interpretation is well constrained east of the Great Western Tiers by several deep wells and excellent exposures along the scarp of the Tiers. The line can be examined in terms of three distinct structural zones that are coincident with the Central Highlands (shot-points 100 – 1650) the Northern Midlands (shot-points 1950 - 2500) areas and separated by the Tiers Fault system (shot-points 1650 – 1950).

Events in the basement in the section from shot-point 1950 to 2499 are picked at changes in seismic character. The basement events dip towards the east between 10° and 20°. Thrust slices appear to become thinner towards the east indicating a possible *décollement* at about 3.0 seconds (TWT) after shot-point 2150.

❖ TB01-TA

Seismic line TB01-TA has been acquired in the Central Highlands across a window in the outcropping dolerite where the Parmeener Supergroup rocks are mapped at the surface. The line is 11.75 km in length, recorded west to east across the central part of the window and intersects the north-south lines TB01-PA and PB (see **Appendix IV**, or map at end of section). The line begins west of the window (on dolerite) near Synnots Creek (487 400.16 mE, 5 321 658.93 mN) and finishes close to the eastern edge of the window on Weasel Plains (489 490.43 mE, 5 319 162.77 mN)

The line crosses the western boundary of the window at shot-point 170, where dolerite is in contact with Unit 2 of the Upper Parmeener Supergroup, passing into the Upper Marine Sequence by shot-point 200. The line remains in the Upper Marine Sequence rocks until it crosses a narrow, finger of outcropping dolerite between shot-points 520 and 555.

The Parmeener Supergroup is interpreted to occupy the top half second (TWT) of the section. The data quality in the Parmeener Supergroup section is good, the single dolerite sill being the easiest unit to identify. The dolerite sill does not transgress gradually through the Parmeener Supergroup as it does on line TB01-PA and PB, indicating that this line is probably sub-parallel to the strike of the dipping sill. The seismic data in the basement section is rather confused and there are no strong character changes or continuous reflectors to indicate the presence of structure. Therefore, the events interpreted in the basement must be treated with some care, as they may not reflect the complexity of the actual geological structure.

❖ **TB01-TB**

Seismic line TB01-TB is located on the western edge of the Central Highlands. The line has been acquired along the Lyell Highway, starting to the north of Mt King William 1 (426 054 mE, 5 326 242 mN) on the western, erosional margin of the Tasmania Basin and finishing to the south of Bronte Park (459 104 mE, 5 328 864 mN) (see **Appendix IV**, or map at end of section). The line is 44.37 km long, the first (western) half strikes towards the northeast. While the eastern half is orientated in an east-southeast direction, intersecting lines TB01-PB and TB01-TI at its eastern end. The line has been acquired over Quaternary glacial and glaciogene deposits that obscure any evidence of underlying structure.

Although the seismic data has been acquired along the highway, the road appears sufficiently straight to not have caused too many problems. In the top half second of the section where the Parmeener Supergroup is interpreted to lie, the seismic data is generally incoherent. However, there are enough zones of coherent data to enable a reasonably confident interpretation of the Parmeener Supergroup section with across the full length of the line.

The basement between shot-points 100 and 1000 is confused. Sets of reflectors dip to the left and to the right of the section, these changes in dip do not correspond closely to changes in the direction of the

road. From shot-point 1000 to the eastern end of the line, the data is less chaotic with all the interpreted events dipping towards the left of the section.

❖ **TB01-TC**

Seismic line TB01-TC is located in the southern part of the Central Highlands and is the southernmost line of the survey (see **Appendix IV**, or map at end of section). The line is 34.58 km long, beginning north of Bothwell on the Lakes Highway (498 251.43 mE, 5 311 968.05 mN) where it intersects line TB01-PB. The line follows the Lakes Highway southwest, turning southeast at shot-point 850 and following Hollow Tree Road, then turns back towards the southwest at shot-point 1100 before finishing northeast of Hamilton (489 066.56 mE, 5 288 268.38 mN). The line is acquired in an area of the Central Highlands where the outcrop geology is highly variable and frequently changing. The line passes over Upper Parmeener Supergroup rocks intruded by Jurassic Dolerite, both overlain by Tertiary Basalts.

The quality of the seismic data along the line is in general, very poor. Horizons usually interpretable in the other sections by their character or reflector pattern, such as the Top and Base Dolerite and Base Parmeener Unconformity horizons, are generally indistinguishable. The data improves between shot-points 950 and 1150 where strong (high amplitude), coherent reflectors are observed and the Base Parmeener Unconformity horizon can be reliably picked. This occurs along the section of the line that strikes southeast. Why the orientation of the line should affect the quality of generally flat-lying reflectors is unclear. The only constraints on the interpretation is the tie with TB01-PB and the outcrop geology, these coupled the generally poor seismic data, has forced a reasonably scant interpretation of this line.

❖ TB01-TD

Seismic line TB01-TD is located on the western side of the Central Highlands and has been acquired perpendicular to line TB01-PB, which it intersects at the northern end of a window in the outcropping dolerite (see **Appendix IV**, or map at end of section). The line is 15.29 km long, relatively straight and strikes northwest to southeast. The line begins on the escarpment of the Great Pine Tier (465 760.10 mE, 5 338 712.52 mN) and finishes on the Bellevue Tier (456 924.20 mE, 5 349 412.80 mN). The line has been acquired mainly over outcropping dolerite, with Upper Marine Sequence rocks outcropping within the window.

The quality of the seismic data along this line is variable. The seismic data in the Parmeener Supergroup part of the section is generally vague, interspersed with small zones containing more coherent data.

Events interpreted in the basement are approximately coincident with similar events interpreted on line TB01-PB and are picked on similar changes in character. The events dip towards the northwest indicating that the anticline (Bellevue Anticline) interpreted on line TB01-PB plunges in this direction.

