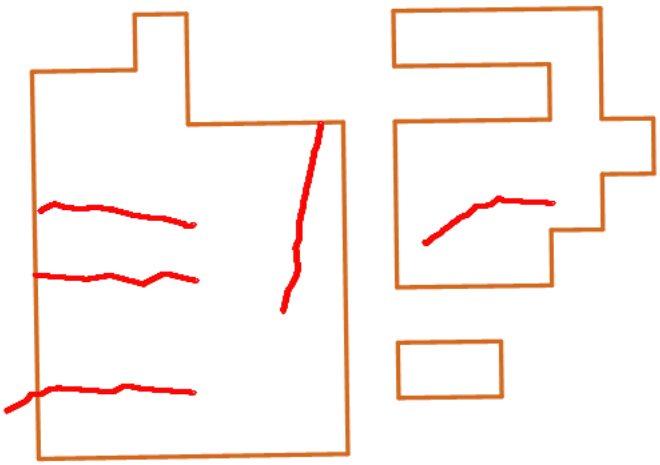
2009 Muttaburra 2D Seismic Survey

PPL799P

Queensland, Australia

12 October to 21 October 2009



Field Quality Control Report

Tony Cheshire
Seismic Consultants Group Pty. Ltd.

TABLES OF CONTENT

APPENDICES

FIGURES

TABLES

MAPS

PHOTOGRAPHS

SECTION 1. SUMMARY

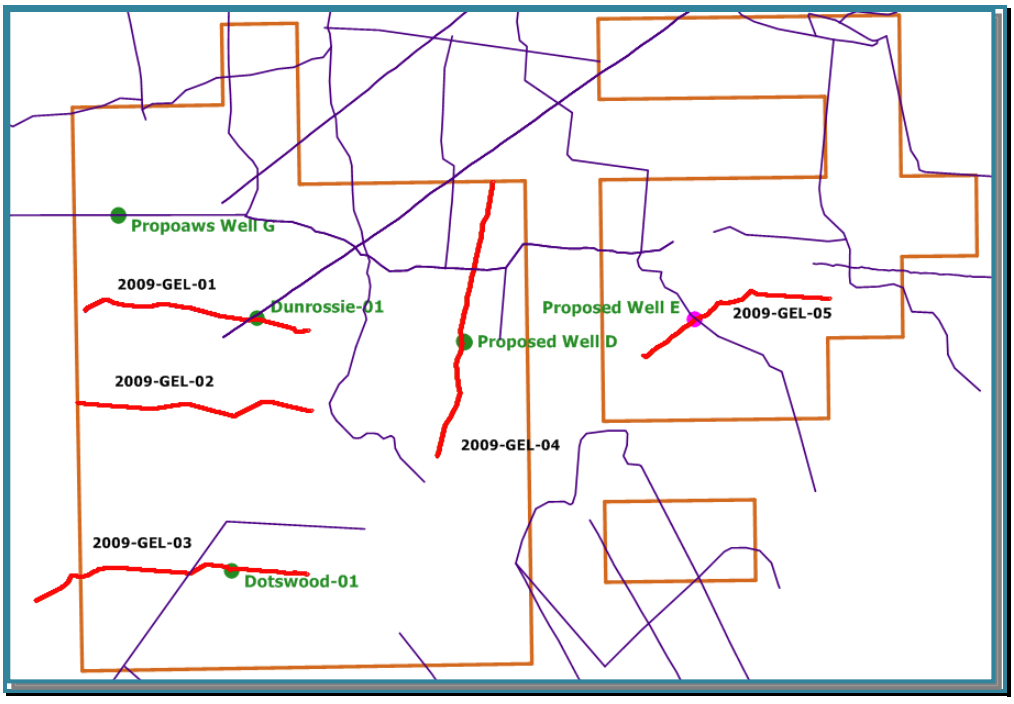
1.1. Introduction

Seismic Consultants Group Pty. Ltd. (SCG) was engaged by MBA Petroleum Consultants Pty Ltd. to provide technical and geophysical field quality control supervision for the recording phase of Galilee Energy Ltd.'s 2009 Muttaburra 2D Seismic Survey through the services of quality control geophysicist, Mr. Tony Cheshire. This report comprises a summary of the seismic survey recording operations and vibrator sweep parameter tests performed in the field.

1.2. Nature of Project

Galilee Energy Limited, as operator of ATP799P located in the Galilee Basin, a prospective coal seam gas (CSG) producing area in central Queensland, Australia, commissioned the design and acquisition of the 2009 Muttaburra 2D Seismic Survey together with a two-hole core drilling program to correlate core stratigraphy with seismic horizon and identify potential CSG bearing structure.

The Muttaburra 2D Seismic Survey comprised five 2D Vibroseis seismic lines between 24.39 km and 33.09 km for a total of 143.91 km. The lines were laid out using the "crooked line" technique with line located on existing tracks where possible. Map 1 below shows the line locations relative to the ATP799P boundary, proposed wells and existing seismic lines while Table 1 on page 2 summarises production progress and Table 2 on page 3 lists survey data acquisition parameters.



Map 1: Line locations relative to PPL799P boundary, proposed wells and existing seismic lines

Galilee Energy contracted Terrex Seismic of Perth, Western Australia, to record the seismic program and Terrex provided the services of their twenty one person Vibroseis crew No.401 equipped with a 600 channel Sercel 428XL Isuzu truck mounted Recording system, three Hemi-50 50,000 lb Vibrators, thirteen Toyota Land Cruisers, a service truck, supply truck, cable workshop truck and cable/geophone truck.

The survey was recorded with a 15 metre station interval and a 6- phone 12.5 metre geophone array using a 240 channel symmetric straddle spread. Two vibrators were used to provide a single 6 second, 10 Hz to 110 Hz sweep recorded at every station to produce a 120-fold Stack-Array stack. A vibrator pad spacing of

15 m was used to keep the vibrator array symmetrical with the geophone array. Data was recorded with a sample rate of 1 ms and a 3 second listen time.

The crew arrived on site on the afternoon of Monday 12th October 2009 and began laying out recording spread. Data acquisition production commenced the next day following vibrator sweep parameter tests. The designated program was completed on Wednesday 21st, a total of ten days, and all line equipment was picked up and sent on to the crew's next project. The crew personnel returned to camp and left the site on the morning of Thursday 22nd October.

Date	Line	Line	Total VPs	Total km	Acc VPs	Acc km	Remarks
11/10/2009	Mob						Mobilise
12/10/2009	1						Mobilise and layout 300 stations
13/10/2009	1		1075	16.200	1075	16.200	Sweep tests and production
14/10/2009	1	2	1137	17.205	2212	33.405	Line 1 complete, start line 2
15/10/2009		2	1404	21.165	3616	54.570	Line 2 complete
16/10/2009	3		998	14.970	4614	69.540	
17/10/2009	3		1201	18.135	5815	87.675	Line 3 Complete
18/10/2009	4		1199	18.105	7014	105.780	
19/10/2009	4	5	1080	16.200	8094	121.980	Line 4 Complete, start line 5.
20/10/2009	5		1141	17.115	9235	139.095	5.73 km remaining
21/10/2009	5		382	5.730	9617	144.825	Line 5 and project complete

Table 1: Production summary

1.3. Nature and Scope of Report

Section 2 of this report contains a description of the physical environment and logistical aspects of the survey while Section 3 comprises health, safety and environmental aspects. Section 4 describes the preparatory stages of the survey of permitting, line preparation and surveying. Recording equipment testing and Vibrator sweep tests are detailed in Section 5 and Section 6 while recording operations are described in Section 7 . Section 8 deals with data quality issues while the Appendix on page 16 contains maps, company and consultant information, topographical survey parameters and equipment and personnel lists.

