CPSAN13B SEISMIC SURVEY

2013 GASCHNITZ 3D

PPL 17, PPL 80 & PPL 101

SOUTH AUSTRALIA

ACQUISITION REPORT

Compiled by: A. White
Santos Ltd.
7th December, 2013

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1 INTRODUCTION

1.1 GENERAL

In July and August 2013, Santos Ltd. carried out approximately 122.88 square kilometres of 3D seismic imaging in South Australia's Petroleum Production Licence (PPL) 101. The survey also extended into PPL 17 & 80 in the north west of the survey area.

The survey was wholly located on the Gidgealpa pastoral lease and was known as the CPSAN13B Gaschnitz 3D Seismic Survey.

The following table details the key companies involved in the acquisition of the survey.

Activity	Contractor
Line Preparation	Terrex Contracting Pty. Ltd.
Surveying	RPS Pty. Ltd.
Seismic Recording	Terrex Seismic Pty. Ltd.(Crew 402)

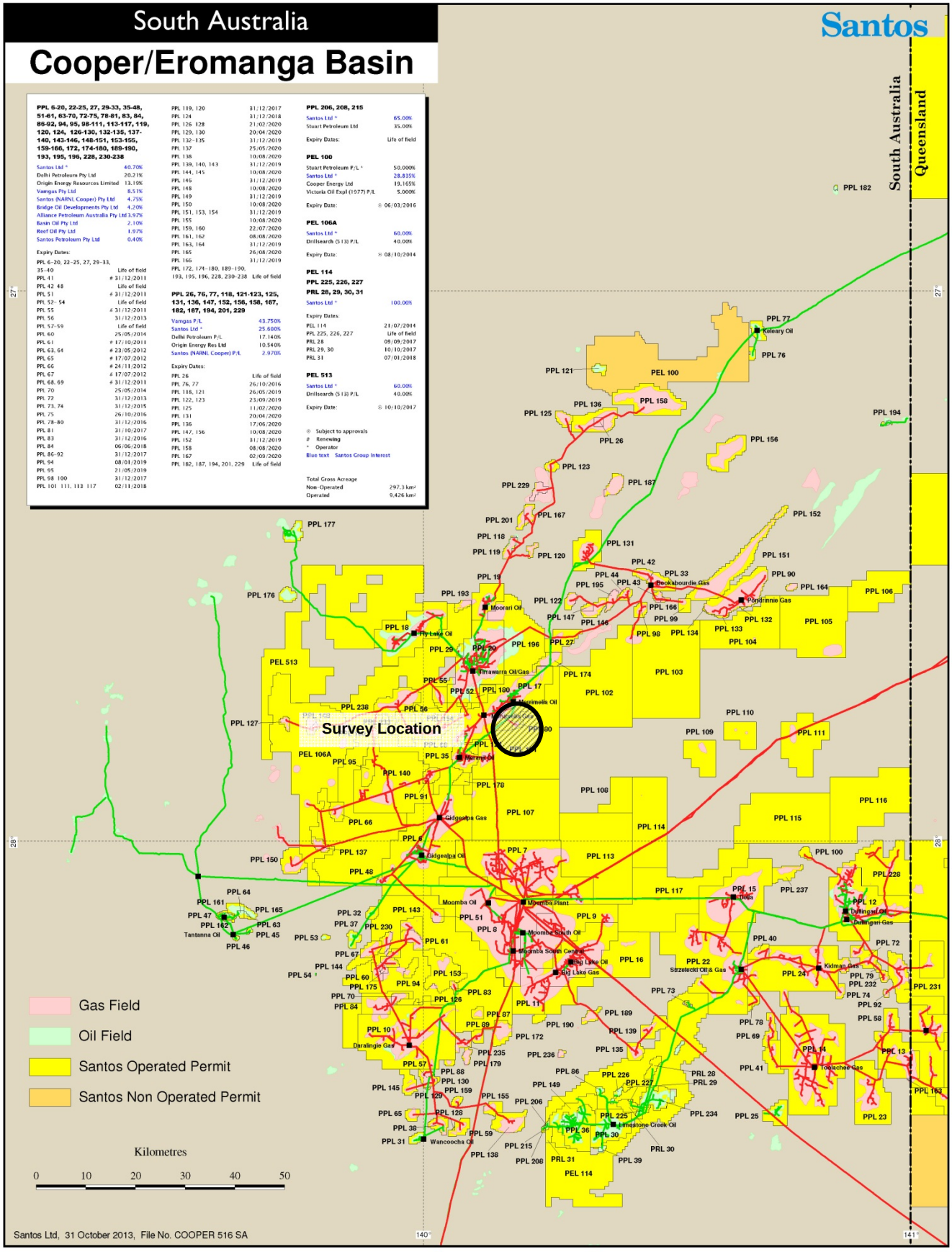
Santos Ltd contracted John Allen to supervise field operations. Sections below, describing field operations, are largely drawn from his observations.

Processing of the seismic data was carried out by Global Geophysical in their centre in Denver, and will be the subject of a separate report.

This report describes the data acquisition of CPSAN13B Gaschnitz 3D Seismic Survey, located approximately 30 kilometres north of the Moomba Gas Facility, in the South Australian Cooper Basin.

1.2 TIMETABLE OF MAIN EVENTS

Date	Activity
18/04/2013	Notice of Entry sent to Gidgealpa, Native Title claimants and other stakeholders.
18/04/2013	Notice of Intention sent to DMITRE.
5/07/2013	Line preparation commenced.
6/07/2013	Survey pegging commenced.
18/07/2013	Line preparation completed (dozing)
19/07/2013	Survey pegging completed.
20/07/2013	Line preparation completed (grading)
27/07/2013	Spread layout commenced
29/07/2013	Spread layout completed
30/07/2013	Recording commenced.
5/08/2013	Recording completed.
5/08/2013	Spread pickup commenced
8/08/2013	Spread pickup completed


South Australia
Cooper/Eromanga Basin
Santos
South Australia
Queensland
PPL 6-20, 22-25, 27, 29-33, 35-48, 51-61, 63-70, 72-75, 78-81, 83, 84, 86-92, 94, 95, 98-111, 113-117, 119, 120, 124, 126-130, 132-135, 137-140, 143-146, 148-151, 153-155, 159-166, 172, 174-180, 189-190, 193, 195, 196, 228, 230-238
Santos Ltd * 40.70%
Delhi Petroleum Pty Ltd 20.21%
Origin Energy Resources Limited 13.19%
Vamgas Pty Ltd 8.51%
Santos (NARNL Cooper) Pty Ltd 4.75%
Bridge Oil Developments Pty Ltd 4.20%
Alliance Petroleum Australia Pty Ltd 3.92%
Basin Oil Pty Ltd 2.10%
Reef Oil Pty Ltd 1.97%
Santos Petroleum Pty Ltd 0.40%
Expiry Dates:
PPL 6-20, 22-25, 27, 29-33, 35-40 Life of field
PPL 41 # 31/12/2011
PPL 42 48 Life of field
PPL 51 # 31/12/2011
PPL 52- 54 Life of field
PPL 55 # 31/12/2011
PPL 56 31/12/2013
PPL 57-59 Life of field
PPL 60 25/05/2014
PPL 61 # 17/10/2011
PPL 63, 64 # 23/05/2012
PPL 65 # 17/07/2012
PPL 66 # 24/11/2012
PPL 67 # 17/07/2012
PPL 68, 69 # 31/12/2011
PPL 70 25/05/2014
PPL 72 31/12/2013
PPL 73, 74 31/12/2015
PPL 75 26/10/2016
PPL 78-80 31/12/2016
PPL 81 31/10/2017
PPL 83 31/12/2016
PPL 84 06/06/2018
PPL 86-92 31/12/2017
PPL 94 08/01/2019
PPL 95 21/05/2019
PPL 98 100 31/12/2017
PPL 101 111, 113 117 02/11/2018
PPL 119, 120 31/12/2017
PPL 124 31/12/2018
PPL 126 128 21/02/2020
PPL 129, 130 20/04/2020
PPL 132-135 31/12/2019
PPL 137 25/05/2020
PPL 138 10/08/2020
PPL 139, 140, 143 31/12/2019
PPL 144, 145 10/08/2020
PPL 146 31/12/2019
PPL 148 10/08/2020
PPL 149 31/12/2019
PPL 150 10/08/2020
PPL 151, 153, 154 31/12/2019
PPL 155 10/08/2020
PPL 159, 160 22/07/2020
PPL 161, 162 08/08/2020
PPL 163, 164 31/12/2019
PPL 165 26/08/2020
PPL 166 31/12/2019
PPL 172, 174-180, 189-190, 193, 195, 196, 228, 230-238 Life of field
PPL 26, 76, 77, 118, 121-123, 125, 131, 136, 147, 152, 156, 158, 167, 182, 187, 194, 201, 229
Vamgas P/L 43.750%
Santos Ltd * 25.600%
Delhi Petroleum P/L 17.140%
Origin Energy Res Ltd 10.540%
Santos (NARNL Cooper) P/L 2.970%
Expiry Dates:
PPL 26 Life of field
PPL 76, 77 26/10/2016
PPL 118, 121 26/05/2019
PPL 122, 123 23/09/2019
PPL 125 11/02/2020
PPL 131 20/04/2020
PPL 136 17/06/2020
PPL 147, 156 10/08/2020
PPL 152 31/12/2019
PPL 158 08/08/2020
PPL 167 02/09/2020
PPL 182, 187, 194, 201, 229 Life of field
PPL 206, 208, 215
Santos Ltd * 65.00%
Stuart Petroleum Ltd 35.00%
Expiry Dates: Life of field
PEL 100
Stuart Petroleum P/L * 50.000%
Santos Ltd * 28.835%
Cooper Energy Ltd 19.165%
Victoria Oil Expl (1977) P/L 5.000%
Expiry Date: ◎ 06/03/2016
PEL 106A
Santos Ltd * 60.00%
Drillsearch (S I3) P/L 40.00%
Expiry Date: ◎ 08/10/2014
PEL 114
PPL 225, 226, 227
PRL 28, 29, 30, 31
Santos Ltd * 100.00%
Expiry Dates:
PEL 114 21/07/2014
PPL 225, 226, 227 Life of field
PRL 28 09/09/2017
PRL 29, 30 10/10/2017
PRL 31 07/01/2018
PEL 513
Santos Ltd * 60.00%
Drillsearch (S I3) P/L 40.00%
Expiry Date: ◎ 10/10/2017
◎ Subject to approvals
Renewing
* Operator
Blue text Santos Group Interest
Total Gross Acreage
Non-Operated 297.3 km²
Operated 9,426 km²
Survey Location
Gas Field
Oil Field
Santos Operated Permit
Santos Non Operated Permit
Kilometres
0 10 20 30 40 50
Santos Ltd, 31 October 2013, File No. COOPER 516 SA
140°
141°
27°
28°

2 SURVEY SCOPE AND OBJECTIVES

The objective of the survey was to evaluate geotechnical properties, the associated geotechnical risk, and gas production potential of the Nappamerri Trough Unitisation Zone (NTUZ) Permian sands by drill/complete/frac/testing Toolachee, Daralingie, Epsilon and/or Patchawarra/Tirrawarra sands outside of structural closure. The NTUZ area has been chosen as the target because it has significant potential to provide measurable and quantifiable results.

Gaschnitz-1 ST1, was completed in Q1 2013. Following evaluation of mudlog and wireline log data the 2C accessible GIIP is estimated to be 1.6 TCF. Gaschnitz-1 ST1 is currently scheduled to be stimulated in June, 2013.

The Gaschnitz well tie at the Toolachee reservoir interval demonstrates good reflector amplitude and continuity of the upper Toolachee reservoir section above the PC20 Toolachee coal.

It was expected the Gaschnitz 3D seismic survey would achieve the following objectives:

- Allow for improved identification and areal extent of stratigraphic packages which are known to thin and thicken in the region & also degrade/improve in quality.
- Identify faults in an area of sparse, mixed-vintage 2D seismic.
- Allow for fracture determination and orientation.
- Provide for improved accuracy in depth conversion and subsequent temperature/pressure prediction.
- Provide a basis for future geomechanical modelling of the insitu stress state.
- Assist with determining the extent and continuity of some of the thicker coal measures, especially in the Toolachee, Epsilon & Patchawarra Fms, intersected in Gaschnitz-1.
- Allow for more accurate well design planning of planned appraisal wells.
- Provide for more accurate volumetric resource calculations.

By achieving some or all of the above objectives, it is expected that the locations of future vertical pilot wells around Gaschnitz-1ST1 as well as potential horizontal wells will be optimised. In addition, it is expected the survey will yield information on acquisition and processing parameters which will assist in the planning of any future, and much larger, 3D surveys relevant to plays in the Nappamerri Trough.

The surface acquisition consisted of the following 33 source and 30 receiver lines:

Receiver Line	Start	End	Length
CPSAN13B-R1000	5048	5255	10.40
CPSAN13B-R1008	5048	5255	10.40
CPSAN13B-R1016	5048	5255	10.40
CPSAN13B-R1024	5048	5255	10.40
CPSAN13B-R1032	5048	5255	10.40
CPSAN13B-R1040	5048	5255	10.40
CPSAN13B-R1048	5048	5255	10.40
CPSAN13B-R1056	5048	5255	10.40
CPSAN13B-R1064	5048	5255	10.40
CPSAN13B-R1072	5048	5255	10.40
CPSAN13B-R1080	5048	5255	10.40
CPSAN13B-R1088	5048	5255	10.40
CPSAN13B-R1096	5048	5255	10.40
CPSAN13B-R1104	5048	5255	10.40
CPSAN13B-R1112	5000	5255	12.80
CPSAN13B-R1120	5000	5255	12.80
CPSAN13B-R1128	5000	5255	12.80
CPSAN13B-R1136	5000	5255	12.80
CPSAN13B-R1144	5000	5255	12.80
CPSAN13B-R1152	5000	5215	10.80
CPSAN13B-R1160	5000	5215	10.80
CPSAN13B-R1168	5000	5215	10.80
CPSAN13B-R1176	5000	5215	10.80
CPSAN13B-R1184	5000	5215	10.80
CPSAN13B-R1192	5000	5215	10.80
CPSAN13B-R1200	5000	5215	10.80
CPSAN13B-R1208	5000	5215	10.80
CPSAN13B-R1216	5056	5215	8.00
CPSAN13B-R1224	5056	5215	8.00
CPSAN13B-R1232	5056	5215	8.00
		Total	320.00

Source Line	Start	End	Length
CPSAN13B-S5000	1112	1207	4.80
CPSAN13B-S5008	1112	1207	4.80
CPSAN13B-S5016	1112	1207	4.80
CPSAN13B-S5024	1112	1207	4.80
CPSAN13B-S5032	1112	1207	4.80
CPSAN13B-S5040	1112	1207	4.80
CPSAN13B-S5048	1000	1207	10.40
CPSAN13B-S5056	1000	1231	11.60
CPSAN13B-S5064	1000	1231	11.60
CPSAN13B-S5072	1000	1231	11.60
CPSAN13B-S5080	1000	1231	11.60
CPSAN13B-S5088	1000	1231	11.60
CPSAN13B-S5096	1000	1231	11.60
CPSAN13B-S5104	1000	1231	11.60
CPSAN13B-S5112	1000	1231	11.60
CPSAN13B-S5120	1000	1231	11.60
CPSAN13B-S5128	1000	1231	11.60
CPSAN13B-S5136	1000	1231	11.60
CPSAN13B-S5144	1000	1231	11.60
CPSAN13B-S5152	1000	1231	11.60
CPSAN13B-S5160	1000	1231	11.60
CPSAN13B-S5168	1000	1231	11.60
CPSAN13B-S5176	1000	1231	11.60
CPSAN13B-S5184	1000	1231	11.60
CPSAN13B-S5192	1000	1231	11.60
CPSAN13B-S5200	1000	1231	11.60
CPSAN13B-S5208	1000	1231	11.60
CPSAN13B-S5216	1000	1231	11.60
CPSAN13B-S5224	1000	1143	7.20
CPSAN13B-S5232	1000	1143	7.20
CPSAN13B-S5240	1000	1143	7.20
CPSAN13B-S5248	1000	1143	7.20
CPSAN13B-S5256	1000	1143	7.20
		Total	318.80

3 DATA ACQUISITION

3.1 PERMITTING

3.1.1 GENERAL

The programme was located wholly within the boundary of the Gidgealpa pastoral lease. The manager of the pastoral lease was initially advised of forthcoming seismic operations by letter, with attached maps etc. Contact was then made with the manager by the Santos Representative to discuss and obtain approval for various aspects of operations, (including timeframe, procedures, fences, gates, roads, camp site, water supply etc.), before field operations commenced.

3.2 LOGISTICS AND COMMUNICATIONS

Terrex Contracting mobilised to the prospect on the 4th July 2013. RPS mobilised to site on the 3rd and 4th July 2013. RPS supplied an office caravan, a three room sleeper caravan and an office/sleeper caravan. Power, meals and ablution facilities were provided by Terrex Contracting.

Terrex Seismic mobilised to the prospect from Brisbane on the 25th and 26th July 2013. They provided a self-contained, air-conditioned, mobile camp capable of accommodating 57 people, to house the field management, recording and maintenance personnel. Line-preparation and Surveying provided their own camp facilities. Senior management of Terrex Seismic was located in Perth and Brisbane.

Two campsites were occupied during the course of the survey. Terrex Contracting & RPS set up their camp on the Plugged and abandoned Merrimellia 18 well pad. the camp coorinates are 418,550mE and 6,928,700m N.

Terrex Seismic set up their camp on a previously disturbed area (borrow pit) along the Gaschnitz 1 access road. Lat: 27° 49’ 13” S Long: 140° 11’ 45” E.

Terrex Seismic supplies and freight was road transported out of Adelaide by KJM on a fortnightly basis. These supplies were delivered to Moomba and then transported by the Terrex supply truck to camp. Bulk diesel fuel was obtained from the North Point in Moomba and delivered to site by the Service Truck. Potable water was obtained from Moomba.

General camp rubbish was disposed of in Moomba. The disposal of effluent water from the two campsites, kitchens and toilets was managed by Veolia Environmental Services.

Crew change flights were commercial flights in and out of the Moomba airstrip on a as needs basis.

3.3 SURVEYING

3.3.1 GENERAL

Horizontal and vertical surveying of seismic lines, using Trimble GPS receivers and ancillary equipment, was carried out by RPS Australia East Pty Ltd. A total of three survey personnel were utilised throughout the survey effort. This comprised one senior surveyor and 2 GPS operators for the duration of the survey.

Surveying commenced on the 5th July conducting control checks and establishing a GPS base. Line pegging commenced on the 7th July once the line preparation equipment had a sufficient lead.

The senior surveyor had a dual role, being responsible for the overall surveying task and also for coordinating the line preparation effort. Duties included the loading of files into the bulldozers on-board GPS, initiating random field checks and maintaining the survey data base. Initial work included the verification of existing survey control and the establishment of a GPS base station within the 3D grid.

Mapping of petroleum and pastoral infrastructure including pipelines, roads, tracks and fences was an early priority. Another was to install and determine the coordinates of Environmental Monitor Points (EMP's) selected and photographed by the client representative.

The Senior Surveyor installed five Environmental Monitoring Points. The Senior Surveyor was also responsible for scouting source and receiver line offsets around various obstacles in the 3D.

Office duties included the QC of all survey data, the compilation of daily survey and line preparation reports and the preparation of 'as surveyed' maps for the field crews.

GPS operators were responsible for chaining, pegging and surveying all geophone stations and VPs within the tolerances specified by Santos. They were also responsible for effecting survey ties to old survey permanent markers to verify the accuracy of the earlier surveys.

RPS used Trimble R7 GPS and Trimble R7 GNSS receivers and TSC2 / TSC3 survey controllers. These are dual frequency receivers enabling very fast and reliable initialisations. Coupled with Trimble TSC2/3 survey controllers, the system is very efficient and user friendly. Repeater stations were installed when the signal from the base was weak or degraded.

Source and receiver stations were set-out and surveyed using the 'real time' kinematic (RTK) GPS method. Prior to commencing work the design coordinates of all stations were calculated and loaded into the Trimble TSCe survey controllers used by the GPS operators. Lines were then driven and each station chained and surveyed by reference to its coordinates and pegged within the clients specified cross-line and in-line tolerances of ±10m and ±2m respectively. As each station was pegged the X, Y and Z values were computed with reference to the WGS 84 datum and stored in the controller. Geophone stations and VP's were pegged at 50m intervals respectively. Numbered wooden pegs and pin flags were used to mark these stations.

Station coordinates were downloaded daily from the TSCe controllers, QC'd in Dynamic Survey Solution's (Trimble owned company) GPSeismic software and transformed from WGS 84 to the Geocentric Datum of Australia (GDA) and the positional data output as MGA coordinates, Zone 54, central meridian 141° 00'E. Ellipsoid heights were converted to the Australian Height Datum (AHD) using the Ausgeoid 98 separation model.

The final survey data was exported directly to mapping software (ArcGIS 10). The mapping software allowed for quick visual checking of point locations. Points in suspect locations (e.g. too close to pipeline) could be flagged for checking. Line preparation and survey database information was also automatically mapped in ArcGIS 10 which enabled the crew to visually monitor daily production and produce up to date progress maps, recording access maps and swath maps for the vibrator operators.

'As surveyed' maps were printed for distribution to the vibrator operators and recording line crew. To assist these crews, roads, tracks, infrastructure, hand carry sections,

detours, cultural heritage detours and no-go zones were included on the colour coded maps. Final survey data was forwarded to both Terrex Seismic and Santos Limited.

3.3.2 OPERATIONS

Inductions where completed on the morning of 5th July. Two dozers arrived on site on 5th July and the third on the 6th July. The grader arrived on the 7th July. All 4 machines had GPS navigation installed prior to commencing work. Line preparation commenced on the morning of 6th July.

Dozing progressed at a good rate however the grading soon fell behind due to the amount of grading required through the crabhole country. A second grader was hired however this grader was continually dogged by mechanical and electrical problems and was eventually stood down to await parts. It recommenced work on 18th July.

Survey worked on ungraded lines for a large portion of the survey. This slowed down the survey crew until the lines through the crabhole flats were completed. Once in the dune country where the crew could easier place the pegs and pinflags outside the dozed rills, the survey crew commenced to slowly catch up to the dozers and eventually finished only one day behind them.

There were few hand carry sections during the survey – mainly on the two small sections of pipeline in the north west corner, through Gidgealpa waterhole and occasional dune points.

While the survey was taking place there was a Halliburton “frac” crew working at Gaschnitz # 1 well. A one kilometre exclusion zone was put in place around the well area while this was going on. Once the “frac” crew had finished the exclusion was lifted and the line preparation and survey crews completed the section.

One RTK base station (Merri 18) was required during the Gaschnitz 3D survey. It was established at an existing well benchmark at Merrimelia #18 – also the camp location. A repeater was used to extend range and pick up any points missed due to loss of radio link.

The GPS operators staked out a total of 6,400 receiver points over 30 receiver lines and a total of 6,376 source points over 33 source lines. The total of 638.80 linear km of line was completed in 12 days to give an average productivity rate of 53.23km/day.

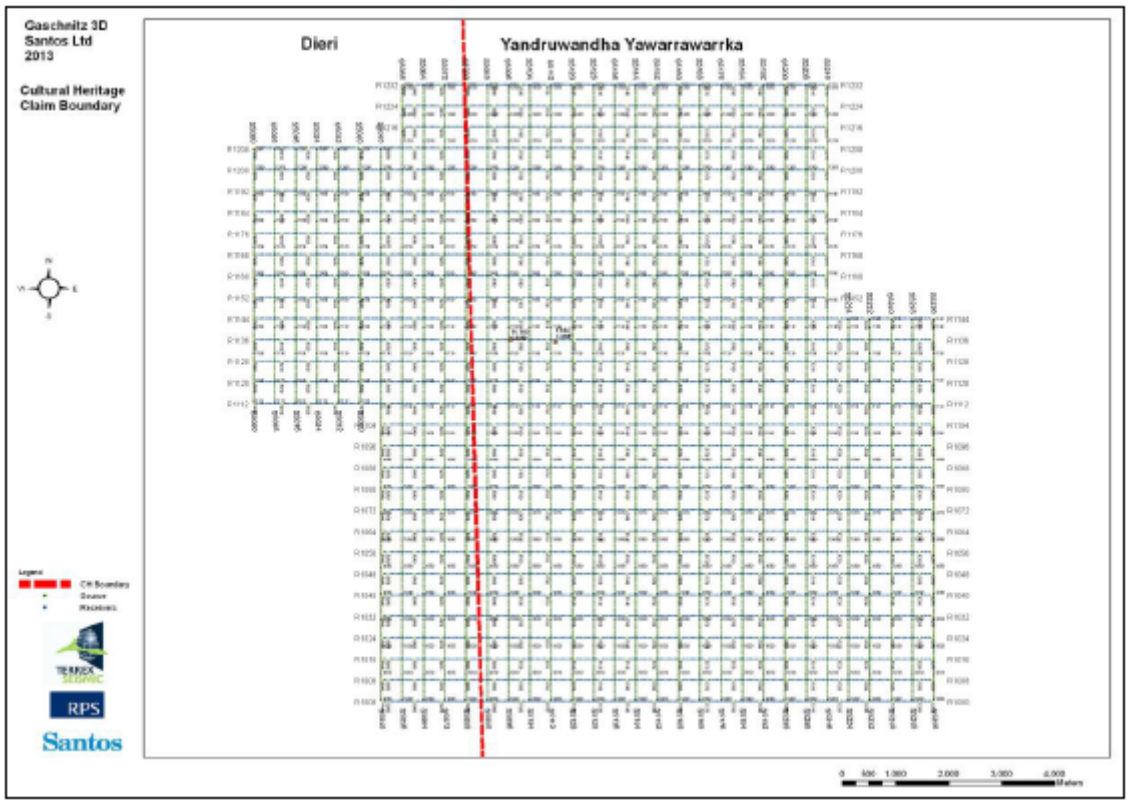
Days Worked:	12
Rx Kilometres:	320.00
Sx Kilometres:	318.80
Total Kilometres:	638.80
Kilometres per Day:	53.23

The survey crew finished on the 18th July 2013, a day after line preparation (dozing) finished but a day before grading of lines was completed.
.
At the completion of the line fieldwork the survey crew located and marked the uphole program then checked the lines for cattle or grader damage, replacing any pegs or pinflags where required.

One member of the survey crew stayed on site for re-pegging ahead of the recording crew. The remaining two members of the RPS survey crew (Eric Amedee and Andrew Tonkin) demobilised to Toowoomba on 21st July 2013.
Operations, personnel and equipment are fully detailed in their Prospect Report, which is appended hereto (Appendix 1).

3.4 CULTURAL HERITAGE CLEARANCE

The Gaschnitz 3D survey was split into two cultural heritage areas (see map below). The western side of the prospect (168.95Km) fell in the Dieri native title area. The eastern side of the prospect (469.85Km) fell in Yandruwandha / Yawarrawarrka (YY) native title area.



Santos Limited has a long term agreement with both Native Title claimants where we abide by certain terms and conditions detailed in a jointly agreed Cultural Heritage Management Plan (CHMP). In particular, Santos Limited was to bear the cost of claimant representatives to inspect the proposed survey area in advance of any on ground activities commencing.

The Dieri Aboriginal Corporation provided four (4) representatives to assist specialist Tim Cuthbertson. Santos provided a Cultural heritage Supervisor (Matt Harvey) from Cultural Heritage Services to oversee and assist the monitors as required. The field inspection was conduction between the 17th and 20th May 2013.

These inspections identified a number of sensitive areas, primarily located on the western portion of the survey area adjacent the Gidgealpa Waterhole. Sites where documented by the Dieri and YY Representatives and detours identified to maintain the sites integrity.

Prior to any work line preparation work commencing, a cultural heritage and site induction were conducted on the morning of the 5th July 2013 by Mike Madey (Santos Cultural Heritage Supervisor) and the site induction by John Allen, (Client Representative for Santos).

3.5 LINE PREPARATION

3.5.1 EQUIPMENT

Line preparation was carried out by Terrex Contracting who supplied a total of eight (8) personnel throughout the survey effort, including those for crew rotation. Personnel work on a 6 week on and 2 week off roster. Terrex Contracting supplied the following equipment:

2 x Komatsu D65EX bulldozers
1 x Caterpiller D7R bulldozer
1 x John Deere 772D 6x6 grader
1 x Caterpiller 14M grader
2 x Prime movers
1 x Iveco Eurotech twin steer utility truck
2 x 4x4 Toyota support vehicles
1 x Water tanker 8,000litre
1 x Fuel tanker trailer
1 x Elross Kitchen/Diner trailer, airconditioned
2 x Elross 8 Man accommodation trailers, airconditioned
1 x Accommodation (cook) / Cold Room trailer
1 x Shower/laundry trailer
1 x Workshop/stores/generator trailer
1 x Low loader
1x Trailer mounted chemical toilets (2)

3.5.2 OPERATIONS

The Terrex Contracting operators mobilised into camp on the 4th July 2013. A 'Greenfield' permit had previously been obtained from the Santos Team Leader (North Gas) in Tirrawarra. On the 5th January a site induction was completed and the JHA reviewed and signed off by all TC and RPS personnel. The first two dozers arrived that day and the third dozer the next day. The grader arrived a day later again.

RPS provided the GPS navigational equipment in the bulldozers and grader. This equipment basically guided the dozer operator along a lines designed course without the need for any material aids. To do this, start and end coordinates of source and receiver lines were loaded into the on-board Garmin 172C GPS receiver. The operator merely called up the lines unique number and a line joining its end points was displayed on a dash mounted navigation screen. Also displayed, were previously recorded cultural heritage sites, cultural heritage exclusions, pipelines and their associated 'No Go' zones, wells and pastoral infrastructure.

During preparation, the machines actual position relative to this line was graphically displayed in real time. Its distance in metres right or left of line was also displayed. The operator was free to weave around rocky terrain, trees, and other substantial vegetation and generally weave to break the line of site. However, operators were specifically requested, where possible, to keep weaving within a ±10 metre tolerance.

Line preparation commenced on the morning of 6th July with Dozers 1 and 2 starting work. Dozer 3 commenced work later that day once GPS was fitted. Grading commenced the same day.

Dozing progressed at a good rate however the grading soon fell behind due to the amount of grading required through the crabhole country. A second grader was hired from KJM and commenced work on 11th July. However this grader was continually dogged by mechanical and electrical problems and was eventually stood down on 14th July to await parts. These were fitted on 15th July but the operator had demobilised so the machine stood by until the dozing had finished and one of the operators could be used to operate it. It recommenced work on 18th July.

As a result, survey worked on ungraded lines for a large portion of the survey. There were few hand carry sections during the survey – mainly on the two small sections of

pipeline in the north west corner, through Gidgealpa waterhole and occasional dune points.

While the survey was taking place there was a Halliburton “frac” crew working at Gaschnitz # 1 well. A one kilometre exclusion zone was put in place around the well area while this was going on. Once the “frac” crew had finished the exclusion was lifted and the line preparation and survey crews completed the section.

3.5.3 PRODUCTION

Line preparation operations took 12 days to complete at an average of 53.23km per day. All line preparation activities were concluded on the 17th July 2013.

Line Preparation Statistics

Total Kilometres prepared:	638.80
Total Kilometres survey:	638.80
Dozer Hours:	346.00
Grader Hours:	241.75
Production Days:	12
Dozer Km per Hour:	1.85

3.6 RECORDING

3.6.1 EQUIPMENT

Terrex Seismic supplied and operated a complete seismic data acquisition system, including, as required.

Recording Equipment

1 x Sercel 428A, 24 bit telemetry recording system
1 x Sercel 464 Similarity System
1 x Client Server HP8600 Workstation
2 x IBM LT02 tape drive
1 x Canon Printer
1 x Westinghouse Series 1000 satellite phone
2 x Motorola 50W VHF radios
1 x Uniden 25W UHF radio
1 x Kodan HF radio
6187 x strings Sensor SM4, 10Hz geophones, 12/string
1660 x Seismic Cables (4 x FDU’s per cable) 6640 channels
350 x Batteries
129 x Transverse Cables
152 x Inline - Line Acquisition Units (LAUL)
49 x Cross Line - Line Acquisition units (LAUX)

Automotive Equipment

A complete list of automotive equipment is included in Terrex Seismic Operations Report. A copy of this report is attached as Appendix 2.

