CPSN08D SEISMIC SURVEY

2008 CALLABONNA 3D

PPL 176, PEL 104

SOUTH AUSTRALIA

ACQUISITION REPORT

Compiled by: A. White
Santos Ltd.
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1 INTRODUCTION

1.1 GENERAL

In the year 2008 Santos Ltd., as operator of Petroleum Production Licence (PPL) 176 and on behalf of Victoria Oil Exploration (PEL 104) under a data sharing agreement carried out approximately 37 square kilometres of 3D seismic imaging in the Callabonna area as the CPSN08D Callabonna 3D Seismic Survey.

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

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

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

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

This report describes the data acquisition of CPSN08D Callabonna 3D Seismic Survey, located approximately 85km north northwest of the Santos Moomba facility.

1.2 TIMETABLE OF MAIN EVENTS

Date	**Activity**
05/03/2008	Notice of Intention sent to PIRSA.
05/03/2008	Notice of Entry sent to landholders (Clifton Hills).
16/04/2008	Notification of survey and request for clearance sent to the Dieri Native Title Claimants.
14/07/2008	Land Access and Data Sharing Agreement signed
28/07/2008	Line preparation commenced.
29/07/2008	Surveyors commenced.
04/08/2008	Line preparation & survey completed.
13/08/2008	Recording commenced.
19/08/2008	Recording completed.

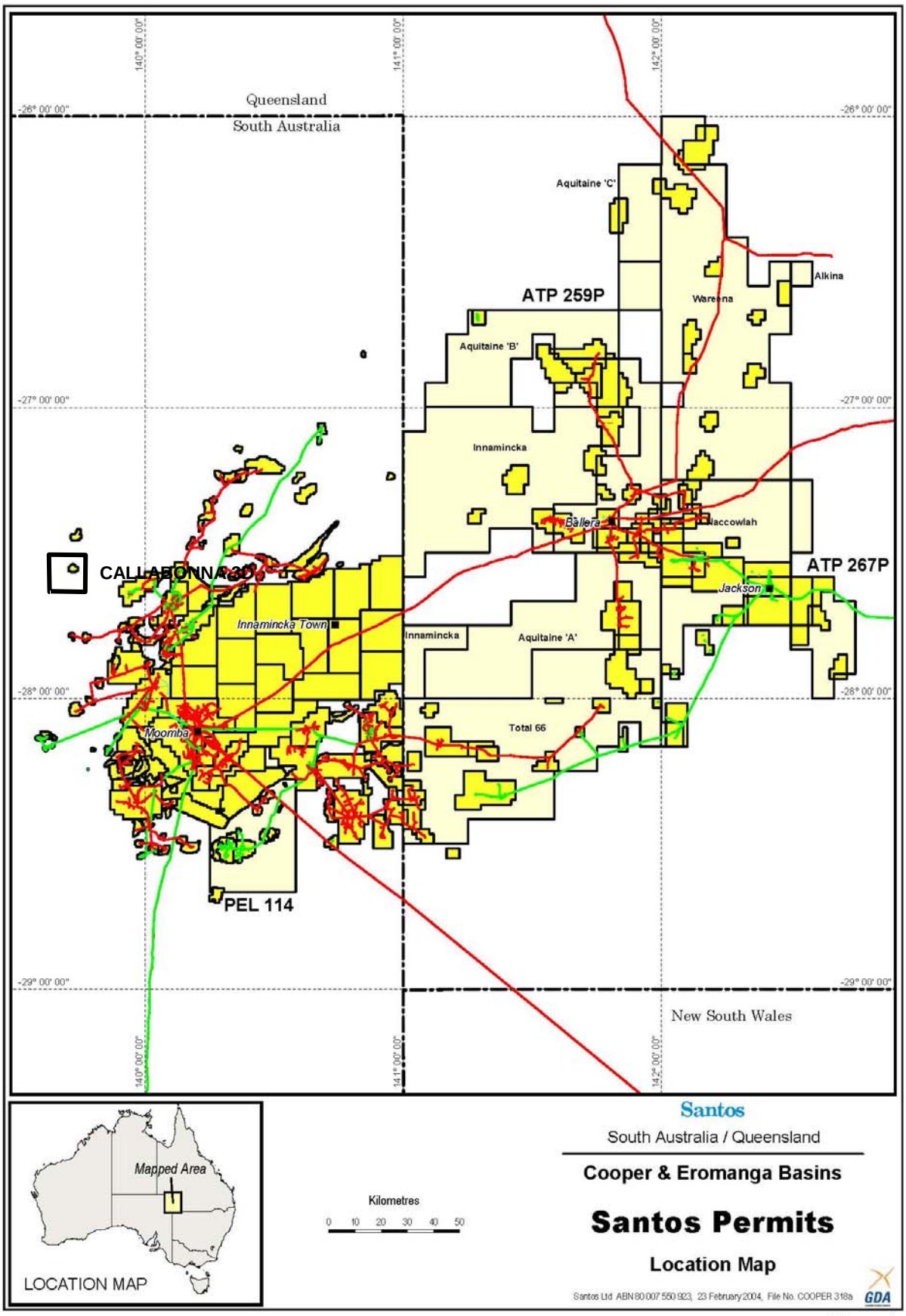
Queensland
South Australia
New South Wales
ATP 259P
ATP 267P
PEL 114
CALLABONNA 3D
Aquitaine 'C'
Aquitaine 'B'
Aquitaine 'A'
Innamincka
Total 66
Alkina
Wareena
Ballera
Naccowlah
Jackson
Innamincka Town
Moomba
140° 00' 00"
141° 00' 00"
142° 00' 00"
-26° 00' 00"
-27° 00' 00"
-28° 00' 00"
-29° 00' 00"
Mapped Area
LOCATION MAP
Kilometres
0 10 20 30 40 50
Santos
South Australia / Queensland
Cooper & Eromanga Basins
Santos Permits
Location Map
Santos Ltd ABN 80 007 550 923, 23 February 2004, File No. COOPER 318a
GDA