1.4. Conclusions and Recommendations

The survey seismic data acquisition was conducted in an efficient and safe manner. The Terrex crew was well managed and disciplined with a good safety ethic and a serious approach to the work. With the exception of some of the geophone strings, spread cables and large trucks, most of the crew equipment was less than two years old and the older equipment appeared to be in good condition and well maintained.

The crew equipment and selected parameters should ensure good quality processed sections. The use of heavier vibrators allowed for good signal to noise ratio in windy conditions while sweeping only one short sweep per VP.

Much of the success of the data acquisition survey is attributable to the preparatory work that had been undertaken prior to the crew's arrival and the resulting well-prepared lines, good access, minimal vibrator detours and good landowner relations.

The following is recommended for future seismic work in the area:

Health and Safety

It is recommended that

1. Contractors should be required to provide to the client documented site and project specific safety and emergency response plans prior to the crew being deployed to the site.

2. Camp site telephones should be fitted with extensions, mobile handsets or external bells/sirens so that calls can be answered when the offices are not attended.

Seismic Data Recording

The contractor is recently undertaking a four-month trial using an off-site geophone and cable repair facility instead of the usual on-crew capability. Thus there is no-longer a way to confirm geophone string quality and the crew is no-longer maintaining its monthly rotation of geophones and cables through the field workshop for testing with only faulty equipment being sent to the off-site facility for repair (see remarks on page 8). If this contractor is to be considered for future work and it is still using an off-site geophone repair system it should be required to provide the following:

a) a documented record of spread equipment rotation through the off-site workshop to demonstrate that all equipment is being regularly tested once a month (for this all spread equipment needs to be numbered and good written and printed records kept);

b) an on-site geophone testing capability (SMT-200 or 300 and a leakage tester) so that the geophones can be tested on-site prior to the start of production.

Number of lines	5
Survey length	144.825kilometers
Average line length	28.965 kilometres
Recording spread	240 channels, symmetric straddle
Full offset fold	120
Survey technique	GPS crooked line
Source	
Type	Vibroseis
Vibrators	Hemi-50, 50,000 lb peak force
Control electronics	Pelton Vib Pro
Source array	2 Vibrators, 15 m pad to pad
Source interval	15 metres (centred between receiver stations)
Sweep	10 Hz to 110 Hz, 6 seconds, 250 ms taper
Sweeps per VP	1
Receivers	
Type	Sensor SM4 10Hz
No. per array	6 in series
Array length	15 metres
Array element interval	2.5metres
Receiver station interval	15 metres
Recording Parameters	
Instrument	Sercel 428XL
Listen time (record length)	3 seconds
Sample rate	1 ms
Channels	240
Noise edit	None
Tape format	SEG-D

Table 2: Survey parameter summary

SECTION 2. TERAIN AND LOGISTICS

ATP799P is located in Central Queensland between Longreach and Hughenden, between approximately 30 and 105 km north of the town of Muttaburra. The town of Longreach was the crew's main logistics centre for crew rotation and supply with operations support provided by Terrex's Brisbane office. (Map 3, Appendix A, page 16)

The survey area is a mix of gidgee and black soil channel and desert country utilised by cattle and sheep grazing properties with elevations ranging from 218 metres to 293 metres and bounded by the Landsborough and Torrens creeks, tributaries of the Thompson River, to the east and west. Kerr Creek runs from north to south through the block and approximately separates the black soil country in the west from the desert country in the east.

Photo 1: Black soil country with surface gravel (left) and grassland (right)

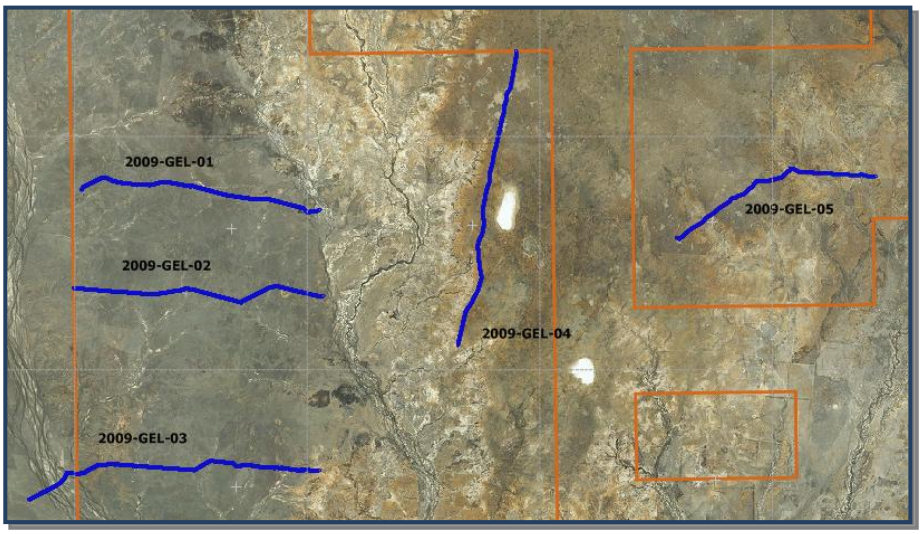
Photo 2: Desert country picking up geophones (left) and a GEL gate (right)

2.1. Terrain

East-west lines 1, 2 and 3 are in similar terrain on black soil channel country grazing properties between the Landsborough river and Kerr Creek with elevations ranging from 218 metres at the Landsborough Creek crossing on the west end of line 2009-GEL-03 to 273 metres at Dunrossie Station near the Muttaburra-Hughenden Road on line 2009-GEL-01. Surface conditions comprise predominantly dry friable black soil with grass tufts with some areas of hard rocky gravel plane (Photo 1 above).

Line 4 and 5 runs through desert cap-rock country with occasional surface rock, dry lakes, little soil cover and dense desert vegetation (Photo 2 above). Elevations on line 4 range from 245 metres in the south to 293 metres in the north and on line 5 from 252 to 272 metres.

Map 2 below shows the different areas on the Google[1] satellite image and the black soil and desert cap-rock areas can be seen clearly.



Map 2: Lines and satellite image

2.2. Communications

Airports

The nearest airport to the survey area is Longreach which is served daily by Qantas with flights to Brisbane. This is 1.5 to two hours drive from the crew base camp on line 2009-GEL-01.

Road Access

Longreach is on the Landsborough highway, 1200 km NW of Brisbane and 670 km W of Rockhampton on the Capricorn Highway. These are two lane sealed road that provide all weather access. From Longreach and Barcaldine the survey area is served by a number of good quality dirt roads however during wet periods flooding of the Thompson River and its tributaries the Landsborough, Tower hill and Cornish Creeks can restrict access.

Numerous cattle and sheep station tracks provide good access through the block.

Telecommunications

Most towns in the area are served by Telstra's Next-G network providing mobile telephone and broadband internet coverage. This coverage extends to some limited extent into the southern part of the block.

The Galilee base camp was served by a satellite telephone and internet connection for important routine and emergency use. Terrex also provided a portable satellite telephone for emergency communications with the recording truck which was also fitted with a satellite telephone.

The recording crew itself used a combination of VHF and UHF communications. The VHF units were used for communications between the vibrators and recording truck with the UHF units being used for line control and troubleshooting.