❖ TB01-TH

Seismic line TB01-TH has been acquired across the Meander Valley, the Great Western Tiers and in the northern part of the Central Highlands (see **Appendix IV**, or map at end of section). The line is 67.86 km in length and has been recorded entirely along the Lake Highway. The line begins south of the town of Deloraine (470 886.59 mE, 5 401 992.61 mN) and heads towards the southwest as far as shot-point 200. From shot-point 200, the line heads south to shot-point 350, then southeast to shot-point 1000. From shot-point 1000 the line, although rather windy, heads south to shot-point 2750, where the line turns east around the bottom of Great Lake, finishing west of the township of Miena (474 703.93 mE, 5 351 054.74 mN).

The line has been recorded across a variety of geologies. From Deloraine to shot-point 650, the line passes over Quaternary sequences and steeply dipping rocks of Late Cambrian to Neoproterozoic age (McClenaghan and Calver, 1994). From shot-point 650, the line moves up through the Parmeener Supergroup sequence, beginning in rocks of the Lower Marine Sequence of the Lower Parmeener Supergroup and finishing at the top of the Great Western Tiers (shot-point 1275) in rock of Unit 2 of the Upper Parmeener Supergroup (McClenaghan and Calver, 1994). The remainder of the line is acquired over outcropping dolerite, with the exception of a short section near Liawenee (shot-points 2300-2650) where Tertiary Basalt is mapped (Forsyth et al., 1995). The main constraints on the interpretation of this line are the drill hole at Golden Valley and the Parmeener Supergroup section mapped in the escarpment of the Great Western Tiers, constraint of the basement structure is supplied by mapped outcrop between Deloraine and the Golden Valley drill hole.

Events within the basement section are interpreted at changes in character. Between shot-points 1650 and 2500, the interpreted events dip shallowly towards the north (right of section). At shot-point 2500, the line changes direction by 90° to the east, which probably accounts for the change in orientation of the events seen in the section at that point. The poor data quality in the Parmeener Supergroup part of this section probably extends into the basement resulting in the paucity of events that are interpretable.

❖ **TB01-TI**

Seismic line TB01-TI is located to the west of Lake Echo in the Central Highlands. The line is 18 km long, beginning on the Lyell Highway (shot-point 100) southeast of where it crosses the Nive River (457 423.47 mE, 5 331 434.31 mN) and heads in a south-easterly direction. The line then moves onto Victoria Valley Road (shot-point 200) while still generally heading towards the southeast. At shot-point 325 the line turns north-northeast along Brown Marsh Road, changing direction back towards the southeast at shot-point 575 finishing to the west of Divers Shore on Lake Echo (shot-point 750) (466 667.35 mE, 5 333

285.08 mN) (see **Appendix IV**, or map at end of section). In the area where the line has been acquired, dolerite is the dominant outcropping lithology (Forsyth et al., 1995).

On the western (left) side of the line, the Base Dolerite horizon is tied to TB01-PB. The pick for the Base Parmeener Unconformity horizon on the left of the section is again tied to TB01-PB. The path of the horizon follows a relative character change between incoherent reflectors underlain by reflectors that have a slightly higher amplitude (stronger) and a lower frequency (thicker). The interpretation is aided by strong reflectors between shot-points 350 and 500 and from 550 to 700.

In the basement, simple dipping events have been interpreted mainly from coherent reflectors rather than at changes in character. The orientation of the interpreted events is highly dependent on the orientation of the line.

❖ **TB02-AA2 and Preliminary Stack for TB02b-AA2**

This traverse extends along the Strickland Road from the Lyell Highway north of Ouse (472 037 mE, 5 301 162 mN) to Duckhole Lagoons north of Strickland (471 810 mE, 5 312 020 mN). This data set is isolated from other existing seismic traverses and can only be linked to them via proposed and acquired line TB02b-AA2 (2007) (see **Appendix IV**, or map at end of section).

The basic model includes the Parmeener cover, with dolerite, possible Silurian and Ordovician sequences and then the Precambrian base. The thicknesses suggested are compatible with seismic data and velocities.

The seismic section clearly reveals dolerite within the sequence and the base Parmeener unconformity lies some 300 ms deeper. The deeper section, below this, includes at least three relatively flat-lying reflecting boundaries.

Shallow structures involving the Parmeener cover are much simpler. All data indicate one dolerite sheet within the section but this sheet passes to an unroofed plug form south of Strickland. Seismic data

resolve most of the dolerite character along this short traverse but only patchily define the base of the cover sequence.

Longford Sub-Basin

❖ TB01-PF

Seismic line TB01-PF is a strike line tying TB01-PT in the south to TB01-PG in the central part of the Longford Sub-basin (see **Appendix IV**, or map at end of section). The line is 34.32 km long, beginning at the intersection with line TB01-PG (502 148.03 mE, 5 376 355.66 mN) it has been acquired towards the southeast, roughly parallel to the scarps of the Great Western and Macquarie Tiers, finishing about 8 km northwest of Campbell Town (533 633.01 mE, 5 362 756.08 mN).

Between shot-points 800 and 1527 the dolerite sill is most easily recognised due to its distinctive seismic character with the Top and Base Dolerite horizons picked at the boundaries. The Base Parmeener Unconformity Horizon is most easily picked after the fault interpreted at shot-point 1025, where the horizon is picked at a change in seismic character from relatively strong (high amplitude) and coherent reflectors to weaker, highly incoherent reflectors. The Base Tertiary Unconformity Horizon is picked at the tie with TB01 PT and extrapolated to the northwest (left) along a change in seismic character from weak (low amplitude) reflectors to reflectors that are stronger and more coherent.