3.6.2 RECORDING PARAMETERS

Instrumentation

Instruments	:	Sercel 428XL – 24 bit.
No. Channels	:	6400
Tape Format	:	SEGD, 8058 IEEE Demultiplexed, LTO 2 Dual Drive Recorded
Filters	:	Hi-cut 200hz. (No Lo Cut)
Sample Rate	:	2 ms
Correlated Record Length	:	5 seconds
RTC	:	Yes
Correlation Type	:	Zero Phase, After Sum
Stack	:	Diversity Stack
Fold of Stack	:	593 Fold (max)

Source

Vibrators	:	2 groups of 2 AVH-IV 62,000 lb peak force on 4X4 articulated buggies.
Electronics	:	Sercel.
Sweep Frequency	:	6-90 Hz
Sweep Length	:	16 seconds (plus 5s listen)
Sweep Function	:	Linear Upsweep
No. Sweeps	:	1
VP Interval	:	50m. orthogonal
Vibrator Array	:	2 in line, 12.5 m. pad to pad standing. No move-up.
End Tapers (Cosine)	:	0.3s
Phase Locking Type	:	Ground Force using M51 HP accelerometers.
Amplitude Control	:	Peak to Peak
Sweep amplitude taper	:	100% (none)
Drive level	:	80% Varied by amplitude control function

Receivers

Group Interval	:	50m
Geophones	:	Sensor SM4 10 Hz Hi spec super phones.
Spread	:	160-256 ch per receiver line (varies over 30 lines)
No. per string	:	12 phones in line 4.16667 m. spacing, centred on station.
Far Trace	:	8774m (diagonal) nominal. 6425m inline / 5975m xline

Recording parameters are detailed in the Terrex Seismic Operations Report. A copy of this report is attached as Appendix 2.

3.6.3 OPERATIONS

The survey was conducted over two distinct landforms which dominated the survey area. In the north is an extensive floodplain associated with the Southwest Branch of the Cooper Creek and in the south, a buff/orange coloured dunefield.

The recording crew mobilised from Brisbane on July 25 and arrived on site the following day. Spread layout commenced on July 27 after all crew members attended a Safety meeting followed by Site and Cultural Heritage Inductions. The heavy duty lug tyres on vibrators were removed and wide, low pressure sand tyres fitted. All four units were pressured up and tested in camp. Similarly, recording instrument tests were completed. Spread layout continued the following day and all four vibrators and the recording truck moved to the eastern end of receiver line R1208 where vibrator point

source and hardwire similarities tests were completed before a series of sweep selection trials commenced.

On July 28, the first in a comprehensive series of trials designed to select the optimum number of sweeps, sweep length and the sweep frequency range was undertaken. These were conduced on the 216 channel receiver line R1208, using a 2 vibrator source array operating between stations 5211 and 5212 near the lines eastern end. Vibrators moved forward 2 metres after each parameter change. Recorded data was written to tape and a 4 second correlated record printed as each trial was completed. The following 32 trials were recorded:

Trial 1a – Number of sweeps & Sweep length

Sweep frequency range 3-80Hz, 2, 3, and 4 sweeps, 4 sec sweep length, 4 sec listen.

Trials 1b and 1c

Repeat using a 6 sec sweep then an 8 sec sweep.

Trial 2a – Sweep frequency, Number & Length

Sweep frequency range 3-90Hz, 2, 3 and 4 sweeps, 4 sec sweep length, 4 sec listen.

Trials 2b and 2c

Repeat using a 6 sec sweep then an 8 sec sweep.

Trial 3a – Sweep frequency, Number & Length

Sweep frequency range 3-100Hz, 2, 3 and 4 sec sweeps, 4 sec sweep length, 4 sec listen.

Trials 3b and 3c

Repeat using a 6 sec sweep then an 8 sec sweep.

Trial 4a – Sweep start frequency, single sweep

Sweep frequency range 5-100Hz, one only 16 sec sweep, 4 sec listen.

Trials 4b, 4c, 4d, 4e

Repeat above for frequency ranges 6-100Hz, 7-100Hz, 8-100Hz and 10-100Hz.

For comparison purposes only, initial trials 1, 2 and 3 were repeated early next morning using a 3 vibrator source array. Data recorded was superior to that obtained using the original 2 vibrator array, with stronger signals reaching the far offsets. Sweep trials resumed on completion of this unscheduled trial.

The second series were conducted on the 160 channel receiver line R1232, again in windy conditions. Two vibrators were used, each starting at opposite ends of the line. Eight different sweep parameters were assigned to each vibrator and each new parameter was trialled over 20 consecutive vp's. Vibrators operated in flip-flop manner and passed each other near the receiver line mid point. Data was written to tape then processed and analysed on site. Four second correlated records were produced in the recording truck. Sweep test parameters assigned to each vibrator are listed below.

Vibrator A

Sweep frequency range 3-100Hz, one sweep, 0.3 sec tapers, 70% force, sweep lengths of 4 sec, 6 sec, 8 sec and 10 sec.

Sweep frequency range 5-100Hz, one sweep, 0.3 sec tapers, 70% force, sweep lengths of 6 sec, 8 sec, 10 sec and 12 sec.

Vibrator B

Sweep frequency range 6-100Hz, one sweep, 0.3 sec tapers, 70% force, sweep lengths of 8 sec, 10 sec, 12 sec and 14 sec.

Sweep frequency range 8-100Hz, one sweep, 0.3 sec tapers, 70% force, sweep lengths of 10 sec, 12 sec, 14 sec and 16 sec.

On the morning of July 30, trial data was still being processed and analysed, spread layout was incomplete and very light winds prevailed. Presented with ideal recording conditions the opportunity was taken to repeat the wind affected trials 1, 2 and 3 using the original 2 vibrator array. Although wind noise was minimal, data on the far offsets was still weak.

The following production sweep parameters were selected following a detailed analysis of the second series data.

Sweep frequency 6-90Hz, single 16 sec sweep, 5 sec listen, 0.3 sec start and end tapers, 70% force.

The original proposal was to conduct this survey in its entirety with all 30 receiver lines active. Due to the inability to provide the required amount of spread within the survey time frame, this plan was modified so as not to unduly delay the project startup.

Recording operations commenced at 1525 hours on July 30 with 90% of receiver lines laid out. Starting at the northernmost swath 1 the two fleets of vibrators rolled onto the survey grid pushing 15 receiver lines until swath 7 was completed early on August 1. Thereafter, the remaining work was divided into panels of 8, 7 and 7 swaths and recorded sequentially with all 30 receiver lines powered up and all 6,400 groups of geophones active. No vp's were skipped.

The Sercel 428 recording system had recently been upgraded to a 428A with the latest Sercel software including hardware and software for the automated GPS source driven system. This latter upgrade involved the installation of a GPS receiver and dedicated radio in each vibrator and the provision of a portable GPS base station receiver to be connected to the recording truck at every setup. The system is capable of controlling multiple source groups (fleets) and is dependant on the observer having the final surveyed coordinates of source points well in advance of vibrator occupation.

When set up on a source point both the X and Y coordinates of all fleet members are averaged then compared to the survey derived values. Provided the fleet coordinates are within the predetermined radial tolerance, the fleet's position and readiness to vibrate is displayed on the recorders GPS screen. The fleet will then automatically start vibrating providing no other fleet is operating. Should the fleet average fall outside the prescribed tolerance, an alarm is activated in the recorder. Then by reference to the screen the observer can instruct the fleet how far and in what direction it has to move to be within specification.

The upgraded system has greatly improved the efficiency of 3D recording. Through automation, vibrator dead time has virtually been eliminated and the observers stress level has been considerably reduced. Providing there are no obstacles to hinder fleet move-ups, and the flip-plop recording method is employed then the delay between one fleet finishing and the next fleet starting to sweep is only a matter of a few seconds.

Overall, data quality was only fair. Wind noise was prevalent most days, particularly on the far offsets where the signal to noise was quite weak. August 4 was a particularly windy day with the wind strength gradually increasing until mid to late afternoon. The number of sweeps per vp was increased to two at 1510 hours then reverted back to one sweep at 1637 hours as the strong gusting winds moderated. The doubling of effort only resulted in a slight improvement.

The source array used throughout this survey comprised of two I/O articulated vibrators, in line, with a pad to pad spacing of 12.5 metres and centred on the station. Two fleets of 2 vibrators were used. In the event of a breakdown the sole unit set up with its base plate on the station. One, 16 second sweep was executed at every station (vp) except when only one vibrator was operational. In this event two sweeps were executed. The listen time at the end of each sweep was 5 seconds.

The vibrator drive level (force) was set at 70%, however, on a number of occasions it was reduced to 60% or even 50% when distortion at the low end of the sweep was excessive. The sweep distortion problem was limited to vp's on the floodplain. In the dunefield it was a rarity.

The four I/O 60,000lb articulated vibrators worked well for most of this survey. One unit had engine problems on August 2 and 3. It automatically shut down for 45 minutes early on the August 2 then again late in the afternoon and was not repaired in time to resume work that day. The remaining vibrator in the fleet continued operating during this down time and completed 111vp's using two sweeps.

All 4 vibrators started work the following day only to have the troublesome unit shut down again mid morning. A new engine control unit was fitted and it resumed operating around midday. In the interim the single vibrator in the fleet continued working and completed 46 vp's using two sweeps.

The survey grid comprised of 30 parallel receiver lines spaced 400m apart and orientated east-west. They varied in length from 8.00 kilometres to 12.80 kilometres and totalled 320.00 kilometres overall. Geophone stations were spaced at 50m intervals along each line with every fourth marked by a numbered wooden peg. Pin flags marked the stations in between. At each station, 12 SM24 geophones were arrayed parallel to the receiver line and spaced 4.17 metres apart, centred on the marker.

Spread was hand carried across the dry Gidgealpa Waterhole and the gas and oil pipelines 'No Go' zones. Line vehicles including vibrators were only permitted to cross buried pipelines at road crossings.

Thirty three source lines spaced 400 metres apart were arranged at right angles to the receiver lines. These varied in length from 4.80 kilometres to 11.60 kilometres and totalled 318.80 kilometres overall. Numbered wooden pegs marked the vp's on both sides of receiver line intersections and every fourth station from the low number receiver line. Pin flags marked the stations in between.

All vp's were confined to the precleared 50 metre corridors on the floodplain and dune swales. They were also confined to the 100 metre corridors over dunes and on both sides of the Santos 'No Go' pipeline zones.

Recording services were provided on an hourly basis. Various project statistics are shown below.

A total of 6376 source points were to be recorded and 6400 receivers to be laid out within the 3D program

Table 1
Project Statistical Summary

Area (sq km)	122.88
Total Kilometres Vibrated	318.80
Total Recording Hours	52.7

Total Adjusted Work Hours	53.5
Total Project Hours	68.2
Total VP's Recorded	6,376
Total VP's Skipped	0
Total Geophone Stations	6,400
Total Recording Days	6

Table 2

Productivity Summary

Km/Recording Hour	6.05
Km/Adjusted hour	5.96
Km/Project Work Hour	4.67
VP's/Recording Hour	121
VP's/Adjusted Work Hour	119
VP's/Project Work Hour	93
Sq. Km/Recording Day	20.48
Efficiency %	78.4

In terms of vp's recorded per recording hour, this survey would have to be the most productive of any onshore 3D surveys undertaken by Santos Limited. This is primarily due to the fact that two source groups were employed and the recording operation was source driven.

Data acquisition was completed early on August 5.

3.6.4 HEALTH & SAFETY

This program was conducted in the cooler months of the year, namely July and August. Winds were predominantly light with variable direction on most days, but occasional moderate to fresh winds were recorded. A couple of storms came through during recording however the survey area only received a few drops of rain at best.

There were no Lost Time Incidents (LTIs) recorded during the survey.

All rubbish and waste material, including tyres, scrap metal and batteries, was segregated on site then disposed of at the Moomba waste depot. The disposal of effluent water from the two campsites, kitchens and toilets was managed by Veolia Environmental Services.

Daily Toolbox and weekly Safety meetings were held by all contractors involved with this survey. Minutes of Toolbox and the weekly Safety meetings were forwarded to Santos Limited.

3.7 WEATHERING SURVEY

3.7.1 GENERAL

A 14 hole uphole program was proposed for the Gaschnitz 3D however only 10 holes were ultimately completed. The program was cut short due to the holes in the west of the program taking much longer to drill than originally budgeted.

RIM Drilling and Velocity Data mobilised from Brisbane on August 4 and arrived at the Terrex Seismic camp late afternoon on August 6 where equipment was inspected. Crews then travelled to the Santos Tirrawarra camp where they were based for the duration of the LVL program. Their late arrival on site was due to the requirement to have all trucks fitted with Super Single tyres as most of the drilling was to be undertaken in a dunefield. The conventional road tyres were removed and the wider tyres and rims fitted when the trucks arrived at Innamincka.

Uphole drilling and logging commenced on August 7 after personnel attended a Terrex Seismic induction followed by Site and Cultural Heritage Inductions conducted by J. Allen.

All 14 uphole locations were pegged and surveyed in advance by RPS. Twelve were located in the dunefield and two on the floodplain. All were centred at the intersection of source and receiver lines. Due to time constraints only 10 of the 14 holes programmed were drilled and logged.

Uphole Locations

Hole	Easting	Northing	Elevation	Comment
UH01	420763.0	6916449.7	42.3	INT R1016/S5096
UH02	420764.3	6918051.2	46.4	INT R1048/S5096
UH03	420765.4	6919650.9	36.1	INT R1080/S5096
UH04	422364.8	6916453.9	52.2	INT R1016/S5128
UH05	422368.4	6918051.9	34.9	INT R1048/S5128
UH06	422365.2	6919649.4	37.1	INT R1080/S5128
UH07	426355.1	6916057.0	39.2	INT R1008/S5208
UH11	428368.1	6916048.2	37.8	INT R1008/S5248
UH13	428367.7	6920055.5	37.5	INT R1008/S5248
UH14	428365.4	6922056.5	36.0	INT R1128/S5248

The mud pit drilling technique was used due to the dry subsurface sands and damp sticky clays. Drilling water came from Merrimelia #1 water well, the same source as the Terrex camp water. Although this involved a round trip of some 30 kilometres or more, road access was good. Water loss (loss circulation) was a problem in several holes with each using more than a truck load of water. Elsewhere, two holes were drilled per truck load. Apart from the loss circulation problem, drilling was straight forward with no down time logged. Drill cuttings were well spread around the drill site and some covered with sand so as to blend with the surrounds. Any wheel ruts created by the heavy trucks were backfilled before leaving the location.

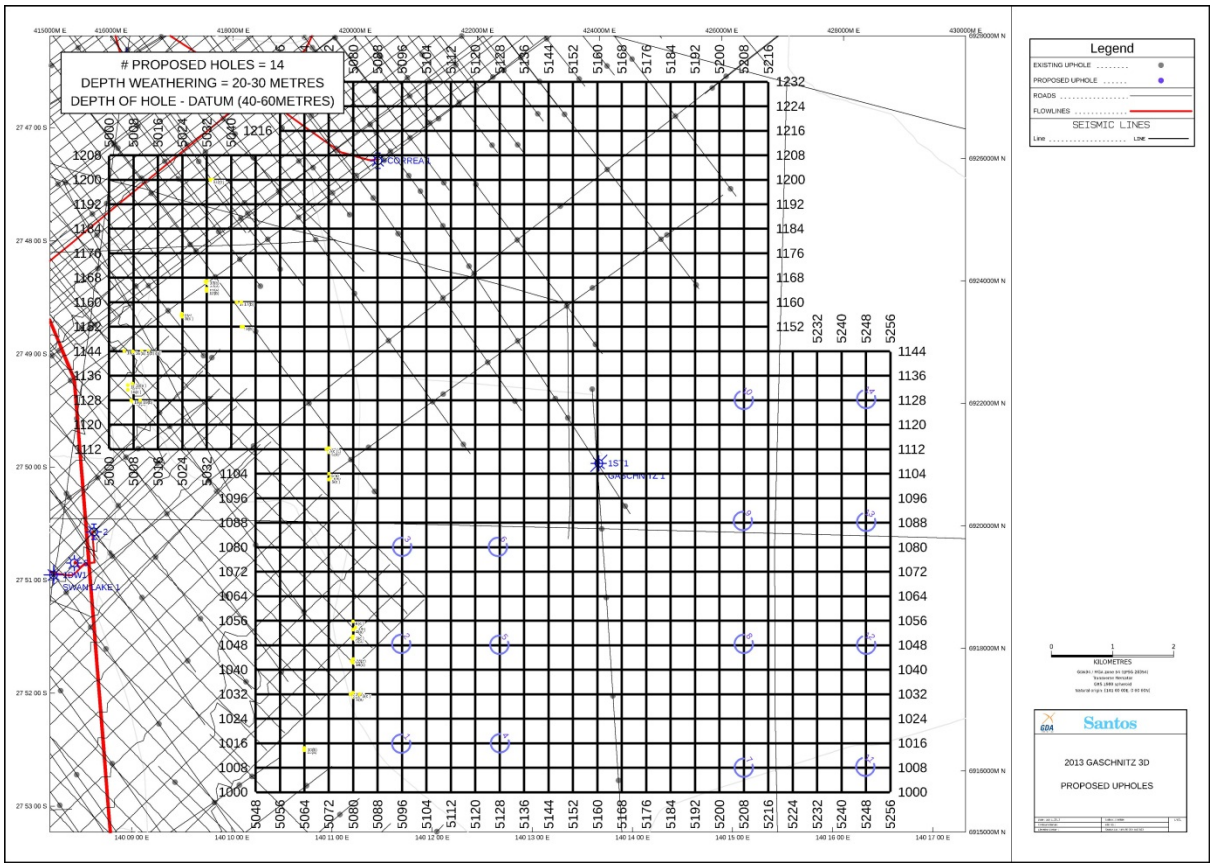
Uphole logging took place immediately the drill rig moved off the hole. The vehicle mounted weight drop unit was positioned 2-3m from the hole and the encased down-hole geophones lowered on a cable to the bottom then pulled up approximately 1m to the first sample point. Two electrically operated sidewall arms were activated, locking the tool against the drill-hole wall. Once the logging tool reached total depth the rig and water trucks began the move to the next location.

The Seistat system recorded the seismic signal generated at every 2 metre spaced sample point and these data sets was graphically displayed as a line trace on a notebook computer screen. On completion of logging the first breaks are manually picked then the system timed the picks to the nearest millisecond. The depth of weathering was interpreted by the observer and the weathering and sub-weathering velocities were automatically computed. These results are shown in Table 5.

LVL Data

Hole	Total Depth (m)	Dw (m)	Vel Wsub m/s
UH 1	46	20	1980
UH 2	46	23	1790
UH 3	36	15	1940
UH 4	54	28	1960
UH 5	36	18	2000
UH 6	38	17	1970
UH7	36	18	1970
UH 11	40	20	2040
UH 13	40	12	1980
UH 14	36	14	1990

On completion of logging, all upholes were double plugged, back filled to surface and the area raked.



3.8 ENVIRONMENT

3.8.1 GENERAL

As operator, Santos Ltd has, for a number of years, been committed to planning and conducting seismic operations in such a way that environmental disturbance is avoided or minimised, and affected areas can rehabilitate naturally in a reasonable time frame. These objectives have most recently been set out and discussed in the publications "Santos Operations Geophysics SEO Arid Areas July 2012", and "South Australia Cooper Basin & Arid Regions Environmental Impact Report: Geophysical Operations" Santos Ltd, July 2012.

The commitment has normally included the distribution of copies of the above to all contractors' personnel, and continual pressure by Santos Ltd field representatives on these personnel to conform to the principles and requirements of these documents.

Compliance with the Aboriginal Heritage Act has also been stressed and, during the year, the strategy to ensure meticulous adherence to standard Santos procedures relating to Cultural Heritage Management and Environmental Sensitivity was reinforced by special training of key personnel, and daily meetings to re-iterate key issues and procedures.

3.8.2 OPERATIONAL OBSERVATIONS

The Gaschnitz 3D seismic survey is located around 25km north of Moomba in PPL 101, 80 & 17. The survey comprises approximately 122.88 sqkm of 3D seismic acquisition with approximately 318km of Source line and 320 km of Receiver line. Line spacing is 400 metres with an orthogonal grid. The survey is located wholly within the Gidgealpa pastoral lease.

During the planning stage of the survey Santos engage David Wiltshire of Social & Ecological Assessment (SEA) to conduct an ecological survey of the proposed survey area. This was conducted on the 13th and 14th May 2013.

The land systems in the Gaschnitz seismic survey area are approximately half floodplain and half dunefield. Some of the floodplain lies within the dune swales.

The section of Cooper Creek floodplain in which the Gaschnitz seismic survey will occur is, at its closest point, approximately 3 km from the main Cooper Creek channel. The floodplains in the north eastern section of the survey area probably flood annually and the floodplains in the dune swales less frequently. Most of the floodplain in the survey area supports moderate to sparse shrubland. The main exceptions are Gidgealpa Waterhole on the western edge of the survey area, and two small waterholes in the north east corner of the survey area that support relatively dense Coolibah woodland.

The survey area consists of a network of shallow drainage lines supporting mainly Old man saltbush, Queensland bluebush and Lignum shrubland, and ephemeral herbfield. The occasional deeper channels and waterholes support Coolibah / River cooba woodland and Lignum shrubland. Queensland bean trees are relatively common around Gidgealpa Waterhole.

The southern section of the survey area consists of parallel sand dunes about 5-7 m high, with claypans that appear to be occasionally flooded by both local rainfall and Cooper Creek floodwaters.

One additional consideration was that of the 15 Mile road which traversed through the survey area. This is the primary tourist route between Innamincka and Birdsville. Particular care was taken during line preparation to conceal the lnes from the general public however in many areas, the vegetation was minimal and therefore wheel tracks where evident.

3.8.3 RESTORATION

Only minimal restoration was required after the survey. Road verges where re-graded to eliminate vehicle tracks.

Unfortunately, in the 3 months following the survey it was reported to Santos that it appeared tourists had been using the seismic lines to travel off the 15 mile road. As a result, in mid-November 2013, Santos returned to the survey with a grader and scarified all obvious seismic lines adjacent the public roads and once again re-graded roadside verges to discourage third party traffic.

PROSPECT REPORT
CPSAN13B
GASCHNITZ 3D SEISMIC SURVEY
FOR SANTOS LTD
JULY 2013

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Contents

1 Introduction

RPS was contracted by Santos Ltd to carry out survey operations on the Gaschnitz 3D operated by Santos Ltd. This report covers the involvement of RPS in the seismic survey. Terrex Seismic (Crew 402) was the seismic acquisition contractor. The prospect was located approximately 30Km to the north of Moomba and approximately 15Km south east of Tirrawarra satellite in North East South Australia. A new gas well (Gaschnitz #1) was in the centre of the prospect and an existing gas well (Correa #1) was located in the north west corner of the prospect. The prospect fell in the following petroleum leases: PPLs 010, 80 and 17 and AAL 164.

The receiver station interval was 50.0m and the source station interval was 50.0m. Receiver and source lines were spaced 400m apart. Total length of lines was 638.80Km. The prospect covered an area of 122.88Km^2. Section 1.1 contains line listings.

RPS used three personnel and three vehicles during the survey. The crew consisted of one Senior Surveyor and two GPS Operators. A three person survey crew was required to complete the survey due to the small size of the prospect.

Terrex Contracting (TC Crew 3) were contracted to carry out the line preparation. Line clearance was carried out using three bulldozers and two graders. Terrex Contracting supplied camp facilities for the survey crew while RPS supplied an office / sleeper (1 bed) caravan and an office / sleeper (3 beds) caravan. RPS was supplied power, meals and showers by Terrex Contracting and all the RPS rooms were designated as single rooms although each had a second bunk installed (used for storage).

The Gaschnitz 3D prospect fell on two native title claim areas. The western side (26%) fell in the Dieri claim area while the rest of the prospect fell in the Yandruwandha / Yawarrawarrka (Y/Y) area. Cultural Heritage clearance was carried out separately by the two groups. They pre-cleared the prospect prior to the arrival of the crew. Site locations and directions were passed onto the crew by the Santos Cultural Heritage supervisor (Mike Madey).

All line preparation and survey work was accomplished using Trimble and Garmin GPS (Global Positioning System) equipment. Much of the mapping information was compiled using Garmin handheld GPS units. All line survey work was carried out using Trimble “real time kinematic” (RTK) GPS receivers.

1.1 Survey Design

Gaschnitz 3D was an orthogonal grid. Source lines ran from south to north and receiver lines ran from east to west. A prospect map is included in Appendix H. The following table contains design information:

Parameter	Receiver	Source
Group interval	50m	NA
VP interval	NA	50m
Station increment	1	1
Line spacing	400	400
Intersection offset	25m	25m
Line bearing (grid)	90°00'00"	0°00'00"
Offset increment	50m	50m
Inline tolerance	4m	4m
Crossline tolerance	10m	10m
Start line	1000	5000
End line	1232	5256
Min station	5000	1000
Max station	5255	1231

Receiver Origin	Easting	Northing
1000 5000	415990.00	6915653.00

1.2 Line Lengths

Receiver Lines:

Line	Start	End	Kms
CPSAN13B-R1000	5048	5255	10.40
CPSAN13B-R1008	5048	5255	10.40
CPSAN13B-R1016	5048	5255	10.40
CPSAN13B-R1024	5048	5255	10.40
CPSAN13B-R1032	5048	5255	10.40
CPSAN13B-R1040	5048	5255	10.40
CPSAN13B-R1048	5048	5255	10.40
CPSAN13B-R1056	5048	5255	10.40
CPSAN13B-R1064	5048	5255	10.40
CPSAN13B-R1072	5048	5255	10.40
CPSAN13B-R1080	5048	5255	10.40
CPSAN13B-R1088	5048	5255	10.40
CPSAN13B-R1096	5048	5255	10.40
CPSAN13B-R1104	5048	5255	10.40
CPSAN13B-R1112	5000	5255	12.80
CPSAN13B-R1120	5000	5255	12.80
CPSAN13B-R1128	5000	5255	12.80
CPSAN13B-R1136	5000	5255	12.80
CPSAN13B-R1144	5000	5255	12.80
CPSAN13B-R1152	5000	5215	10.80
CPSAN13B-R1160	5000	5215	10.80
CPSAN13B-R1168	5000	5215	10.80
CPSAN13B-R1176	5000	5215	10.80
CPSAN13B-R1184	5000	5215	10.80
CPSAN13B-R1192	5000	5215	10.80
CPSAN13B-R1200	5000	5215	10.80
CPSAN13B-R1208	5000	5215	10.80
CPSAN13B-R1216	5056	5215	8.00
CPSAN13B-R1224	5056	5215	8.00
CPSAN13B-R1232	5056	5215	8.00
		Total:	**320.00Km**

Note line lengths include an additional half station (0.05Km) at each end.

Source Lines:

Line	Start	End	Kms
CPSAN13B-S5000	1112	1207	4.80
CPSAN13B-S5008	1112	1207	4.80
CPSAN13B-S5016	1112	1207	4.80
CPSAN13B-S5024	1112	1207	4.80
CPSAN13B-S5032	1112	1207	4.80
CPSAN13B-S5040	1112	1207	4.80
CPSAN13B-S5048	1000	1207	10.40
CPSAN13B-S5056	1000	1231	11.60
CPSAN13B-S5064	1000	1231	11.60
CPSAN13B-S5072	1000	1231	11.60
CPSAN13B-S5080	1000	1231	11.60
CPSAN13B-S5088	1000	1231	11.60
CPSAN13B-S5096	1000	1231	11.60
CPSAN13B-S5104	1000	1231	11.60
CPSAN13B-S5112	1000	1231	11.60
CPSAN13B-S5120	1000	1231	11.60
CPSAN13B-S5128	1000	1231	11.60
CPSAN13B-S5136	1000	1231	11.60
CPSAN13B-S5144	1000	1231	11.60
CPSAN13B-S5152	1000	1231	11.60
CPSAN13B-S5160	1000	1231	11.60
CPSAN13B-S5168	1000	1231	11.60
CPSAN13B-S5176	1000	1231	11.60
CPSAN13B-S5184	1000	1231	11.60
CPSAN13B-S5192	1000	1231	11.60
CPSAN13B-S5200	1000	1231	11.60
CPSAN13B-S5208	1000	1231	11.60
CPSAN13B-S5216	1000	1231	11.60
CPSAN13B-S5224	1000	1143	7.20
CPSAN13B-S5232	1000	1143	7.20
CPSAN13B-S5240	1000	1143	7.20
CPSAN13B-S5248	1000	1143	7.20
CPSAN13B-S5256	1000	1143	7.20
		Total:	**318.80Km**

Note line lengths include an additional half station (0.05Km) at each end.

2 Terrain and Logistics

2.1 Terrain and Vegetation

There was a variety of terrain encountered during the Gaschnitz 3D. The southern half of the prospect was in sand dune terrain with narrow swales and small to medium sized dunes. Many of the swales contained dry swamp areas. Some of the dunes were quite step and required side cuts on the receiver lines. The dunes ran predominantly in a north to south direction. Towards the northern, southern and western ends of the prospect the dunes gradually petered out as they ran onto large crabhole flats. The northern half of the prospect fell on a large crabhole flat. The north east corner of the prospect was very rough through large crabholes, channels and thicker vegetation.

On the crabhole flats the main vegetation was bluebush, saltbush, mulga grass and occasional lignum. There were areas of thick coolibah around channels and waterholes especially in the north east corner of the prospect and around Gidgealpa waterhole in the west. In the dune country the vegetation consisted mainly of sandhill cane grass, whitewood and wattle trees. There were occasional stands of coolibah in the swales especially where they were prone to inundation.

2.2 Logistics

RPS commenced mobilisation to the Gaschnitz 3D on 3rd July 2013 with Eric Amedee, Mike Clark and Andrew Tonkin departing Toowoomba in three Toyotas towing the survey office caravan, sleeper caravan and equipment trailer. They spent the first night in Thargomindah. The next morning they travelled to Gaschnitz 3D camp via Ballera and Innamincka. Upon arrival they set up the caravans and VSAT dish. John Allen (Santos rep) arrived on site in the afternoon with his office / sleeper trailer. He left the trailer and travelled back to Moomba. The staging area was set up the next day.

On the morning of 5th July 2013 Mike Madey (Santos Cultural Heritage Supervisor) conducted a cultural heritage induction for all crew members. This was followed by a site induction conducted by John Allen. Two dozers arrived on site on 5th July – one in the morning and the other in the afternoon. GPS was set up in the first dozer. GPS was set up in the second dozer the next morning. The third dozer arrived on 6th July. GPS was fitted to it as well as the grader (#4). Line preparation commenced on the morning of 6th July with Dozers 1 and 2 starting work. Dozer 3 commenced work later that day once GPS was fitted. Grading commenced the same day.

Dozing progressed at a good rate however the grading soon fell behind due to the amount of grading required through the crabhole country. A second grader was hired from KJM and commenced work on 11th July. However this grader was continually dogged by mechanical and electrical problems and was eventually stood down on 14th July to await parts. These were fitted on 15th July but the operator had demobilised so the machine stood by until the dozing had finished and one of the operators could be used to operate it. It recommenced work on 18th July.

RPS commenced survey commenced line fieldwork on 7th July 2013. RPS carried out GPS control work on 5th July and 8th July. RPS used two GPS operators on the survey. Survey worked on ungraded lines for a large portion of the survey. This slowed down the survey crew until the lines through the crabhole flats were completed. Once in the dune country where the crew could easier place the pegs and pinflags outside the dozed rills, the survey crew commenced to slowly catch up

to the dozers and eventually finished only one day behind them. There were few hand carry sections during the survey – mainly on the two small sections of pipeline in the north west corner, through Gidgealpa waterhole and occasional dune points.

While the survey was taking place there was a Halliburton “frac” crew working at Gaschnitz # 1 well. A one kilometre exclusion zone was put in place around the well area while this was going on. Once the “frac” crew had finished the exclusion was lifted and the line preparation and survey crews completed the section.