Figure 1

2 SURVEY SCOPE AND OBJECTIVES

The survey was designed to provide high quality 3D seismic data over the Callabonna field allowing improved certainty of structure and (possibly) Birkhead stratigraphy. The data will facilitate future appraisal and development drilling on the Callabonna structure and will be used to identify other potential targets at other stratigraphic levels (Namur - shallower & Hutton – deeper.). It is considered too risky to drill using current 2D seismic due to wide line spacing and misties.

Receiver Lines	Start Stn	End Stn	Length	Source Lines	Start Stn	End Stn	Length
CPSN08D-R1000	5024	5175	5.320	CPSN08D-S5000	1040	1127	3.080
CPSN08D-R1008	5024	5175	5.320	CPSN08D-S5008	1024	1143	4.200
CPSN08D-R1016	5016	5175	5.600	CPSN08D-S5016	1016	1143	4.480
CPSN08D-R1024	5008	5183	6.160	CPSN08D-S5024	1000	1175	6.160
CPSN08D-R1032	5008	5183	6.160	CPSN08D-S5032	1000	1175	6.160
CPSN08D-R1040	5000	5183	6.440	CPSN08D-S5040	1000	1175	6.160
CPSN08D-R1048	5000	5183	6.440	CPSN08D-S5048	1000	1175	6.160
CPSN08D-R1056	5000	5183	6.440	CPSN08D-S5056	1000	1175	6.160
CPSN08D-R1064	5000	5183	6.440	CPSN08D-S5064	1000	1175	6.160
CPSN08D-R1072	5000	5183	6.440	CPSN08D-S5072	1000	1175	6.160
CPSN08D-R1080	5000	5183	6.440	CPSN08D-S5080	1000	1175	6.160
CPSN08D-R1088	5000	5183	6.440	CPSN08D-S5088	1000	1175	6.160
CPSN08D-R1096	5000	5183	6.440	CPSN08D-S5096	1000	1175	6.160
CPSN08D-R1104	5000	5183	6.440	CPSN08D-S5104	1000	1175	6.160
CPSN08D-R1112	5000	5183	6.440	CPSN08D-S5112	1000	1175	6.160
CPSN08D-R1120	5000	5183	6.440	CPSN08D-S5120	1000	1175	6.160
CPSN08D-R1128	5000	5183	6.440	CPSN08D-S5128	1000	1175	6.160
CPSN08D-R1136	5008	5183	6.160	CPSN08D-S5136	1000	1175	6.160
CPSN08D-R1144	5008	5183	6.160	CPSN08D-S5144	1000	1175	6.160
CPSN08D-R1152	5024	5183	5.600	CPSN08D-S5152	1000	1175	6.160
CPSN08D-R1160	5024	5175	5.320	CPSN08D-S5160	1000	1175	6.160
CPSN08D-R1168	5024	5175	5.320	CPSN08D-S5168	1000	1175	6.160
CPSN08D-R1176	5024	5167	5.040	CPSN08D-S5176	1000	1167	5.880
		Total	**139.440**	CPSN08D-S5184	1024	1151	4.480
						Total	**139.160**

3 DATA ACQUISITION

3.1 PERMITTING

3.1.1 GENERAL

The programme was located within the boundary of Clifton Hills (Kanowona) 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 of the pastoral lease 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, was made before field operations commenced.