A fault is interpreted at shot-point 800 based on an offset in the dolerite sill. The interpretation of the fault at shot-point 1025 is based on a change in seismic character from stronger to weaker reflectors from the hanging wall to the footwall and steeply dipping reflectors adjacent to the fault in the hanging wall

The interpretation seismic events in the basement section of the line have been made at changes in seismic character. Interpreted events dip between 5° and 15° towards the east-southeast (right).

❖ TB01-PG

Seismic line TB01-PG is the longest line acquired across the Longford Sub-basin. The line is 57 km long. It is a dip line and has been acquired from the southwest towards the northeast. This line is significant as it is the only line which lies approximately orthogonal to and crosses the major basin boundary faults, the Tiers Fault system in the southwest and the Castle Carey Fault in the northeast (Bacon et al., 2000). The line has been recorded across the entire width of the basin and therefore should show the structures and general geometry of the Longford Sub-basin. The line begins at the base of the escarpment of the Great Western Tiers (492 884.67 mE, 5 372 787.91 mN) and finishes in the foothills of the North-eastern Highlands (540 735.74 mE, 5 398 594.51 mN). The line has been acquired over mainly unconsolidated sediments of Quaternary and Tertiary age (Forsyth et al., 1995, McClenaghan and Calver, 1994) (see **Appendix IV**, or map at end of section).

The quality of the seismic data in this section is reasonably good and the three main elements, the Longford Sub-Basin, Tasmania Basin and the basement are easily recognised. The best quality seismic data is in the Longford Sub-basin section where distinct layering and growth on faults is recognised. The quality of the data diminishes beneath a dolerite sill in the Tasmania Basin section of the data. While in the basement section the data quality is good enough to estimate the general structural form.

Between shot points 500 and 1800 this line contains three distinct tertiary depocentres, developed in half-grabens formed by south-westerly dipping fault blocks in the Tasmania Basin section. The western most half-graben lies between shot-points 500 and 975. At the master fault the Parmeener Supergroup down faulted approximately 1500 m towards the northeast across a series of faults between shot-points 500 and 675.

The half-graben is bisected by a zone containing several large, synthetic faults between shot-points 700 and 750. These faults offset the Base Parmeener Unconformity Horizon by about 300 m and either

penetrates the Tertiary section or are coincident with growth, indicating a syn-depositional, early Tertiary age.

The second major Tertiary half-graben depocentre lies between shot-points 975 and 1275. The Tertiary section is extremely well defined by strong reflectors (high amplitude). The Base Tertiary Unconformity Horizon is picked at a strong (high amplitude), negative (red) reflector the base of these reflectors where there is a significant change in seismic character to less coherent reflectors with lower amplitudes. The Tasmania Basin section is offset by about 300 m across boundary fault at shot-point 975. Reflectors in the Tertiary section drape this fault and growth at the fault cannot be distinguished. While this fault may be later than the faults at the master fault to the southwest, they do not disrupt the Tertiary sequence and is therefore classified as Early Tertiary.

Between shot-points 975 and 1275 the Jurassic Dolerite and Tasmania Basin section comprise a single tilted block. The Base Dolerite and Base Parmeener Supergroup horizons are difficult to determine and the interpretation of their positions in this section is aided by better data between shot-points 1500 and 1600.

The third half-graben depocentre lies between shot-points 1275 and 1750. This depocentre is relatively symmetrical. The Tertiary sequence is deposited across several faults that step down towards the northeast between shot-points 1275 and 1400. The throw of these faults ranges from 150 – 350 m, they do not affect reflectors in the Tertiary section and are therefore all classified as Early Tertiary. Conversely, faults in a zone between shot-point 1425 and 1500 are classified as Later Tertiary as they displace reflectors in the Tertiary section.

Between shot-points 1300 and 1750 the position of the Jurassic Dolerite is well defined by a zone of incoherent, low amplitude seismic character. The Base Dolerite Horizon is interpreted at the first negative to positive (red to black) zero-crossing at the base of this zone. In a wedge between shot-points

1425 and 1650, the Base Parmeener Unconformity Horizon is picked at a change in seismic character between strong (high amplitude), relatively coherent reflectors and extremely incoherent data. At shot-point 1650 a large fault, which displaces the Base Parmeener Unconformity horizon by about 200 m towards the southeast and smaller synthetic fault are interpreted. These faults are classified as Undifferentiated Tertiary as they affect the dolerite and Tasmania Basin section but not the Tertiary sequence.

The structural form of the basement is recognised from the interpretation of boundaries between zones of differing seismic character and by relatively continuous reflections. The basement section forms two structurally differing zones, one lying between shot-points 100 and 500 and another from shot-point 500 to the end of the line. The common boundary to these zones being the Tiers Fault System.

❖ **TB01-PM**

Seismic line TB01-PM is an approximately 23 km long dip line acquired over mainly Quaternary and Tertiary age sediments (Forsyth et al., 1995, McClenaghan and Calver, 1994). The line begins at the base of the Great Western Tiers (492 943.55 mE, 5 384 782.46 mN) and has been acquired towards the northeast finishing approximately 2.5 km south of Perth (514 277.48 mE, 5 393 996.66 mN) (see **Appendix IV**, or map at end of section).

Between shot points 275 and 1036 this line contains a half-graben that forms the Tertiary depocentre. The Tertiary sequence contains many strong (high amplitude) laterally coherent reflectors that are not seen anywhere else in the section. A distinctive marker horizon is in the lower part of the sequence, interpreted along a strong (high amplitude) negative reflector. The Base Tertiary Unconformity Horizon is easily recognised at the base of these reflectors and is picked on the last strong (high amplitude)

negative (red) reflector. Faults are generally interpreted at major inflections in the Base Tertiary Unconformity Horizon.