[1] © Google Inc.

2.3. Accommodation

Photo 3: Base Camp

The crew was accommodated in Galilee's camp at the Dunrossie-01 well site on seismic line 2009-GEL-01. This 32 person camp, engaged by Galilee primarily for the core drilling program was supplied by KJM Contractors, Perth. Additional occasional accommodation was also available at the Muttaburra Motel.

Photo 4: Crew transport

2.4. Personnel

Terrex provided a 21/22 person crew as listed in Table 7, Appendix D, 23 and KJM's camp was managed and operated by two cooks alternately performing catering and camp attendant/management duties.

GEL was represented by David Ayling as the Operating Company Representative and Tony Cheshire as the Data Acquisition Quality Control Geophysicist.

2.5. Crew Transport and Recording Equipment

List of crew transport and recording equipment are provided in Appendix E page 24.

For the field supervision of the seismic data acquisition SCG provided a rental 2009 Nissan Patrol complete with first-aid kit, fire extinguisher, long-range tank, winch, recovery kit and second spare tyre together with a satellite phone for emergency and incidental communications.

SECTION 3. HEALTH, SAFETY AND ENVIRONMENT

The recording phase of the survey was conducted in a safe and environmentally sound manner with zero reportable incidents. Terrex have a sound HS&E management system in place and provide a dedicated HS&E specialist on site to administer the system and provide HS&E advice to the crew. Terrex also claims uniquely to operate in a carbon neutral manner.

An adequate stock of personal protective equipment (PPE) was maintained on site. Vehicles were properly equipped with fire extinguishers and first aid kits and were either new or in well maintained condition.

Tool box meetings attended by all crew members were held at 5:45 am each morning before the start of work. At these, HS&E issues were covered including issues specific to this project and not recently encountered by this crew such as remoteness, dehydration and communications.

Photo 5: Morning toolbox meeting

All vehicles on the crew were equipped with one VHF radio and one UHF radio. The VHF radio's are used for medium range communications up to about 25 km such as line operations and where possible line to camp. The UHF radios, with ranges up to about 5 km, are used for communicating between and with the vibrator operators and with truck drivers when on convoy. The recording truck was equipped with an Optus satellite phone and a Codan HF transceiver.

At the start of recording the setup described above left a gap in the communications safety net. Although a VHF radio was installed at the base camp and the KJM camp office had a satellite mobile telephone the offices were often not occupied and phone and radio calls to camp went unanswered. Terrex partially resolved this by renting a portable satellite phone for use by the crew HS&E Advisor or the party chief as

coordinator of the HSE emergency response plan. However, the solution was not completely satisfactory because the satellite phone had to sit outside of the crew manager's office and, having a weak ring tone, was not easily heard above the camp generator noise. As the first line was very close to camp this oversight did not pose too great a risk however it should have been identified that the planning stage.

A site specific safety plan and an emergency response plan had not been prepared prior to the crew's arrival on site and were drafted on-site by the crew safety manager. This work should have been done prior to the crew's deployment to site.

SECTION 4. PERMITTING, LINE PREPARATION AND SURVEYING

All permitting, line preparation and supervision was co-ordinated by GEL with key support by consultants Peter Spraggon and David Ayling.

Sixteen properties were affected by the survey and as well as engaging a seismic line dozing/grading contractor Galilee employed s a local fencer to insert gates in property fences where alternative access was not available. A total of twenty-one access gates were installed on the survey

Lines were located on existing tracks where possible and cleaned and straightened with a grader to 5 to 6 metres.

Line pegging and surveying was undertaken by Conics under contract to Galilee Energy Ltd. Survey projection and datum parameters are provided in Table 4 Appendix C page 20. Table 5 page 21 lists the ends of lines and major bends in both projected and geographic coordinates.

SECTION 5. RECORDING EQUIPMENT TESTING

5.1. Recording Instrument Tests

Terrex do not perform specific monthly or start-of-contract Sercel 428 XL recording instrument tests, preferring to test the equipment once deployed on the line. This is quite acceptable with the Sercel 428XL instrument, especially on crews such as this where access is good. The tests performed were instrument noise, distortion, gain accuracy and pulse response, all have which have fixed built-in pass/fail specifications. Spread equipment test specifications were set as follows and are satisfactory for the working conditions:

Geophone continuity	350 to 460 Ω
Geophone tilt test	5%
Ambient noise	15 μV
Geophone leakage	0.5 MΩ

5.2. Geophone Tests

Up until this project, this crew had maintained a rotation of geophone strings through the on-crew geophone and cable repair workshop. Each day twenty strings were removed from the line for testing, following which they were marked with paint to indicate that they had been tested. Thus the complete set of geophones was tested once a month. Strings were tested for activity, distortion and leakage using an SMT-200 geophone checker and a leakage meter.

Just before deploying to the survey, however, the capability to do this was removed from the crew and a centralised workshop set-up in Brisbane to service this and other Terrex crews. This change, although not impacting this survey, is likely to affect the crew's ability to maintain geophone string quality if the proper testing rotation cannot be maintained. The company is currently conducting a four-month trial of the new system. If the system is retained then client companies would be wise to consider carefully the impact on the crew's ability to provide quality data and examine closely the quality of the geophone strings provided.

As mentioned, the impact of this change on this operation was minimal as the equipment had been properly rotated through the workshop during the month prior to the survey.

SECTION 6. VIBRATOR SWEEP TESTS

Terrex Seismic's crew number 401 arrived on site around mid-day on Monday 12 October and began deploying spread to the western end of line 2009-GEL-01 in the afternoon. Approximately 300 stations were laid by the end of the day. The author on site mid afternoon the same day in time to observe the start-of-contract vibrator wire-line similarity tests.

6.1. Spread Layout Progress and Vibrator Sweep Effort

In discussions with the Terrex Senior Observer it became clear that with the supplied geophone crew strength and two 5 or 6 second sweeps with 3 seconds listen every second VP, the vibrators would most likely be waiting for spread to be laid out for a portion of the working day. Given that sweeping every VP with two vibrators spaced 15 m apart would provide full Stack Array[2] and a step towards Symmetrically Sampled[3] data[4] and with its resulting ground-roll attenuation in the stack, Terrex was asked if it would be prepared to record a single sweep every VP with the provision that should the vibrators start falling behind the layout crews it could go back to the contract specification of one VP every second station. This would add about 5 seconds per cycle which for a 500 VP per day 15km day at 30m interval VPs would amount to 40 minutes to the vibrating time. The Author discussed the issue with Terrex MD, Steve Tobin, who agreed that the crew could record every VP as long as the production rates of the Vibrators and line crew remained balanced and proposed production rates were achieved.

6.2. Vibrator Sweep Tests

Following a set of vibrator far-field signature tests to double check vibrator similarity a set of vibrator sweep test records were recorded with the vibrators set up on VP 1000.5 and recording a single sweep into 120 channels from station 1000 to 1119. The following sweep tests were recorded with production instrument setting.

File #	Sweep From Hz	Sweep To Hz	Record Length sec.	Test Type
11	10	120	6	High frequency test
12	10	110	6	"
13	10	100	6	"
14	8	100	6	Low frequency test
15	6	100	6	"
16	10	110	8	Sweep length test
18	10	110	10	

Table 3: Vibrator Sweep Tests

The Terrex recording system setup provides only paper monitor plots for general quality control of the data so no real difference in data could be observed. The high frequency limit was therefore set at 110 as a

[2] Nigel Anstey (Whatever happened to ground roll, March 1986) and L. Ongkiehong and H. Askin (Towards the universal seismic acquisition technique, June 1988 First Break

[3] Gus J.O. Vermeer (Symmetric sampling, November 1991) Geophysics: The Leading Edge of Exploration

[4] Full symmetric sampling would require a 6 element vibrator array.

compromise to high frequency energy and limiting the bandwidth for a short sweep to give a slightly slower sweep rate so that the vibrators systems can better control the low frequencies.