3.2 LOGISTICS AND COMMUNICATIONS

The prime contractor, Terrex Seismic, provided a self-contained, air-conditioned, mobile camp, as listed in Appendix 2, 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.

All food and freight was road transported to the crew by Neil Mansell's Transport from Adelaide.

Fuel for all vehicles was supplied by IOR Petroleum in Eromanga and delivered to site.

Most other equipment and personnel logistics were supported from Terrex Seismic' Perth office.

3.3 SURVEYING

Horizontal and vertical surveying of seismic lines, using Trimble GPS receivers and ancillary equipment, was carried out by Conics Positioning Pty Ltd (formerly Pioneer Surveys No.2)

Operations, personnel and equipment are fully detailed in their "Conics, Prospect Report, CPSN08D Seismic Survey", which is appended hereto (Appendix 1).

3.4 CULTURAL HERITAGE CLEARANCE

The Callabonna 3D project falls within an area claimed for native title by the Dieri people. Following formal notifications, six (6) representatives of the native title claimants performed a work area clearance of the survey area assisted by archaeologists Jan Scott, Michael Maeorg & Craig Gilbert (who were contracted via Adelaide University) and Bill Hedditch as overall clearance coordinator. This work area clearance was conducted and completed prior to any field activities by Santos.

There were numerous cultural heritage sites identified during the course of this work and detours were identified by the clearance party and provided to Santos. Cultural heritage clearance techniques and details of the detours are the subject of a separate report prepared by representatives of the Dieri people. A copy of this report was also provided to Santos.

3.5 LINE PREPARATION

3.5.1 EQUIPMENT

Line preparation was carried out by Terrex Contracting who supplied a total of fourteen personnel. Personnel work on a 6 week on and 2 week off roster. Terrex contracting supplied the following equipment:

3 x	Komatsu D65EX bulldozers
1 x	Caterpillar 12G grader
1 x	John Deere 6 x 6 grader
3 x	Kenworth prime movers
2 x	Toyota 4x4 utilities
1 x	Nissan 4x4 station wagon
1 x	Isuzu 4x4 supply/crane truck
1 x	Ford L9000 Water Truck with 15,500 litre tank
1 x	Elross 8.1m Kitchen trailer
1 x	Elross 8.1m Diner trailer
2 x	Elross 4 room / 8 man Accommodation trailers
1 x	Office / Sleeper / Laundry trailer
1 x	Shower / Laundry trailer
1 x	Workshop/spare parts trailer
1 x	240v generators – 120kva
1 x	30,000 litre Fuel trailer
2 x	Low loaders
2 x	Trailer mounted chemical toilets

3.5.2 OPERATIONS

Equipment was walked in from the Charo area where the previous Charo 3D had just been completed. Line prep started on 28th July and was completed on 4th August

Three bulldozers and two graders were used to prepare all source and receiver lines. Prior to commencing work, start and end coordinates of source and receiver lines are loaded into the dozers GPS receiver. The current position relative to the straight line joining the end points is graphically displayed on the Garmin 172C on-board navigation screen and the distance in metres right or left of the line is also displayed. The operator is required to keep the machine within the specified line tolerance of ±7m unless detours are necessary to avoid heritage sites or other natural or man made obstructions such as trees, wellheads, pipelines, evaporation ponds, fences etc.

Most of the lines were on the flat alluvial plain which surrounds Callabonna 1 and the remainder was on the dunes on the east and west extremities. In addition, there was an area of plains and old watercourses to the south. Care was taken in the alluvial plain to avoid pushing over too much coolibah. Much of the coolibah was dead but there were many saplings and these had to be avoided as much as possible which was difficult as the growth was so thick.

There were no fence lines or station tracks in the area.

3.5.3 PRODUCTION

A total of 278.38 km of source and receiver lines were prepared in 197 charge hours at an average rate of 1.41 km/chg hour. There was no standby time.