The master fault occurs at shot-point 275, the fault plane is interpreted at a lateral change in seismic character and dips steeply towards the northeast (right of section) displacing the Tasmania Basin section by about 1000 m. Growth is observed in the lower part of the Tertiary sequence below the marker horizon between the faults at shot-point 275 and 350, indicating early Tertiary movement on the master fault. The marker horizon drapes the two closely spaced faults interpreted around shot-point 375 indicating that while they were active during early Tertiary deposition, movement occurred later than movement on the master fault. Reflectors in the sequence below the marker horizon are truncated by it between shot-points 425 and 450 forming an angular unconformity indicating erosion of an earlier sequence. This earlier sequence thickens towards the deepest part of the depocentre at shot-point 500, thickening even further across faults at shot-points 625, 725 and 825, indicating that the earliest Tertiary deposition probably took place in these zones and that the faults were probably active before the master fault.

The Seismic data corresponding to the basement is extremely incoherent, and what little interpretation there is shows events that dip shallowly towards the northeast.

❖ **TB01-PT**

Seismic line TB01-PT is the southernmost dip line acquired across the Longford Sub-basin. The line begins in an area between the Great Western Tiers and Macquarie Tier (518 518.94 mE, 5 362 456.97 mN) and is acquired towards the northeast finishing about 10 km east of Epping Forest (537 735.10 mE, 5 375 383.43 mN) (see **Appendix IV**, or map at end of section).

The interpretation mainly covers the south-western (left) end of the line where the seismic data and constraints are reasonable. Beyond the fault at shot-point 625 a small part of the Tertiary sequence is

discernable, below this the seismic data is extremely incoherent, such that the likelihood of a reasonably accurate interpretation is low.

Structures in the basement are particularly well resolved in this section. Events are interpreted at changes in seismic character that mainly corresponding to changes in amplitude. In the central and north-eastern (right) part of the section the reflector are dominantly linear, coherent and dip towards the northeast at about 20° converging on *décollement* at about 3.5 seconds TWT in the lower, right corner of the section.

❖ TB01-PU

Seismic line TB01-PU is a 29.5 km long dip line acquired over mainly Quaternary and Tertiary age sediments (Forsyth et al., 1995, McClenaghan and Calver, 1994). The line is acquired from southwest to northeast, beginning near the base of the Great Western Tiers (498 438.28 mE, 5 378 187.01 mN) and finishing at the Nile Road (523 284.15 mE, 5 393 913.59 mN) (see **Appendix IV**, or map at end of section).

The interpretation indicates two Tertiary depocentres separated by a high between shot-points 1000 and 1075, where dolerite outcrops. The Tertiary sequence is identified between shot-points 500 and 1000 and shot-point 1075 and the end of the line by a zone of low amplitude (light) reflectors at the top of the section. The Base Tertiary Unconformity Horizon is picked at the base of this zone along a strong (high amplitude) negative (red) reflector.

The seismic data corresponding to the basement is generally poor, however the general form of the basement can be roughly interpreted based mainly on linear events and seismic character changes. The best data occurs towards the base of the section in the northeast (right) and shows a series of long, linear events dipping shallowly at approximately 20° towards the northeast.

❖ TB01-PW

Seismic line TB01-PW is the northernmost dip line recorded across the Longford Sub-basin. The line is 22.6 km long, acquired towards the northwest the line begins inboard of the Tiers Fault System (493 562.37 mE, 5 395 824.94 mN) and finishing about 7 km southwest of Launceston (511 709.63 mE, 5 407 218.21mN) (see **Appendix IV**, or map at end of section).

The interpreted section shows Tertiary rocks deposited two distinct depocentres lying between shot-points 370 and 850, and from 850 to the end of the line. The seismic line begins inboard of the boundary of the south-western depocentre. Based on the form of adjacent lines it is assumed that this depocentre is a half-graben bounded in the southwest by the Tiers Fault System, while the second depocentre is bounded by the fault interpreted at shot-point 850.

Events reflecting the general form of the basement are picked from relatively linear events occurring at changes in seismic character. The events picked are highly linear and dip towards the northwest at about 20° and link to faults affecting the Tasmania Basin sequence.

❖ TB01-TE

Seismic line TB01-TE is a second tie line between lines TB01-PF and PG. The line is about 25.5 km long, beginning about 10 km southwest of Conara (528 449.81 mE, 5 365 762.40 mN). It follows the Mount Joy Road towards the northwest around the southern side of a distinctive topographical feature known as Hummocky Hills, finishing about 5 km to its northwest (516 286.59 mE, 5 385 182.70 mN) (see **Appendix IV**, or map at end of section).

The Tasmania Basin part of the section is devoid of faults, this may be because the line is sub-parallel to regional strike and offsets are not visible in the data.

The seismic data in the basement section comprises both coherent and incoherent data at varying amplitudes. Seismic events in the basement are picked at changes in seismic character. The

interpretation shows the basement is folded to form an antiform with a wave length of about 15 km. The north-western limb (left) dips shallowly, approximately 5°, while the south-eastern limb dips at about 10°. However, the line is not straight, but rather shallowly concave towards the northeast, with the apex between shot-point 500 and 700, about the same position as the crest of the structure in the section. The structure observed here is probably apparent, resulting from the combination of linear reflectors and the changes in line orientation.

Thunderbolt Region

❖ TB02-BA and Preliminary Stacks for TB02bHA, TB02b-HB and TB02b-HC

Line TB02-BA extends from the Tiger Range above the Gordon River (450 932.37 mE, 5 285 937.14 mN), where there was some redundant acquisition which did not assist profiling, migration or correction, to the central plateau and terminates northeast of Great Lake at the very edge of the Great Western Tiers above Poatina (487 453.54 mE, 5 369 833.21mN) (see **Appendix IV**, or map at end of section). The line crosses the topographic ramp onto the plateau. Refer to Figure 10. This line begins on the exposed Lower Palaeozoic rocks of interest to Great South Land Minerals Limited in the Florentine Valley region.