There were no delays due to wet weather during the survey. On a couple of occasions there was rain to the north and south but luckily the prospect was spared.

One RTK base station (Merri 18) was required during the Gaschnitz 3D survey. It was established at an existing well benchmark at Merrimelia #18 – also the camp location. A repeater was used to extend range and pick up any points missed due to loss of radio link.

The line preparation crew completed 3D fieldwork on the 17th July 2013. Line preparation took 12 days at an average of 53.23Km/day. The survey crew finished the next day on 18th July 2013. The survey crew also completed the survey in 12 days at an average of 53.23Km / day.

At the completion of the line fieldwork the survey crew located and marked the uphole program then checked the lines for cattle or grader damage, replacing any pegs or pinflags where required. Uphole locations are listed in Appendix D.

One member of the survey crew stayed on site for re-pegging ahead of the recording crew. The remaining two members of the RPS survey crew (Eric Amedee and Andrew Tonkin) demobilised to Toowoomba on 21st July 2013.

2.2.1 Camp Locations

One camp site was used at Gaschnitz 3D. It was located on the drill lease at Merrimelia #18 well site. This well had been plugged and abandoned. There was good access to all parts of the prospect from this location and good radio reception. The site was located on the edge of the sand dunes and would have been a good location if there had been any rain during the job. The camp site was chosen and cleared by Santos cultural heritage personnel prior to the arrival of the crew.

There was sporadic Next G phone coverage throughout the prospect from the tower at Moomba while there was reasonably good coverage at the camp site.

Camp water was sourced from Moomba. Kitchen water and sewerage from the toilets were collected by Veolia and disposed of in Moomba. Camp rubbish was taken to Moomba.

Site	Easting	Northing	Description
Camp 1	418550	6928700	Located at Merrimelia #18 (P&A) on drill lease.

3 Personnel and Equipment

3.1 Survey Personnel

The RPS crew consisted of three people, made up of one Senior Surveyor and two GPS Operators. All personnel were experienced seismic hands. The following is a list of personnel utilized during the survey:

Duties	Name
Senior Surveyor	Eric Amedee
GPS Operator	Mike Clark
GPS Operator	Andrew Tonkin

3.2 Line Preparation Personnel

The following is a list of personnel utilized by Terrex Contracting Crew 3 during the survey: -

Duties	Name
Camp Manager	Ken Matthews
Mechanic	Brodie Atkinson
Cook	Byron Sweet
Operator	Ian Williams
Operator	Jeff Littlejohn
Operator	Greg Walker
Operator	Aaron Wilmot
Operator	Glen Turner

3.3 Survey Equipment

The following survey equipment was used during the Gaschnitz 3D Survey:

Line Pointing	1 Toyota Landcruiser wagon
	1 Motion table PC / field mapping unit
	1 Garmin GLO Bluetooth GPS receiver
	4 Garmin 172C GPS receivers
	1 Garmin 276C GPS receivers
Survey	2 Toyota Landcruiser utilities
	1 Trimble R7 GNSS Base GPS receiver kit
	2 Trimble R7 GNSS GPS receivers
	2 Trimble R7 GPS receivers
	2 Pacific Crest HPB 450 base modems
	1 Pacific Crest PDL GPS rover radio modems
	3 Trimble TSC3 survey controllers
	1 Trimble TSC2 survey controllers
	2 Garmin Montana GPS receivers
	1 Dell Precision M6500 notebook computer
	1 GPSeismic Processing software package
	1 ArcGIS 10 software package
	1 Trimble Business Centre network software
	1 Canon iX5000 A3 colour printer
	1 Canon MG5350 printer / copier / scanner
	1 VSAT system Hughes HN7740S
	2 Iridium Satellite telephones
	1 Survey Office / sleeper caravan
	1 Sleeper / office caravan (3 x single room)
	1 Heavy duty dual axle box trailer

3.4 Line Preparation Equipment

The following line preparation equipment was used by Terrex Contracting Crew 3 during the Gaschnitz 3D survey:

Equipment
2 Komatsu D65 dozers
1 Caterpillar D7R dozer
1 John Deere 772D grader
1 Caterpillar 14M grader
1 Kitchen / diner trailer
2 Accommodation trailers
1 Sleeper (cook) / cold rooms trailer
1 Workshop / Stores / generator trailer
1 Shower / laundry trailer
1 trailer with two toilets
1 Iveco Eurotech twin steer utility truck
2 Prime movers
1 Water tank trailer
1 Fuel tanker trailer
2 Support 4x4 vehicles
1 VSAT Data / telephone system
1 Satellite telephone

4 Surveying Methods

4.1 Survey datums

The survey datum for Gaschnitz 3D was the Geocentric Datum of Australia 1994 (GDA94). GPS field survey data was collected using the World Geodetic System 1984 (WGS84) datum. It was then downloaded into GPSeismic software for conversion to Australian datums. WGS84 coordinates were converted to the GDA94 and output in Map Grid of Australia (MGA) Zone 54 coordinates. Ellipsoidal heights were converted to the Australian Height Datum (AHD) using the AusGeoid98 geoid separation model.

The following parameters define the World Geodetic System 1984 datum: -

Datum	World Geodetic System 1984
Spheroid	WGS84
Semi-Major Axis	6 378 137.0
Inverse Flattening	298.257
Unit of Measure	International Metres

The following parameters define the Geocentric Datum of Australia 1994: -

Datum	Geocentric Datum of Australia 1994
Spheroid	Geodetic Reference System 1980
Semi-Major Axis	6 378 137.0
Inverse Flattening	298.257222101
Unit of Measure	International Metres

For the purposes of seismic line placement no transformation between GDA 94 and WGS84 was applied. Note that for higher accuracy work a 14 parameter transformation can be applied.

The following parameters define the Map Grid of Australian Zone 54: -

Projection :	Universal Transverse Mercator
Latitude of origin :	0°
Central Meridian (CM) :	141° E
Scale Factor at CM :	0.9996
False Easting :	500 000
False Northing :	10 000 000
Unit of Measure :	International Metres

A national distortion grid (National84.gsb) was used to convert benchmark data between AGD66/84 and GDA94 coordinates. The software used to do this was Datumtran v1.06, a free datum transformation programme developed by the NSW Land Information Group.

4.2 Survey Control

The control for the prospect area was established using GPS static techniques. The datum for the survey was benchmark MERRI 30 located at Merrimelia #30 well. This point was the survey datum for the Merrimelia 3D, Tirrawarra 3D and Greater Leleptian 3D. This point was held fixed for the network adjustment. The control survey was carried out on 5th and 8th July 2013. The Map Grid of Australia (MGA94) coordinates and AHD height for MERRI 30 are as follows:

Station	East	North	Elevation	Remarks
BM Merri 30	419604.175	6932680.234	41.164	Merrimelia #30

A listing of survey network points is included in Appendix C. A listing of ties to old Permanent Markers is included in Appendix E. Well benchmark ties are listed in Appendix F. ITRF (Auspos) ties are listed in Appendix G.

Note that the BM Merr1 30 has been assigned new coordinates based on AUSPOS data logged at Correa 1 BM at Correa #1 well site for the Gaschnitz #1 well survey. They match closely with the RPS AUSPOS tie in Appendix G. There is also a RTK tie to BM Correa 1 in the well benchmark ties in Appendix F. The new coordinates are as listed below:

Station	East	North	Elevation	Remarks
BM Merri 30	419603.785	6932679.835	41.164	Merrimelia #30

4.3 Survey Methods

Survey control was established using the GPS static method. The static method used for control work involves the setting up of a GPS receiver to log data on a known point. A roving GPS receiver then logs data on unknown points for periods of 20 minutes and upwards, depending on the length of the baseline and number of satellites in view at the time. This enabled the change in geometry of the satellite positions to be measured and recorded. After post processing the data to obtain accurate baseline information a position can be determined for the unknown point.

Trimble Business Centre software was used to process static baselines and do network adjustments on the survey control network. This verified the integrity of the network. Data recorded at MERRI 30 and MERRI 18 benchmarks were sent to GeoScience Australia's Auspos website for processing as a check on the quality of the Santos control data. The results of the ties are contained in Appendix F.

Line surveying was carried out using the 'real time' kinematic (RTK) method. This method also consists of base and rover segments. A GPS receiver is set up on a point of known location. This point has usually been established using the static method mentioned above. Through a 15 watt UHF radio modem the base GPS receiver broadcasts the base position and GPS data measured at the base directly to a radio and modem connected to a roving GPS receiver enabling the rover to initialise (resolve satellite cycle ambiguities). Once initialised the roving receiver can calculate its own position to within a few centimetres.

RPS used Trimble R7 GPS receivers and TSC3 survey controllers. These units are dual frequency receivers enabling very fast and reliable initialisations. Coupled with Trimble TSC3 survey controllers, the system is very efficient and user friendly.

4.4 Permanent Markers

For the Gaschnitz 3D the survey crew established an RTK base station at BM Merri 18 at Merrimelia #18 well site (camp location). An aluminium tag, with the description and comments stamped on it, was attached to the marker post. Appendix A contains a list of Permanent Markers including Environmental Monitoring Points (EMP).

4.5 Data Processing and Quality Control

Real Time Kinematic (RTK) stakeout position data was collected in Trimble TSC3 Survey Controllers in WGS 84 format and downloaded into Trimble's GPSeismic processing software. Datum transformations and geoid separations were then applied to the data. Several QC checks were done and the data was then loaded into a database where further checking was done. The QC checks included the following:

- Base coordinates and elevation were checked on download against the control data.
- Antenna heights were checked.
- Cross line and inline offsets from design were checked for any anomalies.
- GPS quality checks. (DOPs, Horizontal precision, Vertical precision, Number of satellites and RMS.
- Initialization checks.
- Checkshot comparisons
- Old Permanent Marker comparisons
- Missing station checks.

Once checking was complete, data could then be queried using GPSQL and the results exported directly to mapping software (ArcGIS 10) or to reports. The mapping software allowed for quick visual checking of point locations. Points in suspect locations (e.g. too close to pipeline) could be flagged for checking. Line preparation and survey database information was also automatically mapped in ArcGIS 10 which enabled the crew to visually monitor production each day and produce up to date progress maps, recording access maps and swath maps for the vibrators.

On completion the data was converted to a format suitable for Santos Ltd.

4.6 Mapping

RPS surveyors scouted the prospect to map fences, gates, tracks, pipelines and any other features pertinent to crew operations. Using this information combined with that supplied by Santos it was possible to supply accurate prospect maps to the crew. These maps also included hand carry locations, access tracks and swath numbers. These maps were supplied to the recording crew in pdf format. The recording crew office had an A3 format colour printer.

5 Line Preparation

Terrex Contracting carried out the line preparation on the Gaschnitz 3D. Terrex Contracting supplied three bulldozers, two graders and camp facilities.

The line preparation equipment and refuelling vehicles had UHF radios installed to enable communications with the dozer pointer and camp. RPS and Terrex Contracting each had a UHF radio set up in their respective offices to enable communications between camp and field vehicles. The dozer pointer had a satellite phone with him to enable communication to camp in an emergency.

All line preparation was carried out under a Greenfield permit issued by the area supervisor at Tirrawarra. No excavation permit was required for Gaschnitz 3D.

5.1 Line Preparation Navigation

Co-ordinates for the start and end of lines for receiver and source lines were loaded into Garmin 172C GPS receivers mounted in the dozers. The machine operators then used the navigation screens to guide them along the lines. Any cultural heritage sites, pipelines, fences, gates, etc. were also loaded into these units to act as visual aids for the operators. The pipelines had a 50m exclusion zone displayed on the GPS to ensure the dozers stayed outside this distance from pipelines.

As well the grader had a Garmin GPS unit (276C) installed. This enabled the grader operators to know exactly where they were at all times and ensured they did not encroach on any pipeline or Cultural Heritage site exclusion zones.

5.2 Environmental Monitoring Points

Five Environmental Monitoring Points (EMPs) were placed on the Gaschnitz 3D prospect. A star picket was placed at the EMP location and surveyed using the RTK method. An aluminium tag, with the name and intersection location stamped on it, was attached to the star picket.

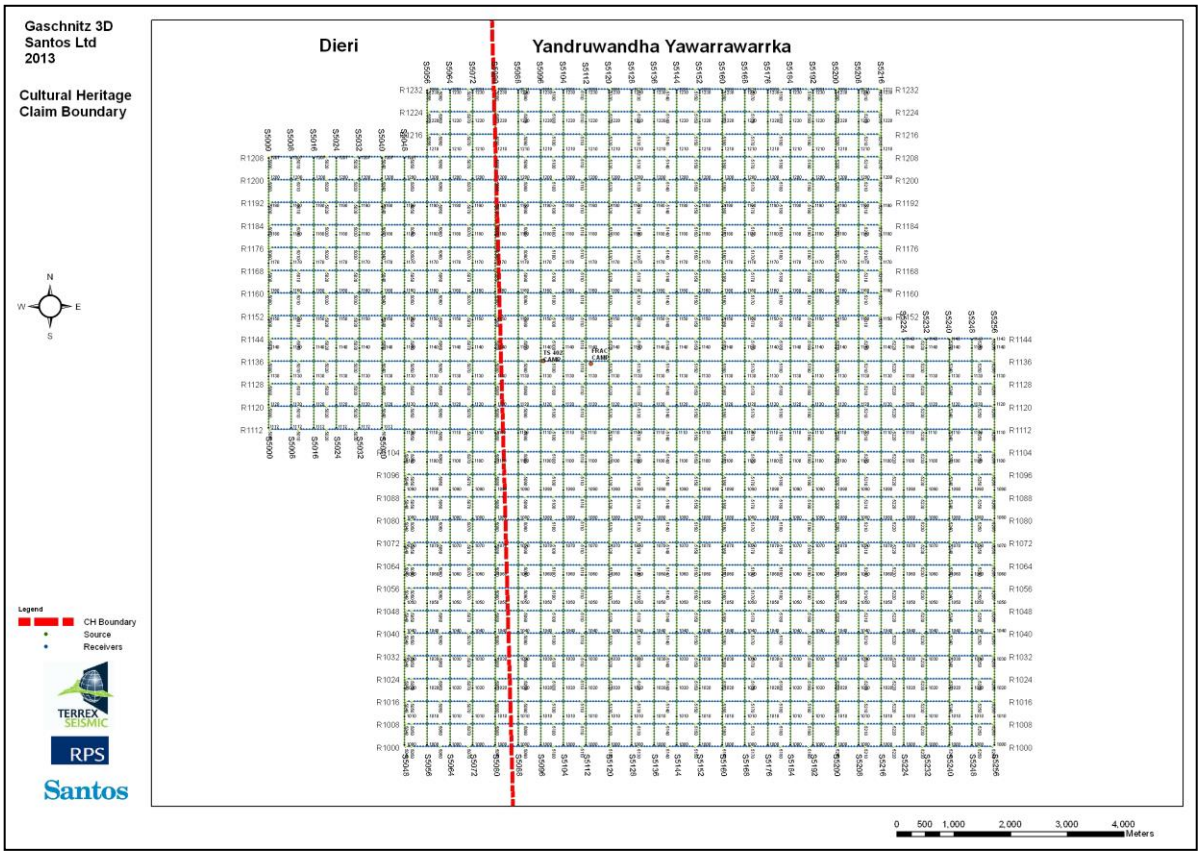
Each EMP was located prior to line preparation by John Allen and one of RPS survey crew using a RTK backpack. Pre and post dozing, and post recording photographs were taken at these locations. The Santos representative on crew (John Allen) took all before and after photographs.

Appendix B contains a list of EMPs.

5.3 Cultural Heritage Clearance

The Gaschnitz 3D prospect was split into two cultural heritage areas (see map below). The western side of the prospect (168.95Km) fell in the Dieri native title area. The eastern side of the prospect (469.85Km) fell in Yandruwandha / Yawarrawarrka (YY) native title area. Both areas were pre-scouted by teams from each group assisted by Mike Madey (Santos Cultural Heritage Supervisor). Upon completion reports were compiled with details of any site areas to be avoided and directions for doing so. This data was imported into the survey GIS and loaded into the line preparation GPS units. The operators were also given detailed maps and information on the sites. The Senior Surveyor checked sites ahead of the dozers to make sure marker pegs were still in place and proposed detours could be followed.

Mike Madey held a Cultural Heritage induction for all crew members on 5th July 2013.



Map 1: Gaschnitz 3D - Native title boundary

6 Health, Safety and Environment

All vehicles belonging to RPS were fitted with IVMS, rollover protection, a fire extinguisher, first aid kits and UHF radios. RPS had two Iridium satellite telephones on crew. One Iridium telephone was in the Senior Surveyor's vehicle and the other was in the survey office. There was also a VSAT telephone in the survey office. The survey office had a UHF radio for intra-field communications.

All rubbish generated in the field was returned to camp for proper disposal. Terrex Contracting organised the disposal of all camp rubbish at Moomba. Kitchen waste water and sewerage was collected by Veolia and disposed of in Moomba.

Line preparation was carried out in a manner which adhered to Santos' environmental guidelines. Minimal blade work was done and lines were weaved to reduce the visual impact of the survey. Special care was taken to minimise visibility of lines around the Innamincka to Birdsville tourist track.

During the survey, the survey crew exercised due care in their operations. RPS and Terrex safety policies were adhered to by all personnel. Daily "toolbox" meetings were held to inform and raise current issues with crew members. The daily toolbox topics were noted in the daily reports. All RPS personnel attended the morning crew toolbox. All RPS personnel attended the weekly TC safety meetings. These were normally held on Sunday mornings.

7 Summary

Overall the survey and line preparation of the Gaschnitz 3D Seismic Survey was done in an efficient and environmentally sound manner.

Survey fieldwork took 12 days to complete at an average of 52.23Km / day. Line preparation took 12 days at 52.23Km / day. Initially the survey crew was held up by the lack of graded lines but once the survey crew got away from the crabhole flats they were able to peg the lines outside the rills. The grader finished the prospect well after the dozers and survey crew.

RPS supplied high quality maps to the recording crew detailing hand carry sections, offsets, fences, gates, tracks, detours, pipelines and any other pertinent information.

It is RPS policy to have an experienced dozer pointer on crew to assist with any line preparation problems and to supply mapping information to the seismic crew. All members of the survey crew were experienced seismic hands.

RPS has at all times endeavoured to carry out its duties in a professional and efficient manner.

Respectfully submitted,

Eric Amedee

Senior Surveyor
RPS

Appendix A

Permanent Marker Listing

Station	Description	Easting	Northing	Elev.
Merri18	BM Merrimelia #18	418477.565	6928713.322	46.865
EMP1	INT R1176/S5016	416764.86	6924453.00	34.75
EMP2	INT R1120/S5088	420364.98	6921653.10	35.55
EMP3	INT R1136/S5160	423964.84	6922453.16	36.18
EMP4	INT R1224/S5208	426366.06	6926835.03	36.58
EMP5	INT R1016/S5224	427162.36	6916451.82	39.40

Appendix B

Environmental Monitoring Points

EMP	Location	Easting	Northing	Elev.
EMP1	INT R1176/S5016	416764.86	6924453.00	34.75
EMP2	INT R1120/S5088	420364.98	6921653.10	35.55
EMP3	INT R1136/S5160	423964.84	6922453.16	36.18
EMP4	INT R1224/S5208	426366.06	6926835.03	36.58
EMP5	INT R1016/S5224	427162.36	6916451.82	39.40

Appendix C

Survey Network Stations

Station	Comment	Easting	Northing	Elev.
Merri 30	BM Merrimelia #30	419604.175	6932680.234	41.164
Merri 18	BM Merrimelia #18	418477.565	6928713.322	46.865

Appendix D

Uphole Listing

Uphole	Location	Easting	Northing	Elev.
UH01	INT R1016/S5096	420762.98	6916449.69	42.83
UH02	INT R1048/S5096	420764.26	6918051.18	46.39
UH03	INT R1080/S5096	420765.39	6919650.87	36.09
UH04	INT R1016/S5128	422364.83	6916453.88	52.24
UH05	INT R1048/S5128	422368.35	6918051.93	34.86
UH06	INT R1080/S5128	422365.15	6919649.35	37.10
UH07	INT R1008/S5208	426355.10	6916057.00	39.24
UH08	INT R1048/S5208	426365.66	6918052.35	47.68
UH09	INT R1088/S5208	426359.02	6920053.81	39.87
UH10	INT R1128/S5208	426364.39	6922052.73	40.56
UH11	INT R1008/S5248	428368.12	6916048.23	37.80
UH12	INT R1048/S5248	428365.79	6918050.79	54.79
UH13	INT R1088/S5248	428367.66	6920055.54	37.49
UH14	INT R1128/S5248	428365.35	6922056.47	36.03

Appendix E

Old Permanent Marker Ties

Station	Line	Survey Easting	Survey Northing	Survey Elev.	OPM Easting	OPM Northing	OPM Elev.	DeltaX	DeltaY	DeltaZ
PM100	83-NDN	419619.35	6920834.77	36.47	419607.61	6920848.52	37.63	11.74	-13.75	-1.16
PM490	84-TWF	423018.29	6927248.92	36.15	423019.23	6927254.57	36.84	-0.94	-5.65	-0.69
PM381	86-ZTT	419934.00	6921069.06	35.61	419934.67	6921071.49	36.29	-0.67	-2.43	-0.68
PM400	86-ZTT	420359.14	6920497.50	35.48	420360.63	6920500.55	36.03	-1.49	-3.05	-0.55
PM474	90-CLW	421973.93	6927108.43	36.04	421970.77	6927111.60	36.92	3.16	-3.18	-0.88
PM1332	00-BR1608	421144.54	6918851.10	43.48	421145.06	6918850.71	43.48	-0.52	0.39	0.00

Appendix F

Well Benchmark Ties

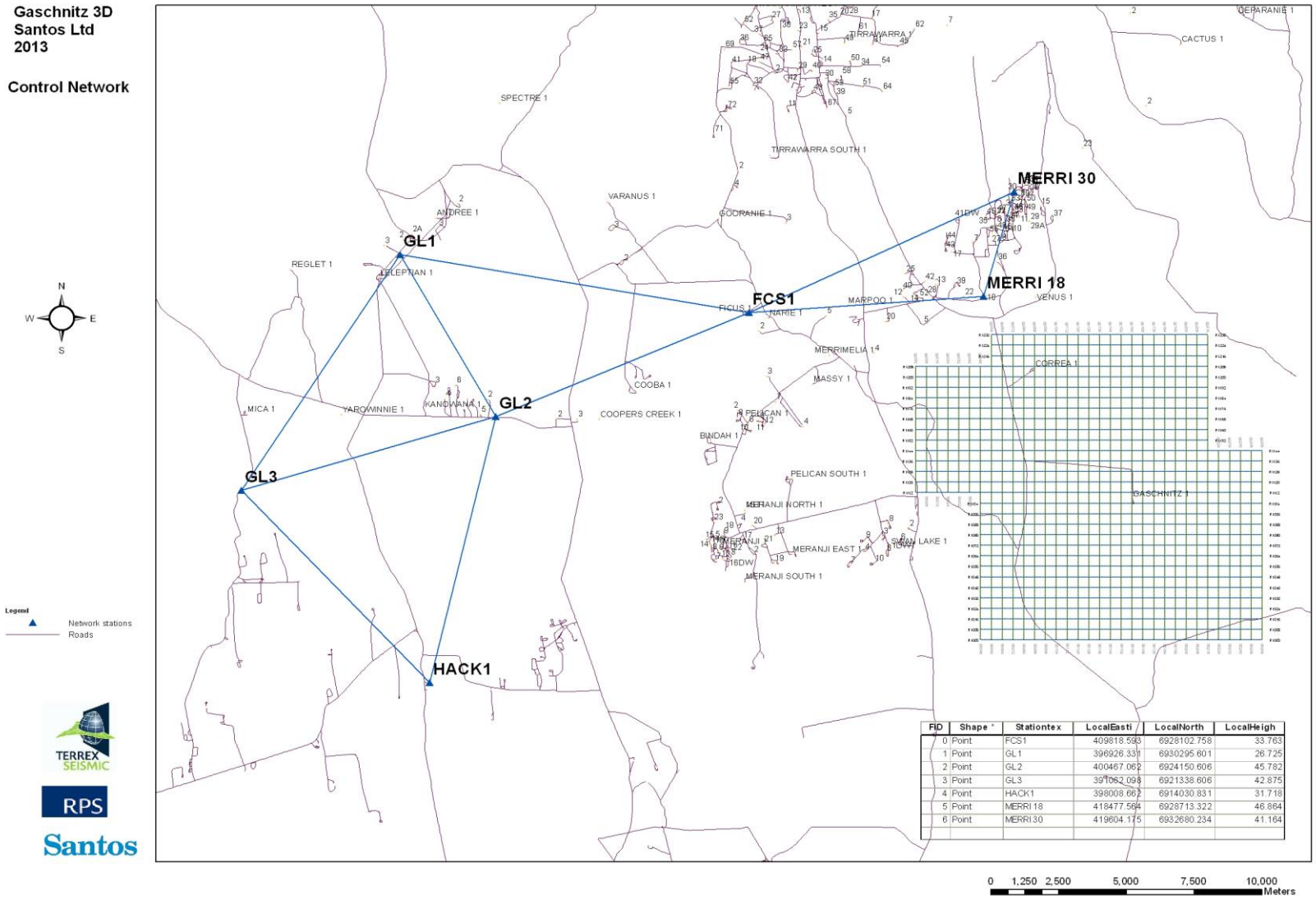
Station	Site	Survey Easting	Survey Northing	Survey Elev.	BM Easting	BM Northing	BM Elev.	DeltaX	DeltaY	DeltaZ
BM CORREA1	CORREA #1 (Well sketch)	420200.174	6926048.467	35.465	420199.685	6926048.564	35.524	0.489	-0.097	-0.059
BM CORREA1	CORREA #1 (Auspos)	420200.174	6926048.467	35.465	420199.821	6926047.978	35.524	0.353	0.489	-0.059

Appendix G

ITRF Control Ties

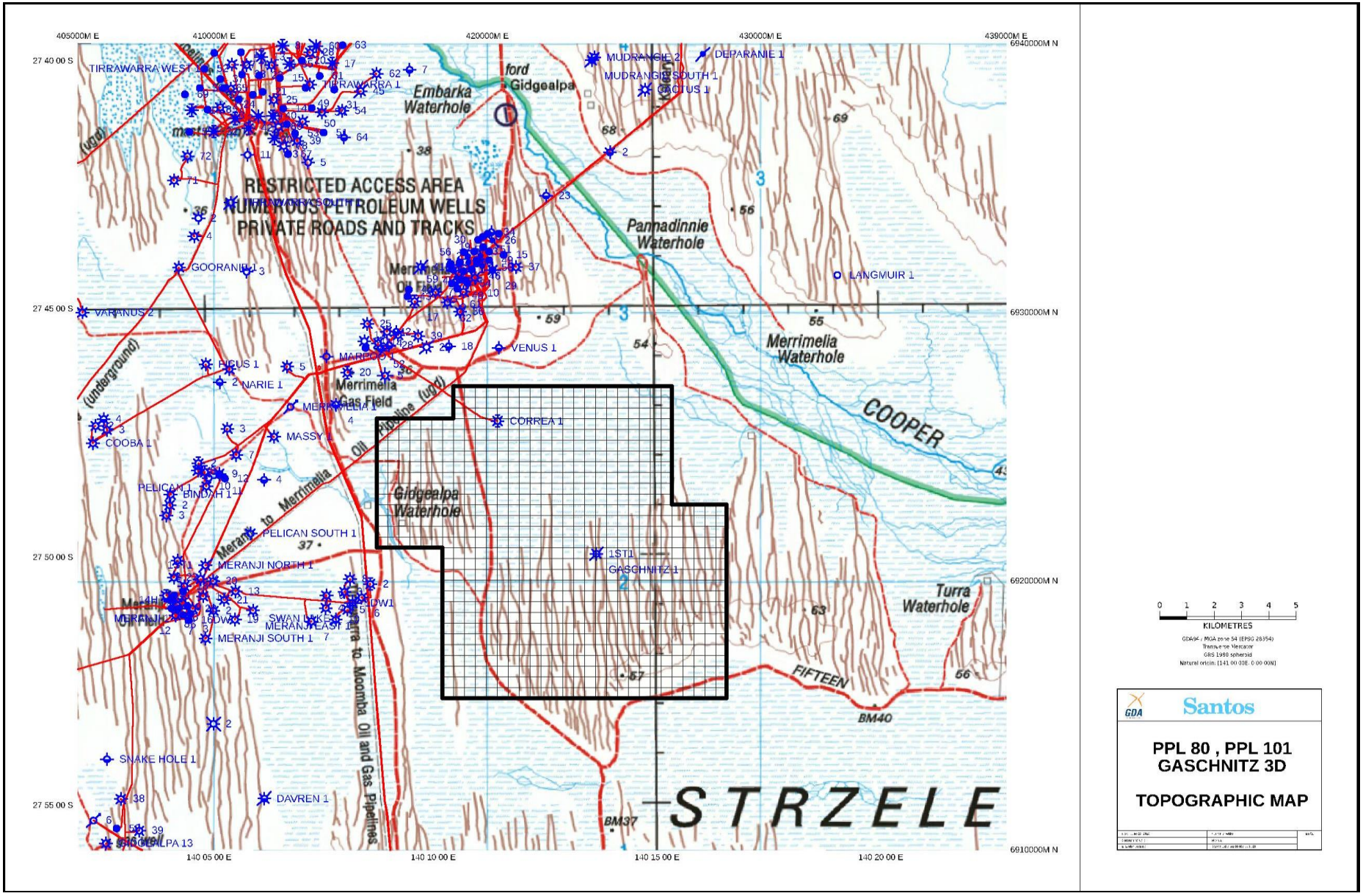
Station	Site	Survey Easting	Survey Northing	Survey Elev.	ITRF/PSM Easting	ITRF/PSM Northing	ITRF/PSM Elev.	DeltaX	DeltaY	DeltaZ
Merri 30	BM Merrimelia #30	419604.175	6932680.234	41.164	419603.793	6932679.832	41.254	0.382	0.402	-0.090
Merri 18	BM Merrimelia #18	418477.565	6928713.322	46.865	418477.182	6928712.919	47.010	0.383	0.403	-0.145

Appendix H - Control Network Map



FID	Shape *	Stationtex	LocalEasti	LocalNorth	LocalHeigh
0	Point	FCS1	409818.593	6928102.758	33.763
1	Point	GL1	396926.331	6930295.601	26.725
2	Point	GL2	400467.062	6924150.606	45.782
3	Point	GL3	391052.098	6921338.606	42.875
4	Point	HACK1	398008.662	6914030.831	31.718
5	Point	MERRI18	418477.564	6928713.322	46.864
6	Point	MERRI30	419604.175	6932680.234	41.164

Appendix I – Prospect Map



Gaschnitz 3D Seismic Survey

Field Operations Report

Prepared for Santos Limited

25th July 2013 to 10th September 2013

Job No. B02028

Crew 402

TERREX SEISMIC

Field Operations Report

For

Gaschnitz 3D Seismic Survey

PPL 101, 80,17 and AAL 164

Written by

Joe Tucker - Crew Manager

Crew 402

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

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Tables

Figures

Photographs

1. INTRODUCTION

Terrex Seismic (Terrex) was contracted by Santos Limited (Santos) to conduct the Gaschnitz 3D Seismic Survey. Recording was completed in 15 days with a total 318.8 kms of source lines recorded, over an area of 128 km^2. Acquisition commenced on 30th July and was completed on 5th August 2013.

Crew 402 commenced mobilisation on 25th August from 22 Crockford Street Banyo (Terrex's Operations office). Crew stayed overnight at Charleville and recommenced the mobilisation from Charleville to Moomba on 26th August 2013.

On the 27th August the crew undertook Cultural Heritage and site inductions. Mike Madey held the Cultural Heritage inductions for all crew members before commencing work and proceeding to the field. Initial spread layout commenced and hard wires were performed on the vibrators, as they had just been through a massive upgrade to meet Santos' requirements for Gaschnitz.