Strong ground-roll obscured most reflectors in the noise cone so monitor plots were printed with a severe low-cut filter of 40 Hz as well as without low-cut filter. The filtered plots showed signal beneath the noise on all reflectors except the most shallow (<300 ms).

Lowering the start frequency showed a slight improvement of the deeper reflectors but with a little more ground-roll noise. An improvement could be seen with an 8 Hz start frequency after applying a low-cut filter on playback while extending the range down to 6 Hz did not give much improvement in signal and ground roll was stronger.

The sweep length comparison did show an improvement in signal to noise in the deeper section as record length increased however the benefits of Stack Array with the shorter 6 second record was thought to outweigh the benefits of the longer record every second VP.

A sweep range of 10 to 110 Hz was therefore selected for production with a 6 second sweep length.

As option of lengthening the sweep to 8 seconds would only add a half an hour to the vibrating time for a 1000 VP (15km day), this was held as an option should the vibrators remain limited by the layout rate.

SECTION 7. SEISMIC DATA RECORDING OPERATIONS

7.1. General

Following a fifteen minute toolbox meeting each morning at 5:45 am, the crew worked a 12 to 13 hour day, achieving between 6 and 9 hours vibrating time each day. The vibrators and recording equipment was reliable and good production rates were maintained.

Photo 6: Vibrators

7.2. Line Operations

Photo 7: Planting geophones (left) and picking up cables (right)

The line crew was equipped with near-new Toyota Land Cruiser deployment vehicles with purpose built caged equipment trays and crew platforms. The crew worked well and maintained a high production rate while maintaining good geophone patterns and plants.

7.3. Data Recording

Photo 8: Sercel 428XL recording truck and instruments

Data was recorded with a 600 channel Sercel 428XL recording system with Pelton Vib Pro Vibrator control electronics mounted in an air-conditioned Isuzu truck. The state-of-the-art Sercel recording system was reliable for the duration of the survey and coupled with the modern Vib Pro vibrator control electronics and new Hemi-50 vibrators and good quality geophone should provide as good data as possible with the given recording parameters.

The senior observer, with 25 years domestic and international experience, operated the equipment and managed the recording operation in a professional manner and was responsive to client requests and questions.

SECTION 8. DATA QUALITY

Data quality on lines 2009-GEL-01, 02 and 03 on the black soil country was good with clean reflectors down to and below the target horizons at about 800-1000ms. Some records on lines 2009-GEL-04 and 05 showed the similar quality but generally the data on these lines was lower frequency in character and occasionally showed evidence of surface reverberation depending on surface conditions.

The weather was dry, hot and generally windy for the duration of the survey. Wind noise may have been an issue with lighter vibrators but with the two 50,000 lb peak force vibrators the signal to noise ratio was good. This not withstanding the author paid significant attention to the manner in which the geophones were planted

The geophones laid out on the first day of operations were planted in the correct pattern with geophone planted approximately 2.5 m apart with the arrays centred on the geophone station peg. The crew had, however, planted a lot of geophones in the "windrow" at the side of the graded track or amongst grass growing beside the track. This can cause problems:

a) because of poor geophone coupling in the loose windrow or friable non-graded normal terrain surface (the author could easily dig a 100 cm trench in the normal ground with the toe of his boot) and

b) wind noise generated by the geophone wires hanging on the stiff, spiky grass.

The geophone front crew were therefore instructed to plant the geophones on the firmer graded track and were sent back to the beginning of the line to re-plant those strings that need to be fixed.

Thereafter the crew generally planted the geophones as required except in the occasional instance where surface conditions became so hard that the only option was to plant the geophones in the windrow. The day after the first and only crew change during the survey the author had cause to instruct the crew to re-plant almost 100 strings of geophones where it was clear that one of the crew was planting the geophone strings in the long grass off the grated track. Once the message had been re-stated the crew did a consistently good job in planting the geophones in often difficult conditions.

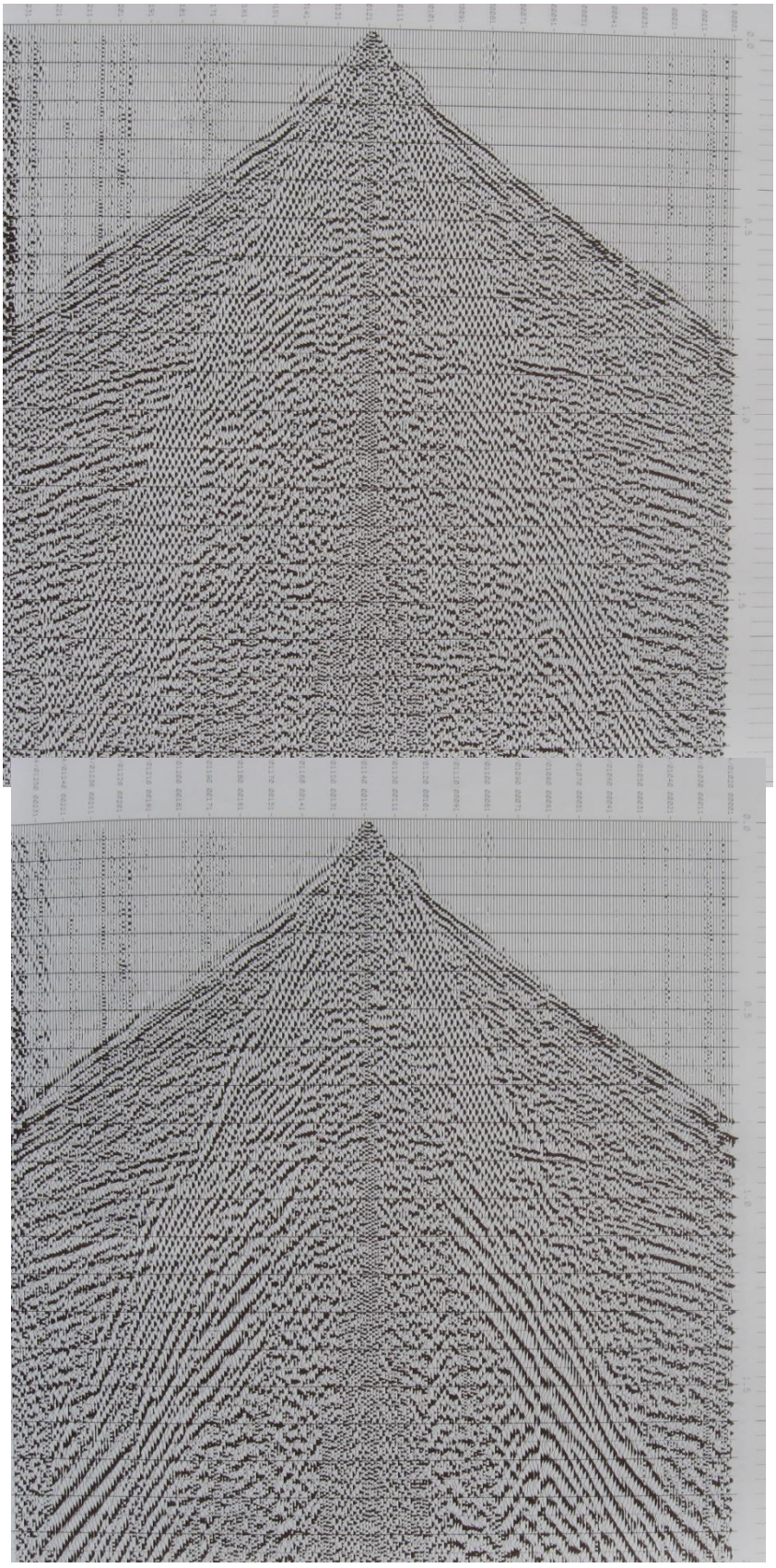


Photo 9: Monitor Plots, Line 4, VP 1139.5, Playback Low Cut 24 Hz (top), Out (Bottom)