Generally, the seismic data in the basement section comprise both coherent and incoherent data at varying amplitudes. Seismic events in the basement are picked at changes in seismic character.

This line is very important to the overall interpretation; as it targets the Thunderbolt Anticline and it crosses the Central Highlands from south to north. The overall quality of the seismic data is good.

The Thunderbolt Anticline has been identified at the southern end of TB02-BA nearby Mount Thunderbolt which probably affects the Eldon and Gordon Groups. The structure lies approximately half a wavelength east of a large scale syncline mapped in the Florentine Valley. TB02b-HA, TB02b-HB and TB02b-HC were proposed and acquired as part of the 2007 survey program.

Preliminary stack information has been taken into consideration in order to define the structure. At the time of writing, the seismic results for 2007 are still being processed by FUGRO SEISMIC IMAGING in Perth Western Australia.

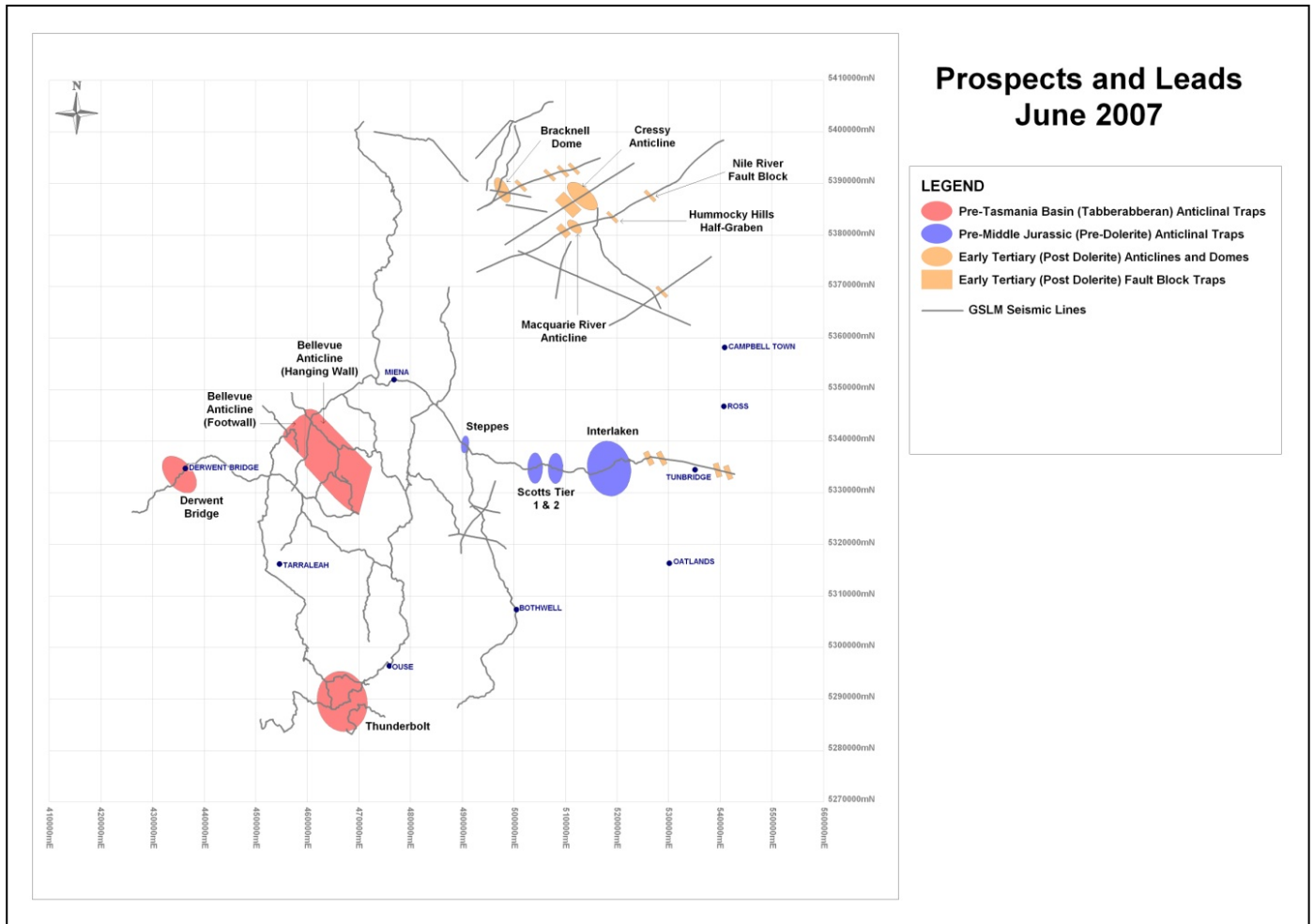
The crest of the structure is truncated by the Base Parmeener Unconformity which lies at 1922 m (6305 ft) below the surface in this location. The shape of the structure is distorted on the seismic section due to the crooked line acquisition. Other than the central anticlinal trap, other possible plays include palaeokarst and sub-unconformity traps.

The estimated depth of the target is 3452m (11 322 ft) and it has been calculated using a seismic velocity of 6500 m/s for the Eldon/Gordon Group sequence. Possible anticlinal trap within the Permian/Triassic; an unconformity/palaeokarst trap in Gordon Limestone and anticlinal trap within Eldon/Gordon Group have been identified.

Lead/Prospect Definition - Targets

Seismic interpretation has identified several fault block traps and small anticlines with shallow targets (2000m to 1500m) in the Gondwana Petroleum System (diagram in **Appendix X**). Seismic interpretation has also identified deeper targets are in the Larapintine Petroleum System (diagram in **Appendix X**) mainly in the Central Highlands with Ordovician targets at depths of 3500m to 4000m.