On the 28th August initial spread layout continued as the job required nearly all the spread to be on the ground to commence shooting. Vibrators conducted more hard wire tests and experimental sweep testing, on receiver line 1232 which is 8 km's or 160 stations in length. Testing started with one vibrator at each of receiver line 1332.

Trial parameters were as follows:

Sweep Test Group #1:

- 2 vibrators, 3 – 80 Hz, 4, 6 & 8 second sweeps, 2, 3 & 4 sweeps per test

Sweep Test Group #2:

- 2 vibrators, 3 – 90 Hz, 4, 6 & 8 second sweeps, 2, 3 & 4 sweeps per test

Sweep Test Group #3:

- 2 vibrators, 3 – 100 Hz, 4, 6 & 8 second sweeps, 2, 3 & 4 sweeps per test

Sweep Test Group #4:

- 2 vibrators, 5 – 100 Hz, 6 – 100 Hz, 7 – 100 Hz, 8 – 100 HZ & 10 – 100 Hz x 16 seconds, 1 sweep

Sergei Vlasov from Santos analysed and Quality Controlled the experimental shooting program.

On the 30th of the July the client requested to re-do the experimental testing due to less wind noise being present.

1.1 Geographic Area

The Gaschnitz 3D was located in PPL101, 80, 17 & AAL 164 in South Australia's Cooper Basin.

The recording crew utilised 1 camp site for the survey, located in the centre of the prospect on the Gaschnitz 1 camp road. Camp co-ordinates: 27° 49' 12.97" S, 140° 11' 44.83" E.

Terrain consisted mostly of large undulating sand dunes running through the prospect. The closest town was the Santos Moomba facility and this was utilised for all crew flights, freight deliveries etc.

Due to the main access road from Moomba and Innamincka to Birdsville running through the southern end of the survey area, there was a medium volume of tourist traffic. To combat this, the crew HSE deployed traffic signs on the road throughout the prospect.

The Gaschnitz 3D prospect was split into two cultural heritage areas; the western side of the prospect (168.95 km) fell in the Dieri native title area, and the eastern side of the prospect (469.85 km) fell in Yandruwandha native title area. Both areas were pre-scouted by teams from each group assisted by Mike Madey (Santos Cultural Heritage Supervisor).

Upon completion of the scout, reports were compiled with details of any site areas to be avoided and directions for doing so. This data was imported into the survey GIS and loaded into the line preparation GPS units. The Terrex Contracting operators were also given detailed maps and information on the sites. The Senior Surveyor checked sites ahead of the dozers to make sure marker pegs were still in place and proposed detours could be followed.

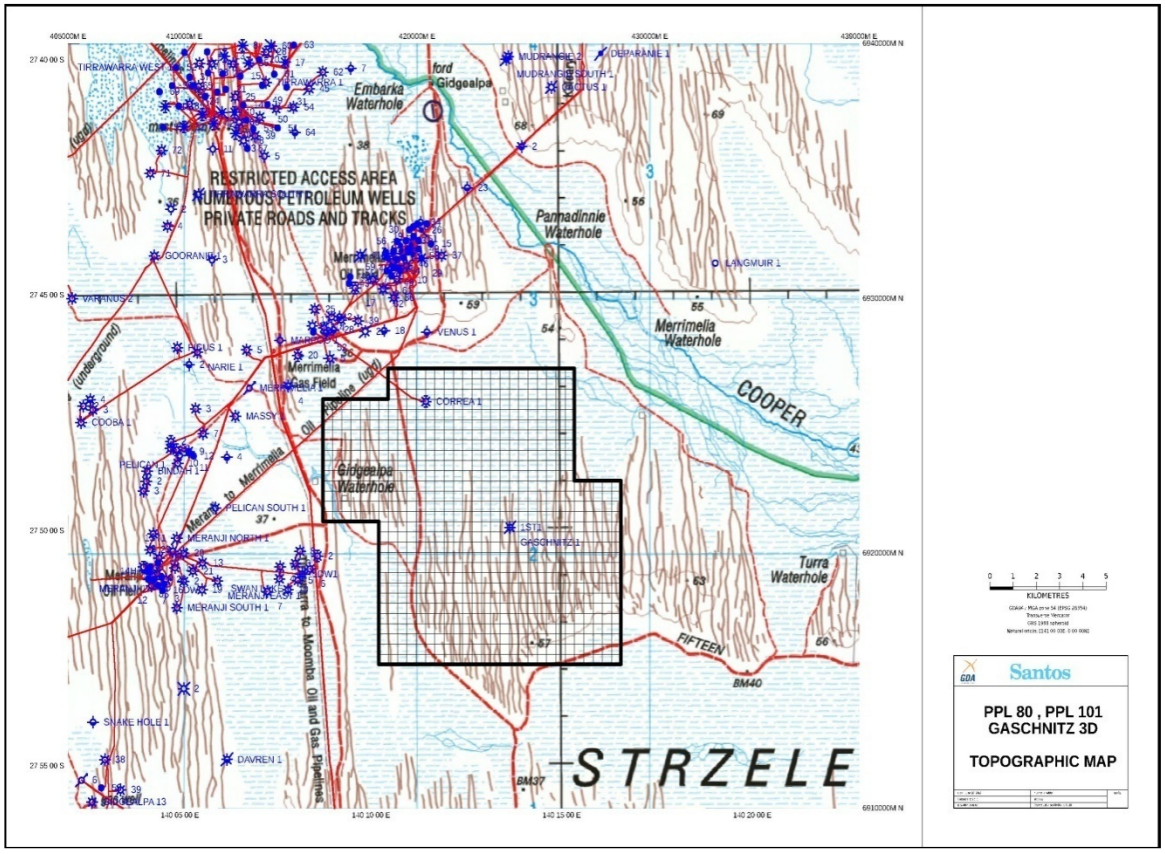


Figure 1 – Survey Map

1.2 Health, Security, Safety and Environmental

Regular breath testing and random drug testing was conducted throughout the Gaschnitz 3D program. There were no safety incidents for the duration of the job.

The department heads all completed their HSE Observation Audits and an SOP was review every week in the HSE departments weekly reporting.

There was a Muster point fire drill undertaken with a prompt and efficient result.

The overall behaviour of the crew and results were very pleasing.

Please see Appendix E - HSE End of Contract Report for additional information.

1.3 Climatic Conditions

Average Minimum Temperature:	3.4 degrees
Average Maximum Temperature:	35.2 degrees
Days lost due to wet weather:	0
Rainfall:	0 mm

1.4 Logistics

The survey crew mobilised from Brisbane office on the morning of Wednesday the 24th July and after travelling all day stayed the night at Charleville; then the next day arriving the next day at the Gaschnitz camp site at 4:30 pm on Thursday the 25th July.

The accommodation facilities were in the form of mobile vans that were provided by Terrex and were capable of sleeping up to 57 people. All meals were provided by the mobile kitchen and diner that was staffed by two full time cooks.

All supplies and freight were transported via road out of Moomba and delivered to camp by Crew Supply Truck. Fuel for all vehicles was picked up by the service truck at North Point Moomba than was delivered to site.

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

Photograph 1 - Vibrator ready for refuelling in the field with orange spill mat under the machine

2. SURVEYING

2.1 Line Pointing/Chaining/Surveying

Line pointing and survey services were provided by RPS.

RPS Surveyors started surveying the program on the 6th July and the work was completed on the 18th July 2013.

The program was completed at an average of 53.23 linear km per day. The Gaschnitz 3D prospect was split into two cultural heritage areas (see map below). The western side of the prospect (168.95Km) fell in the Dieri native title area. The eastern side of the prospect (469.85Km) fell in Yandruwandha native title area. Both areas were pre-scouted by teams from each group assisted by Mike Madey (Santos Cultural Heritage Supervisor).

Mike Madey held a Cultural Heritage induction for crew members on 5th July 2013.

RPS supplied high quality maps to the recording crew detailing hand carry sections, offsets, fences, gates, tracks, detours, pipelines and any other pertinent information.

RPS Personnel

Crew Member	Position
E Amedee	Principal – Survey Senior Seismic Surveyor
M Clark	GPS Operator
A Tonkin	GPS Operator

RPS Equipment

1 Toyota Landcruiser wagon	1 Motion table PC / field mapping unit
2 Toyota Landcruiser utilities	1 Garmin GLO Bluetooth GPS receiver
4 Garmin 172C GPS receivers	1 Garmin 276C GPS receivers
1 Garmin GLO Bluetooth GPS receiver	2 Trimble R7 GNSS GPS receivers
1 Trimble R7 GNSS Base GPS receiver kit	2 Trimble R7 GPS receivers
2 Pacific Crest HPB 450 base modems	3 Trimble TSC3 survey controllers
1 Pacific Crest PDL GPS rover radio modems	1 Trimble TSC2 survey controllers
2 Garmin Montana GPS receivers	1 Dell Precision M6500 notebook computer
1 GPSeismic Processing software package	1 Canon iX5000 A3 colour printer
1 ArcGIS 10 software package	1 Survey Office / sleeper caravan
1 Trimble Business Centre network software	1 Sleeper / office caravan (3 x single room)
1 Canon MG5350 printer / copier / scanner	2 Iridium Satellite telephones

2.2 Line Clearing

Line clearing services were provided by Terrex Contracting Crew 3.

Terrex Contracting (TC) started line clearing on 6th July and work was completed on 20th July 2013. TC supplied three bulldozers, two graders and camp facilities.

The line preparation equipment and refuelling vehicles had UHF radios installed to enable communications with the dozer pointer and camp. RPS and Terrex Contracting each had a UHF radio set up in their respective offices to enable communications between camp and field vehicles. The dozer pointer had a satellite phone with him to enable communication to camp in an emergency. All line preparation was carried out under a Greenfield permit issued by the area supervisor at Tirrawarra. No excavation permit was required for Gaschnitz 3D.

Terrex Contracting Personnel

Crew Member	Position
Ken Matthews	Crew Manager
A Wilmot	Operator
J Littlejohn	Operator
G Walker	Operator
I Williams	Operator
G Turner	Operator
Brodie Atkinson	Mechanic
Byron Sweet	Cook

Terrex Contracting Equipment

1 Caterpillar D7R dozer	1 Sleeper (cook) / coldrooms trailer
1 John Deere 772D grader	1 Workshop / Stores / generator trailer
1 Caterpillar 14M grader	1 Shower / laundry trailer
1 Kitchen / diner trailer	1 trailer with two toilets
2 Accommodation trailers	1 Iveco Eurotech twin steer utility truck
2 Prime movers	1 Water tank trailer
1 Fuel tanker trailer	2 Support 4x4 vehicles
1 VSAT Data / telephone system	1 Satellite telephone

2.3 Production figures

	RPS	Terrex Contracting
Range of Kms/day:	31.02– 57.86km	37.58 – 57.86 km
Average Kms/day:	37.58 km	37.58 km
Minimum Production:	31.02 km	57.86 km
Maximum Production:	57.86 km	66.50 km
Average Production:	50 km	37.58 km
Lost/Standby Days:	0	0
Total Days Onsite:	17	17
Total Production Kms:	638.80 km	638.80 km

3. SERVICES

3.1 Permitting

Permitting services was carried out by the client representative John Allen.

3.2 Fencing

Fencing services were not required

3.3 Traffic Control

Traffic Control Services were not required. But as there was no dedicated traffic controllers the HSE advisor deployed signage when and where they were required.

3.4 Client Representative

The Client Representative for the entire survey was John Allen.

There was only one additional client visitors to crew; Sergey Viasov to observe the experimental parameter testing.

Photograph 2 - Cable truck pulling cable from the spread trailer

4. RECORDING/PROCESSING

Photograph 3 - Observer Mike Coughlin at the helm in production

4.1 General Survey Details

Survey:	Gaschnitz 3D
Survey Location:	PPL 101,80,17 & AAL 164
Total Kms/Sq Kms:	122.88

4.2 Field Recording

Instruments:	Sercel 428
No. Channels:	6400
Tape Drives:	IBM ultrum Lt02(dual drive-200Gbyte per tape)
Tape Format:	SEGD
Filters:	High cut 200 Hz, (0.8 Nyquist-linear) Low cut: out
Sample Interval:	2 milliseconds
Record Length:	5 seconds after correlation
Correlation Type:	Zero phase after sum
Stack:	After Stack

Source Specifications

Vibrators:	Two fleets of 2 x AHV-IV COMMANDER (PLS 364)
Electronics:	Sercel
Sweep Frequency:	6-90 hertz
Sweep Length:	16 seconds
No. Sweeps:	1
VP Interval:	50m
Vibrator Array:	2 vibes in line 12.5 metre pad spacing one standing sweep 70% force
Sweep Amplitude Taper:	100% (none)
Drive Level:	80% varied by amplitude control function
End Tapers(cosine) (s):	0.3s
Phase Locking Type:	Ground Force
Amplitude Control:	Peak to peak

3D Grid Design

Receiver Interval:	50m points on 400m spaced lines
Number of Receiver Points	160-256 receiver's per line, on 30 lines
Source Interval	50m points on 400m spaced lines
Number of Source Points	96-232 VPs per line, on 33 lines
Maximum Fold	593

Photograph 4 - Line Crew picking up Geophones

4.3 3D Recording

Terrex Seismic was contracted by Santos to conduct the 2013 Gaschnitz 3D Seismic Survey.

The program consisted of Thirty (30) receiver lines and Thirty Three (33) source lines for a total of 318.8 linear km and 320.0 linear lm respectively.

Acquisition commenced on Friday the 25th of August 2013 and was completed on 15th August 2013.No adverse weather conditions were encountered during the survey.

SOURCE LINE	STN RANGE	LINE KM	#	TOTAL KM
S5000-5040	1112-1207	4.8	6	28.8
S5048	1000-1207	10.4	1	10.4
S5056-5216	1000-1231	11.6	21	243.6
S5224-5256	1000-1143	7.2	5	36.0
SOURCE INT	**50.0m**	**Total**	**33**	**318.8**
REC LINE	**STN RANGE**	**LINE KM**	**#**	**TOTAL KM**
R1000-1104	5048-5255	10.4	14	145.6
R1112-1144	5000-5255	12.8	5	64.0
R1152-1208	5000-5215	10.8	8	86.4
R1216-1232	5056-5215	8.0	3	24.0
GROUP INT	**50.0m**	**TOTAL**	**30**	**320.0**
TOTAL AREA		128.0km²		

The survey was acquired as a single panel, with all stations set live once laid out. The full fold of coverage is shown in Figure 2.

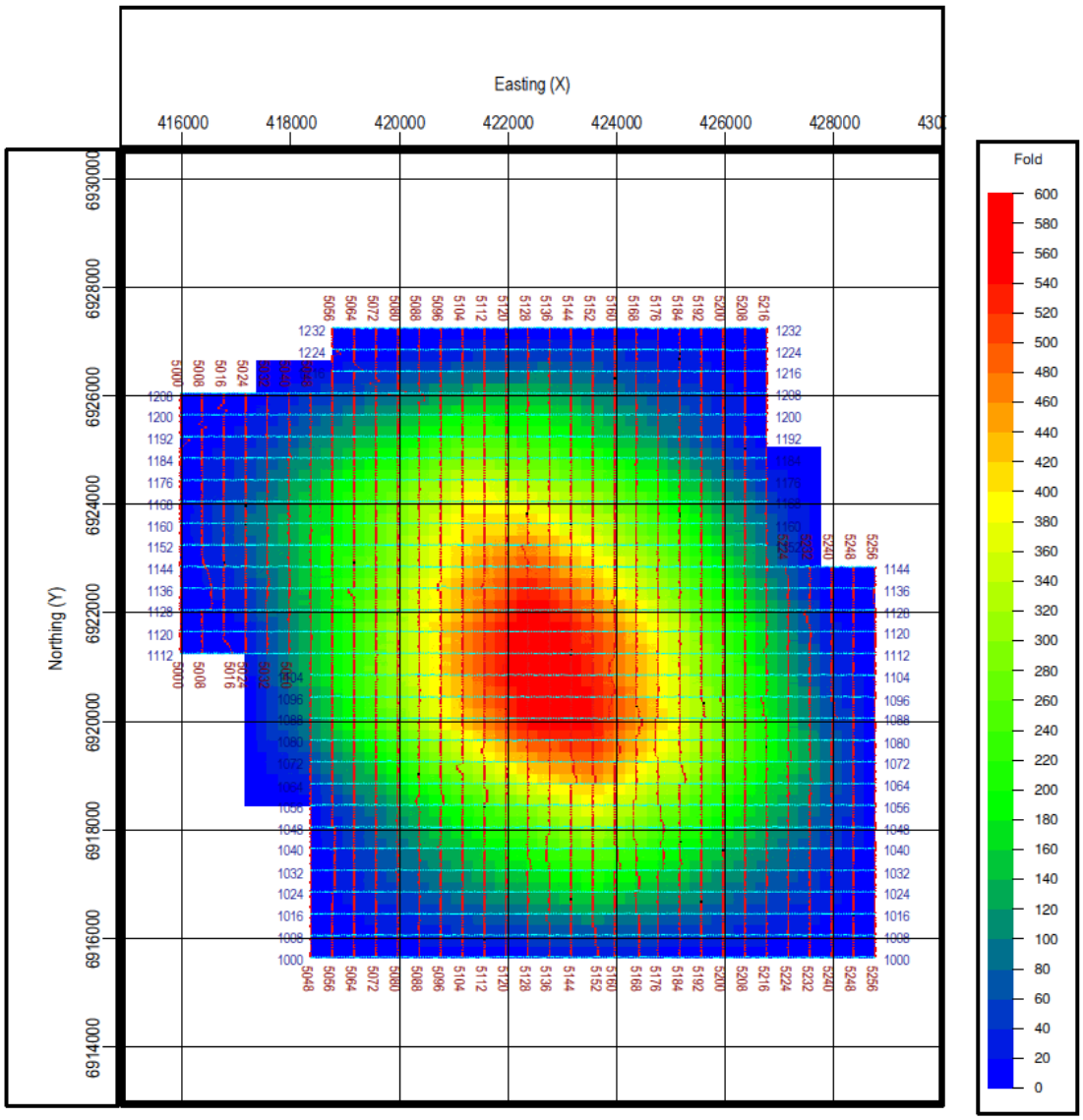


Figure 2 – 3D Panel fold of coverage map

4.4 Crew Performance

The efforts of the crew were to a very high standard even with the warmer conditions encountered. The crew have formed into a highly productive team, operating in rough crab hole country and into sand dunes. The cooperation exhibited during the job is a credited to all personnel. In my opinion crew 402 is a positive and professional crew who work to achieve the highest quality and standards.

Photograph 5 - Dan French inside the cable repair truck

4.5 Tapes

A Tapes

Hand carried by John Allen and was delivered to:

Operations Geophysics Santos LTD

Nick Papanicolaou
C/o Toll Priority Basement
191 Pultney Street
Adelaide S.A 5000

B Tapes

Hand carried by John Allen and was delivered to:

Operations Geophysics Santos LTD

Nick Papanicolaou
C/o Toll Priority Basement
191 Pultney Street
Adelaide S.A 5000

5. QUALITY CONTROL

5.1 Overview

The In-Field QC unit worked as an integral part of the crew and coordinated data flow between the different units on the crew during the seismic operation. The unit performed the quality control of data and seismic processing on a daily basis.

The unit was responsible for checking the seismic data and associated coordinates files for data verification, geometry, noise and overall seismic quality. A brute stack was also generated for each day of production.

5.1.1 Personnel

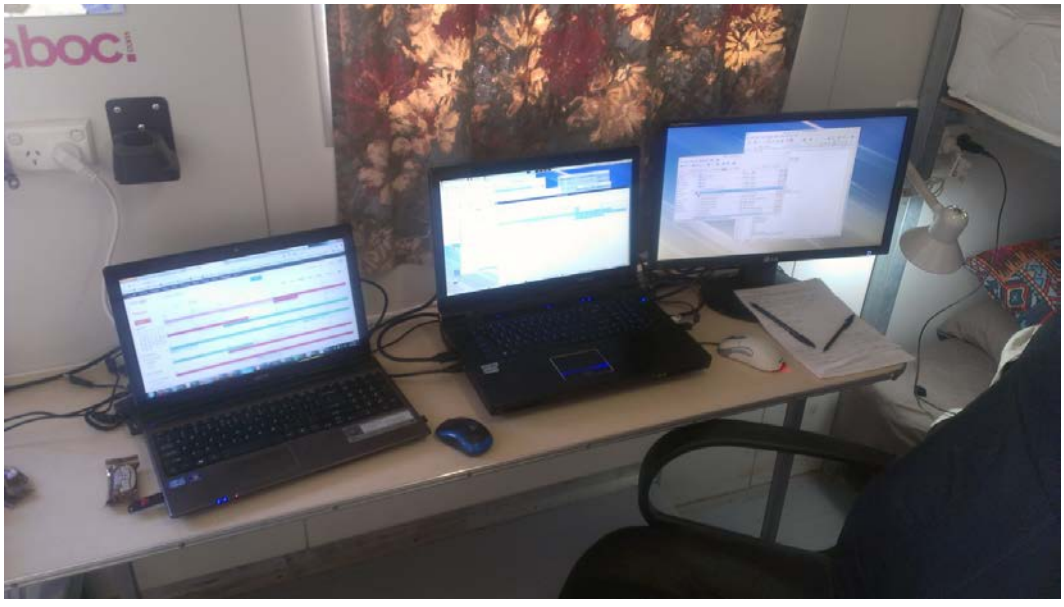
The In-Field QC unit was staffed by In-Field Geophysicist Louis Coleshill for the complete survey, supported by Senior Geophysicists based in Terrex Seismic's Brisbane and Perth offices.

5.1.2 Equipment

The QC unit used a brand new processing supercomputer. The highly mobile setup consisting of a Eurocom Panther 5E Supercomputer laptop, setup with Globe Claritas, greatly improved the speed in which the 3D survey could be processed. The processing system is detailed in Table 1.

Table 1 – QC Unit hardware listing

Item	Item Description
CPU	Intel Xeon E5-2687W @ 3.10GHz, 8 Cores, 16 Threads
HDD	3x 1TB in Raid Array
HDD	1x 240GB Solid State Drive
RAM	32GB
O/S	Red Hat Enterprise Linux Workstation v6
Software	Globe Claritas v6
Display 1	Internal 17.3" 1920x1080
Display 2	External LG Flatron 21.5" 1920x1080



Photograph 6 - Data processing system.

5.1.3 Software

The main geophysical, technical and spatial software components are listed in Table 2.

Table 2 –Software

Software	Version	Purpose
Claritas	v6-0-0.9920	Data processing and seismic QC
OMNI	v12.021	Survey design and planning

Claritas is the processing software used to import, analyse raw seismic data, and geometry using imported SPS files. It is also used to generate brute stacks and export geometry applied data in SEGY format.

OMNI is used to analyse pre-plot (pre-surveyed positioning) spatial data, import surveyed data, edit or move stations, add infill stations, generate recording scripts (set of computer instructions for the recording system on spread geometry for each shot point).

5.1.4 In-Field QC Processes

The schematic in Figure 3 outlines the interaction and data flows between the QC department and the other crew operations.

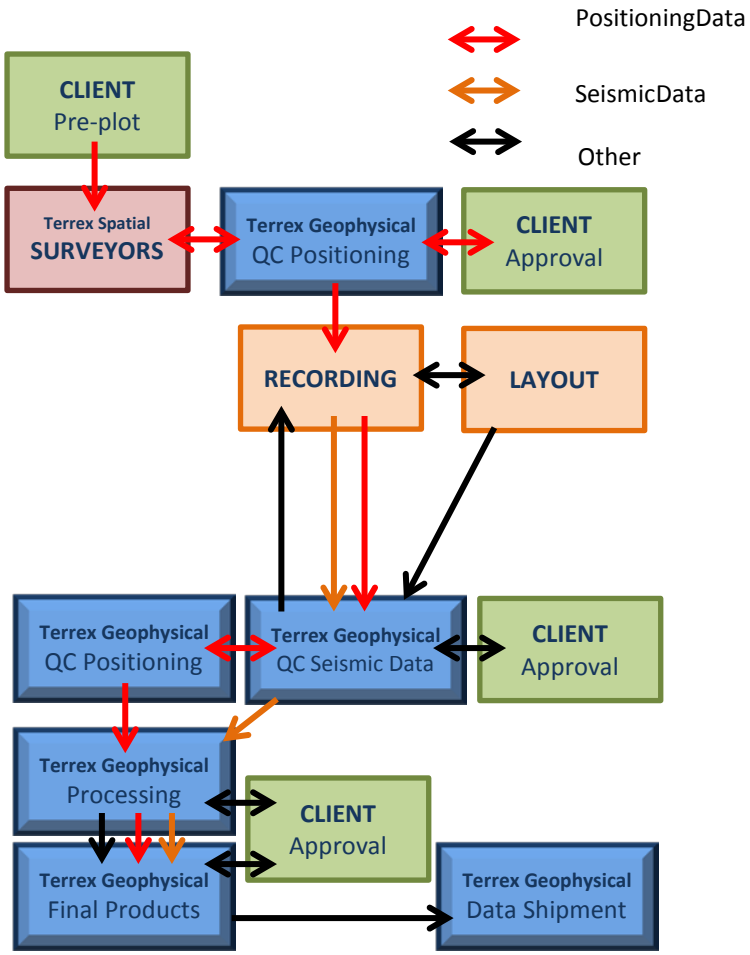


Figure 3 – In-Field QC process diagram

The main responsibilities or the in-field QC unit are as follows:

- **Maintaining the contracted geophysical specifications from the client**
  This included regular field visits to the line crews, vibrator fleet and the recorder, liaison with the client representatives on matters concerning the project's design, fold coverage, daily progress, data quality and compliance of the acquired seismic data with the contractual specifications.
- **Generation of recording scripts**
  A set of instructions with coordinates and spread geometry for the recording system and vibrator control and positioning.
- **Quality control of the seismic, coordinates and support data**
  Including the analysis and processing of the co-ordinate data to generate a final corrected data set, and the analysis of the seismic data to identify and correct any issues.
- **Processing data to Brute Stacks**
  Using the final co-ordinates the data was processed to generate a brute stack. Along with a first look at the processed data, these stacks provide additional quality control along with additional information such as first pass velocities for the processing centre.
- **Generation and shipment of final data products**
  To the processing centre for the final processing, the client for data archival along with the provision of test data and brute stacks for further client assessment
- **HSE Compliance**
  The In-Field QC unit are heavily involved in the HSE programme of the crew with personnel attending the daily HSE toolbox meetings, operational meetings, weekly Safety Sunday sessions, reporting hazards, near-misses and Take 5s using Terrex Seismic's reporting system.

5.2 Project Startup

5.2.1 Acquisition Parameter Tests

Start-up tests were conducted on the vibrators using the Sercel 428 acquisition system and the results analysed using Testif-i, see Figure 4.

5.2.2 Recording Parameters

The recording parameters described in Table 4, Table 5 and Table 6 were agreed with the client representative on crew prior to production.

There were variations on the initial parameters during the survey. The force level of the vibrators was reduced to 60% where distortion was recorded. Along with the following changes made to the source parameters.

Table 3 - Source Parameter changes during production

Date	Comment
Jul 30, 2013	Client increased record length to 5 seconds
Jul 31, 2013	Client request force level to 60%
Jul 31, 2013	Client request sweep change 5-90hz 16 second, 60% force
Jul 31, 2013	Client requested sweep change to 6-90hz 16 seconds 70%
Jul 31, 2013	Force drive level changed to 60%
Jul 31, 2013	Force drive level changed to 70%
Jul 31, 2013	Force drive level changed to 60%
Aug 1, 2013	Force level set to 60% due to ground conditions

Aug 2, 2013	Force level set to 60% -- terrain
Aug 2, 2013	Force drive level at 70%

Table 4 – Source parameter used in production

Parameter	Description
Energy Source	Two fleets of 2 x AHV-IV COMMANDER (PLS 364)
Vibrator Specs	Peak force 61,800 lbs Hold down weight 64,000 lbs.
Acquisition Details	Source Driven with Universal Encoder II.
Source Point interval	50 metre orthogonal x 400m
Vibrator Array (V1)	2 Vibrators inline, with a nominal pad to pad spacing of 12.5m, 1 sweep per VP
Sweep details	6 – 90 Hz linear upsweep 16 seconds sweep time
Number of sweeps/VP	1
Sweep tapers	300ms start, 300ms end (cosine squared)
Sweep control	Sercel 464
Accelerometers	Sercel 464
Vibrator Drive level	Force Control On 70% Peak Force
Phase Lock	Ground Force Phase Lock

Table 5 - Receiver parameters used in production

Parameter	Description
Receiver sensors	SM-24 Geophone Element Vertical, 10 Hz, Sensitivity 28.8V/m/s
Receiver Point interval	50.0 m x 400m
Receiver Array (G1)	12 phones in line 4.167 m. spacing, centred on station.
Receiver patch	Full azimuth recording Complete spread live once available. Spread roll in whilst layout. Entire line was potentially recorded live and the relevant patch extracted for roll in.
Maximum Fold	593m in 25m x 25m CDP bins.

Table 6 – Recording parameters used in production

Parameter	Description	
Acquisition System	Sercel 428	
Record Length	5.0 seconds after correlation	
Sample interval	2ms	
	Correlation sampled at 2 ms	
Recording Filters	Hi-cut filter	Out
	Low cut filter	Out
	Anti-Alias filter	206 Hz (82% of Nyquist)
Recording format	SEG-D to tape, LTO2 and LTO3	

Parameter	Description
Data recorded to tape	Tests: Uncorrelated/Unstacked Production: Correlated/Unstacked
Auxiliary Channels	Channel 1 Digital Pilot 1 Channel 2 100hz Time Base Channel 3 Time Break Channel 4 Auto Correlation + Channel 5 Auto Correlation - Channel 6 Correlation

5.2.3 Navigation Data

The survey was acquired using a survey projection of MGA Zone 54 and the GDA94 datum.

The SPS files generated were in standard 2.1 format, as described in Table 8 and Table 9.

5.3 Data Quality Control

5.3.1 Instruments Testing

As part of the internal QC conducted by observers in the field, a set of standard instrument tests were run on the strings of geophones before production to ensure that all the instruments are in working order, as listed in Table 7.

Table 7– Daily instrument tests

	TEST
1	Gain tests
2	RMS noise tests
3	Common mode rejection tests
4	Cross-feed tests
5	Total Harmonic Distortion tests
6	Impulse tests
7	Impedance tests

5.3.2 Vibrator Hardwire Similarities

A hardwire test was conducted at the start of the job on all vibrators that would be in production using the Sercel acquisition system and processed independently in Testif-I.

It must be noted that hardwire tests are very dependent on sweep parameters and ground conditions. Harsh sweep parameters that fall outside the manufacturer specifications for the vibroseis and hard, uneven ground surface will adversely affect the results. An example hardwire test from the start-up can be found in Figure 4.