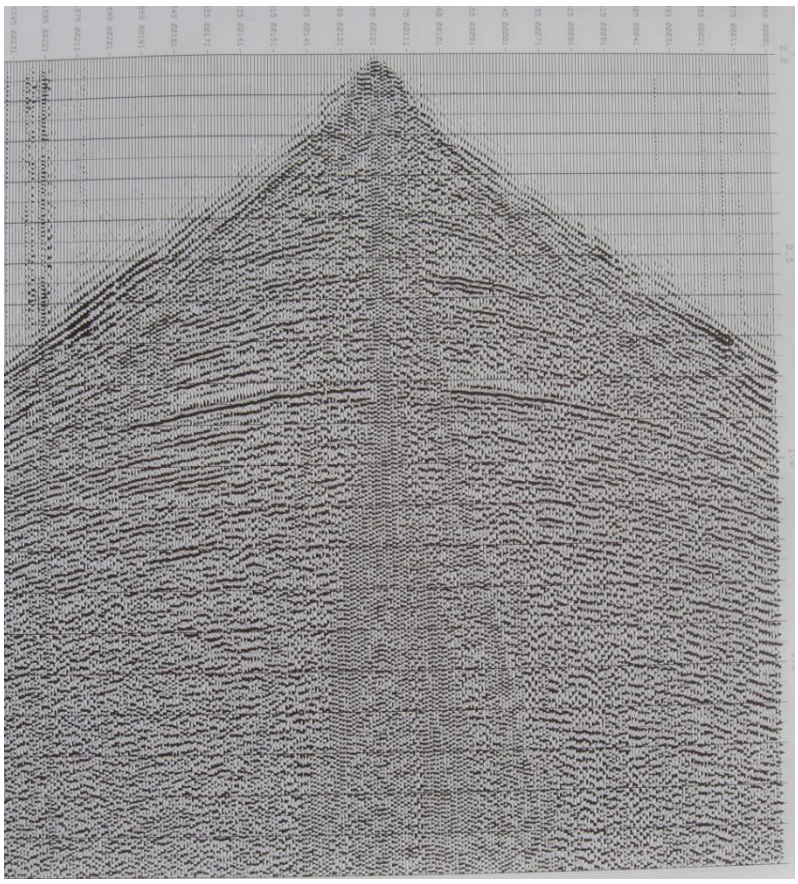


Figure 1: Monitor Plot, Line 4, VP 1484.5, Playback Low Cut 40 Hz

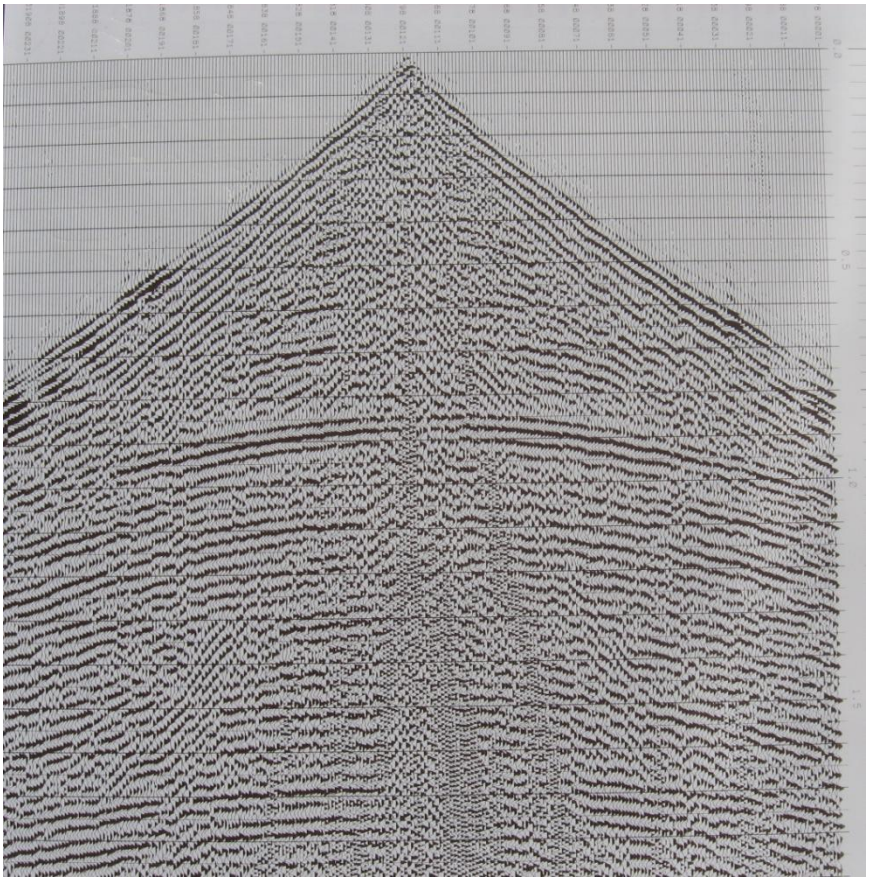
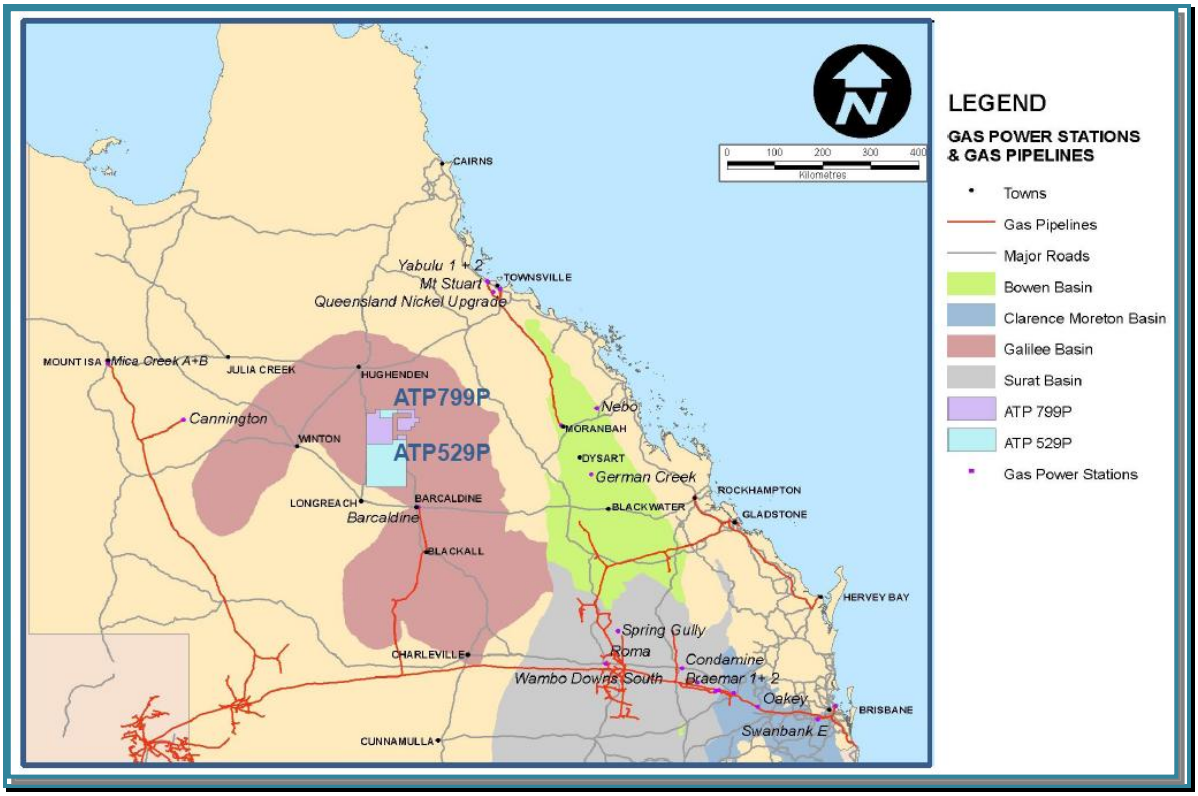


