Senex
Senex Energy Limited

Geophysical Operations Report

Lignum 3D Seismic

PEL104, PEL111, PPL240, PPL 243

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APPROVALS

Position	Name	(tick one column only)		Signature	Date
		Approve	Review		
GM HSSEQ	Gary Proctor	✓			30/01/14
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REVISION HISTORY

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General Manager	Line Manager	HSE Manager	IMS Procedures forms and checklists Position Descriptions Standard Operating Procedure Corporate Emergency Response Plans Regulatory Submissions and Activity Notifications
Line Manager	Site Supervisor	HSE Superintendent	Bridging Document Change Request (MOC) Specific Work Instructions Site and Activity Specific Emergency Response Plans

1 ABSTRACT

The Lignum 3D Seismic survey covers approximately 317 km² of the western flank of the Patchawarra Trough of the South Australian section of the Cooper Basin. The survey was acquired over a portion of PEL 104 (204.95 km²), PEL111 (105.06 km²), PPL 240 (0.94 km²), and PPL243 (3.88 km²). A small section of the survey was also acquired over PEL 91 (1.77 km²) and PPL176 (0.14 km²).

The primary objectives of the survey were to identify new and mature existing leads to a drillable status in each of the permit areas.

The survey was completed successfully with good quality data obtained.

2 INTRODUCTION

The Lignum 3D Seismic Survey within the Cooper Basin in South Australia acquired 316.6km² of new seismic data in PEL 104, PEL 111, PPL 240 and PPL 243, with ground works undertaken between November 9th 2012 and January 30th 2013.

Work Area Clearance (WAC) processes preceded the survey, conducted by representatives of the Dieri Native Title Claimant. The groups were accompanied by their appointed technical experts who prepared reports on the clearance results.

The participants in the Joint Ventures at the time of the survey were as follows:

PEL 104	
Victoria Oil Exploration (1977) Pty Ltd	**40%**
Permian Oil Pty Ltd	**20%**
Impress (Cooper Basin) Pty Ltd	**25%**
Springfield Oil & Gas Pty Ltd	**15%**

PEL 111	
Victoria Oil Exploration (1977) Pty Ltd	**40%**
Permian Oil Pty Ltd	**20%**
Impress (Cooper Basin) Pty Ltd	**25%**
Springfield Oil & Gas Pty Ltd	**15%**

Table 1 ***Survey Statistics***

Acquisition Project Statistics			
Acquisition Start Date	21st Nov 2012	Total Recording Hours	264.7
Acquisition Finish Date	30th Jan 2013	Total Work Hours	401.8
Acquisition Site Days:	70*	Total Project Hours	603
Acquisition Days	30	Weather Delays	2.7
		Animal Damage	27.5
Total Linear km Recorded	2281.15		
Total Square km Recorded	316.6	Km/Recording Hour	8.62
Total VPs Recorded	20946	Km/Work Hour	5.68
Total VPs Skipped	404	Km/Project Hour	3.78
Percentage VP's Skipped	0.02%	VP's/Recording Hour	79.13
Total VPs Overall	21350	VP's/ Work Hour	52.13
		VP's/Project Hour	34.74
Source Line Spacing	250m	Km/Recording Day	76.03
Receiver Line Spacing	300m	Efficiency %	44%
Source Interval	50m	VPs per Recording Day	698.2
Receiver Interval	50m	VPs per Site Day	299.2
Sweep Length	7 Seconds		
Listen time	4 Seconds		
Sweeps/VP	2		
Live channels	1920		
Live Patch	120 ch.x 116 lines		
Fold	12 fold inline, 8 fold cross line, 96 fold nominal.		
**** Inc Christmas Shutdown***			

Line preparation was undertaken by Terrex Contracting, a subsidiary of the Terrex group. Terrex subcontracted Exploration Field Services to undertake Skidsteer driver slashing units in areas of Lignum vegetation. Line preparation commenced on November 9th 2012 and was completed on January 7th 2013.

Surveying and chaining operations were undertaken by Terrex Spatial, another subsidiary of the Terrex group. Surveying commenced on November 9th 2012 and was completed on January 15th 2013. The Terrex Spatial Final Operations report is in included in Appendix 1

Seismic acquisition was conducted by Terrex Seismic. Recording operations commenced on November 27th 2012 and were completed on January 27th 2013. The Terrex Group Field Operations report is in included in Appendix 2.

A GAS audit against the Santos Statement of Environmental Objectives (SEO) (Santos, 2006), was undertaken by Client Representatives Peter Robinson, Mark Kneipp and Pat Mee after acquisition. Reports detailing the initial GAS Audit and a follow-up GAS audit are included in Appendix 3 and 4

Data Processing was undertaken by CGG Services (Australia) in Perth, Western Australia between February 13th 2013 and December 20th 2013. At the time of writing, a Processing Operations Report is not yet available for inclusion in this report.

The contracting groups involved in the survey are summarised in Table 2

Table 2 ***Contractors***

Operation	Contractor
Work Area Clearance	Dieri
Data acquisition	Terrex Seismic
Line preparation	Terrex Contracting (Dozing), Exploration Field Services (Slashers)
Survey	Terrex Spatial
Data processing	CGG Services
WAC Company Rep	Bill Hedditch, Dan Thomas, Huw Gerner
Acquisition Company Rep	Peter Robinson, Mark Kneipp, Pat Mee
Acquisition HSE Company Rep	Add ISRM

3 SURVEY OBJECTIVES AND TARGETS

The Cooper Basin is an intra cratonic sag basin deposited during the Permian and Triassic. This is overlain by intra cratonic Jurassic and Cretaceous sediments of the Eromanga Basin. The Patchawarra Trough is deemed to be the source for hydrocarbons which have the migrated from there toward the basin margins and up into the Eromanga sequence.

The Lignum 3D objective was to outline stratigraphic Birkhead Formation channel prospects throughout the 3D area, and to define conventional Triassic Tinchoo Formation prospects in the north of this 3D area and deep unconventional Patchawarra and Epsilon Formation gas prospects in the south of the 3D area.

4 GEOPHYSICAL EXPLORATION HISTORY

Parts of the Lignum 3D were preceded by the Mollichuta 3D (253 km2) which was acquired in 2009 by Victoria Petroleum. Source line spacing of the Mollichuta 3D ranged from 200m to 800m depending on the area of effort. This resulted in very poor data areas in lower areas of effort and subsequently was not suitable for AVO nor seismic inversion work. As a result, the Lignum 3D was acquired to re-image the poor data areas of the previous Mollichuta 3D. Numerous 2D data of various vintages have been recorded in the area.

There have been eleven previous wells drilled within the Lignum 3D survey area;

Snatcher 3 (Victoria Petroleum 2008) targeted the intra Birkhead channel sand encountered by the previous Snatcher wells. Snatcher 3 resulted in 21m of gross oil pay interval in the Birkhead Formation

Snatcher 4 (Senex Energy 2012) was drilled with the target of to providing a drainage point and to extend the mid Birkhead channel reservoir encountered in Snatcher 1, 2 and 3. Snatcher 4 resulted in 4.5m of gross oil pay interval in the Birkhead Formation

Snatcher 5 (Senex Energy 2012) was drilled with a target of proving the lateral extent of the mid Birkhead channel reservoir encountered in Snatcher 1,2,3 and to provide an offtake point to drain the northern are of the Snatcher Field. Snatcher 5 resulted in a thin, poorly developed Birkhead sand reservoir with a gross pay interval of 1.5m.

Snatcher 9 (Senex Energy 2012) was drilled as a step out appraisal well targeting the intra Birkhead channel sand encountered by the previous Snatcher wells and to test the seismic mapping of the intra Birkhead channel sand from the Mollichuta 3D Seismic Survey. Snatcher 9 resulted in 11.5m net oil pay in the Birkhead Formation

Snatcher 10 (Senex Energy 2012) was drilled as a step out appraisal well targeting the intra Birkhead channel sand encountered by the previous Snatcher wells and to test a seismic anomaly mapped from the Mollichuta 3D Seismic Survey and prove up the existence of the intra Birkhead channel sands in a continuing northwesterly direction. Snatcher 10 resulted in 12m of net oil pay in the Birkhead Formation

Tomcat 1 (Senex Energy 2012) targeted a seismic anomaly interpreted as a stratiagraphic feature in the Intra Birkhead formation, with secondary targets in the Hutton and Namur Sandstones. All zones were water saturated in Tomcat 1 as formations came in 20m low to prognosis.

Mustang 1 (Senex Energy 2012) targeted a seismic anomaly interpreted as a stratiagraphic trap in the Intra Birkhead formation, with secondary targets in the Hutton and Namur Sandstones. Mustang 1 resulted in 4m of net oil pay in the Birkhead Formation.

Thunderchief 1 (Senex Energy 2012) Targeted Intra Birkhead, Hutton & Namur Sandstones. Thunderchief 1 encountered poorly developed reservoir sands in the Birkhead and was plugged and abandoned.

Tigercat 1 (Victoria Petroleum 2008) Targeted Intra Birkhead, Hutton & Namur Sandstones, Poolowanna Formation. Tigercat 1 resulted in 7m of net oil pay in the Birkhead Formation

Tigercat 2 (Senex Energy 2012) targeted a seismic anomaly interpreted to be braided channel sands in the Intra Birkhead Formation adjacent to the oil discovery in Tigercat-1. Tigercat 2 resulted in a thick shale zone replacing the Birkhead reservoir thus no reservoir was encountered. It was plugged and abandoned

Stormbird 1 (Victoria Petroleum 2008) targeted a faulted 4-way dip closure on the Intra Birkhead, Hutton & Namur Sandstones, Poolowanna Formation, Basal Patchawarra/Tirrawarra section. Stormbird 1 resulted in no oil shows. The well was plugged and abandoned.

5 PLANNING METHODOLOGY

5.1 Overview

Consultation with experienced Cooper Basin field consultants, desktop review of satellite imagery and field scouts were used to prepare for the project.

Prior to conducting this survey Senex and Terrex conducted a comprehensive risk assessment to ensure appropriate strategies were in place to manage the identified risks. In addition:

- Senex conducted a review of the Terrex HSE Management System and defined its interface with the Senex HSE standards, regulatory requirements and project risks in the Project HSE MS Bridging Document
- A project specific safety plan was prepared by Terrex to address the identified major risks
- A project specific emergency response plan was developed and validated via an Emergency Response Drill

5.2 Environmentally sensitive areas and SEO

The Lignum 3D Seismic Survey was conducted under the Santos Statement of Environmental Objectives (SEO) (Santos, 2006), which provides objectives and measurements for the preparation and use of seismic lines in order to minimise impact and maximise rehabilitation. The dozer operators and surveyors were all inducted and competent in the techniques required to meet these objectives.

The majority of the tenement is dominated by expanses of linear north-south dunefields, with sandy-clay interdune swales, and locally draining and Cooper Creek overflow fed claypan lakes. The Cooper Creek and its floodplain meander through the centre of the prospect in a south-east to south west curve. The Cooper Creek main channel and its defined drainage lines are dominated by semi-permanent and ephemeral waterholes, which are surrounded by dense stands of Coolibah, occasional River Red Gum, and Acacia Woodland. The immediate Cooper Creek floodplains are dominated by mixed densities of Acacia's, Chenopods and Lignum with an understorey of ephemeral herbs and grasses.

The Cooper Creek and floodplain is an important area that supports a diverse range of biodiversity and provides important breeding habitat for a range of water birds. This area required careful planning to minimise survey disturbance to the area prior to and during line preparation and recording phases.

Vegetation in the dunefield areas of the prospect generally consists of a sparse tall woodland over low shrubland with an understory of perennial and semi-perennial grasses and ephemeral herbs. Species present include: sparse Needlewood (*Hakea leucoptera*), Prickly Wattle (*Acacia victoriae*), Sandhill Wattle (*Acacia ligulata*), and Broughton Willow (Acacia salicina) and Coolibah (Eucalyptus coolabah) on dune toes close to water sources, with Sandhill Canegrass (Zygochloa paradoxa), Poached Egg Daisy (Polycalymma stuartii), Buckbush (Salsola tragus), Cattle Bush (Trichodesma

zeylanicum), Long Tails (Ptilotus polystachyus), Mulga Grass (Aristida sp.), Mulka (Eragrostis dielsii), Bottle Washers (Enneapogon spp.), and Rattlepods (Crotalaria eremea and C. cunninghamii).

Vegetation in the Cooper Creek and floodplain areas generally consists of tall open Coolibah woodland over open Lignum shrubland over predominantly ephemeral herbs. Species present include: Large Coolibah (*Eucalyptus coolabah*), Broughton Willow (Acacia salicina), River Cooba (Acacia stenphylla), Eurah (Eremophila bignoniiflora), Lignum (Muehlenbeckia florulenta), Nitre Goosefoot (*Chenopodium nitrariaceum*), Queensland Bluebush (*Chenopodium auricomum*) and a range of ephemerals and short-lived perennials including Cooper Clover (*Trigonella suavissima*), Billybuttons (*Pycnosorus spp.),* Australian Hollyhock (*Lavatera plebia*), Blue Rod (*Stemodia florulenta*), Sunrays (*Helipterum spp.),* Groundsel (*Senecio lanibracteus*), Grey Germander (*Teucrium racemosum*), Mulka (*Eragrostis dielsii*), Sea Heaths (*Frankenia pauciflora* and *F. serpyllifolia*), Copperburrs (*Sclerolaena* spp.).

Comprehensive environmental guidelines on the preparation of lines were provided in written form and during inductions. These guidelines were followed by the various crews. The key points stressed were -

- Weave lines to break the line of sight;
- Move as little earth and vegetation as possible;
- Walk across clay pans and consolidated flat open ground;
- Offset crossings at creeks/drainage channels to avoid removal of trees and vegetation
- Minimise steep cuts and fills, including dune cuts;
- Store sand from dune cuts on dune flanks and avoid “ramping”
- Minimise blade work in dune swales;
- Where blade-work is necessary, ensure that the windrows are flattened;
- Place doglegs at road and track crossings and try to avoid blade-work within 50m of road crossings;
- Report and avoid any aboriginal artefacts found;
- Ensure that no litter is on the lines;
- Ensure that all gates are left as found closed and drop gates reinstated;
- Report any fence wire breakages immediately and make sure that fences are stock-proof.
- Avoid known areas of weed infestation and report any weed sightings.

In an effort to minimise damage to areas of Lignum vegetation, slasher units were engaged to clear lines. This methodology allowed retention of rootstock, minimising long-term damage to these areas.

A GAS environmental report for this area was **conducted and the report** submitted to DMITRE (see Appendix 3 attached), the report also contains the EMP report and GAS audits for the project. A follow-up audit was conducted by Senex in November 2013 and was also submitted to DMITRE.

5.3 Experimental Program

Recording operations began with an experimental program which was overseen by Senex's Senior Geophysicist, Cameron Belcher. A single line was laid and a series of tests were conducted to pick the optimum parameters for the survey.

Test Program:

2x I/O Vibes, 12.5m Pad to pad, centred between stations at 80% force.

a) 1x 10 sec sweep, 4-110 Hz
   i) Band Pass filter on playback 5-30 Hz low/high Cut
   ii) Band Pass filter on playback 10-30 Hz low/high Cut
   iii) Band Pass filter on playback 5-85 Hz low/high Cut
   iv) Band Pass filter on playback 10-95 Hz low/high Cut
   v) Band Pass filter on playback 10-105 Hz low/high Cut
b) 1 x8 sec sweep, 8-95 Hz
   i) Band Pass filter on playback 10-105 Hz low/high Cut
c) 1x7 sec sweep, 8-95 Hz
d) 1x6 sec sweep, 8-95 Hz

- **Concluded that 2x I/O Vibes, 80% force, 1x7 Sec sweep 8-95 Hz would be used for survey**

IVI Minivibe vs I/O vibe comparison test
(*Note only one IVI minivibe was working for the comparison test, so a single vibe comparison was conducted instead of the preferred 2xvibe Group*)

e) 1x I/O Vibe 80% force, centred on station, 1x7 sec sweep, 8-95 Hz
f) 1xIVI Vibe 80% force, centred on station, 2x7 sec sweep, 8-95 Hz
g) 1xIVI Vibe 80% force, centred on station, 3x7 sec sweep, 8-95 Hz
h) 1xIVI Vibe 80% force, centred on station, 4x7 sec sweep, 8-95 Hz

- **Concluded that 2x IVI Minivibes, 80% force, 2x7 Sec sweep 8-95 Hz would be used for survey in Lignum areas or, if only 1 minivibe was working, 4x7 Sec sweep**

6 CONSULTATION

An Activity Notification was submitted to DMITRE on 3 October 2012, with approval to carry out the seismic survey received on 15 October 2012. During compilation of the Geophysical report, it was discovered that an AAL was not submitted for the survey acquired in PEL 91 and PPL 176 and a non-compliance notice was submitted to DMITRE on January 20th 2014.

The prospect overlay Clifton Hills Station, leased by Clifton Hills Pastoral Company to managers, Travis and Terissa Gilbey.

All overlapping landholders were provided Notices of Entry for this work on 19 September 2012.

The Dieri Aboriginal Corporation was advised of the survey by Notice of Entry and were further consulted for the Cultural Heritage Work Area Clearance.

7 FIELD OPERATIONS

7.1 Cultural Heritage Clearance

An agreement exists with the Dieri group who are the Native Title claimants over the survey area and under that agreement consultation and field inspection of proposed line locations are required prior to conducting any fieldwork.

A Clearance Request for PEL 104 and PEL111 was sent to the Dieri legal representative and a field inspection was conducted 22nd October to 2nd November 2012, 12th November to 23rd November 2012 and 28th November to 5th December. The DAC appointed Jan Scott, Sam Hedditch and Tim Cuthbertson as specialists to document the WAC process. Bill Hedditch, Dan Thomas or Huw Gerner represented Senex onsite.

Inspection and survey of seismic lines was carried out in three 4WD vehicles equipped with on-board navigational equipment consisting of a GPS unit coupled with a laptop computer. This equipment traced and recorded the team's position in relation to the terrain and the proposed seismic lines. The specialists documented the clearance process with field notes, photographs and handheld GPS units.

The field inspection was followed by a report from the technical specialists detailing the clearances and specific exclusions.

Table 3 **Dieri Representatives** –

DAC Representatives
Edward Stewart
Dwayne Kemp
Kaylene Kemp
Mandy Tuipolutu
Stevie Kemp
Shannon Henderson
Richard Edge
Clinton Kemp
Jennifer Naylon
William Lander

Table 4 **WAC Support Representatives** –

Technical Specialist	Senex Representative
Jan Scott	Bill Hedditch
Tim Cuthbertson	Dan Thomas

Sam Hedditch	Huw Gerner

7.2 Line Preparation & Survey

Line preparation was subcontracted through Terrex Seismic to Terrex Contracting (TC) of Brisbane, Queensland. TC provided a camp, five Komatsu D65 dozers and two John Deere graders. Terrex also subcontracted Exploration Field Services to undertake Skidsteer driver slashing units in areas of Lignum vegetation.

Surveying was sub-contracted to Terrex Spatial (TSp) of Yeppoon in Queensland using Novatel GPS equipment.

Line Preparation commenced on November 9th 2012 and was completed on January 7th 2013
Line Surveying commenced on November 9th 2012 and was completed on January 15th 2013

A total of 2281.15 linear km of 3D seismic line was prepared and surveyed.

Table 5 **Control Station locations established.**

Station.	Easting	Northing	R.L	Comments
Survey Datum MGA Zone 53				
LIG1	370981.083	6959757.437	24.202	
New Established and Updated Stations				
LIG2	368614.997	6966088.771	39.196	
LIG3	365154.176	6952509.964	38.654	
LIG4	370340.485	6956498.409	33.936	
LIG5	370276.518	6945708.259	34.574	
LIG6	365572.489	6943866.117	45.177	
Control Checks				
LIG1	370981.083	6959757.437	24.202	Datum
	370981.087	6959757.432	24.201	AUSPOS Check
	0.004	**-0.005**	**-0.001**	**Misclose (c-o)**
LIG1	370981.083	6959757.437	24.202	Datum
	370981.087	6959757.432	24.214	AUSPOS Check
	0.004	**-0.005**	**0.012**	**Misclose (c-o)**
LIG3	365154.168	6952509.965	38.676	Datum
	365154.176	6952509.964	38.654	AUSPOS Check
	-0.03	**-0.001**	**-0.022**	**Misclose (c-o)**
LIG6	365572.491	6943866.101	45.213	Datum
	365572.489	6943866.117	45.177	AUSPOS Check
	-0.002	**0.016**	**-0.036**	**Misclose (c-o)**

Each dozer was equipped by Terrex Spatial with a GPS receiver containing the coordinates of each line including heritage no-go zones and conditions. Information on the survey methods and geodetic and geophysical datum employed is in the Terrex Spatial Survey Report (Appendix 1)

7.3 Health and Safety

During the project more than 97,000 man hours were worked with one medical treatment injury occurring.

One environmental spill occurred where diesel was discovered dripping from a hose.

Two non-conformances occurred, one where activities occurred in a non-operated permit without an AAL and another where a seismic line was dozed without Work Area Clearance.

One breach of Cultural Heritage conditions occurred where a vehicle drove into a restricted area.

Table 6 **Project Key Safety Statistics**

Project Key Safety Statistics	
Terrex Seismic Man hours	97,272
Fatalities	0
Lost Time Injuries	0
Medical Treatment Injuries	1
Audits / Inspections conducted	740
Emergency Drills	1
Spills to the Environment	1
Non-Conformance	2
Cultural Heritage Breach	1

7.4 Recording Operations

Terrex Seismic was selected as the Vibroseis seismic data acquisition contractor for this project.

The survey commenced on November 21st 2012 and was completed on January 30th 2013.

Full details of the operation are in Appendix 2. The acquisition parameters are listed in Table 7. Parameters were selected after a test program was conducted by Senex's Senior Geophysicist Cameron Belcher.

Table 7 **Acquisition Parameters**

Instrumentation	
Instruments	Sercel 428XL
No. Channels	1920 (16 lines x 120 ch)
Tape Drives	IBM Ultrium LT02 (dual drive – 200 Gbyte per tape)
Tape Format	SEGD Revision 1 8058IEEE Demultiplexed, Noise edited correlated summed 4 sec record
Filters	Hi cut 200 Hz, (0.8 Nyquist - Linear) Lo cut: Out
Sample Rate	2 ms
Record Length	4 sec
RTC	Yes
Correlation Type	Zero Phase, After Sum
Stack	Diversity stack
Source Parameters	
Vibrators	Two groups of 2 x Input-Output AHV-IV Buggy Mounted vibrators
Electronics	Pelton VibPro
Sweep Frequency	Mono-sweep, 8-95 Hz
Sweep Length	7 seconds
No. Sweeps	2 standing
VP Interval	50.0m on lines approx. 250m apart
Vibrator Array	2 vibs in line, 12.5m pad to pad standing. Centred on source stations, No move-up.
Sweep Amplitude Taper	100% (none)
Drive Level	70% varied by amplitude control function
End Tapers (cosine)	0.2s, cosine squared
Phase Locking Type	Ground Force
Amplitude Control	Peak to Peak
Receiver Parameters	
Receiver Group Interval	50.0m on lines approx. 300m apart
Number of live traces	1920
Spread	16lines x 120 channels live 25m near trace 3662m far trace
Geophones	Sensor SM4 10 Hz
Array	12 in-line over 50m, centred on stations, 4.167m spacing

Connection	Two parallel strings with 6 phones each, each string connected Series/Parallel
Multiplicity	12 fold inline 8 fold cross line 96 nominal

Data quality throughout the Lignum Seismic Survey was good. Fold was reduced over the area of the Cooper Creek where environmental and Cultural Heritage restrictions reduced source access.

The average recording rate for the survey was 698 VP's (76 km/per day). 8.62 km/recording hour was achieved which is good performance for the crew. Some delays were experienced repairing animal damage to equipment. The average cycle time for the given parameters was about 45 seconds per VP.

7.5 Rehabilitation and de-permitting

At the end of field acquisition activities the lines were checked for any rubbish and pegs left behind. Terrex Contracting ensured any temporary gates were removed and repaired any damage that was noted during the survey.

Three Environmental Monitoring Points (EMP) were established which will enable a record to be kept over time as the lines recover.

8 DATA PROCESSING

8.1 Processing tests

CGG Services (Australia) of Perth WA was awarded the contract to process the data.
The Contractor report for processing is not yet available.

8.2 Processing sequence

1. SEG-D input TL/SI=3000/2ms (Sweep 8-95Hz/7sec)
2. Nav merge and 3D gridding to 20x20m. SLxRL 250x300m
2.1. Brute QC Stack
2.1.1. Resample 2->4ms
2.1.2. Elevation Statics
2.1.3. AGC
2.1.4. NMO Single Velocity Function
2.1.5. Mute
2.1.6. Stack
2.1.7. QC Output: Elevation Cube SEG-Y
3. First Break Picking and Refr/Tomo statics and Floating Datum compute
4. Conversion from Zero- to Minimum Phase
5. Resample 2ms-> 4ms

6. VT^2 Spherical Amplitude Divergence Compensation (single vel) plus amplitude global scaling to 5000
7. Anomalous Amplitude Attenuation/Despiking
7.1. Provisional LNA
7.1.1. Apply Elevation Statics
7.1.2. 2D FK in Shot gather (Reciever Line block)
7.1.3. Single Trace Spiking Decon OL160
7.1.4. Output for VA01 and input to QC Refraction and Tomo Cubes
8. VA01 1x1km . Input provisional LNA. Apply Single Trace Decon OL160ms
1.1. Elevation Static Stack
1.1.1. AGC
1.1.2. NMO VA01
1.1.3. Apply Elevation Statics
1.1.4. Compute and apply Residual Statics #1a (ad-hoc)
1.1.5. Mute
1.1.6. Stack
1.1.7. QC Output: Elevation Cube (□SEG-Y on request)
1.2. Refraction Static Stack
1.2.1. AGC
1.2.2. NMO VA01
1.2.3. Apply Refraction Statics
1.2.4. Compute and apply Residual Statics #1b (ad-hoc)
1.2.5. Mute
1.2.6. Stack
1.2.7. QC Output: Refraction Cube (□SEG-Y on request)
1.3. Tomstatic Stack
1.3.1. AGC
1.3.2. NMO VA01
1.3.3. Apply Tomo statics
1.3.4. Compute and apply Residual Statics #1b (ad-hoc)
1.3.5. Mute
1.3.6. Stack
1.3.7. QC Output: Tomostatic Cube (□SEG-Y on request)

1.4. Post-STK migration 3cubes □ SEG-Y output

2. Apply one of the above LW+Residual Statics #1
3. Gabor Surface Consistent Deconvolution
4. Random Noise Attenuation
5. Linear Noise/Groundroll Attenuatiom
6. Demultiple Tests and Production
7. Surface Consistent Amplitude Correction
7.1. VA02 1x1km
7.2. Compute SC Residual Statics #2
7.3. Stack
7.4. 3D Post-Stack Migration □SEG-Y output
8. Apply SC Residual Statics #2
9. COV binning
10. COV 2*30 Trace Regularization/Interpolation REG3D
10.1. 3D PSTM to VA03 Lines

10.2. VA03 1x1km
11. 5D Interpolation/Regularization
10. Remove TV^2 Ampltude Divergence Compensation
11. 3D PSTM with smoothed VA03
12. CADZO pre-stack (RNA)
13. VA04 25x25m VTI Analysis HDPIC: Vstk and Eta
14. NMO Vstl/Eta VA04
15. Radon3D
16. VA05 25x25m Azimuthal: Vfast, Vslow, Fast Direction ω
17. Azimuthal NMO VA05
18. PSTM Gather Flattenning (Trim)
19. Spectral Correction (broadening)
20. Shift from Processing to MSL=0m Datum
21. Output Processed PSTM gathers
22. Stack
23. Output 10 PSTM Stacks (PSTM gathers compartible): 2 Fulfold, 4 Azimuthal and 4 angle stacks

8.3 Static corrections

- The first breaks for the Lignum survey were picked and then 4 different statics solutions were derived and compared to ascertain the optimum correction for the observed weathering.

- An initial model was generated employing an elevation based correction. This correction was based on a constant depth of weathering of 19 metres at 814 m/sec overtop of a subweathering layer of 1950 metres/second down to a datum of sea level.

- This initial model was input along with the first break picks and iterated to converge on an LMI statics solution. This solution uses the first break information to update the depth of weathering and subweathering velocity in the model to better converge with the first breaks.

- The tomostatics initial model was a simple 3 layer case Thickness/Vz: 30m/1200m/s, 300m/1800m/s, 2100m/s below

- Tomo non-linear solution treats first-breaks as diving rays events and inverts traveltimes to V(z,x,y) tomogram by computing Vz of each cell. Model sampling used 40x100x100m

- A fourth statics model was created using the uphole information provided. For this the uphole depths and velocities were 3D interpolated and a model generated from surface to sea level datum employing these parameters.

8.4 Archived data

An archive data listing will be included in the CGG processing report, when available.

A field tape summary is in Table 8. For each line the following files were archived onto CDs.

SEGY – Filtered Migration Stack, Raw Stack, Raw Migration, Final Stack
CGM+ - Final Stack, Filtered Migrated Stack

Table 8 **Field Tape Summary**

Tape Summary – Lignum 3D Seismic					
Tape #	**First FFID**	**Last FFID**	**First VP**	**Last VP**	**Date Recorded**
1A	1	9481	5150/1629	5235/1354	27/11/12-15/12/12
2A	1	9853	5325/1353	5245/1155	16/12/12-21/01/13
3A	1	5745	5240/1155	5005/1011	22/01/13-27/01/13

9 CONCLUSIONS AND RECOMMENDATIONS

The Lignum Seismic Survey was a technically and operationally successful.

The data acquired was of a very good standard and will provide information to further evaluate the leads and prospects within PEL 104 & 111.

Environmental and cultural heritage considerations made in the planning and conduct of the survey are expected to result in very low long-term impact on the survey area.

The two Cultural Heritage breaches resulted in a review of how WAC data is used by the Line Clearing, Surveying and Recording Crews and the resulting changes to procedures appeared to reduce risk of re-occurrence.

Line preparation methods employed were successful in avoiding significant visual and potential erosion problems and regeneration of the line over time is expected to remove most evidence of the survey. Minimal post-survey rehabilitation was required.

All the contractors utilised during the survey performed well and would all be recommended for future projects in the area. The inclusion of a dedicated HSE company man and a Paramedic to site was well received by the crew.

10 REFERENCES

Santos (2006). South Australian Cooper Basin Operators Statement of Environmental Objectives: Geophysical Operations, June 2006. Santos Ltd, Adelaide.

11 ABBREVIATION LIST

3D – Three Dimensional Seismic
4WD – Four Wheel Drive
AAL – Associated Activities License
AGC – Automatic Gain Control
AVO – Amplitude Versus Offset
CEO – Chief Executive Officer
DMITRE - Department for Manufacturing, Innovation, Trade, Resources and Energy
EMP – Environmental Monitoring Point
GAS – Goal Attainment Score
GM HSSEQ – General Manager Health Safety Security Environment Quality
GPS – Global Positioning System
HSE – Health, Safety & Environment
MOC – Memorandum of Change
PEL – Petroleum Exploration Lease
PPL –Petroleum Production Lease
PTY LTD – Proprietary Limited
QC – Quality Control
SEO – Statement of Environmental Objectives
SEG-D – File Format
SEGY – File Format
RTC – Return to Centre
VP – Vibration Point
WAC – Work Area Clearance

12 FIGURES

Figure 1 **Location Map**

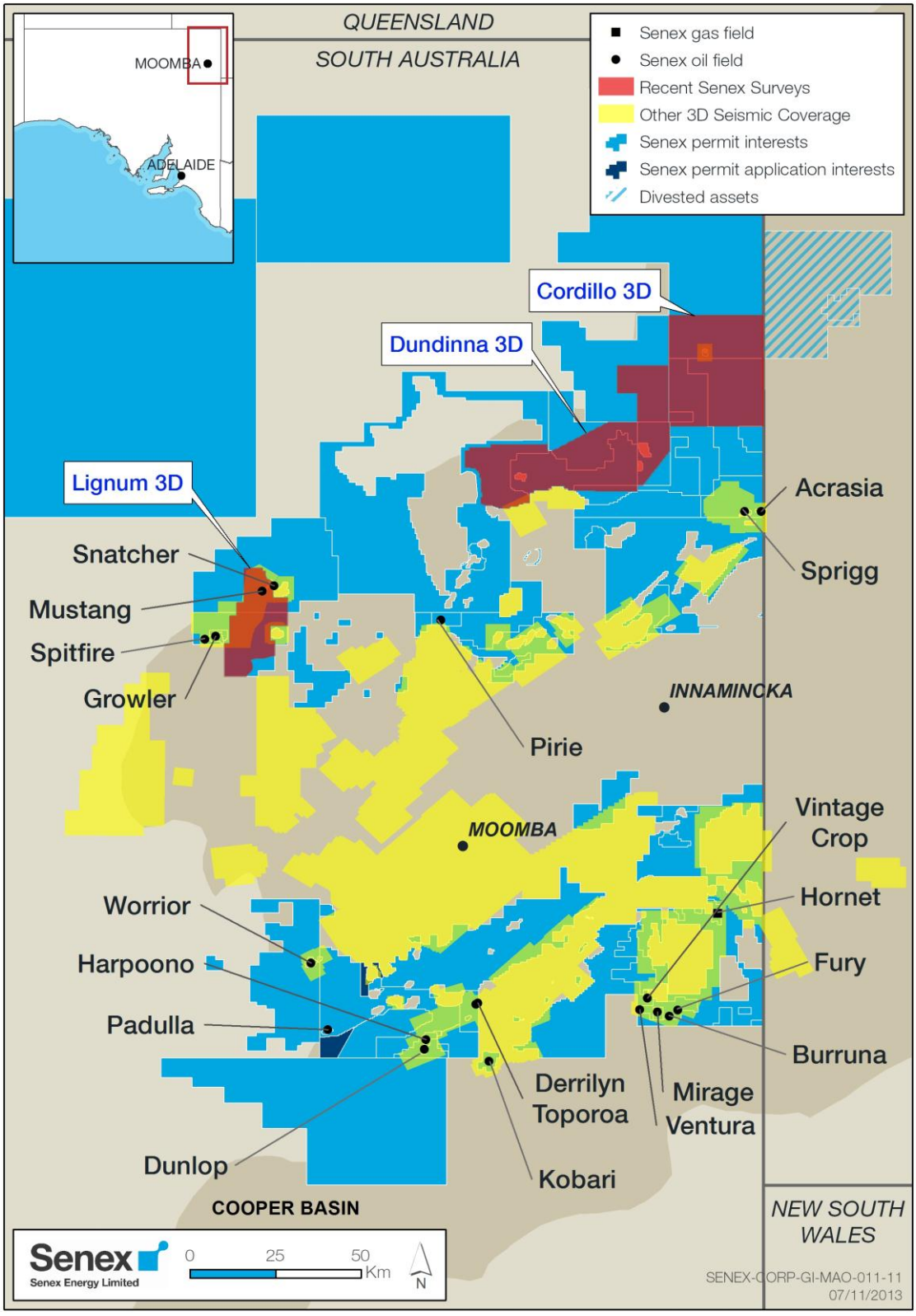


Figure 2 **Line Location Map**

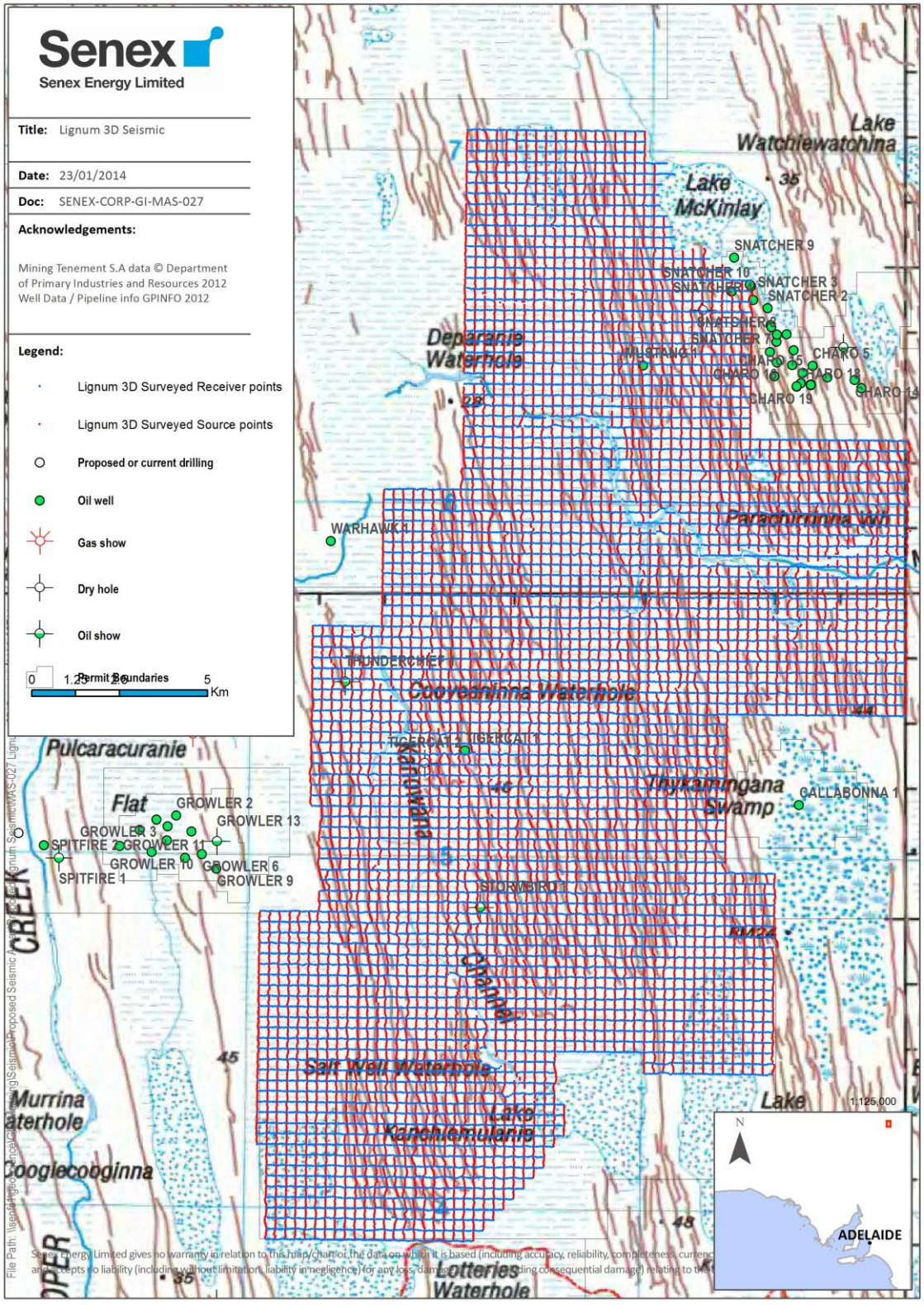
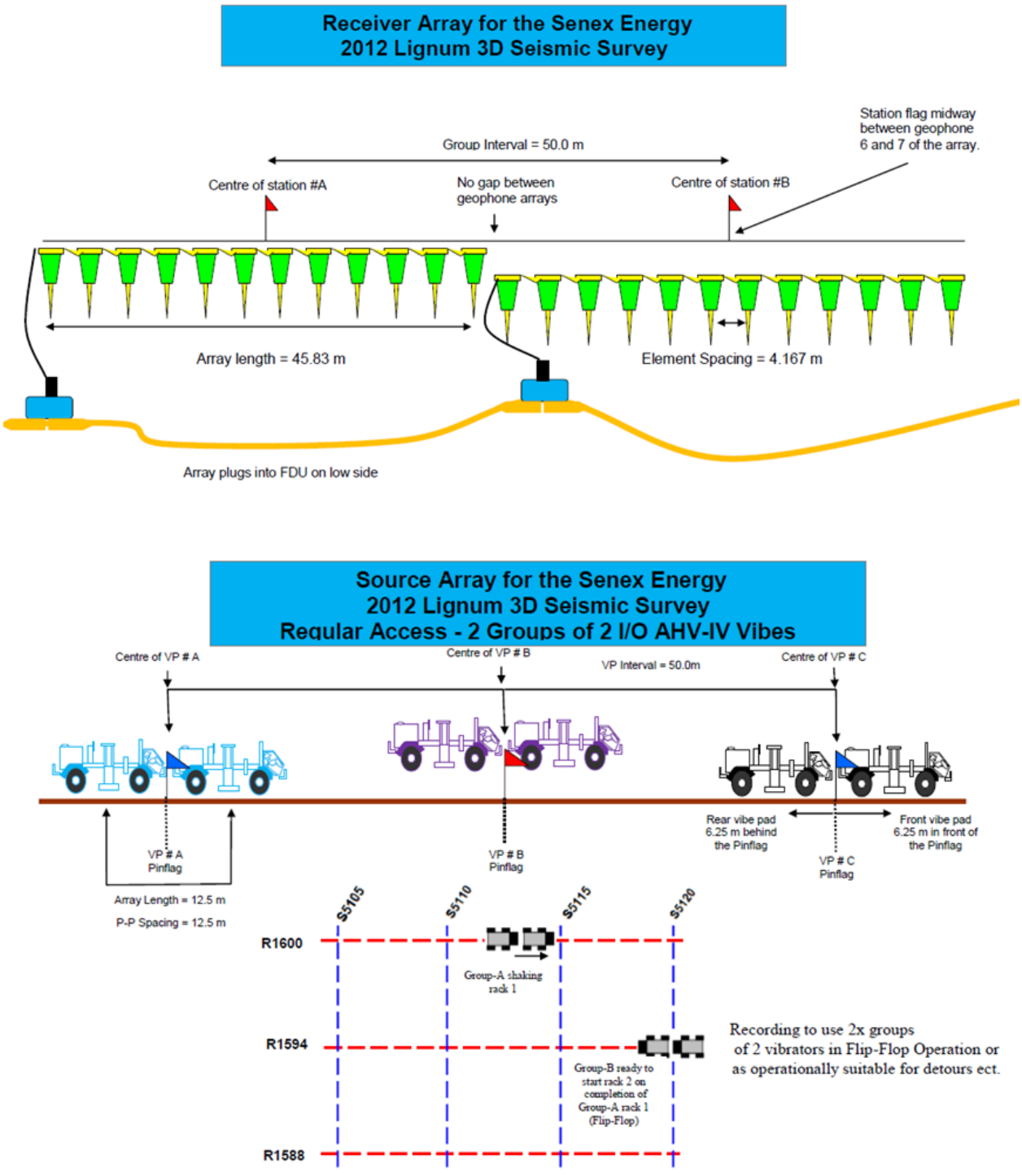


Figure 3 **Acquisition Diagrams**



TERREX SPATIAL

12055

Final Operations Report

on the

2012 Lignum 3D Seismic Survey

for

Terrex Seismic Pty Ltd

and

Senex Energy Ltd

November 2012 - January 2013

The Business Development Manager
Terrex Spatial
100 Rockhampton Road
Yeppoon QLD 4703
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Facsimile: +61 7 4939 2867
E-mail: info@terrexspatial.com

Dynamic Satellite Surveys Pty Ltd Trading As Terrex Spatial has a Quality Management System, externally certified to AS/NZS ISO 9001:2008 standards by SAI Global Pty Ltd (Lic #QEC10046).

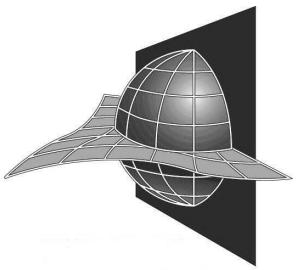
This project was undertaken for Senex Energy Ltd and Terrex Seismic Pty Ltd.

The purpose of the job was to install and survey 3D seismic lines and support the line clearing operations. The use of the data for any other purpose is not authorised.

All data contained in this report and on the attached DVD is deemed to be final and overrides any previous data received from TSp, unless otherwise stated.

Table of Contents

Table of Contents



1

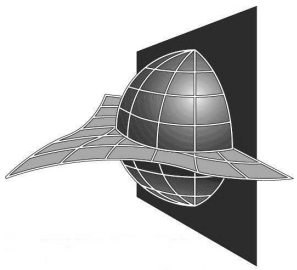
INTRODUCTION

The following report covers the **2012 - 13 Lignum 3D Seismic Survey**, performed by **Terrex Spatial** (TSp) contracted to **Terrex Seismic** (Terrex) for **Senex Energy Ltd** (Senex).

The survey area was located approximately 170 kilometres north-northwest of Moomba, South Australia. Please see **Appendix A - Project Map**.

A total of 2281.15 linear kilometres of seismic lines were surveyed. This consisted of 1043.5 kilometres of receiver lines (3.05 kilometres of hand-carry), pegged at 50-metre station intervals and 250-metre line intervals, and 1240.75 kilometres of source lines, pegged at 50-metre station intervals and 300-metre line intervals. Line summary can be found in **Appendix C - Line Listing**.

The survey operations were completed between the 12th of November 2012 and the 15th of January 2013.



2

INSTRUMENTATION AND PERSONNEL

2.1 Personnel and Logistics

TSp personnel involved in the survey were as follows:

Project Manager:

Ben Allsopp	Bachelor of Surveying, Curtin University of Technology

Senior Surveyors:

Ben George	Graduate Diploma in GIS, University of Melbourne Bachelor of Information Technology, Deakin University
Saeid Gholizadeh	Bachelor of Civil Engineering in Surveying, Islamic Azad University
Stewart Folley	Survey Technician 22 years Geodetic Survey and Mapping industry experience

Line Pointers:

Dirk Smit	Bachelor of Surveying, University of Otago
Justin Matthews	Master of Science in GIS, University of Glamorgan

Matt Boylan	Bachelor of Science in Hydrographic Surveying (Hons), University of Plymouth Grad Cert Spatial Science, USQ

Surveyors:

Rob McKeown	Bachelor of Science in Geomatics, Dublin Institute of Technology
Rob Phillips	Bachelor of Science in Surveying and Mapping, University of East London

GPS Operators:

Alan Finnegan	Survey Technician Diploma of Civil Engineering, Regional Technical College, Dundalk
Andrew James	Survey Assistant
Jason Searle	Survey Assistant
Joey Cunningham	Survey Technician
Josh Guppy	Survey Technician
Ryan Street	Survey Technician
Logan Rowlands	Trainee Surveyor, USQ
Tom Searl	Trainee Surveyor, USQ

Personnel and logistics were supported by the TSp Yeppoon office.

2.2 Equipment

Prior to mobilisation to site, Terrex Spatial (TSp) ensured all equipment performed to the manufacturer's specifications and demonstrated that it was all fully operational before commencement. All equipment was maintained in this condition for the duration of the project.

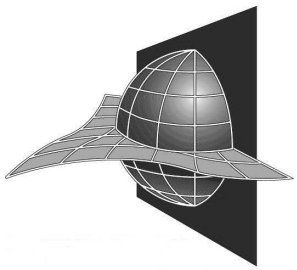
Once on site, all GPS units were regularly checked against datum points on the project and results were archived.

Tribrachs and optical plumbs were calibrated (as per ISO9001:2008 and TSp Standards) and all other sundry survey equipment, which affects quality or accuracy, was inspected and tested to be functioning correctly before use.

Equipment utilised on project:

	Description	Qty
Vehicles	Toyota Landcruisers (Dual Airbag)	6
	Traymark Caravan - Office and Accommodation	1
	Kedron Caravan - TV Room and Accommodation	1
	Dual Axle Peg Trailer	1
Communications	Telstra NextG iPhone	1
	Iridium Satellite Phones	2
	UHF - Vehicle-based Radios	6
	UHF - Hand-held Radios	2
Survey Instruments	NovAtel 702G GPS Antenna	5
	NovAtel OEMV GPS Receivers	5
	Gmouse GPS Receivers	15
	Garmin E-trek10 Hand-held	2
	Rapid Elevation Meter (REM)	1
	Tripod and Tribrach	1
Computing Hardware	Toshiba Laptops	2
	Motion Tablet Computers (GPS Controller)	15
	iPAQ PDA GPS Data Loggers	2

	Description	Qty
(computing hardware continued...)	HP Officejet 7500 E910 Printer	1
Software	Nav12 Setout Software	Ver 2.20
	NavMini Machine Guidance Software	Ver 5.02
	MIB Seismic Processing Software	Ver 7.23
	MapInfo Professional	Ver 8.5
	WIog Data Logger	Ver 8.4
	Waypoint GrafNet Static Processing Software	Ver 8.20
	Waypoint GrafNav Kinematic Processing Software	Ver 8.20



3

SURVEY REFERENCE SYSTEMS

3.1 Geodetic Datum

The project was based on the Geocentric Datum of Australia 1994 (GDA94), which is based on the Geodetic Reference System 1980 (GRS80) model defined by the following parameters:

Datum:	GDA94 (Geocentric Datum of Australia 1994)
Spheroid:	GRS80 (Geodetic Reference System 1980)
Semi-Major Axis:	6 378 137.0
Inverse Flattening:	298.257222101
The Unit of Measure:	International Metre

3.2 Map Projection

Final rectangular coordinates were based on the Map Grid of Australia 1994 (MGA94). Parameters for this projection are as follows:

Projection:	Universal Transverse Mercator (MGA Zone 54)
Latitude of Origin:	0°
Central Meridian (CM):	141° E
Scale Factor at CM:	0.9996
False Easting:	500 000
False Northing:	10 000 000
The Unit of Measure:	International Metre

3.3 Height Datum

All elevations obtained relative to GDA94 have been reduced to the Australian Height Datum 71 (AHD71) using the AUSGeoid98 Geoid - Ellipsoid separation model to determine the separation (N) for the particular area and tied to local control stations where available.

GPS observations are made on the GDA94 datum. The height associated with this datum is an ellipsoidal height (h). The Australian Height Datum (AHD), the height datum associated with MGA94, is an orthometric height, which is measured as the height above mean sea level, or the geoid (H).

The function that defines the relationship between the ellipsoid and orthometric heights is:

H = h - N

Or

AHD = GDA94 - (Geoid-Ellipsoid Separation)

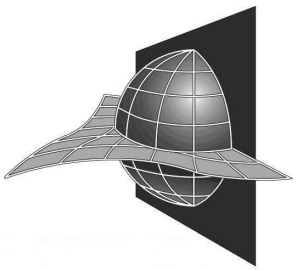
The value for the geoid-ellipsoid separation is interpolated from a national model called AUSGeoid98.

AUSGeoid98 is the third in a series of national geoid models produced for Australia by the Australian Surveying and Land Information Group (AUSLIG). The geoid-ellipsoid data is prepared for the Australian region from:

- EGM96 Global Geopotential Model;
- 1996 Australian Gravity Database, from the Australian Geological Survey Organisation (AGSO);
- AUSLIG / AGSO GEODATA nine-second digital elevation model;
- Satellite altimeter-derived free-air gravity anomalies offshore;
- Theories, techniques and computer software developed by Associate Professor Will Featherstone, Curtin University of Technology[1].

AUSGeoid98 N values were interpolated using the in-house Nav12 software and GrafNet Version 8.30 software, distributed by Waypoint Consulting Inc.

[1] Johnston, G.M., Featherstone, W.E. (1998) AUSGeoid98: A New Gravimetric Model for Australia



4

SURVEY CONTROL

Survey control was established using Static and AUSPOS[1] GPS techniques.

The GPS datum station adopted for the survey was in MGA Zone 54, coordinates listed below:

Station	Easting	Northing	AHD	Comments
LIG1	370981.083	6959757.437	24.202	AUSPOS

Network map, misclosures and base coordinates are shown in **Appendix B - Survey Control**.

TSp used the AUSPOS method of checking survey control, which requires a minimum of four hours of data to be logged. AUSPOS typically produces accuracies of better than 0.05m.

Additional AUSPOS control points were established to ensure redundant connection and fitting to the horizontal and vertical datum in the project area. Sufficient secondary GPS control was established to provide a framework for RTK base station positioning of the 3D seismic lines, ranging no further than ten kilometres from these stations. These stations were also contained within the GrafNet network and post-processed.

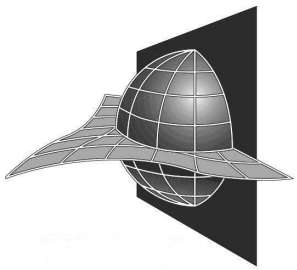
Static observation methods between all survey stations were used. All static observations were processed in a single network in GrafNet software, which allowed the analysis of data, least squares network adjustment, and output of station coordinates. The relative accuracy between control points was better than 10mm +/- 10ppm at the one sigma level for baselines between one kilometre and 200 kilometres in length.

[1] AUSPOS is Geoscience Australia's online post processing engine located at http://www.ga.gov.au/earth-monitoring/geodesy/auspos-online-gps-processing-service/faq1.html

Primary GPS stations were monumented with a star picket driven to ground level. A star picket witness post (1.8m) with identification tag was placed within 0.5m of the ground mark.

All raw data and processing files were archived by date and backed-up daily. Field booking sheets were later scanned to digital files. A comprehensive set of data was made available at the project completion including field sketches, processing files, statistical analysis of the network, Permanent Marker station summary diagrams and photographs.

A survey network map, datum stations values and established control can be found in **Appendix B - Survey Control**.



5

SURVEY OPERATIONS

5.1 Vehicle Navigation

Purpose-built in-house software, NavMini, was run on a Windows-based Motion Tablet PC to provide the operator a simple-to-use interface.

This software uses a position supplied by a Gmouse GPS antenna to display the user's position in MapInfo, containing all pre-plot lines, Cultural Heritage polygons and forced points, no-go areas, fences, gates and all other digital furniture available. It also shows the user the individual pre-plot lines with offset distances from design, and enables easy navigation back to the design line when detours are required.

A range of additional information was available to the user, including the ability to record any positions of interest for later download to the surveyor's computer.

These navigation units were used in the line clearing machines, as well as the line recording vehicles, and maintained by the Terrex Spatial surveyors on site.

Quality checks on the system were relatively straightforward as the data sets used on these machines were exactly the same information that the surveyors utilised.

5.2 Line Clearing

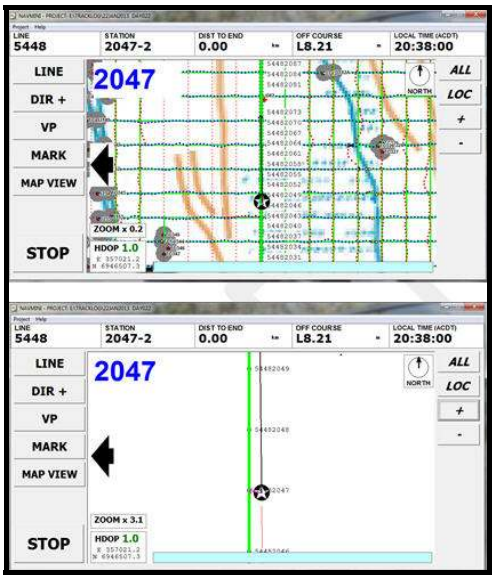
Terrex Contracting (TC) earthmoving equipment was fitted out with TSp custom-built GPS seismic line clearing units. These units comprised a Motion Tablet running NavMini machine guidance software.

NavMini provided all GIS data for the project, at the operator's disposal. Buffer zones were loaded to give operators visual and audible alerts when approaching sensitive areas. Tolerances were also set in the software to alert operators when deviating off design or GPS accuracy loss.

In the case of GPS accuracy loss, operators back-tracked down the line to the last good position fixes to confirm the GPS antenna was still in working order. For small distances, such as passing under trees, operators back-sighted down the line to pass the obstacle and reacquire position fix. When operating with poor positional accuracy, the preference was to walk forward with the blade up until accuracy was restored. This way, when the line was cleared, the operator would be able to forward-sight. If, for an extended period of time, a GPS fix wasn't possible, the operator would pull up and make contact with the line pointer. The line pointer would then assess the situation and the best approach to proceed, such as walking ahead with a hand-held GPS and flagging the route for the operator.

The nominal allowable deviation off design was ±25m as per Senex documentation, although for areas of cultural or environmental concern, this value could be exceeded.

The TSp line pointer worked closely with operators, scouting ahead where possible, and was on-call for assistance in the field. When in radio range, TC operators also had the assistance of the senior surveyor at camp, as well as survey technicians in the field. Machine operator's GIS data and accompanying hardcopy maps were updated daily and toolbox briefings held to discuss obstacles likely to be encountered during the day.



Seven dozers were operational at one time for the line clearing, and two graders were used to touch-up the majority of lines and access tracks. Four slashers also assisted with clearing in areas of Lignum grass, where environmental considerations were increased.

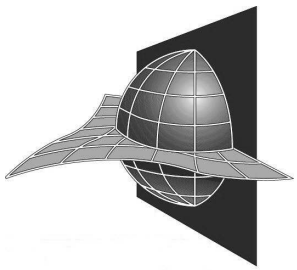
Clearing operations were completed between the 10th of November 2012 and the 7th of January 2013. Grader operations finalised work on the 16th of January 2013.

5.3 Station Positioning

All lines were designed to commence at station 5000 at the western end of the receiver lines, or station 1000 at the southern end of the source lines. Station numbering increased, consecutively progressing along the line to the east or north, respectively.

Terrex Spatial commenced work after receiving approved pre-plots from Senex. Line clearing also commenced after this approval was given. In addition to this, at the request of Senex, Terrex Spatial was asked to complete extension work in the south-eastern sector of the prospect. This work commenced after being approved by Cultural Heritage monitors.

Detailed trace maps were produced for each 3D line, showing access routes, hazards and any other details pertinent to the crew's productivity and safe operation.



6

MONUMENTATION

6.1 Environmental Monitoring Points

At the request of Senex, a number of Environmental Monitoring Points (EMPs) were installed prior to the commencement of line clearing operations. Three points were installed, which were each marked by a star picket with an aluminum identification tag. Please see **Appendix E - Environmental Monitoring Points**.

6.2 Permanent Survey Marks

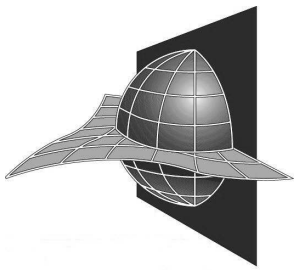
Permanent Survey Marks (PSMs) consist of a 1.8m star picket, witness post with a stamped aluminum tag attached, and a 0.6m star picket driven flush with the ground at the base. The level and position of the 0.6m picket marked the actual reference mark.