Following is a Leads and Prospects Definition map. See **Appendix XI** for Lead and Prospects Definition documents and **Appendix XII** for larger version of map.



Leads and Prospects Map

Gondwanan Petroleum System

❖ Pre-Early Jurassic (Pre-Dolerite) Anticlinal Traps:

STEPPESS ANTICLINE defined by TB01-ST

SCOTS TIER ANTICLINE defined by TB01-ST

SCOTTS TIER FAULT BLOCK defined by TB01-ST

INTERLAKEN ANTICLINE defined by TB01-ST

❖ Early Tertiary (Post Dolerite) Anticlines and Domes:

BRACKNELL DOME defined by TB01-PM, TB01-SD and TB01-SA

CRESSY ANTICLINE defined by TB01-PU

MACQUARIE RIVER ANTICLINE defined by TB01-PG

❖ Early Tertiary (Post Dolerite) Fault Block Traps:

MACQUARIE RIVER FAULT BLOCK defined by TB01-PG

NILE RIVER FAULT BLOCK defined by TB01-PG

HUMMOCKY HILLS HALF-GRABEN defined by TB01-PG

LACHISH FAULT BLOCK defined by TB01-PT

Larapintine Petroleum System

➤ BELLEVUE ANTICLINE

The structure is very well defined by seismic lines TB01-PB, TB01-TD, TB02b-BQ, TB02b-BZ and TB02b-AA1.

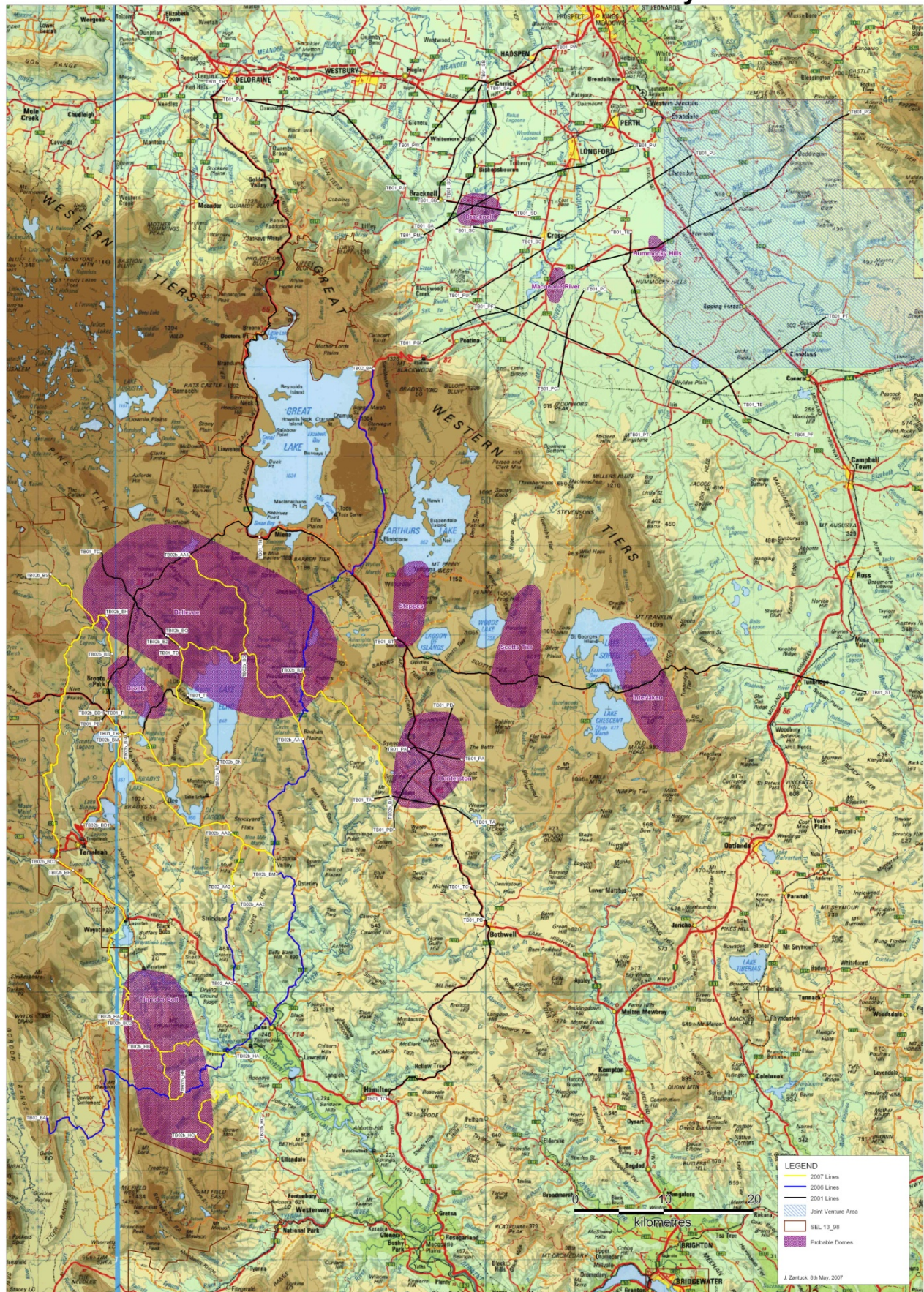
➤ THUNDERBOLT ANTICLINE

The structure is well defined by seismic lines TB02-BA, TB02bHA, TB02b-HB, TB02b-HC and TB02b-BD2.

➤ DERWENT BRIDGE ANTICLINE

The structure is poorly defined by seismic line TB01-TB

Great South Land Minerals - Seismic Survey Lines



All seismic survey lines with labels. Prospects from before 2007 seismic – see Leads and Prospects Map for most recent.