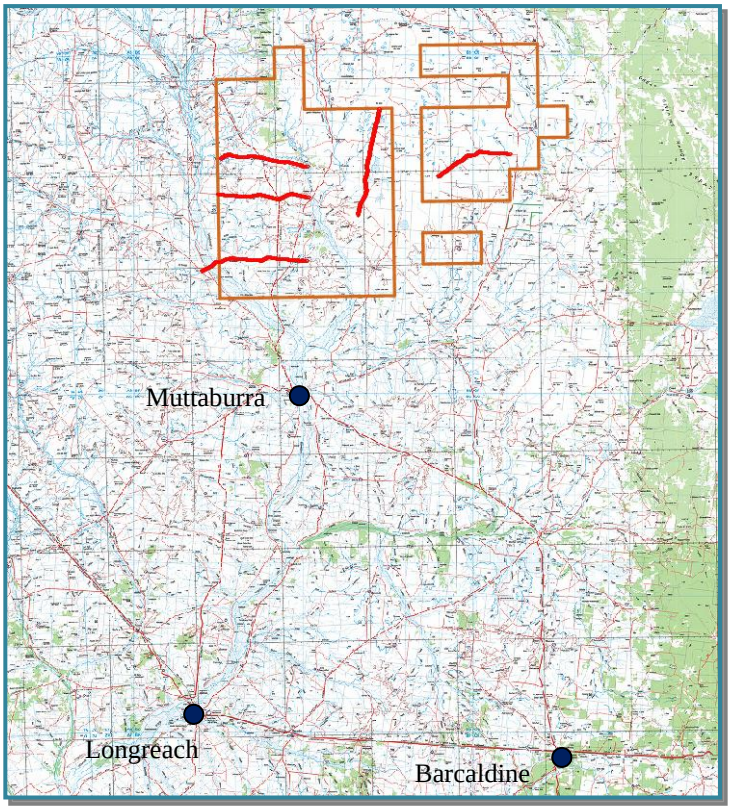
Figure 2: Monitor Plot, Line 4, VP 1797.5, Playback Low Cut 30 Hz