6.3 Line Stations

Wooden stakes, painted blue and numbered front and back, were used to mark every fifth receiver station with intermediate stations marked by blue pin flags. Source stations located either side of an intersection were marked by a wooden stake which was painted pink and numbered front and back, and intermediate source stations were denoted with pink pin flags.

6.4 Wells

TSp endeavoured to survey all known and found wellheads within the survey area using RTK GPS methods. GPS coordinates of these can be found in **Appendix G - Wells**.



7

METHOD OF SURVEY

On this project, two modes of GPS surveying were used; static, and real-time kinematic. Survey Control was established using static survey methods while the pegging operation utilised real-time kinematic (RTK) surveying techniques.

7.1 Static

The static survey method involves setting GPS receivers on one or more known points and then placing further GPS units on unknown points. Data is logged concurrently at all stations and then returned to the office and post-processed using Waypoint GrafNet software.

NovAtel static methods can achieve accuracies of better than 5mm +/- 10ppm in position and elevation. The expected precision for control stations is better than 50mm. The following guidelines were adhered to:

- Satellite geometry during the field observation phase was sufficient to ensure accurate results. The maximum geometric dilution of precision (GDOP) was no greater than six (6).
- The elevation mask was set at 15°.
- The observation period for shorter lines (approximately twenty kilometres) was at least thirty minutes. Observation periods for longer lines increased at a rate of one minute per kilometre of the base line.
- The epoch recording rate was set at 15- or 30-seconds.

- At least four, but preferably as many satellites as possible, were common to all stations simultaneously occupied.

- Only dual-frequency GPS receivers were used.

- Field booking sheets containing a sketch of the relevant part of the network as well as the name used for each station were completed.

7.2 Real-Time Kinematic

The Real-Time Kinematic (RTK) method utilises phases data received from US Navy NAVSTAR satellites to provide three-dimensional positioning. While RTK surveying, one receiver is set up as a base station at a known location while other receivers are used as remote rovers. To obtain real-time capabilities, VHF telemetry is required between the base and the remote GPS receivers.

NovAtel RTK methods can achieve accuracies of better than +/- 0.05m in position and elevation, depending on base line length. The expected precision for locating pegged positions is better than 0.2 metres and is generally better than 0.1 metres.

Initialisation of the OEMV-4 rover GPS usually takes as little as one minute, although this is greatly dependent on satellite geometry, availability and base line length.

Tolerances for accuracy levels set in our Nav12 software prevented the recording of poor quality data.

- The typical range for RTK is up to twelve kilometres, although for this program, the range was limited to around ten kilometres.

- Real-time update rates were set at 2Hz.

- Ambiguities were resolved for all occupations. Sufficient data was gathered to ensure ambiguities were resolved. Traceability of all recorded data was supplied with the in-house software, Nav12.

- Re-occupations were done at least sixty minutes apart and with an independent ambiguity resolution (usually more than twelve hours).

- Samples of stations from each RTK base station were re-observed from a second base station.

- The following attributes were logged with the derived coordinates: base station identification, date, time, datum, number of satellites observed, and standard deviations of the derived coordinates.

- Field booking sheets were completed for each surveyor, each day.

- Line station coordinates were pre-programmed into the rover data unit prior to the start of each day's activities.

- A minimum of five healthy satellites above a mask angle of fifteen degrees was utilised at all times.

- Data generated by the rover unit was checked against a GPS control point other than the base station at the start and end of the work day. Interim checks were also carried out during the course of the day.

- A minimum of five GPS epochs were observed at every check shot.

- The first and last points of any observation session were check shots to a point of known coordinates, in order to verify consistency with previous observations to the required accuracy.

8

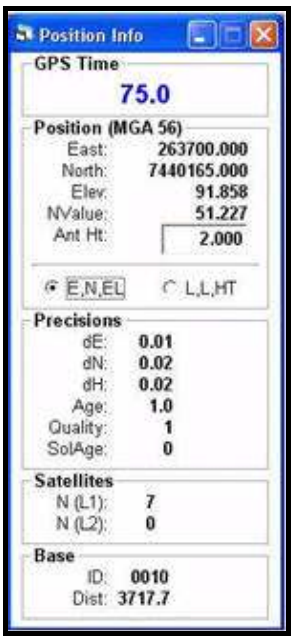
PROCESSING and QUALITY CONTROL

All survey data was immediately recorded internally on the Motion Tablets and subsequently downloaded to the office computer each evening.

Quality of the satellite data was monitored by careful examination of the various on-screen quality control statistics produced by the Nav12 software. These checks on data integrity are in the form of standard deviation (or sigma) values for Easting, Northing and Height, and are generally better than 0.15 metres.

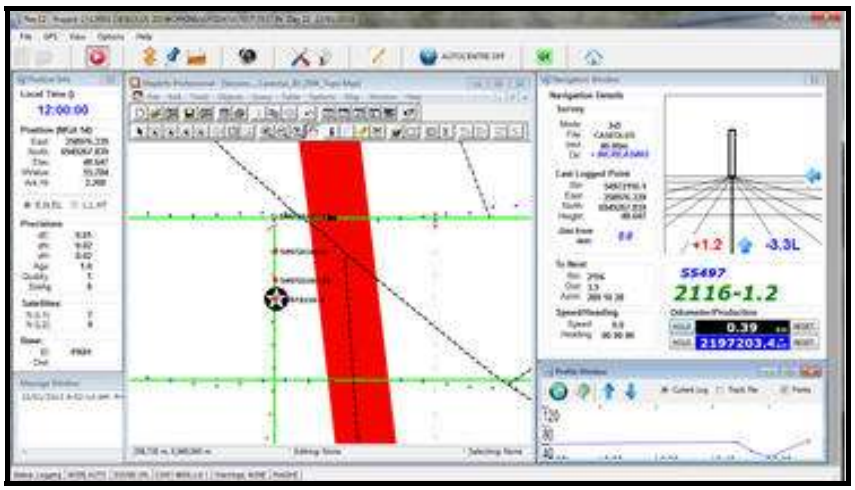
Any recording of positions where the standard deviation values exceeded 0.15 metres was highlighted to the surveyor at the time of recording. When this occurs, it is then possible to re-initialise the GPS in order to obtain a more accurate solution. Any recorded position falling outside the required tolerances was flagged for further investigation and re-recorded if necessary.

Numerous checks on pre-recorded marks were observed during each day's survey in order to confirm the integrity of the GPS base receiver and the placed marks. Particular attention was paid to check shots overlapping base stations.



Example of Nav12 Position Information

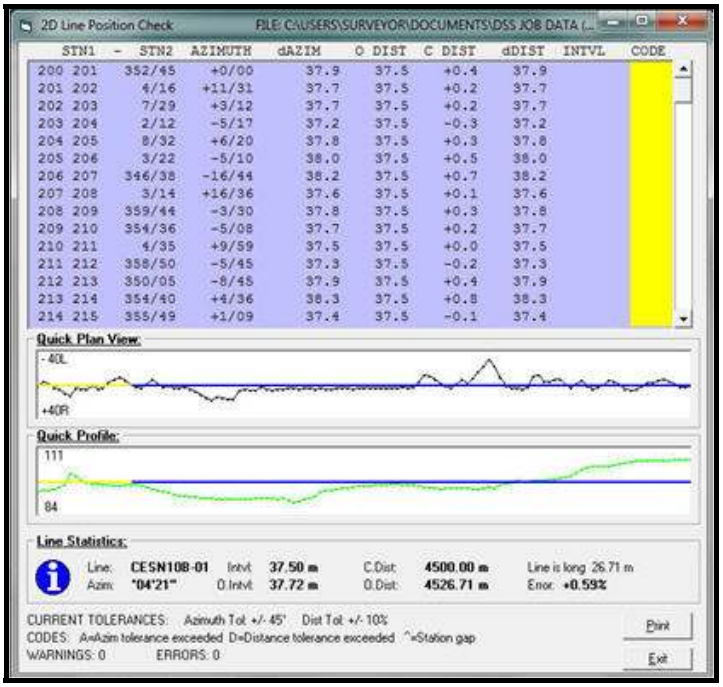
All in-field data was recorded to Nav12 files for traceability and archived accordingly. Field booking sheets were used by each surveyor, each day, and scanned at a later date. Additional quality checking information included a database of production (SEIZMIC software), 3D check lists, daily reports and daily production maps.



Example: Nav12 Display

Coordinates were also checked in the office by MIB software to determine cross-track and in-line errors. Profile plots were examined in detail to identify any height anomalies. Any points showing unusual position or height details were flagged and checked in the field. It should be noted that MIB also flags out-of-spec GPS accuracy when importing field data, and highlights out-of-spec positions for the surveyor.

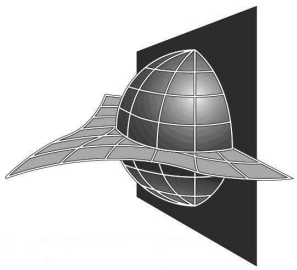
Post-plot positions were compared to pre-plot coordinates to ensure they were within specifications, and COG positions were created for supply to the recording crew.



MIB Position Check

Trace maps were digitally completed in the field before being reviewed back in the office and given to Terrex Seismic for use.

Daily reports were emailed each day, along with daily production maps and weekly reports, as required.



9

DATA PRESENTATION

9.1 General

Position data was annotated with the specified geodetic and grid parameters, including datum, projection, and other header data as specified in the SPS format.

Data including, but not limited to, maps, drives and SPS data were submitted to Senex on a regular basis, coinciding with the seismic tape data shipment, and on request. Survey support data accompanied each tape shipment.

All line files were checked and finalised before the survey crew demobilised from the project.

All final data was provided in UTM grid coordinate format on the MGA94 projection on the GRS80 reference spheroid. All elevations were on the Australian Height Datum (AHD71).

9.2 Maps

A variety of maps were produced for the use of the crew and final Prospect Maps are contained within this report. The maps show the final receiver and source location and other features including tracks, wells, exclusion zones and areas of environmental significance.

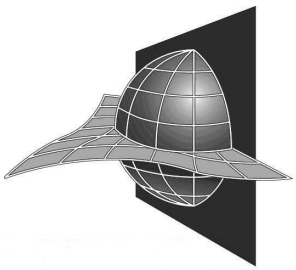
9.3 Data Types

Daily Reports Folder	-	PDF file of each daily report and production map
EMP Folder	-	PDF file of the Environmental Monitoring Point forms
ERF Folder	-	PDF of the Environmental Report Forms
MapInfo Folder	-	Associated TAB files
Maps Folder	-	PDF file of field maps
Photographs Folder	-	JPG files of all job photographs
Report Folder	-	PDF of the final operations report
Survey Data Folder		
RXXXX.rps	-	Line data in SPS format
SXXXX.sps	-	Offset Source stations due to hand-carry

All files were backed up on external hard drives while on site, and maintained on digital disks in the Yeppoon office for future reference after the program.

9.4 Prospect Maps

TSp created panel maps for each panel and swath. These included information such as Cultural Heritage sites, EMPs, topographic features, terrain type, crops, proximity of buildings or other fixed structures, oil wells, bridges, fences, gates, water and access points, ground conditions, detours, etc. A copy of each panel map can be seen in **Appendix D - Prospect Maps**.



10

HEALTH, SAFETY AND ENVIRONMENT

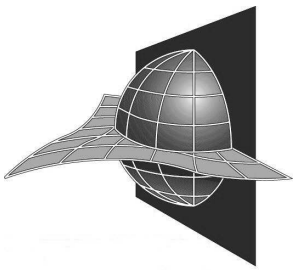
TSp personnel are aware of safety conditions concerning all exploration seismic surveys sites. The Terrex Group's **"Health, Safety, Environment and Quality Policy"** was adhered to at all times.

Terrex Spatial adhered to the Terrex Seismic ERP and SSSP documents, which governed this project.

In addition to site inductions, all TSp personnel have completed 4WD and First Aid Training courses.

All TSp vehicles are fitted with Securatrak In Vehicle Monitoring Systems (IVMS) (allowing driver monitoring and real-time vehicle tracking), UHF radio, shovel, first-aid kit, dry powder and water fire extinguishers, vehicle recovery equipment, rotating beacon and vehicle pre-start check lists. Some vehicles also contained a satellite phone.

Daily toolbox and weekly safety meetings were conducted and documented by both TSp and Terrex Contracting.



11

OPERATIONAL ASPECTS

Ben George, Justin Matthews, Alan Finnegan, Jason Searle and Josh Guppy mobilised to the project site with vehicles, caravans and trailer from the recently-completed Beach Irus project. Mobilisation was completed on the 8th of November 2012 when the survey team arrived and set up to commence survey operations.

The dozers were fitted with GPS systems on the 8th of November and commenced work on the 10th of November 2012.

Some breakdowns complicated line pointing operations and slowed down the work of the survey crews. However, under the circumstances, survey pushed on and achieved a good standard of production. A crew of four (4) slashers was used to clear line through environmentally-sensitive Lignum groves. The crew then broke into teams of two and worked on clearing in the dune areas.

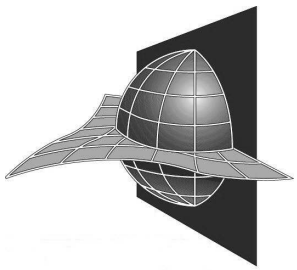
Dozing and survey operations were completed from the 12th of November to the 13th of January. This included a period of shut-down over the Christmas / New Year festive period.

Survey completely demobilised from the site before the end of January 2013.

Personnel and equipment logistics were supported by the Terrex Spatial office.

Survey operations were based from the TC camp. Site coordinates are listed below:

	MGA Zone54		GDA94	
ID	**Easting (m)**	**Northing (m)**	**Latitude (DMS)**	**Longitude (DMS)**
Camp #1	370800	6960180	S 27° 28' 32.99"	E 139° 41' 32.26"
Camp #2	364430	6952690	S 27° 32' 34.11"	E 139° 37' 37.19"
Camp #2	365850	6953090	S 27° 32' 21.27"	E 139° 37' 52.66"



12

CONCLUSIONS AND RECOMMENDATIONS

TSp drew on previous experience in the area to set up and support the survey crew and clearing operations. The experience and expertise of personnel and equipment enabled the survey crew to overcome several obstacles and maintain a good lead over the main crew.

The project consisted of 2297.5 kilometres pegged in forty-six days, giving an average daily production rate of 49.9 kilometres. There was a substantial amount of survey work requiring backpacking around creek areas for environmental and cultural reasons.

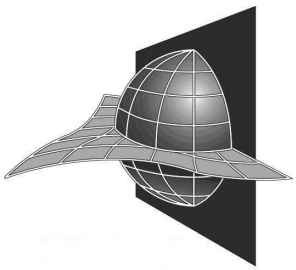
Due to the dune topography across parts of the prospect, the 4WD driving and pin flag placement was, at times, challenging.

Unfortunately, a number of Cultural Heritage breaches occurred over the term of the project. These were a result of either incorrect or missing data, or human error. As a result, intensive training and reviews of data management were undertaken. This resulted in new initiatives being implemented and software improvements to prevent the errors recurring.

TSp hopes to utilise the experience from this project to further develop and grow in our ability to face evermore challenging projects. TSp looks forward to again working with and meeting the staff of those companies involved in the 2012 Lignum 3D Survey.

Signed,
Terrex Spatial
Stewart Folley
Senior Surveyor

Checked and edited,
Terrex Spatial
Ben Allsopp
Project Manager



13

APPENDICES

Project Map

N
W
E
S

CULTURAL HERITAGE LEGEND

- Cultural Heritage Site
- No Go Exclusion
- No Go Hand Carry
- No Go No Blade

LEGEND

- Camp_Locations
- Gates
- Gates_Proposed
- Dozer_Locations
- Point _12055_Lignum_3D_Control
- No_access
- Pipe_Xings
- Fences
- Wells
- Tracks_Cooper
- Holes
- Creek_Crossing
- Wet_Creek
- Wet_Creek
- pipeline
- Water_Pipe
- Design_Source
- Hand_Carry
- Point Dead_Stations
- Point SOURCE_PRODUCTION
- Point RECEIVER_PRODUCTION
- Grader_Production
- Clearing_Production
- Culture_Heritage_Site
- NG_CH_New
- NG_Well_50m_Buffer
- NG_Water_Pipeline_15m_Buffer
- NG_Oil_Pipeline_50m_Buffer
- Lignum_Area

LIG1 LIG2 LIG3 LIG4 LIG5 LIG6
EMP01 EMP02 EMP03
Camp 1 Camp 2 Camp 3

Lake Watchiewatchina
Lake McKinlay
Lake Wynalka
Pulcaracuranie Well
Mollychuta Waterhole
Lake Yarowinie
Lotteries Waterhole
KUMBACALBIE HILL

0 2.5 5
kilometers

TERREX SPATIAL

Scale : 1 : 100,000 (A3)
Drawn: SF
File : Lignum 3D Prospect Map.pdf
Job# : 12055
Date : 15/1/2013

SENEX ENERGY LTD

LIGNUM 3D

Prospect Map

Terrex Spatial : Phone 1800 060 407

Survey Control

Datum Station

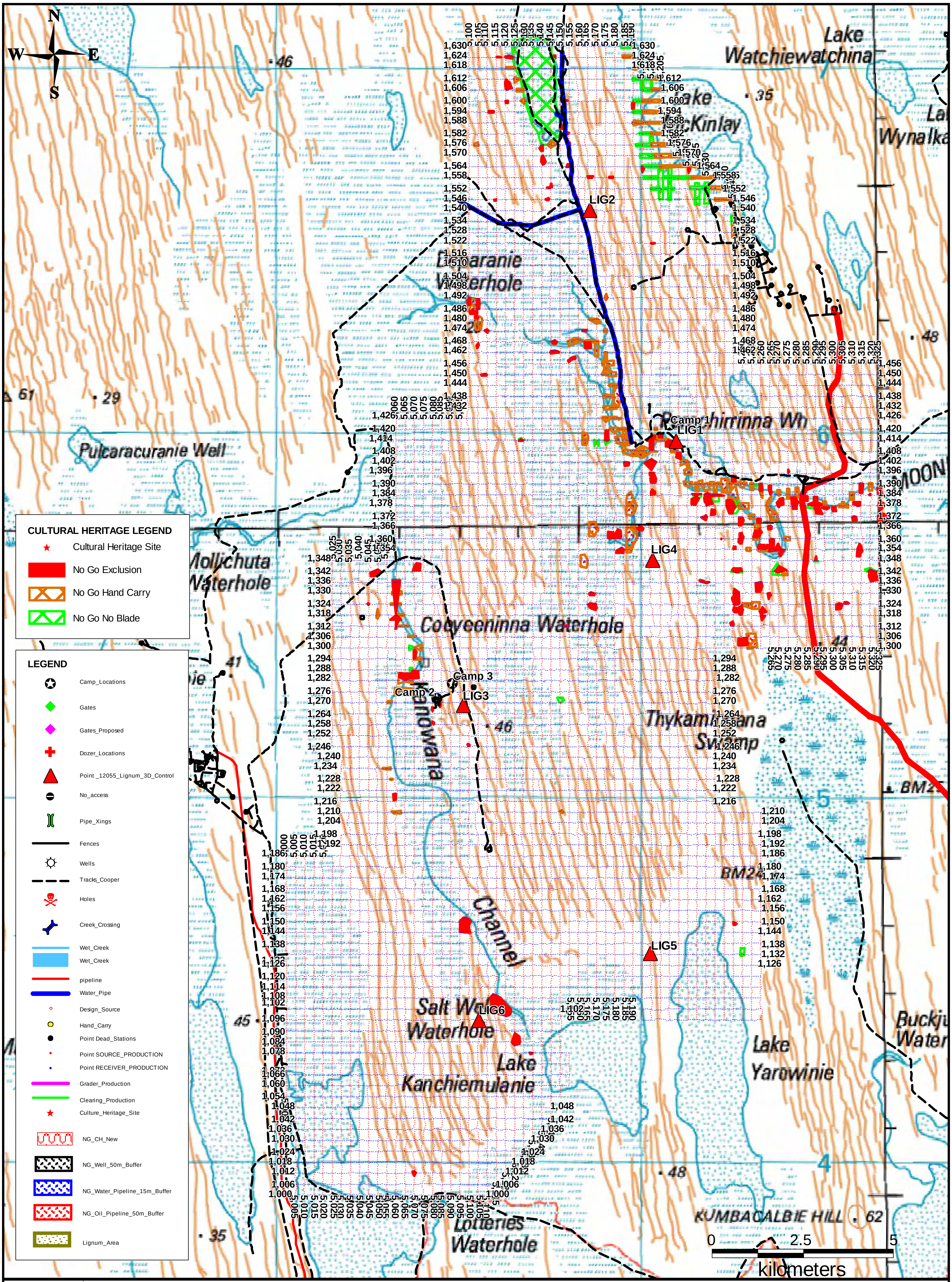
	MGA Zone 53		AHD (AUSGeoid98)	GDA94		
Station	**Easting (m)**	**Northing (m)**	**Height (m)**	**Latitude (DMS)**	**Longitude (DMS)**	**Ellip Height (m)**
LIG1	370981.083	6959757.437	24.202	-27 28 46.78278	139 41 38.70167"	40.419

New Established and Updated Stations

	MGA Zone 53		AHD (AUSGeoid98)	GDA94		
Station	**Easting (m)**	**Northing (m)**	**Height (m)**	**Latitude (DMS)**	**Longitude (DMS)**	**Ellip Height (m)**
LIG2	368614.997	6966088.771	39.196	-27 25 20.24856"	139 40 14.97007"	55.491
LIG3	365154.176	6952509.964	38.654	-27 32 40.22609"	139 38 03.51621"	54.626
LIG4	370340.485	6956498.409	33.936	-27 30 32.45590"	139 41 14.10791"	50.078
LIG5	370276.518	6945708.259	34.574	-27 36 23.02498"	139 41 07.60253"	50.483
LIG6	365572.489	6943866.117	45.177	-27 37 21.22302"	139 38 15.29452"	60.967

Control Checks

Day	Station	Easting	Northing	RL	Comments
315	LIG1	370981.083	6959757.437	24.202	Datum
	LIG1	370981.087	6959757.432	24.201	AUSPOS Check
		0.004	**-0.005**	**-0.001**	**Misclose (c-o)**
316	LIG1	370981.083	6959757.437	24.202	Datum
	LIG1	370981.087	6959757.432	24.214	AUSPOS Check
		0.004	**-0.005**	**0.012**	**Misclose (c-o)**
336	LIG3	365154.168	6952509.965	38.676	AUSPOS
		365154.176	6952509.964	38.654	TSp Static
		0.008	**-0.001**	**-0.022**	**Misclose (c-o)**
10	LIG6	365572.491	6943866.101	45.213	AUSPOS
		365572.489	6943866.117	45.177	TSp Static
		-0.002	**0.016**	**-0.036**	**Miscloses (c-o)**


N
W
E
S
Lake Watchiewatchina
Pulcaracuranie Well
Mollichuta Waterhole
Cooyeeninna Waterhole
Swamp
Channel
Waterhole
Lake Kanchiemulanie
Lake Yarowinie
KUMBACALBIE HILL
Waterhole
LIG1
LIG2
LIG3
LIG4
LIG5
LIG6
Camp 1
Camp 2
Camp 3
CULTURAL HERITAGE LEGEND
Cultural Heritage Site
No Go Exclusion
No Go Hand Carry
No Go No Blade
LEGEND
Camp_Locations
Gates
Gates_Proposed
Dozer_Locations
Point _12055_Lignum_3D_Control
No_access
Pipe_Xings
Fences
Wells
Tracks_Cooper
Holes
Creek_Crossing
Wet_Creek
Wet_Creek
pipeline
Water_Pipe
Design_Source
Hand_Carry
Point Dead_Stations
Point SOURCE_PRODUCTION
Point RECEIVER_PRODUCTION
Grader_Production
Clearing_Production
Culture_Heritage_Site
NG_CH_New
NG_Well_50m_Buffer
NG_Water_Pipeline_15m_Buffer
NG_Oil_Pipeline_50m_Buffer
Lignum_Area
0
2.5
5
kilometers

Scale : 1 : 100,000 (A3)
Drawn: SF
File : Lignum 3D Control Map.pdf
Job# : 12055
Date : 15/1/2013

SENEX ENERGY LTD

LIGNUM 3D

Survey Control Map

Map pictorially represent surveyed digital data only. The accuracy of underlying topographic image features may not relate to the accuracy of surveyed digital data. Any use of this map for reasons other than the intended purpose is not authorised.

Terrex Spatial : Phone 1800 060 407

Line Listing

Source

Station Interval = 50m

Line	Start	End	Distance (km)
S5000	1054	1185	6.55
S5005	1000	1185	9.25
S5010	1000	1185	9.25
S5015	1000	1185	9.25
S5020	1000	1185	9.25
S5025	1000	1185	9.25
S5025	1246	1347	5.05
S5030	1000	1347	17.35
S5035	1000	1347	17.35
S5040	1000	1347	17.35
S5045	1000	1347	17.35
S5050	1000	1347	17.35
S5055	1000	1347	17.35
S5060	1000	1274	13.70
S5060	1279	1315	1.80
S5060	1338	1425	4.35
S5065	1000	1273	13.65
S5065	1286	1308	1.10
S5065	1312	1425	5.65
S5070	1000	1282	14.10
S5070	1287	1298	0.55
S5070	1305	1425	6.00
S5075	1000	1425	21.25
S5080	1000	1425	21.25
S5085	1000	1425	21.25
S5090	1000	1425	21.25
S5095	1000	1425	21.25
S5100	1000	1483	24.15

Line	Start	End	Distance (km)
S5100	1492	1629	6.85
S5105	1000	1485	24.25
S5105	1493	1629	6.80
S5110	1000	1127	6.35
S5110	1131	1629	24.90
S5115	1006	1098	4.60
S5115	1109	1629	26.00
S5120	1012	1097	4.25
S5120	1105	1629	26.20
S5125	1018	1100	4.10
S5125	1103	1629	26.30
S5130	1024	1629	30.25
S5135	1030	1083	2.65
S5135	1087	1467	19.00
S5135	1469	1629	8.00
S5140	1036	1467	21.55
S5140	1469	1629	8.00
S5145	1042	1465	21.15
S5145	1467	1629	8.10
S5150	1054	1465	20.55
S5150	1467	1629	8.10
S5155	1060	1077	0.85
S5155	1108	1456	17.40
S5155	1459	1465	0.30
S5155	1468	1629	8.05
S5160	1108	1466	17.90
S5160	1469	1629	8.00
S5165	1108	1463	17.75
S5165	1469	1629	8.00
S5170	1108	1459	17.55
S5170	1468	1477	0.45

Line	Start	End	Distance (km)
S5170	1480	1629	7.45
S5175	1108	1423	15.75
S5175	1439	1448	0.45
S5175	1462	1470	0.40
S5175	1476	1629	7.65
S5180	1108	1417	15.45
S5180	1444	1629	9.25
S5185	1108	1356	12.40
S5185	1359	1405	2.30
S5185	1419	1629	10.50
S5190	1108	1375	13.35
S5190	1377	1404	1.35
S5190	1408	1629	11.05
S5195	1096	1404	15.40
S5195	1411	1587	8.80
S5195	1589	1611	1.10
S5200	1096	1395	14.95
S5200	1402	1406	0.20
S5200	1416	1581	8.25
S5205	1096	1412	15.80
S5205	1417	1563	7.30
S5210	1096	1410	15.70
S5210	1414	1418	0.20
S5210	1421	1562	7.05
S5215	1096	1402	15.30
S5215	1407	1563	7.80
S5220	1096	1387	14.55
S5220	1402	1563	8.05
S5225	1096	1383	14.35
S5225	1391	1554	8.15
S5230	1096	1385	14.45

Line	Start	End	Distance (km)
S5230	1390	1554	8.20
S5235	1096	1382	14.30
S5235	1390	1545	7.75
S5240	1096	1209	5.65
S5240	1300	1384	4.20
S5240	1393	1545	7.60
S5245	1096	1209	5.65
S5245	1300	1380	4.00
S5245	1394	1539	7.25
S5250	1096	1209	5.65
S5250	1300	1375	3.75
S5250	1379	1387	0.40
S5250	1392	1431	1.95
S5250	1445	1455	0.50
S5255	1096	1209	5.65
S5255	1308	1372	3.20
S5255	1374	1386	0.60
S5255	1392	1455	3.15
S5260	1096	1209	5.65
S5260	1300	1355	2.75
S5260	1357	1385	1.40
S5260	1390	1455	3.25
S5265	1300	1350	2.50
S5265	1356	1383	1.35
S5265	1389	1455	3.30
S5270	1300	1351	2.55
S5270	1354	1383	1.45
S5270	1388	1455	3.35
S5275	1300	1358	2.90
S5275	1361	1381	1.00
S5275	1387	1455	3.40

Line	Start	End	Distance (km)
S5280	1300	1380	4.00
S5280	1387	1455	3.40
S5285	1300	1380	4.00
S5285	1384	1385	0.05
S5285	1388	1455	3.35
S5290	1300	1377	3.85
S5290	1383	1387	0.20
S5290	1390	1455	3.25
S5295	1300	1375	3.75
S5295	1380	1389	0.45
S5295	1394	1455	3.05
S5300	1300	1373	3.65
S5300	1378	1391	0.65
S5300	1396	1455	2.95
S5305	1300	1376	3.80
S5305	1380	1455	3.75
S5310	1300	1380	4.00
S5310	1386	1455	3.45
S5315	1300	1455	7.75
S5320	1300	1385	4.25
S5320	1391	1455	3.20
S5325	1300	1382	4.10
S5325	1388	1455	3.35
		TOTAL	**1240.75**

Receiver

Station Interval = 50m

Line	Start	End	Distance (km)
R1000	5005	5109	5.20
R1006	5005	5114	5.45
R1012	5005	5119	5.70
R1018	5005	5124	5.95
R1024	5005	5129	6.20
R1030	5005	5134	6.45
R1036	5005	5139	6.70
R1042	5005	5144	6.95
R1048	5005	5144	6.95
R1054	5000	5149	7.45
R1060	5000	5154	7.70
R1066	5000	5154	7.70
R1072	5000	5154	7.70
R1078	5000	5154	7.70
R1084	5000	5149	7.45
R1090	5000	5130	6.50
R1090	5132	5149	0.85
R1096	5000	5128	6.40
R1096	5130	5149	0.95
R1096	5195	5259	3.20
R1102	5000	5122	6.10
R1102	5126	5149	1.15
R1102	5195	5259	3.20
R1108	5000	5115	5.75
R1108	5120	5259	6.95
R1114	5000	5259	12.95
R1120	5000	5115	5.75
R1120	5117	5259	7.10

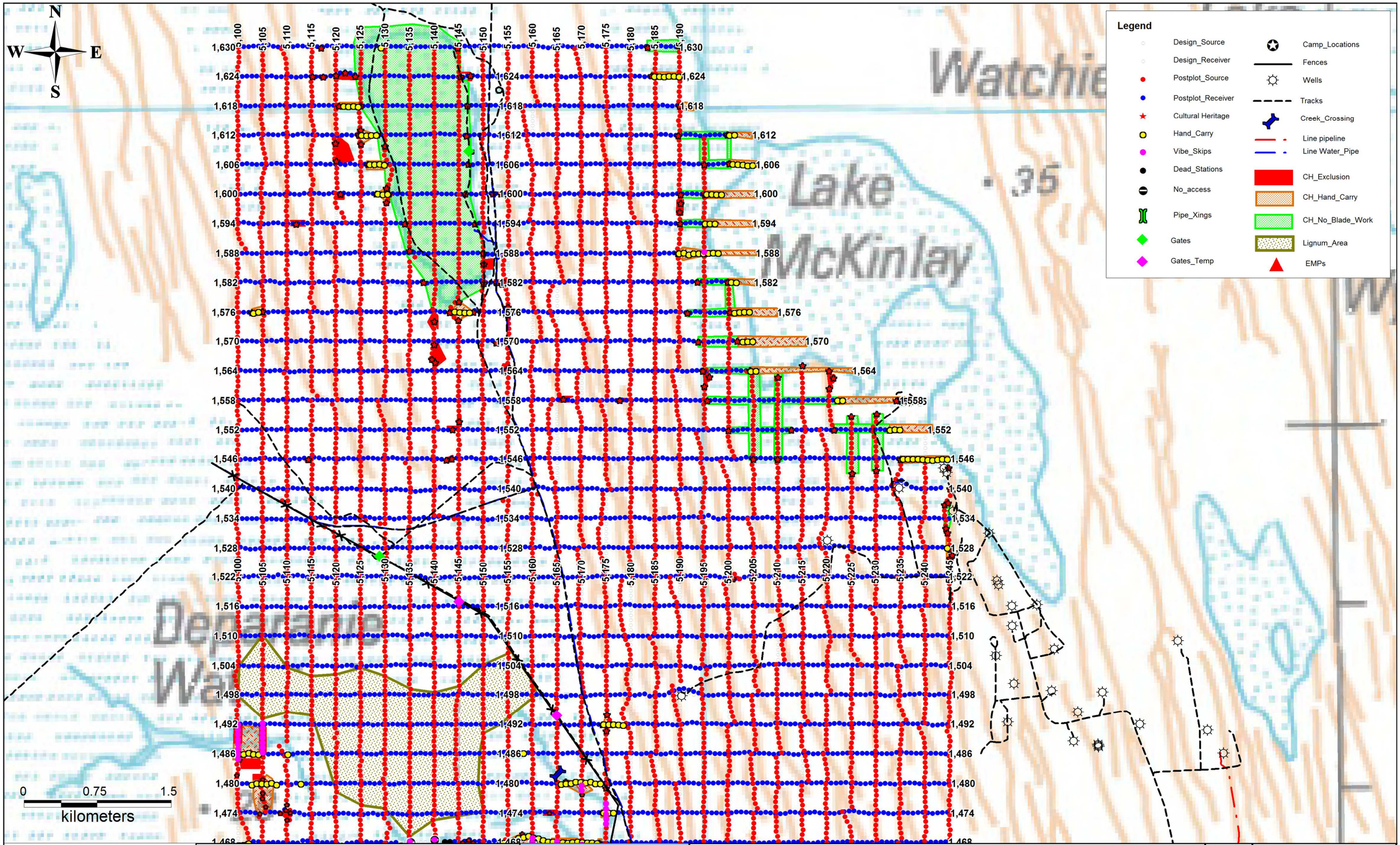
Line	Start	End	Distance (km)
R1126	5000	5259	12.95
R1132	5000	5259	12.95
R1138	5000	5259	12.95
R1144	5000	5259	12.95
R1150	5000	5259	12.95
R1156	5000	5259	12.95
R1162	5000	5259	12.95
R1168	5000	5259	12.95
R1174	5000	5259	12.95
R1180	5000	5259	12.95
R1186	5000	5259	12.95
R1192	5030	5259	11.45
R1198	5030	5259	11.45
R1204	5030	5259	11.45
R1210	5030	5259	11.45
R1216	5030	5234	10.20
R1222	5030	5234	10.20
R1228	5030	5234	10.20
R1234	5030	5234	10.20
R1240	5030	5234	10.20
R1246	5025	5234	10.45
R1252	5025	5234	10.45
R1258	5025	5234	10.45
R1264	5025	5234	10.45
R1270	5025	5234	10.45
R1276	5025	5234	10.45
R1282	5025	5061	1.80
R1282	5063	5234	8.55
R1288	5025	5070	2.25
R1288	5072	5234	8.10
R1294	5025	5071	2.30

Line	Start	End	Distance (km)
R1294	5073	5234	8.05
R1300	5025	5071	2.30
R1300	5073	5324	12.55
R1306	5025	5068	2.15
R1306	5070	5324	12.70
R1312	5025	5324	14.95
R1318	5025	5324	14.95
R1324	5025	5324	14.95
R1330	5025	5324	14.95
R1336	5025	5324	14.95
R1342	5025	5324	14.95
R1348	5025	5324	14.95
R1354	5060	5324	13.20
R1360	5060	5256	9.80
R1360	5258	5324	3.30
R1366	5060	5324	13.20
R1372	5060	5323	13.15
R1378	5060	5324	13.20
R1384	5060	5324	13.20
R1390	5060	5218	7.90
R1390	5220	5240	1.00
R1390	5242	5324	4.10
R1396	5060	5219	7.95
R1396	5221	5324	5.15
R1402	5060	5324	13.20
R1408	5060	5184	6.20
R1408	5186	5186	0.00
R1408	5188	5196	0.40
R1408	5198	5210	0.60
R1408	5212	5324	5.60
R1414	5060	5182	6.10

Line	Start	End	Distance (km)
R1414	5184	5207	1.15
R1414	5209	5324	5.75
R1420	5060	5179	5.95
R1420	5181	5324	7.15
R1426	5060	5175	5.75
R1426	5178	5324	7.30
R1432	5100	5175	3.75
R1432	5178	5324	7.30
R1438	5100	5177	3.85
R1438	5179	5324	7.25
R1444	5100	5176	3.80
R1444	5178	5324	7.30
R1450	5100	5176	3.80
R1450	5178	5324	7.30
R1456	5100	5173	3.65
R1456	5175	5324	7.45
R1462	5100	5128	1.40
R1462	5130	5167	1.85
R1462	5172	5244	3.60
R1468	5100	5141	2.05
R1468	5144	5244	5.00
R1474	5100	5244	7.20
R1480	5100	5244	7.20
R1486	5100	5244	7.20
R1492	5100	5244	7.20
R1498	5100	5244	7.20
R1504	5100	5244	7.20
R1510	5100	5244	7.20
R1516	5100	5244	7.20
R1522	5100	5244	7.20
R1528	5100	5244	7.20

Line	Start	End	Distance (km)
R1534	5100	5244	7.20
R1540	5100	5243	7.15
R1546	5100	5244	7.20
R1552	5100	5234	6.70
R1558	5100	5223	6.15
R1564	5100	5205	5.25
R1570	5100	5204	5.20
R1576	5100	5204	5.20
R1582	5100	5201	5.05
R1588	5100	5197	4.85
R1594	5100	5197	4.85
R1600	5100	5198	4.90
R1606	5100	5204	5.20
R1612	5100	5201	5.05
R1618	5100	5189	4.45
R1624	5100	5189	4.45
R1630	5100	5189	4.45
		TOTAL	**1040.40**

Prospect Maps



TERREX SPATIAL

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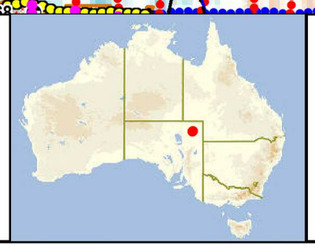
Terrex Spatial : Phone 1800 060 407

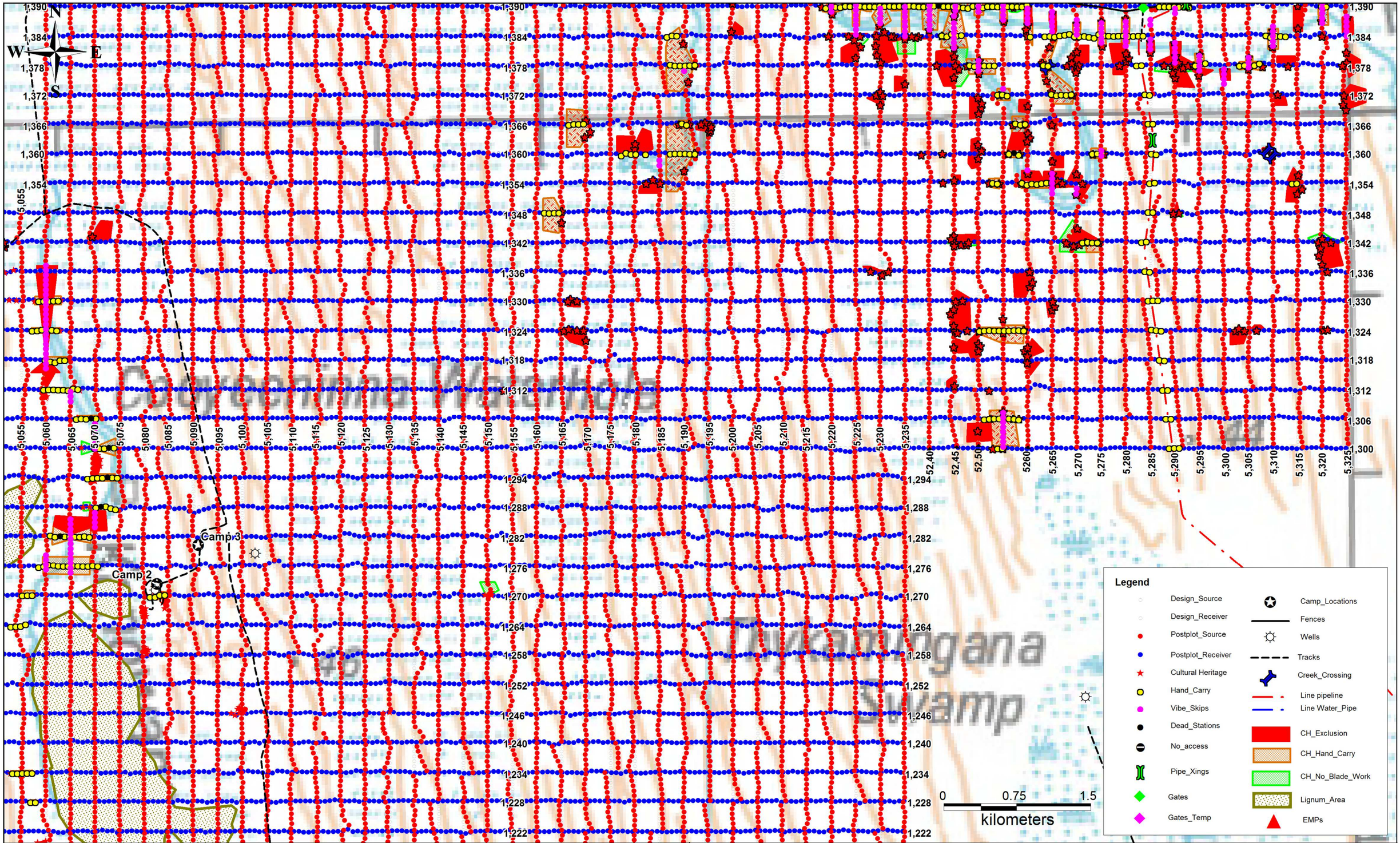


Senex Energy Ltd

LIGNUM 3D SEISMIC SURVEY

Prospect Map 1

Scale	1 : 55000 (A3)
Drawn	BA
File	12055 Prospect Map 1.pdf
Job #	12055
Date	22/1/13



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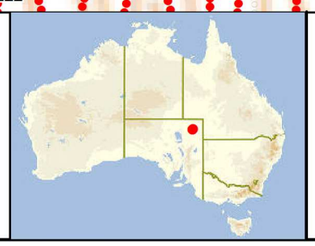

Senex Energy Ltd

LIGNUM 3D SEISMIC SURVEY

Prospect Map 2

Scale	1 : 55000 (A3)
Drawn	BA
File	12055 Prospect Map 2.pdf
Job #	12055
Date	22/1/13

Camp 3

Camp 2

Legend

- Design_Source
- Design_Receiver
- Postplot_Source
- Postplot_Receiver
- Cultural Heritage
- Hand_Carry
- Vibe_Skips
- Dead_Stations
- No_access
- Pipe_Xings
- Gates
- Gates_Temp
- Camp_Locations
- Fences
- Wells
- Tracks
- Creek_Crossing
- Line pipeline
- Line Water_Pipe
- CH_Exclusion
- CH_Hand_Carry
- CH_No_Blade_Work
- Lignum_Area
- EMPs

0 0.75 1.5
kilometers

TERREX SPATIAL

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Terrex Spatial : Phone 1800 060 407

Senex Energy Ltd

LIGNUM 3D SEISMIC SURVEY

Prospect Map 3

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Drawn	BA
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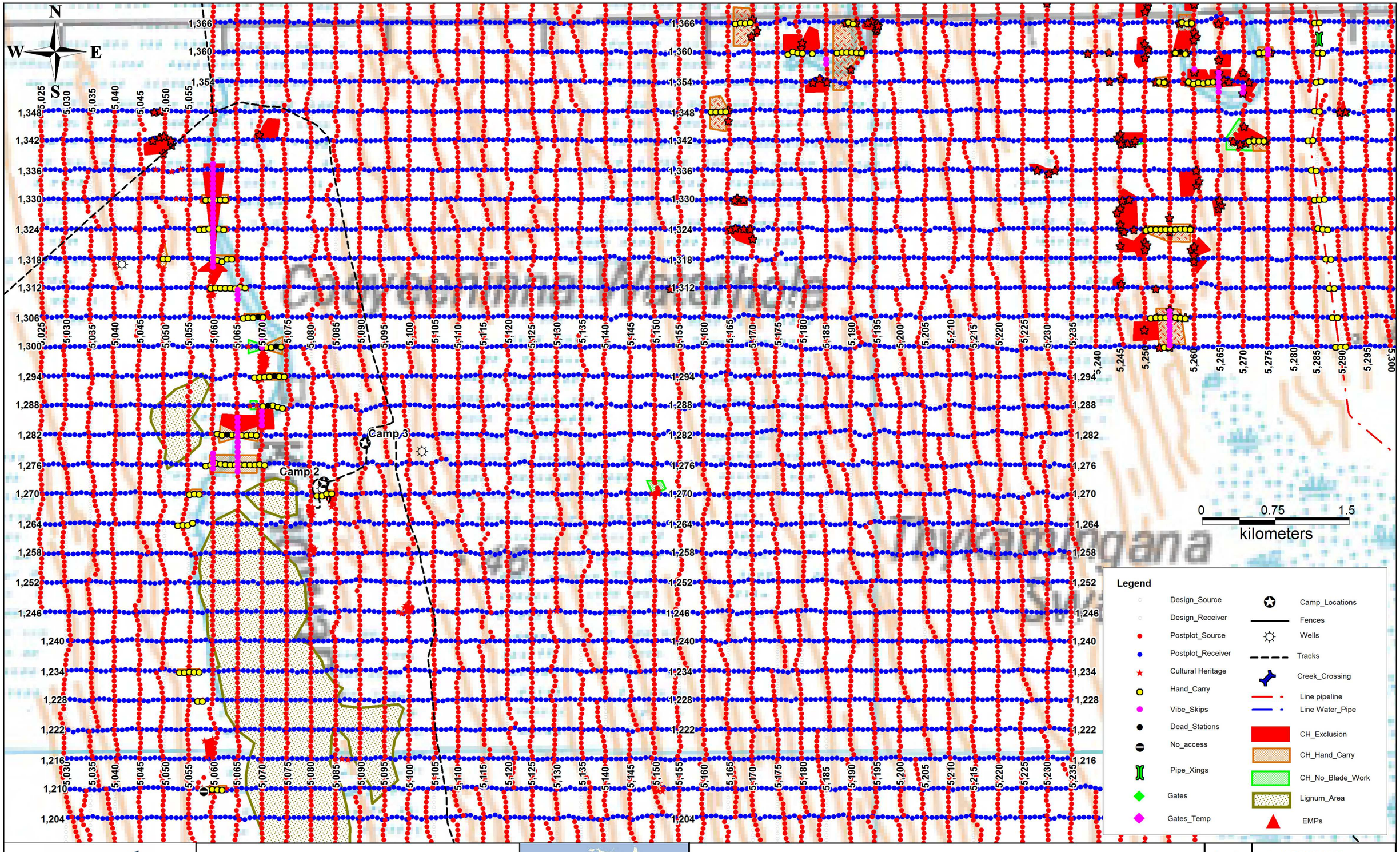
Job #	12055
Date	22/1/13



TERREX SPATIAL

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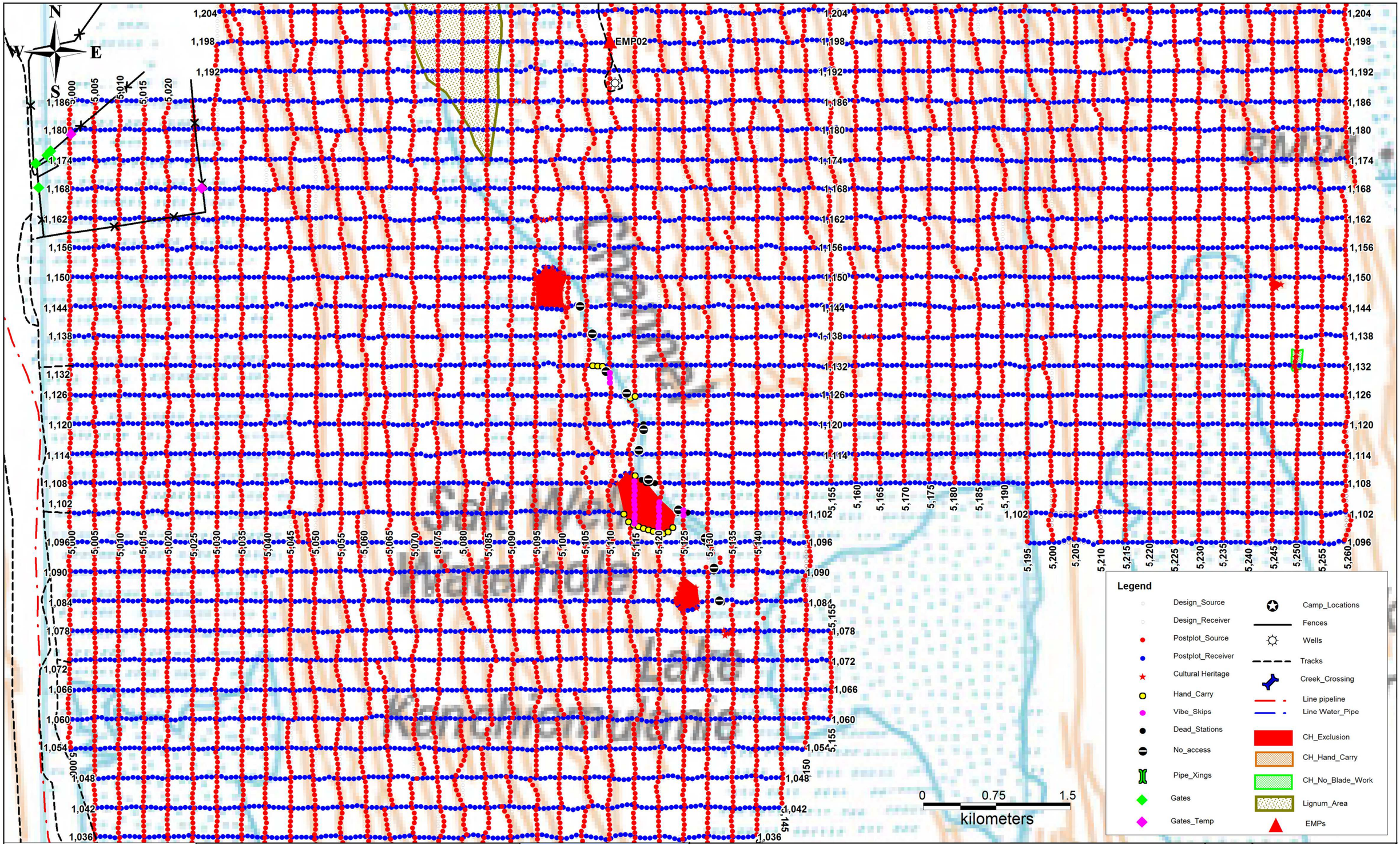
Terrex Spatial : Phone 1800 060 407

Senex Energy Ltd

LIGNUM 3D SEISMIC SURVEY

Prospect Map 4

Scale	1 : 55000 (A3)
Drawn	BA
File	12055 Prospect Map 4.pdf
Job #	12055
Date	22/1/13



TERREX SPATIAL

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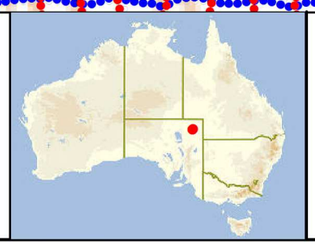
Terrex Spatial : Phone 1800 060 407

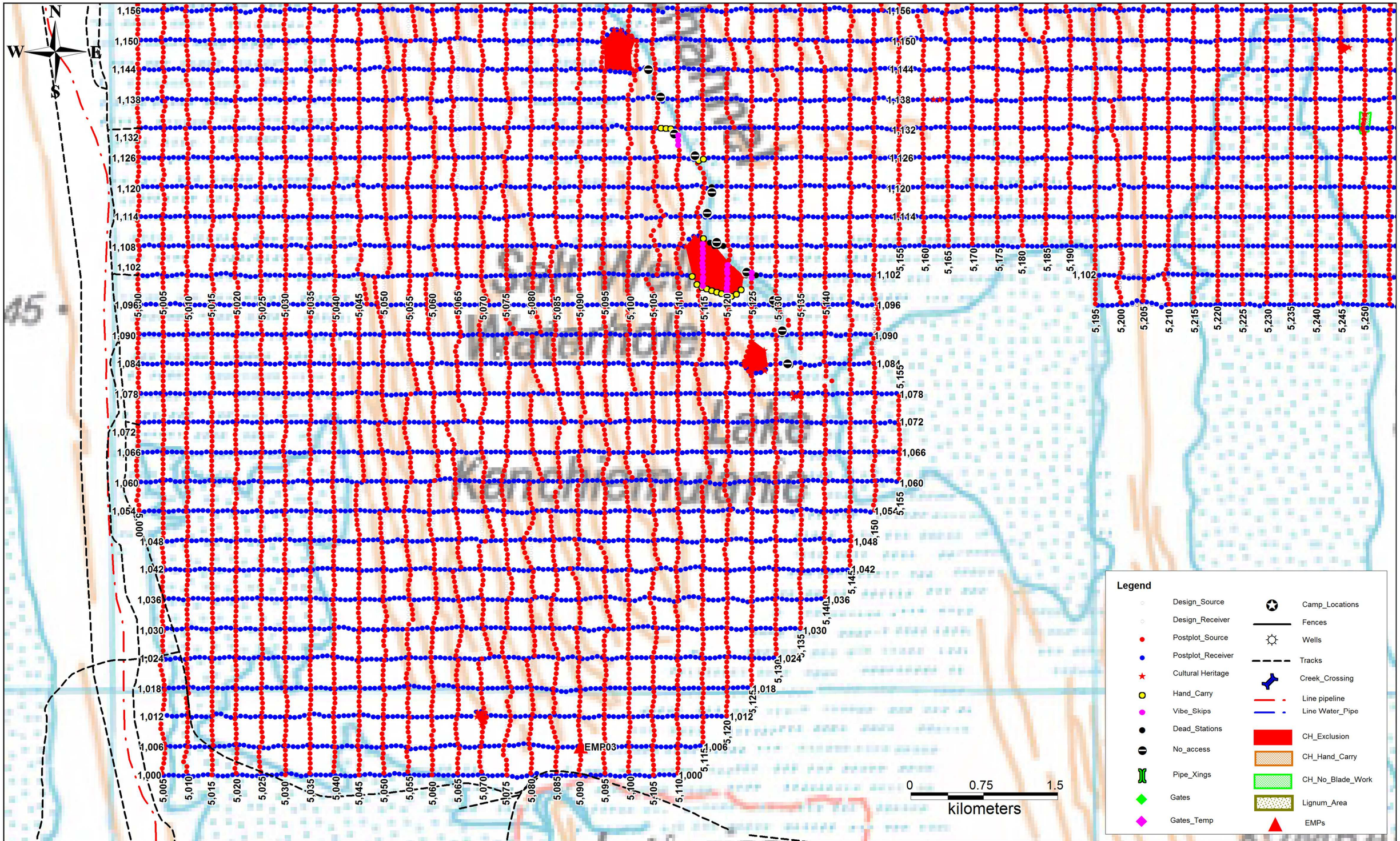


Senex Energy Ltd

LIGNUM 3D SEISMIC SURVEY

Prospect Map 5

Scale	1 : 55000 (A3)
Drawn	BA
File	12055 Prospect Map 5.pdf
Job #	12055
Date	22/1/13



TERREX SPATIAL

The purpose of this map is to represent the surveyed digital data in a pictorial manner only. The accuracy of the underlying topographic image in no way relates to the accuracy of the surveyed digital data. Features on the topographic map have not necessarily been surveyed by Terrex Spatial. Any use of this map for reasons other than the purpose for which it was created is not authorised.

Terrex Spatial : Phone 1800 060 407

Senex Energy Ltd

LIGNUM 3D SEISMIC SURVEY

Prospect Map 6

Scale	1 : 55000 (A3)
Drawn	BA
File	12055 Prospect Map 6.pdf
Job #	12055
Date	22/1/13

Wells

Wells

MGA Zone 54

Well ID	Easting	Northing	Elevation	Comments
STORMBIRD	365851.933	6948549.772	32.327	GL
TIGERCAT	365428.997	6953000.268	25.665	GL
TIGERCAT#2	364409.955	6952619.447	24.141	GL

Photographs

Line 001

Line 006

Senex well

Wildlife on Line 012

Lignum 3D Seismic Survey

Field Operations Report

Prepared for Senex Energy Limited

21st November 2012 to 30th January 2013

Job No. B02023

Crew 402

Field Operations Report

For

Lignum 3D Seismic Survey

PEL 104 & 111

Written by

Shane Goossens - Crew Manager

Crew 402

Terrex Seismic is certified to OHSAS 18001, ISO 14001 and AS 4801.

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Level 4 76 Kings Park Rd
West Perth WA 6005
T +61 8 9235 4600
F +61 8 9324 3640
E info@terrexseismic.com

BRISBANE OPERATIONS OFFICE
22 Crockford Street
Banyo QLD 4014
T +61 7 3621 0300
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100 Rockhampton Road
Yeppoon QLD 4703
T +61 7 4939 2866
F +61 7 7 4939 2867

Table of Contents

Appendices

Photographs

Figures

1. INTRODUCTION

Terrex Seismic was contracted by Senex Energy Limited to conduct the Lignum 3D Seismic Survey located in the western end of the Cooper Basin in PEL 104 & 111. Recording was completed in 53 days with a total 310 kms^2 recorded. The Lignum 3D was recorded as a single panel and was split by the Christmas period.

Acquisition commenced on the 27th November 2012 and the program was completed on the 27th January 2013. Recording was suspended on the 16th December 2012 and all equipment was picked up for the Christmas break period. The crew returned to the field on the 8th January 2013, spread layout commenced on the 9th January with recording resuming on the 12th January 2013.

There were no recording days lost due to inclement weather, with fine and hot weather for the duration of the contract. Recording was suspended on 4 occasions due to extreme heat, with the mercury reaching 54.4 degrees Celsius on the 12th January 2013.