Line Preparation Statistics:

Total Kilometres:	278.600

Dozer Hours:	187.00
Grader Hours:	122.00
Dozer Days:	34.40
Km per Charge Hour:	1.41
Km per Work Day:	35.69
Km per Dozer Day:	11.9

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 and 2000 channel acquisition and processing module
- 1 x Sun Microsystems Sun Blade 2500 server
- 1 x Dell Optiplex GX620 processor with Windows XP 32 operating system
- 2 x NAS 320Gb hard drives plus 2 spares
- 1 x ULTRIUM dual LT02 tape drive
- 1 x Pelton VibPro encode sweep generator.
- 4 x Pelton VibPro VCE's
- 1 x Pelton VIBSIG real time QC system
- 4 x Wall mounted, flat LCD colour display screens
- 1 x Veritas iSys V12 thermal plotter
- 1 x Optus mobilsat phone
- 2 x Motorola 50W VHF radios
- 1 x Uniden 25W UHF radio
- 1 x Codan HF radio
- 2417 x strings Sensor SM4, 10Hz geophones, 12/string
- 605 x cables with 4 combined takeout/A-D converters per cable
- Sufficient power units and batteries to match cable numbers

Automotive Equipment

- 1 x Isuzu 4x4 airconditioned recording truck
- 4 xI/O AHV-IV articulated, hydrostatic 60,000lb vibrators with VHF radios.
- 1 x Paystar 6 x6 vibrator service truck
- 1 x Toyota 4x4 Landcruiser wagon – vib scout
- 1 x Toyota 4x4 utility – line boss
- 2 x Toyota 4x4 utilities – troubleshooters
- 4 x Toyota 4x4 utilities – cable trucks
- 2 x Toyota 4x4 utilities – geophone trucks
- 4 x Toyota 4x4 Landcruiser wagons – line crew
- 1 x Toyota 4x4 utility – depegger
- 1 x Spread trailer (moved by Terrex Contracting prime mover)
- 1 x Kenworth prime mover
- 1 x Paystar 6x6 spread truck
- 2 x Hino 4x4 spread trucks

A complete list of automotive equipment is included in Terrex Seismic Operations Report for "Santos Ltd– 2008 Callabonna 3D Seismic Survey, Operations Report". A copy of this report is attached as Appendix 2.

3.6.2 RECORDING PARAMETERS

Recording parameters are detailed in the Terrex Seismic Operations Report for "Santos Ltd– 2008 Callabonna 3D Seismic Survey, Operations Report". A copy of this report is attached as Appendix 2.

3.6.3 OPERATIONS

The recording crew directly from the previous Charo 3D survey and the same camp was used. Recording commenced on August 13th after layout on the previous day. Hardwire and Point Source sims were completed before startup.

Data quality was generally good throughout the survey although it dropped off somewhat in the flood plain area. At the beginning of recording there were 3 horizons clearly visible but the bottom horizon at around 2 seconds disappeared while recording in the flood plain.

Production rates were satisfactory and there were no skips. The line was generally quiet. There were no pipelines and the Callabonna well was shut down during the survey.

The grid comprised of 23 parallel receiver lines oriented N/S and spaced 280m apart. Lines were numbered in increments of 8 starting with the westernmost most line numbered R1000 and the easternmost, R1176.

Geophone stations were spaced at 35m intervals. At each station, 12 Sensor SM4 geophones were arrayed parallel to the receiver line and spaced 2.92m apart, centred on the station. When fully rolled on, data was recorded by a patch of 1120 geophones on ten lines, each with 112 live stations.

There were 24 source lines, numbered in increments of 8 starting with the northernmost line numbered S5000 and the southernmost S5184. VPs were spaced at 35m intervals. There were a number of offsets for the CH sites and the Callabonna well site.

The vibrator array and the number of sweeps executed at each VP were 2 x 3 secs at 5-90 Hz. Three Input/Output AHV-IV vibrators were arrayed in line with a pad-pad spacing of 12.5m. Where a linear array was not possible because of obstructions such a steep dunes, they were grouped side by side on the peg. If space was insufficient to fit 3 vibrators, two were used with 4 sweeps.

A total of 3976 VPs were recorded in 7 days at an average of 568 VPs per day and the survey was recorded as a single recording panel.