Drilling Program

A Gefco SpeedStar 185K (**Appendix XIII**) was purchased and imported from the USA and has since been granted restricted registration by the Department of Infrastructure Energy and Resources. The drill rig is currently stored in secure, rented, engineering premises in Devonport which includes a section of a large undercover workshop together with an open area to facilitate storage of equipment as it arrives.

After inspection by several external experts who detailed a list of deficiencies, considerable modifications are in progress to ensure that the rig complies with Australian Standards. The modifications are being supervised by an engineer from Pitt & Sherry who is working very closely with Hoist & Crane Inspection Services to ensure compliance. The modifications are expected to be completed in the near future.



GSLM's Gefco SpeedStar 185K drill rig

An extensive drilling program is planned for 2007 and 2008, with the first well of the program spudded in May 2007, at the GSLM Lachish site (near Conara, in the Midlands). The purpose of this hole was to test the depth of the dolerite at this location and also to create a water bore to supply drilling mud for a second well at this site. A comprehensive report on drilling at Lachish is contained in **Appendix XIV**.

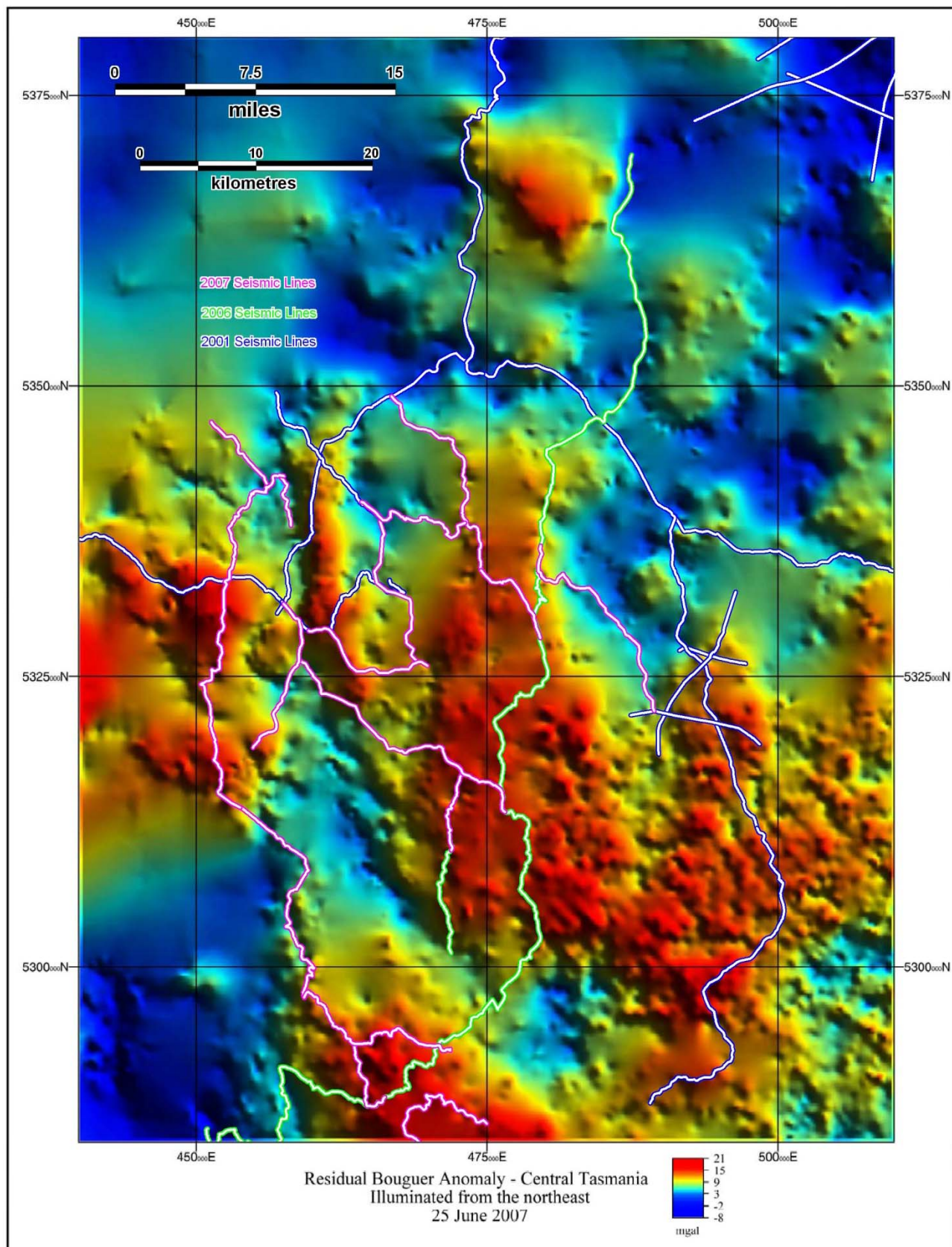
The GEFCO rig and other locally available rigs will be used to drill and case the top-holes (pre-collar) to depths of 200-500m (600 to 1500 feet). The GSLM rig will also be used to complete some of the holes.

Gravity Survey

SOLO GEOPHYSICS of Adelaide, South Australia, was engaged to carry out an extensive gravity survey in central Tasmania as an adjunct to our seismic survey (**Appendix XV**). 1895 gravity stations were measured and the processed results provide valuable information on the hidden geology of the region.