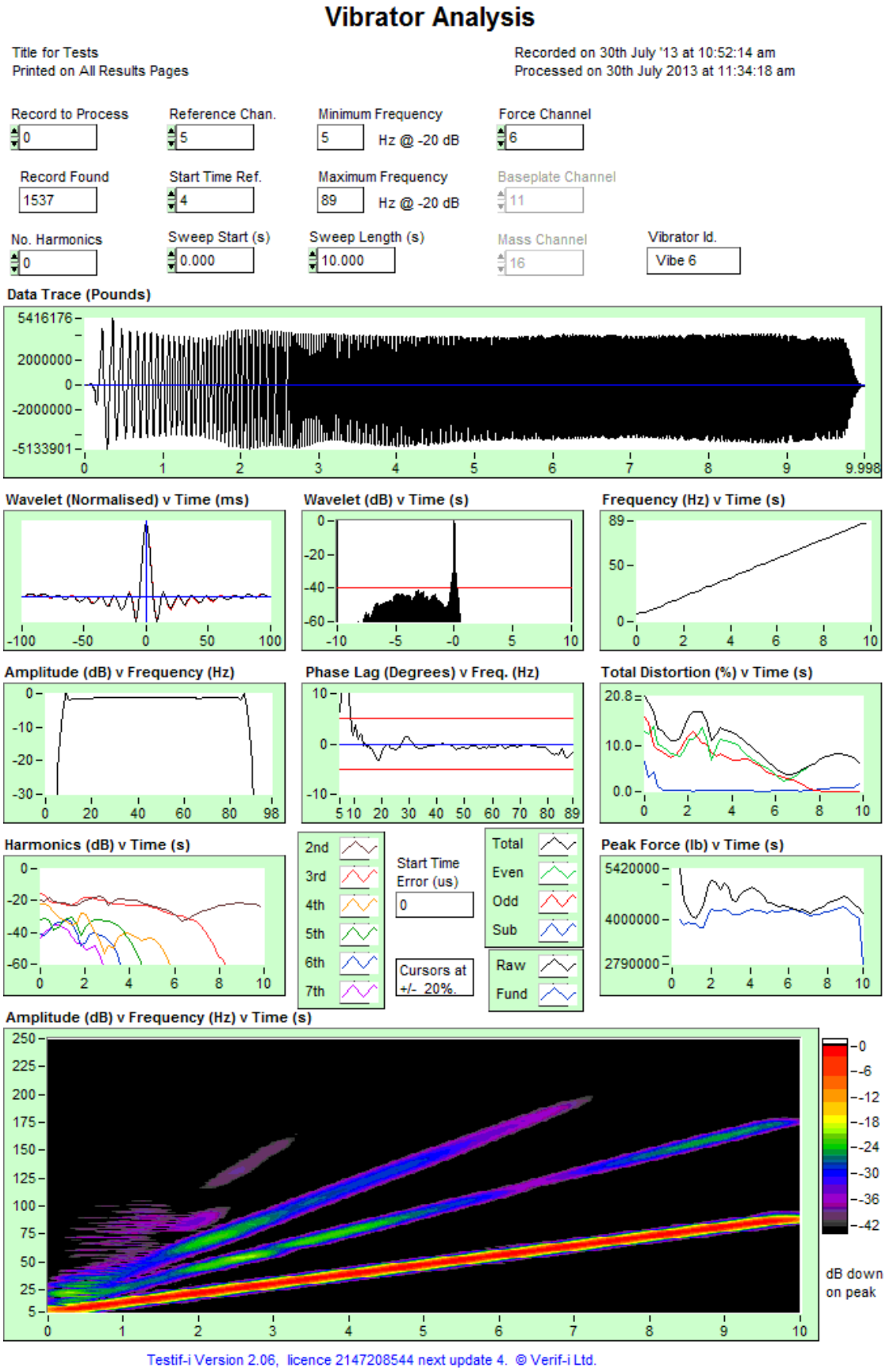


Figure 4– Hardwire similarity test using a Sercel VE464 to receive the data

5.4 Geometry Validation

For seismic data processing purposes, the final surveyed elevation data was merged with the source point XY coordinates recorded from the vibrators GPS systems (after validation and correction of any erroneous GPS readings).The receiver's positioning (XY and Z) used surveyed original positioning.

Particular attention was given to this part of the operation as coordinating shots and receivers are critical to the integrity of the acquired seismic data. A well-developed Terrex Geophysical system utilised dedicated seismic positioning software called OMNI, propriety software, automated scripts and templates to generate an accurate final SPS dataset containing only valid records. A schematic of the process flow from receipt of data from the recorder, through verification to generation of final corrected SPS files is shown in Figure 5.

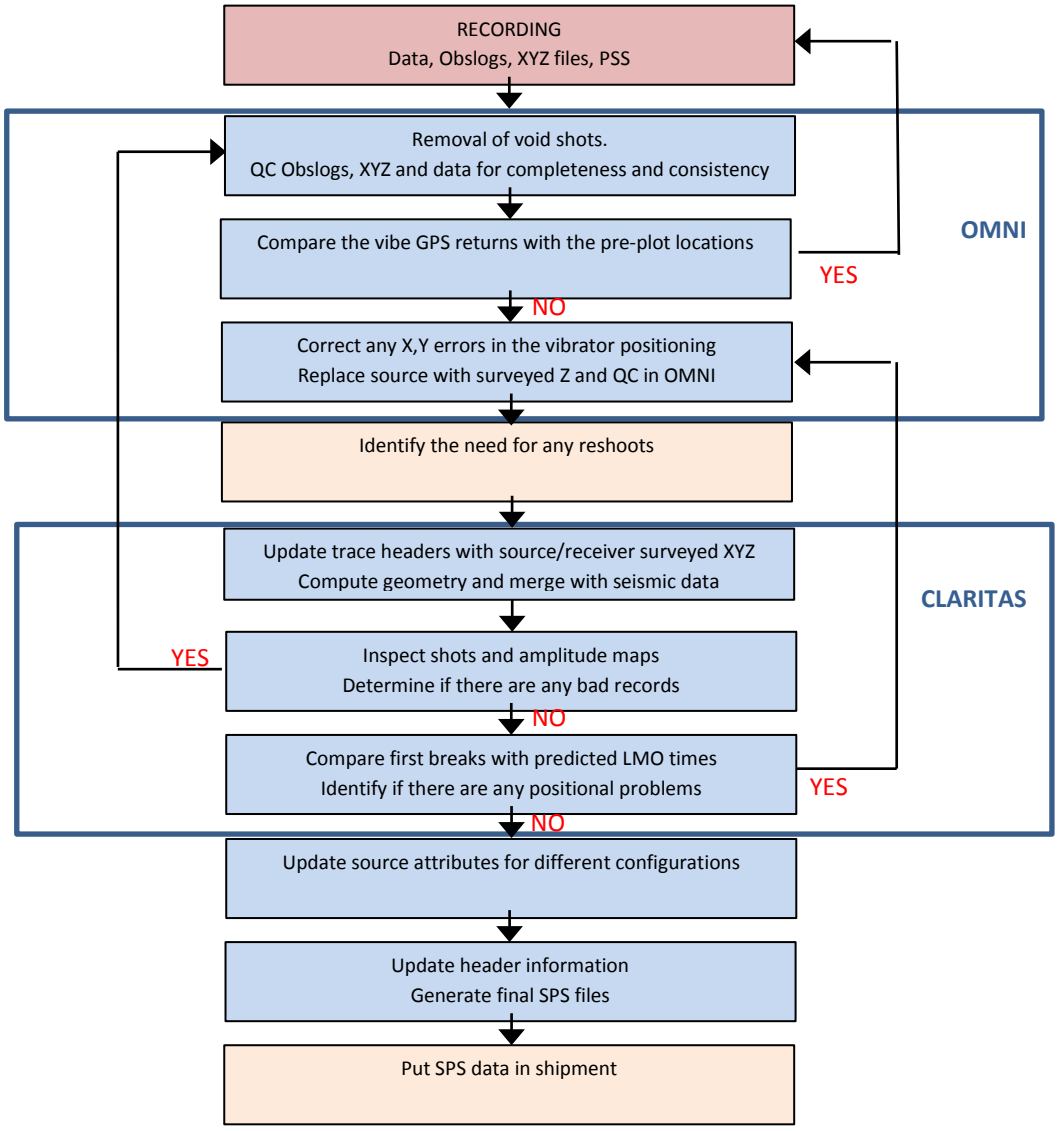


Figure 5– Flowchart of the navigational QC process

Large offsets (>5m) were analysed and checked with comments in the observer logs or with the observers themselves and the source point may be included with a re-surveyed elevation, reshot or voided with a skip. The comparison of COG co-ordinates with the surveyed source points was conducted both statistically and graphically.

Field seismic data were copied to the Claritas workstation and verified. Raw shots were analysed and seismic data integrity checks were performed promptly after receiving the data. In case of anomalies such as geometry errors, missing shots or below-specification shots, the In-Field QC unit reported the issues to the observers, vibrator technicians and any other relevant personnel before the spread was picked up in order to rectify errors.

The first stage of the data processing includes a QC of the navigational data. The valid seismic data was merged with the navigation data. Each shot is reviewed to identity any noise or data issues, first arrival times are predicted using a constant velocity linear move-out based on the observed moveout of the first breaks and overlaid on the gathers (as shown in Figure 6) to identify any mis-positioning issues.

Any mis-positioned sources or receivers or spread errors are identified as timing errors in the LMO displays and the cause is investigated and corrections made to the SPS files and updated in the data prior to the SEGY generation and further processing. This ensures the SPS files are correct and matches the seismic data.

All supplied positioning data were delivered in SPS v2.1 format with a full set of descriptive headers which include projection and datum used for the coordinates and elevation data.

It should be noted that the original SEG-D seismic trace headers contain elevation data from the vibrators' GPS system and these should be updated using the supplied SPS files in the data shipment. The SEGY files already contain the updated correct elevation from survey and any XY corrections as the supplied SPS files was used to update the trace headers prior to exporting the SEGY files.

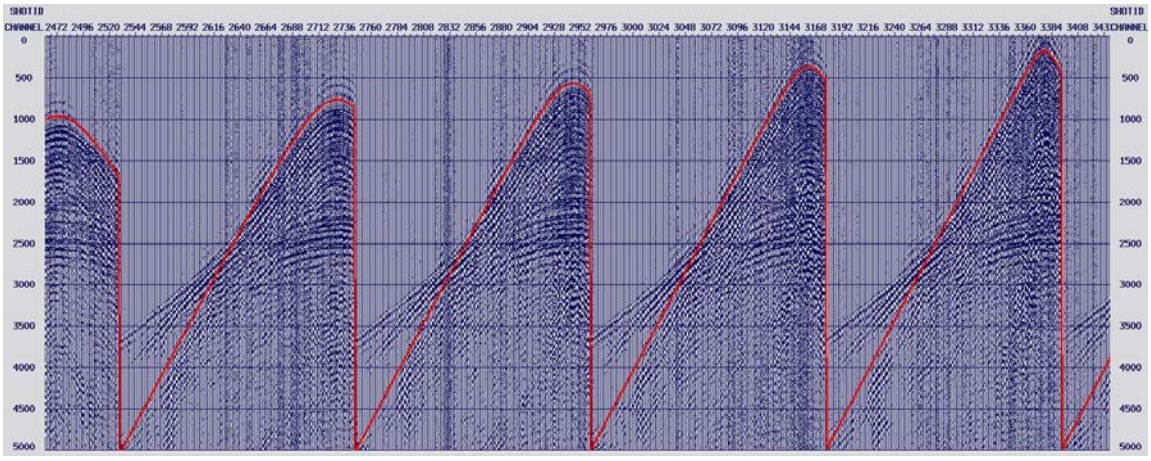


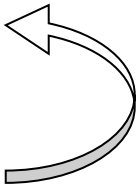
Figure 6– Geometry check

The geometry check image in Figure 6 indicates the first arrivals are coming back at a high velocity, especially at the mid to far offsets where the recorded event is a refraction from a shallow interface, giving a flatter profile than is usual and indicative of a fast layer below the refracting horizon. The red line is a velocity profile for a given offset using an average arbitrary velocity setting.

5.4.1 Brute Stack Generation

Field stacks were created daily after the newly acquired data had been concatenated and had the final geometry applied. This provided an additional QC of the data quality and geometry application. As shown in the shot records the data quality was good across the survey with strong reflectors present across majority of the offsets. Below is the processing flow used to produce the brute stacks along with images of the stacks.

- Apply geometry to data
- Resample to 4ms
- Apply elevation statics
- 500ms AGC
- NMO
- 70% Stretch mute
- Stack
- First pass velocity picking
- 500ms AGC



5.4.2 Generation of Final Products

The SPS co-ordinate files were written with a survey projection of MGA zone 54 and the GDA94 datum, using the standard 2.1 format, as described in Table 8 and Table 9.

Table 8 - SPS source and receiver format description

Definition	Columns	Format
Record Identification	1	'R' or 'S'
Line name	2 – 11	F10.2
Point Number	12 – 21	F10.2
Point Index	24	I1
Point Code	25 – 26	A2
Easting (m)	47 – 55	F9.1
Northing (m)	56 – 65	F10.1
Elevation (m)	66 – 71	F6.1
Julian Day	72 – 74	I3
Time (hhmmss)	75 – 80	3A2

Table 9 – SPS relational file format description

Definition	Columns	Format
Record Identification	1	'X'
Tape number	2 – 7	3A2
Record number	8 – 15	I8
Record increment	16	I1
Instrument code	17	A1
Source line number	18 – 27	F10.2
Source point number	28 – 37	F10.2
Source Index	38	I1

Definition	Columns	Format
First channel in group	39 – 43	I5
Last Channel in group	44 – 48	I5
Channel increment	49	I1
Receiver line number	50 – 59	F10.2
First receiver point in group	60 – 69	F10.2
Last receiver point in group	70 – 79	F10.2
Receiver point index	80	I1

The validated raw seismic data correlated and updated with the geometry, and the brute stacks were recorded in standard SEGY format.

5.5 Results and data examples

5.5.1 Example data

A typical raw shot record is shown in Figure 7. It contains a limited amount of noise and strong reflectors can be observed around 2.5 seconds two-way time (TWT).

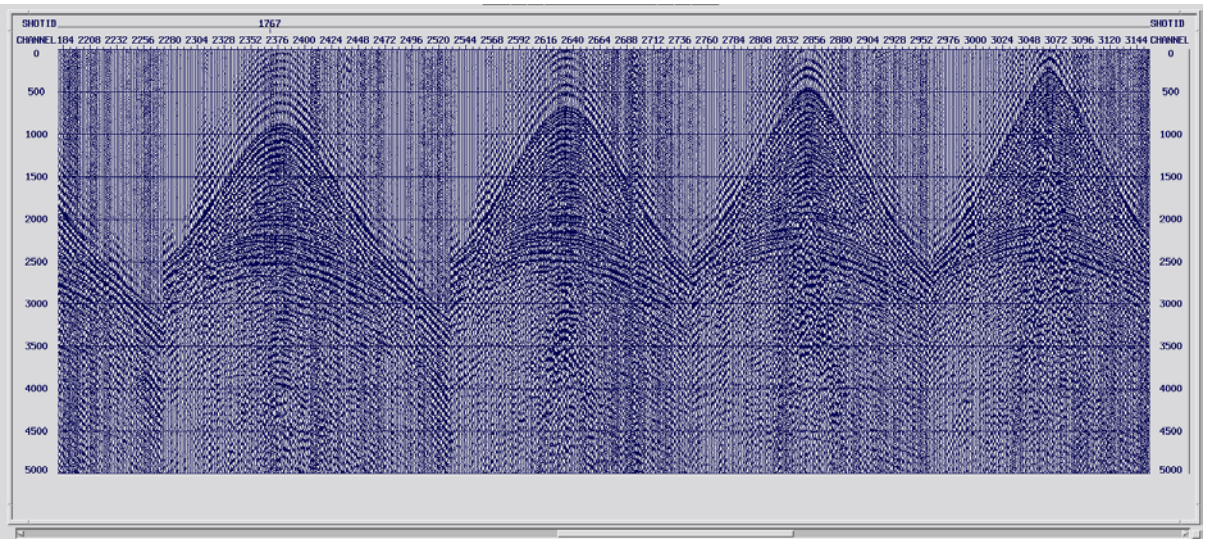


Figure 7– Typical raw shot display

Example stack displays can be found in Figure 8 to Figure 12 below. It should be noted that the processing applied in these brute stacks is designed for efficiency with regards to the resources and time available on crew, to provide a quality control product in the stack domain and an early indication of the data and structures. Significant improvements would be expected after the data has been fully processed.

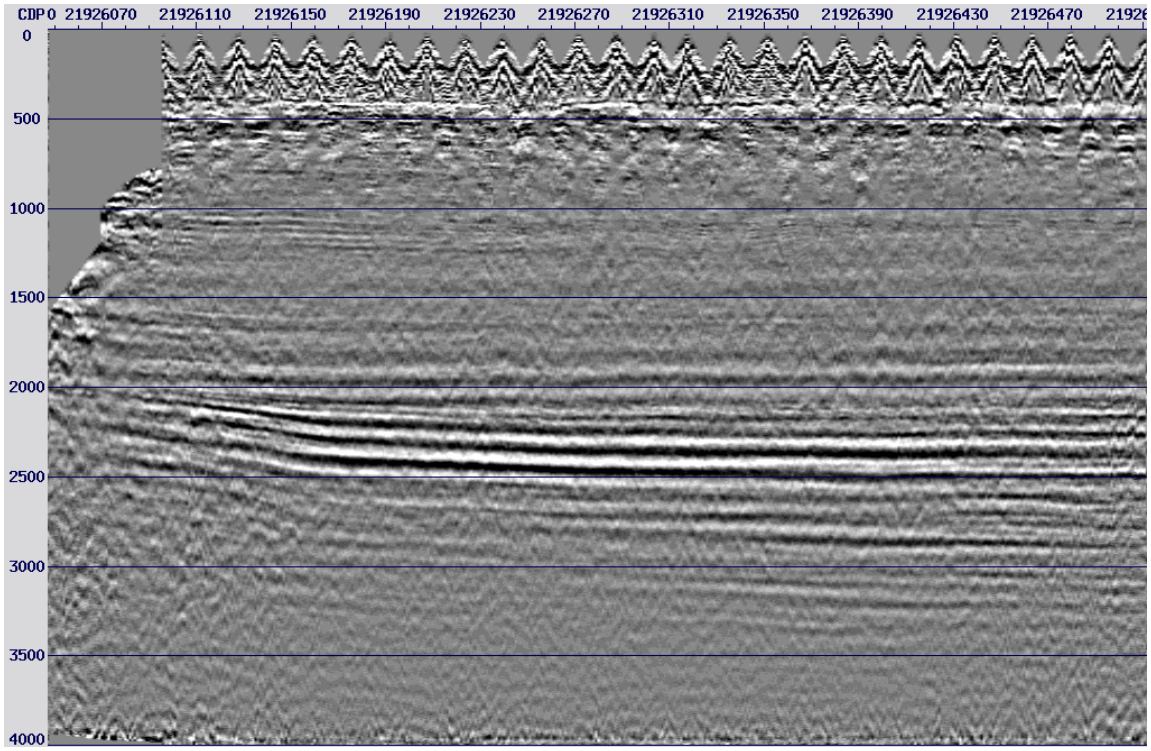


Figure 8– Brute stack (Receiver Line 1096)

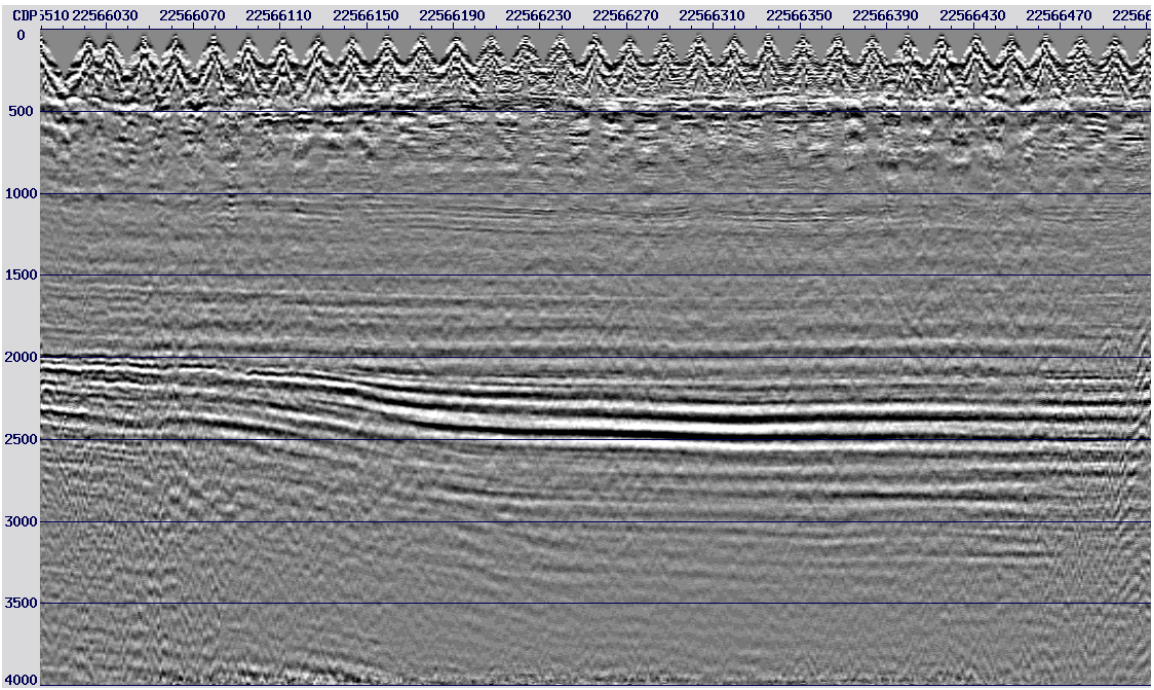


Figure 9– Brute stack (Receiver Line 1128)

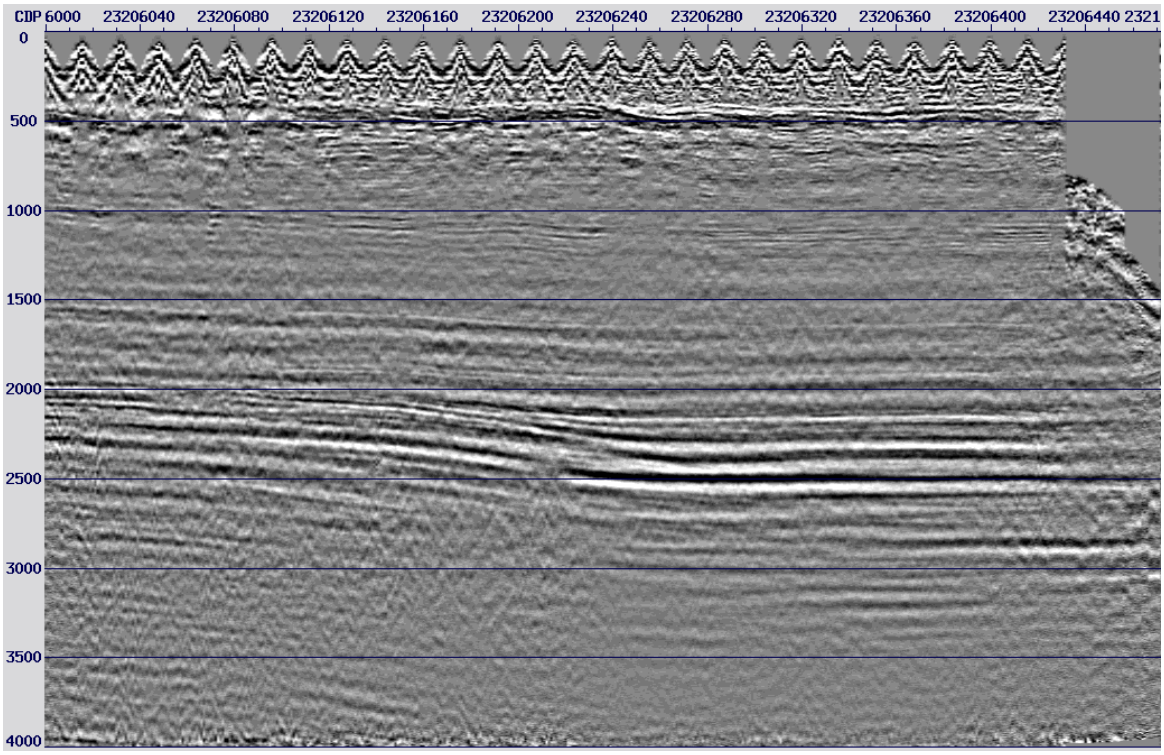


Figure 10– Brute stack (Receiver Line 1160)

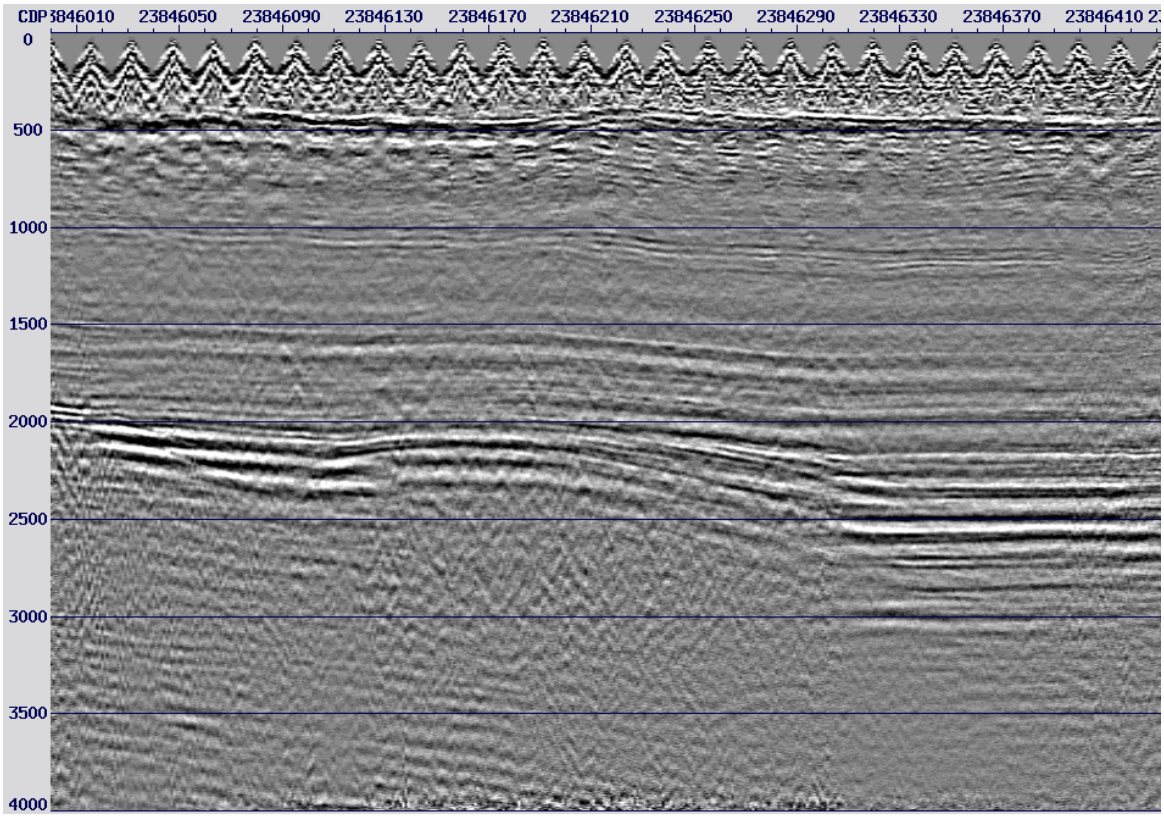


Figure 11– Brute stack (Receiver Line 1192)

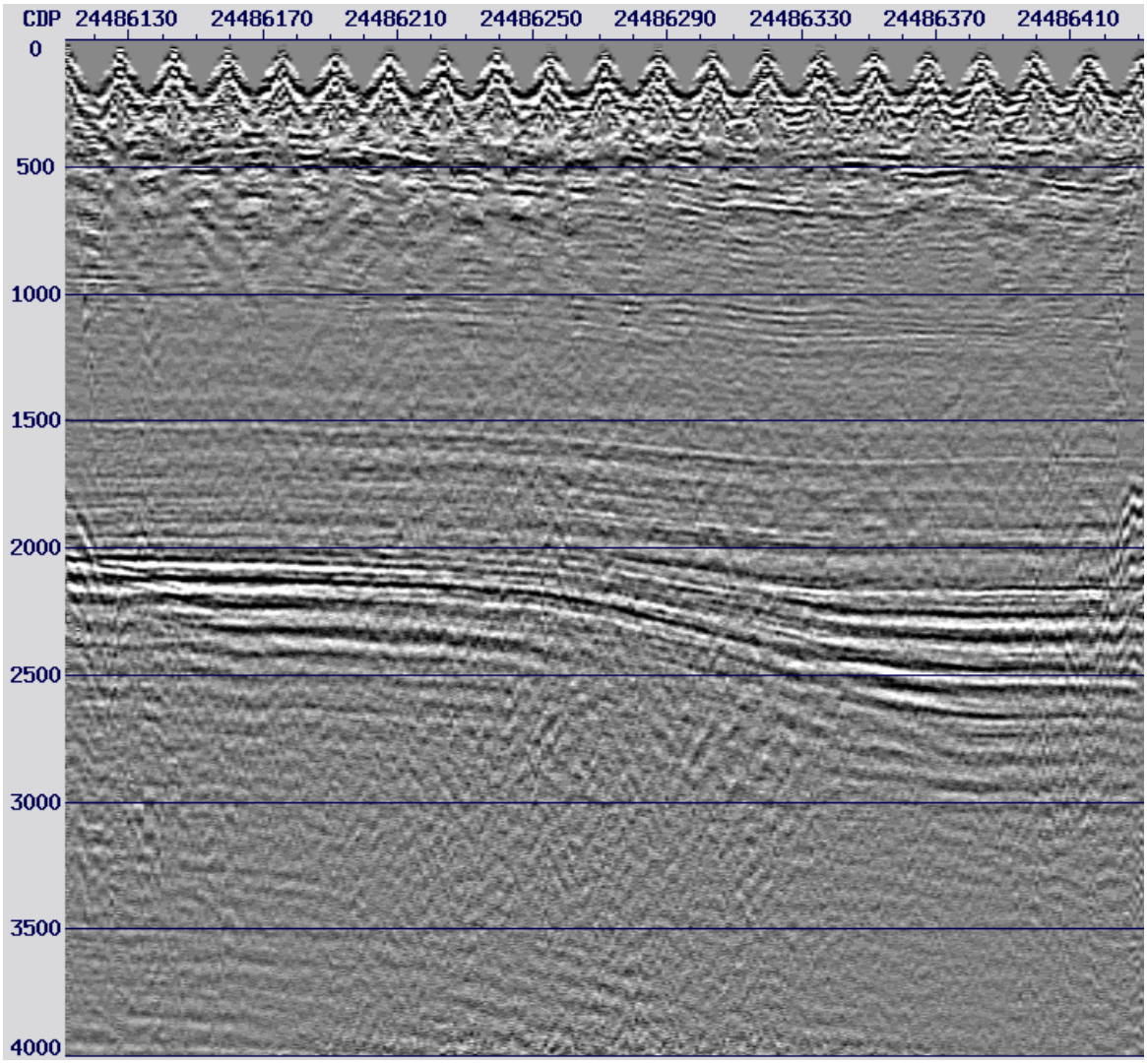


Figure 12– Brute stack (Receiver Line 1224)

5.5.2 Summary

The Field stacks show there are continuous data across the length of the lines. Further processing should enhance the deeper parts much more and be able to delineate the structures better than the brute stacks show, as well as improving the clarity of the reflectors at the target depths of between 2000 and 2500 ms, in particular the faults that are apparent in the stacks but they are somewhat undulating and there are some dipping reflectors that may require migration.

Significant events and trends in all the lines are obvious even at the early field stack stage and it is expected that these events can be enhanced further in the processing centre. It should be noted that the brute stacks had no signal processing applied and only elevation statics.

The recorded data and support files delivered to the client is of a high quality. It is expected that final processing will yield excellent results and meet the clients objectives of imaging their target areas.

In-Field Quality Control has been useful in this project, identifying and repairing files with bad geometry, incorrect coordinates or removing poor records with questionable or missing attributes. This process will improve the quality of the final product, and reduce time spent at the processing centre addressing any issues or potentially removing useful data. Issues such as missed shots and incorrect geometry flagged by the In-Field Unit were rectified immediately in the field when the equipment and staff were still present.

It is to be expected that having the whole survey live once laid out should produce results of higher quality. Shooting commenced as per a standard 3D survey with the crew laying out spread for the whole survey in

the background. Once all spread was laid all the receivers were then made live. This meant the line crew then had a few days in which no spread was to be laid out or picked up whilst shooting of the survey was competed because spread was only to be picked up once shooting had finished. To summarise there was spread roll-in but no spread roll-out.

The change of sweep length very early on in production from 4 seconds to 16 seconds will hopefully yield some comparable results to assist in the selection of future acquisition parameters.

The positioning of the vibrators were extremely close to the surveyed positions. The confidence of the vibrator positions is much higher due to the GPS positioning whereas in the previous system, they are assumed to have been in the correct location.