1.1 Geographic Area

The Lignum 3D prospect was situated approximately 10 kms northeast of the Senex Growler Facility and approximately 110 kms northwest of Moomba in the northeast corner of South Australia. The closest major towns are Innamincka, about 220 km to the east and Birdsville, about 160 km to the north.

Base camp was situated on the Tigercat #2 well pad with Latitude 27°32’36”S and Longitude 139°37’36”E, directly east of Growler Facility. The terrain consisted of large rolling sand dunes and some large areas of lignum. All lignum areas were slashed with bobcats rather than cleared with bulldozers to minimise environmental impact.

Photograph 1 – Sunset on Lignum 3D

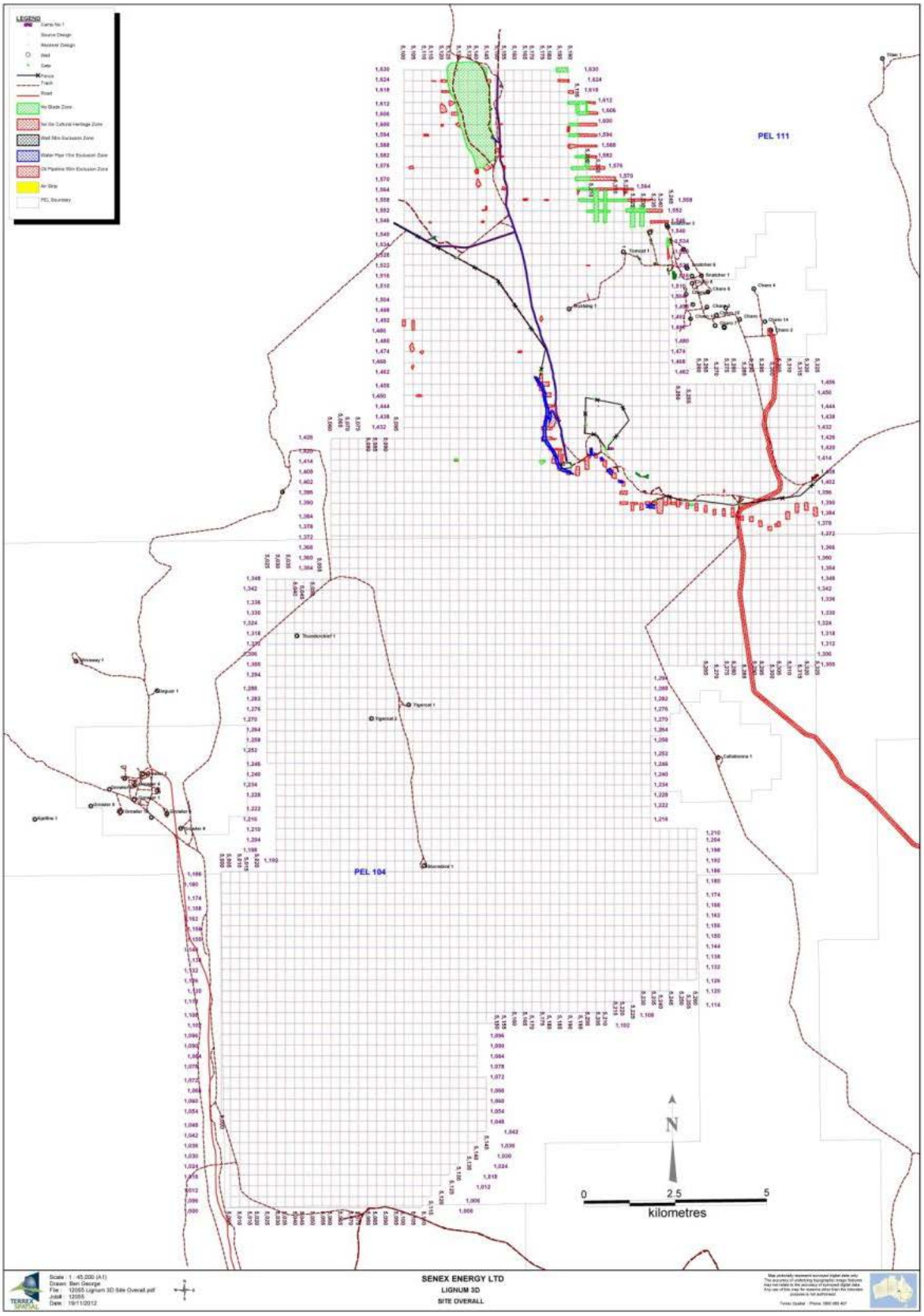

Figure 1– Lignum 3D Survey Map

1.2 Climatic Conditions

Average Minimum Temperature:	22.6 degrees
Average Maximum Temperature:	40.6 degrees
Days lost due to wet weather:	No time was lost due to weather
Rainfall:	N/A

1.3 Logistics

The recording crew mobilised from the Beach Energy Irus 3D Seismic Survey on the 21st November 2012 and spent the first few days performing vibrator sweep tests and laying out spread, with Cameron Belcher of Senex Energy selecting the final recording parameters after completion of sweep tests.

The accommodation facilities were in the form of mobile vans that were provided by Terrex Seismic and were capable of sleeping up to 56 people. All meals were provided by the mobile kitchen and diner that was staffed by two full time cooks.

All food supplies were transported via KJM from PFD in Adelaide and freight was transported via road out of Adelaide and Brisbane by Mansells transport and was delivered to Moomba depot for pick up by the Terrex supply drivers.

Fuel for all vehicles was supplied by Terrex's on site 30,000 litre diesel tanker.

All other logistics were supported out of Terrex Seismic Perth and Brisbane offices.

Photograph 2 – Envirovibes were used during sweep tests

2. SURVEYING

2.1 Line Pointing/Chaining/Surveying

Line pointing and survey services were provided by Terrex Spatial and RPS.

Terrex Spatial Personnel

Crew Member	Position
Ben George	Senior Surveyor
Ben Allsopp	Senior Surveyor
Justin Matthews	Surveyor
Alan Finnegan	Surveyor
Jason Serle	Surveyor
Joshua Guppy	Surveyor
Dirk Smidt	Surveyor
Rob McKeown	Surveyor
Rob Phillips	Surveyor
Matt Nicholson	Surveyor

2.2 Line Clearing

Line clearing services were provided by Terrex Contracting.

Terrex Contracting Personnel

Crew Member	Position
Kenny Matthews	Crew Manager
Duncan Reid	Cook
Marcus Edwards	Cook
Harley Rossel	Mechanic
Daniel Gill	Mechanic
Chris Merret	Mechanic
Wi Harana	Operator
Laurie Girdler	Operator
Josh Matthews	Operator
Dave James	Operator
Mick McKenna	Operator
Greg Walker	Operator
Jeff Littlejohn	Operator
Paul Malmstrom	Operator
Brad Makajev	Offsider
Rob Peirpoint	Offsider
Nathan McMahon	Offsider
Karl Webb	Offsider
William Wensley	Offsider

3. SERVICES

3.1 Permitting

Permitting services were provided by Senex Energy Limited.

3.2 Fencing

Fencing services were carried out by Senex Energy Contractors.

3.3 Traffic Control

Traffic Control Services were not required.

3.4 Client Representative

The Client Representatives for this survey were Mark Kneipp, Peter Robinson, and Patrick Mee.

Photograph 3 – Observer troubleshooting live spread

4. RECORDING/PROCESSING

4.1 General Survey Details

Survey:	Lignum 3D
Survey Location:	Clifton Hills Station, Cooper Basin, South Australia
Total Sq Kms:	316.6
AFE Code:	PEL 104, 111 & PPL 240

4.2 Field Recording Parameters

Instruments:	Sercel 428XL
No. Channels:	1920 live channels (16 lines x 120 channels each line)
Tape Drives:	IBM Ultrium LTO2 (Dual Drive – 200 Gbyte per tape)
Tape Format:	SEGD Revision 1 80581EEE Demultiplexed
Filters:	Hi cut 200 Hz, (0.8 Nyquist – Linear) Lo cut: Out
Sample Interval:	2 ms
Record Length:	4 seconds
RTC:	Yes
Correlation Type:	Zero Phase, After Sum
Stack:	Diversity Stack

Source Data

Vibrators:	2 groups of 2 x Hemi 60
Electronics:	Pelton VibPro
Sweep Frequency:	Mono-sweep, 8-95 Hz
Sweep Length:	7 seconds
No. Sweeps:	2 standing
VP Interval:	50 m along lines spaced at 250 m intervals. . VPs staggered between lines in a pattern of 3, with source lines running North-South and orthogonal to receiver lines
Vibrator Array:	2 vibes in line, 12.5 m pad to pad, centered on station, no move up
Sweep Amplitude Taper:	100% (none)
Drive Level:	70% varied by amplitude control function
End Tapers:	0.2 secs, cosine squared.
Phase Locking Type:	Ground Force
Amplitude Control:	Peak to Peak

Receivers

Receiver Group Interval:	50 m along lines spaced at 300 m intervals. RPs staggered between lines in a pattern of 3, with receiver lines running East-West and orthogonal to source lines
Spread:	16 lines x 120 channels each line
Geophones:	Sensor SM24 10 Hz or Equivalent
Array:	12 phones inline over 50 m, centered on station, 4.167 m spacing
Connection:	Two parallel strings with 6 phones each, each string connected Series/Parallel (3 x 2)
Nominal Fold	96 (12 fold inline X 8 fold crossline)

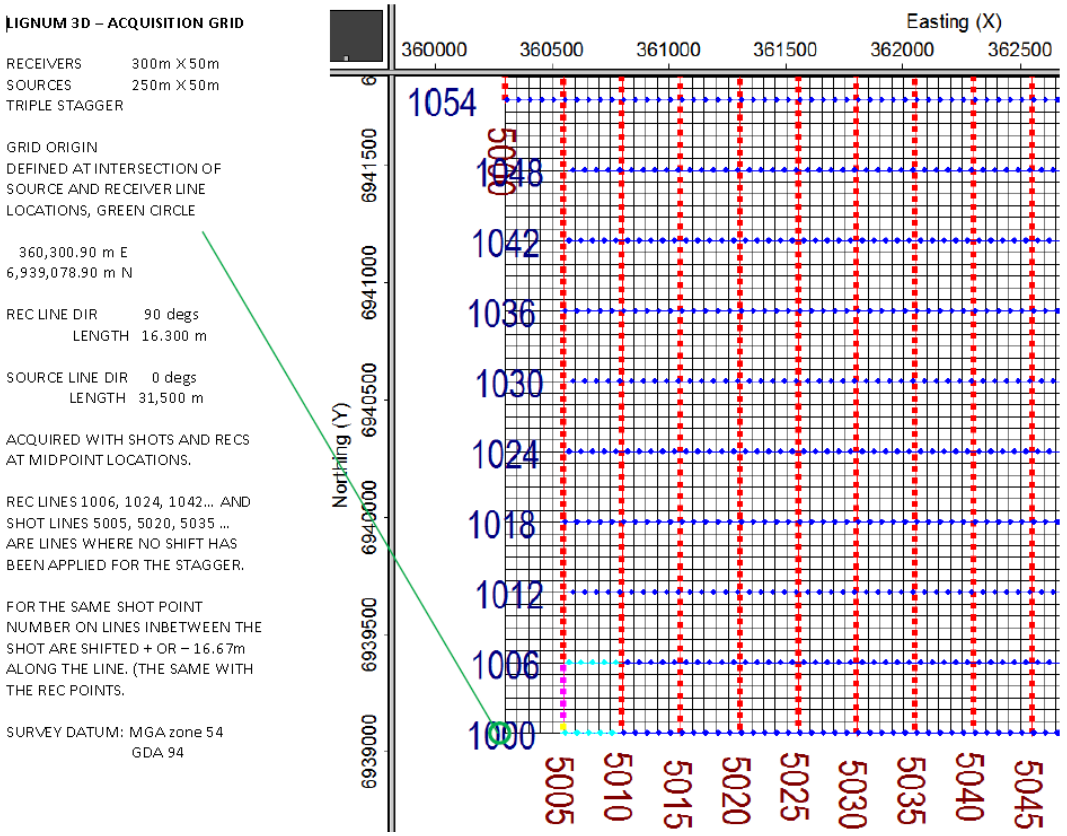

Figure 2 - Acquisition Grid

4.3 3D Recording

The survey was acquired from North to South as a single panel.

4.3.1 Pre-Christmas Production

Production started on the 27th November 2012 on station 5150 : 1629, and continued through until the 16th December when production was suspended for the Christmas shut down. Production was also suspended on the 3rd December 2012 due to a Cultural Heritage (CH) incursion where survey pegs were hand carried through an exclusion zone. Recording resumed on the 9th December after a field visit by the Dieri Traditional Owners to determine that the incursion had not disturbed any cultural sites.

The pre-Christmas area consisted of large sand dunes and large areas of Cooper Creek flood plain and waterholes with multiple exclusion zones and hand carry areas due to many cultural sites of significance.

Many of the receiver lines had impassable creek crossings that required the spread to be either deviated or laid through using the Terrex supplied boat.

All source lines through the creek areas were either deviated or skipped altogether. Multiple areas of densely vegetated lignum were slashed with bobcats and were initially intended to be recorded using IVI Envirovibes, but after good drying weather it was determined that the large 60,000lb Inova AHV's could be utilised. Line crew worked very efficiently through these difficult areas, moving large amounts of spread through multiple hand-carries. The average recording rate in this area was 748 VP's per day, not including days lost due to the CH incursion. There were no days lost during this period due to wet weather, but an average of 1.0 hour per day was lost due to animal damage.

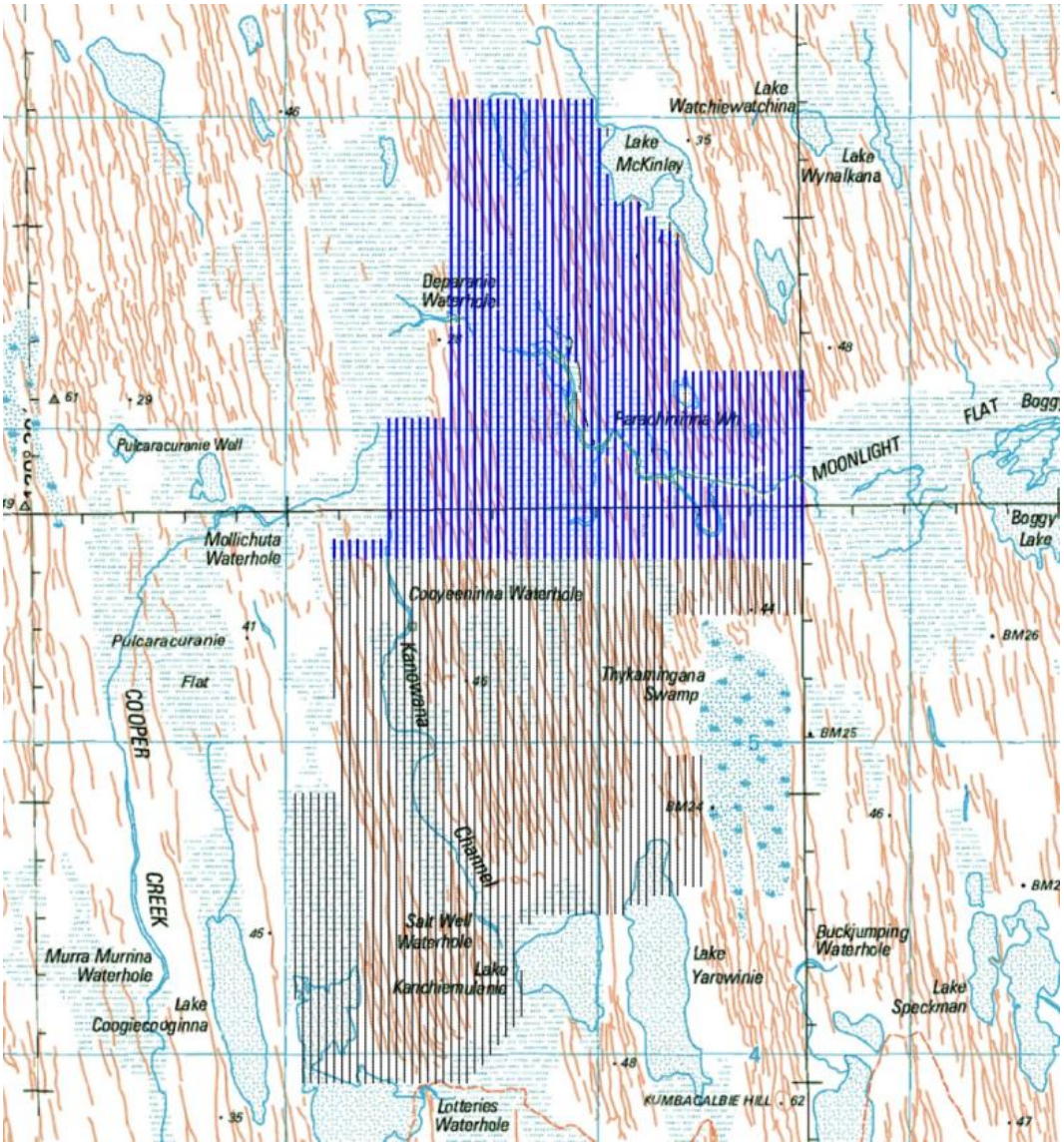

Figure 3 – Pre-Christmas Production Map

4.3.2 Post-Christmas Production

Production resumed after the Christmas shut down on the 12th January 2013, on station 5325 : 1335, and continued un-interrupted until completion of the Lignum 3D survey on the 27th January 2013, at an average production rate of 904 VP's per day. The post-Christmas area consisted mostly of large sand dunes with minimal hand carries due to cultural heritage sites and creeks, resulting in a better production rate than the pre-Christmas period. There were no days lost during this period due to wet weather but an average of 0.9 hour per day was lost due to animal damage.

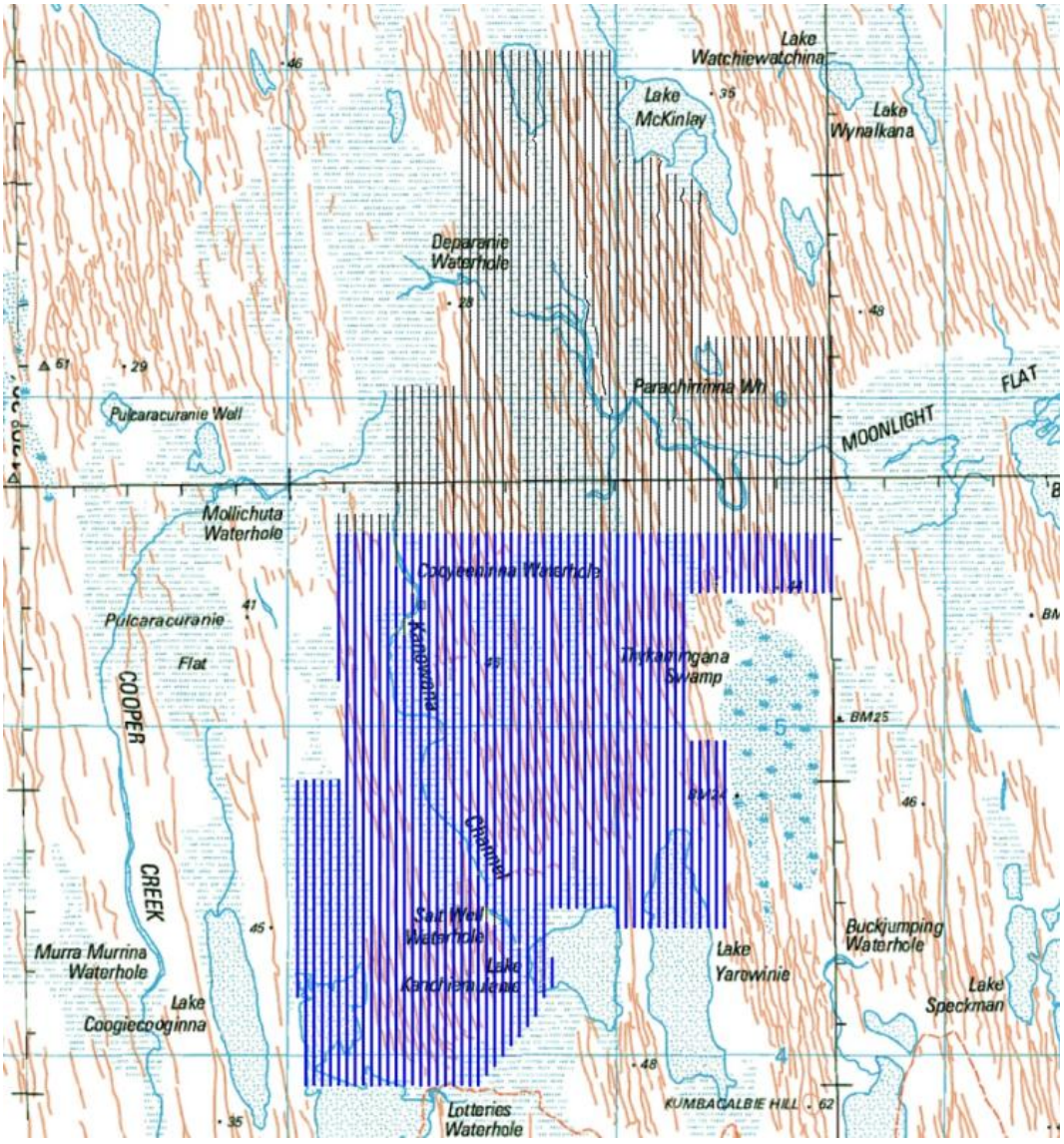

Figure 4 – Post-Christmas Production Map

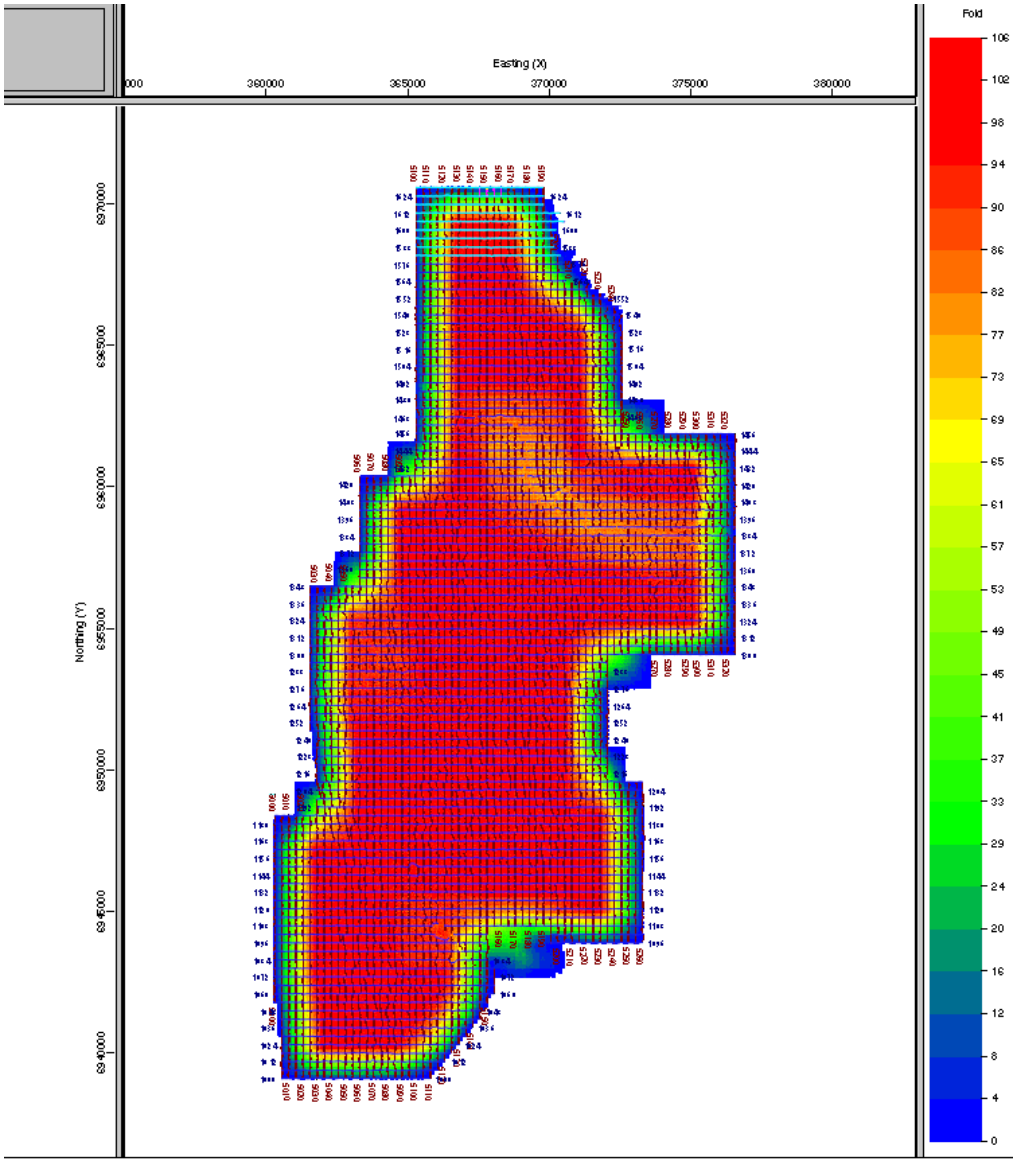

Figure 5 - Fold of Coverage Map

4.4 Crew Performance

The overall crew performance on the Lignum 3D Seismic Survey was excellent, especially when taking into account some of the difficult areas that the crew had to work through and the extreme heat conditions.

4.5 Processing Tapes

A Tapes

sent via Australian Air Express to:

Senex Energy Limited
GPO Box 2233
Brisbane, Queensland 4001

Attn: Cameron Belcher

07 3837 9900

B Tapes

sent via Australian Air Express to:

Senex Energy Limited
GPO Box 2233
Brisbane, Queensland 4001

Attn: Cameron Belcher

07 3837 9900

Photograph 4 – Example of areas that required Terrex boat for spread layout

Appendix A - Field Equipment Specifications

Recording Equipment

Data Acquisition System:	SERCEL 428 - 24 Bit 3D Seismic
Similarity System:	Pelton VIBRPO Real Time
Computing:	Sun Blade Computer with 4 x 22 inch Flat Screens
Plotter:	Veritas V12 Plotter, UPS, LIM, APM
Tape Drives:	2 x LTO High Density
Comms:	1 x 10 metre 6 DB Boost High Gain Antenna

Source Equipment

Vibrators:	2 groups of 2 x Hemi 60
Peak force:	60,000lbs per Vibrator
Hold-Down Weight:	60,000lbs per Vibrator
Vibrator Control Electronics:	4 x Pelton VibPro
Sweep Generator :	1 x Pelton VibPro

Electronics are capable of Trade Marked Varisweep.

Line Equipment

Seismic Cables:	1350 (4 FDU's per cable) 5400 channels
Takeouts:	55 m separation between takeouts
LAUL Units:	135 x Line Power
LAUX Units:	21 x Line Crossing
Transverse Cables:	60 x Transverse Cables
Batteries:	180 x Line Batteries
Battery Chargers:	32 x Sercel
Geophones:	Sensor SM24 10Hz geophones or equivalent
Geophone Strings:	5400 (12 ph/group)
Geophone Tester:	1 x Bird Dog Portable
Vehicle Radios:	VHF Motorola & UHF GME
Personnel Radios:	VHF Icom H/Held & UHF Uniden H/Held

Note: Terrex Seismic warrants that 90% of equipment will be used in field and up to 10% may be undergoing repair and maintenance.

Appendix B - Vehicle Equipment Listing

#	Vehicle	Deployment	Registration
Light Vehicle			
1	VDJ 79R Series Landcruiser Trayback	De-pegger	1CUE 670
2	VDJ 79R Series Landcruiser Trayback	Op Manager	536 RPU
3	76 Series Landcruiser Wagon	PM	1DXL 386
4	76 Series Landcruiser Wagon	Front Crew	459 LGW
5	76 Series Landcruiser Wagon	Vibe Crew	460 LGW
6	76 Series Landcruiser Wagon	Front Crew	461 LGW
7	76 Series Landcruiser Wagon	Back Crew	462 LGW
8	76 Series Landcruiser Wagon	Back Crew	463 LGW
9	VDJ 79R Series Landcruiser Trayback	Cable	465 LGW
10	VDJ 79R Series Landcruiser Trayback	Trouble Shooter	466 LGW
11	VDJ 79R Series Landcruiser Trayback	Jugs	467 LGW
12	VDJ 79R Series Landcruiser Trayback	Jugs	468 LGW
13	VDJ 79R Series Landcruiser Trayback	Cable	469 LGW
14	VDJ 79R Series Landcruiser Trayback	Jugs	470 LGW
15	VDJ 79R Series Landcruiser Trayback	Cable	471 LGW
16	VDJ 79R Series Landcruiser Trayback	Mecho's	472 LGW
17	VDJ 79R Series Landcruiser Trayback	Trouble Shooter	473 LGW
18	VDJ 79R Series Landcruiser Trayback	Cable	474 LGW
19	VDJ 79R Series Landcruiser Trayback	Jugs	475 LGW
20	VDJ 79R Series Landcruiser Trayback	Trouble Shooter	476 LGW
21	VDJ 79R Series Landcruiser Troopcarrier	HSE Ambo	477 LGW
22	100 Series Landcruiser Wagon	Vibe Crew	772 KCU
Heavy Vehicle			
1	Inova AHV-IV PLS362	Vibrator 1	C 95555
2	Inova AHV-IV PLS362	Vibrator 2	C 95556
3	Inova AHV-IV PLS362	Vibrator 3	C 95557
4	Inova AHV-IV PLS362	Vibrator 4	C 95558
5	Isuzu	Recorder	1BSB 131
6	Nissan MK190	Cable Repair	1DDE 233
7	Freightliner	Drinking Water	1DDE 225
8	Paystar	Vibe Service Truck	1DDE 234
9	Paystar	Mechos Store	1DDE 227
10	Paystar	Shower Water	1BUI775
11	Hino	Fridge / Freezer Truck	228 SBT
12	Paystar	Waste pod carrying	1DDE 229
13	Hino	Crane Truck	1CMW 981
14	Kenworth (Yellow princess)	Towing	747 SAH

#	Vehicle	Deployment	Registration
15	Kenworth	Workshop Cab/o	1AGB 177
16	Kenworth	Towing	999 LWW
17	Kenworth (Green with ice box)	Towing	KW 9880
18	Kenworth (Green KW 85 series)	Towing	675 RDS
Van and Trailer			
1	Elross (3 Rooms / 6 Men)	Accommodation	1TGL 663
2	Elross (3 Rooms / 6 Men)	Accommodation	1TGL 664
3	Elross (3 Rooms / 6 Men)	Accommodation	1TGL 666
4	Elross (3 Rooms / 6 Men)	Accommodation	1TGL 815
5	Elross (3 Rooms / 6 Men)	Accommodation	1TGL 812
6	Elross (3 Rooms / 6 Men)	Accommodation	1TGL 811
7	Elross (3 Rooms / 6 Men)	Accommodation	1TJB 338
8	Elross (3 Rooms / 6 Men)	Accommodation	1THT 116
9	Elross (3 Rooms / 6 Men)	Accommodation	1THT 117
10	Elross (3 Rooms / 6 Men)	Accommodation	1THV 394
11	Elross (1 Room / 4 Men)	Accommodation	1TER 546
12	Elross	PM Office / Accommodation	1TGL 813
13	Elross	HSE Office	1TFB 626
14	Elross	Kitchen	1TGZ 790
15	Elross	Diner	1TGZ 789
16	Tandem Lunch Van	Lunch Room	692 QPG
17	Trailer	Laundry	502 QJG
18	Elross (7 person)	Showers	1TKM 922
19	Trailer (C'made)	Mech. Workshop	1TAR 750
20	Tri-axle trailer	Generators	126 QMP
21	Tri-axle trailer	Vibe Stores / Cold Rooms	507 QJG
22	Tri-axle trailer	Carry Diesel Tanks	158 QUE
23	Box Trailer	Carry Satellite Dish	CM 9933
24	Tandem box trailer	Signs / Wash Down	YIE 679
25	Trailer	5 person toilet	499 QJG
26	Dolly		509 QJG
27	Tri-axle trailer	Carry spread	078 QMU
28	Tri-axle trailer	Carry spread	688 QTF
29	Dual-axle trailer	Carry spread	092 QIR
30	Trailer	Storage	347 QJX

Appendix C - Tape Listings

Tape 1A

TAPE TRANSMITTAL

TO: Senex Energy
GPO Box 2233
Brisbane Qld 4001
07 3837 9900
ATTN: Cameron Belcher

Page 1

Tape #	Swath	First FFID	Last FFID	First VP	Last VP	Date Recorded	Comments
1A	Lignum 3D	1	9481	5150/1629	5325/1354	27/11/12 - 15/12/12	Completed
2A	Lignum 3D	1	9853	5325/1353	5245/1155	16/12/12 - 21/01/13	Completed
3A	Lignum 3D	1	5745	5240/1155	5005/1011	22/01/13 - 27/01/13	Completed

Sent by: David Keat

Received by: ..... Date: .....

Tape 2A

TAPE TRANSMITTAL

TO: Senex Energy
GPO Box 2233
Brisbane Qld 4001
07 3837 9900
ATTN: Cameron Belcher

Page 1

Tape #	Swath	First FFID	Last FFID	First VP	Last VP	Date Recorded	Comments
1B	Lignum 3D	1	9481	5150/1629	5325/1354	27/11/12 - 15/12/12	Completed
2B	Lignum 3D	1	9853	5325/1353	5245/1155	16/12/12 - 21/01/13	Completed
3B	Lignum 3D	1	5745	5240/1155	5005/1011	22/01/13 - 27/01/13	Completed

Sent by: David Keat

Received by: ..... Date: .....

Appendix D - HSE Policy & OH&S Standards

Health Safety Environmental and Quality Policy

Terrex is a Seismic Acquisition and Surveying Contractor providing services to the Oil, Gas, Mineral and Infrastructure Industries.

Our vision is to evolve into one of the world's most operationally efficient, technologically advanced, innovative and safest onshore Seismic Acquisition and Survey service providers.

Our aim is to provide a healthy and safe workplace while minimising the environmental impacts of our activities and satisfying our customers' expectations.

We at Terrex are committed to:

- Providing a healthy and safe workplace for our employees, contractors and the general public.
- Conducting all operations in such a manner as to minimise their impact on the environment.
- Promoting the protection of all Natural and Cultural environments that can be affected by our activities.
- Seeking to continuously improve in the efficient use of natural resources and energy through recycling and waste management.
- Regularly review and improve our process to minimise health and safety hazards, negative significant impacts to the environment and prevent pollution.
- Establishing measurable objectives and targets for improving our safety and environmental performance.
- Working with our customers, suppliers and employees to seek continual improvement of our activities.
- Complying with legislation and industry codes of practice wherever we conduct business.

To ensure this commitment we have implemented an integrated management system, which meets the requirements of:

- **AS/NZS 4801 Occupational Health and Safety Management Systems**
- **OHSAS 18001 Occupational Health and Safety Management System**
- **AS/NZS ISO 14001 Environmental Management Systems.**
- **AS/NZS ISO 9001 Quality Systems**

This policy is basic to all Terrex operations and adherence is the prime responsibility of management, every employee and all contractors / sub contractors.

Stephen P. C. Tobin
Director

Dated: 24 November 2011

Drug and Alcohol Policy

Terrex is committed to:

- Ensuring the Safety and Health of its employees and its subcontractors is maintained;
- Maintaining a SAFE and Healthy workforce and workplace through a proactive approach.

Scope

This policy outlines the responsibilities and applies to all employees of TERREX and all of its subcontractors.

All personnel are considered "on the job" whenever he/she is on:

- Any Company or client property, including parking areas; or
- Company time even if off Company premises – including paid lunch, rest periods, and periods of being on call.

Responsibilities

- Terrex is responsible for maintaining a Drug-Free Workplace and Workforce.
- As a Duty of Care to all employees and contractors, the company will initiate:
  - Random;
  - Upon suspicion;
  - With cause; and
  - Post-accident / incident Drug and Alcohol Testing.

It is expected all employees and contractors will co-operate with the nominated Company Representative in this matter.

- The Company prohibits the use, unauthorized possession, manufacture, distribution or sale of illegal drugs, illegal inhalants, drug paraphernalia or controlled substances (i.e. all chemical substances or drugs listed in any controlled substances act or regulation applicable under any federal and /or state local laws) by any employee or contractor while on duty, while on Company premises or work sites or conducting Company business, or while operating or occupying any Company vehicle/equipment at any time.
- It is the responsibility of an individual to disclose to the nominated company representative any use of prescription drugs and over-the-counter drugs or designer / "look alike" drugs, prior to entering the work place. As the use of prescription drugs and/or over-the-counter drugs may also affect an employee's job performance and seriously impair his/her ability to work safely and effectively. Misusing prescribed or over-the-counter medication on company property or company assignment is strictly prohibited. Designer or "look alike" drugs are prohibited on all Terrex work sites. Non-disclosure will be treated as a breach of this Policy.
- Terrex permits the consumption of mid strength and light beer only on operational work sites including but is not limited to, offices, workshops, vehicles, production facilities and other operational areas, and car parks.
- It is the responsibility of all employees and contractors to have a 0% blood alcohol reading before commencing and during work hours.
- Pertaining to employees and contractors in rehabilitation or self-rehabilitation, confidentiality of personal information will be maintained, although personal information will be released by the Medical Services on a need-to-know basis or as required by law.
- All personnel working on Company premises or performing Company work must have read this Policy and will be asked to cooperate with the administration of this Policy. A breach of this policy and the associated procedure may result in disciplinary action.

Stephen P. C. Tobin
Dated: 29 November 2011

Fitness for Work Policy

Terrex is committed to providing a safe, healthy and productive workplace for all its employees. The company recognises that alcohol, drugs, substance abuse, or fatigue will impair employees' ability to perform their jobs properly and that any of these factors will have adverse effects on the safety, efficiency, and productivity.

Scope

This policy outlines the responsibilities and applies to all employees of TERREX.

All personnel are considered "on the job" whenever on:

- Any Company or client property, including parking areas; or
- Company time even if off Company premises including paid lunch, rest periods, and periods of being on call.

Policy

- The company prohibits the misuse of legitimate drugs, or the use, possession, distribution or sale of illicit or non-prescribed controlled drugs, or other substances, on company business or premises.
- Any employee who takes prescription medication should check with their doctor to establish if the use of the medication will impair their work performance, or pose a safety risk to the worker or any other person in the workplace. If so, the worker should seek advice in writing from their doctor and provide a copy of this letter to their manager.
- In-line with community attitudes, legislation and legal liability, smoking shall only be permitted in designated smoking areas.
- The company recognises alcohol, drug or substance dependency as a treatable condition. Employees who suspect they have a dependency problem are encouraged to seek professional advice and to follow appropriate treatment promptly before it results in work performance problems.
- Employees working outdoors are required to undergo periodical medical examinations at the company's expense.
- Drug and Alcohol testing will be conducted by the company on a daily / random or for-case basis.
- All employees are required to comply with the requirements of the company's Workplace Rehabilitation program and actively support employees who are participating in rehabilitation.
- All employees are required to comply with this Fitness for Work Policy and the relevant company procedures that support this policy that are listed below. Failure to meet the requirement of this policy and its associated procedures will result in disciplinary action, up to, and including, dismissal.
  - TS-PRO-18 Workplace Rehabilitation
  - TS-PRO-19 Drug and Alcohol
  - TS-PRO-20 Code of Conduct
  - TS-PRO-22 Journey Management
  - TS-SOP-GEN009 Fatigue Management

Joe Dwyer
Executive General Manager
Dated: 18 April 2012

Appendix E - HSE End of Contract Report

Health Safety & Environment
End of Contract Report
Senex Energy
Lignum 3D
1 November - 31 January 2013

Client: Senex Energy

Location: Cooper Basin

TS Camp Coordinate – Lat: 27°32'36.38" Long 139°37'36.44"

170 km west north west of Moomba

Sub- Contractors
Terrex Contracting
RPS & Terrex Spatial
Slashers

HSE Advisors: Brad Harrison, Shannon Buck, Geoff Oswell, Charlie Portelli

Average Personnel: 49

BAC Tests Conducted: 2684

Preliminary Drug Tests Conducted: 17

Standard Operating Procedure Revisions: 7

JSA Revisions: 3

Summary:

Date	
21-Nov-12	Mobilise to Lignum 3D camp site
	Inductions performed on 10 personnel laying out the test line
	Risk assessment performed on Vibrators - guard rails to be constructed on rear landing and over wheel arches
22-Nov-12	Senex HSE Peter Huxford inducts all crew on survey plus Terrex site induction by HSEA Brad Harrison
23-Nov-12	Terrex HSE Coordinator, Geoff Oswell, to crew.
25-Nov-12	Safety Sunday - radio communications and call points for Lignum 3D
	Crew commences laying out spread
25-Nov-12	Incident - Cultural Heritage breach by TC dozer on lines 1300, 507 and 1306
26-Nov-12	Inspection of Terrex Contracting camp by Geoff Oswell
26-Nov-12	Incident - Oil spill by TC dozer - <1L
27-Nov-12	Audit of TC3 Camp by Senex HSE, Peter Huxford & G. Oswell.
28-Nov-12	HIR Card re: Vehicular near miss.
28-Nov-12	Senex HSE Peter Huxford departs & is replaced by Javis Selly.
30-Nov-12	Crew Cahnge personnel inducted by Javis Selly & G. Oswell - 5 persons.
1-Dec-12	General induction/discussion with Terrex Spatial surveyors.
	Induction B. Allsopp & T. Searl Surveyors.
2-Dec-12	Muster point assemble drill conducted prior to Safety Sunday
3-Dec-12	Two crew members taken to Moomba with eye complaints
4-Dec-12	Cultural Heritage breach on no go zone, crew stood down for investigation
5-Dec-12	Cultural Heritage stand down
7-Dec-12	return to work order given, crew stayed in camp while survey and dozer got ahead
8-Dec-12	crew returned to the field on restricted 8 hour days, waiting for cultural heritage monitors.
11-Dec-12	WAC team members staying in camp, tribal elders visit to inspect
14-Dec-12	Near miss car almost hit water truck on Snatcher Growler road
16-Dec-12	last day of shooting before Christmas
9-Jan-13	Terrex site reinduction for returning crew members and Senex project induction
	Crew commences laying out spread post Christmas shut down
10-Jan-13	Incident - graze to shin of Julien Goossens
12-Jan-13	Crew brought in from the field at 1pm as temp reached 54 degrees
13-Jan-13	Crew brought in from the field at 1pm as temp reached 49 degrees
17-Jan-13	Incident - chest pain reported by Ardi Webber
21-Jan-13	Crew brought in from the field at 3.30pm as temp reached 49 degrees
27-Jan-13	Vibes finished shooting out the job
30-Jan-13	Crew finished loading spread onto spread trailers, all pegs and pinnies picked up

Report compiled by:
Brad Harrison

Safety Statistics

Terrex Seismic Man-hours	70,584
Sub-Contractor Man-hours	26,040
Fatalities	0
LTI's	0
MTI's	1
Days since last MTI/LTI	64
First Aid Incidents	4
Incident / Accident Reports	10
Hazard Identification Reports	80
Training Hours	710.00
Tool Box/Safety Meeting Man/hrs	823.10
Audits / Inspections	740
Drills	1
Land Spills (< 5 litres)	1

Medical Statistics

Clinic Attendance	
Referral	0
Eye infections, Eye injuries, Eye irritation	3
Heat	3
GIT: Diarrhoea, Nausea, Vomiting	7
Headaches	9
Bites and Stings	0
Misc	1
Muscular Skeletal: Soft tissue injury, Sprain/Strain	2
Skin Conditions: Rash, Fungal Infection	3
Colds, Influenza type symptoms	3
Urinary Tract Infection	0
Wound Care: Lacerations, Dressings, Suture removal	3
Allergic Conditions	0
TOTAL	**34**

Appendix F - Personnel Crew List and Numbers

CREW LIST

Admin Staff	
Crew Manager	Shane Goossens
Crew Manager	David Keat
HSE Advisor Coordinator	Geoff Oswell
HSE Advisor	Brad Harrison
HSE Advisor	Shannon Buck
HSE Advisor Trainee	Charlie Portelli
Paramedic	John Katsis
Paramedic	Alex Hughes
Camp Staff	
Mechanic	Ben Madsen
Mechanic	Julien Goossens
Mechanic	Sean Phypers
Mechanic	Marco Paul
Mechanic	Rhys Klincke
Cook	Paul Barry
Cook	Kris Blizzard
Cook	Jamie Cuff
Kitchen Hand	Masako Iwasaki
Kitchen Hand	Toni Baird
Supply	Robert Anderson
Supply	Jamie Cuff
Supply	Damien Williams
Supply	Daniel Gratton
Supply	Greg Harris
Campy	Susan Lewis
Campy	Melanie Schweiger
Campy	Sjaan Scadding
Technical	
Observer	Mike Coughlin
Observer	Mardon Day
Cable Repair	Daniel French
Cable Repair	Les Grainger

Vibrator Crew	
Vibe Op	Alan Fuller
Vibe Op	Peter Cust
Vibe Op	John-Paul Mullaly
Vibe Op	Barry Jeffrey
Vibe Op	Sophie Tuhua
Vibe Op	Shane DeSilva
Vibe Op	Daniel Gratton
Vibe Op	Peter Santos
Vibe Op	Damien Williams
Vibe Op	Andrew Ribar
Vibe Op	Melanie Schweiger
Vibrator Technical	
Vibe Tech	Stuart Rauckman
Vibe Tech	Marco Paul
Senior Line	
Line Boss	Adam Cameron
Line Boss	William Smith
Troubleshooter	
Troubleshooter	Kane Minion
Troubleshooter	Dylan Hobson
Troubleshooter	Matthew Charles
Troubleshooter	William Smith
Troubleshooter	Nathan Orchard
Troubleshooter	John Gamble
Troubleshooter	Carlo Paul
Troubleshooter	Ryan Newbould

Line Crew	
Line Crew	Toni Baird
Line Crew	Paul Barry
Line Crew	Nicholas Blumer
Line Crew	Max Broome
Line Crew	Sophie Carter
Line Crew	Teneal Coad
Line Crew	Lachlan De Brenni
Line Crew	Earl Down
Line Crew	Elias Dyball
Line Crew	Jason Eade
Line Crew	Steven Ford
Line Crew	Maxime Gazeau
Line Crew	John Gamble

Line Crew	
Line Crew	Andria Gibson
Line Crew	Jamie Goodwill
Line Crew	Ben Greaney
Line Crew	Jarrod Hepi
Line Crew	Dylan Hobson
Line Crew	Rob Homer
Line Crew	Chris Hynes
Line Crew	Navneet Jain
Line Crew	Alex Johnson
Line Crew	Alex Kerr
Line Crew	Jack Kruger
Line Crew	Susan Lewis
Line Crew	Sherry Mallory
Line Crew	Greg Marsh
Line Crew	Kevin McKenzie
Line Crew	Scott McQuade
Line Crew	Kane Minion
Line Crew	Adam Nugent
Line Crew	Jake O'Connell
Line Crew	Nathan Orchard
Line Crew	Ben Palmer
Line Crew	Ebony Polley
Line Crew	Carlo Paul
Line Crew	Russell Quickfall
Line Crew	Johan Quinot
Line Crew	Andrew Ribar
Line Crew	Zac Richards
Line Crew	Hamish Rogers
Line Crew	Francois Roux
Line Crew	Sjaan Scadding
Line Crew	Justin Selter
Line Crew	Jayme Taylor
Line Crew	Lewis Thomas
Line Crew	Mark Toese
Line Crew	Zachary Travers
Line Crew	Belinda Tubman
Line Crew	Danielle Walker
Line Crew	Ardi Webber
Line Crew	Steven Weare
Line Crew	Anthony Willis
Line Crew	Shae Wishart

CREW NUMBERS

POSITION	NUMBERS
Crew Manager	1-2
HSE Advisor	1-2
Paramedic	1
Mechanic	1-3
Cook	2
Kitchen Hand	1
Supply	1-2
Campy	1-2
Observer	1-2
Cable Repair	1-2
Vib Crew	5-6
Vib Tech	1
Line Boss	1
Trouble Shooter	2
Line Crew	24-32

Appendix G - Recording Statistics

Charge Summary

	WT													ST						DT					NCT								TOTALS											
	Initial Layout	Recording	Sweep Tests	QC Daily Tests	Recorder Moveup	Spread Damage	Detours	Travel	Waiting on Spread	Traverse Move	Swath Move	Spread Security	Other	Total Work Time	Inductions	Toolbox	Initial Layout	Weather	Other	Total Standby Time	Troubleshooting	Recorder Down	Vibes Down	Total Down Time	Camp Setup	Initial Layout	Sweep Tests	Vibes Down	Prospect / Camp Move	Other	Total Non-Charge Time	Total Hours	Total Hours TD	VPs	VPs TD	Skips	Skips TD	LKm	LKm TD	SqKm	SqKm TD	Charge Hours	Charge Hours TD
21-11																0.30				0.30					6.00	3.20			2.50		11.70	12.00	12.00									0.30	0.30
22-11								1.50						1.50	1.00	0.30				1.30							8.50				8.50	11.30	23.30									2.80	3.10
23-11			0.80	0.70				1.30						2.80		0.30				0.30	0.70			0.70						7.20	7.20	11.00	34.30									3.10	6.20
24-11																0.30				0.30										9.70	9.70	10.00	44.30									0.30	6.50
25-11								1.20						1.20		0.30				0.30						11.00					11.00	12.50	56.80									1.50	8.00
26-11								1.00						1.00		0.30				0.30						11.20					11.20	12.50	69.30									1.30	9.30
27-11		4.70		2.50		0.60		1.00						8.80		0.30		1.00	0.10	1.40						2.30					2.30	12.50	81.80	432	432			21.6000	21.6000	5.3967	5.3967	10.20	19.50
28-11		11.60		0.10		0.60		1.00		0.20				13.50		0.30				0.30			0.10	0.10								13.90	95.70	1157	1589	1	1	57.9000	79.5000	14.4663	19.8630	13.80	33.30
29-11		9.50		0.20		0.70	0.10	1.00		0.50				12.00		0.30				0.30		0.20	0.40	0.60								12.90	108.60	873	2462	2	3	43.7500	123.2500	10.9309	30.7939	12.30	45.60
30-11		8.60		0.10		2.00		1.20		0.50				12.40		0.30				0.30		0.10	0.10	0.20								12.90	121.50	731	3193	1	4	36.6000	159.8500	9.1445	39.9383	12.70	58.30
01-12		6.70		0.10		1.10		1.00		0.50			2.40	11.80		0.30				0.30	0.50	0.10	0.20	0.80								12.90	134.40	592	3785	14	18	30.3000	190.1500	7.5704	47.5088	12.10	70.40
02-12		7.30		0.10	0.90	0.80	0.90	0.90		0.80				11.70		0.60				0.60		0.10	0.10	0.20					0.50	0.50	13.00	147.40	636	4421	42	60	33.9000	224.0500	8.4699	55.9786	12.30	82.70
03-12					1.00			0.90						1.90		0.30				0.30									9.50	9.50	11.70	159.10		4421		60		224.0500		55.9786	2.20	84.90
04-12								1.00						1.00		0.30				0.30									8.70	8.70	10.00	169.10		4421		60		224.0500		55.9786	1.30	86.20
05-12																0.30				0.30									9.70	9.70	10.00	179.10		4421		60		224.0500		55.9786	0.30	86.50
06-12																0.30				0.30									9.70	9.70	10.00	189.10		4421		60		224.0500		55.9786	0.30	86.80
07-12								1.00					6.70	7.70		0.30				0.30											8.00	197.10		4421		60		224.0500		55.9786	8.00	94.80
08-12								1.00					6.70	7.70		0.30				0.30											8.00	205.10		4421		60		224.0500		55.9786	8.00	102.80
09-12		5.30				1.60		0.80						7.70		0.30				0.30											8.00	213.10	400	4821	8	68	20.4000	244.4500	5.0969	61.0756	8.00	110.80
10-12		5.50		0.10		0.50		0.90		0.60				7.60		0.30				0.30	0.20			0.20							8.10	221.20	438	5259	13	81	22.5500	267.0000	5.6341	66.7097	7.90	118.70
11-12		9.50		0.10		0.50	0.30	1.00		0.90				12.30		0.30				0.30	0.90			0.90							13.50	234.70	834	6093	41	122	43.7500	310.7500	10.9309	77.6405	12.60	131.30
12-12		9.00		0.10		1.90		0.90		1.30				13.20		0.30				0.30	0.50			0.50							14.00	248.70	814	6907	44	166	42.9000	353.6500	10.7185	88.3591	13.50	144.80
13-12		10.40		0.10		0.60	0.10	0.80		1.60				13.60		0.30				0.30											13.90	262.60	927	7834	87	253	50.7000	404.3500	12.6673	101.0264	13.90	158.70
14-12		8.20				1.20	0.50	0.90		2.10				12.90		0.30				0.30	0.50			0.50							13.70	276.30	755	8589	55	308	40.5000	444.8500	10.1189	111.1453	13.20	171.90
15-12		8.30		0.10		0.80	0.60	0.80	0.30	2.30				13.20		0.30		0.20		0.50	0.20			0.20							13.90	290.20	835	9424	7	315	42.1000	486.9500	10.5186	121.6639	13.70	185.60
16-12		10.40		0.10		1.10	0.40	0.80		0.90				13.70		0.30				0.30	0.40			0.40							14.40	304.60	1047	10471	7	322	52.7000	539.6500	13.1670	134.8309	14.00	199.60
17-12																0.30	12.70			13.00											13.00	317.60		10471		322		539.6500		134.8309	13.00	212.60
18-12																0.50	11.50			12.00											12.00	329.60		10471		322		539.6500		134.8309	12.00	224.60
19-12																0.30	8.70			9.00											9.00	338.60		10471		322		539.6500		134.8309	9.00	233.60
09-01								1.00						1.00	0.50	0.30	11.00			11.80											12.80	351.40		10471		322		539.6500		134.8309	12.80	246.40
10-01								1.70						1.70		0.30	11.50			11.80											13.50	364.90		10471		322		539.6500		134.8309	13.50	259.90
11-01								0.50						0.50		0.30	12.40			12.70											13.20	378.10		10471		322		539.6500		134.8309	13.20	273.10
12-01		3.30	0.10				0.30	0.60		0.40				4.70		0.30	3.50	1.50		5.30			1.10	1.10							11.10	389.20	293	10764		322	14.6500	554.3000	3.6603	138.4912	10.00	283.10
13-01		10.80				0.80		0.60		1.00				13.20		0.30				0.30									0.10	0.10	13.60	402.80	1025	11789	20	342	52.2500	606.5500	13.0546	151.5458	13.50	296.60
14-01		10.90				0.30	0.20	0.60		1.20				13.20		0.30				0.30	0.20			0.20							13.70	416.50	1046	12835	16	358	53.1000	659.6500	13.2670	164.8128	13.50	310.10
15-01		11.40			0.20	0.20		0.50		0.60				12.90		0.30				0.30		0.50		0.50							13.70	430.20	1098	13933	18	376	55.8000	715.4500	13.9416	178.7544	13.20	323.30
16-01		9.90			0.50	1.10		0.30		0.10				11.90		0.30				0.30	0.60			0.60							12.80	443.00	933	14866	3	379	46.8000	762.2500	11.6929	190.4473	12.20	335.50
17-01		9.00				1.40	0.50	0.60		0.40	0.30			12.20		0.30				0.30		0.20		0.20							12.70	455.70	846	15712		379	42.3000	804.5500	10.5686	201.0159	12.50	348.00
18-01		8.00				0.50	0.90	0.60		0.50				10.50		0.30				0.30											10.80	466.50	769	16481		379	38.4500	843.0000	9.6067	210.6226	10.80	358.80
19-01		10.00				0.60	0.30	0.60		0.30				11.80		0.30				0.30	0.50			0.50							12.60	479.10	1025	17506		379	51.2500	894.2500	12.8048	223.4274	12.10	370.90
20-01		10.40				0.70	0.20	0.60		0.40				12.30		0.30				0.30	0.20			0.20							12.80	491.90	1062	18568		379	53.1000	947.3500	13.2670	236.6943	12.60	383.50
21-01		6.90			1.30	1.10	0.10	0.90		0.30				10.60		0.30				0.30	0.70	0.20		0.90							11.80	503.70	642	19210		379	32.1000	979.4500	8.0201	244.7145	10.90	394.40
22-01		10.00			0.50	0.40		1.00		0.30				12.20		0.30				0.30		0.10		0.10							12.60	516.30	828	20038		379	41.4000	1020.8500	10.3437	255.0582	12.50	406.90
23-01		9.20				2.00		1.00		0.10				12.30		0.30				0.30	0.20			0.20							12.80	529.10	849	20887	3	382	42.6000	1063.4500	10.6436	265.7018	12.60	419.50
24-01		8.90				2.00		1.00						11.90		0.30				0.30		0.10		0.10							12.30	541.40	897	21784	19	401	45.8000	1109.2500	11.4431	277.1449	12.20	431.70
25-01		9.80				1.00		1.00		0.40				12.20		0.30				0.30											12.50	553.90	1001	22785	3	404	50.2000	1159.4500	12.5424	289.6873	12.50	444.20
26-01		10.30				0.90		1.00						12.20		0.30				0.30											12.50	566.40	1032	23817		404	51.6000	1211.0500	12.8922	302.5795	12.50	456.70
27-01		10.90				0.50		1.00						12.40		0.30				0.30	0.10			0.10							12.80	579.20	1122	24939		404	56.1000	1267.1500	14.0165	316.5960	12.70	469.40
28-01	9.20							1.00						10.20		0.30				0.30											10.50	589.70		24939		404		1267.1500		316.5960	10.50	479.90
29-01	9.70							1.00						10.70		0.30				0.30											11.00	600.70		24939		404		1267.1500		316.5960	11.00	490.90
30-01	2.00													2.00		0.30				0.30											2.30	603.00		24939		404		1267.1500		316.5960	2.30	493.20
Grand Total	**20.90**	**264.70**	**0.90**	**4.40**	**4.40**	**27.50**	**5.40**	**39.00**	**0.30**	**18.20**	**0.30**		**15.80**	**401.80**	**1.50**	**15.80**	**71.30**	**2.70**	**0.10**	**91.40**	**6.40**	**1.60**	**2.00**	**10.00**	**6.00**	**27.70**	**8.50**		**2.50**	**55.10**	**99.80**	**603.00**	**15717.90**	**24939**	**525363**	**404**	**11271**	**1267.1500**		**316.5960**		**493.20**	**11053.40**