Data shipments were sent at the end of the job via courier service from Moomba. There was only 1 tape used during the survey

3.7 WEATHERING SURVEY

3.7.1 GENERAL

Due to the existing uphole coverage, no weathering survey was required.

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 "Statement of Environmental Objectives: Geophysical Operations" Santos Ltd, June 2006, and "Environmental Impact Report : Geophysical Operations" Santos Ltd, June 2006.

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 weather was sunny and mild with cold nights. There were some windy days but not enough to cause problems

The Callabonna 3D prospect was a mixture of sand dunes and an alluvial flood plain known as the Thykamingana Swamp. There was a section of dune country on the western side of the prospect and another section running along the eastern side and around the north-eastern section of the prospect. The dunes were mostly small to medium in size though some of the dunes were quite steep on the eastern side. The larger dunes were on the western side. The dunes generally ran in a north-north-westerly direction. The dunes were mostly white coloured, from Cooper Creek alluvium, and were of a powdery consistency, often difficult to cross.

The flood plain was thickly vegetated in places, especially around the edges – mainly with Coolibah trees and saplings, many dead or dying, and stretches of lignum plain. The dunes were lightly vegetated with sandhill canegrass. The swales had marpoo, some reasonable stands of prickly wattle and occasional whitewood.

Some of the areas were a mixture of sand flat and alluvial flood plain and the vegetation varied between lignum and saltbushes and prickly wattle, often giving over to stands of Coolibah. The Coolibah and other mature trees were generally much larger and more vigorous in what appeared to be watercourses along the bases of the dunes on the east and west extremities of the flood plain.

All rubbish and waste material, including tyres and batteries, was segregated on site then disposed of at the Moomba waste depot. Grey water was drained away from the camp and discharged into a graded drain. The camp site was left in a neat and tidy condition when the crew departed.

Environmental Audits of 4 kilometre sections of 4 lines were conducted and submitted in a separate report. There were no outstanding environmental problems seen on the audits apart from a medium size coolibah which had been knocked over. However, half the tree was dead and the live section was much less than 2 metres.

3.8.3 RESTORATION

Only minimal restoration was required and primarily limited to the campsites and road verges. Restoration activities have been delayed until October/November 2008 due to availability of the required earthmoving equipment.

APPENDIX 1 – CONICS POSITIONING FINAL OPERATIONS REPORT

PROSPECT REPORT

CPSN08D SEISMIC SURVEY

SANTOS: PPL 176

CALLABONNA 3D

FOR

SANTOS LTD

July / August 2008

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CPSN08D-R1000 - 1176
CPSN08D-S5000 - 5184

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1.0 INTRODUCTION

Conics Positioning was contracted by Terrex Seismic to carry out survey operations on the Callabonna 3D operated by Santos Ltd. This report covers the involvement of Conics Positioning in the seismic survey. The survey was located around the Callabonna #1 oil well approximately 41 km north-west of Tirrawarra satellite in North East South Australia. The terrain was predominantly small to medium sand dunes lightly vegetated with small trees, shrubs and grasses and a large floodplain with light to heavy vegetation coverage. The survey took place in July and August 2008. The weather was fine and cool.

The receiver station interval was 35.0m. The source station interval was 35.0m. Receiver and source lines were spaced 280m apart. Total length of lines was 278.60 km. Section 1.2 contains line listings.

Terex Contracting were contracted to carry out the line preparation. Cultural Heritage pre-clearance was carried out by the Dieri group. Site locations with 50m warning circles were loaded onto each Dozer's GPS unit so they could be avoided.

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.

1.1 SURVEY DESIGN

Callabonna 3D was an orthogonal grid. Receiver lines ran north to south and source lines ran west to east. The following table contains design information:

Parameter	Receiver	Source
Group interval	35m	NA
VP interval	NA	35m
Station increment	1	1
Line spacing	280	280
Intersection offset	17.5m	17.5m
Line bearing (grid)	180°	90°
Offset increment	35m	35m
Inline tolerance	2m	5m
Crossline tolerance	7m	7m
Start line	1000	5000
End line	1176	5184
Min station	5000	1000
Max station	5183	1175

Receiver Origin	Easting	Northing
1000 5000	370750.00	6955032.50

1.2 LINE LENGTHS

Receiver Lines:

Line	Start	End	Kms
CPSN08D-R1000	5024	5175	5.320
CPSN08D-R1008	5024	5175	5.320
CPSN08D-R1016	5016	5175	5.600
CPSN08D-R1024	5008	5183	6.160
CPSN08D-R1032	5008	5183	6.160
CPSN08D-R1040	5000	5183	6.440
CPSN08D-R1048	5000	5183	6.440
CPSN08D-R1056	5000	5183	6.440
CPSN08D-R1064	5000	5183	6.440
CPSN08D-R1072	5000	5183	6.440
CPSN08D-R1080	5000	5183	6.440
CPSN08D-R1088	5000	5183	6.440
CPSN08D-R1096	5000	5183	6.440
CPSN08D-R1104	5000	5183	6.440
CPSN08D-R1112	5000	5183	6.440
CPSN08D-R1120	5000	5183	6.440
CPSN08D-R1128	5000	5183	6.440
CPSN08D-R1136	5008	5183	6.160
CPSN08D-R1144	5008	5183	6.160
CPSN08D-R1152	5024	5183	5.600
CPSN08D-R1160	5024	5175	5.320
CPSN08D-R1168	5024	5175	5.320
CPSN08D-R1176	5024	5167	5.040
		Total:	**139.44**

Note line lengths include an additional half station at each end.

Source Lines:

Line	Start	End	Kms
CPSN08D-S5000	1040	1127	3.080
CPSN08D-S5008	1024	1143	4.200
CPSN08D-S5016	1016	1143	4.480
CPSN08D-S5024	1000	1175	6.160
CPSN08D-S5032	1000	1175	6.160
CPSN08D-S5040	1000	1175	6.160
CPSN08D-S5048	1000	1175	6.160
CPSN08D-S5056	1000	1175	6.160
CPSN08D-S5064	1000	1175	6.160
CPSN08D-S5072	1000	1175	6.160
CPSN08D-S5080	1000	1175	6.160
CPSN08D-S5088	1000	1175	6.160
CPSN08D-S5096	1000	1175	6.160
CPSN08D-S5104	1000	1175	6.160
CPSN08D-S5112	1000	1175	6.160
CPSN08D-S5120	1000	1175	6.160
CPSN08D-S5128	1000	1175	6.160
CPSN08D-S5136	1000	1175	6.160
CPSN08D-S5144	1000	1175	6.160
CPSN08D-S5152	1000	1175	6.160
CPSN08D-S5160	1000	1175	6.160
CPSN08D-S5168	1000	1175	6.160
CPSN08D-S5176	1000	1167	5.880
CPSN08D-S5184	1024	1151	4.480
		Total:	**139.16**

Note line lengths include an additional half station at each end.

2.0 TERRAIN AND LOGISTICS

2.1 TERRAIN

The terrain at Callabonna 3D prospect consisted mainly of sand dunes and flood plain. There was a strip of dunes running down the western side of the prospect and another strip running along the eastern side and around the eastern top of the prospect. The dunes were mostly small to medium in size though some of the dunes were quite steep on the eastern side. The bigger dunes were on the western side of the prospect. The dunes generally ran in a north-north-westerly direction. Between the dune strips was a large flood plain. The flood plain was thickly vegetated in places, especially around the edges – mainly with coolabah trees and saplings. The dunes were lightly vegetated with small trees, shrubs and grasses.

2.2 LOGISTICS

Terex Contracting established a camp approximately 42 km north west of Tirrawarra satellite on the south side of the access road to Charo oil field. This location was central to the Charo and Callabonna 3D prospects. The camp site was cleared for use by the Cultural Heritage clearance team. The site itself was sandy and reasonably flat. The coordinates for the site are listed below in section 2.2.1.

Conics Positioning mobilised three Toyota Landcruiser utilities (including two new vehicles) and an office caravan from Tieri in Central Queensland on 15th July 2008. The crew arrived at the Terrex Contracting camp site at approximately 1:30pm on 17th July. A cultural heritage induction was held by Tom Hedditch on the evening of 17th July. Mike Clark drove a vehicle from Brisbane to the crew on 30th – 31st July.

Conics Positioning completed Charo 3D prior to commencing Callabonna 3D. This was done between 18th July and 28th July. Dozer 1 walked from Charo 3D to Callabonna 3D on the morning of 28th July and commenced work. The rest of the line preparation equipment walked from Charo 3D to Callabonna 3D on the afternoon of 28th July and commenced work on the morning of 29th July. Dozer 5 developed an electrical fault at the end of the Charo 3D and was eventually replaced by Dozer 8 on 30th July. The GPS unit from Dozer 5 was swapped into Dozer 8. Survey fieldwork started on the 29th July and was completed on the 4th August. Line preparation commenced on 28th July and was completed on 4th August 2008.