5.6 Data Shipments

The In-Field unit was responsible for the seismic data shipment to the client, processing centre and infield representatives, details on the data and destinations can be found in

Table 11. Offsite shipments are detailed in Table 12 and the shipping details and addresses are in Table 10.

The support data was supplied on DVD as well as field data tapes and included the following data:

- SPS files, version 2.1 (Source, Receiver and Relations(S, R and X files)
  See Table 8 and Table 9 for formats
- Final, edited and combined observer logs relevant to the shipment
- Line report (Notes about the data for the line in the shipment)
- Raw daily files (unedited observer logs, Trimble receiver files, SBS timebreaks and ancillary files)

The field data tapes were recorded as SEG-D revision on LTO2 cartridges. Tapes were read back to verify the data integrity before shipment.

Table 10– Shipping Details

Client Office ("A" copy)		**Processing Centre ("B" copy)**	
Shipping Agent	Hand-carry, John Allen, Client Rep	Shipping Agent	Toll Priority
Company	Santos Ltd	Company	Santos Ltd
Contact	Nick Papanicolaou	Contact	Nick Papanicolaou
Phone	(08) 8116 7258	Phone	(08) 8116 7258
Address	Basement 191 Pultney St Adelaide 5000	Address	Basement 191 Pultney St Adelaide 5000

Table 11– Summary of deliverables

ON COMPLETION OF SURVEY			
What Data	*Comments*	*To Where*	*Medium*
Brute Stack	Screenshots of brute stacks	Client Rep	email
AT PROJECT END			
What Data	*Comments*	*To Where*	*Medium*
Original Seismic Data, unstacked, uncorrelated	SEG-D Receiver SEG-Auxiliaries	Client office	LTO2 tape cartridge
Support Data	SPS, obslogs& other usable data.		DVD

Table 12– Details on shipments

Shipment	Date	Medium	Comments
Tape Set A and support Data	11/08/2013	Tapes and CD	Given to John Allen
Tape Set B and support Data	11/08/2013	Tapes and CD	Given to John Allen

Appendix A - Field Equipment Specifications

Recording Equipment

Data Acquisition System:	SERCEL 428 - 24 Bit 3D Seismic
Similarity System:	Sercel 464
Tape Drives:	2 x LTO High Density
Comms:	1 x 10 metre 6 DB Boost High Gain Antenna

Source Equipment

Vibrators:	4 x AHV-IV Commander 2 groups of 2 Online. 0 x Standby
Peak force:	61,800lbs per Vibrator
Hold-Down Weight:	64,000 lbs per Vibrator
Vibrator Control Electronics:	DSD Sercel 464
Sweep Generator :	DSG Sercel 464

Electronics are capable of Trade Marked Varisweep.

Line Equipment

Seismic Cables:	1660 (4FDU's per cable) 6640 channels
Takeouts:	55m separation between takeout's
LAUL Units:	152
LAUX Units:	49
Transverse Cables:	129
Batterys:	350
Battery Chargers:	4 Sercel
Geophones:	Sensor SM4 10Hz geophones or equivalent
Geophone Strings:	6187 (12ph/group)
Geophone Tester:	1 x Sensor SMT200
Vehicle Radios:	1 VHF/ 1 UHF

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	USED FOR	REGISTRATION	TOWING
1	79 Series LandcruiserTrayback	PM Ute	536-RPU	
2	76 Series Landcruiser Wagon	Back Crew	459 LGW	
3	77 Series Landcruiser Wagon	Vibe	460- LGW	Client
4	78 Series Landcruiser Wagon	Front Crew	463-LGW	
5	79 Series LandcruiserTrayback	Cable	468 LGW	ElrossAccom #11
6	79 Series LandcruiserTrayback	Jugs	469 LGW	ElrossAccom #7
7	79 Series LandcruiserTrayback	Trouble Shooter	476 LGW	ElrossAccom #8
8	79 Series LandcruiserTrayback	De-pegger	466 LGW	
1	76 Series Landcruiser Wagon	PM Wagon	1DXL 386	Sat Trailer - CM9933
2	76 Series Landcruiser Wagon	Front Crew	461 LGW	ElrossAccom #10
3	76 Series Landcruiser Wagon	Back Crew	462 LGW	ElrossAccom #12
4	79 Series LandcruiserTrayback	Cable	465 LGW	Lunch Van - 761 QVX
5	79 Series LandcruiserTrayback	Line Boss	472 LGW	Elross Office #1
6	79 Series LandcruiserTrayback	Jugs	467 LGW	ElrossAccom #5
7	79 Series LandcruiserTrayback	Cable	474 LGW	ElrossAccom #3
8	79 Series LandcruiserTrayback	Jugs	475 LGW	Storage Trailer - 347 QJX
9	79 Series LandcruiserTrayback	Cable	470 LGW	ErossAccom #4
10	79 Series LandcruiserTrayback	Cable	471 LGW	ElrossAccom #6
11	79 Series LandcruiserTrayback	Mecho's	020 RNR	Wash Down Trailer - YIE 679
12	79 Series LandcruiserTrayback	Trouble Shooter	473 LGW	ElrossAccom #9
13	78 Series LandcruiserTroopcarrier	HSE Ambo	477 LGW	Elross HSE #2
14	100 Series Landcruiser Wagon	Vibe Crew	772 KCU	ElrossAccom #13
15	Isuzu	Recorder	1BSB 132	
16	Nissan	Cable Repair	1DDE 233	
17	Freightliner	Drinking Water	1DDE 225	Elross Diner - 1TGZ 789
18	Paystar	Vibe ServiceTruck	1DDE 234	
19	Paystar	Mechos Store	1DDE 227	Laundry
20	Paystar	Tank Carrier	1DDE 229	Storage/Ice 501 QJG
21	Paystar	Shower Water	1BUI776	Showers - 1TKM 922
22	Hino	Fridge truck	228 SBT	Toilets - 499 QJG
23	Hino	Crane Truck	1CMW 981	Elros Kitchen 1TGZ 790
24	Kenworth	Towing	675 RDS	Spead
25	Kenworth	Cab over	1AGB 178	Workshop + Workshop
26	Kenworth	Towing	KW 9880	Fuel
27	Kenworth	Towing	747 SAH	Cool Room /Generator
28	Kenworth		999-LWW	

Appendix C - Tape Listings

Tape 1

TAPE TRANSMITTAL

TO: Operations Geophysics Santos LTD
C/o Toll Priority Basement
191 Pultney street
Adelaide S.A 5000 Page 1
ATTN: Nick Papanicolaou

GASCHNITZ 3D 2013							
Tape #	**Line**	**First FFID**	**Last FFID**	**First VP**	**Last VP**	**Date Recorded**	**Comments**
1A	Gaschnitz 3-D	1547	7953	5216/1176	5152/1055	30-7-2013 - 5-8-2013	Production Files for Gaschnitz 3-D
2A	Gaschnitz 3-D	1546	8515	5208/1211	5112/1088	28-7-2013 - 5-8-2013	Test Files for Gaschnitz 3-D

Also Includes Obs Logs, SPS -X, SPS - R, SPS - S, Time Sheets, Tape Listing, Maps, Daily Tests

Sent by: .....Mardon Day…..... Date:..... 11th August 2013.....

Received by: .....John Allen..... Date…… 11th August 2013.....

Tape 2

TAPE TRANSMITTAL

TO: Operations Geophysics Santos LTD
C/o Toll Priority Basement
191 Pultney street
Adelaide S.A 5000 Page 1
ATTN: Nick Papanicolaou

GASCHNITZ 3D 2013							
Tape #	**Line**	**First FFID**	**Last FFID**	**First VP**	**Last VP**	**Date Recorded**	**Comments**
1B	Gaschnitz 3-D	1547	7953	5216/1176	5152/1055	30-7-2013 - 5-8-2013	Production Files for Gaschnitz 3-D
2B	Gaschnitz 3-D	1546	8515	5208/1211	5112/1088	28-7-2013 - 5-8-2013	Test Files for Gaschnitz 3-D

Also Includes Obs Logs, SPS -X, SPS - R, SPS - S, Time Sheets, Tape Listing, Maps, Daily Tests

Sent by: .....Joe Tucker…..... Date: 19th August 2013

Received by: .....Nick Papanicolaou..... Date: 19th August 2013

Appendix D - HSE Policy & OH&S Standards

Health Safety Environment 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 be 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.
- Respecting all forms of indigenous and non-indigenous heritage and maintaining cultural heritage values.
- 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.

Joe Dwyer
Chief Executive Officer

Dated: 18th March 2013

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.
- Subject to Client approval and compliance with the Company's Drug and Alcohol and Fitness for Work Policies, outside of working hours Terrex permits the consumption of mid-strength and light beer only within Terrex camps.
- 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.

Joe Dwyer
Chief Executive Officer
Dated: 13th May 2013

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
Chief Executive Officer
Dated: 14th December 2012

Appendix E - HSE End of Contract Report

HSE End of Contract Report

25/07/2013 - 12/08/2013

Gaschnitz 3D Land Seismic Survey

Client: **Santos**

Location: **Moomba**

PEL: **PPL 101, 80 & 17/ AAL 164**

Project Number: **BO2028**

Crew 402

Operations Manager –Shane Goosens
shane@terrexseismic.com – 08 9467 1016

Certified System Health & Safety AS 4801 SAI GLOBAL
Certified System Health & Safety OHSAS 18001 SAI GLOBAL
Certified System Environment ISO 14001 SAI GLOBAL

Contents

Tables

HSE

Project Overview

Name of Project:	Gaschnitz 3D Land Seismic Survey.
Permits:	PPL 101, 80&17 / AAL 164
Name of Client:	Santos
Location:	25km North of Moomba
Camp Site:	Gaschnitz Well access Rd Moomba
Crew Conducting Survey:	Terrex Seismic 402
Key Personnel:	Crew Manager: Joe Tucker
	HSE Advisor: Shannon Buck

When:

Start date by Line preparation and Survey Contractors	017/07/2013
Start date by Seismic Crew	25 /07/2013
Completion date of survey	12/08/2013
Duration of survey	18 days

The key activities include:

Mobilization;

Set up of new recorder and experimental shots

Inductions / training / inspections;

Establishing a survey base & marking of lines;

Land transport of personnel & equipment;

Seismic crew layout / pick up of seismic equipment;

Acquiring data (surface seismic acquisition using I/O Vibrators);

Rehabilitation as required;

Shutdown / De-mobilize site.

Type of Survey:	3D
Number of Kilometres:	122.88 km²
Number of Lines: Receiver (Rx):	30
Number of Lines: Source (Sx):	33
Channels Live:	6400
Working Channels:	6400 channels
Group Interval:	50 metres
SP interval:	50 metres
Energy Source:	Nova AHV- IV PLS 364
Total Terrex Personnel:	47
Terrex Contractors:	Terrex Spatial - Survey Terrex Contracting
Client Contractors:	Terrex Seismic
Medical Support Resources:	Moomba Base Medical Centre RFDS
Emergency Services:	**000 services**
Applicable Legislation	Workplace Health & Safety Act 2011

Project Summary

25-July-13 402 Mobilise from Brisbane to Charleville

26-July-13 Continue to Mobilise From Charleville 760km to Moomba Campsite.

27-July-13 Initial Tool Box Meeting - Official introductions.

Santos Induction and Santos Cultural Heritage induction

27-July-13 Vibrators tested Plant risk assessment reviewed following mass upgrade and base plate replacement.

05-August-13 Seismic Acquisition Completed**.**

10-August- 13 Demobilisation.

Statistical Summary

Table 1: Monthly Safety Statistics

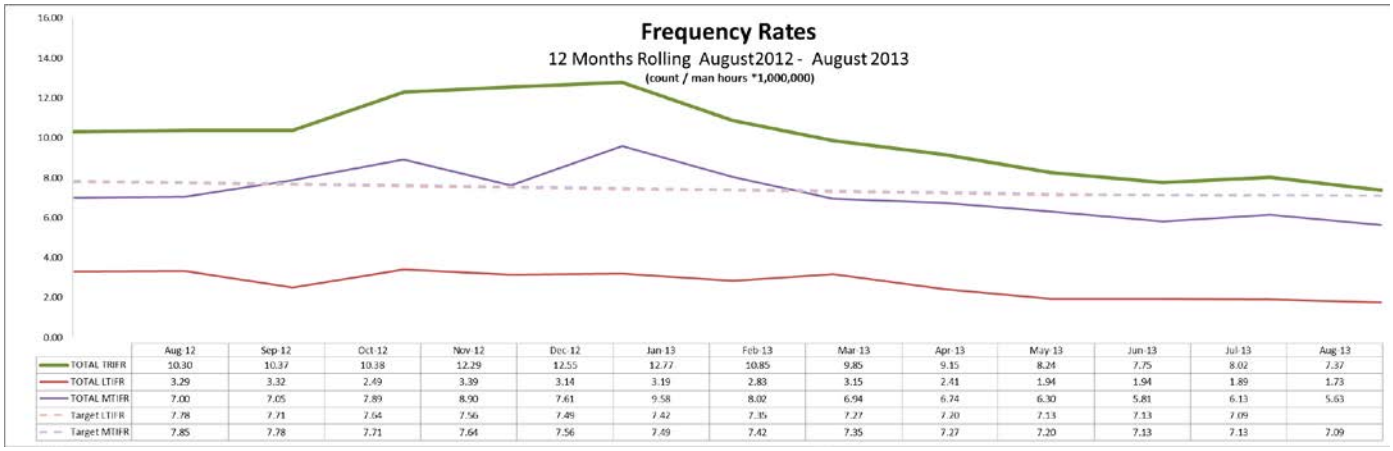
Crew 402 Monthly Safety Stats	Jul	Aug	YTD
Terrex Seismic Man-hours	5160.00	6120.00	11280.00
Sub-Contractor Man-hours	2820.00	0.00	2820.00
Fatalities	0	0	0.00
LTI's	0	0	0.00
MTI's	0	0	0.00
Days since last MTI/LTI	229	241	470.00
Serious Potential Incidents (SPI)	0	0	0.00
First Aid Incidents	0	0	0.00
Environmental Incidents Land Spills (< 5 litres)	0	0	0.00
Cultural Heritage Incidents	0	0	0.00
Incident / Accident Reports	0	0	0.00
Near Miss Reports	0	0	0.00
Work Days Lost	0	0	0.00
Hazard Identification Reports	6	40	46.00
Training Hours	261.25	17	278.25
Tool Box / Safety Meeting Man-hours	47.70	138	185.60
Audits / Inspections	35	99	134.00
Drills	0	1	1.00
	Total Man Hrs		14100.00

TOTAL TRIFR	0.0	0.0	0.0
TOTAL LTIFR	0.0	0.0	0.0
TOTAL MTIFR	0.0	0.0	0.0
Hazard Identification Report	751.9	3262.4	3262.4

Lead Indicators	Jul	Aug	YTD
Hazard Identification Reports Received	6	40	46.00
Hazard Reports Closed - No. Closed out in ATR	4	38	42.00
Audits/Site Inspections inc HSE obs/ins.	35	99	134.00
Equipment Inspections	137	170	319.00
Training & Induction Hours	261	17	362.25
Tool Box / Safety Meeting Man-hours	48	138	195.50
Tool Box Meetings Conducted	7	11	19.00
HSE Meeting Conducted	1	1	2.00
Risk Assessments Conducted	0	0	0.00
JSA's &/or PTW Conducted	0	0	0.00
SOP's Reviewed	0	4	5.00
IVMS Kms Driven	21,880	10,830	32710.00
IVMS Breaches	0	0	0.00
Drills	0	1	1.00
BAC Conducted	323	509	864.00
BAC Passed	323	507	862.00
Drug Test Conducted	4	8	12.00
Drug Test Passed	4	8	12.00
New Hires Commenced this week	3	0	5.00
Employees terminated /left this week	0	0	0.00

Please check the Incident Classification Guideline in the IMS **TS-GUI-05 Definitions and Classification Guideline**

Table 2: Overall Terrex Safety Performance vs Terrex Targets



Key Performance Indicators

Table 3: KPI Chart

Key Performance Indicator	*Measure*	*Achieved (yes/no)*	*Performance Score*
All personnel to complete Santos Level 1, 2 & Heat Stress Inductions as well as Santos Approved 4WD training	***100% Compliance***	***Yes***	***100%***
Land Transportation Incidents per month	***<2***	***Yes***	***100% - 0 recorded***
Emergency Drills Conducted per project (specifically fire or medical)	***1+***	***Yes***	***Fire Evac/ Muster point***
ATR/Hazard Reports Closed out within 90 days	***90%***	***Yes***	***96% Closed out***
IVMS Exceptions per project	***<10***	***yes***	***100%***
Documented Crew Manager Inspections per month	***4***	***yes***	***100%***
Documented Department Head Inspections per month (Line Boss, Mechanic, Cable Repair)	***each department head once per month***	***yes***	***100%***
Site Audit of Subcontractor Activity	***each contractor 3 monthly***	***Yes***	
Consistency in Hazard Reporting volume & Quality throughout all departments based the ratio of number of people in each department	***At least 1 per person per month (all departments)***	***Yes***	***36 HIR cards recieved***

Land Transportation

IVMS Risk Management Report

Risk Management Report

Company Name	Terrex
Created on	Oct 28, 2013
From	Jul 25, 2013
To	Aug 12, 2013
Distance Unit	km
Speed Unit	km/h

									Possible Tamper							
			errex Exceeding 115 Kp		No Seatbelt		Harsh Braking		Device was unplugged		Open Circuit on Antenn		Short Circuit on Antenn		Comments	Action Taken
Item	**Group**	**Total Distan**	**Duration**	**Count**	**Duration**	**Count**	**Duration**	**Count**	**Duration**	**Count**	**Duration**	**Count**	**Duration**	**Count**		
(020RNR) Toyota Trayback	Crew 402, Securatrak Reporting	2897.52	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
Freightliner Water Truck (1DDE225)	Crew 402, Securatrak Reporting	584.45	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
Hino Crane (1CMW981)	Crew 402, Securatrak Reporting	1149.97	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
459LGW - Back Crew	Crew 402, Securatrak Reporting	405.51	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
460LGW - Back Crew	Crew 402, Securatrak Reporting	978.34	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
462LGW - Front Crew	Crew 402, Securatrak Reporting	2787.67	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
466LGW - Line Boss	Crew 402, Securatrak Reporting	356.99	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
467LGW - Jug Truck	Crew 402, Securatrak Reporting	1971.59	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
468LGW - Cable Truck	Crew 402, Securatrak Reporting	1526.17	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
469LGW - Jug Truck	Crew 402, Securatrak Reporting	1215.45	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
470LGW - Cable Truck	Crew 402, Securatrak Reporting	2946.19	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
471LGW - Cable Truck	Crew 402, Securatrak Reporting	1287.66	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
473LGW - Troubleshooter	Crew 402, Securatrak Reporting	1665.15	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
474LGW - front crew Wagon	Crew 402, Securatrak Reporting	2679.92	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
475LGW - Jug Truck	Crew 402, Securatrak Reporting	3548.53	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
477LGW - HSE Ambo	Crew 402, Securatrak Reporting	2576.16	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
476LGW - Troubleshooter	Crew 402, Securatrak Reporting	2263.01	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
465LGW - Cable Truck	Crew 402	2542.24	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
461LGW - Front Crew	Crew 402	2933.60	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0	0:00:00	0		
		36316.14	**0:00:00**	**0.00**	**0:00:00**	**0.00**	**0:00:00**	**0.00**	**0:00:00**	**0.00**	**0:00:00**	**0.00**	**0:00:00**	**0.00**	**0.00**	**0.00**

Risks Assessments

See Site Specific Risk Register.

Emergency Response Procedures

Drills

Fire Evac Drill Gaschnitz 130810.pdf

Inductions & Training

Inductions / Training Statistics

Training Summary

	Personnel Participating	Training Time (Hrs)	Total Time (Hrs)
Terrex Corporate Inductions:	3	29	87
Terrex Site Inductions:	56	1	56
Terrex Site Re-inductions:	56	0.25	14
Terrex Visitor Induction:	1	0.25	0.25
Fire Tender Induction:	0	0	0
Santos Level 1 Inductions:	3	2	6
Santos Level 2 Inductions:	6	2	12
Heat Stress Inductions:	3	0.5	1.5
SOP Revisions:	0	0	0
Safety Sunday:	133	0.3	39.9
Map Reading:	0	0	0
Crew Competency:	0	0	0
Total Training Hours:			**216.65**

Site Inductions

All personnel actively involved with the Santos Gaschnitz_3D Project undertook the site induction; Visitors to site were given a brief Camp & Project Overview.

Training / Inductions

Client induction Gaschnitz.pdf

cultural heritage induction Gaschnitz.p

Induction Sign and information sheets.xl

Meetings

Daily Meeting – Toolboxes / July

Toolbox minutes 130725.pdf

Toolbox minutes 130726.pdf

Toolbox minutes 130727.pdf

Toolbox minutes 130729.pdf

Toolbox minutes 130730.pdf

Toolbox minutes 130731.pdf

Toolbox minutes 130801.pdf

Toolbox minutes 130802.pdf

Toolbox minutes 130803.pdf

Toolbox minutes 130805.pdf

Toolbox minutes 130806.pdf

Toolbox minutes 130807.pdf

Toolbox minutes 130809.pdf

Toolbox minutes 130810.pdf

Weekly Meeting – Safety Toolboxes

Toolbox minutes 130728.pdf

Toolbox minutes 130804.pdf

Toolbox minutes 130811.pdf

HOD_130805.pdf

HOD_130729.pdf

Jul-13		1 Mon	2 Tue	3 Wed	4 Thu	5 Fri	6 Sat	7 Sun	8 Mon	9 Tue	10 Wed	11 Thu	12 Fri	13 Sat	14 Sun	15 Mon	16 Tue	17 Wed	18 Thu	19 Fri	20 Sat	21 Sun	22 Mon	23 Tue	24 Wed	25 Thu	26 Fri	27 Sat	28 Sun	29 Mon	30 Tue	31 Wed	Total Hours	# of Meetings
Tool box meetings	# Attendees																									32	32	52		52	52	52		
	Duration (min.)	18	18	18	18	18	18		18	18	18	18	18	18		18	18	18	18	18	18		18	18	18	18	18	18		18	18	18		
	Daily Total (hrs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.6	9.6	15.6	0.0	15.6	15.6	15.6	81.60	6
Safety meetings (Combined Crews)	# Attendees																												52					
	Duration(min.)							18							18							18							18					
	Daily Total (hrs)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.6	0.0	0.0	0.0	15.60	1
																															Combined totals		97.20	7

Aug-13		1 Thu	2 Fri	3 Sat	4 Sun	5 Mon	6 Tue	7 Wed	8 Thu	9 Fri	10 Sat	11 Sun	12 Mon	13 Tue	14 Wed	15 Thu	16 Fri	17 Sat	18 Sun	19 Mon	20 Tue	21 Wed	22 Thu	23 Fri	24 Sat	25 Sun	26 Mon	27 Tue	28 Wed	29 Thu	30 Fri	31 Sat	Total Hours	# of Meetings
Tool box meetings	# Attendees	48	48	47		47	47	46	46	49	34		36	36	36																		
	Duration (min.)	18	18	18		18	18	18	18	18	18		18	18	18	18	18	18		18	18	18	18	18	18		18	18	18	18	18	18		
	Daily Total (hrs)	14.4	14.4	14.1	0.0	14.1	14.1	13.8	13.8	14.7	10.2	0.0	10.8	10.8	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	156.00	12
Safety meetings (Combined Crews)	# Attendees				47							34																						
	Duration(min.)				18							18							18							18								
	Daily Total (hrs)	0.0	0.0	0.0	14.1	0.0	0.0	0.0	0.0	0.0	0.0	10.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.30	2
																															Combined totals		180.30	14

Audits and inspections

Inspections:

Fire Ext & Smoke Alarms Insp 2013072

Fire Ext & Smoke Alarm Insp 1308011.p

HSE Observations

HSE Observation-130728.

HSE OBS CABLE Repair 130803.pdf

HSE OBS Line Boss 130804.pdf

HSE OBS MECHANIC 130803.pdf

HSE OBS Audit of Drilling contractor 13(

Events Reporting

Incident reporting

Nil Incidents

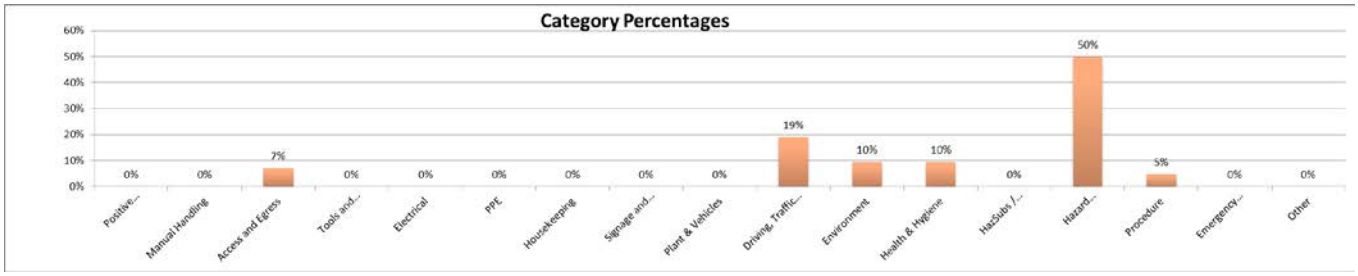
Date:	Incident No.	Title:	Status:

Environmental

To Be supplied by Client Representative – Santos Campsite Rehabilitation Report and Photos of abandonment.

Hazard reporting

36 Hazard Cards were submitted during the Project with a 100% closure.



Action Tracking Register

Crew: 402

Action / Hazard Tracking Register 2013

ATR No.	Project Number	Date of Report	Initiators Name	Haz ID / Obs / Insp	Category	Report Content - Incident / Accident / Hazard / Near Miss	Rating	Action Plan / Comment	Responsible Party	Target Date	Close-out Date	Status	Notes
363	B02028	28/07/2013	Line crew	Hazard Card	Hazard Identification	very large and deep crab holes that you can fall down or trip in	Minor	take extra care when walking and kicking in phones.	All crew	30/07/2013	29/07/2013	Closed	discussed at tool box 29/07/2013
364	B02028	28/07/2013	Luke Scaading	Hazard Card	Hazard Identification	rough track with big holes	Minor	drive to the conditions	All crew	30/07/2013	29/07/2013	Closed	discussed at tool box 29/07/2013
365	B02028	30/07/2013	Dru Arnold	Hazard Card	Hazard Identification	50mtr stations require more thinking leading to stress	Minor	ask for help if stuck , take time to get it right	cable truckers	31/07/2013	31/07/2013	Closed	discussed at tool box 31/07/2013
366	B02028	30/07/2013	Dru Arnold	Hazard Card	Hazard Identification	Static affected radio comms	Minor	wipe aerial, see cable repair to fix, make sure you get positive comms before you proceed	All crew	31/07/2013	31/07/2013	Closed	discussed at tool box 30/07/2013
367	B02028	30/07/2013	Dru Arnold	Hazard Card	Hazard Identification	Static affected radio comms	Minor	sure you get positive comms before you proceed	All crew	31/07/2013	31/07/2013	Closed	discussed at tool box 30/07/2013
368	B02028	4/08/2013	Joshua Moore	Hazard Card	Health & Hygiene	Depression and anxiety	Minor	hitches straight away so try and help them through with the positive 402	All crew	4/08/2013	5/08/2013	Closed	discussed at tool box 5/08/2013
369	B02028	4/08/2013	Joshua Moore	Hazard Card	Environment	Gym Equipment	Minor	put weights away and respect the gear	All crew	6/08/2013	5/08/2013	Closed	discussed at tool box 5/08/2013
370	B02028	4/08/2013	Jason Leahy	Hazard Card	Access and Egress	getting in and out of spread trucks when wet	Minor	3 points of contact	All crew	5/08/2013	5/08/2013	Closed	discussed at tool box 5/08/2013
371	B02028	4/08/2013	Sophie Carter	Hazard Card	Driving, Traffic and Rail	Road trains turning at the intersection of the camp road	Minor	pull over and wait till they have completed their manouver	All crew	4/08/2013	5/08/2013	Closed	discussed at tool box 5/08/2013
372	B02028	5/08/2013	Danial Harvey	Hazard Card	Environment	Foxes and other wild animalls coming into camp	Minor	no rubbish left out and be extra tidy around camp	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
373	B02028	5/08/2013	Chris Welch	Hazard Card	Driving, Traffic and Rail	always check tyre pressuress	Minor	are at 40psi and need to be lowered to 25 to resume line work.	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
374	B02028	5/08/2013	Matt Wood	Hazard Card	Health & Hygiene	playing sport after work	Minor	warm up and strecth before physical activity	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
375	B02028	5/08/2013	Teika Keleher	Hazard Card	Access and Egress	Water truck parked ner the female toilet stairs, possibilty of tripping and	Minor	move the truck a safe distance away	supply	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
376	B02028	5/08/2013	Michael Rhind	Hazard Card	Driving, Traffic and Rail	Main road to Moomba very rutted and lots of corrigations	Minor	drive to the conditions and scan ahead for impending dangers	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
377	B02028	5/08/2013	Michael Rhind	Hazard Card	Environment	weak grond in crab hole sections,possible to fall through	Minor	boots done up properly and take care , pick root and scan ahead	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
378	B02028	5/08/2013	Kieran Schiffer	Hazard Card	Driving, Traffic and Rail	when running on roads , third partyy traffic	Minor	stay off the roads don't play loud music and always concentrate, wear Hi Vis	fit people	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
379	B02028	5/08/2013	Kieran Schiffer	Hazard Card	Health & Hygiene	water bottles not being clean	Minor	regularly clean your water bottles with warm soapy water(detergent)	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
380	B02028	5/08/2013	Dylan Hobson	Hazard Card	Driving, Traffic and Rail	speed in vehicles	Minor	never feel the pressure to travel faster just because som	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
381	B02028	5/08/2013	Kieran Schiffer	Hazard Card	Access and Egress	opening van doors on crew	Minor	be aware that somebody may be on the other side of the door, open slowly and	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
382	B02028	5/08/2013	Dylan Hobson	Hazard Card	Procedure	Hats brim getting pushed up while working on the back of trucks.	Minor	always apply and re-apply sunscreen all day	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
383	B02028	5/08/2013	crew	Hazard Card	Driving, Traffic and Rail	speeding in camp	Minor	first gear idle around camp applies to everyone	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
384	B02028	5/08/2013	Jacob Arnall	Hazard Card	Hazard Identification	loose objects on the dash board	Minor	remove them as they can become missiles in the event of an accident	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
385	B02028	5/08/2013	Jacob Arnall	Hazard Card	Hazard Identification	Pot holes and trenches	Minor	stop and fix up and or flag off the area	All crew	8/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013