Appendix H - Survey Daily Reports

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	30/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
						0.0000	0.0000			
						0.0000	0.0000			
Daily Total						-	-	-	-	-
Cum Total						1,267.1500	316.5960	404	24,939	-

Cum.L.Km	1267.1500
Pgm.L.Km:	1240.7500
L.Km.Remain:	-26.4000
% Completed:	102%
Av Daily Prod L.Km:	19.5
Cum.Sq.Km	316.5960
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	-6.5960
% Completed:	102%
Av Daily Prod Sq.Km:	4.9

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up	2.00					2.00	2.00
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	2.00	0.30	-	-	-	2.30	2.30
CUM TOTAL	401.80	91.40	10.00	99.80	-	603.00	493.20

Client :	0	*Visitor's :*	
Field Crew :	25		
Camp Crew :	11	*Light Vehicles :*	
Total Crew :	36	*Heavy Vehicles :*	

COMMENTS:

* Temperatures dropped due to a cool change from the South, Max temp 37 degrees

* Line crew continued and completed loading & counting spread at staging area
* Continued de-pegging

* Client rep - Pat Mee outbound to Brisbane
* 11 x Personnel outbound from Moomba, 3 x Inbound

Spread Movement:

Client:	Lignum 3D			Date:	Wednesday, 30 January 2013		
Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
		Total Stations:	0			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 1 x HSE Plus; Meals & services
Personnel:
Vehicle:
Meals:

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	
Traffic Control: *Vehicles* 0	**Personnel:** 0	

Camp Location/Co-ords : 27' 32'36" Lat, 139' 37'36" Long

Weather : **Hot/Sunny** **17 - 37⁰**

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	29/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
						0.0000	0.0000			
						0.0000	0.0000			
Daily Total						-	-	-	-	-
Cum Total						1,267.1500	316.5960	404	24,939	-

Cum.L.Km	1267.1500
Pgm.L.Km:	1240.7500
L.Km.Remain:	-26.4000
% Completed:	102%
Av Daily Prod L.Km:	19.8
Cum.Sq.Km	316.5960
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	-6.5960
% Completed:	102%
Av Daily Prod Sq.Km:	4.9

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up	9.70					9.70	9.70
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	10.70	0.30	-	-	-	11.00	11.00
CUM TOTAL	399.80	91.10	10.00	99.80	-	600.70	490.90

Client :	1	*Visitor's :*	
Field Crew :	34		
Camp Crew :	10	*Light Vehicles :*	
Total Crew :	44	*Heavy Vehicles :*	

COMMENTS:

* Temperatures dropped due to a cool change from the South, Max temp 37 degrees

* Line crew continued loading & counting spread at staging area
* Continued de-pegging

EXTRAS: 1 x HSE Plus; Meals & services

Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27' 32'36" Lat, 139' 37'36" Long

Weather : **Hot/Sunny** **17 - 37⁰**

Spread Movement:

Client: Lignum 3D | Date: Tuesday, 29 January 2013

Layout Line	Layout Station #	Layout Station #	Layout Total	Pickup Line	Pickup Station #	Pickup Station #	Pickup Total
		Total Stations:	0			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	Vib Crew:	Back Crew:	Signage:
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	Security:	Comments:
Personnel:	Personnel:	
Traffic Control: Vehicles 0	Personnel: 0	

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	27/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5005-5145			1,047.0	1,042.0	98	6.0000	1.4991		120	
5005-5140			1,041.0	1,036.0	99	6.0000	1.4991		120	
5005-5135			1,035.0	1,030.0	100	8.1000	2.0238		162	
5005-5130			1,029.0	1,024.0	101	7.8000	1.9488		156	
5005-5125			1,023.0	1,018.0	102	7.5000	1.8739		150	
5005-5120			1,017.0	1,012.0	103	7.2000	1.7989		144	
5005-5115			1,011.0	1,006.0	104	6.9000	1.7240		138	
5005-5110			1,005.0	1,000.0	105	6.6000	1.6490		132	
Daily Total						**56.1000**	**14.0165**	**-**	**1,122**	**-**
Cum Total						**1,267.1500**	**316.5960**	**404**	**24,939**	**-**

Cum.L.Km	1267.1500
Pgm.L.Km:	1240.7500
L.Km.Remain:	-26.4000
% Completed:	102%
Av Daily Prod L.Km:	20.4
Cum.Sq.Km	316.5960
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	-6.5960
% Completed:	102%
Av Daily Prod Sq.Km:	5.1

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.90					10.90	10.90
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.50					0.50	0.50
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.10			0.10	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.40**	**0.30**	**0.10**	**-**	**-**	**12.80**	**12.70**
CUM TOTAL	**378.90**	**90.50**	**10.00**	**99.80**	**-**	**579.20**	**469.40**

Client :	2	***Visitor's :***	2
Field Crew :	34		
Camp Crew :	10	***Light Vehicles :***	
Total Crew :	44	***Heavy Vehicles :***	

COMMENTS:

* Recording completed on the Lignum 3D
* 0.5 "Damage" due to cattle dragging geophones and cable overnight
large amount of cattle attacking the spread around the creek areas
* 0.1 "T/Shoot" Line break
* Temperatures dropped due to a cool change from the South, Max temp 35 degrees
* Line crew continued loading & counting spread at staging area
* Total Km's updated with final survey data

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Hot/Sunny 23 - 35°

Spread Movement:

Client: Lignum 3D — Date: Sunday, 27 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1108	5259	5120	140
				1102	5149	5000	150
				1096	5149	5000	150
				1090	5139	5000	140
				1084	5139	5000	140
				1078	5139	5000	140
				1072	5153	5000	154
				1066	5153	5000	154
				1102	5259	5195	65
				1096	5259	5195	65
		Total Stations:	**0**			**Total Stations:**	**1298**
		Bad Cables	3			Bad Phones	2
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	26/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5005-5150			1,083.0	1,078.0	92	4.5000	1.1243		90	
5005-5155			1,077.0	1,072.0	93	4.8000	1.1993		96	
5005-5155			1,071.0	1,066.0	94	9.6000	2.3985		192	
5005-5155			1,065.0	1,060.0	95	9.6000	2.3985		192	
5005-5150			1,059.0	1,054.0	96	9.3000	2.3236		186	
5005-5145			1,053.0	1,048.0	97	8.7000	2.1737		174	
5005-5145			1,047.0	1,042.0	98	2.7000	0.6746		54	
5005-5140			1,041.0	1,036.0	99	2.4000	0.5996		48	
Daily Total						**51.6000**	**12.8922**	**-**	**1,032**	**-**
Cum Total						**1,211.0500**	**302.5795**	**404**	**23,817**	**-**

Cum.L.Km	1211.0500
Pgm.L.Km:	1240.7500
L.Km.Remain:	29.7000
% Completed:	98%
Av Daily Prod L.Km:	19.9
Cum.Sq.Km	302.5795
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	7.4205
% Completed:	98%
Av Daily Prod Sq.Km:	5.0

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.30					10.30	10.30
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.90					0.90	0.90
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.20**	**0.30**	**-**	**-**	**-**	**12.50**	**12.50**
CUM TOTAL	**366.50**	**90.20**	**9.90**	**99.80**	**-**	**566.40**	**456.70**

Client :	2	***Visitor's :***	2
Field Crew :	34		
Camp Crew :	10	***Light Vehicles :***	
Total Crew :	44	***Heavy Vehicles :***	

COMMENTS:

* 0.9 "Damage" due to cattle dragging geophones and cable overnight
large amount of cattle attacking the spread around the creek areas

* Temperatures dropped due to a cool change from the South, Max temp 40 degrees

* Line crew continued loading & counting spread at staging area
* 1 x personnel to crew 403 via Innaminka

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Hot/Sunny 27 - 40°

Spread Movement:

Client: Lignum 3D **Date:** Saturday, 26 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1138	5259	5000	260
				1132	5259	5000	260
				1126	5259	5000	260
				1120	5259	5000	260
				1114	5259	5000	260
				1108	5120	5000	121
		Total Stations:	**0**			**Total Stations:**	**1421**
		Bad Cables	3			Bad Phones	5
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	25/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5005-5260			1,107.0	1,102.0	88	11.2000	2.7983		224	
5005-5260			1,101.0	1,096.0	89	10.8000	2.6984		216	
5005-5150			1,095.0	1,090.0	90	9.3000	2.3236		186	
5005-5150			1,089.0	1,084.0	91	9.3000	2.3236	3	183	
5005-5150			1,083.0	1,078.0	92	4.8000	1.1993		96	
5005-5155			1,077.0	1,072.0	93	4.8000	1.1993		96	
Daily Total						**50.2000**	**12.5424**	**3**	**1,001**	**-**
Cum Total						**1,159.4500**	**289.6873**	**404**	**22,785**	**-**

Cum.L.Km	1159.4500
Pgm.L.Km:	1240.7500
L.Km.Remain:	81.3000
% Completed:	93%
Av Daily Prod L.Km:	19.3
Cum.Sq.Km	289.6873
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	20.3127
% Completed:	93%
Av Daily Prod Sq.Km:	4.8

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	9.80					9.80	9.80
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	1.00					1.00	1.00
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.40					0.40	0.40
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.20**	**0.30**	**-**	**-**	**-**	**12.50**	**12.50**
CUM TOTAL	**354.30**	**89.90**	**9.90**	**99.80**	**-**	**553.90**	**444.20**

Client :	2	***Visitor's :***	2
Field Crew :	35		
Camp Crew :	10	***Light Vehicles :***	
Total Crew :	45	***Heavy Vehicles :***	

COMMENTS:

* 1.0 "Damage" due to cattle dragging geophones and cable overnight large amount of cattle attacking the spread around the creek areas
* 3 x skips for creek area
* Temperatures still high, Max temp 46 degrees
* Camp Generator still struggling with extreme heat
* Line crew continued loading & counting spread at staging area
* Crew change 9 x personnel outbound from Birdsville

Spread Movement:

Client:	Lignum 3D			Date:	Friday, 25 January 2013		
Layout				**Pickup**			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1162	5259	5000	260
				1156	5259	5000	260
				1150	5259	5000	260
				1144	5259	5000	260
		Total Stations:	**0**			**Total Stations:**	**1040**
		Bad Cables	4			Bad Phones	7
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Hot/Sunny 29 - 46°

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Pat Mee	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Hot/Sunny	**Est. Finish**	27/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	24/01/2013	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5005-5260			1,131.0	1,126.0	84	4.5000	1.1243		90	
5005-5260			1,125.0	1,120.0	85	4.5000	1.1243		90	
5005-5260			1,119.0	1,114.0	86	15.9000	3.9726		318	
5005-5260			1,113.0	1,108.0	87	15.9000	3.9726	1	317	
5005-5260			1,107.0	1,102.0	88	2.3000	0.5747	10	36	
5005-5260			1,101.0	1,096.0	89	2.7000	0.6746	8	46	
Daily Total						**45.8000**	**11.4431**	**19**	**897**	**-**
Cum Total						**1,109.2500**	**277.1449**	**401**	**21,784**	**-**

Cum.L.Km	**1109.2500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**131.5000**
% Completed:	**89%**
Av Daily Prod L.Km:	**18.8**
Cum.Sq.Km	**277.1449**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**32.8551**
% Completed:	**89%**
Av Daily Prod Sq.Km:	**4.7**

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	8.90					8.90	8.90
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	2.00					2.00	2.00
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down			0.10			0.10	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**11.90**	**0.30**	**0.10**	**-**	**-**	**12.30**	**12.20**
CUM TOTAL	**342.10**	**89.60**	**9.90**	**99.80**	**-**	**541.40**	**431.70**

Client :	2	***Visitor's :***	2
Field Crew :	42		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* 2.0 "Damage" due to camels and cattle dragging geophones and cable overnight large amount of cattle attacking the spread around the creek areas
* 0.1 "Recorder" Spread crashed, reboot
* Temperatures still high, Max temp 46 degrees
* Camp Generator still struggling with extreme heat

* Line completed laying spread, trailers moved to staging area for loading

Spread Movement:

Client: Lignum 3D **Date:** Thursday, 24 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1036	5140	5100	41	1174	5259	5030	230
1030	5135	5005	131	1168	5259	5030	230
1024	5130	5005	126				
1018	5125	5005	121				
1012	5120	5005	116				
1006	5115	5005	111				
1000	5110	5005	106				
		Total Stations:	**752**			**Total Stations:**	**460**
		Bad Cables	3			Bad Phones	6
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **27 - 46°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	23/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5005-5260			1,143.0	1,138.0	82	9.9000	2.4735		198	
5005-5260			1,137.0	1,132.0	83	9.9000	2.4735		198	
5005-5260			1,131.0	1,126.0	84	11.4000	2.8483	3	225	
5005-5260			1,125.0	1,120.0	85	11.4000	2.8483		228	
Daily Total						**42.6000**	**10.6436**	**3**	**849**	**-**
Cum Total						**1,063.4500**	**265.7018**	**382**	**20,887**	**-**

Cum.L.Km	1063.4500
Pgm.L.Km:	1240.7500
L.Km.Remain:	177.3000
% Completed:	86%
Av Daily Prod L.Km:	18.3
Cum.Sq.Km	265.7018
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	44.2982
% Completed:	86%
Av Daily Prod Sq.Km:	4.6

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	9.20					9.20	9.20
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	2.00					2.00	2.00
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.20			0.20	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.10					0.10	0.10
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.30**	**0.30**	**0.20**	**-**	**-**	**12.80**	**12.60**
CUM TOTAL	**330.20**	**89.30**	**9.80**	**99.80**	**-**	**529.10**	**419.50**

Client :	2	***Visitor's :***	2
Field Crew :	42		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* 2.0 "Damage" due to camels and cattle dragging geophones and cable overnight large amount of cattle attacking the spread around the creek areas
* 0.2 "T/shoot" Bad Laul, transmission problems
* Temperatures still high, Max temp 45 degrees late afternoon
* Camp Generator still struggling with extreme heat

Spread Movement:

Client: Lignum 3D — Date: Wednesday, 23 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1054	5144	5000	145	1192	5259	5030	230
1048	5144	5000	145	1186	5259	5030	230
1042	5144	5000	145	1180	5259	5030	230
1036	5100	5000	101				
		Total Stations:	**536**			**Total Stations:**	**690**
		Bad Cables	4			Bad Phones	5
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat, 139° 37'36" Long

Weather : Hot/Sunny 28 - 45°

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Pat Mee	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Hot/Sunny	**Est. Finish**	27/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	22/01/2013	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5005-5260			1,155.0	1,150.0	80	14.7000	3.6728		294	
5005-5260			1,149.0	1,144.0	81	14.7000	3.6728		294	
5005-5260			1,143.0	1,138.0	82	6.0000	1.4991		120	
5005-5260			1,137.0	1,132.0	83	6.0000	1.4991		120	
Daily Total						**41.4000**	**10.3437**	**-**	**828**	**-**
Cum Total						**1,020.8500**	**255.0582**	**379**	**20,038**	**-**

Cum.L.Km	**1020.8500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**219.9000**
% Completed:	**82%**
Av Daily Prod L.Km:	**17.9**
Cum.Sq.Km	**255.0582**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**54.9418**
% Completed:	**82%**
Av Daily Prod Sq.Km:	**4.5**

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.00					10.00	10.00
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup	0.50					0.50	0.50
Spread Damage / Chewage	0.40					0.40	0.40
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down			0.10			0.10	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.30					0.30	0.30
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.20**	**0.30**	**0.10**	**-**	**-**	**12.60**	**12.50**
CUM TOTAL	**317.90**	**89.00**	**9.60**	**99.80**	**-**	**516.30**	**406.90**

Client :	2	***Visitor's :***	2
Field Crew :	42		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* 0.4 "Damage" due to camels and cattle dragging geophones and cable overnight
* 0.5 "Recorder move completed
* 0.1 "Recorder" System reboot
* Temperatures still high, Max temp 46 degrees late afternoon

Spread Movement:

Client: Lignum 3D **Date:** Tuesday, 22 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1078	5149	5000	150	1210	5259	5030	230
1072	5153	5000	154	1204	5259	5030	230
1066	5153	5000	154	1198	5259	5030	230
1060	5153	5000	154				
		Total Stations:	**612**			**Total Stations:**	**690**
		Bad Cables	8			Bad Phones	10
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Camp Location/Co-ords : 27° 32'36" Lat, 139° 37'36" Long

Weather : **Hot/Sunny** **26 - 46°**

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	21/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5005-5260			1,167.0	1,162.0	78	14.1500	3.5354		283	
5005-5260			1,161.0	1,156.0	79	15.5500	3.8852		311	
5005-5260			1,155.0	1,150.0	80	1.2000	0.2998		24	
5005-5260			1,149.0	1,144.0	81	1.2000	0.2998		24	
Daily Total						**32.1000**	**8.0201**	**-**	**642**	**-**
Cum Total						**979.4500**	**244.7145**	**379**	**19,210**	**-**

Cum.L.Km	979.4500
Pgm.L.Km:	1240.7500
L.Km.Remain:	261.3000
% Completed:	79%
Av Daily Prod L.Km:	17.5
Cum.Sq.Km	244.7145
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	65.2855
% Completed:	79%
Av Daily Prod Sq.Km:	4.4

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	6.90					6.90	6.90
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup	1.30					1.30	1.30
Spread Damage / Chewage	1.10					1.10	1.10
Detours	0.10					0.10	0.10
Travel	0.90					0.90	0.90
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.70			0.70	-
Recorder Down			0.20			0.20	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.30					0.30	0.30
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**10.60**	**0.30**	**0.90**	**-**	**-**	**11.80**	**10.90**
CUM TOTAL	**305.70**	**88.70**	**9.50**	**99.80**	**-**	**503.70**	**394.40**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	53	***Heavy Vehicles :***	

COMMENTS:

* 1.1 "Damage" due to camels and cattle dragging geophones and cable overnight
* .7 "T/Shooting" due to line breaks
* .2 "Recorder" System reboot
* Crew returned to camp at 3.30pm due to extreme heat, max 48 degrees
* Partial recorder move, will complete move tomorrow

* 1 x personnel outbound from Moomba

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **29 - 48°**

Spread Movement:

Client: Lignum 3D **Date:** Monday, 21 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1102	5149	5100	50	1422	5234	5025	210
1096	5149	5000	150	1416	5234	5025	210
1090	5149	5000	150				
1084	5149	5000	150				
1102	5259	5195	65				
1096	5259	5195	65				
Total Stations:			**630**	**Total Stations:**			**420**
Bad Cables			4	Bad Phones			5
				LAUL			0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	20/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5030-5260			1,191.0	1,186.0	74	10.5000	2.6234		210	
5005-5260			1,185.0	1,180.0	75	10.8000	2.6984		216	
5005-5260			1,179.0	1,174.0	76	13.8000	3.4479		276	
5005-5260			1,173.0	1,168.0	77	15.9000	3.9726		318	
5005-5260			1,167.0	1,162.0	78	1.7500	0.4372		35	
5005-5260			1,161.0	1,156.0	79	0.3500	0.0874		7	
Daily Total						**53.1000**	**13.2670**	**-**	**1,062**	**-**
Cum Total						**947.3500**	**236.6943**	**379**	**18,568**	**-**

Cum.L.Km	947.3500
Pgm.L.Km:	1240.7500
L.Km.Remain:	293.4000
% Completed:	76%
Av Daily Prod L.Km:	17.2
Cum.Sq.Km	236.6943
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	73.3057
% Completed:	76%
Av Daily Prod Sq.Km:	4.3

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.40					10.40	10.40
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.70					0.70	0.70
Detours	0.20					0.20	0.20
Travel	0.60					0.60	0.60
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.20			0.20	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.40					0.40	0.40
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.30**	**0.30**	**0.20**	**-**	**-**	**12.80**	**12.60**
CUM TOTAL	**295.10**	**88.40**	**8.60**	**99.80**	**-**	**491.90**	**383.50**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* Great production day
* .7 "Damage" due to camels and cattle dragging geophones and cable overnight
* .2 "T/Shooting" due to line breaks

* Camp generator still struggling in extreme heat, max 44 degrees

Spread Movement:

Client: Lignum 3D **Date:** Sunday, 20 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1120	5039	5000	40	1440	5234	5025	210
1114	5259	5000	260	1434	5234	5025	210
1108	5259	5000	260	1428	5234	5025	210
1102	5100	5000	101				
		Total Stations:	**661**			**Total Stations:**	**630**
		Bad Cables	4			Bad Phones	4
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **27 - 44°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Pat Mee	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Hot/Sunny	**Est. Finish**	27/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	19/01/2013	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5030-5235			1,215.0	1,210.0	70	5.3500	1.3367		107	
5030-5260			1,209.0	1,204.0	71	6.9000	1.7240		138	
5030-5260			1,203.0	1,198.0	72	14.1000	3.5229		282	
5030-5260			1,197.0	1,192.0	73	14.1000	3.5229		282	
5030-5260			1,191.0	1,186.0	74	3.6000	0.8995		72	
5005-5260			1,185.0	1,180.0	75	5.1000	1.2742		102	
5005-5260			1,179.0	1,174.0	76	2.1000	0.5247		42	
Daily Total						**51.2500**	**12.8048**	**-**	**1,025**	**-**
Cum Total						**894.2500**	**223.4274**	**379**	**17,506**	**-**

Cum.L.Km	**894.2500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**346.5000**
% Completed:	**72%**
Av Daily Prod L.Km:	**16.6**
Cum.Sq.Km	**223.4274**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**86.5726**
% Completed:	**72%**
Av Daily Prod Sq.Km:	**4.1**

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.00					10.00	10.00
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.60					0.60	0.60
Detours	0.30					0.30	0.30
Travel	0.60					0.60	0.60
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.50			0.50	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.30					0.30	0.30
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**11.80**	**0.30**	**0.50**	**-**	**-**	**12.60**	**12.10**
CUM TOTAL	**282.80**	**88.10**	**8.40**	**99.80**	**-**	**479.10**	**370.90**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* .6 "Damage" due to camels and cattle dragging geophones and cable overnight
* .5 "T/Shooting" due to line breaks and vibrators damaging a cable
* .3 "Detours" due to large soft dunes and fenceline
* Camp generator still struggling in extreme heat, max 40 degrees

Spread Movement:

Client: Lignum 3D **Date:** Saturday, 19 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1138	5259	5144	116	1270	5234	5025	210
1132	5259	5000	260	1264	5234	5025	210
1126	5259	5000	260	1258	5234	5025	210
1120	5259	5039	221	1252	5234	5030	205
				1246	5234	5030	205
		Total Stations:	**857**			**Total Stations:**	**1040**
		Bad Cables	6			Bad Phones	7
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **30 - 40°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	27/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	18/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5025-5325			1,227.0	1,222.0	68	12.0000	2.9982		240	
5030-5325			1,221.0	1,216.0	69	12.0000	2.9982		240	
5030-5325			1,215.0	1,210.0	70	7.2500	1.8114		145	
5030-5360			1,209.0	1,204.0	71	7.2000	1.7989		144	
Daily Total						**38.4500**	**9.6067**	**-**	**769**	**-**
Cum Total						**843.0000**	**210.6226**	**379**	**16,481**	**-**

Cum.L.Km	843.0000
Pgm.L.Km:	1240.7500
L.Km.Remain:	397.7500
% Completed:	68%
Av Daily Prod L.Km:	15.9
Cum.Sq.Km	210.6226
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	99.3774
% Completed:	68%
Av Daily Prod Sq.Km:	4.0

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	8.00					8.00	8.00
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.50					0.50	0.50
Detours	0.90					0.90	0.90
Travel	0.60					0.60	0.60
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.50					0.50	0.50
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**10.50**	**0.30**	**-**	**-**	**-**	**10.80**	**10.80**
CUM TOTAL	**271.00**	**87.80**	**7.90**	**99.80**	**-**	**466.50**	**358.80**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* .5 "Damage" due to camels dragging geophones and cable overnight
*.9 "Detour" due to large, soft sand dunes
* Production shut down early due to extreme heat conditions, vibrators & line crew overheating
* Camp generator struggling in extreme heat, max 48 degrees

Spread Movement:

Client: Lignum 3D — Date: Friday, 18 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1156	5163	5000	164	1294	5127	5025	103
1150	5259	5000	260	1288	5234	5025	210
1144	5259	5000	260	1282	5234	5025	210
1138	5143	5000	144	1276	5234	5025	210
		Total Stations:	**828**			**Total Stations:**	**733**
		Bad Cables	3			Bad Phones	5
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **29 - 48°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Pat Mee	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Hot/Sunny	**Est. Finish**	29/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	Shane Goossens	**Date:**	17/01/2013	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5025-5325			1,251.0	1,246.0	64	8.1000	2.0238		162	
5030-5325			1,245.0	1,240.0	65	7.8000	1.9488		156	
5030-5325			1,239.0	1,234.0	66	12.6000	3.1481		252	
5030-5325			1,233.0	1,228.0	67	12.6000	3.1481		252	
5030-5325			1,227.0	1,222.0	68	0.6000	0.1499		12	
5030-5325			1,221.0	1,216.0	69	0.6000	0.1499		12	
Daily Total						**42.3000**	**10.5686**	**-**	**846**	**-**
Cum Total						**804.5500**	**201.0159**	**379**	**15,712**	**-**

Cum.L.Km	**804.5500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**436.2000**
% Completed:	**65%**
Av Daily Prod L.Km:	**15.5**
Cum.Sq.Km	**201.0159**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**108.9841**
% Completed:	**65%**
Av Daily Prod Sq.Km:	**3.9**

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	9.00					9.00	9.00
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	1.40					1.40	1.40
Detours	0.50					0.50	0.50
Travel	0.60					0.60	0.60
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down			0.20			0.20	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.40					0.40	0.40
Swath Move	0.30					0.30	0.30
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.20**	**0.30**	**0.20**	**-**	**-**	**12.70**	**12.50**
CUM TOTAL	**260.50**	**87.50**	**7.90**	**99.80**	**-**	**455.70**	**348.00**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* 1.4 "Damage" due to cattle dragging geophones overnight and chewed cables during the day
*.2 "Recorder Down" due to sytem crash - reset system
* Line crew sent in earlier due to hot & humid conditions
* Reduction in total day hours to minimise the chances of heat related issues
* Detour time due to soft sand dunes

Spread Movement:

Client: Lignum 3D **Date:** Thursday, 17 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1204	5123	5030	94	1330	5123	5025	99
1198	5259	5030	230	1324	5324	5025	300
1192	5259	5030	230	1318	5324	5025	300
1186	5259	5030	230	1312	5324	5025	300
1180	5259	5030	230	1306	5324	5224	101
1174	5039	5030	10				
		Total Stations:	**1024**			**Total Stations:**	**1100**
		Bad Cables	3			Bad Phones	4
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
2 x HSE Plus — Vehicle:
Meals & services — Meals:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **28 - 43°**

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Pat Mee	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Hot/Sunny	**Est. Finish**	29/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	Shane Goossens	**Date:**	16/01/2013	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5025-5325			1,275.0	1,270.0	60	5.7000	1.4241	3	111	
5025-5325			1,269.0	1,264.0	61	5.7000	1.4241		114	
5025-5325			1,263.0	1,258.0	62	12.9000	3.2231		258	
5025-5325			1,257.0	1,252.0	63	12.9000	3.2231		258	
5025-5325			1,251.0	1,246.0	64	4.8000	1.1993		96	
5030-5325			1,245.0	1,240.0	65	4.8000	1.1993		96	
Daily Total						**46.8000**	**11.6929**	**3**	**933**	**-**
Cum Total						**762.2500**	**190.4473**	**379**	**14,866**	**-**

Cum.L.Km	**762.2500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**478.5000**
% Completed:	**61%**
Av Daily Prod L.Km:	**14.9**
Cum.Sq.Km	**190.4473**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**119.5527**
% Completed:	**61%**
Av Daily Prod Sq.Km:	**3.7**

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	9.90					9.90	9.90
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup	0.50					0.50	0.50
Spread Damage / Chewage	1.10					1.10	1.10
Detours						-	-
Travel	0.30					0.30	0.30
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.60			0.60	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.10					0.10	0.10
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**11.90**	**0.30**	**0.60**	**-**	**-**	**12.80**	**12.20**
CUM TOTAL	**248.30**	**87.20**	**7.70**	**99.80**	**-**	**443.00**	**335.50**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* 1.1 "Damage" due to cattle dragging geophones overnight and chewed cables during the day
* .6 "Troubleshooting" due to intermittent cable problem
* Line crew sent in earlier due to hot & humid conditions
* Recorder moved continued from previous day

Spread Movement:

Client: Lignum 3D **Date:** Wednesday, 16 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1204	5123	5030	94	1330	5123	5025	99
1198	5259	5030	230	1324	5324	5025	300
1192	5259	5030	230	1318	5324	5025	300
1186	5259	5030	230	1312	5324	5025	300
1180	5259	5030	230	1306	5324	5224	101
1174	5039	5030	10				
		Total Stations:	**1024**			**Total Stations:**	**1100**
		Bad Cables	3			Bad Phones	4
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **26 - 41°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Pat Mee	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	30/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	15/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5025-5325			1,299.0	1,294.0	56	7.8000	1.9488	1	155	
5025-5325			1,293.0	1,288.0	57	7.8000	1.9488		156	
5025-5325			1,287.0	1,282.0	58	12.9000	3.2231	8	250	
5025-5325			1,281.0	1,276.0	59	12.9000	3.2231	9	249	
5025-5325			1,275.0	1,270.0	60	7.2000	1.7989		144	
5025-5325			1,269.0	1,264.0	61	7.2000	1.7989		144	
Daily Total						**55.8000**	**13.9416**	**18**	**1,098**	**-**
Cum Total						**715.4500**	**178.7544**	**376**	**13,933**	**-**

Cum.L.Km	715.4500
Pgm.L.Km:	1240.7500
L.Km.Remain:	525.3000
% Completed:	58%
Av Daily Prod L.Km:	14.3
Cum.Sq.Km	178.7544
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	131.2456
% Completed:	58%
Av Daily Prod Sq.Km:	3.6

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	11.40					11.40	11.40
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup	0.20					0.20	0.20
Spread Damage / Chewage	0.20					0.20	0.20
Detours						-	-
Travel	0.50					0.50	0.50
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down			0.50			0.50	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.60					0.60	0.60
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.90**	**0.30**	**0.50**	**-**	**-**	**13.70**	**13.20**
CUM TOTAL	**236.40**	**86.90**	**7.10**	**99.80**	**-**	**430.20**	**323.30**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* .2 "Damage" due to cattle dragging geophones overnight
* .5 "Recorder Down" due to generator problem, repaired by vibe tech
* Relief birddog Pat Mee arrived on crew
* Visit by Dieri representatives, happy with cultural heritage awareness on crew
* Excellent production

Spread Movement:

Client:	Lignum 3D			Date:	Tuesday, 15 January 2013		
	Layout				Pickup		
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1234	5234	5207	28	1348	5324	5025	300
1228	5234	5030	205	1342	5324	5025	300
1222	5234	5030	205	1336	5324	5025	300
1216	5234	5030	205	1330	5324	5124	201
1210	5259	5030	230				
1204	5259	5124	136				
		Total Stations:	**1009**			**Total Stations:**	**1101**
		Bad Cables	5			Bad Phones	4
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **24 - 41°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	30/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	14/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5025-5325			1,317.0	1,312.0	53	11.1000	2.7733		222	
5025-5325			1,311.0	1,306.0	54	15.9000	3.9726	5	313	
5025-5325			1,305.0	1,300.0	55	15.9000	3.9726	11	307	
5025-5235			1,299.0	1,294.0	56	5.1000	1.2742		102	
5025-5235			1,293.0	1,288.0	57	5.1000	1.2742		102	
Daily Total						**53.1000**	**13.2670**	**16**	**1,046**	**-**
Cum Total						**659.6500**	**164.8128**	**358**	**12,835**	**-**

Cum.L.Km	659.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	581.1000
% Completed:	53%
Av Daily Prod L.Km:	13.5
Cum.Sq.Km	164.8128
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	145.1872
% Completed:	53%
Av Daily Prod Sq.Km:	3.4

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.90					10.90	10.90
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.30					0.30	0.30
Detours	0.20					0.20	0.20
Travel	0.60					0.60	0.60
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.20			0.20	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	1.20					1.20	1.20
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**13.20**	**0.30**	**0.20**	**-**	**-**	**13.70**	**13.50**
CUM TOTAL	**223.50**	**86.60**	**6.60**	**99.80**	**-**	**416.50**	**310.10**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* .3 "Damage" due to cattle dragging a cable during production
* .2 "Troubleshooting" due to line battery crash
* Cooler weather, crew remained in the field all day
* .2 "Detour" due to steep sand dunes

Spread Movement:

Client: Lignum 3D — Date: Monday, 14 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1264	5075	5025	51	1372	5324	5060	265
1258	5234	5025	210	1366	5324	5060	265
1252	5234	5025	210	1360	5324	5060	265
1246	5234	5025	210	1354	5324	5060	265
1240	5234	5030	205				
1234	5207	5030	178				
		Total Stations:	**1064**			**Total Stations:**	**1060**
		Bad Cables	4			Bad Phones	10
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x HSE Plus — Personnel:
Meals & services — Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Hot/Sunny 26 - 40°

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles 0	0	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	31/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	13/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5025-5325			1,335.0	1,330.0	50	15.6500	3.9101	6	307	
5025-5325			1,329.0	1,324.0	51	15.9000	3.9726	6	312	
5025-5325			1,323.0	1,318.0	52	15.9000	3.9726	6	312	
5025-5325			1,317.0	1,312.0	53	4.8000	1.1993	2	94	
Daily Total						**52.2500**	**13.0546**	**20**	**1,025**	**-**
Cum Total						**606.5500**	**151.5458**	**342**	**11,789**	**-**

Cum.L.Km	606.5500
Pgm.L.Km:	1240.7500
L.Km.Remain:	634.2000
% Completed:	49%
Av Daily Prod L.Km:	12.6
Cum.Sq.Km	151.5458
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	158.4542
% Completed:	49%
Av Daily Prod Sq.Km:	3.2

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.80					10.80	10.80
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.80					0.80	0.80
Detours						-	-
Travel	0.60					0.60	0.60
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	1.00					1.00	1.00
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other				0.10		0.10	-
TOTAL	**13.20**	**0.30**	**-**	**0.10**	**-**	**13.60**	**13.50**
CUM TOTAL	**210.30**	**86.30**	**6.40**	**99.80**	**-**	**402.80**	**296.60**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* .1 "Other" downtime due to reshooting VP's, flaky cable causing line dropouts
* Excellent production considering conditions
* Line crew sent to camp at approx 3PM due to extreme heat conditions, all available spread laid out
* Ice machines shut down, generator struggling with heat

Spread Movement:

Client: Lignum 3D — Date: Sunday, 13 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1270	5234	5028	207				
1264	5234	5076	159				
		Total Stations:	**366**			**Total Stations:**	**0**
		Bad Cables	4			Bad Phones	10
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x HSE Plus — Personnel:
Meals & services — Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat, 139° 37'36" Long

Weather : Hot/Sunny 30 - 46°

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	31/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	12/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5285-5325			1,335.0	1,330.0	50	2.6500	0.6621		53	
5290-5325			1,329.0	1,324.0	51	2.4000	0.5996		48	
5290-5325			1,323.0	1,318.0	52	2.4000	0.5996		48	
5290-5325			1,317.0	1,312.0	53	2.4000	0.5996		48	
5290-5325			1,311.0	1,306.0	54	2.4000	0.5996		48	
5290-5325			1,305.0	1,300.0	55	2.4000	0.5996		48	
Daily Total						**14.6500**	**3.6603**	**-**	**293**	**-**
Cum Total						**554.3000**	**138.4912**	**322**	**10,764**	**-**

Cum.L.Km	554.3000
Pgm.L.Km:	1240.7500
L.Km.Remain:	686.4500
% Completed:	45%
Av Daily Prod L.Km:	11.8
Cum.Sq.Km	138.4912
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	171.5088
% Completed:	45%
Av Daily Prod Sq.Km:	2.9

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up		3.50				3.50	3.50
Recording	3.30					3.30	3.30
Experimental						-	-
H/Wires & SIMS: Sweep Tests	0.10					0.10	0.10
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours	0.30					0.30	0.30
Travel	0.60					0.60	0.60
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down			1.10			1.10	-
Prospect/Camp Move						-	-
Traverse Move	0.40					0.40	0.40
Swath Move						-	-
Vibe Travel						-	-
Weather		1.50				1.50	1.50
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**4.70**	**5.30**	**1.10**	**-**	**-**	**11.10**	**10.00**
CUM TOTAL	**197.10**	**86.00**	**6.40**	**99.70**	**-**	**389.20**	**283.10**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* Initial layout contiued
* Vibrator hardwires completed
* Detour time due to hot/soft sand dunes
* Vibrator down time due to bad accelerometer, spare vibe had to detour pipeline
* Weather standby time due to extreme heat conditions, line crew shut down at 1.30PM @ 47 degrees C
* 1 x personnel out via Thargomindah
* All VP's on eastern side of pipeline recorded

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Hot/Sunny 29 - 48°

Spread Movement:

Client: Lignum 3D — Date: Saturday, 12 January 2013

Layout Line	Layout Station #	Layout Station #	Layout Total	Pickup Line	Pickup Station #	Pickup Station #	Pickup Total
1294	5234	5028	207				
1288	5234	5025	210				
1282	5234	5025	210				
1276	5234	5025	210				
		Total Stations:	**837**			**Total Stations:**	**0**
		Bad Cables	3			Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control: — ***Vehicles*** ***0*** — **Personnel:** **0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	31/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	11/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	11.7
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	2.9

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up		12.40				12.40	12.40
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	0.50					0.50	0.50
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	0.50	12.70	-	-	-	13.20	13.20
CUM TOTAL	192.40	80.70	5.30	99.70	-	378.10	273.10

Client :	2	*Visitor's :*	2
Field Crew :	41		
Camp Crew :	13	*Light Vehicles :*	
Total Crew :	54	*Heavy Vehicles :*	

COMMENTS:

* Initial layout contiued

EXTRAS: 1 x Senex HSE, 1 x HSE Plus — Personnel:

Meals & services — Vehicle:

Meals:

Camp Location/Co-ords : 27° 32'36" Lat

139° 37'36" Long

Weather : Hot/Sunny 22 - 45°

Spread Movement:

Client: Lignum 3D — Date: Friday, 11 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1324	5324	5084	241				
1318	5324	5060	265				
1312	5324	5025	300				
1306	5324	5025	300				
1300	5324	5025	300				
1294	5027	5025	3				
		Total Stations:	1409			Total Stations:	0
		Bad Cables	4			Bad Phones	10
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control: — Personnel:

Vehicles 0 — 0

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	31/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	10/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	12.0
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	3.0

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up		11.50				11.50	11.50
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.70					1.70	1.70
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	1.70	11.80	-	-	-	13.50	13.50
CUM TOTAL	191.90	68.00	5.30	99.70	-	364.90	259.90

Client :	2	*Visitor's :*	2
Field Crew :	41		
Camp Crew :	13	*Light Vehicles :*	
Total Crew :	54	*Heavy Vehicles :*	

Spread Movement:

Client: Lignum 3D — Date: Thursday, 10 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1354	5324	5108	217				
1348	5324	5025	300				
1342	5324	5025	300				
1336	5324	5025	300				
1330	5324	5025	300				
1324	5084	5025	60				
		Total Stations:	1477			Total Stations:	0
		Bad Cables	5			Bad Phones	8
						LAUL	0

COMMENTS:

* Initial layout contiued

EXTRAS: 2 x monitors, 1 x Senex HSE — Personnel:
1 x HSE Plus — Vehicle:
Meals & services — Meals:

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Hot/Sunny 28 - 35°

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control:		*Personnel:*
Vehicles	*0*	0

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Hot/Sunny	**Est. Finish**	31/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	Shane Goossens	**Date:**	9/01/2013	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	12.3
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	3.1

HOURS	**Working Time** Charge	**Standby Time** Charge	**Down Time** N/Charge	**Non-Charge Time** N/Charge	**Other 1** N/Charge	**Total**	**Charge Hours**
Camp Setup/Packup						-	-
Inductions		0.50				0.50	0.50
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up		11.00				11.00	11.00
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**1.00**	**11.80**	**-**	**-**	**-**	**12.80**	**12.80**
CUM TOTAL	**190.20**	**56.20**	**5.30**	**99.70**	**-**	**351.40**	**246.40**

Client :	2	***Visitor's :***	2
Field Crew :	41		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	54	***Heavy Vehicles :***	

COMMENTS:

* Crew inductions held in the morning
* Initial layout commenced

Spread Movement:

Client: Lignum 3D **Date:** Wednesday, 9 January 2013

Layout Line	Station #	Station #	Total	Pickup Line	Station #	Station #	Total
1378	5324	5060	265				
1372	5324	5060	265				
1366	5324	5060	265				
1360	5324	5060	265				
1354	5107	5060	48				
		Total Stations:	**1108**			**Total Stations:**	**0**
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: 2 x monitors, 1 x HSE Plus — Personnel:
Meals & services — Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Hot/Sunny** **28 - 35°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	31/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	8/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	12.6
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	3.1

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting						-	-
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	-	-	-	-	-	-	-
CUM TOTAL	189.20	44.40	5.30	99.70	-	338.60	233.60

Client :	1	*Visitor's :*	
Field Crew :			
Camp Crew :	7	*Light Vehicles :*	
Total Crew :	7	*Heavy Vehicles :*	

COMMENTS:

* Crew arrived on site approx 7PM

EXTRAS: 1 x HSE Plus

Personnel:

Vehicle:

Meals:

Camp Location/Co-ords : 27° 32'36" Lat

139° 37'36" Long

Weather : Hot/Sunny 31 - 45°

Spread Movement:

Client: Lignum 3D — Date: Tuesday, 8 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
		Total Stations:	0			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control: — *Vehicles* 0 — **Personnel:** 0

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Hot/Sunny	Est. Finish	31/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	7/01/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	12.8
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	3.2

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting						-	-
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	-	-	-	-	-	-	-
CUM TOTAL	189.20	44.40	5.30	99.70	-	338.60	233.60

Client :	1	*Visitor's :*	
Field Crew :			
Camp Crew :	7	*Light Vehicles :*	
Total Crew :	7	*Heavy Vehicles :*	

COMMENTS:

* Bus mobilised out of Brisbane overnighting in Cunnamulla
* 7 people in camp readying for crew arrival

EXTRAS: 1 x HSE Plus — Personnel:
Meals & services — Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Hot/Sunny 31 - 45°

Spread Movement:

Client: Lignum 3D — Date: Monday, 7 January 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
		Total Stations:	0			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control: — Personnel:
Vehicles 0 — 0

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Peter Robinson	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Overcast & Warm	Est. Finish	17/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	19/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	23.5
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	5.9

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up		8.70				8.70	8.70
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	-	9.00	-	-	-	9.00	9.00
CUM TOTAL	189.20	44.40	5.30	99.70	-	338.60	233.60

Client :	1	*Visitor's :*	
Field Crew :	38		
Camp Crew :	14	*Light Vehicles :*	
Total Crew :	52	*Heavy Vehicles :*	

COMMENTS:

* Spread pickup continued
* All spread off the ground by 2.30pm, line crew de-pegged source lines for remainder of day
* Crew officially finished for 2012, bus back to Brisbane first thing tomorrow morning
* 10 people outbound via Moomba

Spread Movement:

Client: Lignum 3D — Date: Wednesday, 19 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
		Total Stations:	0			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Dieri Monitors — Personnel: — Vehicle: — Meals:

Camp Location/Co-ords : 27° 32'36" Lat, 139° 37'36" Long

Weather : Overcast & Warm 25 - 35°

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	
Traffic Control:	Personnel:	
Vehicles 0	0	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Peter Robinson	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	15/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	18/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	24.5
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	6.1

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.50				0.50	0.50
Recorder Setup						-	-
Initial Layout/Pick up		11.50				11.50	11.50
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	-	12.00	-	-	-	12.00	12.00
CUM TOTAL	189.20	35.40	5.30	99.70	-	329.60	224.60

Client :	1	*Visitor's :*	3
Field Crew :	38		
Camp Crew :	14	*Light Vehicles :*	
Total Crew :	52	*Heavy Vehicles :*	

Spread Movement:

Client: Lignum 3D — Date: Tuesday, 18 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1384	5324	5060	265
				1378	5324	5060	265
				1372	5324	5060	265
				1366	5324	5060	265
				1360	5324	5060	265
				1354	5324	5060	265
				1348	5239	5025	215
				1342	5214	5025	190
				1336	5119	5025	95
		Total Stations:	0			Total Stations:	2090
		Bad Cables				Bad Phones	
						LAUL	0

COMMENTS:

* 2 x Dieri traditional owners departed crew via Moomba
* Spread pickup continued
* .5 "Toolbox" due to longer than normal safety meeting

EXTRAS: Dieri Monitors — Personnel: — Vehicle: — Meals:

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Camp Location/Co-ords :	27° 32'36" Lat	
	139° 37'36" Long	
Weather :	Fine & Hot	22 - 38°

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control:	Personnel:
Vehicles 0	0

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Peter Robinson	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	15/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	18/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	24.5
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	6.1

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.50				0.50	0.50
Recorder Setup						-	-
Initial Layout/Pick up		11.50				11.50	11.50
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	-	12.00	-	-	-	12.00	12.00
CUM TOTAL	189.20	35.40	5.30	99.70	-	329.60	224.60

Client :	1	*Visitor's :*	3
Field Crew :	38		
Camp Crew :	14	*Light Vehicles :*	
Total Crew :	52	*Heavy Vehicles :*	

Spread Movement:

Client: Lignum 3D — Date: Tuesday, 18 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1384	5324	5060	265
				1378	5324	5060	265
				1372	5324	5060	265
				1366	5324	5060	265
				1360	5324	5060	265
				1354	5324	5060	265
				1348	5239	5025	215
				1342	5214	5025	190
				1336	5119	5025	95
		Total Stations:	0			Total Stations:	2090
		Bad Cables				Bad Phones	
						LAUL	0

COMMENTS:

* 2 x Dieri traditional owners departed crew via Moomba
* Spread pickup continued
* .5 "Toolbox" due to longer than normal safety meeting

EXTRAS: Dieri Monitors — Personnel: — Vehicle: — Meals:

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Camp Location/Co-ords :	27° 32'36" Lat	
	139° 37'36" Long	
Weather :	Fine & Hot	22 - 38°

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control:	
Vehicles	*0*

Personnel:	
	0

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Peter Robinson	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	13/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	17/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						539.6500	134.8309	322	10,471	-

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	25.7
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	6.4

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up		12.70				12.70	12.70
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	-	13.00	-	-	-	13.00	13.00
CUM TOTAL	189.20	23.40	5.30	99.70	-	317.60	212.60

Client :	1	*Visitor's :*	3
Field Crew :	38		
Camp Crew :	14	*Light Vehicles :*	
Total Crew :	52	*Heavy Vehicles :*	

COMMENTS:

* 2 x Dieri traditional owners on crew monitoring dozer & survey operations
* Spread pickup started
* Suspected snake bite in the field, patient taken to Broken Hill by RFDS

EXTRAS: Dieri Monitors Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Hot 23 - 36°

Spread Movement:

Client: Lignum 3D Date: Monday, 17 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1348	5324	5240	85
				1342	5324	5215	110
				1336	5324	5120	205
				1330	5324	5025	300
				1324	5324	5025	300
				1318	5324	5025	300
				1312	5324	5025	300
				1306	5324	5025	300
				1300	5324	5025	300
				1294	5235	5025	211
		Total Stations:	0			Total Stations:	2411
		Bad Cables	5			Bad Phones	4
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control: — *Vehicles* 0 — **Personnel:** 0

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Peter Robinson	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	10/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	16/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5060-5325			1,353.0	1,348.0	47	16.1000	4.0226	5	317	
5060-5325			1,347.0	1,342.0	48	18.3000	4.5722		366	
5060-5325			1,341.0	1,336.0	49	18.3000	4.5722	2	364	
Daily Total						**52.7000**	**13.1670**	**7**	**1,047**	**-**
Cum Total						**539.6500**	**134.8309**	**322**	**10,471**	**-**

Cum.L.Km	539.6500
Pgm.L.Km:	1240.7500
L.Km.Remain:	701.1000
% Completed:	43%
Av Daily Prod L.Km:	27.0
Cum.Sq.Km	134.8309
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	175.1691
% Completed:	43%
Av Daily Prod Sq.Km:	6.7

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.40					10.40	10.40
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	1.10					1.10	1.10
Detours	0.40					0.40	0.40
Travel	0.80					0.80	0.80
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.40			0.40	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.90					0.90	0.90
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**13.70**	**0.30**	**0.40**	**-**	**-**	**14.40**	**14.00**
CUM TOTAL	**189.20**	**10.40**	**5.30**	**99.70**	**-**	**304.60**	**199.60**

Client :	1	***Visitor's :***	3
Field Crew :	38		
Camp Crew :	14	***Light Vehicles :***	
Total Crew :	52	***Heavy Vehicles :***	

COMMENTS:

* 2 x Dieri traditional owners on crew monitoring dozer & survey operations
* Recording completed for the year, spread pickup for the next 3 days
*1.1 "Spread Damage" due to cattle chewing and dragging geophones & cable overnight
* .4 "Troubleshooting" due to intermittent line problem through creek
* Good production day considering interruptions to shooting

EXTRAS: Dieri Monitors Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Hot 27 - 38°

Spread Movement:

Client: Lignum 3D Date: Sunday, 16 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1306	5159	5025	135	1402	5324	5121	204
1300	5324	5025	300	1396	5324	5060	265
1294	5235	5025	211	1390	5324	5060	265
		Total Stations:	**646**			**Total Stations:**	**734**
		Bad Cables	5			Bad Phones	4
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Peter Robinson	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Hot	**Est. Finish**	13/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	Shane Goossens	**Date:**	15/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5060-5325			1,371.0	1,366.0	44	9.6000	2.3985		192	
5060-5325			1,365.0	1,360.0	45	16.2000	4.0476	1	323	
5060-5325			1,359.0	1,354.0	46	16.2000	4.0476	6	318	
5060-5325			1,353.0	1,348.0	47	0.1000	0.0250		2	
Daily Total						**42.1000**	**10.5186**	**7**	**835**	**-**
Cum Total						**486.9500**	**121.6639**	**315**	**9,424**	**-**

Cum.L.Km	**486.9500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**753.8000**
% Completed:	**39%**
Av Daily Prod L.Km:	**25.6**
Cum.Sq.Km	**121.6639**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**188.3361**
% Completed:	**39%**
Av Daily Prod Sq.Km:	**6.4**

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	8.30					8.30	8.30
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	0.80					0.80	0.80
Detours	0.60					0.60	0.60
Travel	0.80					0.80	0.80
Waiting On Spread	0.30					0.30	0.30
Line Move						-	-
Troubleshooting			0.20			0.20	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	2.30					2.30	2.30
Swath Move						-	-
Vibe Travel						-	-
Weather		0.20				0.20	0.20
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**13.20**	**0.50**	**0.20**	**-**	**-**	**13.90**	**13.70**
CUM TOTAL	**175.50**	**10.10**	**4.90**	**99.70**	**-**	**290.20**	**185.60**

Client :	1	***Visitor's :***	3
Field Crew :	38		
Camp Crew :	14	***Light Vehicles :***	
Total Crew :	52	***Heavy Vehicles :***	

COMMENTS:

* 2 x Dieri traditional owners on crew monitoring dozer & survey operations
* .2 "Weather" due to small storm north of camp
*.8 "Spread Damage" due to cattle chewing and dragging geophones & cable overnight
* .2 "Troubleshooting" due to intermittent line problem
* Good production day considering interruptions to shooting

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Hot** **29 - 42°**

Spread Movement:

Client: Lignum 3D **Date:** Saturday, 15 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1318	5299	5025	275	1420	5324	5141	184
1312	5324	5025	300	1414	5324	5060	265
1306	5324	5160	165	1408	5324	5060	265
				1402	5120	5060	61
		Total Stations:	**740**			**Total Stations:**	**775**
		Bad Cables	5			Bad Phones	7
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Peter Robinson	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	15/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	14/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5060-5325			1,389.0	1,384.0	41	2.1000	0.5247	19	23	
5060-5325			1,383.0	1,378.0	42	15.6000	3.8976	26	286	
5060-5325			1,377.0	1,372.0	43	16.2000	4.0476	10	314	
5060-5325			1,371.0	1,366.0	44	6.6000	1.6490		132	
Daily Total						**40.5000**	**10.1189**	**55**	**755**	**-**
Cum Total						**444.8500**	**111.1453**	**308**	**8,589**	**-**

Cum.L.Km	444.8500
Pgm.L.Km:	1240.7500
L.Km.Remain:	795.9000
% Completed:	36%
Av Daily Prod L.Km:	24.7
Cum.Sq.Km	111.1453
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	198.8547
% Completed:	36%
Av Daily Prod Sq.Km:	6.2

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	8.20					8.20	8.20
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	1.20					1.20	1.20
Detours	0.50					0.50	0.50
Travel	0.90					0.90	0.90
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.50			0.50	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	2.10					2.10	2.10
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.90**	**0.30**	**0.50**	**-**	**-**	**13.70**	**13.20**
CUM TOTAL	**162.30**	**9.60**	**4.70**	**99.70**	**-**	**276.30**	**171.90**

Client :	1	***Visitor's :***	3
Field Crew :	38		
Camp Crew :	14	***Light Vehicles :***	
Total Crew :	52	***Heavy Vehicles :***	

COMMENTS:

* 2 x Dieri traditional owners on crew monitoring dozer & survey operations
* 1 x personnel outboud via Birdsville
*1.2 "Spread Damage" due to cattle chewing and dragging geophones & cable overnight
* .5 "Troubleshooting" due to multiple line breaks

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Hot 29 - 42°

Spread Movement:

Client: Lignum 3D Date: Friday, 14 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1330	5286	5025	262	1438	5244	5100	145
1324	5324	5025	300	1432	5324	5100	225
1318	5324	5300	25	1426	5324	5060	265
				1420	5140	5060	81
		Total Stations:	587			Total Stations:	716
		Bad Cables	5			Bad Phones	7
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control: — ***Vehicles*** ***0*** — **Personnel:** **0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Peter Robinson	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	17/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	Shane Goossens	Date:	13/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5060-5325			1,407.0	1,402.0	38	4.2000	1.0494		84	
5060-5325			1,401.0	1,396.0	39	15.9000	3.9726	12	306	
5060-5325			1,395.0	1,390.0	40	15.9000	3.9726	27	291	
5060-5325			1,389.0	1,384.0	41	14.1000	3.5229	48	234	
5060-5325			1,383.0	1,378.0	42	0.6000	0.1499		12	
Daily Total						**50.7000**	**12.6673**	**87**	**927**	**-**
Cum Total						**404.3500**	**101.0264**	**253**	**7,834**	**-**

Cum.L.Km	404.3500
Pgm.L.Km:	1240.7500
L.Km.Remain:	836.4000
% Completed:	33%
Av Daily Prod L.Km:	23.8
Cum.Sq.Km	101.0264
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	208.9736
% Completed:	33%
Av Daily Prod Sq.Km:	5.9

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	10.40					10.40	10.40
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	0.60					0.60	0.60
Detours	0.10					0.10	0.10
Travel	0.80					0.80	0.80
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	1.60					1.60	1.60
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**13.60**	**0.30**	**-**	**-**	**-**	**13.90**	**13.90**
CUM TOTAL	**149.40**	**9.30**	**4.20**	**99.70**	**-**	**262.60**	**158.70**

Client :	1	***Visitor's :***	3
Field Crew :	38		
Camp Crew :	14	***Light Vehicles :***	
Total Crew :	52	***Heavy Vehicles :***	

COMMENTS:

* 2 x Dieri traditional owners on crew monitoring dozer & survey operations
* 2 x personnel outboud via Moomba / 2 inbound
*1.9 "Spread Damage" due to cattle chewing and dragging geophones & cable overnight
* .5 "Troubleshooting" due to line break over a road crossing

EXTRAS: Terrex Spatial — Personnel: / Vehicle: / Meals:

Camp Location/Co-ords : 27° 32'36" Lat, 139° 37'36" Long

Weather : Fine & Hot 29 - 42°

Spread Movement:

Client: Lignum 3D **Date:** Thursday, 13 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1348	5324	5246	79	1462	5244	5100	145
1342	5324	5025	300	1456	5324	5100	225
1336	5324	5025	300	1450	5324	5100	225
1330	5324	5287	38	1444	5235	5100	136
		Total Stations:	**717**			**Total Stations:**	**731**
		Bad Cables	4			Bad Phones	6
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Peter Robinson	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Hot	**Est. Finish**	21/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	Shane Goossens	**Date:**	12/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5325			1,431.0	1,426.0	34	2.1000	0.5247		42	
5100-5325			1,425.0	1,420.0	35	2.1000	0.5247		42	
5100-5325			1,419.0	1,414.0	36	9.9000	2.4735	11	187	
5060-5325			1,413.0	1,408.0	37	16.2000	4.0476	19	305	
5060-5325			1,407.0	1,402.0	38	12.0000	2.9982	14	226	
5060-5325			1,401.0	1,396.0	39	0.3000	0.0750		6	
5060-5325			1,395.0	1,390.0	40	0.3000	0.0750		6	
Daily Total						**42.9000**	**10.7185**	**44**	**814**	**-**
Cum Total						**353.6500**	**88.3591**	**166**	**6,907**	**-**

Cum.L.Km	**353.6500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**887.1000**
% Completed:	**29%**
Av Daily Prod L.Km:	**22.1**
Cum.Sq.Km	**88.3591**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**221.6409**
% Completed:	**29%**
Av Daily Prod Sq.Km:	**5.5**

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	9.00					9.00	9.00
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	1.90					1.90	1.90
Detours						-	-
Travel	0.90					0.90	0.90
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.50			0.50	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	1.30					1.30	1.30
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**13.20**	**0.30**	**0.50**	**-**	**-**	**14.00**	**13.50**
CUM TOTAL	**135.80**	**9.00**	**4.20**	**99.70**	**-**	**248.70**	**144.80**

Client :	1	***Visitor's :***	1
Field Crew :	38		
Camp Crew :	14	***Light Vehicles :***	
Total Crew :	52	***Heavy Vehicles :***	

COMMENTS:

*1.9 "Spread Damage" due to cattle chewing and dragging geophones & cable overnight
* .5 "Troubleshooting" due to line break over a road crossing
* Good production considering detours etc around culturally sensitive Cooper Creek area
* Dieri traditional owners on crew conducting meetings and investigation into cultural heritage breach
* Good production day

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Hot 29 - 42°

Spread Movement:

Client: Lignum 3D **Date:** Wednesday, 12 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1366	5209	5060	150	1480	5169	5100	70
1360	5324	5060	265	1474	5244	5100	145
1354	5324	5060	265	1468	5244	5100	145
1348	5246	5025	222				
		Total Stations:	**902**			**Total Stations:**	**360**
		Bad Cables	4			Bad Phones	5
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Peter Robinson	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Hot	**Est. Finish**	24/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	Shane Goossens	**Date:**	11/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5325			1,443.0	1,438.0	32	6.8500	1.7115	12	125	
5100-5325			1,437.0	1,432.0	33	6.9000	1.7240	12	126	
5100-5325			1,431.0	1,426.0	34	9.6000	2.3985	6	186	
5060-5325			1,425.0	1,420.0	35	14.1000	3.5229	9	273	
5060-5325			1,419.0	1,414.0	36	6.3000	1.5740	2	124	
Daily Total						**43.7500**	**10.9309**	**41**	**834**	**-**
Cum Total						**310.7500**	**77.6405**	**122**	**6,093**	**-**

Cum.L.Km	**310.7500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**930.0000**
% Completed:	**25%**
Av Daily Prod L.Km:	**20.7**
Cum.Sq.Km	**77.6405**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**232.3595**
% Completed:	**25%**
Av Daily Prod Sq.Km:	**5.2**

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	9.50					9.50	9.50
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	0.50					0.50	0.50
Detours	0.30					0.30	0.30
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.90			0.90	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.90					0.90	0.90
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.30**	**0.30**	**0.90**	**-**	**-**	**13.50**	**12.60**
CUM TOTAL	**122.60**	**8.70**	**3.70**	**99.70**	**-**	**234.70**	**131.30**

Client :	1	***Visitor's :***	1
Field Crew :	38		
Camp Crew :	14	***Light Vehicles :***	
Total Crew :	52	***Heavy Vehicles :***	

COMMENTS:

* Full production day
* .5 "Spread Damage" due to cattle chewing and dragging geophones & cable overnight
* .9 "Troubleshooting" due to 2 x line breaks over road crossings
* Jonny Shirley & Susan Mallan on crew from Senex head office in Brisbane
* Dieri traditional owners on crew conducting meetings and investigation into cultural heritage breach
* Good production day

Spread Movement:

Client: Lignum 3D **Date:** Tuesday, 11 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1378	5343	5180	164	1486	5244	5100	145
1372	5343	5060	284	1480	5244	5170	75
1366	5343	5210	134				
		Total Stations:	**582**			**Total Stations:**	**220**
		Bad Cables	9			Bad Phones	3
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Hot** **21 - 36°**

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Warm	**Est. Finish**	30/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	Shane Goossens	**Date:**	10/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5325			1,455.0	1,450.0	30	3.9000	0.9744		78	
5100-5325			1,449.0	1,450.0	31	3.9000	0.9744		78	
5100-5325			1,443.0	1,450.0	32	6.3500	1.5865	1	126	
5100-5325			1,437.0	1,450.0	33	6.3000	1.5740	6	120	
5100-5325			1,431.0	1,450.0	34	2.1000	0.5247	6	36	
Daily Total						**22.5500**	**5.6341**	**13**	**438**	**-**
Cum Total						**267.0000**	**66.7097**	**81**	**5,259**	**-**

Cum.L.Km	**267.0000**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**973.7500**
% Completed:	**22%**
Av Daily Prod L.Km:	**19.1**
Cum.Sq.Km	**66.7097**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**243.2903**
% Completed:	**22%**
Av Daily Prod Sq.Km:	**4.8**

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	5.50					5.50	5.50
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	0.50					0.50	0.50
Detours						-	-
Travel	0.90					0.90	0.90
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.20			0.20	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move	0.60					0.60	0.60
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**7.60**	**0.30**	**0.20**	**-**	**-**	**8.10**	**7.90**
CUM TOTAL	**110.30**	**8.40**	**2.80**	**99.70**	**-**	**221.20**	**118.70**

Client :	1	***Visitor's :***	1
Field Crew :	38		
Camp Crew :	14	***Light Vehicles :***	
Total Crew :	52	***Heavy Vehicles :***	

COMMENTS:

* Restricted 8 hour day while waiting for survey crew to get a decent lead
* .6 "Spread Damage" due to cattle chewing and dragging geophones & cable overnight
* .2 "Troubleshooting" due to intermittent line breaks
* Jonny Shirley & Susan Mallan arrived on crew from Senex head office in Brisbane

Spread Movement:

Client: Lignum 3D **Date:** Monday, 10 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1384	5344	5112	233	1498	5244	5100	145
1378	5179	5060	120	1492	5244	5100	145
		Total Stations:	**353**			**Total Stations:**	**290**
		Bad Cables	1			Bad Phones	4
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords :	27° 32'36" Lat	***Trouble Shooters:***	***Security:***
	139° 37'36" Long	Personnel:	Personnel:
Weather :	**Fine & Warm** **21 - 36°**	***Traffic Control:***	**Personnel:**
		Vehicles ***0***	**0**

Comments:

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Warm	**Est. Finish**	30/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	9/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5325			1,455.0	1,450.0	30	9.6000	2.3985	6	186	
5100-5325			1,449.0	1,444.0	31	9.6000	2.3985	2	190	
5100-5325			1,443.0	1,438.0	32	0.6000	0.1499		12	
5100-5325			1,437.0	1,432.0	33	0.6000	0.1499		12	
Daily Total						**20.4000**	**5.0969**	**8**	**400**	**-**
Cum Total						**244.4500**	**61.0756**	**68**	**4,821**	**-**

Cum.L.Km	**244.4500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**996.3000**
% Completed:	**20%**
Av Daily Prod L.Km:	**18.8**
Cum.Sq.Km	**61.0756**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**248.9244**
% Completed:	**20%**
Av Daily Prod Sq.Km:	**4.7**

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	5.30					5.30	5.30
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	1.60					1.60	1.60
Detours						-	-
Travel	0.80					0.80	0.80
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**7.70**	**0.30**	**-**	**-**	**-**	**8.00**	**8.00**
CUM TOTAL	**102.70**	**8.10**	**2.60**	**99.70**	**-**	**213.10**	**110.80**

Client :	1	***Visitor's :***	1
Field Crew :	38		
Camp Crew :	14	***Light Vehicles :***	
Total Crew :	52	***Heavy Vehicles :***	

COMMENTS:

* Resumed recording today
* Recording crew have reduced working hours to allow line prep to gain lead
* Other 5.3 = Repairing and connecting hand carry sections
* Other 1.6 = Cattle removing phones & chewing on spread
  All line crew having to replant geophones and replacing cables

* 2 x Personnel inbound from Brisbane

Spread Movement:

Client: Lignum 3D **Date:** Sunday, 9 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1490	5165	5060	106				
1484	5111	5060	52				
		Total Stations:	**158**			**Total Stations:**	**0**
		Bad Cables	1			Bad Phones	7
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Warm** **18 - 29°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	31/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	8/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						224.0500	55.9786	60	4,421	-

Cum.L.Km	224.0500
Pgm.L.Km:	1240.7500
L.Km.Remain:	1016.7000
% Completed:	18%
Av Daily Prod L.Km:	18.7
Cum.Sq.Km	55.9786
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	254.0214
% Completed:	18%
Av Daily Prod Sq.Km:	4.7

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other	6.70					6.70	6.70
TOTAL	7.70	0.30	-	-	-	8.00	8.00
CUM TOTAL	95.00	7.80	2.60	99.70	-	205.10	102.80

Client :	1	*Visitor's :*	1
Field Crew :	38		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	50	*Heavy Vehicles :*	

COMMENTS:

* Recording crew have reduced working hours to allow line prep to gain lead
* Recording crew restricted from accessing all hand carry areas until approval by Dieri people
* Other 6.7 = Cows removing phones & chewing on spread over the past 4 days
All line crew having to replant geophones and replacing cables
crew waiting to access restricted areas, Vibrators ready for production

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Hot 24 - 42°

Spread Movement:

Client: Lignum 3D Date: Saturday, 8 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1496	5323	5060	264				
1490	5323	5168	156				
		Total Stations:	420			Total Stations:	0
		Bad Cables	3			Bad Phones	5
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control: *Vehicles* 0 | Personnel: 0

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	25/01/2013
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	7/12/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						224.0500	55.9786	60	4,421	-

Cum.L.Km	224.0500
Pgm.L.Km:	1240.7500
L.Km.Remain:	1016.7000
% Completed:	18%
Av Daily Prod L.Km:	20.4
Cum.Sq.Km	55.9786
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	254.0214
% Completed:	18%
Av Daily Prod Sq.Km:	5.1

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other	6.70					6.70	6.70
TOTAL	7.70	0.30	-	-	-	8.00	8.00
CUM TOTAL	87.30	7.50	2.60	99.70	-	197.10	94.80

Client :	1	*Visitor's :*	1
Field Crew :	38		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	50	*Heavy Vehicles :*	

COMMENTS:

* Return to work - Approved by Client
* Recording crew have reduced working hours to allow line prep to gain lead
* Recording crew restricted from accessing all hand carry areas until approval by Dieri people
* Other 6.7 = replacing dead battery's in field, crew waiting to access restricted areas
  Vibrators ready for production

* Crew change = 10 x personnel outbound, 15 x personnel inbound from Moomba

Spread Movement:

Client: Lignum 3D — Date: Friday, 7 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
		Total Stations:	0			Total Stations:	0
		Bad Cables	0			Bad Phones	0
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles 0	0	

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27' 32'36" Lat
139' 37'36" Long

Weather : **Fine & Hot** **18 - 39^0**

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Warm	**Est. Finish**	20/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	6/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						224.0500	55.9786	60	4,421	-

Cum.L.Km	224.0500
Pgm.L.Km:	1240.7500
L.Km.Remain:	1016.7000
% Completed:	18%
Av Daily Prod L.Km:	22.4
Cum.Sq.Km	55.9786
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	254.0214
% Completed:	18%
Av Daily Prod Sq.Km:	5.6

HOURS	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other				9.70		9.70	-
TOTAL	-	0.30	-	9.70	-	10.00	0.30
CUM TOTAL	79.60	7.20	2.60	99.70	-	189.10	86.80

Client :	1	***Visitor's :***	1
Field Crew :	36		
Camp Crew :	9	***Light Vehicles :***	
Total Crew :	45	***Heavy Vehicles :***	

COMMENTS:

* Cultural site breach - Client shut down all field work until investigation complete
  and When Senex & Terrex are satisfied with the outcome
* Other N/C - 9.7 = Hours will be ammended after Terrex/Senex meetings.
  Line crew working around camp
  Vibe crew continuing machine maintenance

Spread Movement:

Client:	Lignum 3D			**Date:**	Thursday, 6 December 2012		
Layout				**Pickup**			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
		Total Stations:	0			**Total Stations:**	0
		Bad Cables	0			Bad Phones	0
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27' 32'36" Lat
139' 37'36" Long

Weather : **Fine & Warm** **15 - 34⁰**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Warm	**Est. Finish**	14/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	5/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						224.0500	55.9786	60	4,421	-

Cum.L.Km	224.0500
Pgm.L.Km:	1240.7500
L.Km.Remain:	1016.7000
% Completed:	18%
Av Daily Prod L.Km:	24.9
Cum.Sq.Km	55.9786
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	254.0214
% Completed:	18%
Av Daily Prod Sq.Km:	6.2

HOURS	**Working Time** Charge	**Standby Time** Charge	**Down Time** N/Charge	**Non-Charge Time** N/Charge	**Other 1** N/Charge	**Total**	**Charge Hours**
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other				9.70		9.70	-
TOTAL	-	0.30	-	9.70	-	10.00	0.30
CUM TOTAL	79.60	6.90	2.60	90.00	-	179.10	86.50

Client :	1	***Visitor's :***	1
Field Crew :	36		
Camp Crew :	9	***Light Vehicles :***	
Total Crew :	45	***Heavy Vehicles :***	

COMMENTS:

* Cultural site breach - Client shut down all field work until investigation complete
and When Senex & Terrex are satisfied with the outcome
* Other N/C - 9.7 =
Line crew working around camp
Vibe crew continuing machine servicing & maintenance

* 3 x Personnel outbound from Moomba

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Warm 18 - 30°

Spread Movement:

Client: Lignum 3D **Date:** Wednesday, 5 December 2012

Layout Line	Station #	Station #	Total	**Pickup** Line	Station #	Station #	Total
			Total Stations: 0				**Total Stations:** 0
			Bad Cables 0				Bad Phones 0
							LAUL 0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control: ***Personnel:***
Vehicles ***0*** **0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Warm	**Est. Finish**	9/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	4/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						224.0500	55.9786	60	4,421	-

Cum.L.Km	224.0500
Pgm.L.Km:	1240.7500
L.Km.Remain:	1016.7000
% Completed:	18%
Av Daily Prod L.Km:	28.0
Cum.Sq.Km	55.9786
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	254.0214
% Completed:	18%
Av Daily Prod Sq.Km:	7.0

HOURS	**Working Time** Charge	**Standby Time** Charge	**Down Time** N/Charge	**Non-Charge Time** N/Charge	**Other 1** N/Charge	**Total**	**Charge Hours**
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other				8.70		8.70	-
TOTAL	**1.00**	**0.30**	**-**	**8.70**	**-**	**10.00**	**1.30**
CUM TOTAL	**79.60**	**6.60**	**2.60**	**80.30**	**-**	**169.10**	**86.20**

Client :	1	***Visitor's :***	1
Field Crew :	37		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* No recording today, waiting on Line Prep & Survey lead
* Cultural site breach - Client shut down all field work until investigation complete and When Senex & Terrex are satisfied with the outcome
* All personnel returned from field, maintenance on machines ok by Client

* Vibe crew completing machine servicing & maintenance
* Other N/C - 8.7 = Line crew laying spread on available receiver lines to R1402 setting up spread around creek areas, personnel working around camp

EXTRAS: Terrex Spatial Personnel:
Vehicle:
Meals:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Warm** **20 - 30°**

Spread Movement:

Client: Lignum 3D **Date:** Tuesday, 4 December 2012

Layout Line	Station #	Station #	Total	**Pickup** Line	Station #	Station #	Total
1402	5099	5060	40				
		Total Stations:	**40**			**Total Stations:**	**0**
		Bad Cables	0			Bad Phones	0
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Warm	**Est. Finish**	3/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	3/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						224.0500	55.9786	60	4,421	-

Cum.L.Km	224.0500
Pgm.L.Km:	1240.7500
L.Km.Remain:	1016.7000
% Completed:	18%
Av Daily Prod L.Km:	32.0
Cum.Sq.Km	55.9786
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	254.0214
% Completed:	18%
Av Daily Prod Sq.Km:	8.0

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup	1.00					1.00	1.00
Spread Damage / Chewage						-	-
Detours						-	-
Travel	0.90					0.90	0.90
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other				9.50		9.50	-
TOTAL	**1.90**	**0.30**	**-**	**9.50**	**-**	**11.70**	**2.20**
CUM TOTAL	**78.60**	**6.30**	**2.60**	**71.60**	**-**	**159.10**	**84.90**

Client :	1	***Visitor's :***	2
Field Crew :	37		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* No recording today, waiting on Line Prep & Survey lead

* Other N/C - 9.5 Line crew laying spread on available receiver lines to R1402 setting up spread around creek areas
* Vibe crew completing machine servicing & maintenance

* 1 x Terrex Spatial personnel staying in camp

EXTRAS: Terrex Spatial Personnel: 1
Vehicle:
Meals: **x3**

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Warm** **19 - 33°**

Spread Movement:

Client: Lignum 3D **Date:** Monday, 3 December 2012

Layout				**Pickup**			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1408	5324	5060	265	1510	5244	5100	145
1402	5324	5100	225	1504	5244	5100	145
		Total Stations:	**490**			**Total Stations:**	**290**
		Bad Cables	2			Bad Phones	5
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Warm	**Est. Finish**	29/12/2012
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	2/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5245			1,479.0	1,474.0	26	7.8000	1.9488	4	152	
5100-5245			1,473.0	1,468.0	27	8.1000	2.0238	7	155	
5100-5245			1,467.0	1,462.0	28	9.0000	2.2486	15	165	
5100-5245			1,461.0	1,456.0	29	9.0000	2.2486	16	164	
Daily Total						**33.9000**	**8.4699**	**42**	**636**	**-**
Cum Total						**224.0500**	**55.9786**	**60**	**4,421**	**-**

Cum.L.Km	**224.0500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**1016.7000**
% Completed:	**18%**
Av Daily Prod L.Km:	**37.3**
Cum.Sq.Km	**55.9786**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**254.0214**
% Completed:	**18%**
Av Daily Prod Sq.Km:	**9.3**

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.60				0.60	0.60
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	7.30					7.30	7.30
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup	0.90					0.90	0.90
Spread Damage / Chewage	0.80					0.80	0.80
Detours	0.90					0.90	0.90
Travel	0.90					0.90	0.90
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down			0.10			0.10	-
Vibes Down			0.10			0.10	-
Prospect/Camp Move						-	-
Traverse Move	0.80					0.80	0.80
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other				0.50		0.50	-
TOTAL	**11.70**	**0.60**	**0.20**	**0.50**	**-**	**13.00**	**12.30**
CUM TOTAL	**76.70**	**6.00**	**2.60**	**62.10**	**-**	**147.40**	**82.70**

Client :	1	***Visitor's :***	2
Field Crew :	37		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* Continued recording on Lignum 3D
* Recorded all available spread today
* No spread layout today, waiting on Dozers & Survey
* Line crew picking up spread ready for layout
* 42 x skips for creek & Cultural Heritage sites.

* Other N/C - 0.5 = Charge to Terrex Spatial - Waiting on Survey to complete 6 receiver points on 1414
* Vibes D/T 0.1 = Checking machines, refueling
* Recorder D/T 0.1 = Omit files, reshoot vps
* Spread damage 0.8 = Dingoes & Cattle chewing and dragging spread overnight & throughout the day on live spread

* 1 x Terrex Spatial personnel staying in camp

EXTRAS: Terrex Spatial Personnel: 1
Vehicle:
Meals: **x3**

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Warm** **24 - 32°**

Spread Movement:

Client: Lignum 3D **Date:** Sunday, 2 December 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1534	5244	5100	145
				1528	5244	5100	145
				1522	5244	5100	145
				1516	5244	5100	145
		Total Stations:	**0**			**Total Stations:**	**580**
		Bad Cables	4			Bad Phones	7
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Very Hot	**Est. Finish**	28/12/2012
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	1/12/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5245			1,503.0	1,498.0	22	1.8000	0.4497		36	
5100-5245			1,497.0	1,492.0	23	8.4000	2.0987		168	
5100-5245			1,491.0	1,486.0	24	9.0000	2.2486	12	168	
5100-5245			1,485.0	1,480.0	25	9.0000	2.2486	2	178	
5100-5245			1,479.0	1,474.0	26	1.2000	0.2998		24	
5100-5245			1,473.0	1,468.0	27	0.9000	0.2249		18	
Daily Total						**30.3000**	**7.5704**	**14**	**592**	**-**
Cum Total						**190.1500**	**47.5088**	**18**	**3,785**	**-**

Cum.L.Km	**190.1500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**1050.6000**
% Completed:	**15%**
Av Daily Prod L.Km:	**38.0**
Cum.Sq.Km	**47.5088**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**262.4912**
% Completed:	**15%**
Av Daily Prod Sq.Km:	**9.5**

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	6.70					6.70	6.70
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	1.10					1.10	1.10
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.50			0.50	-
Recorder Down			0.10			0.10	-
Vibes Down			0.20			0.20	-
Prospect/Camp Move						-	-
Traverse Move	0.50					0.50	0.50
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other	2.40					2.40	2.40
TOTAL	**11.80**	**0.30**	**0.80**	**-**	**-**	**12.90**	**12.10**
CUM TOTAL	**65.00**	**5.40**	**2.40**	**61.60**	**-**	**134.40**	**70.40**

Client :	1	***Visitor's :***	2
Field Crew :	37		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* Continued recording on Lignum 3D
* No spread layout today, waiting on Dozers & Survey spread layout to R1414, line crew de-pegging and troubleshooting spread
* 14 x skips, 5100 - 1484 to 1491, 5105 - 1486 to 1491 for Cultural Heritage areas
* Troubleshoot 0.5 = Bad cables & phones on live spread
* Other 2.4 = Cultural Heritage hand carry & creek areas hindering access to live spread, Troubleshooters using hand held VHF radios in these areas
* Vibes D/T 0.2 = Checking machines, refueling
* Recorder D/T 0.1 = Omit files, reshoot vps
* Spread damage 1.1 = Dingoes & Cattle chewing and dragging spread overnight & throughout the day on live spread

* 1 x Terrex Spatial personnel staying in camp

EXTRAS: Terrex Spatial Personnel: 1
Vehicle:
Meals: **x3**

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Very Hot** **29 - 40°**

Spread Movement:

Client: Lignum 3D **Date:** Saturday, 1 December 2012

Layout				**Pickup**			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1414	5274	5100	175	1552	5234	5100	135
				1546	5244	5100	145
				1540	5243	5100	144
		Total Stations:	**175**			**Total Stations:**	**424**
		Bad Cables	16			Bad Phones	13
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Very Hot	Est. Finish	27/12/2012
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	30/11/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5245			1,527.0	1,522.0	18	5.4000	1.3492		108	
5100-5245			1,521.0	1,516.0	19	5.4000	1.3492		108	
5100-5245			1,515.0	1,510.0	20	9.0000	2.2486		180	
5100-5245			1,509.0	1,504.0	21	9.0000	2.2486		180	
5100-5245			1,503.0	1,498.0	22	7.2000	1.7989		144	
5100-5245			1,497.0	1,492.0	23	0.6000	0.1499	1	11	
Daily Total						**36.6000**	**9.1445**	**1**	**731**	**-**
Cum Total						**159.8500**	**39.9383**	**4**	**3,193**	**-**

Cum.L.Km	159.8500
Pgm.L.Km:	1240.7500
L.Km.Remain:	1080.9000
% Completed:	13%
Av Daily Prod L.Km:	40.0
Cum.Sq.Km	39.9383
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	270.0617
% Completed:	13%
Av Daily Prod Sq.Km:	10.0

HOURS	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	8.60					8.60	8.60
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	2.00					2.00	2.00
Detours						-	-
Travel	1.20					1.20	1.20
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down			0.10			0.10	-
Vibes Down			0.10			0.10	-
Prospect/Camp Move						-	-
Traverse Move	0.50					0.50	0.50
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.40**	**0.30**	**0.20**	**-**	**-**	**12.90**	**12.70**
CUM TOTAL	**53.20**	**5.10**	**1.60**	**61.60**	**-**	**121.50**	**58.30**

Client :	1	***Visitor's :***	2
Field Crew :	37		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* Continued recording on Lignum 3D
* Good production
* Spread damage 2.0 = Dingoes & Cattle chewing and dragging spread overnight & large percentage of damage throughout the day on live spread, Troubleshooters having problems around creek areas with very rough terrain, hand carry sections
* Line crew have caught Survey & Dozers, R1414 is the last completed receiver line

* Vibes D/T 0.1 = Checking machines
* Recorder D/T 0.1 = Omit files, reshoot vps

* 1 x Terrex Spatial personnel staying in camp

EXTRAS: Terrex Spatial Personnel: 1
Vehicle:
Meals: **x3**

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Very Hot** **29 - 45°**

Spread Movement:

Client: Lignum 3D **Date:** Friday, 30 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1432	5324	5100	225	1594	5197	5100	98
1426	5324	5060	265	1588	5197	5100	98
1420	5324	5060	265	1582	5201	5100	102
1414	5324	5275	50	1576	5204	5100	105
				1570	5204	5100	105
				1564	5205	5100	106
				1558	5223	5100	124
		Total Stations:	**805**			**Total Stations:**	**738**
		Bad Cables	14			Bad Phones	4
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Very Hot	**Est. Finish**	26/12/2012
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	29/11/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5220			1,563.0	1,558.0	12	2.9500	0.7371		59	
5100-5230			1,557.0	1,552.0	13	3.3000	0.8245		66	
5100-5230			1,551.0	1,546.0	14	3.6000	0.8995		72	
5100-5240			1,545.0	1,540.0	15	8.7000	2.1737		174	
5100-5245			1,539.0	1,534.0	16	9.0000	2.2486		180	
5100-5245			1,533.0	1,528.0	17	9.0000	2.2486	2	178	
5130-5185			1,527.0	1,522.0	18	3.6000	0.8995		72	
5130-5185			1,521.0	1,516.0	19	3.6000	0.8995		72	
Daily Total						**43.7500**	**10.9309**	**2**	**873**	**-**
Cum Total						**123.2500**	**30.7939**	**3**	**2,462**	**-**

Cum.L.Km	**123.2500**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**1117.5000**
% Completed:	**10%**
Av Daily Prod L.Km:	**41.1**
Cum.Sq.Km	**30.7939**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**279.2061**
% Completed:	**10%**
Av Daily Prod Sq.Km:	**10.3**

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	9.50					9.50	9.50
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.20					0.20	0.20
Recorder Moveup						-	-
Spread Damage / Chewage	0.70					0.70	0.70
Detours	0.10					0.10	0.10
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down			0.20			0.20	-
Vibes Down			0.40			0.40	-
Prospect/Camp Move						-	-
Traverse Move	0.50					0.50	0.50
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**12.00**	**0.30**	**0.60**	**-**	**-**	**12.90**	**12.30**
CUM TOTAL	**40.80**	**4.80**	**1.40**	**61.60**	**-**	**108.60**	**45.60**

Client :	1	***Visitor's :***	1
Field Crew :	37		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* Continued recording on Lignum 3D

* Spread damage 0.7 = Dingoes & Cattle chewing spread overnight
* Vibes 0.4 = Refueling & blowing coolers, checking machines
* Recorder D/T 0.2 = 0mit files reshoot vps

* Crew Change 6 x personnel inbound, 6 x personnel outbound from Moomba
* Senex HSE - Peter Huxton outbound from Moomba

Spread Movement:

Client: Lignum 3D **Date:** Thursday, 29 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1444	5244	5100	145	1618	5189	5100	90
1438	5177	5100	78	1612	5189	5100	90
1438	5324	5255	70	1606	5203	5100	104
				1600	5198	5100	99
		Total Stations:	**293**			**Total Stations:**	**383**
		Bad Cables	10			Bad Phones	5
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Line Clearing Personnel:
Vehicle:
Float Hours:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Very Hot** **28 - 45°**

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Hot	**Est. Finish**	27/12/2012
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	28/11/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5100-5190			1,629.0	1,624.0	1	2.7000	0.6746		54	
5100-5190			1,623.0	1,618.0	2	2.7000	0.6746		54	
5100-5190			1,617.0	1,612.0	3	3.0000	0.7495		60	
5100-5195			1,611.0	1,606.0	4	3.3000	0.8245		66	
5100-5195			1,605.0	1,600.0	5	3.3000	0.8245		66	
5100-5195			1,599.0	1,594.0	6	3.3000	0.8245		66	
5100-5195			1,593.0	1,588.0	7	3.6000	0.8995	1	71	
5100-5195			1,587.0	1,582.0	8	3.6000	0.8995		72	
5100-5200			1,581.0	1,576.0	9	6.3000	1.5740		126	
5100-5200			1,575.0	1,570.0	10	6.3000	1.5740		126	
5100-5200			1,569.0	1,564.0	11	6.3000	1.5740		126	
5130-5200			1,563.0	1,558.0	12	4.5000	1.1243		90	
5130-5200			1,557.0	1,552.0	13	4.5000	1.1243		90	
5130-5200			1,551.0	1,546.0	14	4.5000	1.1243		**90**	
Daily Total						**57.9000**	**14.4663**	**1**	**1,157**	**-**
Cum Total						**79.5000**	**19.8630**	**1**	**1,589**	**-**

Cum.L.Km	**79.5000**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**1161.2500**
% Completed:	**6%**
Av Daily Prod L.Km:	**39.8**
Cum.Sq.Km	**19.8630**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**290.1370**
% Completed:	**6%**
Av Daily Prod Sq.Km:	**9.9**

HOURS	**Working Time**	**Standby Time**	**Down Time**	**Non-Charge Time**	**Other 1**	**Total**	**Charge Hours**
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording	11.60					11.60	11.60
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	0.10					0.10	0.10
Recorder Moveup						-	-
Spread Damage / Chewage	0.60					0.60	0.60
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down			0.10			0.10	-
Prospect/Camp Move						-	-
Traverse Move	0.20					0.20	0.20
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**13.50**	**0.30**	**0.10**	**-**	**-**	**13.90**	**13.80**
CUM TOTAL	**28.80**	**4.50**	**0.80**	**61.60**	**-**	**95.70**	**33.30**

Client :	1	***Visitor's :***	2
Field Crew :	37		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* Continued recording on Lignum 3D

* Spread damage 0.6 = Dingoes & Cattle chewing spread overnight
* Vibes 0.1 = Refueling, checking machines

* 1 X personnel driving Spread truck to 404 for spread pickup
* Unknown noise - has been found to be earthquakes around the Innamincka area

* Jarvis Selly - Senex HSE inbound from Moomba
* Jonny Shirley - Senex Ops Manager outbound from Moomba
* 1 x TS personnel outbound from Moomba

Spread Movement:

Client: Lignum 3D **Date:** Wednesday, 28 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1480	5244	5100	145	1630	5189	5100	90
1474	5244	5100	145	1624	5189	5100	90
1468	5244	5100	145				
1462	5244	5100	145				
1456	5244	5100	145				
1450	5244	5100	145				
		Total Stations:	**870**			**Total Stations:**	**180**
		Bad Cables	8			Bad Phones	3
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Line Clearing Personnel:
Vehicle:
Float Hours:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Hot** **22 - 41°**

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Very Hot	**Est. Finish**	22/01/2013
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	27/11/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5125-5170			1,629.0	1,624.0	1	3.0000	0.7495		60	
5125-5170			1,623.0	1,618.0	2	3.0000	0.7495		60	
5130-5170			1,617.0	1,612.0	3	2.7000	0.6746		54	
5125-5170			1,611.0	1,606.0	4	2.7000	0.6746		54	
5125-5170			1,605.0	1,600.0	5	2.7000	0.6746		54	
5125-5170			1,599.0	1,594.0	6	2.7000	0.6746		54	
5125-5165			1,593.0	1,588.0	7	2.4000	0.5996		48	
5125-5165			1,587.0	1,582.0	8	2.4000	0.5996		48	
Daily Total						**21.6000**	**5.3967**	**-**	**432**	**-**
Cum Total						**21.6000**	**5.3967**	**-**	**432**	**-**

Cum.L.Km	**21.6000**
Pgm.L.Km:	**1240.7500**
L.Km.Remain:	**1219.1500**
% Completed:	**2%**
Av Daily Prod L.Km:	**21.6**
Cum.Sq.Km	**5.3967**
Pgm.Sq.Km:	**310.0000**
Sq.Km.Remaining:	**304.6033**
% Completed:	**2%**
Av Daily Prod Sq.Km:	**5.4**

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up				2.30		2.30	-
Recording	4.70					4.70	4.70
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing	2.50					2.50	2.50
Recorder Moveup						-	-
Spread Damage / Chewage	0.60					0.60	0.60
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather		1.00				1.00	1.00
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other		0.10				0.10	0.10
TOTAL	**8.80**	**1.40**	**-**	**2.30**	**-**	**12.50**	**10.20**
CUM TOTAL	**15.30**	**4.20**	**0.70**	**61.60**	**-**	**81.80**	**19.50**

Client :	1	***Visitor's :***	2
Field Crew :	37		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	49	***Heavy Vehicles :***	

COMMENTS:

* Line crew continued & completedInitial Layout
* Started recording on Lignum 3D
* Other 0.1 = Unknown noise affecting spread while recording, Client rep investigating
* Spread damage 0.6 = Dingoes & Cattle chewing spread overnight
* QC 2.5 = Hardwires, parameter reloading & checking
* Senex Operations Manager - Jonny Shirley onsite
* 1 X personnel driving Spread truck to 404 for spread pickup

Spread Movement:

Client: Lignum 3D **Date:** Tuesday, 27 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1528	5244	5211	34				
1522	5244	5100	145				
1516	5244	5100	145				
1510	5244	5100	145				
1504	5244	5100	145				
1498	5244	5100	145				
1492	5244	5100	145				
1486	5244	5100	145				
		Total Stations:	**1049**			**Total Stations:**	**0**
		Bad Cables	5			Bad Phones	3
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Line Clearing Personnel:
Vehicle:
Float Hours:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Very Hot 27 - 42°

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Very Hot	**Est. Finish**	#DIV/0!
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	26/11/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
						0.0000	0.0000			
Daily Total						-	-	-	-	-
Cum Total						-	-	-	-	-

Cum.L.Km	0.0000
Pgm.L.Km:	1240.7500
L.Km.Remain:	1240.7500
% Completed:	0%
Av Daily Prod L.Km:	#DIV/0!
Cum.Sq.Km	0.0000
Pgm.Sq.Km:	310.0000
Sq.Km.Remaining:	310.0000
% Completed:	0%
Av Daily Prod Sq.Km:	#DIV/0!

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up				11.20		11.20	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.00					1.00	1.00
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**1.00**	**0.30**	**-**	**11.20**	**-**	**12.50**	**1.30**
CUM TOTAL	**6.50**	**2.80**	**0.70**	**59.30**	**-**	**69.30**	**9.30**

Client :	1	***Visitor's :***	1
Field Crew :	37		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	49	***Heavy Vehicles :***	

COMMENTS:

* Line crew continued Initial Layout
* Vibe crew completed safety rails on AHV-IV Vibrators
* Dingoes & Cattle chewing spread overnight

* 1 X personnel inbound from 407
* 1 X personnel driving Spread truck to 404 for spread pickup

* Cultural Heritage Breach CoC Boundary - Line clearing & Survey, Investigation continuing
  Report pending

EXTRAS: Line Clearing Personnel:
Vehicle:
Float Hours:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Very Hot 23 - 44°

Spread Movement:

Client: Lignum 3D **Date:** Monday, 26 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1570	5204	5100	105				
1564	5205	5100	106				
1558	5206	5100	107				
1552	5223	5100	124				
1546	5235	5100	136				
1540	5247	5100	148				
1534	5245	5100	146				
1528	5210	5100	111				
		Total Stations:	**983**			**Total Stations:**	**0**
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control: ***Vehicles*** ***0*** **Personnel:** **0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	#DIV/0!
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	25/11/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
						0.0000	0.0000			
Daily Total						-	-	-	-	-
Cum Total						-	-	-	-	-

Cum.L.Km	0.0000
Pgm.L.Km:	1278.9000
L.Km.Remain:	1278.9000
% Completed:	0%
Av Daily Prod L.Km:	0.0
Cum.Sq.Km	0.0000
Pgm.Sq.Km:	304.6400
Sq.Km.Remaining:	304.6400
% Completed:	0%
Av Daily Prod Sq.Km:	0.0

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up				11.00		11.00	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.20					1.20	1.20
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**1.20**	**0.30**	**-**	**11.00**	**-**	**12.50**	**1.50**
CUM TOTAL	**5.50**	**2.50**	**0.70**	**48.10**	**-**	**56.80**	**8.00**

Client :	1	***Visitor's :***	1
Field Crew :	36		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* Line crew started Initial layout

* Vibe crew & CM helping move TC camp South near Tigercat #2
* 1 X personnel driving Spread truck to 404 for spread pickup

Spread Movement:

Client: Lignum 3D — Date: Sunday, 25 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1630	5190	5100	91				
1624	5190	5100	91				
1618	5190	5100	91				
1612	5205	5100	106				
1606	5202	5100	103				
1600	5199	5100	100				
1594	5198	5100	99				
1588	5198	5100	99				
1582	5202	5100	103				
1576	5204	5100	105				
		Total Stations:	988			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Line Clearing — Personnel: — Vehicle: — Float — Hours:

Camp Location/Co-ords :	27° 32'36" Lat	***Trouble Shooters:***	***Security:***
	139° 37'36" Long	Personnel:	Personnel:
Weather :	Fine & Hot 22 - 42°	***Traffic Control:***	***Personnel:***
		Vehicles 0	0

Comments:

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	#DIV/0!
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	24/11/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
						0.0000	0.0000			
Daily Total						-	-	-	-	-
Cum Total						-	-	-	-	-

Cum.L.Km	0.0000
Pgm.L.Km:	1278.9000
L.Km.Remain:	1278.9000
% Completed:	0%
Av Daily Prod L.Km:	0.0
Cum.Sq.Km	0.0000
Pgm.Sq.Km:	304.6400
Sq.Km.Remaining:	304.6400
% Completed:	0%
Av Daily Prod Sq.Km:	0.0

HOURS	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other				9.70		9.70	-
TOTAL	-	0.30	-	9.70	-	10.00	0.30
CUM TOTAL	4.30	2.20	0.70	37.10	-	44.30	6.50

Client :	1	*Visitor's :*	1
Field Crew :	36		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	48	*Heavy Vehicles :*	

COMMENTS:

* 1 X personnel driving Spread truck to 404 for spread pickup
* Camp maitenance & repairs being carried out
* Vibe crew continued fabricating safety rails for machines
* Other 9.7 = Line crew on standby
waiting for line clearing to gain lead.

EXTRAS: Line Clearing Personnel:
Vehicle:
Float Hours:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Hot 23 - 40°

Spread Movement:

Client: Lignum 3D Date: Saturday, 24 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
		Total Stations:	0			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Signage:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*Security:*	*Comments:*
Personnel:	Personnel:	

Traffic Control: *Vehicles* 0 | Personnel: 0

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	#DIV/0!
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	23/11/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
						0.0000	0.0000			
Daily Total						-	-	-	-	-
Cum Total						-	-	-	-	-

Cum.L.Km	0.0000
Pgm.L.Km:	1278.9000
L.Km.Remain:	1278.9000
% Completed:	0%
Av Daily Prod L.Km:	0.0

Cum.Sq.Km	0.0000
Pgm.Sq.Km:	304.6400
Sq.Km.Remaining:	304.6400
% Completed:	0%
Av Daily Prod Sq.Km:	0.0

HOURS	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests	0.80					0.80	0.80
QC Spread						-	-
QC / Daily Tests/Testing	0.70					0.70	0.70
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.30					1.30	1.30
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting			0.70			0.70	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other				7.20		7.20	-
TOTAL	**2.80**	**0.30**	**0.70**	**7.20**	**-**	**11.00**	**3.10**
CUM TOTAL	**4.30**	**1.90**	**0.70**	**27.40**	**-**	**34.30**	**6.20**

Client :	1	***Visitor's :***	
Field Crew :	36		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

Spread Movement:

Client: Lignum 3D **Date:** Friday, 23 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
						Total Stations:	**0**
		Bad Cables				Bad Phones	
						LAUL	0

COMMENTS:

* Observer, Troubleshooter & Vibe crew out to field
* Sweep tests 0.8 = Parameter testing carried out on AHV-IV & Envirovibes
* Other 7.2 = Vibe maintenance, repairs & fabricating safety rails for machines
* 0.7 = Troubleshoot test line R1552

* Line crew on standby
waiting for line clearing to gain lead.

* Crew change 8 x Personnel inbound, 7 x outbound from Moomba
* 2 x Personnel driving to Brisbane
* Cameron Belcher outbound from Moomba

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Line Clearing Personnel:
Vehicle:
Float Hours:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Hot 15 - 39°

Traffic Control:	**Personnel:**
Vehicles ***0***	**0**

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PEL 104 & 111	Client Rep:	Mark Kneipp	Acq Start Date	27/11/2012
Client:	Senex Energy	State:	SA	Weather:	Fine & Hot	Est. Finish	#DIV/0!
Survey Name:	Lignum 3D	Crew Mgr:	David Keat	Date:	21/11/2012	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
						0.0000	0.0000			
Daily Total						-	-	-	-	-
Cum Total						-	-	-	-	-

Cum.L.Km	0.0000
Pgm.L.Km:	1278.9000
L.Km.Remain:	1278.9000
% Completed:	0%
Av Daily Prod L.Km:	0.0

Cum.Sq.Km	0.0000
Pgm.Sq.Km:	304.6400
Sq.Km.Remaining:	304.6400
% Completed:	0%
Av Daily Prod Sq.Km:	0.0

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup				6.00		6.00	-
Inductions						-	-
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up				3.20		3.20	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel						-	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move				2.50		2.50	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	-	0.30	-	11.70	-	12.00	0.30
CUM TOTAL	-	0.30	-	11.70	-	12.00	0.30

Client :	1	***Visitor's :***	1
Field Crew :	36		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* Camp move to Senex Lignum 3D

* Camp move = 2.5
* Packup/setup camp = 6.0, on Tigercat #2 pad
* Small line crew assembled and loaded trucks for Test line, 135 channels on 1552
  Inductions held by Peter Huxton at TC camp for initial testing crew
* Risk Assessment carried out on Vibrators with Terrex CM, HSE,Vibe crew & Senex CR, HSE

* Senex Senior Geo - Cameron Belcher arrived onsite to oversee parameter testing

EXTRAS: Line Clearing Personnel:
Vehicle:
Float Hours:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : Fine & Hot 15 - 33°

Spread Movement:

Client: Lignum 3D **Date:** Wednesday, 21 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1552	5100	5235	136				
		Total Stations:	136			**Total Stations:**	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	

Traffic Control:	
Vehicles	***0***

Personnel:
0

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	**Area:**	PEL 104 & 111	**Client Rep:**	Mark Kneipp	**Acq Start Date**	27/11/2012
Client:	Senex Energy	**State:**	SA	**Weather:**	Fine & Hot	**Est. Finish**	#DIV/0!
Survey Name:	Lignum 3D	**Crew Mgr:**	David Keat	**Date:**	22/11/2012	**2D / 3D**	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
						0.0000	0.0000			
Daily Total						-	-	-	-	-
Cum Total						-	-	-	-	-

Cum.L.Km	0.0000
Pgm.L.Km:	1278.9000
L.Km.Remain:	1278.9000
% Completed:	0%
Av Daily Prod L.Km:	0.0
Cum.Sq.Km	0.0000
Pgm.Sq.Km:	304.6400
Sq.Km.Remaining:	304.6400
% Completed:	0%
Av Daily Prod Sq.Km:	0.0

HOURS

	Working Time	Standby Time	Down Time	Non-Charge Time	Other 1	Total	Charge Hours
	Charge	Charge	N/Charge	N/Charge	N/Charge		
Camp Setup/Packup						-	-
Inductions		1.00				1.00	1.00
Toolbox / Ind / S-Meeting		0.30				0.30	0.30
Recorder Setup						-	-
Initial Layout/Pick up						-	-
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests				8.50		8.50	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel	1.50					1.50	1.50
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**1.50**	**1.30**	**-**	**8.50**	**-**	**11.30**	**2.80**
CUM TOTAL	**1.50**	**1.60**	**-**	**20.20**	**-**	**23.30**	**3.10**

Client :	1	***Visitor's :***	1
Field Crew :	37		
Camp Crew :	13	***Light Vehicles :***	
Total Crew :	50	***Heavy Vehicles :***	

COMMENTS:

* Inductions held by HSE Peter Huxton (Senex) & Brad Harrison (Terrex)
* Observer, Troubleshooter & Vibe crew out to field
* Hardwires 8.5 = Changing instruments & radios from AHV-IV to Enviro's, Problems with torque motors on both sets of vibes, repairs carried out and ready for parameter testing tomorrow

* Line crew preparing all vehicles for Initial layout, crew on standby waiting for line clearing to gain lead.

* 2 x Personnel inbound from Moomba

Spread Movement:

Client: Lignum 3D **Date:** Thursday, 22 November 2012

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
			Total Stations:	**0**			**Total Stations:**	**0**
			Bad Cables				Bad Phones	
							LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Signage:***
Personnel:	Personnel:	Personnel:	Personnel:

EXTRAS: Line Clearing Personnel:
Vehicle:
Float Hours:

Camp Location/Co-ords : 27° 32'36" Lat
139° 37'36" Long

Weather : **Fine & Hot** **23 - 36°**

Trouble Shooters:	***Security:***	***Comments:***
Personnel:	Personnel:	
Traffic Control:	**Personnel:**	
Vehicles ***0***	**0**	

Crew Manager Client Rep

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Seismic Data Processing Report

3D Land

For: ***SENEX Energy Limited***

Area: ***PEL 104 , 111 & PPL240, Cooper Basin***

Survey: ***Lignum 3D***

CGG Australia				
38 Ord Street			February 10, 2014	
WEST PERTH WA 6005				
AUSTRALIA				
		Compiled by:		
Tel:	(08) 9214 6200	*Marwoto*		
Fax:	(08) 9214 6222	*Anatoly Osadchuk*		

Contents

Table of Figures

1 Introduction

1.01 Scope of report

This report describes 320 sq. km seismic data processing of Lignum 3D 2012 onshore survey for SENEX Energy Ltd by CGG between February 2012 and December 2013.

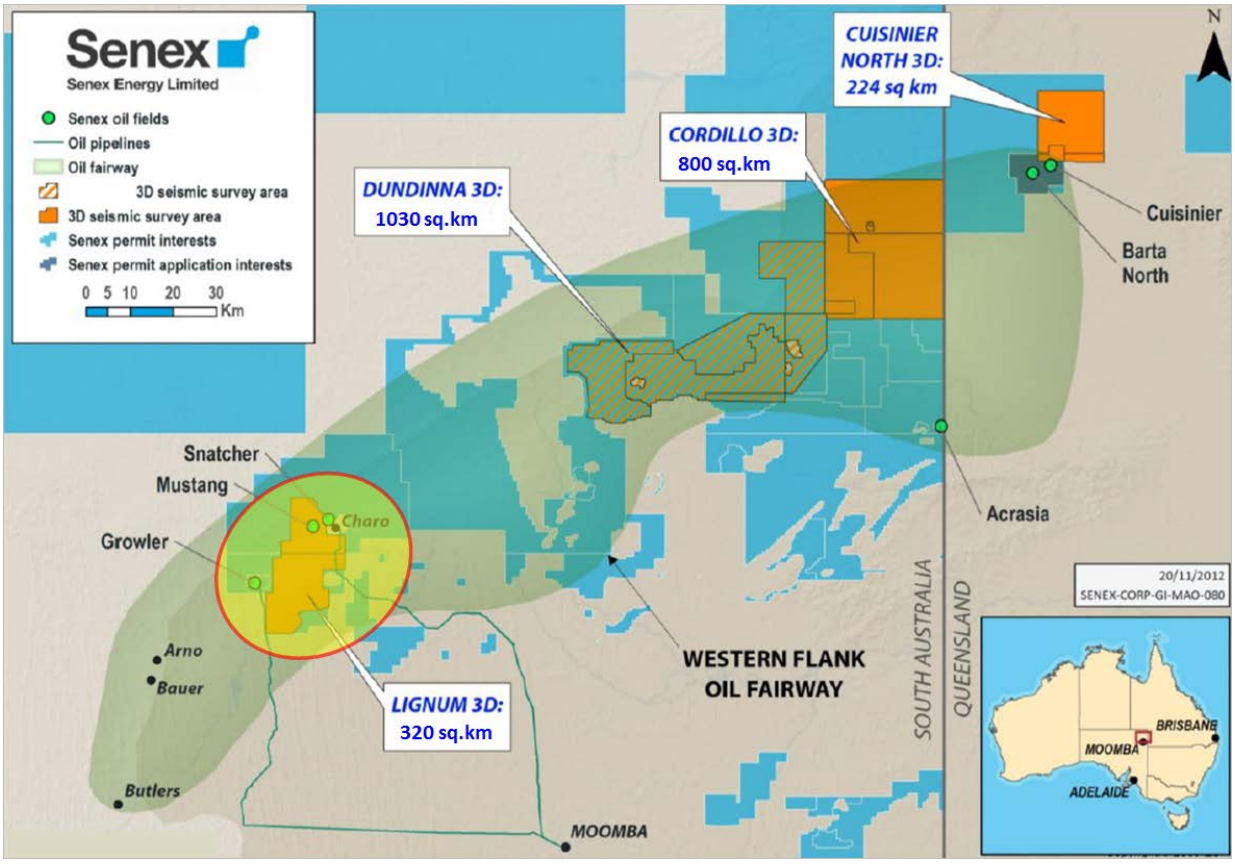


Figure 1 Lignum 3D in SENEX exploration campaign context

Project management and parameter testing were conducted in Perth and production was run at CGG processing hub in Singapore.

The project is registered under CGG project number ph109se.

1.02 Purpose and objectives of the processing

The processing goals were high SNR, good temporal resolution, pre-stack time migrated datasets suitable for AVO and AVAZ analyses.

1.03 Personnel

SENEX :

Irwan Djamaludin	*Geophysicist*
Cameron Belcher	*Senior Geophysicist*

For CGG:

Marwoto	*Project Leader*
Anatoly Osadchuk	*Sr. Team Leader*
Nigel Mudge	*Centre Manager*

1.04 Acquisition Parameters

General Parameters	
Survey Name	Lignum 3D
Acquisition contractor	Terrex Seismic Crew 402
Year acquired	2012-2013
Volume	320 km^2
Correlated Record Length	3 sec
Acquisition Sample Interval	2 ms
Channels per record	1920 (16 lines x 120 Channels live)
Acquisition Filter	High: 0.8 Nyquist-Linear
Bin size	25x25m
Nominal CMP Fold	96
Source Parameters	
Source type	I/O AVH-IV
Electronics	Vib Pro
Source peg interval	50 m
Source line interval	250 m
Source array	2 Vibs (12.5m PAD TO PAD)
Drive Level	80% force
Sweep frequency	8-95Hz
Sweep amplitude taper	200 ms
Sweep type	Linear
Sweep length	7 sec
Sweeps per VP	1 standing sweep
Phase Lock	N/A
Amplitude control	N/A
Receiver Parameters	
Receiver interval	50 m
Receiver line interval	300 m
Receiver array	12 phones 4.16m apart
Receiver array dimensions	50m Centred on Station
Spread	1920 (16 lines x 120 Channels live)
Instrumentation	
Recorder	SERCEL 428
Geophone	N/A
Pre-Amp Gain	12 DB
Sum	N/A
Correlation	With Pilot

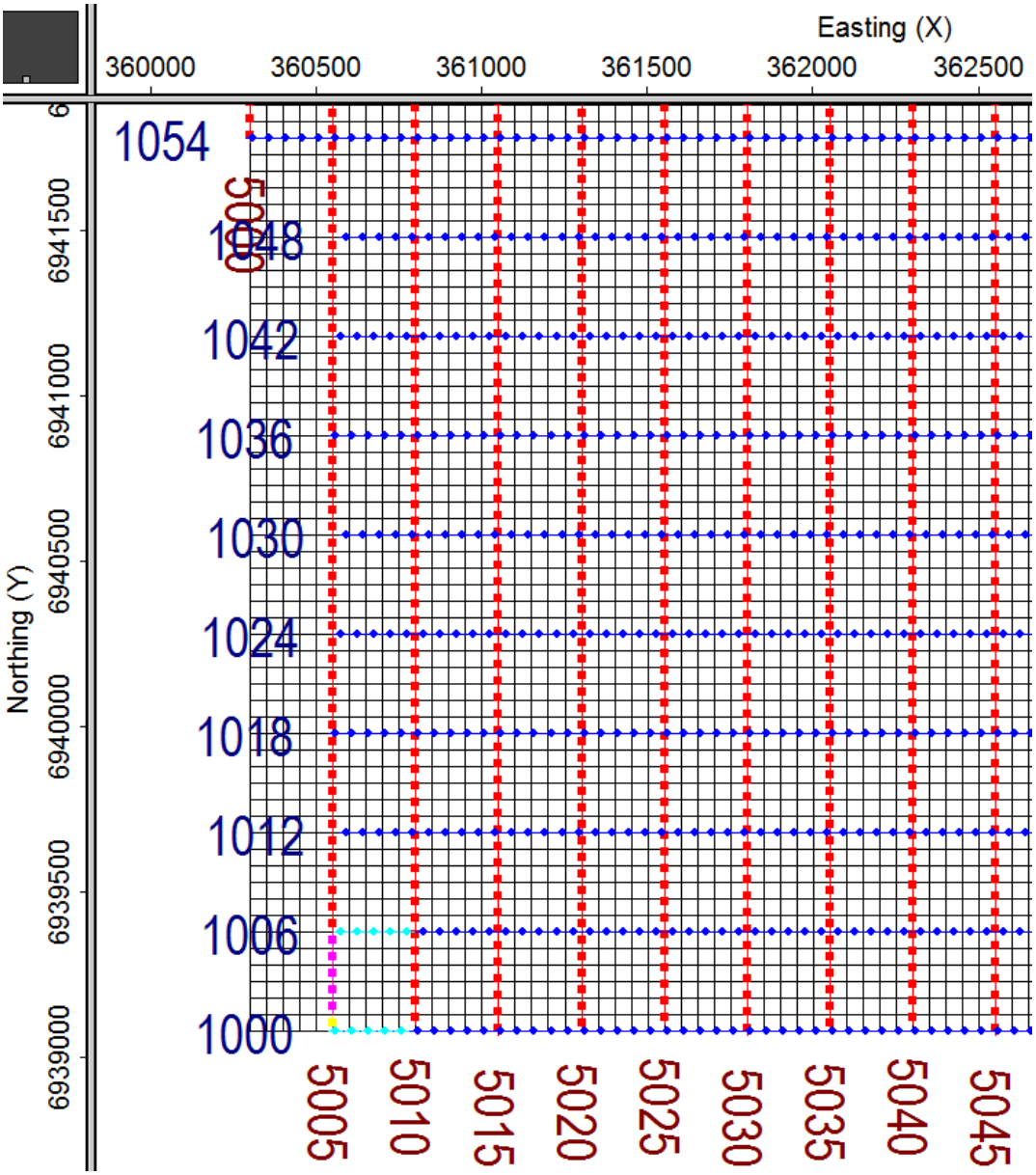


Figure 2 Acquisition Grid: Receivers - Blue, Shots – Red. RL/SL 300x250m. SP&RCV Int 50m

2 Processing

2.01 Processing Sequence and Deliverables Summary

1. **SEG-D input** TL/SI=3000/2ms
2. **Nav merge and 3D gridding**
3. **First Break Picking and Tomo Statics**
4. **Conversion from Zero- to Minimum Phase**
5. **Resample** 2ms-> 4ms
6. **VT^2 Spherical Amplitude Compensation and Global Scaling to 5000**
7. **Anomalous Amplitude Attenuation/Despiking**
8. **VA01** 1x1km**.** Input provisional LNA and Single Trace Decon and Elevation Statics
9. **Apply LW Tomostatic+Residual Statics #1**
10. **Gabor Surface Consistent Deconvolution**

11. **Linear Noise/Groundroll Attenuatiom**
12. **Random Noise Attenuation**
13. **3DTauP Deconvolution**
14. **Surface Consistent Amplitude Correction**
15. **VA02** 1x1km
16. **Compute/Apply Surface Consistent Residual Statics #2**

Common Offset Vector Route (COV)
Input from step #16

A1. **A1. Split to 95** COV
A2. **A2. COV domain regularization REG3D**
A3. **A3. Remove TV^2 Amplitude Compensation**
A4. 3D PSTM to VA03 Lines
A5. **VA03** 1x1km
A6. **3D PSTM** with smoothed VA03
A7. **VA03A** 1x1km to guide autopicking
A8. **VA04.** Dense Vstk and Eta 25x25m autopicking
A9. **NMO** VA04 Vstk/Eta
A10. **Radon3D**
A11. **VA05** 25x25m Azimuthal: Vfast, Vslow, Azimuth ω
A12. **AzNMO** VA05
A13. **Gather Flattenning** (Trim)
A14. **Shift from Processing to MSL=0m Datum**
A14.1 SPARN de-noise → Output
A14.11 Same Offsets Summed → Output
A15. **Stack** with 35deg mute
A16. **Inv-Q Amplitude only**
A17. **Spectral Correction**
A18. **Time variant gain 4dB/sec**
A19. **CADZO de-noise**
A20. **Final PSTM Stack**

5D Interpolation Route (5D int)
Input from step #16

B1. **5D Interpolation/Regularization** to 345 fold
B2. **Remove TV^2 Amplitude Compensation**
B3. **3D PSTM** with smoothed VA03
B4. **VA03A** 1x1km to guide autopicking
B5. **VA04.** Dense Vstk and Eta 25x25m autopicking
B6. **NMO** VA04 Vstk/Eta
B7. **Radon3D**
B8. **VA05** 25x25m Azimuthal: Vfast, Vslow, Azimuth ω
B9. **AzNMO** VA05
B10. **Gather Flattenning** (Trim)
B11. **Shift from Processing to MSL=0m Datum**
B11.1 SPARN de-noise → Output
B11.11 Same Offsets Summed → Output
B12. **Stack**
B13. **Inv-Q Amplitude only**
B14. **Spectral Correction**
B15. **Time variant gain 4dB/sec**
B16. **Final PSTM Stack**