APPENDICES

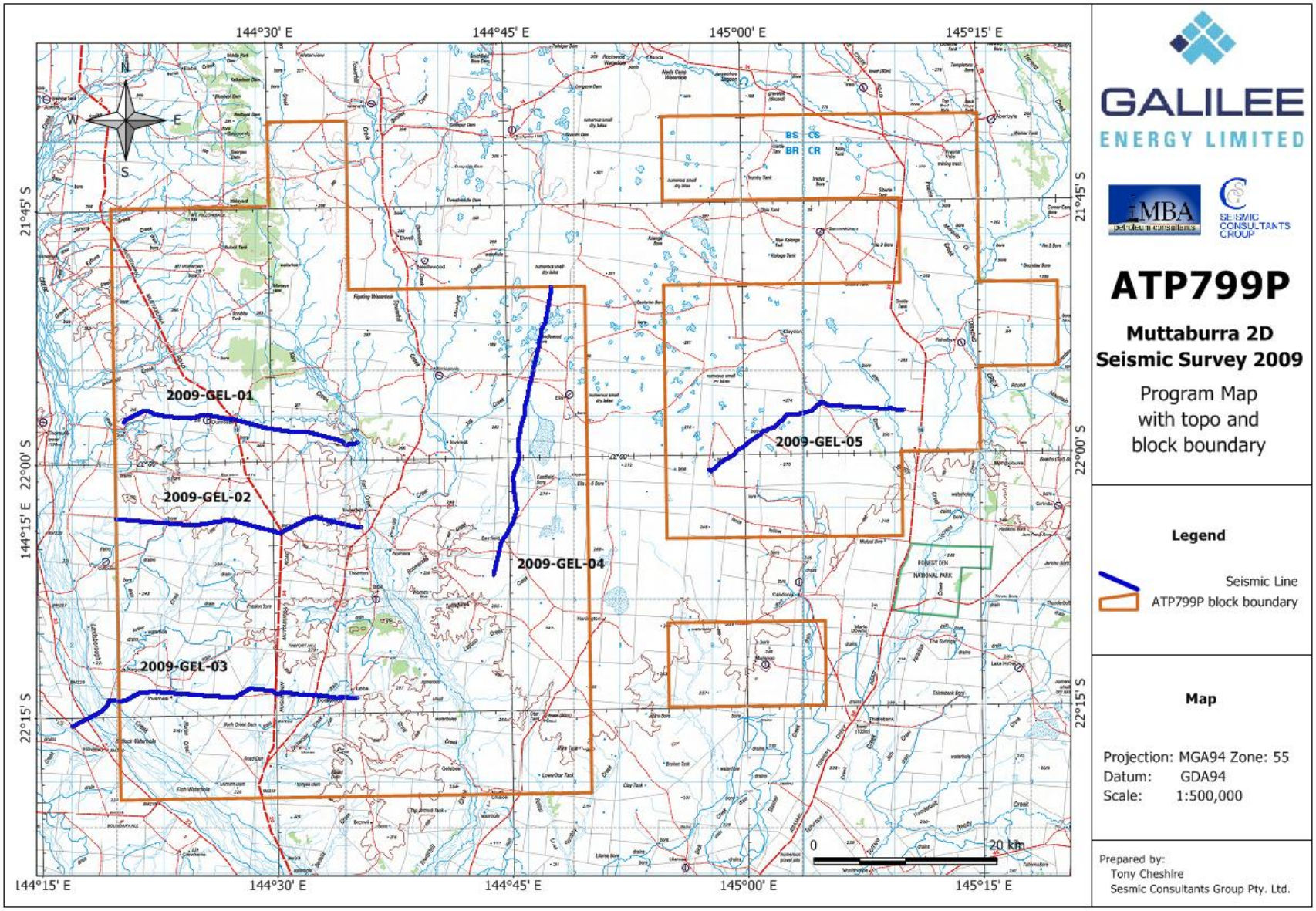
Appendix A Maps



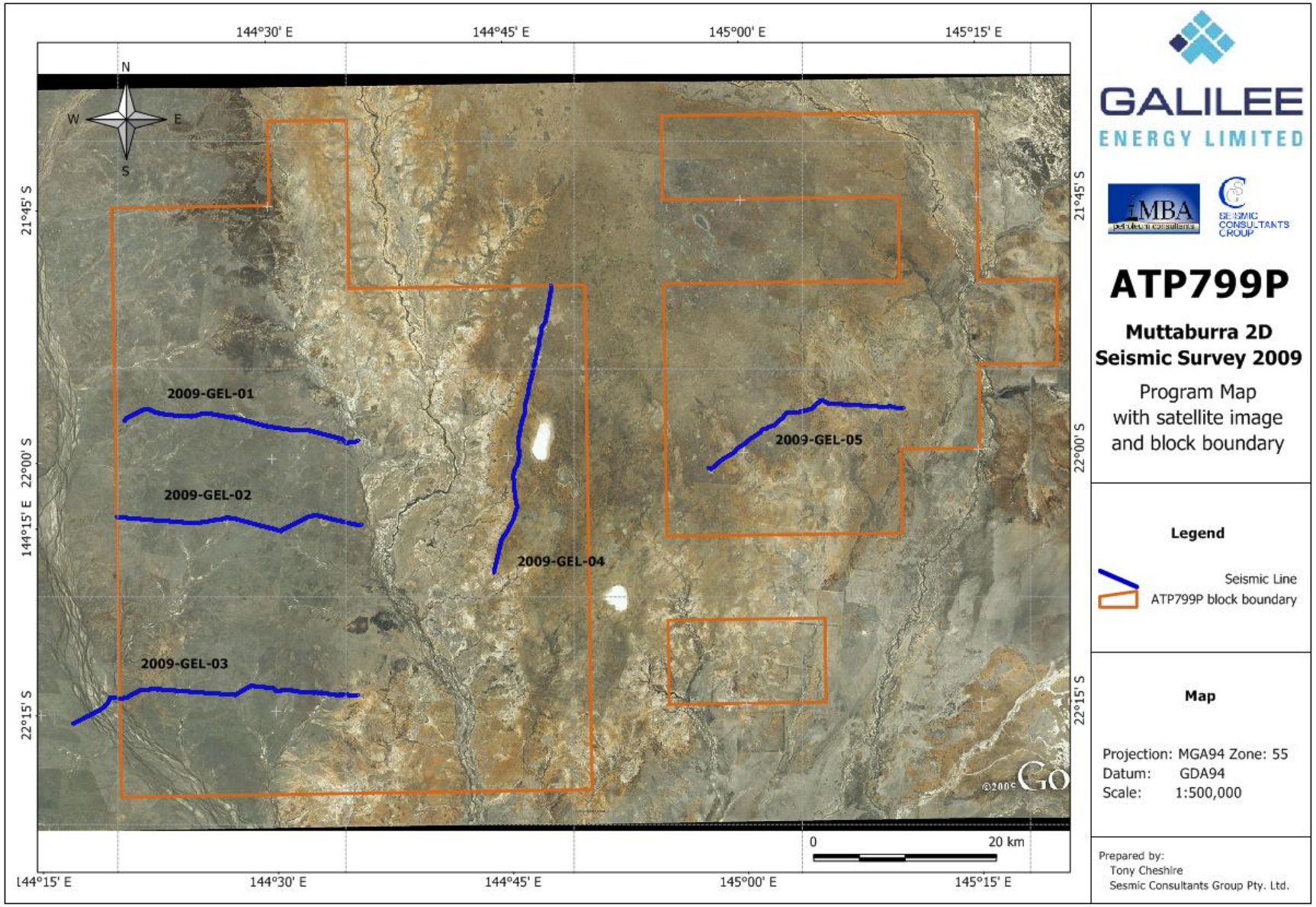
Map 3: Regional context of the survey



Map 4: Local context of the survey



Map 5: Program map with topo



Map 6: Program Map with satellite image

Appendix B Company and Consultant Information

Operator:	GALILEE ENERGY LIMITED C/o Eastern Corporation Level 2, 895 Ann Street Fortitude Valley, QLD 4006 Tel: 07 3216-1155 Attn: Glenn Haworth General Manager, Operations E-Mail: ghaworth@easterncorp.com.au
Acquisition Contractor:	TERREX SEISMIC PTY. LTD. Unit 2, 1st Floor 37 Howson Way Bibra Lake, WA 6163 Tel: 08 9434-4388 Attn: Steve Tobin, Managing Director E-Mail: steve@terrexseismic.com
Survey Sub-contractor	Conics Mining & Infrastructure Level 2, 28 Robertson Street Fortitude Valley Queensland 4006 PO Box 1469, Fortitude Valley Queensland 4006 Telephone: +61 7 3852 6889 Facsimile: +61 7 3852 5779 E-mail: ben.allsopp@conics.com.au
Client Geophysicist	MBA Petroleum Consultants 27 Douglas Street PO Box 2098 Milton Brisbane, QLD 4064 Tel: 07 3367 3822 Attn: Peter Spraggon E-mail: peter.spraggon@mbapetcon.com.au
Field QC Representative	SEISMIC CONSULTANTS GROUP PTY. LTD. 44 Paterson Lane, P.O. Box 720 Byron Bay, NSW 2481, Australia Tel/Fax: +61 2 6685 7828 Attn: Tony Cheshire, Director E-mail: scg@seiscons.com
Operating Company Representative	David Ayling E-mail: david.ayling@clear.net.nz

Appendix C Topographical Survey Data

Projection	MGA94
Zone	55
False Easting	500,000
False Northing	10,000,000
Central Meridian	147° E
Central Parallel	0°
Scale Factor at meridian	0.9996
Datum	GDA94
Ellipsoid	GRS80, ITRF92 Semi-major axis r = 6,378,137.0 Inverse flattening 1/f = 298.257222101