Crew: 402

Action / Hazard Tracking Register 2013

ATR No.	Project Number	Date of Report	Initiators Name	Haz ID / Obs / Insp	Category	Report Content - Incident / Accident / Hazard / Near Miss	Rating	Action Plan / Comment	Responsible Party	Target Date	Close-out Date	Status	Notes
386	B02028	5/08/2013	Jacob Arnall	Hazard Card	Hazard Identification	Fatigue	Minor	Eat good food not too sugary or fatty plenty of sleep not too much beer	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
387	B02028	5/08/2013	Jacob Arnall	Hazard Card	Driving, Traffic and Rail	camp move driving	Minor	stay out of dust a minimum of 200 meteres spacings, you may need more	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
388	B02028	5/08/2013	Max Broome	Hazard Card	Driving, Traffic and Rail	tyre pressure being too hard	Minor	lower tyre pressure to correct level for line work	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
389	B02028	5/08/2013	Max Broome	Hazard Card	Procedure	When performing a new task	Minor	step back and take 5	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
390	B02028	5/08/2013	Max Broome	Hazard Card	Hazard Identification	hot hangers in field	Minor	with summer coming up be ready for hot hangers and make sure not to expose your skin	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
391	B02028	5/08/2013	Jacob Arnall	Hazard Card	Hazard Identification	Wearing hats and caps around camp can change vision and depth perception	Minor	to avoid hitting your head remove hats before entering door ways and put on just after exit, take extra care and be vidulant.	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
392	B02028	5/08/2013	Alex Kerr	Hazard Card	Hazard Identification	walking around cap in the morning half awake	Minor	wake up properly before performing tasks, wash your face in cold water	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
393	B02028	5/08/2013	Rob Homer	Hazard Card	Hazard Identification	putting jugs on hanger in rough conditions	Minor	wear gloves improve loading techniques, slower driving ans warnings from the driver	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
394	B02028	5/08/2013	Dani Williams	Hazard Card	Hazard Identification	broken spring on cars	Minor	drive slowly especially in rough conditions	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
395	B02028	5/08/2013	Steve Weare	Hazard Card	Hazard Identification	starting new tasks	Minor	step back take 5	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
396	B02028	5/08/2013	Matt Bartlett	Hazard Card	Hazard Identification	crab holes in the North East corner of the prospect	Minor	take care and slow down in this corner of the prospect	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
397	B02028	5/08/2013	Chris Dunn	Hazard Card	Hazard Identification	cold weather	Minor	warm up before performing manual lifting tasks	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
398	B02028	5/08/2013	Rob Anderson	Hazard Card	Hazard Identification	cold weather	Minor	warm up before performing manual lifting tasks	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
399	B02028	5/08/2013	Chris Hynes	Hazard Card	Hazard Identification	Back injury	Minor	use correct lifting techniques in all lifts	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
40	B02028	5/08/2013	Chris Hynes	Hazard Card	Hazard Identification	infection in cuts & abrassions	Minor	always wear gloves and seek help if cut to clean wound disinfect and cover	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
401	B02028	5/08/2013	Chris Hynes	Hazard Card	Hazard Identification	exposed bars on cable and jug buggy's	Minor	replace any padding that has worn away	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
402	B02028	5/08/2013	Mel Schweiger	Hazard Card	Hazard Identification	sleep deprivation Fatigue	Minor	ensure enough sleep every night 6 to 8 hours	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
403	B02028	5/08/2013	Sjaan Scaading	Hazard Card	Hazard Identification	dirty toilet seats	Minor	spray with glen 20 before you take a seat and prevent germs being spread	All crew	9/08/2013	6/08/2013	Closed	discussed at tool box 6/08/2013
404	B02028	08/08/20103	Josh Moore	Hazard Card	Environment	rubbish	Minor	pick up all rubbish and bring to camp	All crew	9/08/2013	9/08/2013	Closed	discussed at t ool box on 9/08/2013
405	B02028	8/08/20103	Dylan Hobson	Hazard Card	Health & Hygiene	going to toilet	Minor	No foot stool as per picture	All crew	10/08/203	10/08/203	Closed	discussed at t ool box on 10/08/2013

Health performance

Alcohol test

BAC Tests completed during the project

	July	*August*	*Total*
No. Tested	*323*	*509*	*832*
% Passed	*323*	*507*	*2*

Drug test

Preliminary Drug Tests over the project

	Total
No. Tested	*12*
% Passed	*100%*

Medical Statistics

Nil Clinic attendances were recorded over the duration of the Project

Field Operations

Pulling cable and phones off the spread truck at the start of the job

Washing cars and vans for the trip up North

Appendix F - Personnel Crew List and Numbers

CREW LIST

Admin Staff	
Crew Manager	Joe Tucker
HSE Advisor	Shannon Buck
Camp Staff	
Mechanic	Julien Goossens
Mechanic	Ben Madson
Cook	Paul Barry
Cook	Jamie Cuff
Supply	Robert Anderson
Campy	Sjaan Scadding
Campy	Melanie Schweiger
Technical	
Observer	Mardon Day
Cable Repair	Dan French
Quality Control	Louis Coleshill
Vibrator Crew	
Vibe Op	JP Mullaly
Vibe Op	Barry Jeffery
Vibe Op	Peter Cust
Vibe Op	Luke Samios
Vibe Op	Simon Miscevski
Vibe Op	Allen Fuller
Vibrator Technical	
Vibe Tech	Marco Paul
Vibe Tech	Stu Rauckman
Senior Line	
Line Boss	Adam Cameron
Troubleshooter	
Troubleshooter	Carlo Paul
Troubleshooter	John Gamble
Line Crew	
Line Crew	JocobArnall
Line Crew	Dru Arnold

Line Crew	
Line Crew	Matthew Bartlett
Line Crew	Max Broome
Line Crew	Sophie Carter
Line Crew	John Condon
Line Crew	Christopher Dunn
Line Crew	Talaatama Faapito
Line Crew	Ben Greaney
Line Crew	Daniel Harvey
Line Crew	Dylan Hobson
Line Crew	Rob Homer
Line Crew	Chris Hynes
Line Crew	Leigh Johnson
Line Crew	TeikaKeleher
Line Crew	Alex Kerr
Line Crew	Jason Leahy
Line Crew	Joshua Moore
Line Crew	Michael Rhind
Line Crew	Luke Scadding
Line Crew	Kieran Schrieffer
Line Crew	PoemarkToese
Line Crew	Danielle Walker
Line Crew	Steven Weare
Line Crew	Chris Welch
Line Crew	Matthew Wood

CREW NUMBERS

POSITION	NUMBERS
Crew Manager	1
HSE Advisor	1
Mechanic	1-2
Cook	2
Supply	1
Campy	2
Observer	1
Quality Control	1
Cable Repair	1
VibeCrew	6
Vibe Tech	1-2
Line Boss	1
Trouble Shooter	2
Line Crew	30

Appendix G - Recording Statistics

Charge Summary

	WT										ST		NCT								TOTALS													
	Initial Layout	Recording	Experimental	Spread Damage	Detours	Traverse Move	Vibe Travel	Crew Demobe	Other	Total Work Time	Toolbox	Total Standby Time	Experimental	Sweep Tests	QC Daily Tests	Spread Damage	Travel	Vibes Down	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	Stn's	Stn's TD
25-07								10.00		10.00											10.00	10.00									10.00	10.00		
26-07								10.00		10.00											10.00	20.00									10.00	20.00		
27-07	9.20									9.20	1.80	1.80					0.50			0.50	11.50	31.50									11.00	31.00		
28-07	8.90									8.90	0.30	0.30	1.00	0.50			0.60			2.10	11.30	42.80									9.20	40.20		
29-07	7.90		2.40							10.30	0.30	0.30					0.60			0.60	11.20	54.00									10.60	50.80		
30-07		1.90	1.00	0.30			1.50		5.80	10.50	0.30	0.30					0.60			0.60	11.40	65.40	209	209			10.4500	10.4500	4.0279	4.0279	10.80	61.60		
31-07		9.40		0.70		0.10				10.20	0.30	0.30				0.40	0.60			1.00	11.50	76.90	1101	1310			55.0500	65.5000	21.2188	25.2467	10.50	72.10		
01-08		9.80		0.80		0.10				10.70	0.30	0.30					0.50			0.50	11.50	88.40	1201	2511			60.1000	125.6000	23.1653	48.4119	11.00	83.10		
02-08		8.80		0.50	0.30	0.20				9.80	0.30	0.30					0.60	0.80		1.40	11.50	99.90	1097	3608			54.8000	180.4000	21.1224	69.5344	10.10	93.20		
03-08		9.00		1.20						10.20	0.30	0.30					0.60		0.40	1.00	11.50	111.40	1107	4715			55.3500	235.7500	21.3344	90.8688	10.50	103.70		
04-08		9.00		1.40		0.10				10.50	0.30	0.30			0.10		0.60			0.70	11.50	122.90	1069	5784			53.4500	289.2000	20.6021	111.4708	10.80	114.50		
05-08		4.80	5.80	0.40						11.00	0.30	0.30					0.80	0.20		1.00	12.30	135.20	592	6376			29.6000	318.8000	11.4092	122.8800	11.30	125.80		
06-08	11.50									11.50	0.30	0.30									11.80	147.00		6376				318.8000		122.8800	11.80	137.60		
07-08	11.50									11.50	0.30	0.30									11.80	158.80		6376				318.8000		122.8800	11.80	149.40		
08-08	11.50									11.50	0.30	0.30									11.80	170.60		6376				318.8000		122.8800	11.80	161.20		
09-08											0.30	0.30							8.00	8.00	8.30	178.90		6376				318.8000		122.8800	0.30	161.50		
10-08											0.30	0.30							8.00	8.00	8.30	187.20		6376				318.8000		122.8800	0.30	161.80		
11-08											0.30	0.30							8.00	8.00	8.30	195.50		6376				318.8000		122.8800	0.30	162.10		
12-08											0.30	0.30							10.00	10.00	10.30	205.80		6376				318.8000		122.8800	0.30	162.40		
Grand Total	**60.50**	**52.70**	**9.20**	**5.30**	**0.30**	**0.50**	**1.50**	**20.00**	**5.80**	**155.80**	**6.60**	**6.60**	**1.00**	**0.50**	**0.10**	**0.40**	**6.00**	**1.00**	**34.40**	**43.40**	**205.80**	**2102.20**	**6376**	**69145**			**318.8000**		**122.8800**		**162.40**	**1902.00**		

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	#DIV/0!
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	25/07/2013	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:	318.8000
L.Km.Remain:	318.8000
% Completed:	0%
Av Daily Prod L.Km:	0.0
Cum.Sq.Km	0.0000
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	122.8800
% Completed:	0%
Av Daily Prod Sq.Km:	0.0

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						-	-
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	10.00					10.00	10.00
Spread Security						-	-
Other						-	-
TOTAL	10.00	-	-	-	-	10.00	10.00
CUM TOTAL	10.00	-	-	-	-	10.00	10.00

Client :	1	*Visitor's :*	1
Field Crew :	39		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	51	*Heavy Vehicles :*	

COMMENTS:

* Crew mobilised out of Brisbane at 7am, arriving in Charleville at 5pm

Personnel:
Vehicle:

Spread Movement:

Client: Gaschnitz 3D — Date: Thursday, 25 July 2013

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

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Jugs:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***De-pegger:***	***Comments:***
Personnel:	Personnel:	
	Personnel:	
Vehicles 0	0	

Camp Location/Co-ords :

Weather : Fine/Cool

Crew Manager

Client Rep

Appendix H - Survey Daily Reports

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	#DIV/0!
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	26/07/2013	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:	318.8000
L.Km.Remain:	318.8000
% Completed:	0%
Av Daily Prod L.Km:	0.0
Cum.Sq.Km	0.0000
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	122.8800
% 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						-	-
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	10.00					10.00	10.00
Spread Security						-	-
Other						-	-
TOTAL	10.00	-	-	-	-	10.00	10.00
CUM TOTAL	20.00	-	-	-	-	20.00	20.00

Client :	1	*Visitor's :*	1
Field Crew :	39		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	51	*Heavy Vehicles :*	

Spread Movement:

Client:	Gaschnitz 3D			Date:	Friday, 26 July 2013		
Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
		Total Stations:	0			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

COMMENTS:

* Crew continued mobilisation, leaving Charleville at 7am QLD time, arriving Gaschnitz 4:30pm SA time

Personnel:

Vehicle:

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
Vehicles 0	Personnel: 0	

Camp Location/Co-ords :

Weather : Fine/Cool

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	#DIV/0!
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	27/07/2013	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:	318.8000
L.Km.Remain:	318.8000
% Completed:	0%
Av Daily Prod L.Km:	0.0

Cum.Sq.Km	0.0000
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	122.8800
% 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		1.80				1.80	1.80
Recorder Setup						-	-
Initial Layout/Pick up	9.20					9.20	9.20
Recording						-	-
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel				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	9.20	1.80	-	0.50	-	11.50	11.00
CUM TOTAL	29.20	1.80	-	0.50	-	31.50	31.00

Client :	1	*Visitor's :*	1
Field Crew :	39		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	51	*Heavy Vehicles :*	

COMMENTS:

* Cultural Heritag & site inductions held
* Initial spread layout commenced
* Hardwires performed on vibrators

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 7° - 29°

Spread Movement:

Client: Gaschnitz 3D Date: Saturday, 27 July 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1232	5215	5056	160				
1224	5215	5056	160				
1216	5215	5056	160				
1208	5215	5000	216				
1200	5120	5000	121				
		Total Stations:	817			Total Stations:	0
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
Vehicles 0	Personnel: 0	

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	#DIV/0!
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	28/07/2013	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:	318.8000
L.Km.Remain:	318.8000
% Completed:	0%
Av Daily Prod L.Km:	0.0

Cum.Sq.Km	0.0000
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	122.8800
% Completed:	0%
Av Daily Prod Sq.Km:	0.0

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	8.90					8.90	8.90
Recording						-	-
Experimental				1.00		1.00	-
H/Wires & SIMS: Sweep Tests				0.50		0.50	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel				0.60		0.60	-
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	**8.90**	**0.30**	**-**	**2.10**	**-**	**11.30**	**9.20**
CUM TOTAL	**38.10**	**2.10**	**-**	**2.60**	**-**	**42.80**	**40.20**

Client :	1	***Visitor's :***	1
Field Crew :	39		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	51	***Heavy Vehicles :***	

COMMENTS:

* Toolbox 6:30
* Initial spread layout continued
* Hardwires performed on vibrators
* Experimental = Sweep testing vibrators

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 10° - 31°

Spread Movement:

Client: Gaschnitz 3D Date: Sunday, 28 July 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1200	5215	5121	95				
1192	5215	5000	216				
1184							
1176	5215	5000	216				
1168	5215	5000	216				
1160	5215	5000	216				
1152	5215	5000	216				
		Total Stations:	1175			Total Stations:	0
		Bad Cables	4			Bad Phones	6
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Jugs:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***De-pegger:***	***Comments:***
Personnel:	Personnel:	
Vehicles 0	**Personnel:** 0	

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	#DIV/0!
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	29/07/2013	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:	318.8000
L.Km.Remain:	318.8000
% Completed:	0%
Av Daily Prod L.Km:	#DIV/0!

Cum.Sq.Km	0.0000
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	122.8800
% Completed:	0%
Av Daily Prod Sq.Km:	#DIV/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	7.90					7.90	7.90
Recording						-	-
Experimental	2.40					2.40	2.40
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage						-	-
Detours						-	-
Travel				0.60		0.60	-
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	10.30	0.30	-	0.60	-	11.20	10.60
CUM TOTAL	48.40	2.40	-	3.20	-	54.00	50.80

Client :	1	*Visitor's :*	2
Field Crew :	39		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	51	*Heavy Vehicles :*	

COMMENTS:

* Toolbox 6:30
* Initial spread layout completed
* Experimental continued
* Visitor = Sergey Vlasov

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 10° - 29°

Spread Movement:

Client: Gaschnitz 3D Date: Monday, 29 July 2013

Layout Line	Station #	Station #	Total	Pickup Line	Station #	Station #	Total
1144	5255	5000	256				
1136	5255	5000	256				
1128	5255	5000	256				
1120	5255	5000	256				
1112	5255	5000	256				
1104	5255	5048	208				
1096	5255	5048	208				
1088	5255	5048	208				
1184	5215	5000	216				
		Total Stations:	2120			Total Stations:	0
		Bad Cables	3			Bad Phones	5
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
Vehicles 0	Personnel: 0	

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	28/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	30/07/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5056-5216			1,231.0	1,224.0	1	1.6000	0.6167		32	
5056-5216			1,223.0	1,216.0	2	1.6000	0.6167		32	
5056-5116			1,215.0	1,208.0	3	1.6000	0.6167		32	
5000-5216			1,207.0	1,200.0	4	1.6000	0.6167		32	
5000-5216			1,199.0	1,192.0	5	1.6000	0.6167		32	
5000-5216			1,191.0	1,184.0	6	1.5500	0.5974		31	
5000-5216			1,183.0	1,182.0	7	0.9000	0.3469		18	
Daily Total						**10.4500**	**4.0279**	**-**	**209**	**-**
Cum Total						**10.4500**	**4.0279**	**-**	**209**	**-**

Cum.L.Km	10.4500
Pgm.L.Km:	318.8000
L.Km.Remain:	308.3500
% Completed:	3%
Av Daily Prod L.Km:	10.5
Cum.Sq.Km	4.0279
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	118.8521
% Completed:	3%
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	1.90					1.90	1.90
Experimental	1.00					1.00	1.00
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.30					0.30	0.30
Detours						-	-
Travel				0.60		0.60	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down						-	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel	1.50					1.50	1.50
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other	5.80					5.80	5.80
TOTAL	**10.50**	**0.30**	**-**	**0.60**	**-**	**11.40**	**10.80**
CUM TOTAL	**58.90**	**2.70**	**-**	**3.80**	**-**	**65.40**	**61.60**

Client :	1	***Visitor's :***	2
Field Crew :	39		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	50	***Heavy Vehicles :***	

COMMENTS:

* Toolbox 6:30
* Other = Client standby waiting for client to pick production sweep
* Experimental = Client requests to be redone due to less wind
* Vibe Travel = Vibrators moving to R1208 east end to do Experimentals
* Visitor = Sergey Vlasov
* Crew change 1 outbound

Spread Movement:

Client: Gaschnitz 3D — Date: Tuesday, 30 July 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1080	5255	5048	208				
1072	5255	5048	208				
1064	5255	5048	208				
1056	5255	5048	208				
1048	5255	5048	208				
1040	5255	5048	208				
1032	5255	5048	208				
1024	5255	5048	208				
		Total Stations:	**1664**			**Total Stations:**	**0**
		Bad Cables	3			Bad Phones	2
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Jugs:***
Personnel:	Personnel:	Personnel:	Personnel:

Personnel:

Vehicle:

Trouble Shooters:	***De-pegger:***	***Comments:***
Personnel:	Personnel:	
Vehicles ***0***	**Personnel:** **0**	

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 4.9° - 23°

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	7/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	31/07/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5056-5216			1,231.0	1,224.0	1	6.4000	2.4669		128	
5056-5216			1,223.0	1,216.0	2	6.4000	2.4669		128	
5056-5116			1,215.0	1,208.0	3	6.4000	2.4669		128	
5000-5216			1,207.0	1,200.0	4	8.5000	3.2763		170	
5000-5216			1,199.0	1,192.0	5	9.0000	3.4690		180	
5000-5216			1,191.0	1,184.0	6	8.8500	3.4112		177	
5000-5216			1,183.0	1,182.0	7	9.5000	3.6617		190	
Daily Total						**55.0500**	**21.2188**	**-**	**1,101**	**-**
Cum Total						**65.5000**	**25.2467**	**-**	**1,310**	**-**

Cum.L.Km	65.5000
Pgm.L.Km:	318.8000
L.Km.Remain:	253.3000
% Completed:	21%
Av Daily Prod L.Km:	32.8
Cum.Sq.Km	25.2467
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	97.6333
% Completed:	21%
Av Daily Prod Sq.Km:	12.6

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	9.40					9.40	9.40
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.70			0.40		1.10	0.70
Detours						-	-
Travel				0.60		0.60	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
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	**10.20**	**0.30**	**-**	**1.00**	**-**	**11.50**	**10.50**
CUM TOTAL	**69.10**	**3.00**	**-**	**4.80**	**-**	**76.90**	**72.10**

Client :	1	***Visitor's :***	2
Field Crew :	37		
Camp Crew :	11	***Light Vehicles :***	
Total Crew :	48	***Heavy Vehicles :***	

COMMENTS:

* Toolbox 6:30
* Production is with 2 fleets of vibrators
* Spread damage = 7 line breaks in morning
* All of the channels are on the ground
* Crew change 2 outbound
* Visitor = Sergey Vlasov

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 6.6° - 26.2°

Spread Movement:

Client: Gaschnitz 3D Date: Wednesday, 31 July 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
1016	5255	5048	208				
1008	5255	5048	208				
1000	5255	5048	208				
		Total Stations:	**624**			**Total Stations:**	**0**
		Bad Cables	7			Bad Phones	7
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Jugs:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***De-pegger:***	***Comments:***
Personnel:	Personnel:	
Vehicles ***0***	**Personnel:** **0**	

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	5/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	1/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5056-5216			1,231.0	1,224.0	1	0.4000	0.1542		8	
5056-5216			1,223.0	1,216.0	2	0.4000	0.1542		8	
5056-5116			1,215.0	1,208.0	3	0.4000	0.1542		8	
5000-5216			1,207.0	1,200.0	4	1.1000	0.4240		22	
5000-5216			1,199.0	1,192.0	5	0.6000	0.2313		12	
5000-5216			1,191.0	1,184.0	6	0.8000	0.3084		16	
5000-5216			1,183.0	1,176.0	7	0.8000	0.3084		16	
5000-5216			1,175.0	1,168.0	8	7.2000	2.7752		144	
5000-5216			1,167.0	1,160.0	9	7.2000	2.7752		143	
5000-5216			1,159.0	1,152.0	10	7.2000	2.7752		144	
5000-5216			1,151.0	1,144.0	11	6.8000	2.6210		136	
5000-5256			1,143.0	1,136.0	12	6.8000	2.6210		136	
5000-5256			1,135.0	1,128.0	13	6.8000	2.6210		136	
5000-5256			1,127.0	1,120.0	14	6.8000	2.6210		136	
5000-5256			1,119.0	1,112.0	15	6.8000	2.6210		136	
Daily Total						**60.1000**	**23.1653**	-	**1,201**	-
Cum Total						**125.6000**	**48.4119**	-	**2,511**	-

Cum.L.Km	125.6000
Pgm.L.Km:	318.8000
L.Km.Remain:	193.2000
% Completed:	39%
Av Daily Prod L.Km:	41.9
Cum.Sq.Km	48.4119
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	74.4681
% Completed:	39%
Av Daily Prod Sq.Km:	16.1

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	9.80					9.80	9.80
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				0.50		0.50	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
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	**10.70**	**0.30**	**-**	**0.50**	**-**	**11.50**	**11.00**
CUM TOTAL	**79.80**	**3.30**	**-**	**5.30**	**-**	**88.40**	**83.10**

Client :	1	***Visitor's :***	1
Field Crew :	35		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	47	***Heavy Vehicles :***	

COMMENTS:

* Toolbox 6:30
* Production is with 2 fleets of vibrators
* Vibrators had an excellent day's production
* Spread damage was a cable dragged by 3rd party traffic and chewage
* Crew change 3 outbound 1 Inbound

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 8.1° - 29.5°

Spread Movement:

Client:	Gaschnitz 3D			Date:	Thursday, 1 August 2013		
Layout				**Pickup**			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
			Total Stations:	**0**			**Total Stations:**	**0**
			Bad Cables	3			Bad Phones	6
							LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Jugs:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***De-pegger:***	***Comments:***
Personnel:	Personnel:	
Vehicles ***0***	**Personnel:** **0**	

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	5/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	2/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5056-5216			1,175.0	1,168.0	8	4.0000	1.5418		80	
5056-5216			1,167.0	1,160.0	9	4.0000	1.5418		81	
5056-5116			1,159.0	1,152.0	10	4.0000	1.5418		80	
5000-5216			1,151.0	1,144.0	11	4.4000	1.6960		88	
5000-5256			1,143.0	1,136.0	12	6.4000	2.4669		128	
5000-5256			1,135.0	1,128.0	13	6.4000	2.4669		128	
5000-5256			1,127.0	1,120.0	14	6.4000	2.4669		128	
5000-5256			1,119.0	1,112.0	15	6.4000	2.4669		128	
5048-5256			1,111.0	1,104.0	16	2.4000	0.9251		48	
5048-5256			1,103.0	1,096.0	17	2.0000	0.7709		40	
5048-5256			1,095.0	1,088.0	18	2.0000	0.7709		40	
5048-5256			1,087.0	1,080.0	19	1.6000	0.6167		32	
5048-5256			1,079.0	1,072.0	20	1.6000	0.6167		32	
5048-5256			1,071.0	1,064.0	21	1.6000	0.6167		32	
5048-5256			1,063.0	1,056.0	22	1.6000	0.6167		32	
Daily Total						**54.8000**	**21.1224**	-	**1,097**	-
Cum Total						**180.4000**	**69.5344**	-	**3,608**	-

Cum.L.Km	180.4000
Pgm.L.Km:	318.8000
L.Km.Remain:	138.4000
% Completed:	57%
Av Daily Prod L.Km:	45.1
Cum.Sq.Km	69.5344
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	53.3456
% Completed:	57%
Av Daily Prod Sq.Km:	17.4

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	8.80					8.80	8.80
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.50					0.50	0.50
Detours	0.30					0.30	0.30
Travel				0.60		0.60	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down				0.80		0.80	-
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	**9.80**	**0.30**	**-**	**1.40**	**-**	**11.50**	**10.10**
CUM TOTAL	**89.60**	**3.60**	**-**	**6.70**	**-**	**99.90**	**93.20**

Client :	1	***Visitor's :***	1
Field Crew :	35		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	47	***Heavy Vehicles :***	

COMMENTS:

* Toolbox 6:30
* Vibrator Downtime = Production was with 2 fleets of vibrators until 14:33 when fleet 1 had a vibrator problem. Fleet 1 continued production with 1 vibrator using 2 sweeps
  Fleet 1 Vibes shot 111 Vp's and this added 21 seconds extra/sweep
  With no spare vibrator there is a Penalty of 39 minutes 0.7
  And 0.1 of the total 0.8 was waiting for vibes to get ready
* Spread damage was by 3rd party traffic and overnight animal chewage

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 6° - 26.2°

Spread Movement:

Client: Gaschnitz 3D | Date: Friday, 2 August 2013

Layout Line	Station #	Station #	Total	Pickup Line	Station #	Station #	Total

Total Stations:	**0**	**Total Stations:**	**0**
Bad Cables	2	Bad Phones	3
		LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Jugs:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***De-pegger:***	***Comments:***
Personnel:	Personnel:	
Vehicles ***0***	**Personnel:** **0**	

Crew Manager | Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	4/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	3/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5048-5256			1,111.0	1,104.0	16	7.6000	2.9294		152	
5048-5256			1,103.0	1,096.0	17	8.0000	3.0836		160	
5048-5256			1,095.0	1,088.0	18	7.7500	2.9872		155	
5048-5256			1,087.0	1,080.0	19	8.0000	3.0836		160	
5048-5256			1,079.0	1,072.0	20	8.0000	3.0836		160	
5048-5256			1,071.0	1,064.0	21	8.0000	3.0836		160	
5048-5256			1,063.0	1,056.0	22	8.0000	3.0836		160	
Daily Total						**55.3500**	**21.3344**	**-**	**1,107**	**-**
Cum Total						**235.7500**	**90.8688**	**-**	**4,715**	**-**

Cum.L.Km	235.7500
Pgm.L.Km:	318.8000
L.Km.Remain:	83.0500
% Completed:	74%
Av Daily Prod L.Km:	47.2
Cum.Sq.Km	90.8688
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	32.0112
% Completed:	74%
Av Daily Prod Sq.Km:	18.2

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	9.00					9.00	9.00
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	1.20					1.20	1.20
Detours						-	-
Travel				0.60		0.60	-
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				0.40		0.40	-
TOTAL	**10.20**	**0.30**	**-**	**1.00**	**-**	**11.50**	**10.50**
CUM TOTAL	**99.80**	**3.90**	**-**	**7.70**	**-**	**111.40**	**103.70**

Client :	1	***Visitor's :***	1
Field Crew :	35		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	47	***Heavy Vehicles :***	

COMMENTS:

* Toolbox 6:30
* Production was 2 fleets of 2
* Spread damage was overnight animal chewage & 3rd party traffic including several large trucks
* Vibe 7 having problems, Fleet 1 back to 1 Vibe 2 sweeps for 40 VPs
* Other is Penalty of 0.3 and 0.1 battery crashing

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 5° - 19.2°

Spread Movement:

Client: Gaschnitz 3D Date: Saturday, 3 August 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
			Total Stations:	**0**			**Total Stations:**	**0**
			Bad Cables	3			Bad Phones	2
							LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Jugs:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***De-pegger:***	***Comments:***
Personnel:	Personnel:	
Vehicles ***0***	**Personnel:** **0**	

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	4/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	4/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5048-5256			1,111.0	1,104.0	16	0.8000	0.3084		16	
5048-5256			1,103.0	1,096.0	17	0.8000	0.3084		16	
5048-5256			1,095.0	1,088.0	18	1.0500	0.4047		21	
5048-5256			1,087.0	1,080.0	19	1.2000	0.4625		24	
5048-5256			1,079.0	1,072.0	20	1.2000	0.4625		24	
5048-5256			1,071.0	1,064.0	21	1.2000	0.4625		24	
5048-5256			1,063.0	1,056.0	22	1.2000	0.4625		24	
5048-5256			1,055.0	1,048.0	23	6.8000	2.6210		136	
5048-5256			1,047.0	1,040.0	24	6.8000	2.6210		136	
5048-5256			1,039.0	1,032.0	25	6.8000	2.6210		136	
5048-5256			1,031.0	1,024.0	26	6.4000	2.4669		128	
5048-5256			1,023.0	1,016.0	27	6.4000	2.4669		128	
5048-5256			1,015.0	1,008.0	28	6.4000	2.4669		128	
5048-5256			1,007.0	1,000.0	29	6.4000	2.4669		128	
Daily Total						53.4500	20.6021	-	1,069	-
Cum Total						289.2000	111.4708	-	5,784	-

Cum.L.Km	289.2000
Pgm.L.Km:	318.8000
L.Km.Remain:	29.6000
% Completed:	91%
Av Daily Prod L.Km:	48.2
Cum.Sq.Km	111.4708
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	11.4092
% Completed:	91%
Av Daily Prod Sq.Km:	18.6

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	9.00					9.00	9.00
Experimental						-	-
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing				0.10		0.10	-
Recorder Moveup						-	-
Spread Damage / Chewage	1.40					1.40	1.40
Detours						-	-
Travel				0.60		0.60	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
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	10.50	0.30	-	0.70	-	11.50	10.80
CUM TOTAL	110.30	4.20	-	8.40	-	122.90	114.50

Client :	1	*Visitor's :*	1
Field Crew :	35		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	47	*Heavy Vehicles :*	

COMMENTS:

* Toolbox 6:30
* Production was 2 fleets of 2
* Spread damage was overnight animal chewage & 3rd party traffic
* From File 7110-7221 using 2 sweeps per vp, Client request due to windy conditions
* From File 7222-using 1 sweep per vp

Personnel:
Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S, 140° 11' 44.83" E

Weather : Fine/Cool 5° - 25.6°

Spread Movement:

Client: Gaschnitz 3D — Date: Sunday, 4 August 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	2			Bad Phones	2
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
	Personnel:	
Vehicles 0	0	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	5/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	5/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
5048-5256			1,055.0	1,048.0	23	4.0000	1.5418		80	
5048-5256			1,047.0	1,040.0	24	4.0000	1.5418		80	
5048-5256			1,039.0	1,032.0	25	4.0000	1.5418		80	
5048-5256			1,031.0	1,024.0	26	4.4000	1.6960		88	
5048-5256			1,023.0	1,016.0	27	4.4000	1.6960		88	
5048-5256			1,015.0	1,008.0	28	4.4000	1.6960		88	
5048-5256			1,007.0	1,000.0	29	4.4000	1.6960		88	
Daily Total						**29.6000**	**11.4092**	**-**	**592**	**-**
Cum Total						**318.8000**	**122.8800**	**-**	**6,376**	**-**

Cum.L.Km	318.8000
Pgm.L.Km:	318.8000
L.Km.Remain:	0.0000
% Completed:	100%
Av Daily Prod L.Km:	45.5
Cum.Sq.Km	122.8800
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	0.0000
% Completed:	100%
Av Daily Prod Sq.Km:	17.6

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	4.80					4.80	4.80
Experimental	5.80					5.80	5.80
H/Wires & SIMS: Sweep Tests						-	-
QC Spread						-	-
QC / Daily Tests/Testing						-	-
Recorder Moveup						-	-
Spread Damage / Chewage	0.40					0.40	0.40
Detours						-	-
Travel				0.80		0.80	-
Waiting On Spread						-	-
Line Move						-	-
Troubleshooting						-	-
Recorder Down						-	-
Vibes Down				0.20		0.20	-
Prospect/Camp Move						-	-
Traverse Move						-	-
Swath Move						-	-
Vibe Travel						-	-
Weather						-	-
Human Error						-	-
Washdown						-	-
Crew Demobe/Remobe						-	-
Spread Security						-	-
Other						-	-
TOTAL	**11.00**	**0.30**	**-**	**1.00**	**-**	**12.30**	**11.30**
CUM TOTAL	**121.30**	**4.50**	**-**	**9.40**	**-**	**135.20**	**125.80**