Table 1. Deliverables generated in the course of processing

	Deliverable	Filename	Format	Media	Number of Copies	Datum	Comment
		Seismic Gathers					
1	Raw Shot Gathers with Geom	Raw_Shot_Gathers.sgy	SEGY	USB# U00176	1	N/A	
2	Pre-Interpolation CMP gathers	PreInterpolation_CMP_Gathers.sgy	SEGY	USB# U00176	1	Float	NMO and Sph Amplitude compensation backed off
	COV Route						
3	95-fold Raw PSTM gathers (COV)	Raw_PSTM_Gathers_COV_NoNMO.sgy	SEGY	USB# U00176	1	Float	NMO backed off
4	95-fold Raw PSTM gathers (COV)	Raw_PSTM_Gathers_COV_WithNMO.sgy	SEGY	USB# U00176	1	MSL	NMO applied
5	95-fold Processed PSTM Gathers for Azimuthal Analysis (COV)	PSTM_Gathers_COV.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, AzNMO, Trim
6	95-fold Processed PSTM Gathers for AVO Analysis (COV)	PSTM_Gathers_COV_Sparn.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, AzNMO, Trim, SPARN
7	52-fold Processed PSTM Gathers for AVO Analysis (COV)	PSTM_Gathers_COV_Sparn_OffSum.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, AzNMO, Trim, SPARN , Same Offsets Summed
	5D Interpolation Route						
8	345-fold Raw PSTM gathers (5D int)	Raw_PSTM_Gathers_5Dint_NoNMO.sgy	SEGY	USB# U00176	1	Float	NMO backed off
9	345-fold Raw PSTM gathers (5D int)	Raw_PSTM_Gathers_5Dint_WithNMO.sgy	SEGY	USB# U00176	1	MSL	NMO applied
10	345-fold Processed PSTM Gathers for Azimuthal Analysis (5D int)	PSTM_Gathers_5Dint_Radon3D_ILxx.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim
11	345-fold Processed PSTM Gathers for AVO Analysis (5D int)	PSTM_Gathers_5Dint_Radon3D_Sparn_ILxx.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim, SPARN
12	95-fold Processed PSTM Gathers for AVO Analysis (5D int)	PSTM_Gathers_5Dint_Radon3D_Sparn_OffSum_ILxx.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim, SPARN , Same Offsets Summed
13	Azimuthal PSTM gathers Az= 00deg (5D int)	PSTM_Gathers_5Dint_Radon3D_Sparn_OffSum_000deg.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim, SPARN , Same Offsets Summed
14	Azimuthal PSTM gathers Az= 45deg (5D int)	PSTM_Gathers_5Dint_Radon3D_Sparn_OffSum_045deg.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim, SPARN , Same Offsets Summed
15	Azimuthal PSTM gathers Az= 90deg (5D int)	PSTM_Gathers_5Dint_Radon3D_Sparn_OffSum_090deg.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim, SPARN , Same Offsets Summed
16	Azimuthal PSTM gathers Az= 135deg (5D int)	PSTM_Gathers_5Dint_Radon3D_Sparn_OffSum_135deg.sgy	SEGY	USB# U00175	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim, SPARN , Same Offsets Summed

		Seismic Cubes					
	COV Route						
17	95-fold Raw Full Fold Stack without Q (COV)	19A_COV_Raw_PSTM_FullFold_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim, Post-stack CADZO
18	95-fold Raw Full Fold Stack with Q (COV)	20A_COV_Raw_PSTM_FullFold_Stack_Inv Q.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim, Inv-Q, Post-stack CADZO
19	95-fold Final Full Fold Stack wihtout Q (COV)	21A_COV_Final_PSTM_FullFold_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim,Spectral Correction , Time-Variant Gain , Post-stack CADZO
20	95-fold Final Full Fold Stack with Q (COV)	22A_COV_Final_PSTM_FullFold_Stack_Inv Q.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim,Inv_Q, Spectral Correction , Time-Variant Gain , Post-stack CADZO
21	Angle Stack 00-15deg (COV)	23A_COV_PSTM_00_15deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim, Post-stack CADZO
22	Angle Stack 15-25deg (COV)	23A_COV_PSTM_15_25deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim, Post-stack CADZO
23	Angle Stack 25-35deg (COV)	23A_COV_PSTM_25_35deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim, Post-stack CADZO
24	Angle Stack 35-45deg (COV)	23A_COV_PSTM_35_45deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim, Post-stack CADZO
25	Angle Stack 45-55deg (COV)	23A_COV_PSTM_45_55deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, AzNMO, Trim, Post-stack CADZO
	5D Interpolation Route						
26	345-fold Raw Full Fold Stack without Q (5D int)	14A_5Dint_Raw_PSTM_FullFold_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim
27	345-fold Raw Full Fold Stack with Q (5D int)	15A_5Dint_Raw_PSTM_FullFold_Stack_Inv Q.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim, Inv-Q
28	345-fold Final Full Fold Stack wihtout Q (5D int)	16A_5Dint_Final_PSTM_FullFold_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,Spectral Correction , Time-Variant Gain
29	345-fold Final Full Fold Stack with Q (5D int)	17A_5Dint_Final_PSTM_FullFold_Stack_Inv Q.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,Inv-Q, Spectral Correction , Time-Variant Gain
30	Angle Stack 00-15deg (5D int)	18A_5Dint_PSTM_00_15deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,
31	Angle Stack 15-25deg (5D int)	18A_5Dint_PSTM_15_25deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,
32	Angle Stack 25-35deg (5D int)	18A_5Dint_PSTM_25_35deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,
33	Angle Stack 35-45deg (5D int)	18A_5Dint_PSTM_35_45deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,
34	Angle Stack 45-55deg (5D int)	18A_5Dint_PSTM_45_55deg_Stack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,

35	Azimuthal stack Az=00deg (5D int)	24A_5Dint_PSTM_000Deg_AzimuthalStack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,
36	Azimuthal stack Az=45deg (5D int)	24A_5Dint_PSTM_045Deg_AzimuthalStack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,
37	Azimuthal stack Az=90deg (5D int)	24A_5Dint_PSTM_090Deg_AzimuthalStack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,
38	Azimuthal stack Az=135deg (5D int)	24A_5Dint_PSTM_135Deg_AzimuthalStack.sgy	SEGY	USB# U002	1	MSL	Vnmo/Eta, Radon3D, AzNMO, Trim,
		Kinematic Attribute Cubes					
39	VA04 HDPIC Dense 25x25m **Vnmo** Velocity (5D int)	25A_DenseStackingVelocity_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
40	VA04 HDPIC Dense 25x25m **Eta** (5D int)	26A_DenseEffectiveEta_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
41	VA04 HDPIC Dense 25x25m Dix Velocity **(5D int)**	27A_DenseVerticalVint_DixVnmo_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
42	VA04 HDPIC Dense 25x25m Dix "Horizontal" Velocity (5D int)	28A_DenseHorizontalVint_DixVanelliptical_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
43	VA05 ANIMA Azimuthal Dense 25x25m **Vnmo fast** (5D int)	29A_Dense_VNMO_Fast_Cube_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
44	VA05 ANIMA Azimuthal Dense 25x25m **Vnmo slow (5D int)**	30A_Dense_VNMO_Slow_Cube_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
45	VA05 ANIMA Azimuthal Dense 25x25m Vnmo **fast Azimuth (5D int)**	31A_Dense_VNMO_Azimuth_Cube_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
46	VA05 ANIMA Kdensity Dense 25x25m Vnmo **fast Azimuth (5D int)**	32A_Dense_VNMO_Kdensity_Cube_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
		Extra Products (experimental, not in Contract)					
	Kinematic Fracture Analysis						
47	VA05 Kint - Fracture Density Indicator Cube (5D int)	33A_Dense_VINT_Anisotropy_Coefficient_Cube_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
48	VA05 Fast Vint Azimuth - Fracture Orientation Indicator (5D int)	34A_Dense_VINT_Azimuth_Cube_FixedDatum.sgy	SEGY	USB# U002	1	MSL	
	Amplitude Fracture Analysis (Ruger AVAz)						
49	Intercept Cube (5 int)	35A_InterceptCubeA.sgy	SEGY	USB# U002	1	MSL	
50	Isotropic Gradient Cube (5D int)	36A_IsotropicGradientCubeBiso.sgy	SEGY	USB# U002	1	MSL	
51	Anisotropic Gradient Cube (5D int)	37A_AnisotropicGradientCubeBani.sgy	SEGY	USB# U002	1	MSL	

52	Azimuthal Gradient Cube (5D int)	38A_AzimuthalGradientCubeQfrac.sgy	SEGY	USB# U002	1	MSL	
		ASCII Attributes					
53	Floating Datum	Lignum3D_FloatingDatum.txt	ascii	USB# U002	1	N/A	IL/XL/X/Y/Static Shift
54	Tomo LW Statics and Residual Statics	Lignum3D_Tomostatics_and_ResidualStatics.txt	ascii	USB #U002	1	N/A	Tomostatics and Residual Statics
55	Stacking Velocity VA02 1x1km	VA02_StackingVelocity1x1km_WesternFormat.txt	ascii	USB# U002	1	Float	Last VA of un-migrated data On Processing Datum
56	Migration Velocity Smooth VA03 1x1km	VA03_MigrationVelocitySmooth1x1km_WesternFormat.sgy	ascii	USB# U002	1	Float	Smoothed VA03. On Processing Datum
57	Post PSTM Velocity VA03A 1x1km - hand picked	VA03A_PostPSTM_Velocity1x1km_WesternFormat.sgy	ascii	USB# U002	1	Float	Post PSTM Velocity - hand picked Velocity On Processing Datum
58	Post PSTM Dense VA04 extract 250x250m/50ms	VA04_PostPSTM_DenseVelocity250x250m_WesternFormat.sgy	ascii	USB# U002	1	Float	Post PSTM Velocity - Automatic Dense Velocity On Processing Datum
59	Bin Cordinates with PSTM CDP Fold (COV)	Lignum3D_BinCoordinat_PSTM_FoldCover_COV.txt	ascii	USB# U002	1	N/A	IL/XL/X/Y/Final Stack Fold
	Bin Cordinates with PSTM CDP Fold (5D int)	Lignum3D_BinCoordinat_PSTM_FoldCover_5Dint.txt	ascii	USB# U002	1	N/A	IL/XL/X/Y/Final Stack Fold
60	Processing Report		pdf	DVD #2	1		

2.02 SEG-D Input

At this step SEG-D field records 3s/2ms were converted to CGG internal format.

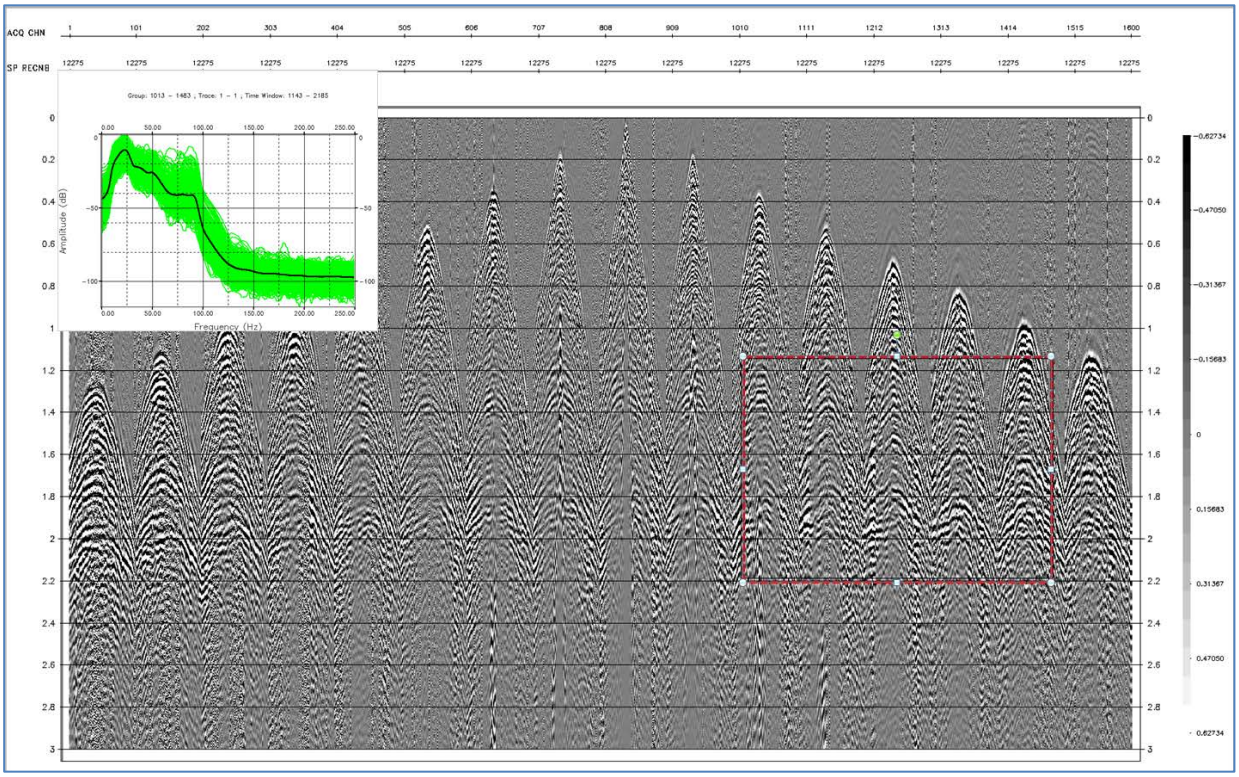
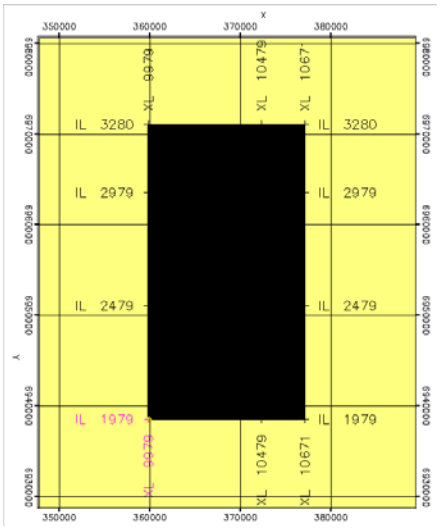


Figure 3 Lignum raw shot record example

Data was found to be in good technical condition: no digital distortions, no corrupted headers encountered.

2.03 Geometry and Grid

Geometry database was created from SPS files, loaded to trace headers and gridded to 3D CMP as follows:



Geodetic Datum **GDA94**
Projection Zone **54S**

Grid Corners (INL/CRL) (X/Y):

(1979, 9979) (359788.40000, 6938566.40000)
(3280, 9979) (359788.40000, 6971091.40000)
(3280, 10671) (377088.40000, 6971091.40000)
(1979, 10671) (377088.40000, 6938566.40000)

INL/XL Increment 1/1
CMP Cell size 25x25m

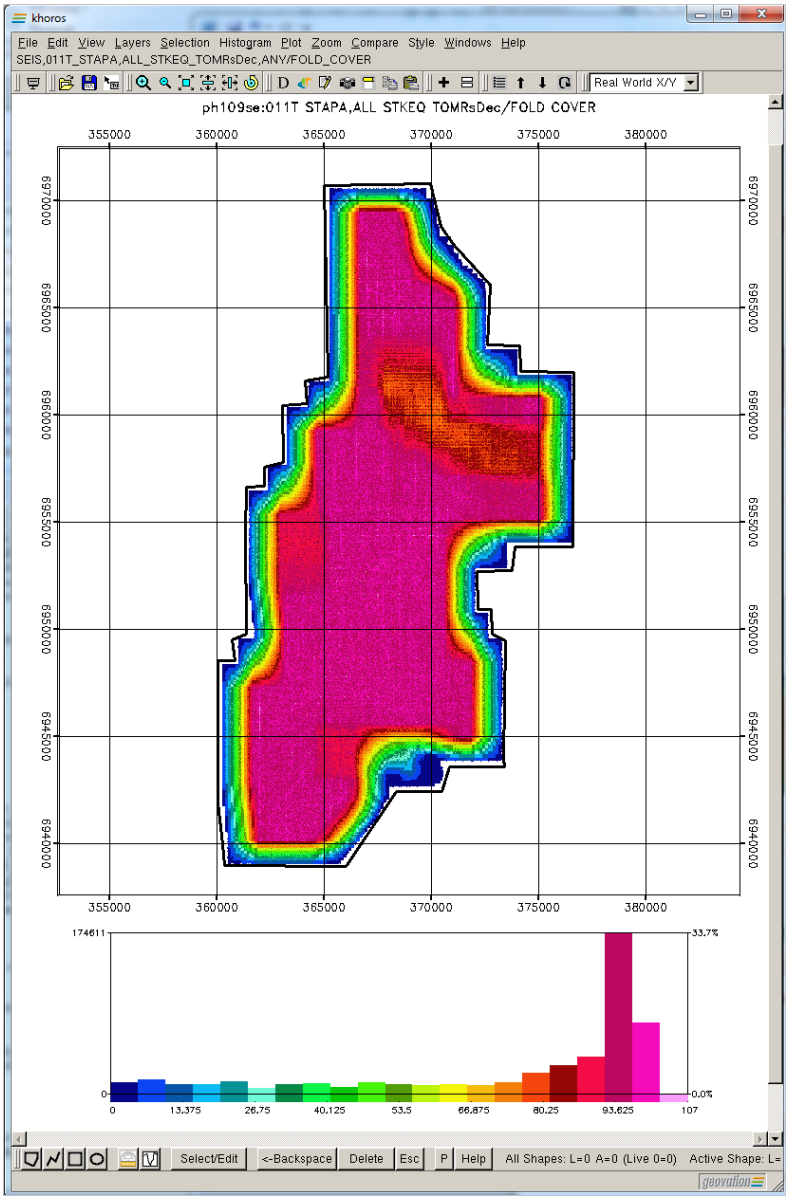


Figure 4 Raw Stack Fold Map

Survey Polygon

XY	360271.256	6939951.339
XY	360033.071	6941890.842
XY	360033.071	6948525.985
XY	360815.678	6948560.011
XY	360713.599	6949512.750
XY	361360.100	6949784.961
XY	361326.073	6954480.601
XY	361360.100	6956658.289
XY	362210.759	6956692.315
XY	362210.759	6957577.001
XY	363095.445	6957781.159
XY	363061.418	6960469.243
XY	364184.289	6960537.295
XY	364116.236	6961626.139
XY	365171.054	6961762.245
XY	365000.922	6970745.208
XY	369934.746	6970813.260
XY	370445.142	6968839.731
XY	371023.590	6967989.071
XY	371942.302	6966968.280
XY	372724.909	6966083.594
XY	372622.830	6963293.432
XY	374119.990	6963225.379
XY	374154.017	6962068.482
XY	376637.942	6962000.429
XY	376603.916	6953868.126
XY	373881.806	6953868.126
XY	373779.726	6952745.255
XY	372112.434	6952711.229
XY	372180.487	6950941.858
XY	372792.962	6950941.858
XY	372826.988	6949784.961
XY	373439.463	6949478.724
XY	373371.410	6943932.424
XY	373405.436	6943592.161
XY	370819.432	6943592.161
XY	370479.168	6942435.264
XY	368369.533	6942435.264
XY	366021.713	6938930.547
XY	360339.308	6938964.574

2.04 Conversion from Zero- to Minimum-Phase and Resampling

The input Klauder wavelet corresponding to 8-95Hz/7s/200ms sweep was extracted from a field record auxiliary channel. Figure 5 illustrates the process and demonstrates that minimum-phasing operator M(z) does a good minimum-phasing on a more realistic signal, namely Klauder after 1.7s travel in an attenuating Q=120 medium (simulation by Forward Q modeling).

Resampling from 2ms to 4ms which followed, was performed without prior anti-alias filter.

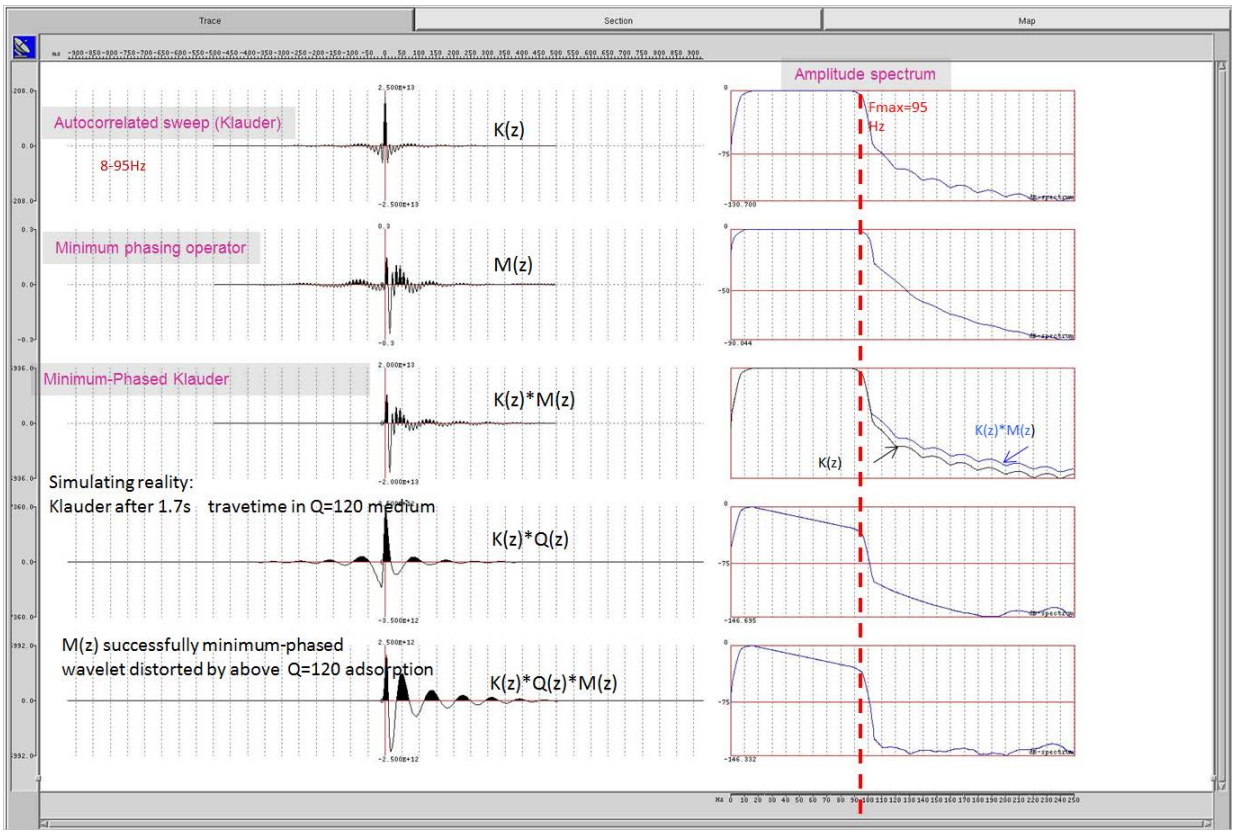


Figure 5 Minimum Phasing Filter design

2.05 First Breaks and Long Wave Statics

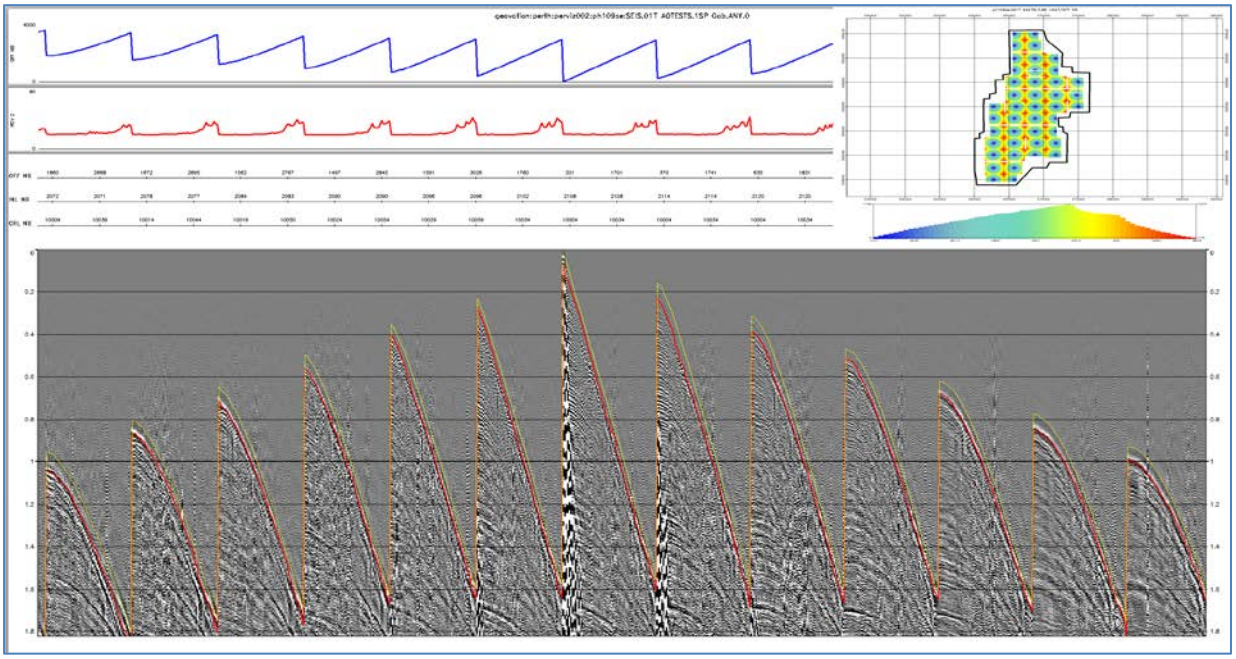


Figure 6 First Breaks QC in XSpead domain. YLW – guide, RED – real picks. Top right XSpeads used to QC FB picks

First breaks were auto-picked on raw shots and qc'd over survey area on XSpread gathers. Four different static solutions were derived and compared to ascertain the optimal statics for the observed weathering.

An *Elevation Static* correction was based on a constant depth of weathering of 20 metres at 814 m/sec overtop of a subweathering layer of 1958 metres/second down to a datum of sea level.

This model was also input along with the first break picks and iterated to converge on an *LMI static* solution. LMI – Linear Model Inversion - uses first breaks to update the depth of weathering and subweathering velocity of initial model to fit the first breaks.

The *Tomo Statics* initial model was a simple 3 layer: thickness/Vz: 30m/1200m/s, 300m/1800m/s, 2100m/s below.
Tomo non-linear solution treats first-breaks as diving rays events and inverts traveltimes to V(z,x,y) tomogram by computing Vz of each cell. Model sampling used 40x100x100m

The *Uphole static* model was created using the uphole information provided. For this the uphole depths and vertical times were 3D interpolated/extrapolated in Tornado and Tz at depth slice Z=0m was used as statics.

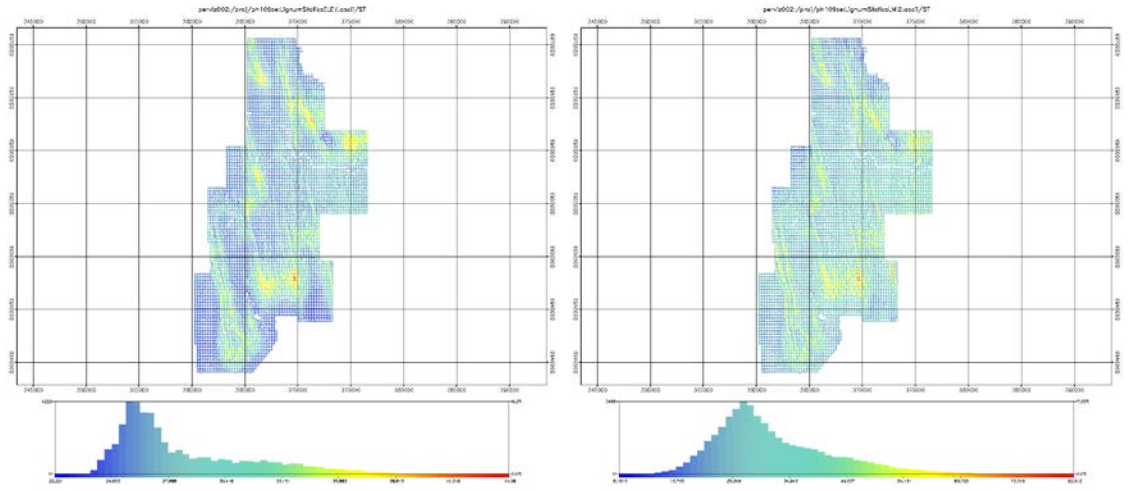


Figure 7 Elevation Statics Med=29ms (LHS) and LMI Statics Med=27ms (RHS)

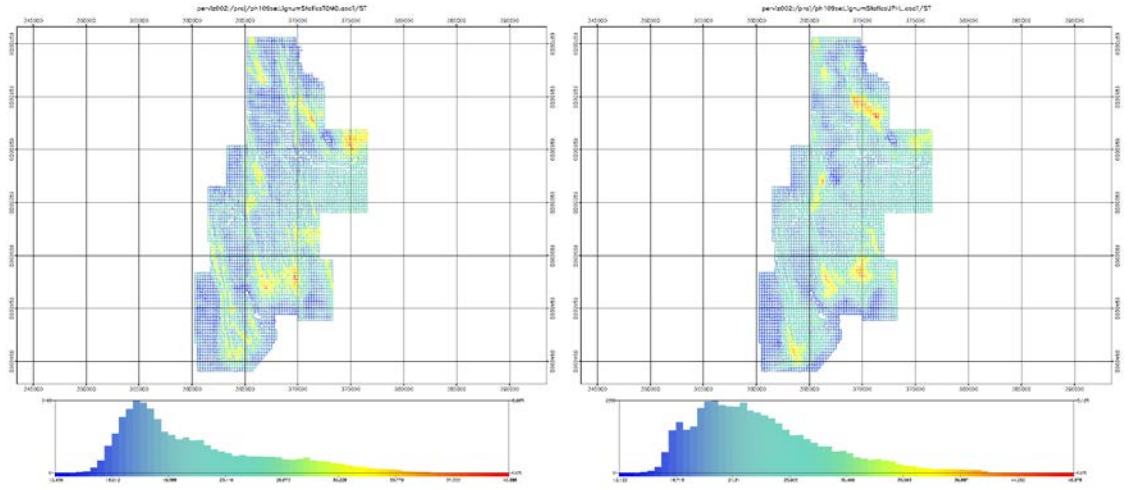


Figure 8 Tomo Statics Med=17ms (LHS) and Uphole Statics Med=20ms (RHS)

After extensive qc on maps and stack cubes, for production SENEX approved tomostatics.

2.06 Anomalous amplitudes/noise bursts attenuation

Vibroseis data at input to processing is represented by correlograms generated in field from originally recorded vibrogram. Even if there were any spikes at a vibrogram, after correlation they are transformed to a lengthy noise trains. Such trains can be detected by comparing trace amplitudes of adjacent traces in a sliding window against their median value. Once detected, an anomalous trace fragment is scaled down by M/A, where M is median and A – anomalous amplitude.

Production Parameters:

Number of traces in sliding window:	7
Sliding window length:	300ms
Anomalous Amplitude threshold:	3.5

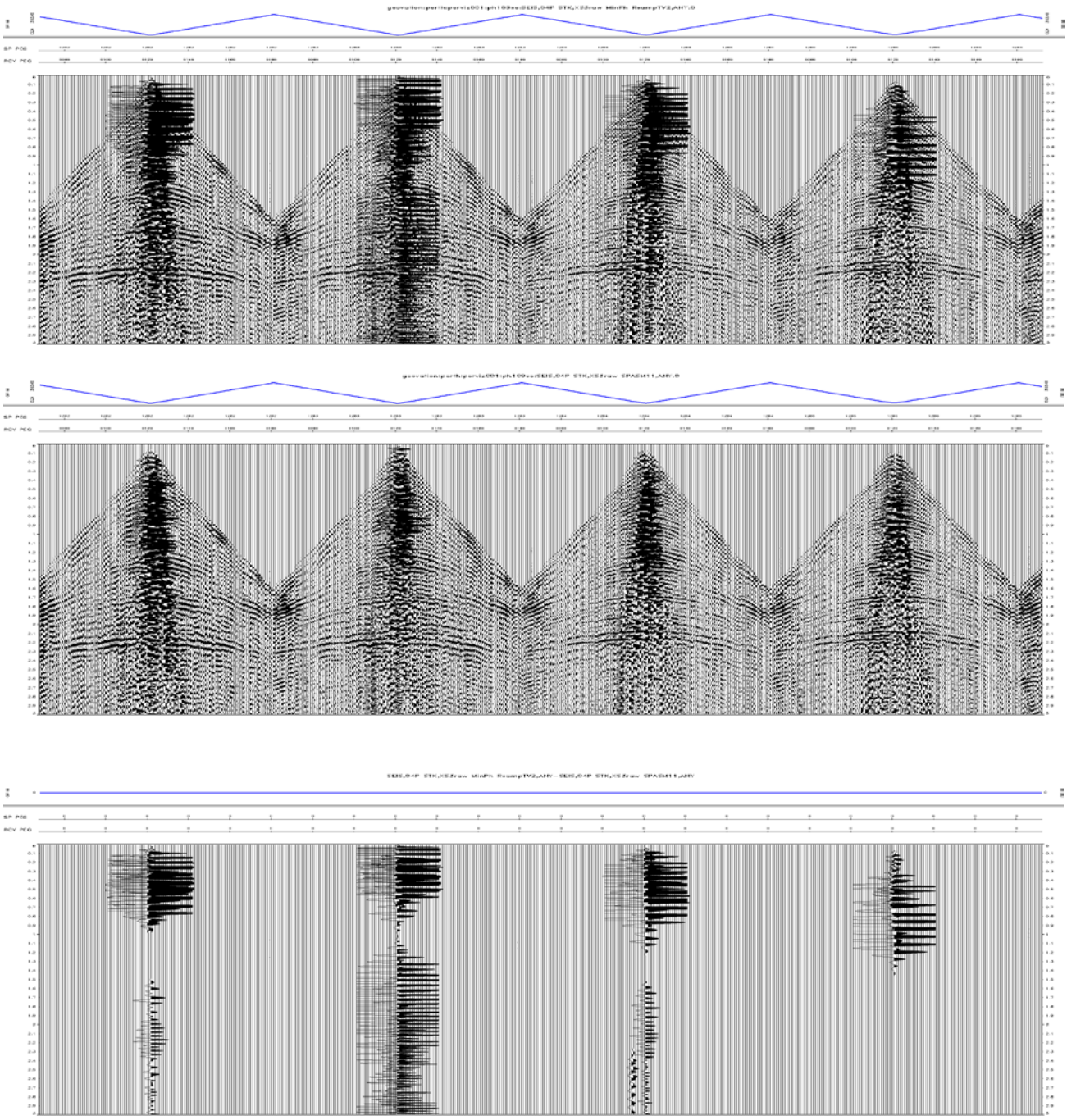


Figure 9 Noise burst example. Before, after attenuation and difference

2.07 Gabor Deconvolution

GABOR performs deconvolution and spectral balancing in one go using Gabor transforms. It can be applied to prestack or post-stack data.

Here it was applied in a Surface Consistent mode. All the available traces are used to simultaneously estimate five components of the wavelets embedded in the seismic traces. A survey-average component is estimated to ensure more stable estimates of the shot, receiver, offset, and CDP components. All these components are estimated, but *only shot and receiver applied.*

The Gabor transforms are used to capture the time-variant properties of seismic traces. The conventional stationary convolutional trace model is extended to a nonstationary convolutional model, where a time-variant wavelet can be estimated and deconvolved in the Gabor domain.

Gabor deconvolution can give better estimates of seismic reflectivity series when seismic wavelets change rapidly in time. Intuitively, the Gabor deconvolution algorithm can be considered an advanced multiwindow deconvolution method, which performs deconvolution and attenuation compensation at the same time.

To test SC Gabor decon all data was processed twice, first using SC Spiking deconvolution and then – Gabor.

SC Spiking Decon Parameters

Design window:	Horizon driven
Operator Length:	160ms
WF	1%

SC Gabor Decon Parameters

Smoothing in Time:	400ms
Smoothing in Frequency:	10Hz

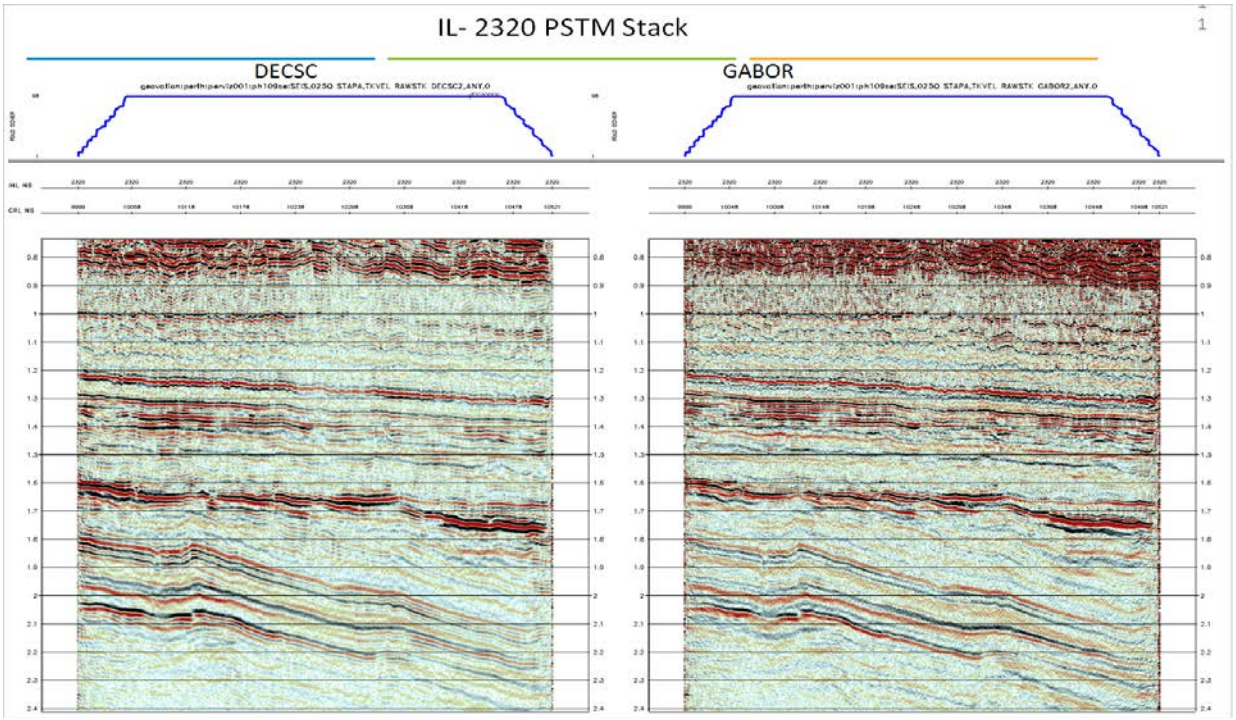


Figure 10 PSTM Stacks: LHS – SC Spiking Decon, RHS – SC Gabor Decon

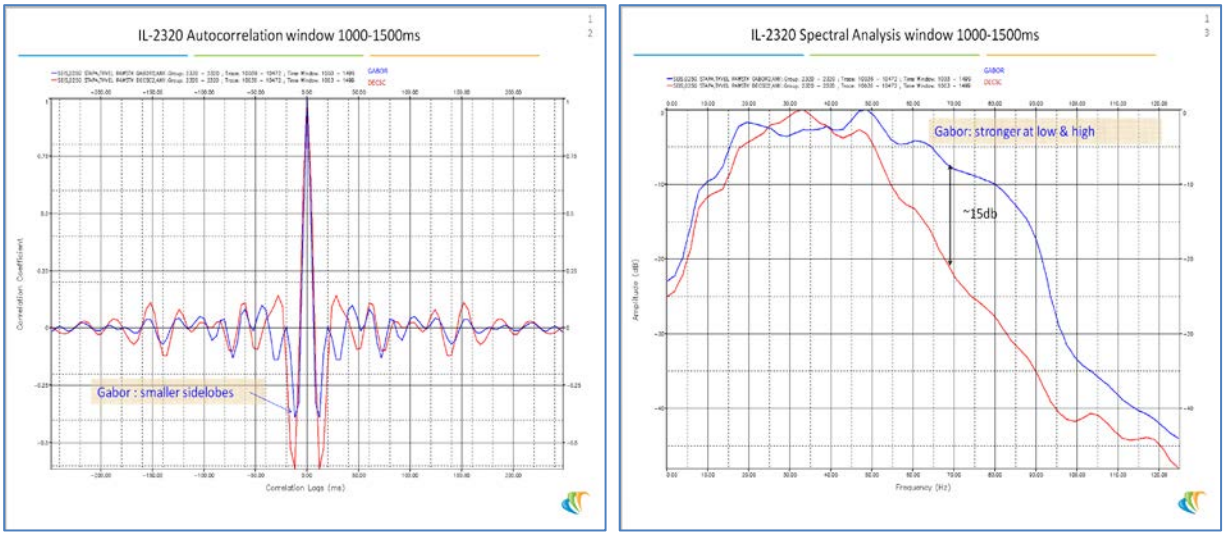


Figure 11 PSTM Stacks Analyses: LHS – Autocorrelations, RHS – Spectra

Visual comparison, spectral and autocorrelation analyses demonstrated that Gabor broadens spectrum and delivers better temporal resolution. On that basis it was accepted for production.

2.08 Linear Noise Attenuation

For linear noise attenuation two modules have been tested - FKF3D and LINAT.
Multiple tests have been run on real data and synthetics. The synthetics was created using real geometry, realistic signal and noise parameters and Lignum typical velocities. The main purpose of synthetics was to make sure that LNA does not hit primary reflections.

Applied in dip filtering mode FKF3D attenuates velocity zone located between two user-defined velocities Vmin and Vmax in the f-Kx-Ky domain in Fmin/Fmax range.

LINAT attenuate ground roll on cross spread data with orthogonal geometry. Data is first put into an orthogonal cube that is defined by two spatial attributes and time to form a T-X-Y cube and then is transformed to F-Kx-Ky domain. It is analyzed and filtered in that domain. Results are later transformed back to T-X-Y domain and are output

FKF3D Parameters:

XSpread	Domain
50-1400m/s	Vmin-Vmax range
1-30Hz	Frequency Range

LINAT Parameters:

XSpread	Domain
50-1400m/s	Vmin-Vmax range
1-30Hz	Frequency Range

To make sure that LNA does not damage primaries or diffractions LNA was first applied on synthetics generated by replacing data samples of a real Lignum XSpead with typical signal and noise models (Figure 12)

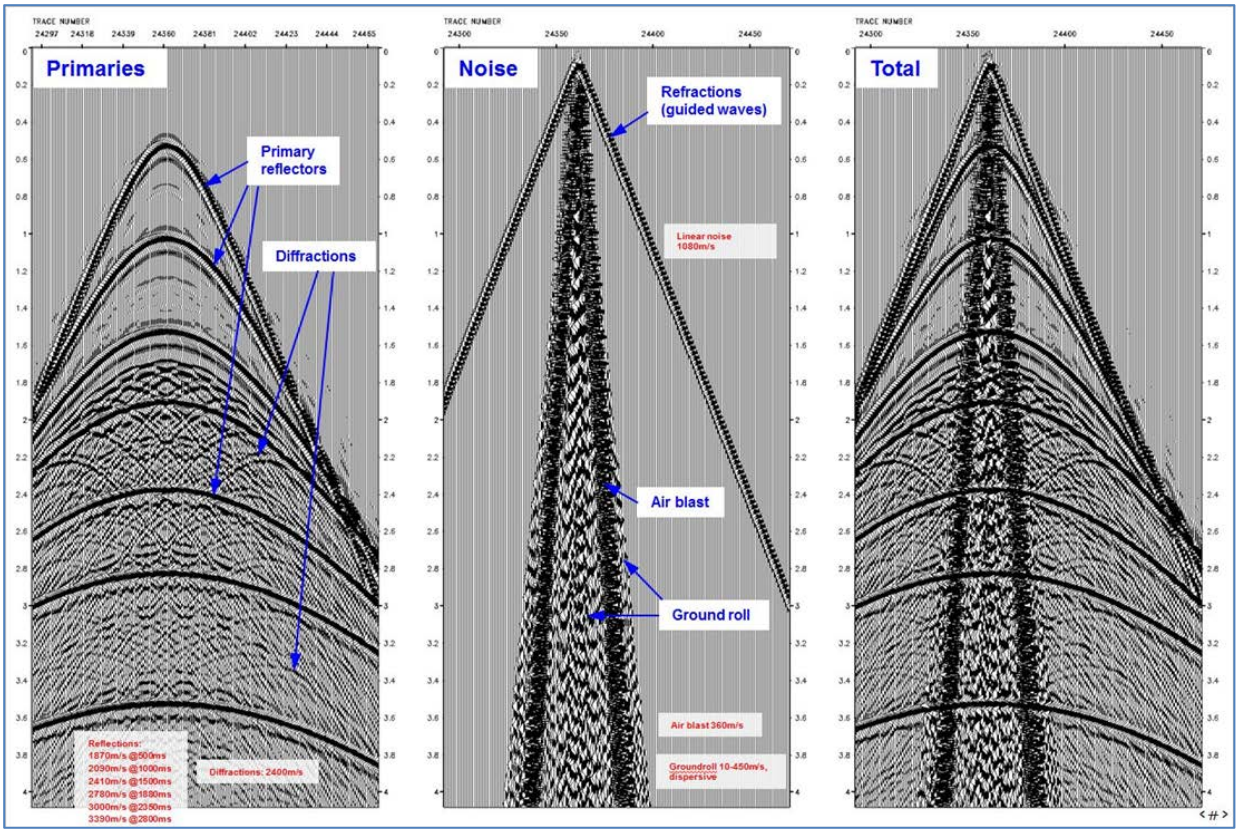
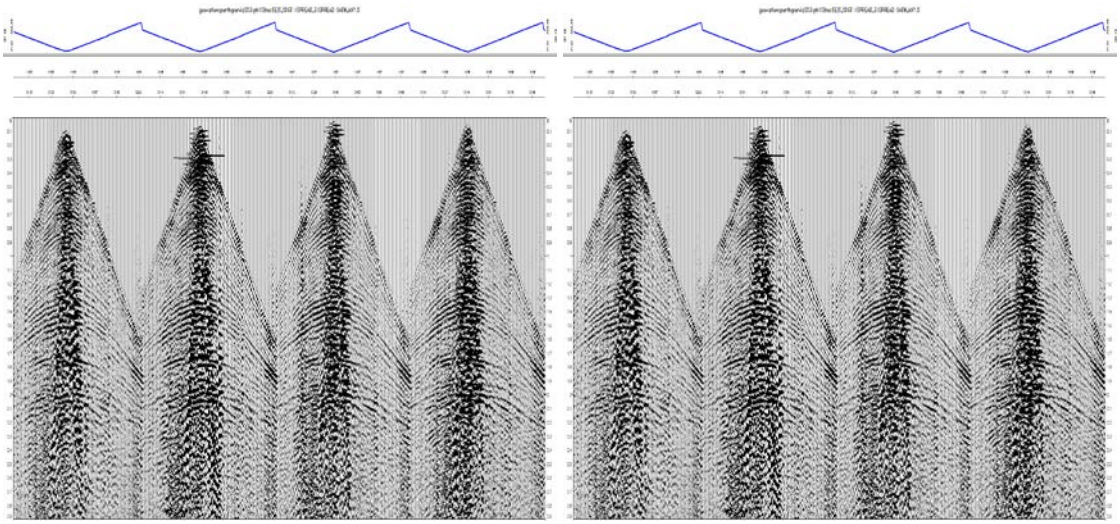


Figure 12 Synthetics used in LNA tests to make sure reflections and diffractions are not harmed by the process

The comparison showed no dramatic difference between LINAT and 3D FK. LINAT has been chosen for production because, unlike FKF3D, it has not created few minor arte-facts.



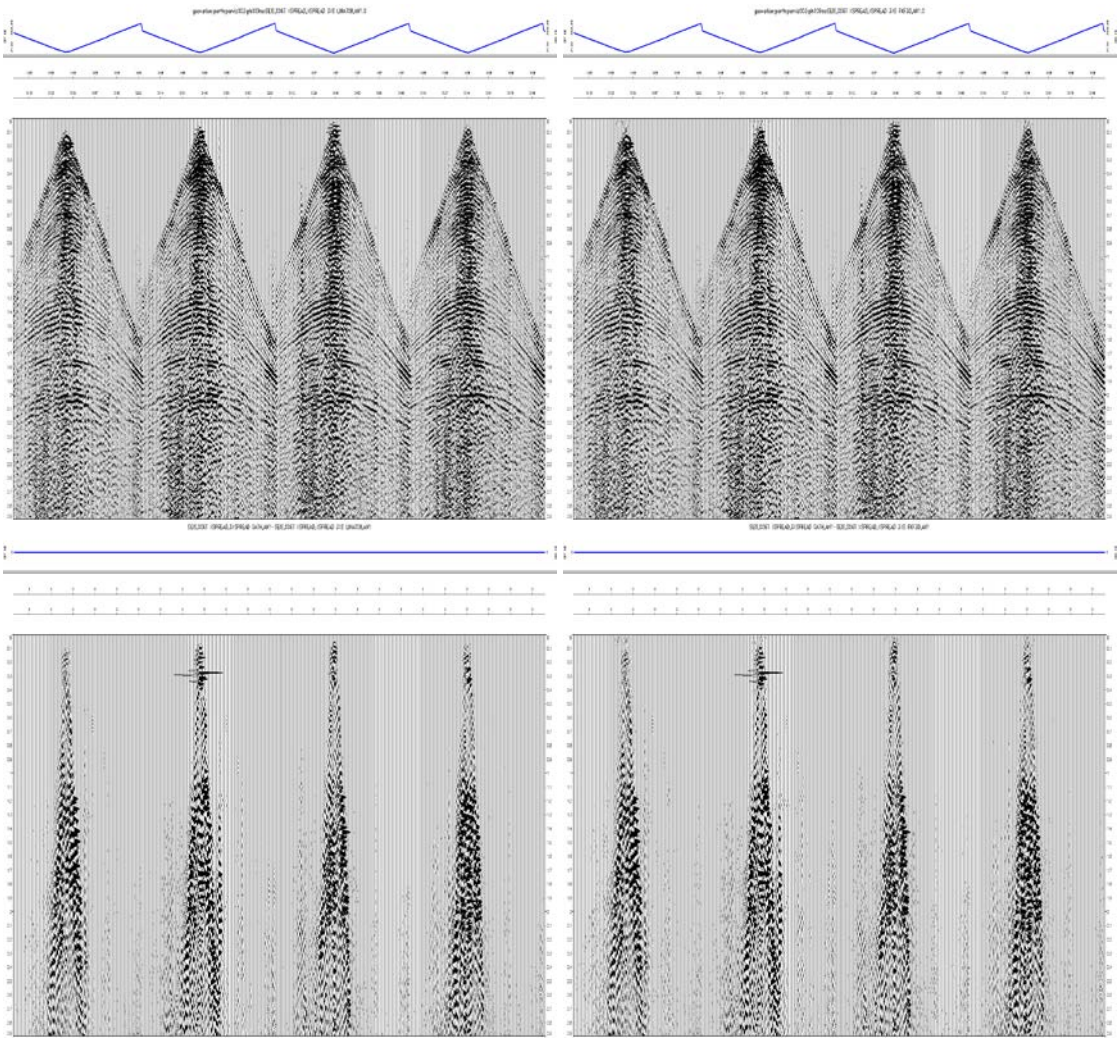


Figure 13 Top-Bottom: Before/After/Difference. LHS – LINAT, RHS - FKF3D

2.09 Random Noise Attenuation FDNAT

Deconvolution has raised noise level. To suppress it, we applied 2 passes of FDNAT: in shot domain on each cable separately, then in receiver domain – separately on each shot line.

The FDNAT module attenuates high-amplitude noise in decomposed frequency bands. It uses frequency-dependent and time-variant amplitude threshold values in defined trace neighborhoods to detect and suppress noise specific to different frequency ranges and different times.

Production parameters:

NC41, FREQ5,T0,TH3,T2600,TH3,T4000,TH1.0,
FREQ10,T0,TH4,T2600,TH3.0,T4000,TH1.0,
FREQ14,T0,TH4,T2600,TH3.0,T4000,TH1.0,
FREQ30,T0,TH4,T2600,TH3.0,T4000,TH1.0,
FREQ60,T0,TH4,T2600,TH3.0,T4000,TH1.0,
FREQ90,T0,TH4,T2600,TH3.0,T4000,TH1.0

where NC – number of traces; TH – threshold; T-TWT; FREQ – frequency.

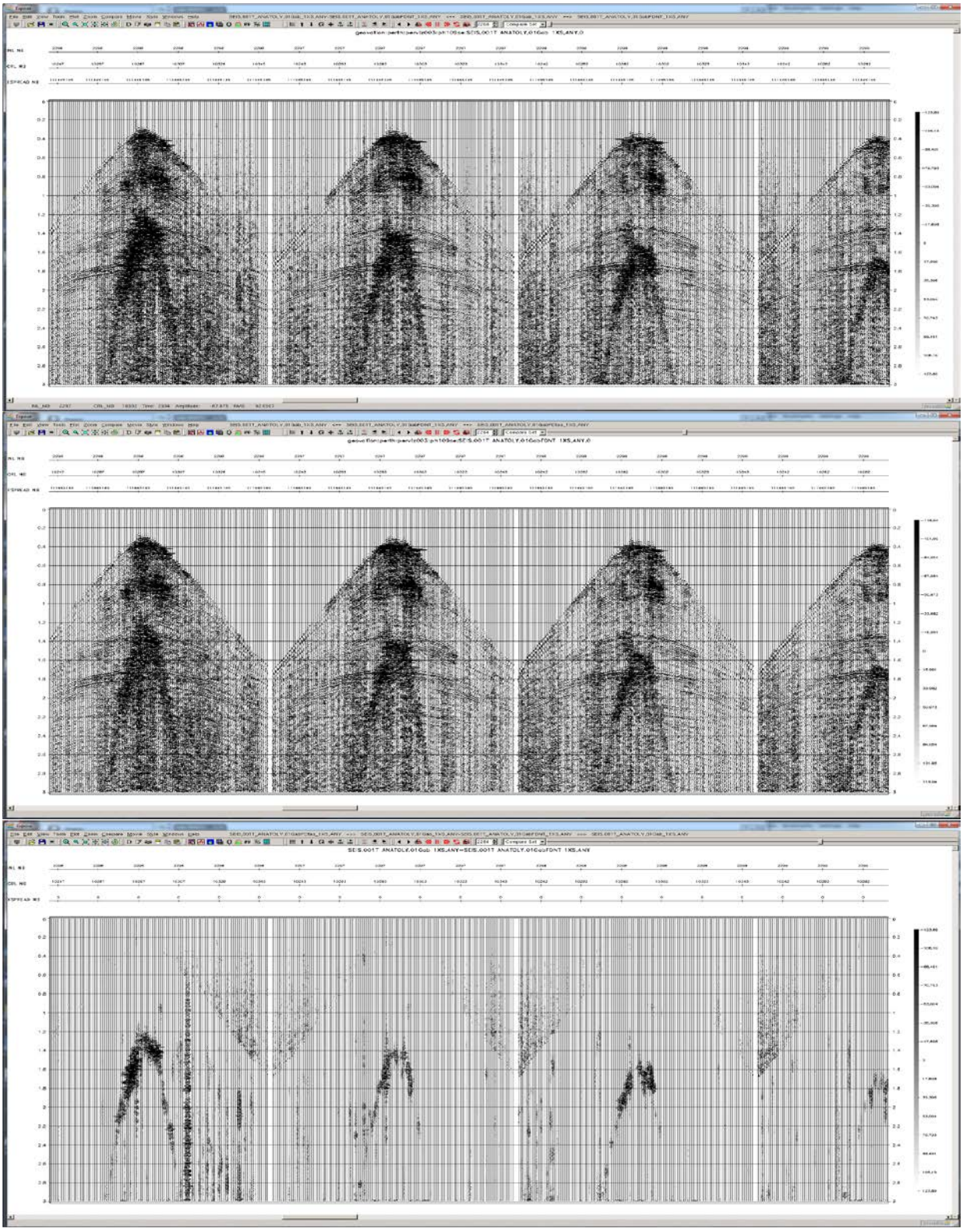


Figure 14 Top-to-Bottom: Before/After FDNAT and difference

2.10 Surface Consistent Residual Statics

There were 2 passes of 3D Residual Static Corrections, one after VA01 and another – after VA02 step. In both cases MASTT modul has been used.

Modules MAST1 and MAST2 produce a surface consistent statics solution. MAST1 computes and saves the cross-correlations and other information to disk files. MAST2 uses these files to compute residual statics that out to database for application.

Production Parameters:

Window Horizon driven (Fig. 15)
Max shift +-/24ms (1st pass)
Max shift +-/18ms (2nd pass)

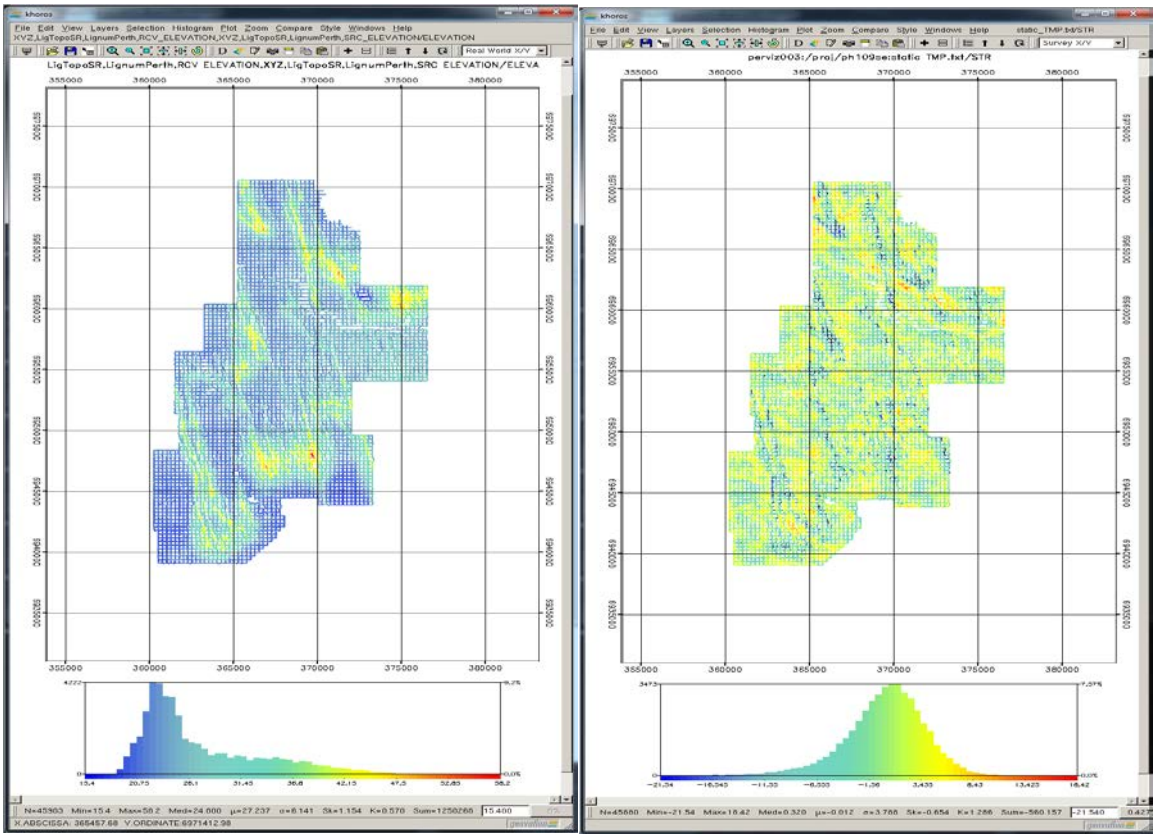


Figure 15 LHS – Elevations. RHS - Shot and RCV Residual Statics. Sum of two passes

Residual Statics Statistics								
. Shot and RCV	Number Points	Min	Max	Med	Mean	Standard Deviation	Skew	Kurtosis
Elevations for reference (m)	45880	15.4	58.2	24.8	27.24	6.14	1.11	0.57
Sum of two passes (msec)	45880	-21.54	18.42	0.32	-0.012	3.78	-0.654	1.286

2.11 Deconvolution in 3D TauP domain

The purpose of deconvolution in TauP is to eliminate short-period multiples. Unlike in T-X, multiple period on P-traces is constant and that makes multiple prediction and suppression more efficient.