Only one RTK base station (CHARO1) was required during the Callabonna 3D survey. It was located on top of a sand dune on the east side of the road to Charo field. It was positioned by GPS static methods. A permanent marker was placed at the site. This base station was also used for Charo 3D.

2.2.1 Camp Locations

Site	Easting	Northing	Description
Camp 1	376460	6959175	Approx. 42km north west of Tirrawarra satellite on the south side of the access road to Charo oil field.

3.0 PERSONNEL AND EQUIPMENT

3.1 SURVEY PERSONNEL

The Conics Positioning crew consisted of five people, made up of one senior surveyor, a surveyor and three GPS operators. The following is a list of personnel utilized during the survey:

Duties	Name
Senior Surveyor	Eric Amedee
GPS Operator	Mike Clark
GPS Operator	John Gerrie
GPS Operator	Bart Kargol

3.2 LINE PREPARATION PERSONNEL

The following is a list of personnel utilized by Terex Contracting during the survey: -

Name	Duties
Operations Mgr / Camp Boss	Leeton McHugh
Mechanic / Camp Boss	Peter Dehaas
Mechanic	Ken Matthews
Mechanic	Bryce Gaffin
Mechanic	Des Leed
Mechanic's assistant	Gene Hicks
Cook	Jim Hawthorn
Cook	Marlene Roberts
Operator	Gene Greenhalgh
Operator	Eric Ree
Operator	Cliff Jurd
Operator	John Talbot
Operator	Reece Greenhalgh
Operator	Barry Marini
Operator	Nick Smith

3.3 SURVEY EQUIPMENT

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

Line Pointing	1 Toyota Landcruiser ute
	3 Garmin 172C GPS receivers
	6 Garmin Data Cards
	3 PacCrest PDL GPS rover radio modems
	1 Garmin 276C GPS receiver
	1 Garmin 3006C GPS receiver
	1 UHF radio
Survey	3 Toyota Landcruiser utes
	1 Trimble R7 Base GPS receiver
	3 Trimble R7 GPS receivers
	1 PacCrest PDL GPS 35W base radio modem
	1 PacCrest PDL GPS 35W repeater radio modem
	3 PacCrest PDL GPS rover radio modems
	4 UHF radios
	1 UHF handheld radios
	1 Toshiba Satellite computer
	1 GPSeismic Processing software package
	1 ArcGIS 9 software package
	1 Canon i9950 A3 colour printer
	1 Lexmark X215 laser printer/copier/fax/scanner
	1 Globalstar Satellite phones
	1 Survey Office caravan
	1 IVMS Download Computer
	1 Six man accommodation caravan
	1 Dual axle box trailer
	1 Air compressor
	Survey consumables

3.4 LINE PREPARATION EQUIPMENT

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

Equipment
4 Komatsu D65 dozers
1 Caterpillar 12G grader
1 John Deere Grader (6x6)
1 Kitchen caravan (Elross)
1 Diner caravan (Elross)
2 Accommodation caravans (Elross)
1 Workshop / generator trailer
1 Office / sleeper trailer
1 4 bed sleeper trailer (extra personnel)
1 Shower / laundry trailer
3 Prime movers
2 Floats
1 Camp generator
1 6x4 Water truck
1 Water bladder
1 Fuel tanker
1 4x4 light truck
1 4x4 supply / crane truck
3 Support 4x4 vehicles
1 VSAT Data / telephone system
1 Satellite telephone (kitchen)

4.0 SURVEYING METHODS

4.1 SURVEY DATUMS

The survey datum for Callabonna 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, GDA94 is identical as WGS84, so no transformations were 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 v1.05, a datum transformation programme developed by the NSW Department of Lands.

4.2 SURVEY CONTROL

The control for the prospect area was established using GPS static techniques. The datum for the survey was from BM CHR2, a station on the Charo #2 well control survey.

The Map Grid of Australia (MGA94) coordinates and AHD height for the BM is as follows:

BM	Description	Easting	Northing	Elev.
CHR2	Charo control survey	377523.275	6960015.148	25.962

A listing of ties to other well benchmarks and old Permanent Markers is included in Appendix B.

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 Geomatics Office software was used to run a network adjustment on the survey control network. This verified the integrity of the network.