Client :	1	***Visitor's :***	1
Field Crew :	35		
Camp Crew :	12	***Light Vehicles :***	
Total Crew :	47	***Heavy Vehicles :***	

COMMENTS:

* Toolbox 6:30
* Production was completed on 3D
* The pick up of spread commenced
* Spread damage was overnight animal chewage
* Experimental testing commenced at 13:24 and was completed at 18:15
  The experimental time included 4.6hrs of recording time, a Swath move of 0.6 and a vibe move of 0.6 for the vibes to reach the trial area, with a total time of 5.8hrs
* Travel time of 0.8 includes the recorder returning to camp time of 0.5hrs
* Vibe down time was 1 vibe with electrical issue
* All of the vibes returned to camp at end of day

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 3.4° - 27.1°

Spread Movement:

Client: Gaschnitz 3D Date: Monday, 5 August 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1232	5216	5056	161
				1224	5216	5056	161
				1216	5216	5056	161
				1208	5216	5000	217
				1200	5216	5000	217
		Total Stations:	**0**			**Total Stations:**	**912**
		Bad Cables	2			Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	***Vib Crew:***	***Back Crew:***	***Jugs:***
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	***De-pegger:***	***Comments:***
Personnel:	Personnel:	
Vehicles ***0***	**Personnel:** **0**	

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	6/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	6/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						318.8000	122.8800	-	6,376	-

Cum.L.Km	318.8000
Pgm.L.Km:	318.8000
L.Km.Remain:	0.0000
% Completed:	100%
Av Daily Prod L.Km:	39.9
Cum.Sq.Km	122.8800
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	0.0000
% Completed:	100%
Av Daily Prod Sq.Km:	15.4

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	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	11.50	0.30	-	-	-	11.80	11.80
CUM TOTAL	132.80	4.80	-	9.40	-	147.00	137.60

Client :	1	*Visitor's :*	2
Field Crew :	34		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	46	*Heavy Vehicles :*	

COMMENTS:

* Toolbox 6:30
* The pick up of spread continued
* Total channels of spread to pick up at end of production was 5488 which equates to 40.65 hours with 912 picked up on the 5th August
* Crew change was one outbound
* One visitor arrived from other crew to pick up 125 cables

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 5.1° - 30.7°

Spread Movement:

Client: Gaschnitz 3D Date: Tuesday, 6 August 2013

Layout Line	Station #	Station #	Total	Pickup Line	Station #	Station #	Total
				1192	5215	5000	216
				1184	5215	5000	216
				1176	5215	5000	216
				1168	5215	5000	216
				1160	5215	5000	216
				1152	5215	5000	216
				1144	5255	5000	256
				1136	5255	5000	256
				1128	5210	5000	211
				1120	5184	5000	185
				1112	5100	5000	101
				1104	5128	5048	81
		Total Stations:	0			Total Stations:	2386
		Bad Cables	2			Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
Vehicles 0	Personnel: 0	

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	7/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	7/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						318.8000	122.8800	-	6,376	-

Cum.L.Km	318.8000
Pgm.L.Km:	318.8000
L.Km.Remain:	0.0000
% Completed:	100%
Av Daily Prod L.Km:	35.4
Cum.Sq.Km	122.8800
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	0.0000
% Completed:	100%
Av Daily Prod Sq.Km:	13.7

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	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	11.50	0.30	-	-	-	11.80	11.80
CUM TOTAL	144.30	5.10	-	9.40	-	158.80	149.40

Client :	1	*Visitor's :*	2
Field Crew :	35		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	47	*Heavy Vehicles :*	

COMMENTS:

* Toolbox 6:30
* The pick up of spread continued
* One visitor outbound
* One visitor arrived from Australian satellite Communications

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 9.0° - 29.5°

Spread Movement:

Client: Gaschnitz 3D Date: Wednesday, 7 August 2013

Layout Line	Station #	Station #	Total	Pickup Line	Station #	Station #	Total
				1128	5255	5211	45
				1120	5255	5185	71
				1112	5255	5101	155
				1104	5255	5129	127
				1096	5255	5048	208
				1088	5255	5048	208
				1080	5255	5048	208
				1072	5255	5048	208
				1064	5255	5048	208
				1056	5255	5048	208
				1048	5255	5184	72
				1040	5255	5200	56
				1032	5255	5158	98
		Total Stations:	0			Total Stations:	1872
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
Vehicles 0	Personnel: 0	

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	8/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	8/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						318.8000	122.8800	-	6,376	-

Cum.L.Km	318.8000
Pgm.L.Km:	318.8000
L.Km.Remain:	0.0000
% Completed:	100%
Av Daily Prod L.Km:	31.9
Cum.Sq.Km	122.8800
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	0.0000
% Completed:	100%
Av Daily Prod Sq.Km:	12.3

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	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	11.50	0.30	-	-	-	11.80	11.80
CUM TOTAL	155.80	5.40	-	9.40	-	170.60	161.20

Client :	1	*Visitor's :*	2
Field Crew :	37		
Camp Crew :	12	*Light Vehicles :*	
Total Crew :	49	*Heavy Vehicles :*	

COMMENTS:

* Toolbox 6:30
* The pick up of spread and de- pegging is continuing.
* Crew change one outbound & three inbound

Personnel:

Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 5.8° - 25.5°

Spread Movement:

Client: Gaschnitz 3D Date: Thursday, 8 August 2013

Layout				Pickup			
Line	Station #	Station #	Total	Line	Station #	Station #	Total
				1048	5183	5048	136
				1040	5199	5048	152
				1032	5158	5048	111
				1024	5255	5048	208
				1016	5255	5048	208
				1008	5255	5048	208
				1000	5255	5048	208
		Total Stations:	0			Total Stations:	1231
		Bad Cables				Bad Phones	
						LAUL	0

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
Vehicles 0	Personnel: 0	

Crew Manager Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	9/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	9/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						318.8000	122.8800	-	6,376	-

Cum.L.Km	318.8000
Pgm.L.Km:	318.8000
L.Km.Remain:	0.0000
% Completed:	100%
Av Daily Prod L.Km:	29.0
Cum.Sq.Km	122.8800
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	0.0000
% Completed:	100%
Av Daily Prod Sq.Km:	11.2

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				8.00		8.00	-
TOTAL	-	0.30	-	8.00	-	8.30	0.30
CUM TOTAL	155.80	5.70	-	17.40	-	178.90	161.50

Client :	1	*Visitor's :*	1
Field Crew :	24		
Camp Crew :	10	*Light Vehicles :*	
Total Crew :	34	*Heavy Vehicles :*	

Spread Movement:

Client: Gaschnitz 3D — Date: Friday, 9 August 2013

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

COMMENTS:

* Toolbox 6:30
* Other = de-pegging that was completed
* Crew change 15 outbound
* One visitor from Australian satellite Communications outbound

Traffic Control:

Front Crew: Personnel:
Vib Crew: Personnel:
Back Crew: Personnel:
Jugs: Personnel:

Personnel:
Vehicle:

Trouble Shooters: Personnel:
De-pegger: Personnel:
Comments:
Personnel:
Vehicles 0 — 0

Camp Location/Co-ords : 27° 49' 12.97" S, 140° 11' 44.83" E

Weather : Fine/Cool 7.6° - 20.5°

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	10/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	10/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						318.8000	122.8800	-	6,376	-

Cum.L.Km	318.8000
Pgm.L.Km:	318.8000
L.Km.Remain:	0.0000
% Completed:	100%
Av Daily Prod L.Km:	26.6
Cum.Sq.Km	122.8800
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	0.0000
% Completed:	100%
Av Daily Prod Sq.Km:	10.2

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						-	-
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				8.00		8.00	-
TOTAL	-	0.30	-	8.00	-	8.30	0.30
CUM TOTAL	155.80	6.00	-	25.40	-	187.20	161.80

Client :	1	*Visitor's :*	1
Field Crew :	24		
Camp Crew :	10	*Light Vehicles :*	
Total Crew :	34	*Heavy Vehicles :*	

COMMENTS:

* Toolbox 6:30
* Other = Crew in camp loading spread trucks

Personnel:
Vehicle:

Camp Location/Co-ords : 27° 49' 12.97" S, 140° 11' 44.83" E

Weather : Fine/Cool 7.1° - 35.2°

Spread Movement:

Client: Gaschnitz 3D — Date: Saturday, 10 August 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:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
Vehicles 0	Personnel: 0	

Crew Manager — Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	11/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	11/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						318.8000	122.8800	-	6,376	-

Cum.L.Km	318.8000
Pgm.L.Km:	318.8000
L.Km.Remain:	0.0000
% Completed:	100%
Av Daily Prod L.Km:	24.5
Cum.Sq.Km	122.8800
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	0.0000
% Completed:	100%
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						-	-
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				8.00		8.00	-
TOTAL	-	0.30	-	8.00	-	8.30	0.30
CUM TOTAL	155.80	6.30	-	33.40	-	195.50	162.10

Client :	1	*Visitor's :*	1
Field Crew :	24		
Camp Crew :	10	*Light Vehicles :*	
Total Crew :	34	*Heavy Vehicles :*	

COMMENTS:

* Toolbox 6:30
* Other = Crew in camp getting ready for camp move.
* Spare spread sent to other crews
* Spare vans and vehicles parked in Moomba

Personnel:
Vehicle:

Spread Movement:

Client: Gaschnitz 3D | Date: Sunday, 11 August 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:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
Vehicles 0	Personnel: 0	

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 8.5° - 35.0°

Crew Manager

Client Rep

Terrex Seismic - Daily Report

Crew:	402	Area:	PPL101, 80, 17 & AAL 164	Client Rep:	John Allen	Acq Start Date	30/07/2013
Client:	Santos Ltd	State:	SA	Weather:	Fine/Cool	Est. Finish	12/08/2013
Survey Name:	Gaschnitz 3D	Crew Mgr:	Joe Tucker	Date:	12/08/2013	2D / 3D	3D

PRODUCTION

Line	File	File	Stn	Stn	Swath #	L / Kms.	Sq / Kms.	Skips	Vp's	Stn's
Daily Total						-	-	-	-	-
Cum Total						318.8000	122.8800	-	6,376	-

Cum.L.Km	318.8000
Pgm.L.Km:	318.8000
L.Km.Remain:	0.0000
% Completed:	100%
Av Daily Prod L.Km:	22.8
Cum.Sq.Km	122.8800
Pgm.Sq.Km:	122.8800
Sq.Km.Remaining:	0.0000
% Completed:	100%
Av Daily Prod Sq.Km:	8.8

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				10.00		10.00	-
TOTAL	-	0.30	-	10.00	-	10.30	0.30
CUM TOTAL	155.80	6.60	-	43.40	-	205.80	162.40

Client :	1	*Visitor's :*	1
Field Crew :	24		
Camp Crew :	10	*Light Vehicles :*	
Total Crew :	34	*Heavy Vehicles :*	

Spread Movement:

Client: Gaschnitz 3D — Date: Monday, 12 August 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

COMMENTS:

* Toolbox 6:30
* Other = Camp move from Gaschnitz

Traffic Control:

Front Crew:	*Vib Crew:*	*Back Crew:*	*Jugs:*
Personnel:	Personnel:	Personnel:	Personnel:

Personnel:
Vehicle:

Trouble Shooters:	*De-pegger:*	*Comments:*
Personnel:	Personnel:	
	Personnel:	
Vehicles 0	0	

Camp Location/Co-ords : 27° 49' 12.97" S
140° 11' 44.83" E

Weather : Fine/Cool 8.5° - 35.0°

Crew Manager — Client Rep

Appendix I - AHV-IV Commander (PLS 364) Specifications

Source Products

INOVA

AHV-IV™ COMMANDER (PLS 364)

FEATURES

- Accurate weighted-sum ground force estimate
- Stiffer baseplate designed for improved coupling
- Increased force output
- Broad bandwidth
- Lower distortion
- INOVA's Patented Pre-Loaded Stilt Structure prolongs the life of parts
- Simplified Operator Controls
- Improved Operator Visibility
- Certified Roll-Over Protection
- Simplified Hydraulics
- Fewer Hoses & Components
- Articulated, Oscillated Steering

TECHNICAL SPECIFICATIONS - PLS 364 ACTUATOR

Shaker Model:	P-Wave Vibrator; PLS 364
Peak Force:	275 kN (61,800 lb)
Piston Area:	132.9 sq cm (20.6 sq in)
Mass Weight:	4,998 kg (11,020 lb)
Driven Weight:	2,027 kg (4,469 lb)
Useable Stroke:	9.83 cm (3.87 in)
Frequency Limit:	5 Hz to 250 Hz
Mass Accumulators (2):	3.8L (1.0 gal.) Servo Manifold
Lift Stroke:	97 cm (38 in)
Balance Method:	Airbags
Isolation Method:	Airbags
Hydraulic System:	Closed-loop
Hydraulic System Pumps:	2 x 119 cc (7.25 in3); Denison P-7
Servo Valve:	Atlas 240H (with DR modification)
Pilot Valve:	MOOG

Filtration:	3-micron absolute servo filter; 3.5-micron absolute, high and low pressure, triple element
Accumulators:	2 x 19 L (5 gal); bladder-type
Heat Exchanger:	Steel core; multi-wing fan; hydraulically-driven
Reservoir:	170 L (45 gal)
Baseplate Type:	Reinforced rectangular
Baseplate Area:	2.5 m² (3,864 in²)
Baseplate Clearance:	46 cm (18 in) - Tires
Winch Capacity:	13,608 kg (30,000 lb)

AHV-IV™ COMMANDER (PLS 364)

TECHNICAL SPECIFICATIONS - CHASSIS

Engine:	Detroit Diesel – Series 60, 14 L (425 BHP @ 1,900 RPM) Optional Engine: 500 BHP @ 1900 RPM
Air Cleaner:	Dry-type, 3-stage with pre-cleaner
Cooling:	Water-cooled radiator to +50° C (+122° F) for hot climate and -50° C (-58° F) for cold climate
Air Compressor:	13 CFM
System Warning Device:	Engine shutdown system for low oil pressure, high engine water temperature, and low coolant level
Fuel Capacity:	757.08 L (200 gal)
Drive Pumps:	100 cc (6.1 in3) with electric displacement control
Drive Motors:	250 cc (15.25 in3) variable volume with electronic control for 6 forward and 2 reverse speeds
Frame:	Solid-steel frame for maximum strength and reliability; 35 articulated; hydraulic power steering; 16.5 oscillation center joint
Axles:	Inboard planetary axle with enclosed wet disc brakes and differential lock
Gearboxes:	Single speed
Cab:	Fabricated-steel construction; high visibility with adjustable driver and passenger seat; two, 3-point shoulder belts; air-conditioning; heater; defroster; wiper; dome light; and side-mounted mirrors
Electrical:	+ 24 V start; +12 V run with 110-amp alternator and two, heavy-duty, +12 V, 8D batteries; battery-disconnect switch
Tire Options:	Logger: 170 x 86 x 64 cm (67 x 34 x 25 in); 14 ply Super Terra Grip: 167 x 109 x 64 cm (66 x 43 x 25 in); 16 ply; tubeless Sand Tire: 167 x 112 x 64 cm (66 x 44 x 25 in); 16 ply Rock Lug: 23.5 x 25; tubeless

PHYSICAL SPECIFICATIONS

Buggy Length:	10.01 m (400 in)
Buggy Width:	3.4 m (134 in) for 66 x 44 in tires 2.44 m (96 in) for 23.5 x 25 tires 3.0 m (118 in) for tracks
Height (maximum):	3.50 m (138 in) for tires 3.68 m (145 in) for tracks
Wheelbase:	4.77 m (188 in)
Turning radius – inside:	6.93 m (273 in)
Speed:	26 km/hr (16 mph)
Gradeability:	Tires: 60%: (31 degrees) Tracks: 51% (27 degrees)
Gross Vehicle Weight:	Minimum 25,968 kg (57,250 lb) Maximum* 29,937 kg (66,000 lb)
Hold-down Weight:	Minimum 22,383 kg (50,350 lb) Maximum* 29,030 kg (64,000 lb)
Front axle Weight:	Minimum 13,789 kg (30,400 lb) Maximum* 15,853 kg (34,950 lb)
Rear axle Weight:	Minimum 12,179 kg (26,850 lb) Maximum* 14, 084 kg (31,050 lb)

* Desired weight achieved with removable slide-on frame weight

SM-24 Geophone Element

Where Quality Data Starts

Features

- Tight specification, low-distortion geophone
- Extended spurious over 240 Hz, allowing full bandwidth at 2-ms sampling
- Backwards compatible with SM-4, SM-4 SuperphoneTM range, and SM-24ST
- Horizontal element available for shear-wave and 3-C recording.
- 3-year non-prorated warranty
- Lowest lifecycle cost of ownership in the industry
- Installed base of over 8 million worldwide (est.)

The SM-24 geophone element is designed to offer the highest performance in seismic exploration based upon field-proven I/O Sensor technology. Low distortion, combined with excellent specifications, provide high-fidelity data in 2-D and 3-D surveys. The extended bandwidth allows the full potential of 2-ms/24-bit recording systems to be realized.
The tight specifications, unique element design, and exceptional quality of the Sensor SM-24 make it the lowest life cycle cost of ownership geophone in the industry.

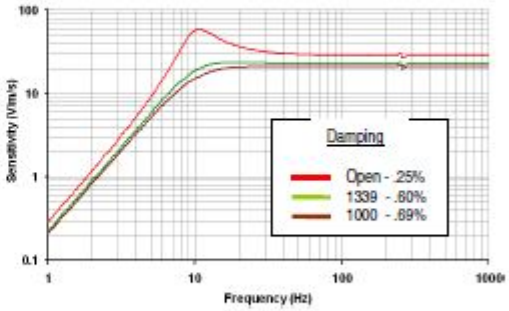
Applications: 2-D & 3-D seismic exploration with bandwidth from 10 Hz up to 240 Hz.

Implementation: Can be installed in a variety of I/O Sensor geophone cases.

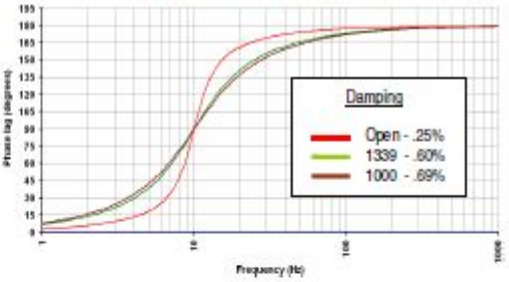
Specifications: SM-24 Geophone Element

Frequency		
Natural frequency	10 Hz	
Tolerance	± 2.5%	
Maximium tilt angle for specified Fn	10°	
Typical spurious frequency	>240 Hz	
Distortion		
Distortion coil to case velocity with 17.78mm/s (0.7 in/s) p.p.	<0.1%	
Distortion measurement frequency	12 Hz	
Typical distortion (string of 12 in series, measured at 12 Hz)	0.03 %	
Damping		
Open circuit (typical)	0.25	
Damping calibratio- shunt resistance	1,339 Ω	
Damping with calibration shunt	0.6	
Tolerance with calibration shunt	+ 5 %, - 0 %	
Sensitivity		
Sensitivity	28.8 V/m/s	(0.73 V/in/s)
Tolerance	± 2.5 %	
RtBcfn	6,000 Ω Hz	
Moving mass	11 g	(0.38 oz)
Max coil excurstion p.p.	2 mm	(0.08 in)
Coil Resistance		
Standard	375 Ω	
Tolerance	+/- 2.5 %	
Physical Characteristics		
Diameter	25.4 mm	(1 in)
Height	32 mm	(1.26 in)
Weight	74 g	(2.6 oz)
Operating temperature range	-40°C to +100°C	(-40°F to +212°F)
Warranty Period*	3 years	

Geophone Response Curve – SM-24 10 Hz



Geophone Phase Lag – SM-24 10 Hz



* Warranty excludes damage caused by high voltage and physical damage to the element case.

All parameters are specified at +20°C in the vertical position unless otherwise stated.

Appendix J - RPS Prospect Report – CPSAN13B

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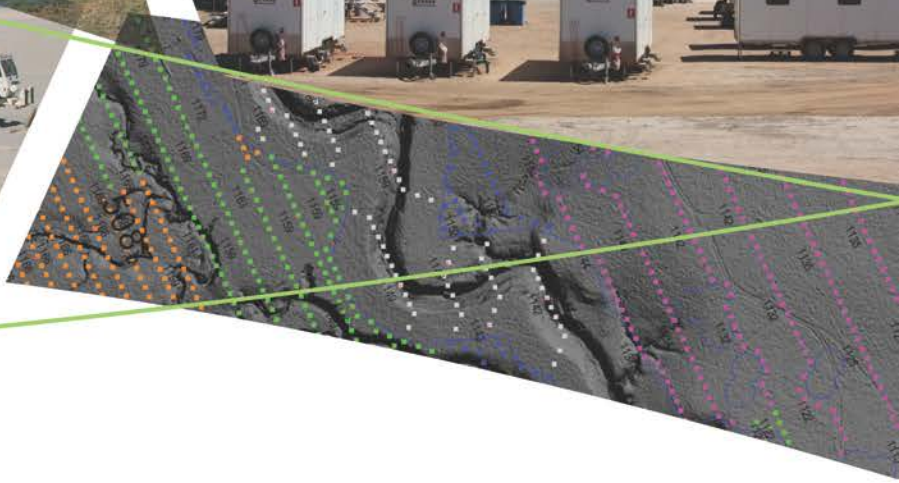


Certified System — Health & Safety OHSAS 18001 — SAI GLOBAL

Certified System — Environment ISO 14001 — SAI GLOBAL

Certified System — Health & Safety AS 4801 — SAI GLOBAL

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

APPENDIX 3 - RECORDING PRODUCTION STATISTICS

	WT										ST		NCT								TOTALS													
	Initial Layout	Recording	Experimental	Spread Damage	Detours	Traverse Move	Vibe Travel	Crew Demobe	Other	Total Work Time	Toolbox	Total Standby Time	Experimental	Sweep Tests	QC Daily Tests	Spread Damage	Travel	Vibes Down	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	Stn's	Stn's TD
25-07								10.00		10.00											10.00	10.00									10.00	10.00		
26-07								10.00		10.00											10.00	20.00									10.00	20.00		
27-07	9.20									9.20	1.80	1.80					0.50			0.50	11.50	31.50									11.00	31.00		
28-07	8.90									8.90	0.30	0.30	1.00	0.50			0.60			2.10	11.30	42.80									9.20	40.20		
29-07	7.90		2.40							10.30	0.30	0.30					0.60			0.60	11.20	54.00									10.60	50.80		
30-07		1.90	1.00	0.30			1.50		5.80	10.50	0.30	0.30					0.60			0.60	11.40	65.40	209	209			10.4500	10.4500	4.0279	4.0279	10.80	61.60		
31-07		9.40		0.70		0.10				10.20	0.30	0.30				0.40	0.60			1.00	11.50	76.90	1101	1310			55.0500	65.5000	21.2188	25.2467	10.50	72.10		
01-08		9.80		0.80		0.10				10.70	0.30	0.30					0.50			0.50	11.50	88.40	1201	2511			60.1000	125.6000	23.1653	48.4119	11.00	83.10		
02-08		8.80		0.50	0.30	0.20				9.80	0.30	0.30					0.60	0.80		1.40	11.50	99.90	1097	3608			54.8000	180.4000	21.1224	69.5344	10.10	93.20		
03-08		9.00		1.20						10.20	0.30	0.30					0.60		0.40	1.00	11.50	111.40	1107	4715			55.3500	235.7500	21.3344	90.8688	10.50	103.70		
04-08		9.00		1.40		0.10				10.50	0.30	0.30			0.10		0.60			0.70	11.50	122.90	1069	5784			53.4500	289.2000	20.6021	111.4708	10.80	114.50		
05-08		4.80	5.80	0.40						11.00	0.30	0.30					0.80	0.20		1.00	12.30	135.20	592	6376			29.6000	318.8000	11.4092	122.8800	11.30	125.80		
06-08	11.50									11.50	0.30	0.30									11.80	147.00		6376				318.8000		122.8800	11.80	137.60		
07-08	11.50									11.50	0.30	0.30									11.80	158.80		6376				318.8000		122.8800	11.80	149.40		
08-08	11.50									11.50	0.30	0.30									11.80	170.60		6376				318.8000		122.8800	11.80	161.20		
09-08											0.30	0.30							8.00	8.00	8.30	178.90		6376				318.8000		122.8800	0.30	161.50		
10-08											0.30	0.30							8.00	8.00	8.30	187.20		6376				318.8000		122.8800	0.30	161.80		
11-08											0.30	0.30							8.00	8.00	8.30	195.50		6376				318.8000		122.8800	0.30	162.10		
12-08											0.30	0.30							10.00	10.00	10.30	205.80		6376				318.8000		122.8800	0.30	162.40		
Grand Total	**60.50**	**52.70**	**9.20**	**5.30**	**0.30**	**0.50**	**1.50**	**20.00**	**5.80**	**155.80**	**6.60**	**6.60**	**1.00**	**0.50**	**0.10**	**0.40**	**6.00**	**1.00**	**34.40**	**43.40**	**205.80**	**2102.20**	**6376**	**69145**			**318.8000**		**122.8800**		**162.40**	**1902.00**		

APPENDIX 4 - PERSONNEL LIST

APPENDIX 4
PERSONNEL LIST

Terrex Seismic Position & number on crew at one time (total used on survey)

Crew Manager 1
QHSE Advisor 1
Cook 2
Camp Attendants 2
Mechanics 1-2
Supply Drivers 1
Observers 1
Cable Repair Technicians 1
Quality Control 1
Vibrator Operators 4 (6)
Vibrator Technician 1 (2)
Trouble Shooter 2
Trouble Shooter 2
Line Crew 30

RPS

Senior Surveyor / Line Pointer 1
GPS Operators 25

Terrex Contracting

Crew Supervisor 1
Cooks 1
Mechanic 1
Operators 5

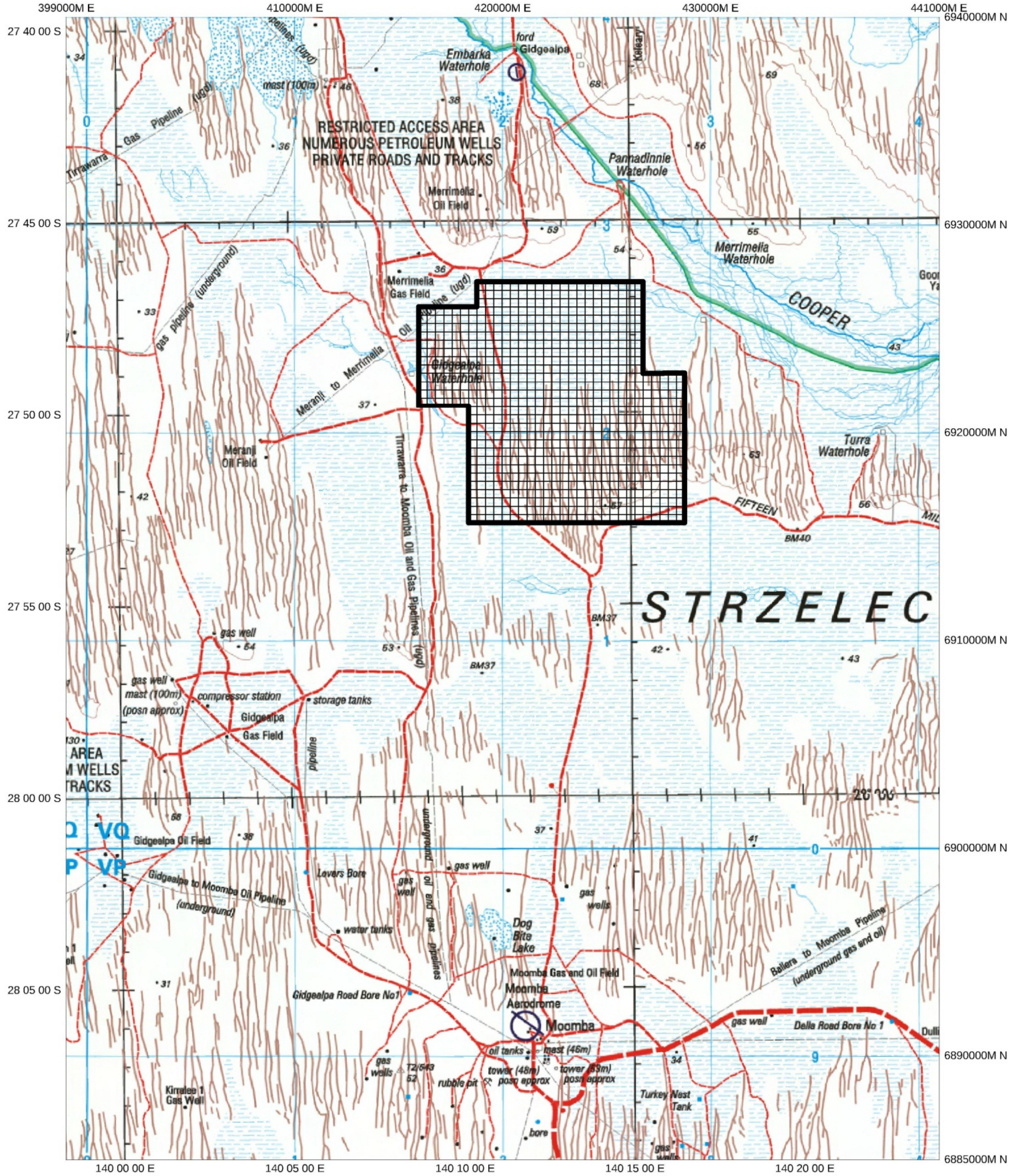
APPENDIX 5 - TAPE LIST

Tape listing for 2013 Gaschnitz 3D Seismic Survey

Field Tapes				
1A	1B			
2A	2B			
Support Data				
OBS/SPS				

4 Field tapes (2 x 2copies)
1 Obs/SPS CD

APPENDIX 6 - MAPS



0 2 4 6 8 10

KILOMETRES

GDA94 / MGA zone 54 (EPSG 28354)
Transverse Mercator
GRS 1980 spheroid
Natural origin: [141 00 00E, 0 00 00N]

GDA Santos

PPL 80 , PPL 101
GASCHNITZ 3D

TOPOGRAPHIC MAP

Date : April 8, 2013	Author : A White	ENCL
Contour Interval :	File No. :	
Elevation Datum :	Santos Ltd ABN 80 007 550 923	

Santos

A.C.N. 007 550 923

PROGRAM MAP
CPSAN13B SEISMIC SURVEY
PPL 101, 80 & 17
2013 GASCHNITZ 3D

Line name prefix = CPSAN13B-

SOURCE LINE	STN RANGE	LINE KM	#	TOTAL KM
S5000-5040	1112-1207	4.80	6	28.80
S5048	1000-1207	10.40	1	10.40
S5056-5216	1000-1231	11.60	21	243.60
S5224-5256	1000-1143	7.20	5	36.00
SOURCE INT	**50.0m**	**Total**	**33**	**318.80**

REC LINE	STN RANGE	LINE KM	#	TOTAL KM
R1000-1104	5048-5255	10.40	14	145.60
R1112-1144	5000-5255	12.80	5	64.00
R1152-1208	5000-5215	10.80	8	86.40
R1216-1232	5056-5215	8.00	3	24.00
GROUP INT =	**50.0M**	**Total**	**30**	**320.00**

TOTAL AREA **122.88 Km^2**

SPECIFIC CONDITIONS:
1. STANDARD CODE OF PRACTICE SHOULD BE ADHERED TO AT ALL TIMES

MAP 1 OF 1

LINE TOLERANCE : 20% OF GROUP INTERVAL. REFER TO TSS FOR DETAILS

DATE: 10 April 2013	SCALE 1:50,000
DRAWN:	APPROVED:

0 1 2 3 4 5
KILOMETRES