Production Parameters:

Domain: XSpread	
Design Window	1000-2000ms
Operator Length 180ms,	
Gap	18ms
NF	1%
Application Window:	1000 – 3000ms

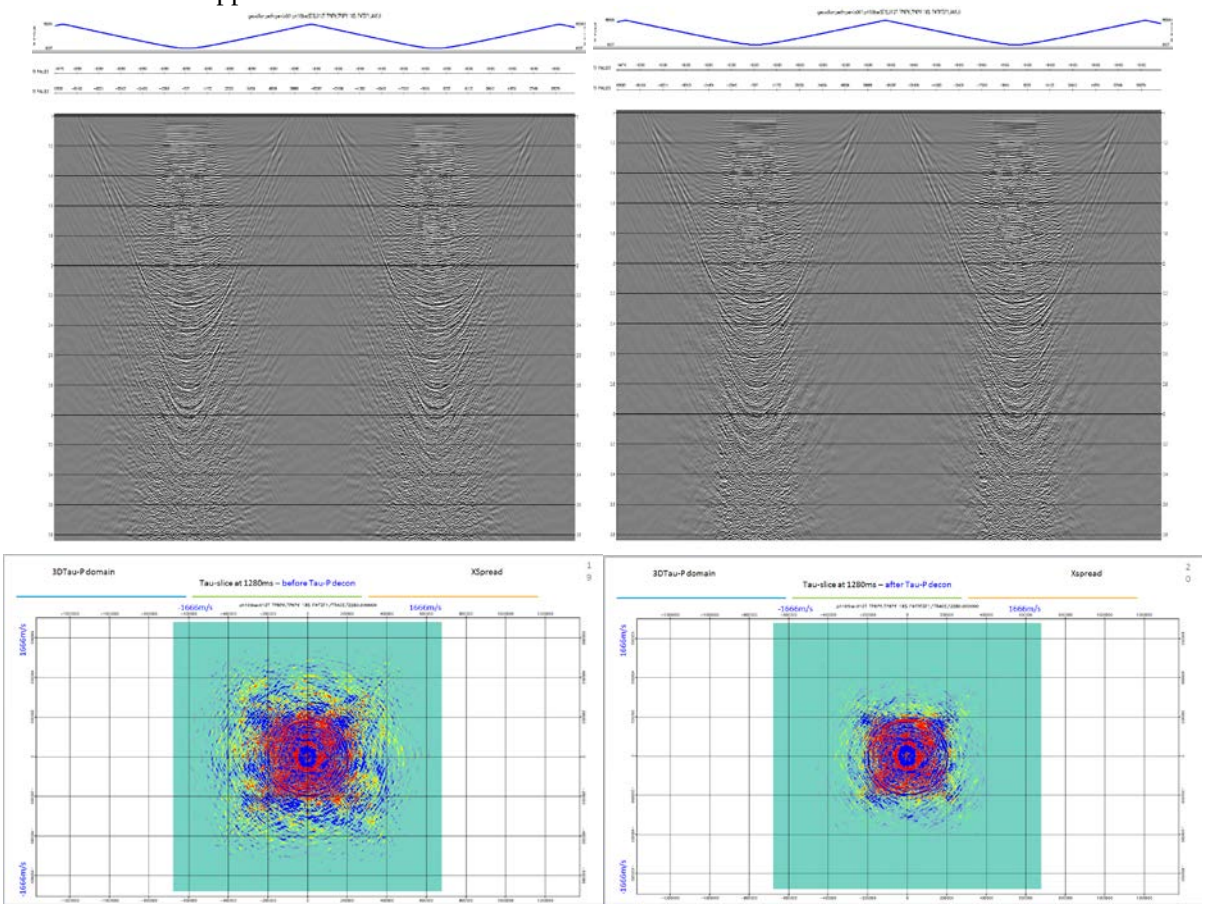


Figure 16 3D TauP Cross-sections: top – vertical, bottom – slices; LHS – before, RHS – after DBS

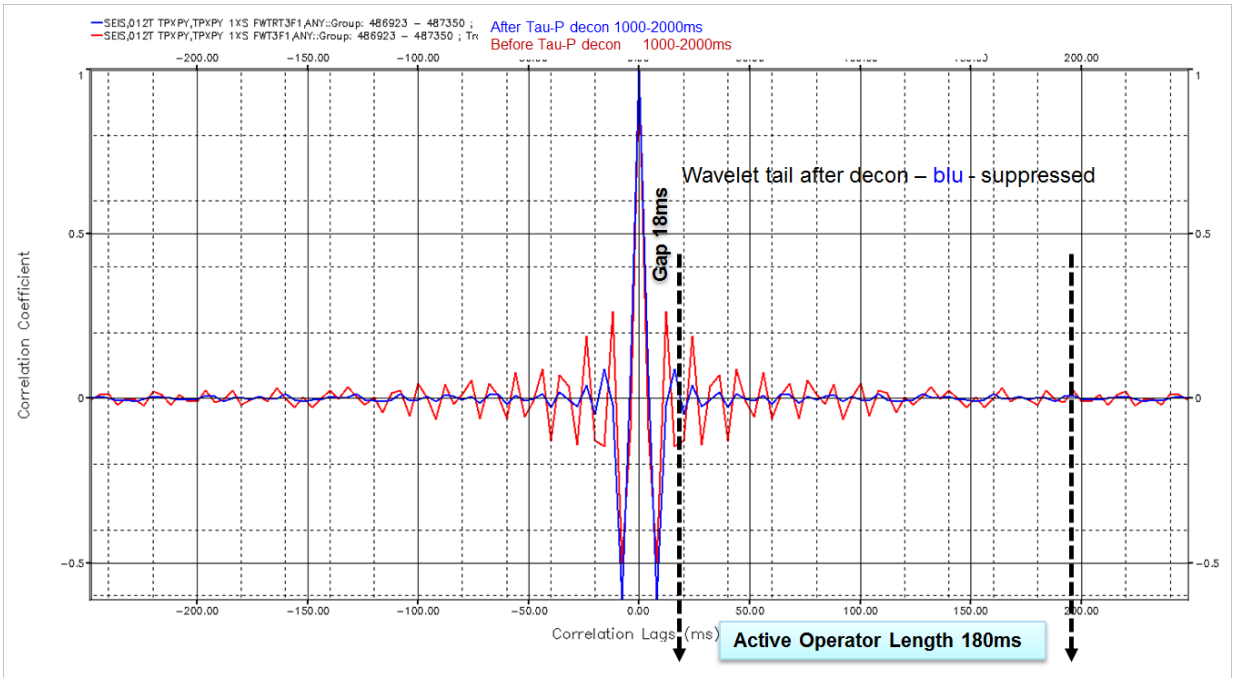


Figure 17 Autocorrelation before/after DBS in 3DTauP

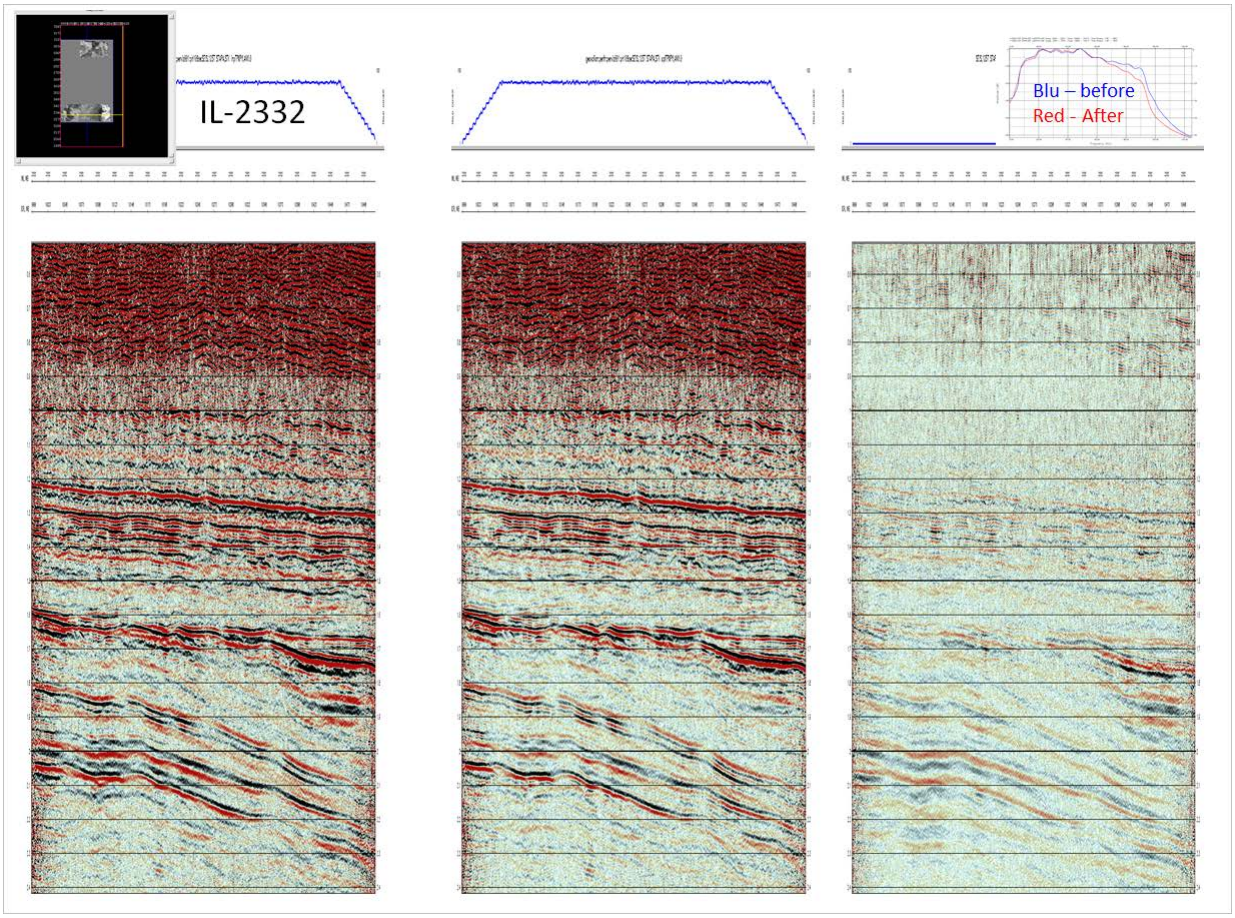


Figure 18 Stack: Before/After DBS in 3DTauP and difference

2.12 Surface Consistent Amplitude Correction (SCAC)

SCAC attempts to compensate for source amplitude variation, receiver coupling, as well as for effect of near surface condition in a surface consistent manner. It computes shot, receiver, and offset amplitude terms, but unless requested only shot and receiver terms are applied

Production Parameters:

Amplitude Computation Window:	Horizon driven (Fig. 19)
Correction Applied:	Shot and Receivers

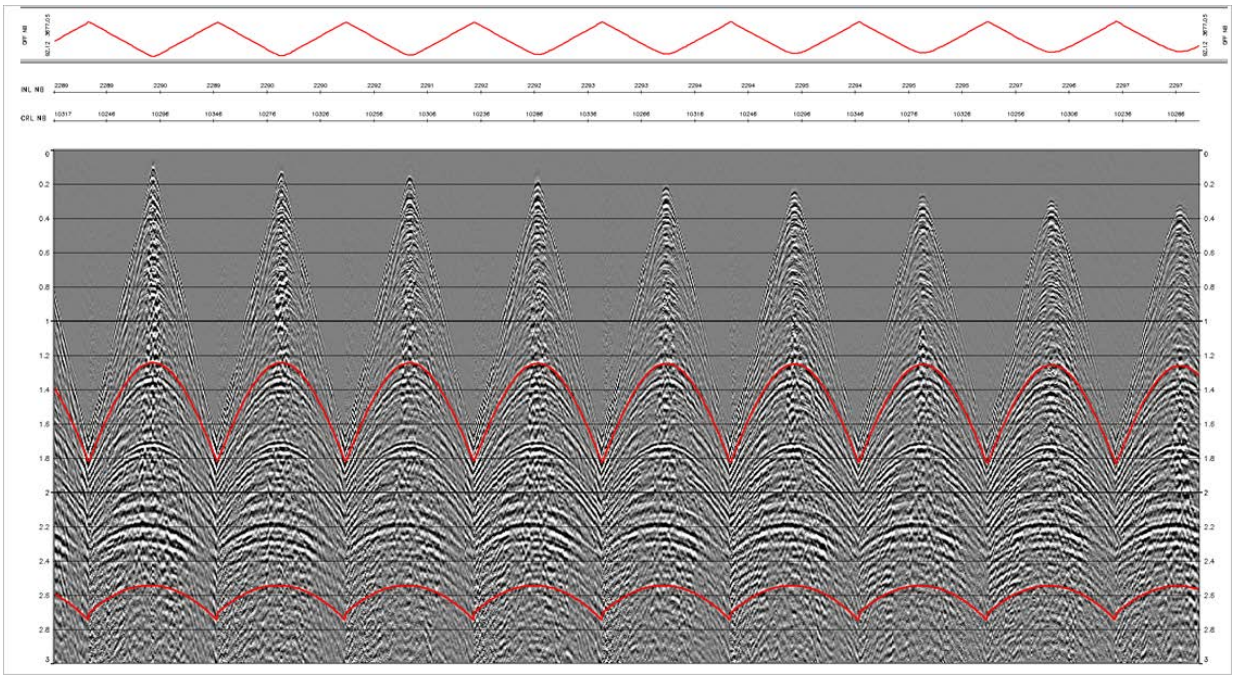
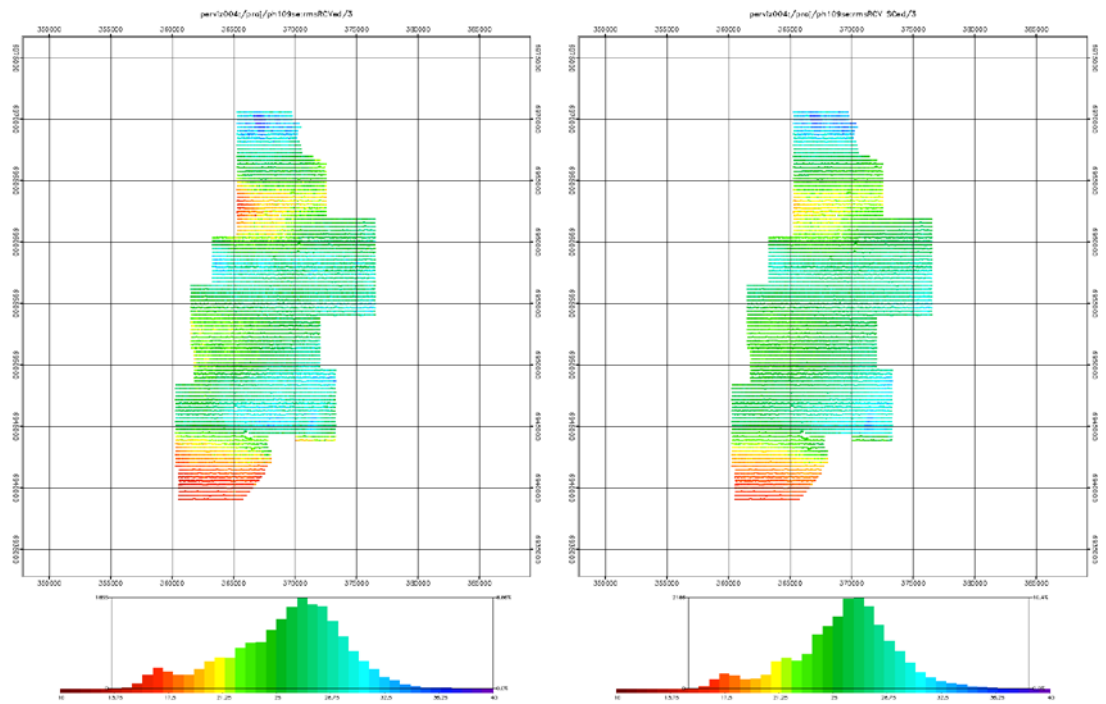


Figure 19 SCAC computation window



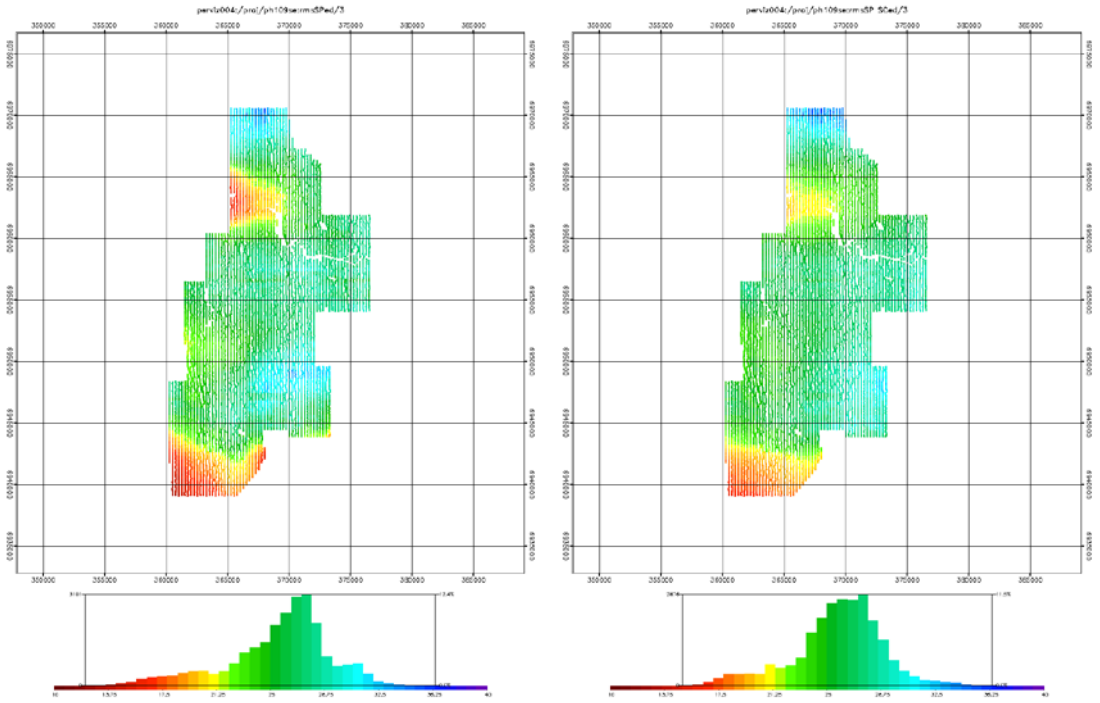


Figure 20 SCAC RMS amplitudes before/after. Top – RCVs, bottom - SPs

2.13 COV: Common Offset Vector Binning (Tiling) and Regularization

COV binning is a simple way of splitting data, acquired by 3D orthogonal geometry, to carry it through migration honouring azimuthal effects, thus making possible amplitude and velocity azimuthal analyses.
One more important practical consideration to go COV is a better PSTM gather flattening before stack. This flattening , by way of AzNMO and post-mig trim-statics , translates to a better high frequency preservation and so improves resolution.

Lignum raw 3D CMP gather is a semi-regular scatter with nominally 1 trace per **600x500m** in OFF_X/OFF_Y coordinates. Each tile forms a single fold 25x25m cube, which is migrated subsequently by conventional PSTM algorithm as if it were a common offset cube.

COV binning creates multi-azimuth CMP gathers with fold approximately equal to the acquisition nominal fold. To regularize the fold and fill holes COV binning is followed by REG3D.

REG3D performs regularization of data along two directions using Fourier Reconstruction. The input data are transformed using an irregular 2D Fourier decomposition that respects the input data positions. The reverse transform maps the data to a regular grid. Two algorithms are available, standard Fourier reconstruction (FR), and de-aliased Fourier reconstruction (DF).

The data are processed in blocks of size NC by NC in the X and Y directions. There is no limit on the number of traces in each block. There can be empty and overfold bins. Each block is processed individually with a forward irregular Fourier transform followed by a reverse transform to the bin centre position. The number of output traces will normally be different to the number of input traces.
After each block is regularized, blocks are merged together with taper sizes TAP in the X and Y directions.

Production parameters:

Domain:	COV cube
Mode:	De-aliased
NC IL/XL Block/Taper(TAP):	41x41/20 trc
Window/Taper:	200/100ms
Dip Limit:	1500m/s

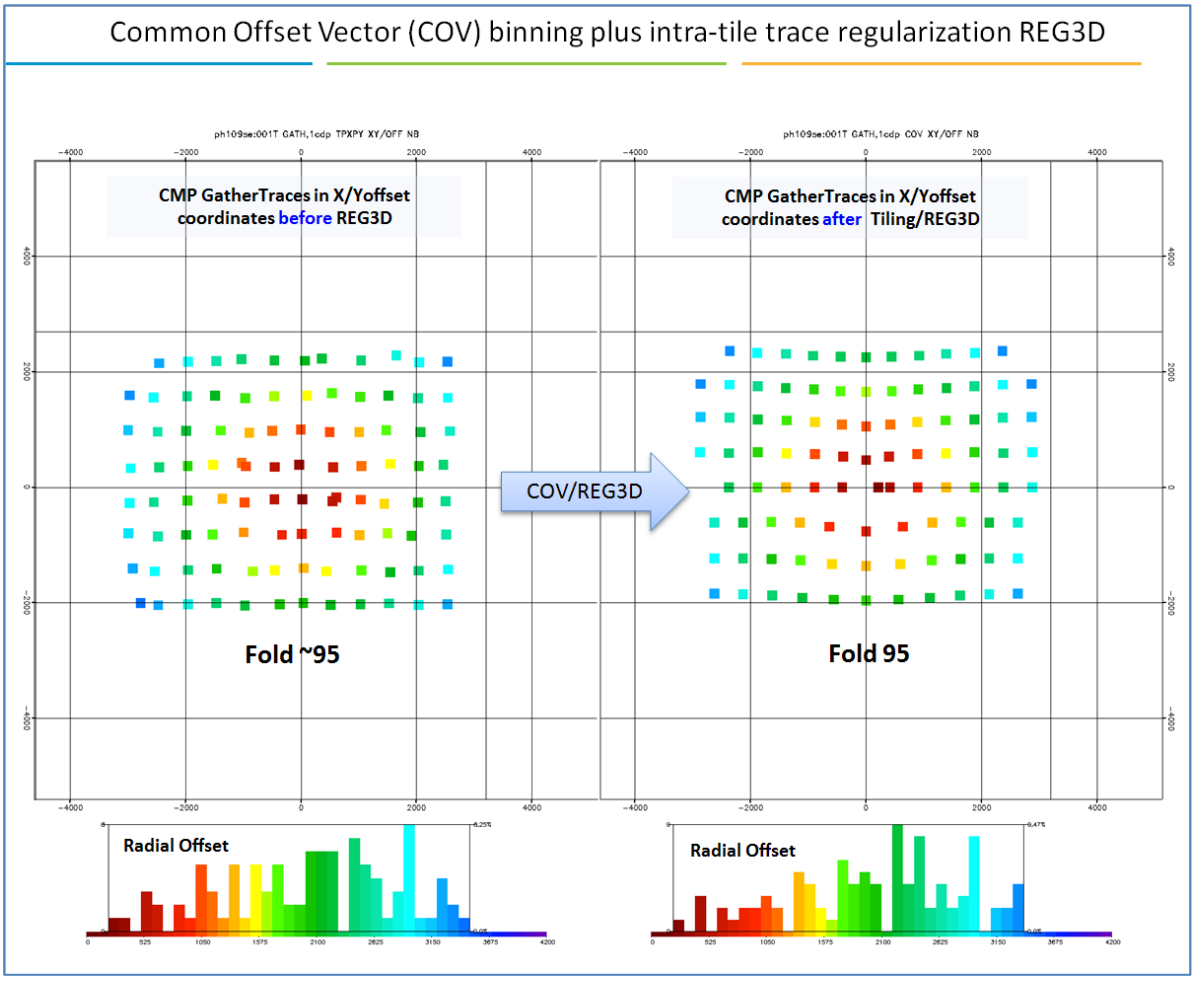


Figure 21 CMP gather before and after COV tiling and trace regularization

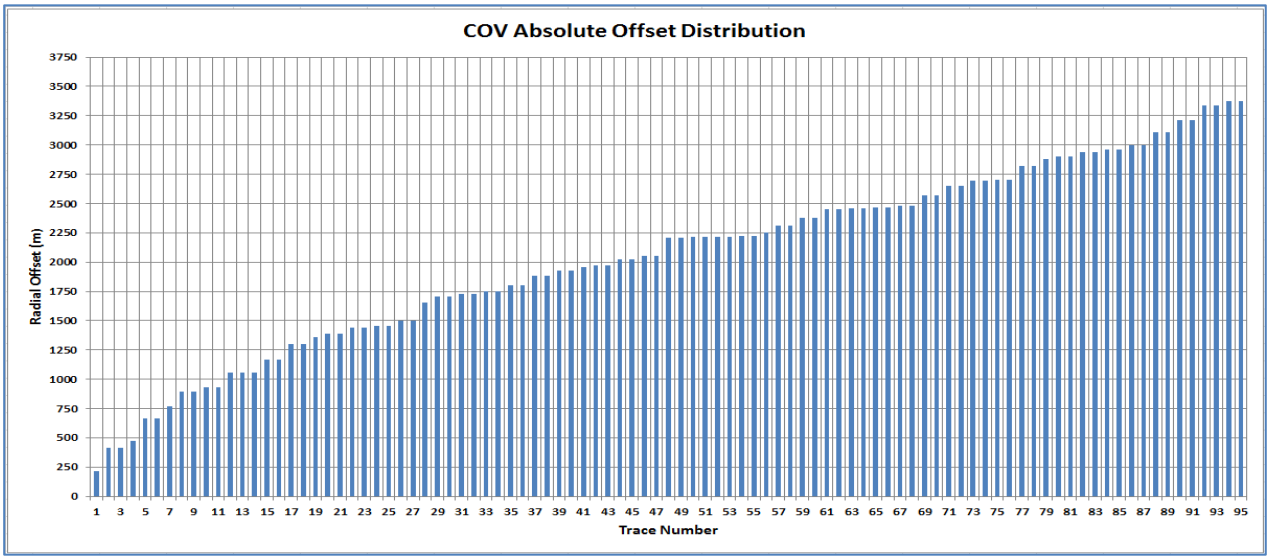


Figure 22 Absolute offsets within a CMP gather after COV tiling/REG3D

2.14 5D Interpolation and Regularization FREND

FREND module performs multi-dimensional Fourier data mapping/regularisation. Data is processed in overlapping spatio-temporal blocks

After temporal FFT, each frequency slice is transformed into the spatial frequency domain with an irregular Fourier transform (similar to the antileakage Fourier transform). The reverse Transform reconstructs the energy to the bin centre (regularisation) or specified coordinates (mapping).

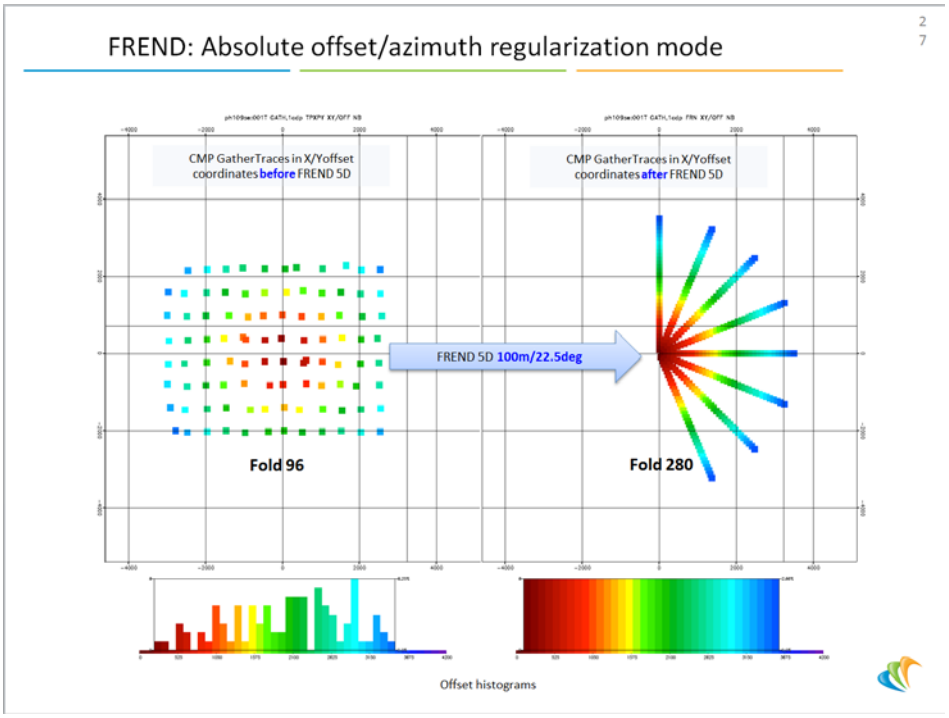


Figure 23 5D-Interpolation in radial mode

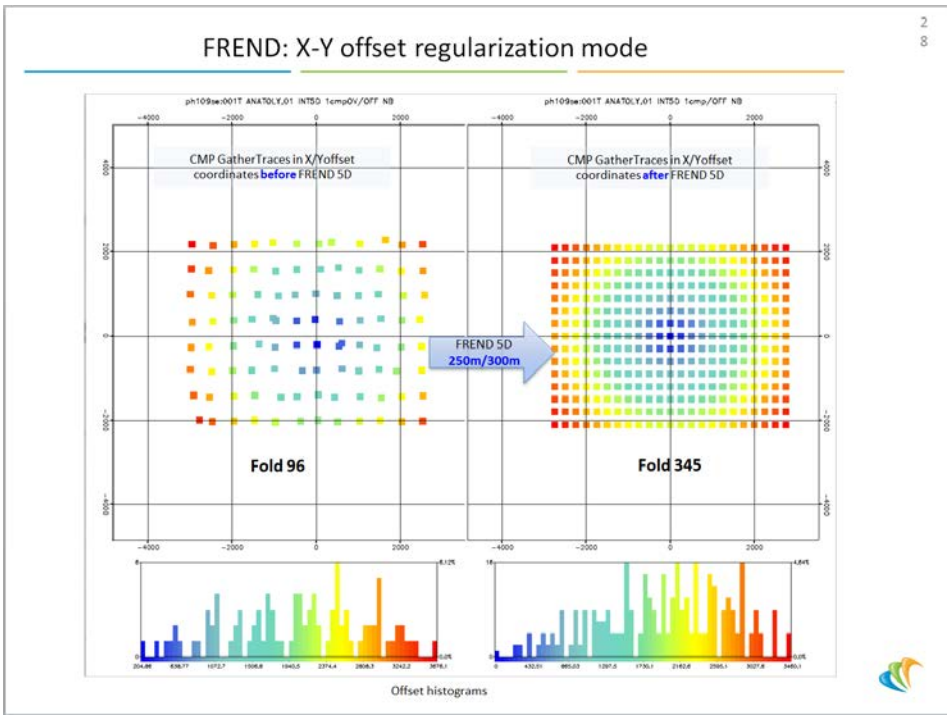


Figure 24 5D-Interpolation in offset X/Y orthogonal mode

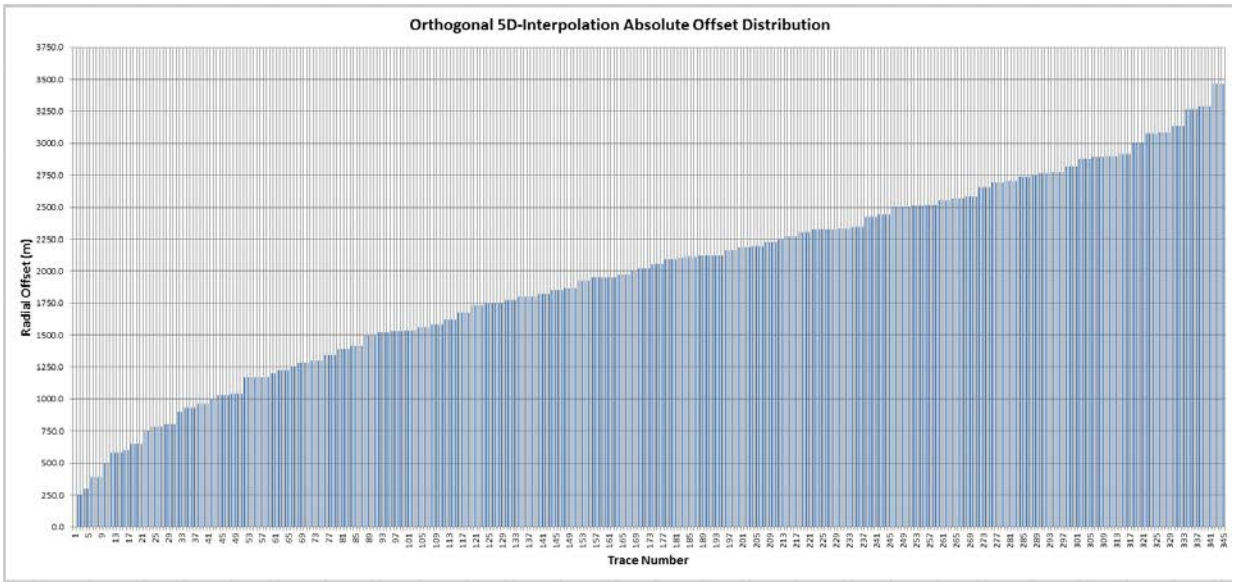


Figure 25 Absolute offsets within CMP gather after orthogonal 5D Interpolation (production version)

Two modes of 5D interpolation has been trialed - radial (Fig. 23) and orthogonal (Fig. 24 and 25). For production orthogonal 5D interpolation has been approved.

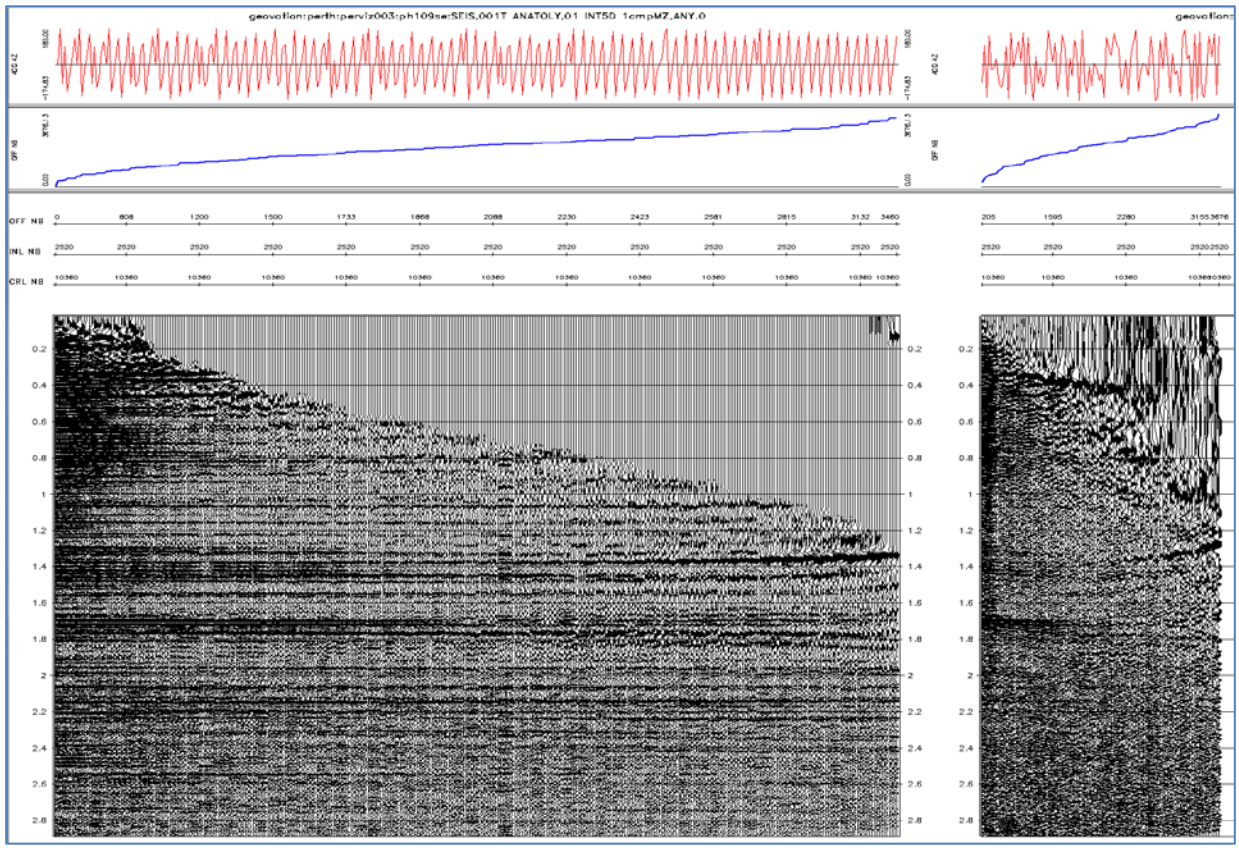


Figure 26 CMP Gather after (LHS) and before (RHS) orthogonal 5D interpolation (production version)

2.15 Velocity Analyses

There were 4 passes of 1x1km manual velocity picking:

VA01 – to support Residual Statics #1
VA02 – to support Residual Statics #2
VA03 – on targeted 3D PST-migrated lines, to create migration V-field
VA03A – post PSTM, to create a guide for Dense Vnmo/Eta auto-picking

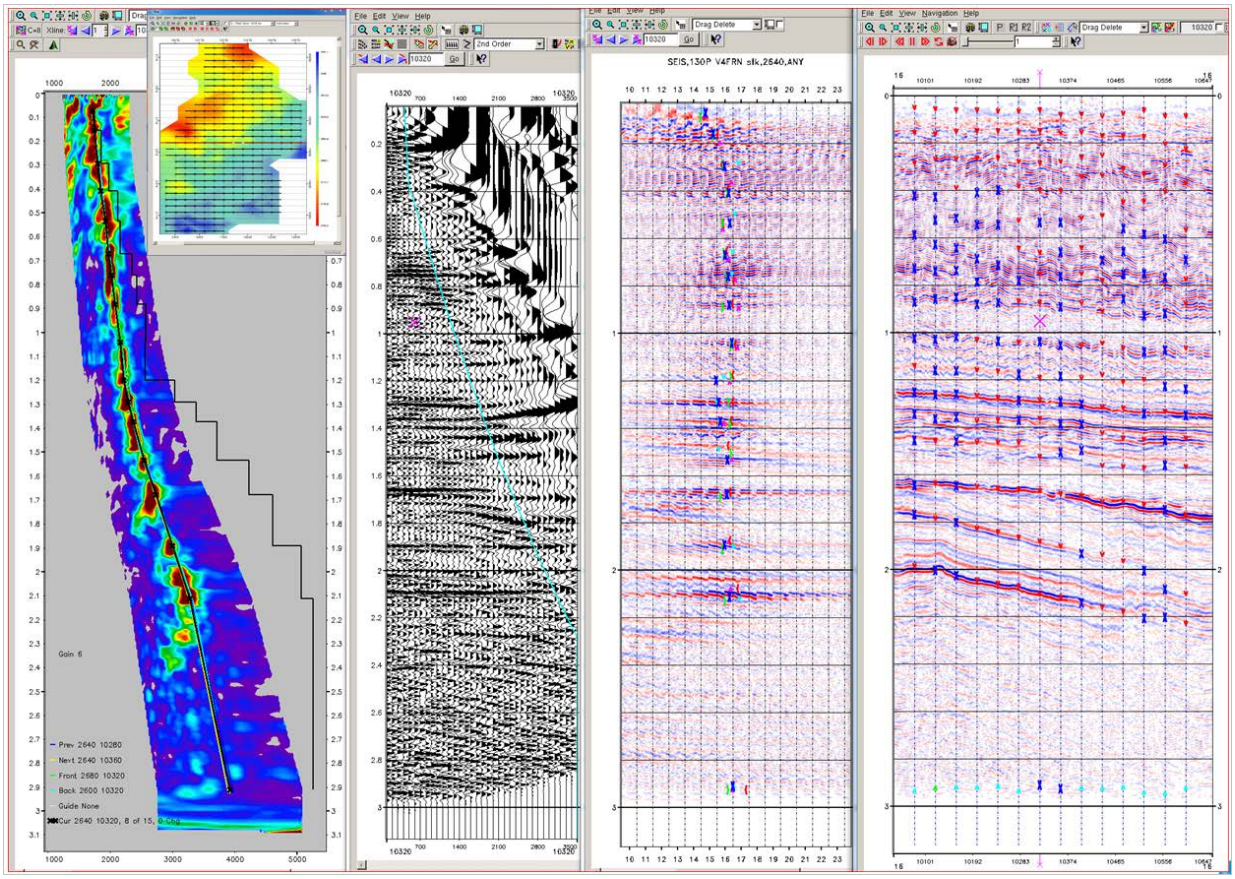


Figure 27 VA03A 1x1km. Interactive Velocity Picking session example

2.16 3D Kirchhoff Pre-Stack Time Migration

Kirchhoff migration module is a trace-by-trace migration, which treats each output sample as the apex of a diffraction curve. Input samples are summed along the diffraction curve, which is characterized by a locally defined 1D RMS velocity function and raybending. The reflector image is built by constructive interference.

Geometrical spreading compensation is included into migration as amplitude terms of the Green function.

Production Parameters:

Single fold COV cubes were migrated one by one
Migration Velocity – smoothed VA03
Dip limit – 60 degree
Half-Aperture Limit – T0R1000,T500R1250,T1000R1500,T2000R3000,T3000R3500

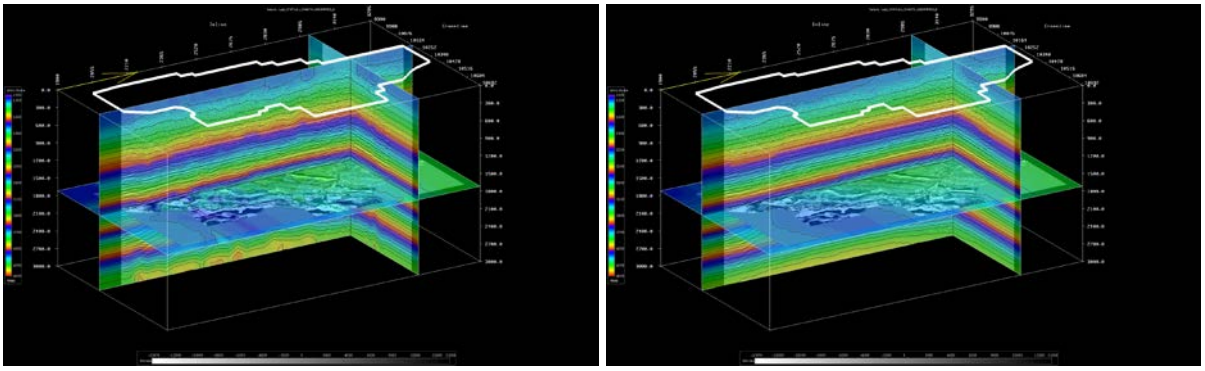


Figure 28 Migration velocity VA03 before and after smoothing

2.17 Dense VTI Analysis HDPIC

In VTI model reflections traveltime is expressed through Vnmo and effective Eta (Alkalifah & Tsvankin)

$$t_\rho^2 = t_0^2 + \frac{\rho^2}{v_{nmo}^2} - \frac{2\eta\rho^4}{v_{nmo}^2[t_0^2 v_{nmo}^2 + (1+2\eta)\rho^2]}$$

$$\eta = \frac{1}{2}\left\{\left(\frac{V_a}{V_{nmo}}\right)^2 - 1\right\}$$

where ρ – absolute (radial) offset and Va – anelliptical (“horizontal”) velocity.

The HDPIC module is used to generate dense volumes of velocity and anellipticity moveout parameters. It is based on an original approach of anelliptic shifted hyperbola moveout equation which corresponds to a sixth order approximation of anisotropic travel times. Both velocity and anellipticity parameters are simultaneously estimated using the full coverage of the data. The scanning of two internal uncorrelated parameters generates bispectral panels at time slices. The sampling of these parameters is directly related to the sensitivity of the normal moveout. For practical reasons, HDPIC outputs the uncorrelated parameters dtn and $\tau 0$ to help further interpolation, filtering and conversion to Vnmo and Eta (anellipticity) parameters.

A corridor, limited by the minimum and maximum values of Velocity and Eta reduces the analysis domain. Semblance maximum is used as the automatic picking criteria.

Computed effective parameters can be converted to interval

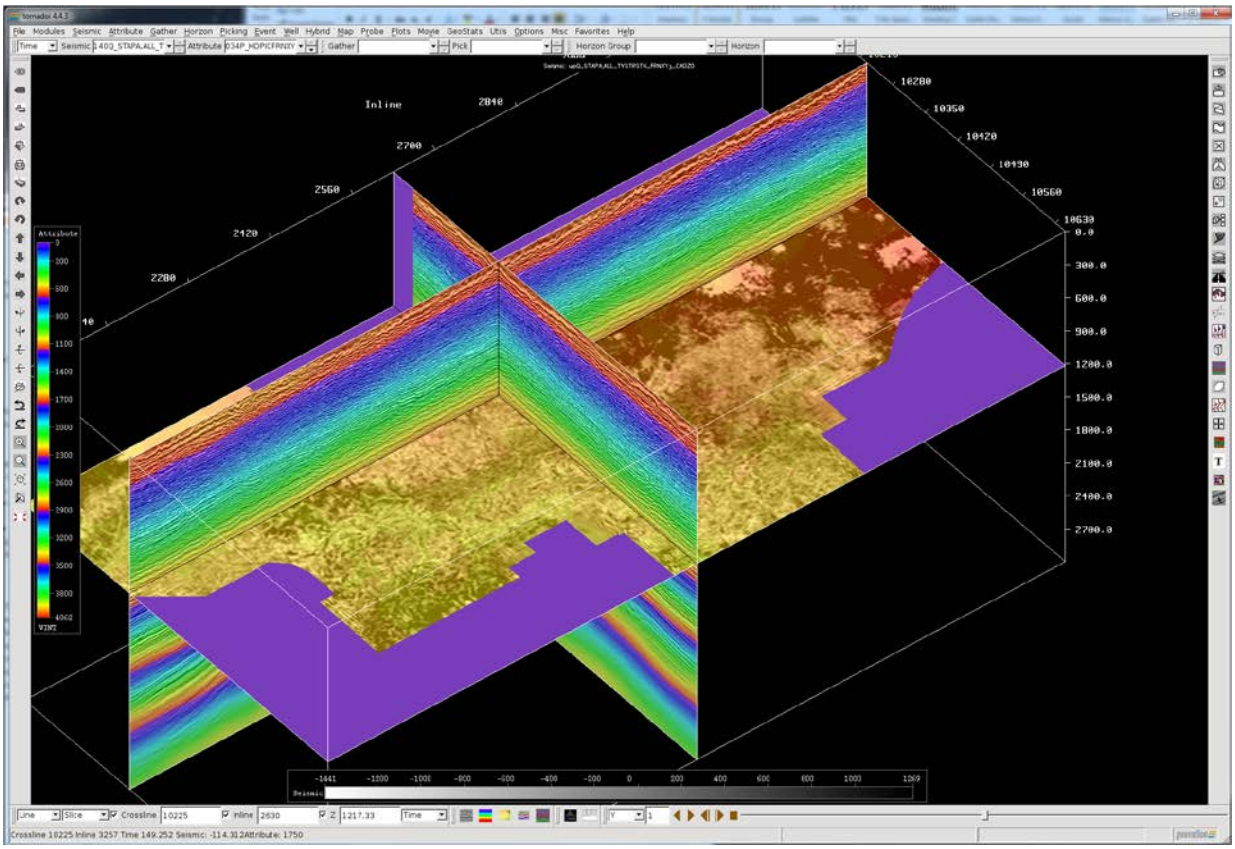
Dix Inversions

$$v^2_{nmo\_int}(t_1 \to t_2) = \frac{t_2 V^2_{nmo}(t_2) - t_1 V^2_{nmo}(t_1)}{t_2 - t_1}$$ Interval nmo velocity

$$v^4_{a\_int}(t_1 \to t_2) = \frac{t_2 V^4_{a}(t_2) - t_1 V^4_{a}(t_1)}{t_2 - t_1}$$ Interval anelliptic velocity

$$\eta_{int}(t_1 \to t_2) = \frac{1}{8}\left(\frac{v^4_{a\_int}(t_1 \to t_2)}{v^4_{nmo\_int}(t_1 \to t_2)} - 1 \right)$$ Interval anellipticity

The HDPIC result has been QC'd volumetrically in Tornado, on NMO'd gathers, semblances and stacks.



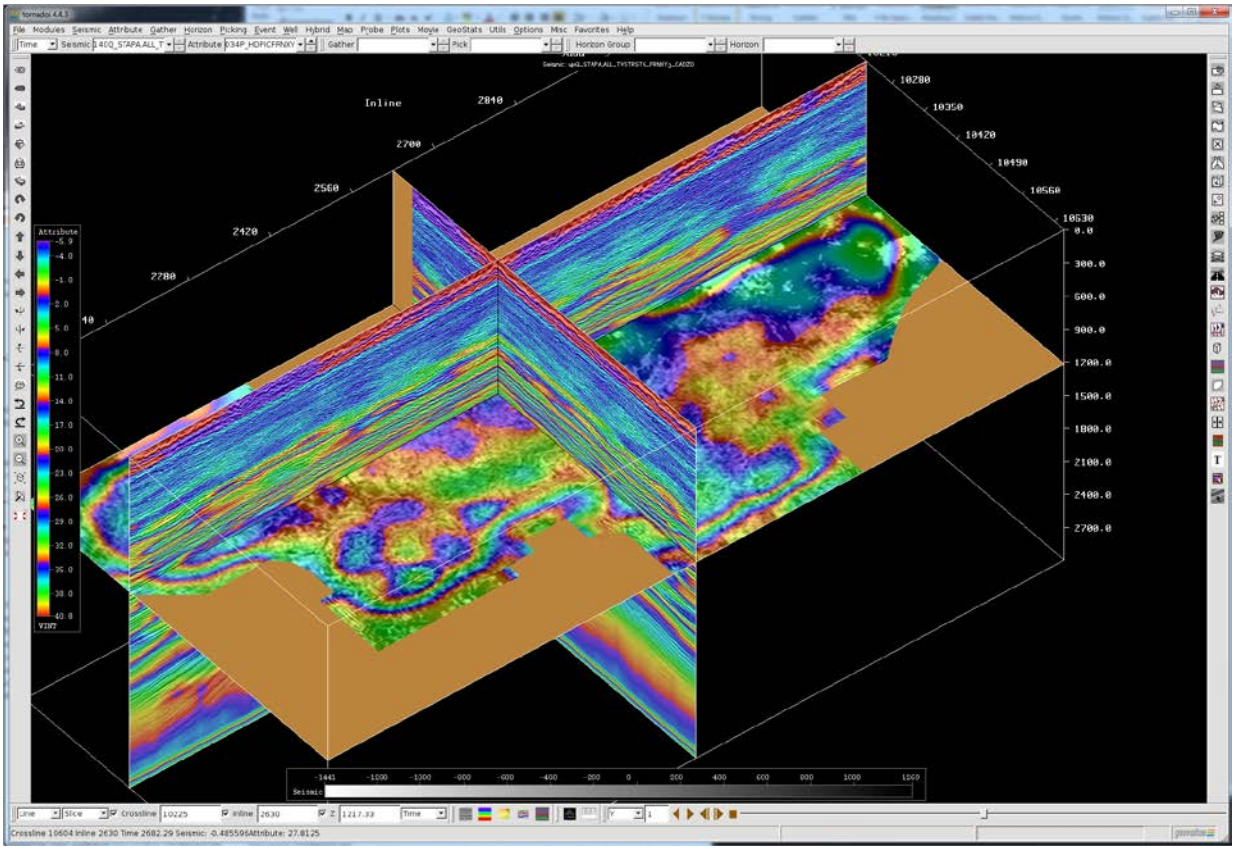


Figure 29 HDPIC 25x25m Vnmo (top) and Eta*1000 (bottom)

2.18 3D Radon

3D Radon (module TQXQY) performs a 3D parabolic Radon filtering of 3D NMO-corrected bin gathers, taking into account the X and Y components of the offset vector, and handling azimuthal variations of the curvature of the paraboloids. The module computes a model of primary and multiple events. This computation is based on data decomposition into user-defined paraboloids and performed using a highresolution, de-aliased, 3D parabolic Radon decomposition in the Fourier domain. The highresolution feature results in sparse, highly focused around a few components Radon spectra. Events corresponding to paraboloids with the largest curvatures are considered to be multiples. Events corresponding to paraboloids with the smallest curvatures are considered to be primary events. Limits between primaries and multiples are defined by the user. The difference between the data and the sum of the primary and multiple events is considered noise. The model of multiples and, optionally, a part of the noise are subtracted from the input data.

Production Parameters:

Transform	-512ms-1536ms
Cutoff	256ms
Max Azimuthal anomaly	100ms
Reference Offset	6000m

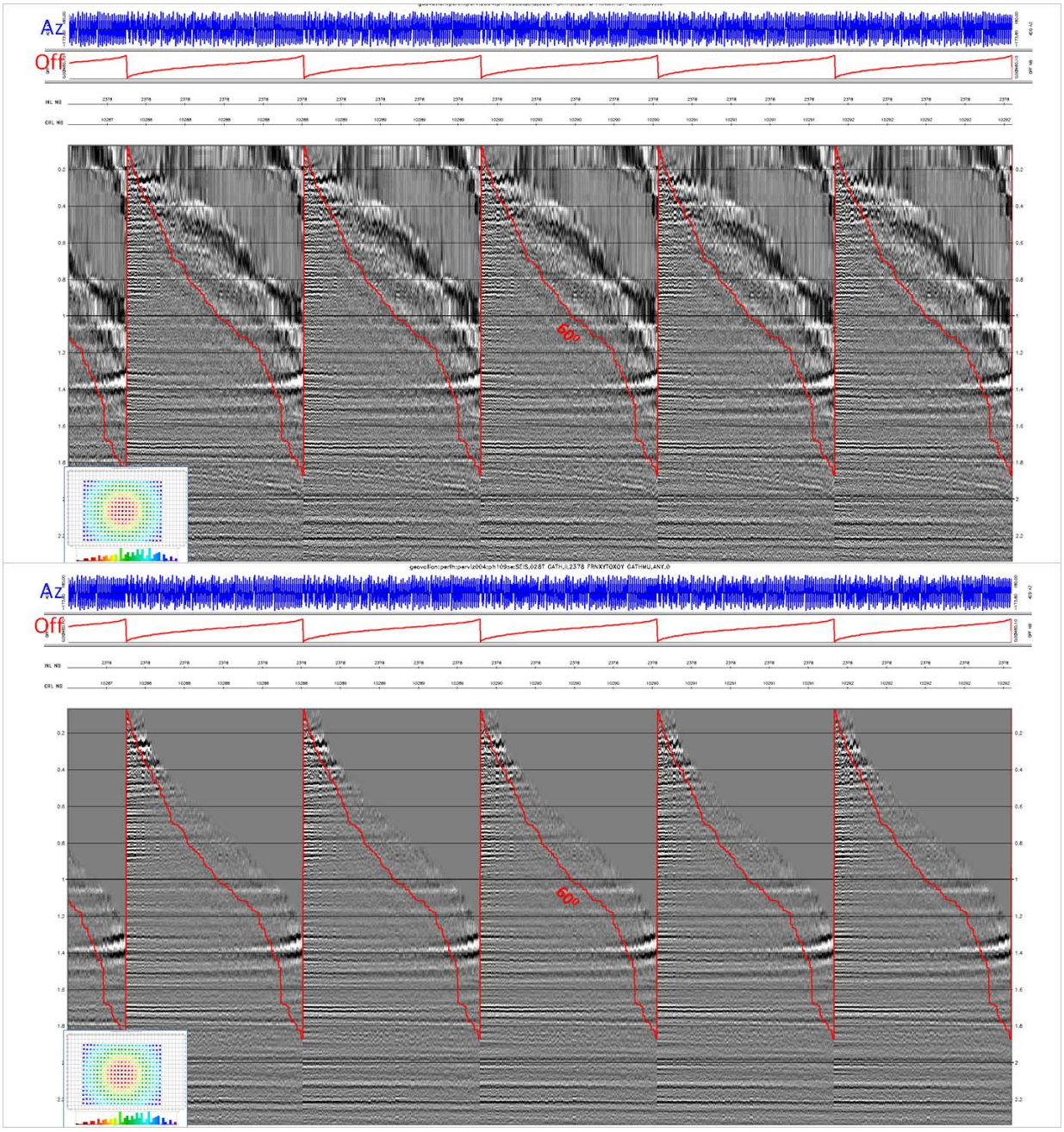


Figure 30 PSTM gather before (top) and after (bottom) 3D Radon

2.19 Azimuthal Velocity Analysis

Azimuthal velocity analysis purpose is two-fold:

- improve gather flattening by accounting for azimuthal NMO anomalies
- evaluate azimuthal velocity anisotropy parameters and attempt to interpret them in terms of fracture density and orientation

It is expected that fast velocity direction coincides with fracture direction and Vfast-Vslow/Vfast is proportional to fracture density.

The theory behind is based on assumption that what in an isotropic medium used to be a 3D hyperboloid is now an elliptically squeezed/stretched in horizontal plane 3D hyperboloid.