Gravity surveyors, Central Highlands



Gravity, Central Highlands
Prepared by Dr David Leaman
Incorporating SOLO GEOPHYSICS 2007 survey data

Geochemical and Source and Seep Studies

Several geochemical investigations were carried out during the past year. A major study was carried out on oil seeps in the western part of the Tasmania Basin near Zeehan. These seeps of oil and bitumen are found within both Precambrian and Permian sandstones. External consultant Professor Alan Cook remarked that “such abundant evidence of oil and bitumen is unusual in the Permian of Australia”. GSLM staff re-collected this oil and bitumen from outcrops of latest Permian sandstone (“Cygnet Coal Measures correlate”) and these were sent to GEOTECH in Perth, Western Australia. They report (**Appendix XVI**) that the bitumen impregnated sandstone shows a predominance of low-molecular weight alkanes. An MPI vitrinite reflectance equivalence of above 1% is indicated but surface oxidation may have affected the values. This high value is supported by mineral fluorescence but rare vitrinite gives a value of 0.85%. Cook (**Appendix XVII, page 14**) reports that “The presence of oil suggests that the lack of vitrinite and liptinite is not due to weathering.” The organic matter derives from terrigenous sources with significant marine algal input. The relatively low C27/C29 sterane and diasterane ratios indicate a terrestrial higher plant input into a near-shore estuary or bay. The presence of norhopanes indicates a distinct carbonate signature. This non-tasmanite carbonate signature is characteristic of other enigmatic bitumens found in at the surface and within sandstones in southern Tasmania at Tunnack, Bruny Island and near Bridgewater.

This geochemical study shows that oil has been generated from and has migrated from fully mature Permian source rocks in the western part of the basin and that these are geochemically similar to carbonate derived bitumens in the southern part of the basin. The source rock has not been identified. The source potential of the following Permian units has, though been confirmed :

1. Woody Island/Quamby Fm, 2. tasmanite and *Tasmanites*-rich horizons, 3. Macrae Mudstone, 4. carbonaceous shales and coals within the Liffey/Faulkner Groups, 5. carbonaceous shales within the uppermost Permian Cygnet Coal Measures and correlates, 6. Minor oil shales.

Our previous estimates of the possible potential resource onshore Tasmania have used the standard Source Potential Index (SPI). This has resulted in estimates of about 3 billion barrels of recoverable oil. Our new study has used the ZETAWARE software package and, for the first time, provides us with an estimate of potential, recoverable gas resources. After inputting rather conservative figures of source rock distributions and recovery factors we estimate a total potential recoverable resource of 6 trillion cubic feet (tcf) of gas and 346 million barrels of oil. See **Appendix XVIII** on generative potential for further details.

Environment

As a part of our commitment to our environmental responsibility, GSLM has and will undertake detailed environmental studies and planning prior to the commencement of seismic and drilling operations. The Company has and will undertake rehabilitation programs necessary to restore any land disturbed by exploration activities, and will respond quickly and effectively if accidental pollution or environmental damage occurs.

2007 Seismic Acquisition Program

The Conservation Assessment Section of DPIW deemed that the environmental management plan developed for the autumn 2006 seismic acquisition program was adequate to cover the 2007 seismic program, provided addendums were compiled to cover any new areas, not included in the original document. These addendums were duly compiled by environmental contractors SEMF and were approved by DPIW (**Appendix XIX**).

A similar process was undertaken with regard to traffic management. An addendum to the 2006 seismic program Traffic Management Plan was compiled by SEMF and approved by DIER (**Appendix XX**).

As set out by the environmental management plan, seismic lines were pegged so as to clearly indicate areas of threatened or endangered species. In these areas the seismic crew stayed only on pre-defined tracks, in order to avoid stress to the identified species.

Damage to roads and the environment were also minimised during the 2007 seismic survey, through the employment of sound operational methods and procedures by the contractors.

Drilling Program

Work has been progressing to ensure that appropriate environmental studies and approvals are in place for the upcoming drilling program. This includes the commissioning of the following studies, when necessary, for each planned drill site:

- Threatened species - Flora and Fauna (including wedge tailed eagles)
- Cultural heritage
- Aboriginal heritage
- Acoustic
- Hydrogeology

A number of these studies have been completed so far, for proposed drill sites Lachish, Hebron, Eglon and Gezer (**Appendix XXI**).

Rehabilitation Programs

After completion of the 2007 GSLM seismic program, two environmental rehabilitation initiatives were undertaken as a result of feedback that was gained from land owner/managers. The first problem which was identified was damage to an access road as a result of the seismic survey. The second problem was the necessary removal of seismic pegs on two of the roads that were not used during the 2007 survey.

An access road running through the Macclesfield property was damaged by the seismic contractors during seismic acquisition in wet conditions. In order to restore the road to a condition that was deemed acceptable by the landowner, GSLM staff then liaised with both the landowner and the repair contractor

until a suitable agreement was reached as to the scope and degree of repair which was necessary. On completion of the road restoration, the landowner inspected the road and was happy with the outcome.

Appendix XXII contains a full report.

After the completion of the 2007 seismic survey, several pegged lines were left unused as a result of changes that were made to the program. A planned line along the Lyell Highway (BD2), where an acquisition problem was identified with collecting data near 50 Hz power lines, and a private road west of Bothwell (BK), where the land owner did not wish the pegs to remain, had the unused pegs removed. For other unused lines, permission was obtained from the relevant authorities to leave the pegs in place for the present. Pegs were removed using a DIER approved road crew, and have now been placed in storage ready for later use.



Before and after condition of road on Macclesfield property

Exploration Expenditure

Exploration Expenditure July 06 to June 07

Geology	\$122,716.68
Geochemistry	\$9,555.00
Geophysics - Ground	\$4,776,970.25
Feasibility Studies	\$36,300.00
Rehabilitation	\$30,675.00
Drilling / Gridding	\$405,481.19
Other - Capitalised	\$2,764,721.99
Expensed Costs & Admin.	\$261,837.18
SUB TOTAL	\$8,408,257.29
Expenditure (01/07/04 - 30/06/06)	\$3,084,991.85
Expenditure up to 30/06/04	\$6,417,215.86
TOTAL	\$17,910,465.00