Table 4: Map projection and datum parameters

Line	GDA94	GDA94	GDA Lat	GDA Long
2009-GEL-03	220098	7536049	144.2841	-22.2585
2009-GEL-03	222920	7537509	144.3117	-22.2458
2009-GEL-03	223397	7537804	144.3164	-22.2432
2009-GEL-03	223503	7538023	144.3174	-22.2412
2009-GEL-03	223639	7538069	144.3188	-22.2408
2009-GEL-03	223911	7538319	144.3215	-22.2386
2009-GEL-03	224154	7538947	144.3239	-22.2330
2009-GEL-03	225008	7538909	144.3322	-22.2335
2009-GEL-03	225175	7538825	144.3338	-22.2342
2009-GEL-03	226068	7538999	144.3425	-22.2328
2009-GEL-03	226824	7539461	144.3499	-22.2288
2009-GEL-03	227119	7539537	144.3528	-22.2281
2009-GEL-03	227384	7539748	144.3554	-22.2263
2009-GEL-03	228088	7539832	144.3622	-22.2256
2009-GEL-03	228368	7539824	144.3649	-22.2257
2009-GEL-03	228655	7539907	144.3677	-22.2250
2009-GEL-03	237908	7539264	144.4573	-22.2323
2009-GEL-03	239633	7540263	144.4742	-22.2235
2009-GEL-03	241925	7540021	144.4964	-22.2260
2009-GEL-03	242334	7539680	144.5003	-22.2292
2009-GEL-03	243499	7539809	144.5116	-22.2282
2009-GEL-03	243877	7539801	144.5153	-22.2283
2009-GEL-03	249271	7539219	144.5675	-22.2343
2009-GEL-03	249756	7539317	144.5722	-22.2335
2009-GEL-03	251299	7539158	144.5871	-22.2352
2009-GEL-02	224866	7558774	144.3342	-22.0542
2009-GEL-02	233619	7558090	144.4188	-22.0617
2009-GEL-02	236959	7558696	144.4513	-22.0567
2009-GEL-02	237565	7558676	144.4571	-22.0570
2009-GEL-02	242840	7557231	144.5080	-22.0708
2009-GEL-02	245829	7558774	144.5372	-22.0573
2009-GEL-02	246884	7558969	144.5474	-22.0557
2009-GEL-02	251768	7557836	144.5945	-22.0667
2009-GEL-01	225729	7569282	144.3443	-21.9595
2009-GEL-01	226068	7569681	144.3477	-21.9559
2009-GEL-01	228002	7570657	144.3665	-21.9474
2009-GEL-01	228600	7570498	144.3723	-21.9489
2009-GEL-01	228959	7570259	144.3757	-21.9511
2009-GEL-01	233006	7569800	144.4148	-21.9559
2009-GEL-01	234900	7570139	144.4332	-21.9531
2009-GEL-01	244589	7568225	144.5266	-21.9719
2009-GEL-01	245546	7568405	144.5359	-21.9704
2009-GEL-01	249653	7567328	144.5755	-21.9807
2009-GEL-01	249992	7566889	144.5787	-21.9847
2009-GEL-01	251407	7567109	144.5924	-21.9829
2009-GEL-04	266158	7552581	144.7331	-22.1161
2009-GEL-04	266971	7556283	144.7415	-22.0828
2009-GEL-04	268822	7559805	144.7600	-22.0512
2009-GEL-04	268280	7563281	144.7552	-22.0198
2009-GEL-04	268867	7564500	144.7611	-22.0089
2009-GEL-04	269047	7565855	144.7630	-21.9967
2009-GEL-04	268731	7567254	144.7601	-21.9840
2009-GEL-04	271846	7580211	144.7921	-21.8674
2009-GEL-04	272478	7584004	144.7987	-21.8333
2009-GEL-05	289709	7564194	144.9628	-22.0142
2009-GEL-05	290023	7564053	144.9658	-22.0156
2009-GEL-05	295390	7568039	145.0183	-21.9802
2009-GEL-05	295437	7568275	145.0188	-21.9781
2009-GEL-05	296975	7568824	145.0338	-21.9733
2009-GEL-05	298388	7570236	145.0476	-21.9607
2009-GEL-05	299345	7570236	145.0569	-21.9608
2009-GEL-05	301056	7570644	145.0735	-21.9573
2009-GEL-05	301982	7571680	145.0826	-21.9481
2009-GEL-05	302751	7571241	145.0900	-21.9521
2009-GEL-05	311099	7570754	145.1707	-21.9575

Table 5: Approximate line bend coordinates

Line	1st stn	1st VP	Last stn	Last VP	Surveyed length	Line Km
2009-GEL-01	1000	1000.5	2788	2787.5	26.82	26.82
2009-GEL-02	1000	1000.5	2848	2847.5	27.72	27.72
2009-GEL-03	1000	1000.5	3206	3205.5	33.09	33.09
2009-GEL-04	1000	1000.5	3126	3125.5	31.89	31.89
2009-GEL-05	1000	1000.5	2626	2625.5	24.39	24.39
					143.91	**143.91**

Table 6: BOL and EOL Stations and Line Lengths

Appendix D Personnel List

	Client Manager	Glenn Haworth
	Client Geophysicist	Peter Spraggon
	Client Representatives	Cheshire Tony/Ayling David
1	Crew Manager	Rea Darren/ Bates Steven
2	HSE	Bates Steven/Smith Robin
3	Observer	O'Donnell Peter / Fox Ricky
4	Vibe Tech	Sharam Colin
5	Vibe Op (1)	Bobrowski Shirley
6	Vibe Op (2)	Tuite Al
7	Vibe Op (3)	Tucker Joe
8	Line Boss	Rees Phillip
9	Troubleshooter	Kingston Dean
10	Line Crew	Ansell Brian
11	Line Crew	Andress Rod
12	Line Crew	Bootsma Tracey
13	Line Crew	Bunn Jason
14	Line Crew	Gemeiner Kym
15	Line Crew	Gerbert Peter
16	Line Crew	Harmston Ken
17	Line Crew	Heenans Mark (Nick)
18	Line Crew	Miles Keeley
19	Line Crew	Pokarier Peter
20	Line Crew	Steinhaus Kristiann
21	Line Crew	Watty Dion
22	Line Crew	Wright Mark

Table 7: Personnel list

Appendix E Contractor Equipment

Vehicle Type	Year	Use
Land Cruiser Wagon	2009	HSE Wagon
Land Cruiser Tray Back	2009	Jug Truck
Land Cruiser Tray Back	2009	Cable Truck
Land Cruiser Tray Back	2009	Cable Truck
Land Cruiser Tray Back	2009	Geophone Truck
Land Cruiser Tray Back	2009	Geophone Truck
Land Cruiser Tray Back	2009	Line Boss
Land Cruiser Tray Back	2009	Crew Manager
Land Cruiser Tray Back	2009	Mechanic
Land Cruiser Tray Back	2009	Trouble-shooter
Land Cruiser Wagon	2009	Front Crew
Land Cruiser Wagon	2009	Back Crew
Toyota 100 series		Vibe Wagon

Table 8: Light Vehicles

Vehicle Type	Year	Use
Isuzu		Service Truck
Isuzu FTS700	2000	Recorder (428)
International Paystar - Hemi 50	2008	Vibrator
International Paystar - Hemi 50	2008	Vibrator
Hino	2008	Cable Repair W/shop
Volvo F-16 8x4	2002	Spread Truck
Nissan MK235		Supply/Utility

Appendix F Production Statistics

Date	Line	From	To	Stations	Skips	VPs	Line	From	To	Stations	Skips	VPs	Total VPs	Total km	Acc VPs	Acc km	Remarks
11/10/2009	Mob																Mobilise
12/10/2009	1																Mobilise and layout 300 stations
13/10/2009	1	1000.5	2079.5	1080	5	1075							1075	16.200	1075	16.200	Sweep tests and production
14/10/2009	1	2080.5	2788.5	709	0	709	2	2848.5	2411.5	438	10	428	1137	17.205	2212	33.405	Line 1 complete, start line 2
15/10/2009							2	2410.5	1000.5	1411	7	1404	1404	21.165	3616	54.570	Line 2 complete
16/10/2009	3	1000.5	1997.5	998		998							998	14.970	4614	69.540	
17/10/2009	3	1998.5	3206.5	1209	8	1201							1201	18.135	5815	87.675	Line 3 Complete
18/10/2009	4	944.5	2150.5	1207	8	1199							1199	18.105	7014	105.780	
19/10/2009	4	2151.5	3126.5	976		976	5	1000.5	1103.5	104		104	1080	16.200	8094	121.980	Line 4 Complete, start line 5.
20/10/2009	5	1104.5	2244.5	1141		1141							1141	17.115	9235	139.095	5.73 km remaining
21/10/2009	5	2245.5	2626.5	382		382							382	5.730	9617	144.825	Line 5 and project complete

Total VPs	9617
Total Skips	38
Total Kilometers	144.825
Average km/day	16.092
Average VP/day	1069

-.-