Azimuthal Traveltime

$$T = \sqrt{T_0^2 + \frac{R^2}{V_\varphi^2}}$$

where

$$\frac{1}{V_\varphi^2} = \frac{\cos^2(\varphi - \omega)}{V_{fast}^2} + \frac{\sin^2(\varphi - \omega)}{V_{slow}^2}$$

where

ω – fast velocity azimuth
φ – trace azimuth

$$k = \frac{V_{fast} - V_{slow}}{V_{fast}}$$

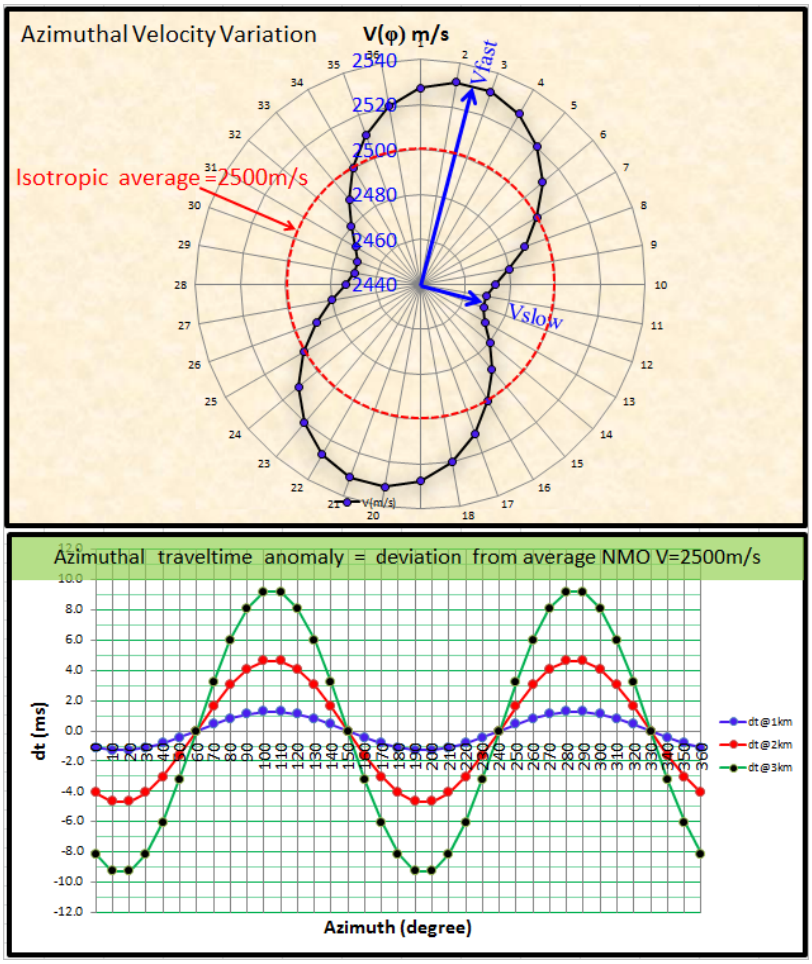


Figure 31 Azimuthal Vnmo anisotropy ω=15deg k =2.5% and caused by it moveout anomalies at offsets 1km, 2km and 3km

For azimuthally varying velocities, a straightforward Dix inversion is not appropriate as it does not honors azimuth. A technique has been developed for rms to interval conversion (Generalized Dix equation and analytic treatment of normal moveout velocity for anisotropic media, Grechka, Tsvankin and Cohen, Geophysical Prospecting, 1999, Vol. 47, p117-148) which takes into account azimuth.

It is implemented in geovation™ as a two-step process involving the modules AZCON and WCONV. The module AZCON converts between azimuthal velocity model parameters (fast velocity, slow velocity, and fast velocity azimuth calculated in the module ANIMA) and the elements of the inverse of the Cohen matrix (a 2 × 2 symmetric matrix representing a different azimuthal velocity parameterization). The module WCONV performs generalized Dix inversion to convert between the rms and interval values of the elements of the inverse of the Cohen matrix. These are then converted back to velocities using AZCON.

For fracture detection the main parameter is

$$K_{int} = \frac{VINT_{fast} - VINT_{slow}}{VINT_{fast}}$$

and azimuth of VINTfast.

2.20 Azimuthal NMO and Trim Statics

Azimuthal NMO has been applied using VA05 azimuthal analysis attributes – Vfast, Vslow and azimuth ω.

Time-Variant trim-statics has been computed in 400ms sliding gate from 100 to 3000ms. Max shift 12ms.

As can be seen from Fig. 32 below , the effect of AzNMO is tiny. Flattening effect of TV-trim statics is stronger.

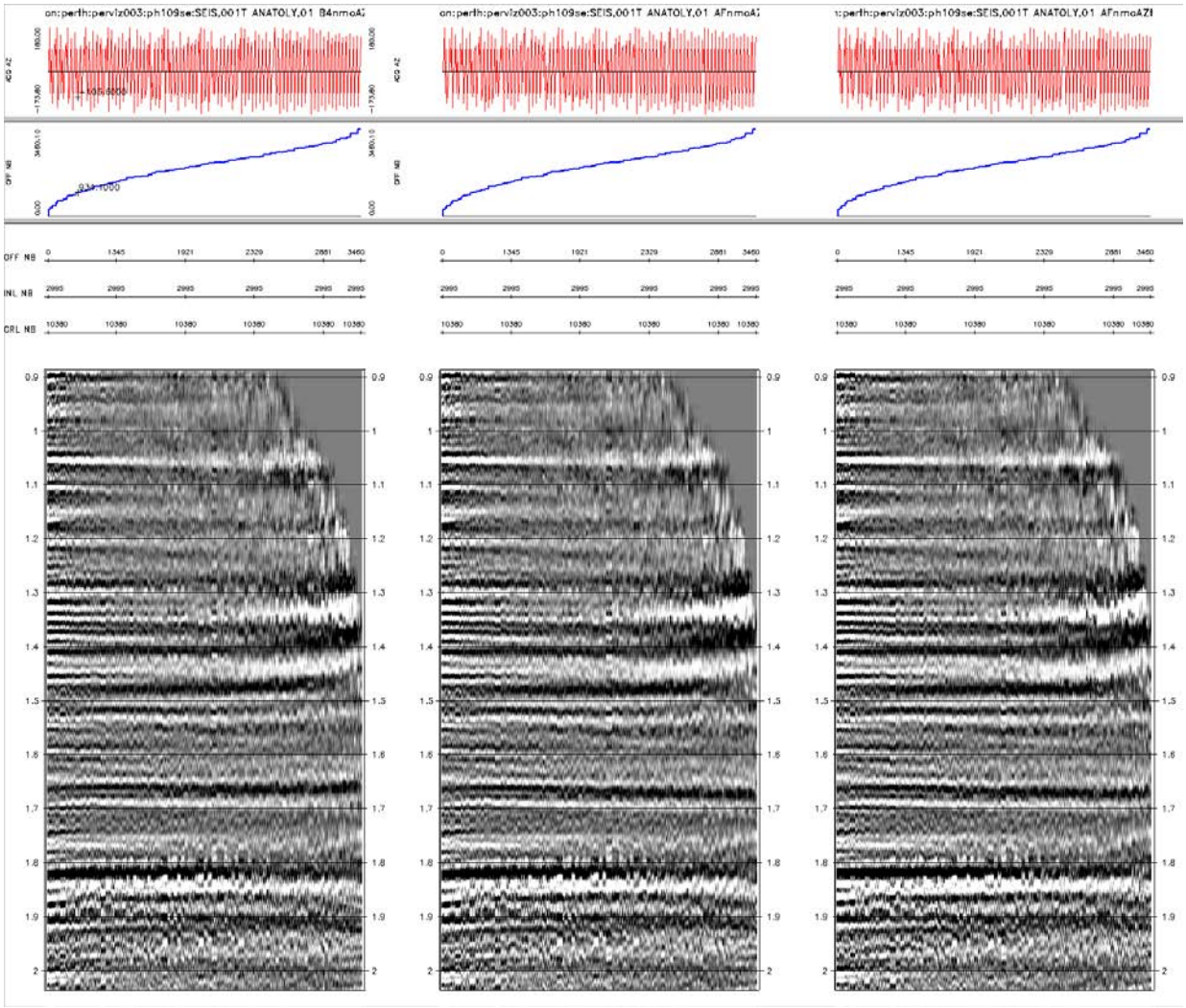


Figure 32 AzNMO and Trim-Statics. PSTM Gather

2.21 Stacks

Full Stacks were generated using 35deg mute.
5 Angle Stacks - using mutes

00-15deg
15-25deg
25-35deg
35-45deg
45-55deg

Azimuthal stacks - using

15-45deg

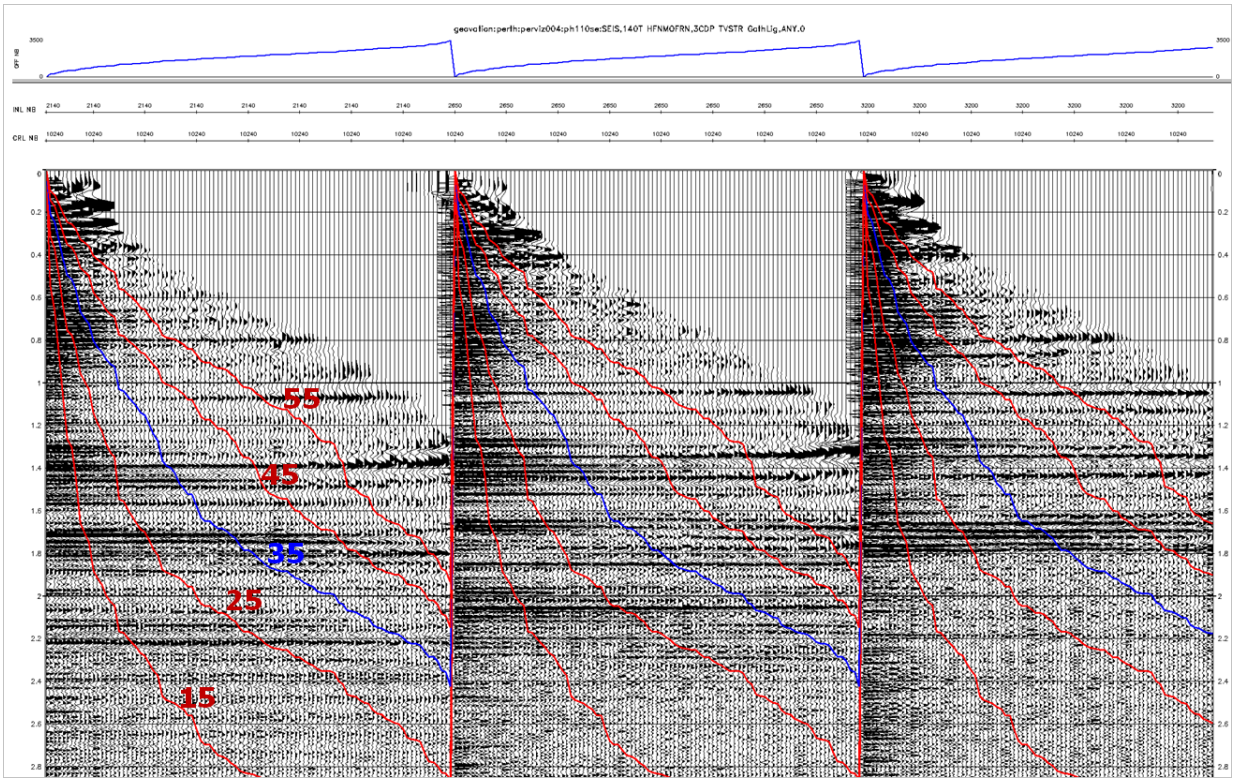


Figure 33 Stacking mutes

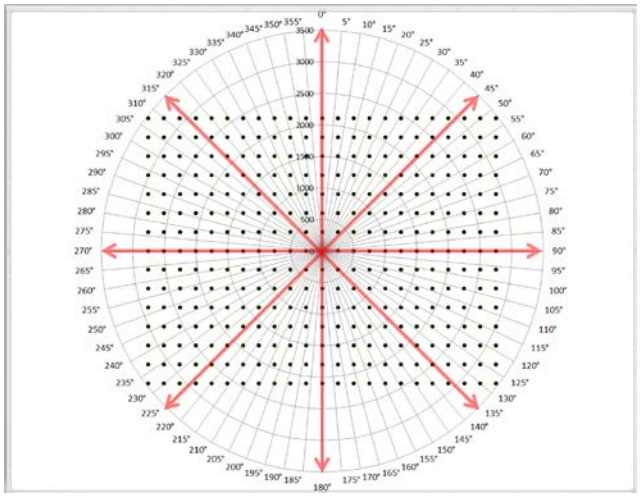
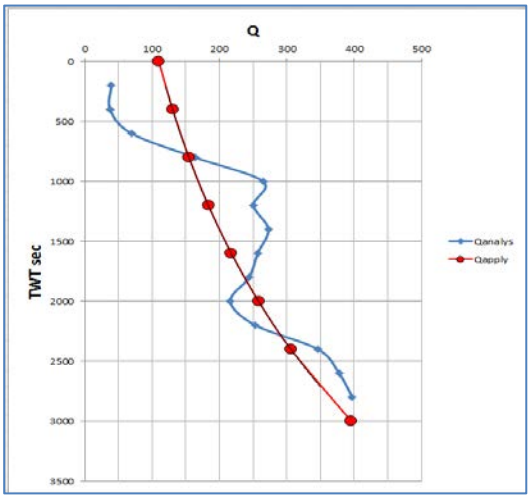


Figure 34 Four Azimuthal Stacks generated in production 0deg, 45deg, 90deg and 135deg

2.22 Inverse Q

To compensate for amplitude absorption an inverse Q filter "Amplitude Only" has been applied on post-stack.
The Q-function below used in InvQ filtering is an edited version of Q-analysis performed on a stacked cube.



TWT	Qapply
0	110
400	130
800	150
1200	180
1600	220
2000	260
2400	300
3000	400

Figure 35 Q Attenuation analysis (blue) and (red)

Because of prior spiking deconvolution, Q values here do not reflect real attenuation in rocks. Inverse Q filter here is rather a convenient way of applying time-variant spectral correction.

2.23 Spectral Correction

Spectral correction operator was computed in on stacked data in 1.2s-2.2s window and applied on the whole trace.
The process boosted spectrum below 10Hz and 80Hz at high frequency.

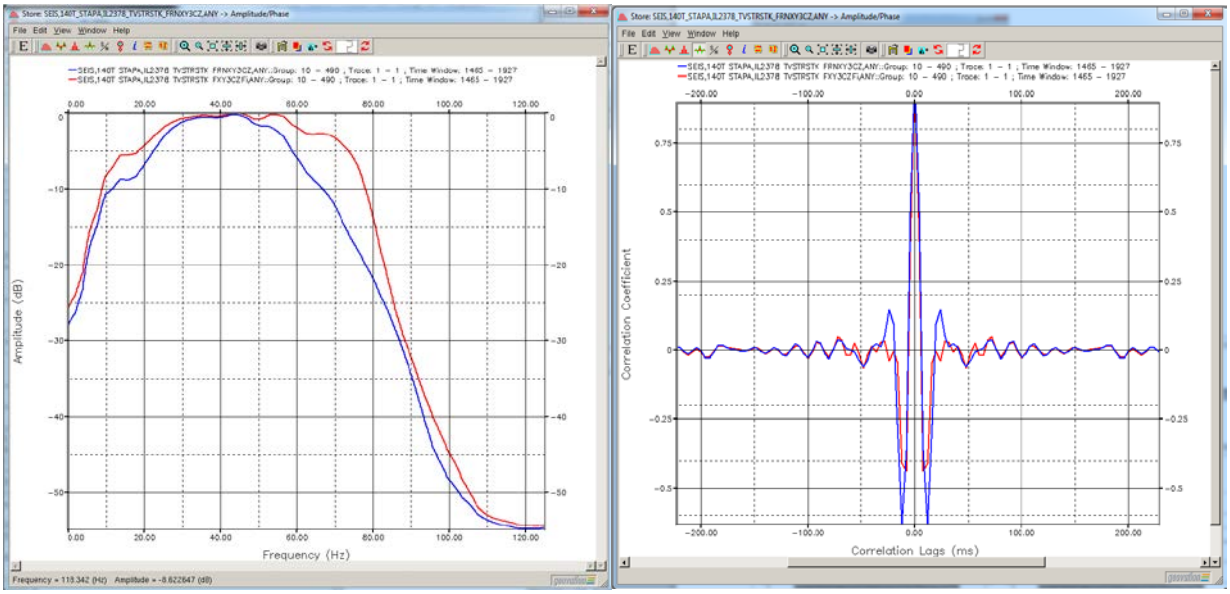


Figure 36 Spectral Correction. Spectrum and autocorr: Blue – before, Red – after. W1465-1927ms

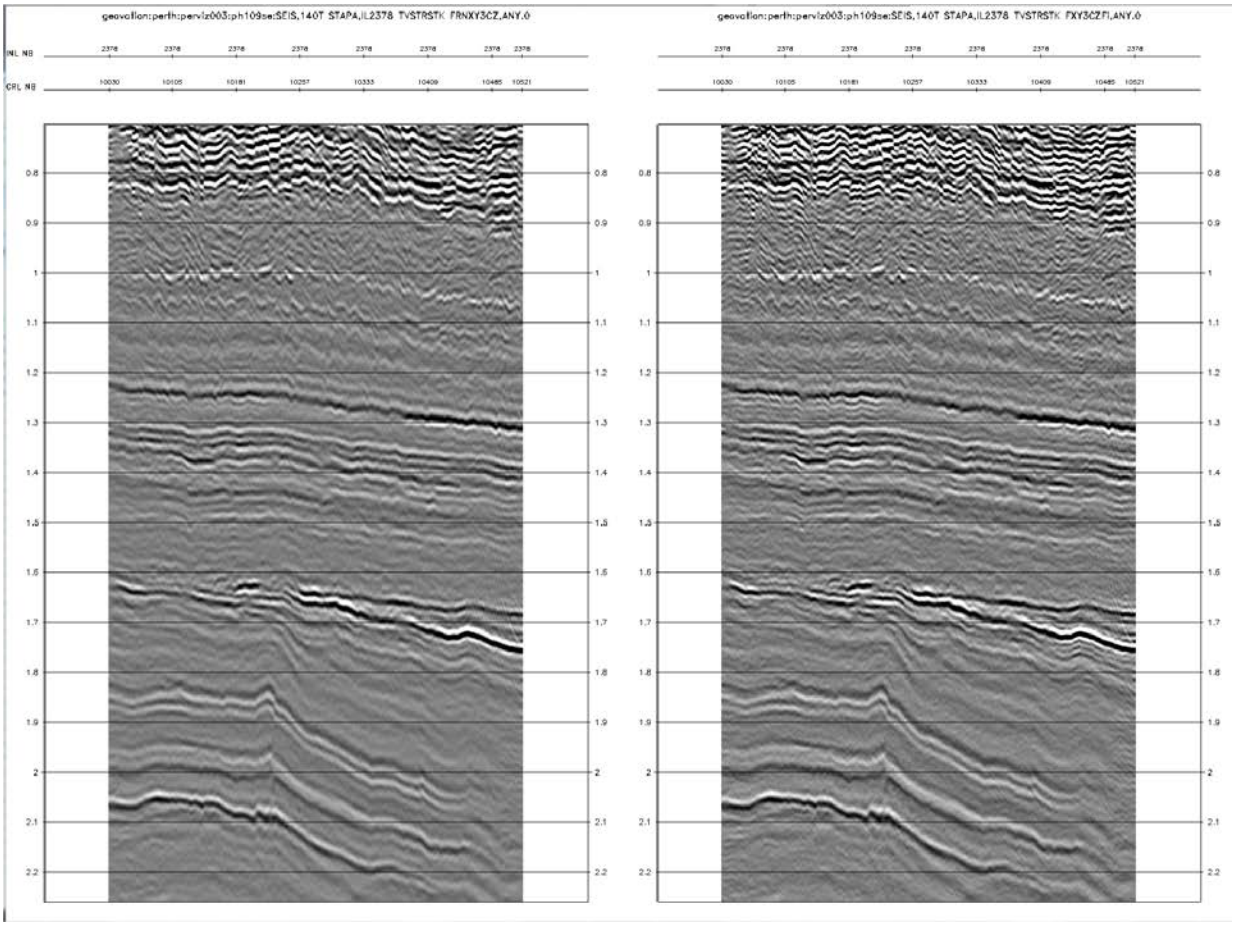


Figure 37 Stack before (lhs) and after (rhs) Spectral Correction

2.24 Post-Stack De-Noise CADZO

Post-stack CADZO was applied *only on stack cubes 17-25 generated in COV route (see Deliverbles Table).*

In CADZO input traces are Furrier transformed to frequency domain where they form a complex Hankel matrix. Singular Value Decomposition (SVD) reduces the rank of this matrix. Then it is returned to Hankel form and FFT'd to time domain.

Signal tends to span over lower ranks, random noise occupies higher. Noise is filtered out by limiting rank of the output matrix.

Production parameters:

Domain	Post-stack 3D cube
Mode/Rank:	Hankel/3
IL/XL block/taper:	15x15/7x7
Temporal window:	400/200ms

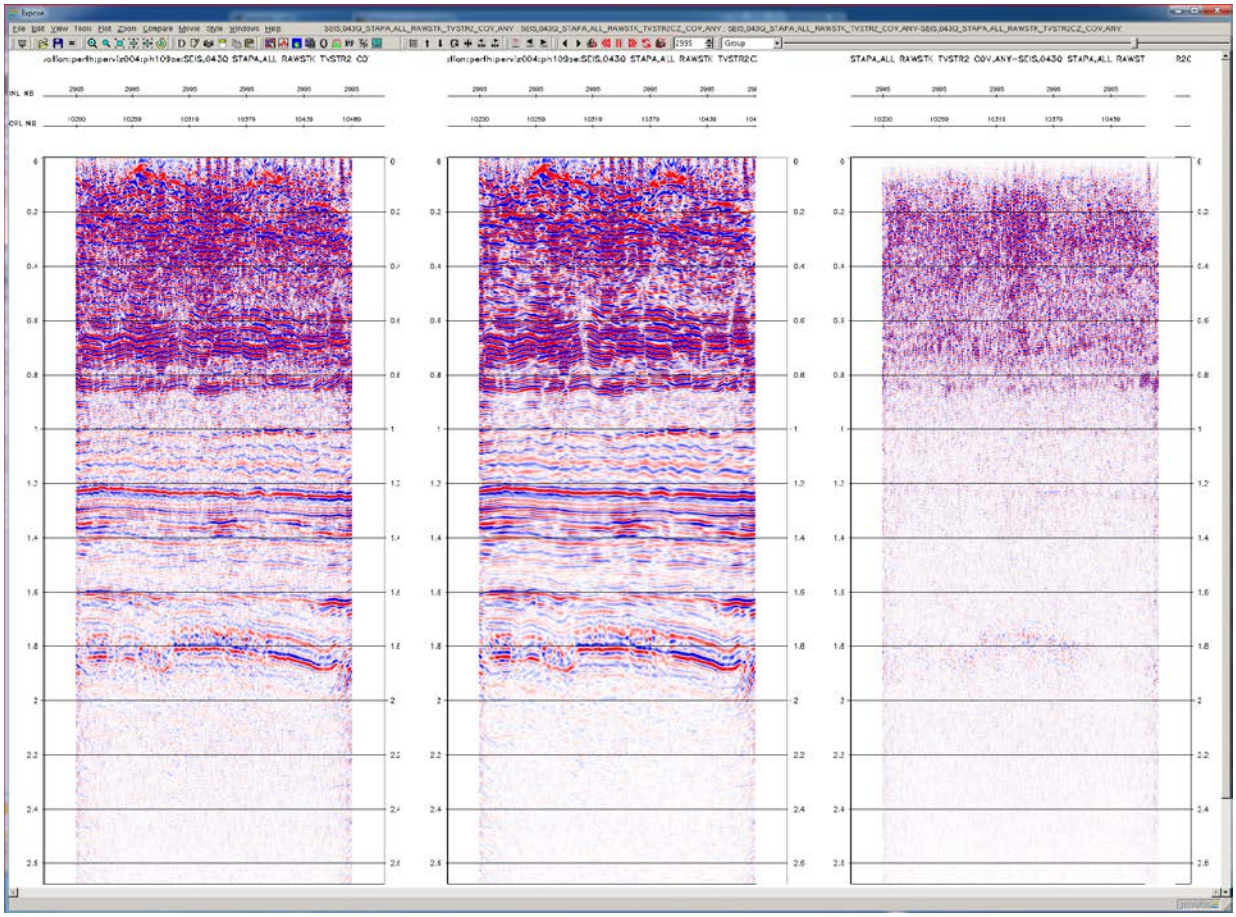


Figure 38 Post-Stack CADZO: before/after and difference. Inline through Mustang-1.

2.25 SPARN and Same Offset Trace Sum

SPARN has been applied to improve S/N on Processed PSTM Gathers 6-7, 11-12 and 13-16 (see Deliverables Table, Chapter 2.01).

SPARN carries out projective filtering in the (f-x) domain. It separates the signal, assumed to be predictable in x, from non-predictable noise, for all the signal's component frequencies. Rather than using predictive filtering, SPARN uses projective filtering. The signal after filtering is the same as it would be after passing through a filter whose spectrum values are 0 or 1. This ensures that the signal is preserved, at the same time as optimizing the attenuation of random noise. The projective filter is calculated from an auto-deconvolved prediction error filter.

Production Parameters:

Adjacent gathers flipped to create near-to-near/ far-to-far offset sequence
Processing Block 600ms by 150trc
Block overlap 100ms and 20 trc

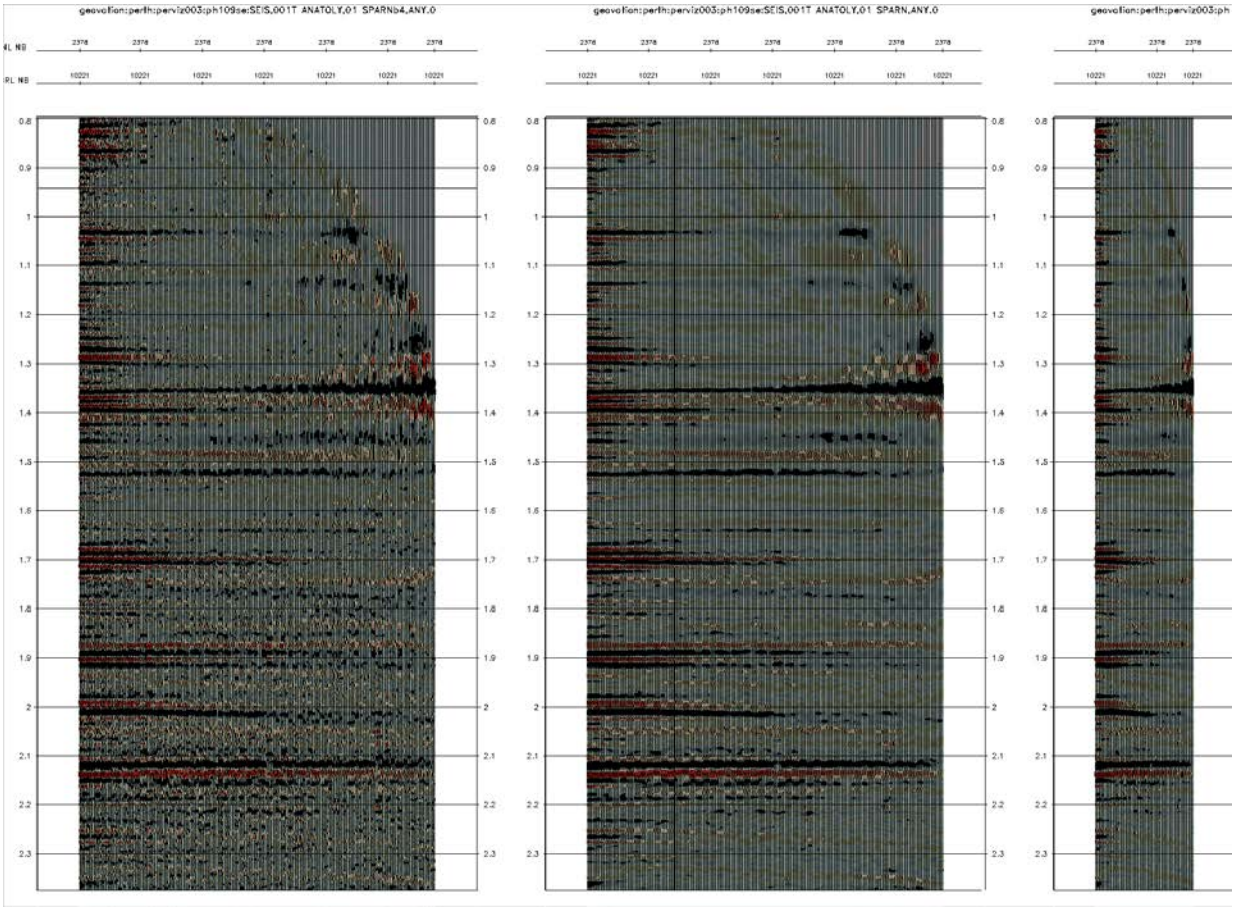


Figure 39 Stormbird-1 PSTM Gathers: Input, SPARN and Same Trace Sum

Same offset trace sum datasets were generated to make conventional AVO analysis/inversion more convenient, i.e. smaller volume and higher S/N at iput.

2.26 Conclusion

Both approaches - Common Offset Vector (COV) and 5D interpolation - employed on the project delivered a good imaging, satisfactory resolution and AVO/AVAZ compliant pre-stack data.

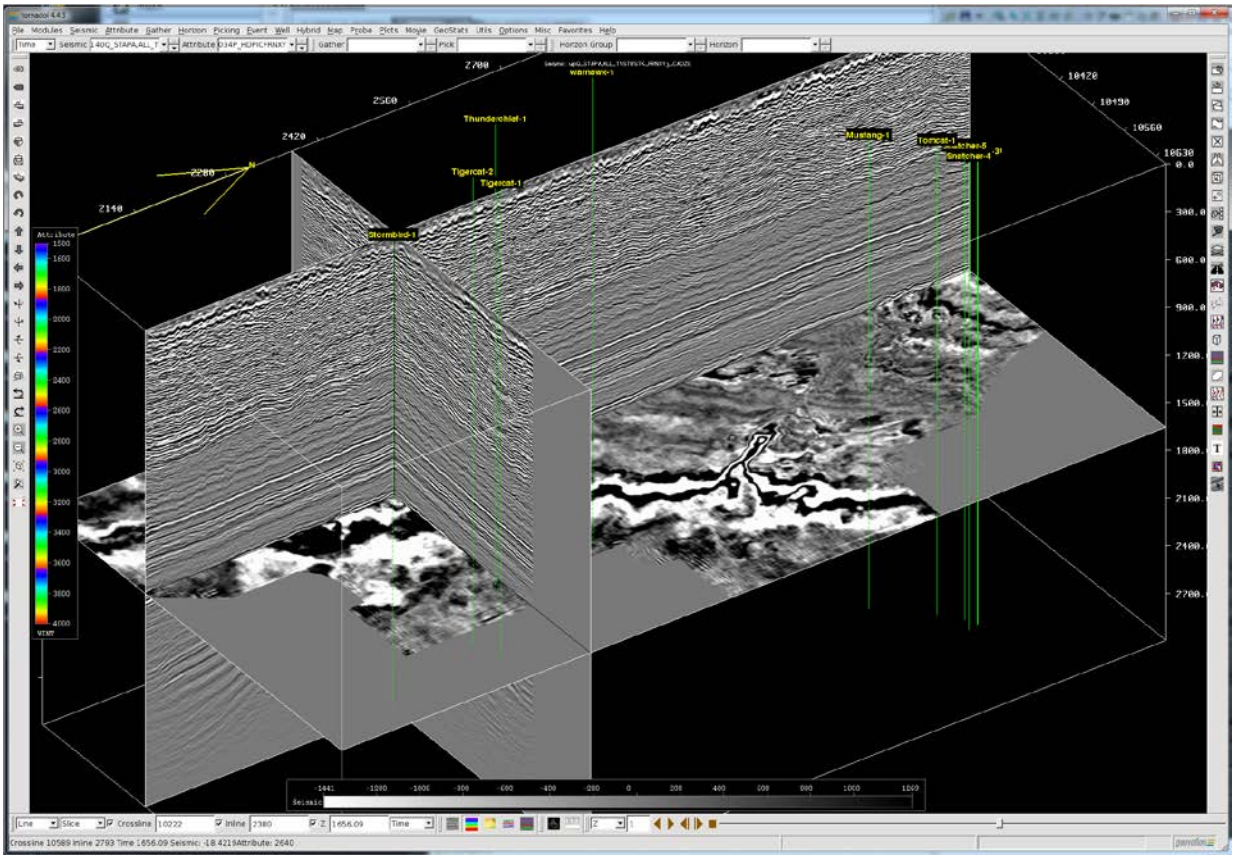


Figure 40 Final PSTM Cube

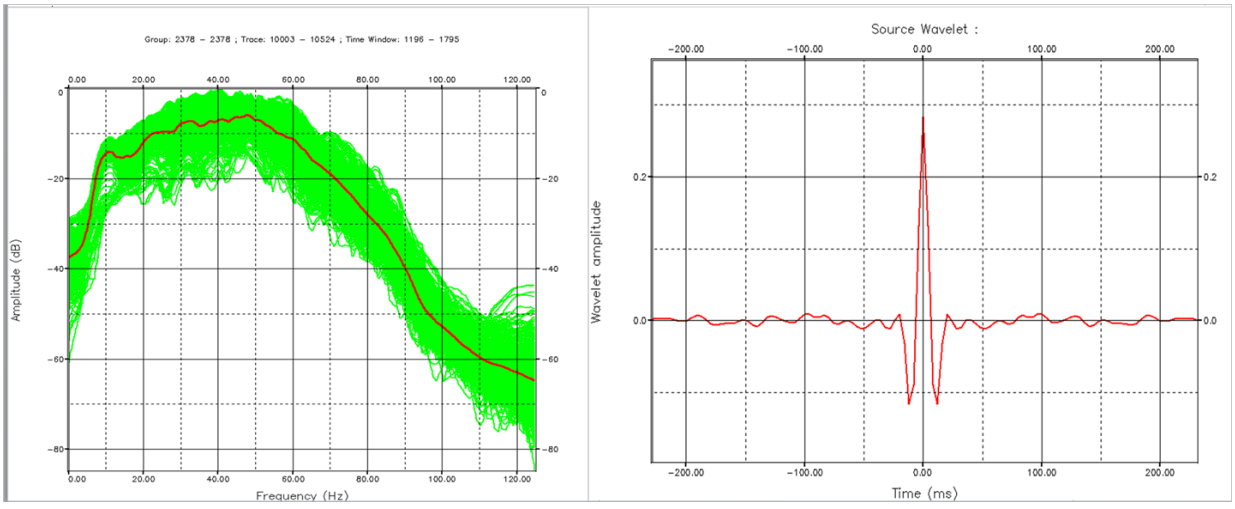


Figure 41 Typical data, Spectrum and corresponding nominal wavelet in TWT 1.2-1.8s interval .

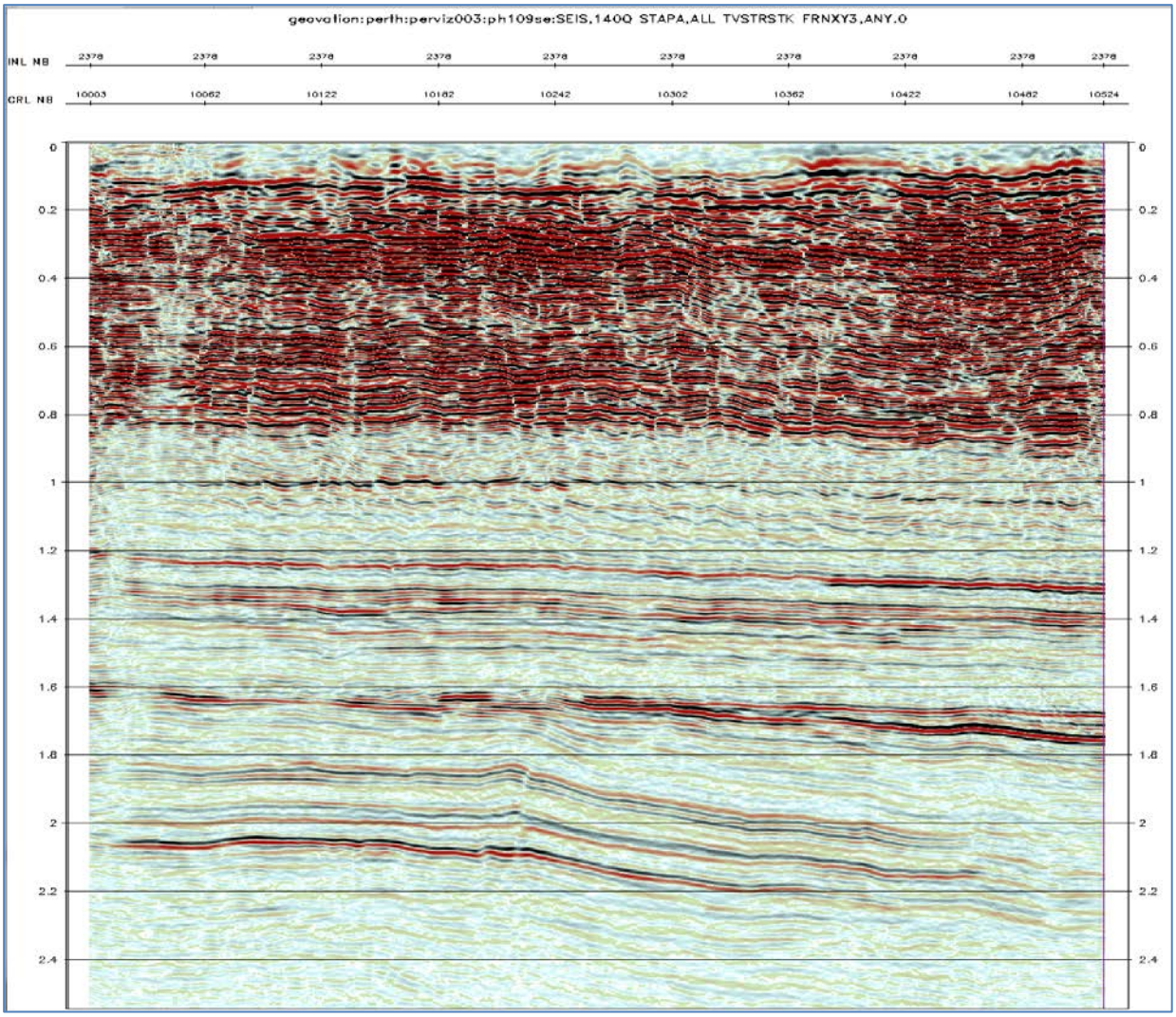


Figure 42 Final Stack. Line through Stormbird–1.

3 Appendices

3.01 EBCDIC and Trace Header Examples

EXAMPLE 1. **PRE-INTERPOLATION CMP GATHERS**

CLIENT : SENEX ENERGY
DATA : PRE-INTERPOLATION CMP GATHERS (3S/4MS,ON FLOATING DATUM)
PROSPECT : LIGNUM 3D
AREA : COOPER BASIN
INLINES : (1999 - 3260)
CROSSLINES : (9999 - 10651)
SAMPLE RATE : 4MS, RECORD LENGTH: 3000MS
INLINE FROM SOUTH TO NORTH INC=1, XLINE FROM WEST TO EAST INC=1
CORNERS (INL/CRL) (X/Y)
1999 9999 360288.40 6939066.40
3260 9999 360288.40 6970591.40
3260 10651 376588.40 6970591.40
1999 10651 376588.40 6939066.40
SEGY HEADER BYTE POSITIONS:
BYTES 09-12 : FIELD FFID BYTES 37-40 : OFFSET
BYTES 73-76 : SP_X BYTES 77-80 : SP_Y
BYTES 81-84 : RCV_X BYTES 85-88 : RCV_Y
BYTES 141-144 : BIN_X (IBM FP) BYTES 145-148 : BIN_Y (IBM FP)
BYTES 197-200 : INLINE BYTES 201-204 : XLINE
BYTES 209-212 : SP NUMBER BYTES 213-216 : RCV NUMBER
BYTES 127-128 : SP LINE BYTES 129-130 : SP POINT
BYTES 131-132 : RCV LINE BYTES 133-134 : RCV POINT
BYTES 135-136 : SURVEY NUMBER (LIGNUM3D=1)
BYTES 233-236 : PROCESSING DATUM (IBM FP)
BYTES 237-240 : AZIMUTH FROM NORTH (IBM FP)
PROCESSING SEQUENCE:
01. REFORMAT SEGY TO INTERNAL FORMAT RL/SI=3000/2MS.
02. TRACE EDITING, NAV-SEISMIC MERGING, 3D GRIDDING TO 25X25M
03. MINIMUM PHASE CONVERSION, RESAMPLE 2MS TO 4MS
04. TV^2 AMPLITUDE COMPENSATION
05. TOMO STATICS INVERSION AND APPLICATION
06. TRACE EDIT / DESPIKING 07. GABOR DECONVOLUTION
08. GROUND ROLL AND RANDOM NOISE ATTENUATION IN CROSS-SPREAD
08. 2ND RNA
09. VA01 1X1KM 10. 1ST SURFACE CONSISTENT RESIDUAL STATICS
11. SURFACE CONSISTENT AMP CORRECTION
12. VA02 1X1KM 13. 2ND SURFACE CONSISTENT RESIDUAL STATICS
14. DBS IN 3D TAU-P, OL 18/180MS
15. INVERSE TV^2 AMPLITUDE DIVERGENCE COMPENSATION
16. PROCESSED BY CGG, PERTH DATA PROCESSING CENTRE, DECEMBER 2013

BYTES WORD MEANING 2-D 3-D:

BYTES/FORMAT/MEANING		
9 - 12 I4 FIELD RECORD NUMBER		
13 -16 I4 TRACE NUMBER		
17 -20 I4 SP NUMBER		
21 -24 I4 CMP NUMBER		
33 -34 I4 17 STACK WORD		
37 -40 I4 SOURCE DETECOR DISTANCE		
41 -44 I4 ELEVATION RECEIVER/DETECTOR		*X10*
45 -48 I4 ELEVATION SOURCE		*X10*
49 -52 I4 13 DEPTH OF SOURCE		*X10*
61 -64 I4 6 STATION NUMBER SOURCE (PROCESSING)		*9 DIGITS* *SAME AS ACQ 209-212*
65 -68 I4 7 STATION NUMBER DETECTOR (PROCESSING)		*9 DIGITS* *SAME AS ACQ 213-216*

69 -70 I2 ELEVATION AND DEPTH SCALAR		*1*
71 -72 I2 COORDINATE SCALAR		*1*
73 -76 I4 X-COORDINATE SOURCE		
77 -80 I4 Y-COORDINATE SOURCE		
81 -84 I4 X-COORDINATE DETECTOR		
85 -88 I4 Y-COORDINATE DETECTOR		
89 -90 I2 COORDINATE UNITS		*1 (METERS)*
91 -94 I2 IBM-FP TRIM STATIC		*0*
95 -96 I2 SHOTHOLE TIME AT SOURCE		*0*
99 - 100 I2 FIELD STATIC CORRECTION AT SOURCE LOCATION		*0*
101 -102 I2 FIELD STATIC CORRECTION AT DETECTOR LOCATION		*0*
109 -110 I2TIME OF FIRST SAMPLE (TMFS)		*0*
111 -112 I4 TIME OF FIRST SAMPLE (TMFS)		*0*
113 -114 I2 FIRST LIVE SAMPLE		
115 -116 I2 NUMBER OF SAMPLES IN THIS TRACE		
117 -118 I2 SAMPLE INTERVAL IN MICROSECONDS FOR THIS TRACE		
127 -128 I2 (ACQUISITION)		*SP LINE FROM SPS*
129 -130 I2 (ACQUISITION)		*SP PEG FROM SPS*
131 -132 I2 (ACQUISITION)		*RCV LINE FROM SPS*
133 -134 I2 (ACQUISITION)		*RCV PEG FROM SPS*
135-136 I2 SURVEY NUMBER		*LIGNUM =1*
141 -144 IBM-FP X-COORDINATE AT CELL CENTRE		*BIN_X*
145 -148 IBM-FP Y-COORDINATE AT CELL CENTRE		*BIN_Y*
149 -152 IBM-FP X-COORDINATE MIDPOINT		*CMP_X*
153 -156 IBM-FP Y-COORDINATE MIDPOINT		*CMP_Y*
185 -188 IBM-FP RESIDUAL STATIC CORRECTION AT SOURCE LOCATION:		*RES. 1+2*
189 -192 IBM-FP RESIDUAL STATIC CORRECTION AT DETECTOR LOCATION:		*RES. 1+2*
193 -194 I2 CMP DATUM CORRECTION APPLIED		*0*
197 -200 I4 INLINE NUMBER WITHIN 3D SURVEY IL		
201 -204 I4 CROSSLINE NUMBER WITHIN 3D SURVEY XL		
205 - 208 I4 CMP NUMBER		*IL*100000+XL*
209 - 212 I4 FIELD STATION NUMBER SOURCE **NOTE B* (ACQUISITION)		*9 DIGITS. SAME AS 61-64*
213 - 216 I4 FIELD STATION NUMBER DETECTOR **NOTE B* (ACQUISITION)		*9 DIGITS. SAME AS 65-68*
217 - 218 I2 FIELD RECORD NUMBER		*SAME AS 9-12*
221 - 222 I2 SOURCE TYPE 1=VIBROSEIS 2=DYNAMITE		
225 - 228 I4-FP RELATIVE & RESIDUAL SOURCE STATIC		*TOTAL STATICS: DS+RES1+RES2*
229 - 232 IBM-FP RELATIVE & RESIDUAL DETECTOR STATIC		*TOTAL STATICS: DS+RES1+RES2*
233 - 236 IBM-FP CDP DATUM CORRECTION		*NOT APPLIED*
237- 240 IBM-FP 3D AZIMUTH		*SOURCE-TO-RECEIVER AZIMUTH FROM NORTH, 0-360DEG RANGE, DEG.*

NOTES:

FIELD STATION NUMBER SOURCE = *SURVEY NUMBER *10^8 +SOURCE LINE*10^4+SOURCE PEG (SOURCE LINE AND SOURCE PEG AS IN SPS)*

FIELD STATION NUMBER DETECTOR = *SURVEY NUMBER *10^8 +RCV LINE*10^4+RCV PEG (RCV LINE AND RCV PEG AS IN SPS)*

EXAMPLE 2. **PROCESSED MULTI-AZIMUTH PSTM GATHERS**

CLIENT : SENEX ENERGY
DATA : PSTM GATHERS 5D INTERP (ON FIXED DATUM)
PROSPECT : LIGNUM 3D
AREA : COOPER BASIN
INLINES : (1999 - 3260)
CROSSLINES : (9999-10651)
SAMPLE RATE : 4MS, RECORD LENGTH: 3000MS
SEGY HEADER BYTE POSITIONS:
BYTES 37-40 : OFFSET
BYTES 81-84 : CDP_X BYTES 85-88 : CDP_Y
BYTES 141-144 : CDP_X BYTES 145-148 : CDP_Y
BYTES 17-20 AND 197-200:INLINE BYTES 21-24 AND 201-204:XLINE
BYTES 233-236 : PROCESSING DATUM (IBM FP) - APPLIED
BYTES 237-240 : AZIMUTH FROM NORTH (IBM FP)
CORNERS (INL/CRL) (X/Y)
1999 9999 360288.40 6939066.40
3260 9999 360288.40 6970591.40
3260 10651 376588.40 6970591.40
1999 10651 376588.40 6939066.40
PROCESSING SEQUENCE:
01. REFORMAT SEGY TO INTERNAL FORMAT (RECORD LENGTH 3000 MS).
02. TRACE EDITING, NAV-SEISMIC MERGING, 3D BINNING
03. MINIMUM PHASE CONVERSION, RESAMPLE 2MS TO 4MS
04. TV^2 AMPLITUDE COMPENSATION
05. TOMO STATICS INVERSION AND APPLICATION
06. TRACE EDIT / DESPIKING
07. GABOR DECONVOLUTION
08. GROUND ROLL AND RANDOM NOISE ATTENUATION IN CROSS-SPREAD
08. 2ND RNA
09. VA01 1X1KM 10. 1ST SURFACE CONSISTENT RESIDUAL STATICS
11. SURFACE CONSISTENT AMP CORRECTION
12. VA02 1X1KM 13. 2ND SURFACE CONSISTENT RESIDUAL STATICS
14. DBS IN 3D TAU-P, OL 18/180MS
15. 5D ORTHOGONAL INTERPOLATION AND REGULARIZATION
16. PSTM VELOCITY VA03 1X1KM
17. 3D KIRCHHOFF PSTM (WITH INTERNAL AMPLITUDE COMPENSATION)
18. VA03A 1X1 KM VELOCITY ANALYSIS AFTER PSTM
19. DENSE VA04 20X20M V/ETA, RADON3D, AZIMUTHAL NMO VEL, TRIM STATICS,
20. STATICS CORRECTION FROM PROCESSING TO FIXED DATUM MSL 0M
21. SEGY OUTPUT

BYTES WORD MEANING 2-D 3-D:

BYTES/FORMAT/MEANING	
17 -20 I4 GRID INLINE NUMBER	
21 -24 I4 GRID XLINE NUMBER	
37 -40 I4 SOURCE DETECOR DISTANCE	
71 -72 I2 COORDINATE SCALAR	*1*
81 -84 I4 X-COORDINATE 3D CELL CENTRE	
85 -88 I4 Y-COORDINATE 3D CELL CENTER	
89 -90 I2 COORDINATE UNITS	*1 (METERS)*
109 -110 I2TIME OF FIRST SAMPLE (TMFS)	*0*
111 -112 I4 TIME OF FIRST SAMPLE (TMFS)	*0*
113 -114 I2 FIRST LIVE SAMPLE	
115 -116 I2 NUMBER OF SAMPLES IN THIS TRACE	
117 -118 I2 SAMPLE INTERVAL IN MICROSECONDS FOR THIS TRACE	
141 -144 I4 IBM-FP X-COORDINATE AT CELL CENTRE	*3D GRID CELL CENTRE*
145 -148 I4 IBM-FP Y-COORDINATE AT CELL CENTRE	*3D GRID CELL CENTRE*
197 -200 I4 INLINE NUMBER WITHIN 3D SURVEY IL	
201 -204 I4 CROSSLINE NUMBER WITHIN 3D SURVEY XL	
205 - 208 I4 CMP NUMBER	*(IL*100000)+XL*
233 - 236 I4 IBM-FP CDP DATUM CORRECTION	
237- 240 I4IBM-FP 3D AZIMUTH	*SOURCE-TO-RECEIVER AZIMUTH FROM NORTH, 0-360DEG RANGE, DEGREES*

EXAMPLE 3. **FINAL PSTM STACK**

CLIENT : SENEX ENERGY
DATA : 5Dint_Final_PSTM_FullFold_Stack_InvQ
PROSPECT : LIGNUM 3D
AREA : COOPER BASIN
INLINES : 1999 - 3260
CROSSLINES : 9999 - 10651
SAMPLE RATE : 4MS, RECORD LENGTH: 3000MS
SEGY HEADER BYTE POSITIONS:
BYTES 25-28 : BIN FOLD
BYTES 81-84 :BIN POINT EASTING BYTES 85-88 :BIN POINT NORTHING
BYTES 197-200:INLINE NUMBER BYTES 201-204:XLINE NUMBER
BYTES 233-236:PROCESSING DATUM (IBM FP) - APPLIED
CORNERS (INL/CRL) (X/Y)
1999 9999 360288.40 6939066.40
3260 9999 360288.40 6970591.40
3260 10651 376588.40 6970591.40
1999 10651 376588.40 6939066.40
PROCESSING SEQUENCE:
01. REFORMAT SEGY TO INTERNAL FORMAT (RECORD LENGTH 3000 MS).
02. TRACE EDITING, NAV-SEISMIC MERGING, 3D BINNING
03. MINIMUM PHASE CONVERSION, RESAMPLE 2MS TO 4MS
04. TV^2 AMPLITUDE COMPENSATION
05. TOMO STATICS INVERSION AND APPLICATION
06. TRACE EDIT / DESPIKING 07. GABOR DECONVOLUTION
08. GROUND ROLL AND RANDOM NOISE ATTENUATION IN CROSS-SPREAD
08. 2ND RNA
09. VA01 1X1KM 10. 1ST SURFACE CONSISTENT RESIDUAL STATICS
11. SURFACE CONSISTENT AMP CORRECTION
12. VA02 1X1KM 13. 2ND SURFACE CONSISTENT RESIDUAL STATICS
14. DBS IN 3D TAU-P, OL 18/180MS
15. 5D ORTHOGONAL INTERPOLATION AND REGULARIZATION
16. PSTM VELOCITY VA03 1X1KM
17. 3D KIRCHHOFF PSTM (WITH INTERNAL AMPLITUDE COMPENSATION)
18. VA03A 1X1 KM VELOCITY ANALYSIS AFTER PSTM
19. DENSE VA04 20X20M V/ETA, RADON 3D, AZIMUTHAL NMO VELOCITY, TRIM STATICS,
20. 35 DEG ANGLE MUTE, STACK, INV-Q AMPLITUDE ONLY,
21. SPECTRAL CORRECTION, TIME VARIANT GAIN 4dB/S
22. STATICS CORRECTION FROM PROCESSING TO FIXED DATUM MSL 0m
23. SEGY OUTPUT

BYTES WORD MEANING 2-D 3-D:

Bytes/Format/Meaning		
17 -20 I4 Grid Inline Number		
21 -24 I4 Grid Xline Number		
71 -72 I2 Coordinate Scalar		*1*
81 -84 I4 X-Coordinate 3D Cell Centre		
85 -88 I4 Y-Coordinate 3D Cell Centre		
89 -90 I2 Coordinate Units		*1 (meters)*
109 -110 I2Time of First Sample (TMFS)		*0*
111 -112 I4 Time of First Sample (TMFS)		*0*
113 -114 I2 First Live Sample		
115 -116 I2 Number of Samples in This Trace		
117 -118 I2 Sample Interval in Microseconds for This Trace		
141 -144 IBM-FP X-Coordinate at Cell Centre		*3D Grid Cell Centre*
145 -148 IBM-FP Y-Coordinate at Cell Centre		*3D Grid Cell Centre*
197 -200 I4 Inline Number within 3D Survey IL		
201 -204 I4 Crossline Number within 3D Survey XL		
205 - 208 I4 CMP Number		*IL*100000+XL*
233 - 236 IBM-FP CDP datum correction		
237- 240 IBM-FP 3D Azimuth		*N/A*

EXAMPLE 4. **DENSE 25x25m Vnmo CUBE**

CLIENT : SENEX ENERGY
DATA : DENSE STACKING VELOCITY FIXED DATUM
PROSPECT : LIGNUM 3D
AREA : COOPER BASIN
INLINES : 1999 - 3260
CROSSLINES : 9999 - 10651
SAMPLE RATE : 4MS, RECORD LENGTH: 3000MS
SEGY HEADER BYTE POSITIONS:
BYTES 25-28 : BIN FOLD
BYTES 81-84 :BIN POINT EASTING BYTES 85-88 :BIN POINT NORTHING
BYTES 197-200:INLINE NUMBER BYTES 201-204:XLINE NUMBER
BYTES 233-236:PROCESSING DATUM (IBM FP) - APPLIED
CORNERS (INL/CRL) (X/Y)
1999 9999 360288.40 6939066.40
3260 9999 360288.40 6970591.40
3260 10651 376588.40 6970591.40
1999 10651 376588.40 6939066.40
PROCESSING SEQUENCE:
01. REFORMAT SEGY TO INTERNAL FORMAT (RECORD LENGTH 3000 MS).
02. TRACE EDITING, NAV-SEISMIC MERGING, 3D BINNING
03. MINIMUM PHASE CONVERSION, RESAMPLE 2MS TO 4MS
04. TV^2 AMPLITUDE COMPENSATION
05. TOMO STATICS INVERSION AND APPLICATION
06. TRACE EDIT / DESPIKING 07. GABOR DECONVOLUTION
08. GROUND ROLL AND RANDOM NOISE ATTENUATION IN CROSS-SPREAD
08. 2ND RNA
09. VA01 1X1KM 10. 1ST SURFACE CONSISTENT RESIDUAL STATICS
11. SURFACE CONSISTENT AMP CORRECTION
12. VA02 1X1KM 13. 2ND SURFACE CONSISTENT RESIDUAL STATICS
14. DBS IN 3D TAU-P, OL 18/180MS
15. 5D ORTHOGONAL INTERPOLATION AND REGULARIZATION
16. PSTM VELOCITY VA03 1X1KM
17. 3D KIRCHHOFF PSTM (WITH INTERNAL AMPLITUDE COMPENSATION)
18. VA03A 1X1 KM VELOCITY ANALYSIS AFTER PSTM
19. DENSE VA04 25X25M V/ETA
20. STATICS CORRECTION FROM PROCESSING TO FIXED DATUM MSL 0M
21. SEGY OUTPUT

BYTES WORD MEANING 2-D 3-D:

Bytes/Format/Meaning		
17 -20 I4 Grid Inline Number		
21 -24 I4 Grid Xline Number		
71 -72 I2 Coordinate Scalar		*1*
81 -84 I4 X-Coordinate 3D Cell Centre		
85 -88 I4 Y-Coordinate 3D Cell Centre		
89 -90 I2 Coordinate Units		*1 (meters)*
109 -110 I2Time of First Sample (TMFS)		*0*
111 -112 I4 Time of First Sample (TMFS)		*0*
113 -114 I2 First Live Sample		
115 -116 I2 Number of Samples in This Trace		
117 -118 I2 Sample Interval in Microseconds for This Trace		
141 -144 IBM-FP X-Coordinate at Cell Centre		*3D Grid Cell Centre*
145 -148 IBM-FP Y-Coordinate at Cell Centre		*3D Grid Cell Centre*
197 -200 I4 Inline Number within 3D Survey IL		
201 -204 I4 Crossline Number within 3D Survey XL		
205 - 208 I4 CMP Number		*IL*100000+XL*
233 - 236 IBM-FP CDP datum correction		
237- 240 IBM-FP 3D Azimuth		*N/A*

END OF REPORT