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 35 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.

Conics Positioning used the latest Trimble R7 GPS receivers. These units are dual frequency receivers enabling very fast and reliable initialisations. Coupled with Trimble TSCe and TSC2 survey controllers the system is very efficient and user friendly.

4.4 PERMANENT MARKERS

For the Callabonna 3D the survey crew established an RTK base station (CHARO1) on top of a sand dune approximately 400m east of the rig road to Charo oil field. This was the same base station used at Charo 3D. An aluminium tag, with the description and comments stamped on it, was attached to the permanent marker. Three Environmental Monitoring Points were placed and surveyed during the survey as well. Appendix A contains a list of Permanent Markers.

4.5 DATA PROCESSING AND QUALITY CONTROL

Real Time Kinematic (RTK) stakeout position data was collected in Trimble TSCe and TSC2 Survey Controllers in WGS 84 format and downloaded into Dynamic Survey Solution's (USA) GPSeismic 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 SQL and the results exported directly to mapping software (ArcGIS 9) 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 9 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

Conics Positioning surveyors scouted the prospect to map fences, gates, tracks, pipelines and any other features pertinent to crew operations. Cultural Heritage information was supplied by Santos. Using this information combined with that supplied by Santos it was possible to supply accurate prospect maps to the crew.

5.0 LINE PREPARATION

Terrex Contracting carried out the line preparation on the Callabonna 3D. Terrex Contracting supplied four bulldozers (three on line), two graders and camp facilities. Showers and meals were provided by Terrex Contracting.

The line preparation equipment and refuelling vehicles had UHF radios installed to enable communications with the dozer pointer and camp. Conics Positioning had a UHF radio set up in the office to enable communications between camp and field vehicles. The dozer pointer or survey had a satellite phone with them to enable communication to camp or in emergencies.

A Greenfield permit was issued by the Tirrawarra Field Production Superintendent. One of the Greenfield permit requirements was that there would be no excavation within 50m of any infrastructure. Exclusion zones were loaded into the dozer GPS units to ensure dozers stayed outside this zone.

The survey ran smoothly with no delays due to weather. Dozer 5 was replaced by Dozer 8 due to an electrical problem. The other two dozers had no problems. A Komatsu mechanic was on crew to fix some mechanical issues with the new Komatsu bulldozers (Dozers 1 & 2).

The north-south orientation of the receiver lines meant some lines required side cuts or ran along tops of dunes.

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.

Exclusion zones for pipelines, wells and cultural heritage features were also loaded into the dozer GPS units to warn the operators of their proximity.

The Differential GPS (DGPS) method was used to supply satellite correction data to the operators' GPS units. A base GPS receiver was set up on a point with known coordinates (usually the same base as survey) and using radio/modem units the base GPS receiver broadcast pseudorange (uncorrected distance to each satellite) corrections to the GPS receivers mounted on the dozers. This enabled the dozing receivers to generate positions to sub-metre accuracy.

5.2 ENVIRONMENTAL MONITORING POINTS

There were three Environmental Monitoring Points (EMP) placed on the Callabonna 3D prospect. Conics Positioning placed the markers and took the before and after line preparation photographs. These points are listed in both Appendices A and B.

6.0 HEALTH, SAFETY AND ENVIRONMENT

All vehicles belonging to Conics Positioning were fitted with rollover protection, a fire extinguisher, first aid kits and UHF radios. A VSAT telephone was located in the office. As well Conics Positioning had a Globalstar satellite telephones on crew. The phone was located in the senior surveyor's vehicle; thus communications could be maintained at all times. The survey office had a UHF radio with a high gain antenna for communications with line preparation and survey field crews.

All rubbish generated in the field was returned to camp for proper disposal. Terrex Contracting organised the disposal of all camp rubbish.

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.

Conics Positioning conducted daily breath analysis testing of all employees to ensure employees were not under the influence of alcohol. This was done using a Lion Alcolmeter 500.

Conics Positioning vehicles were fitted with SecuraTrak vehicle monitoring systems (IVMS). A downloading computer was set up in the survey office. There were ongoing problems getting the vehicle units to download via the RF unit.

During the survey, the survey crew exercised due care in their operations and as a result there were no lost time incidents. Conics Positioning and Terrex safety policies were adhered to by all personnel. Daily toolbox meetings were held to inform and raise current issues with crew members. Toolbox minutes were documented and passed onto Terrex at the end of each week. The daily topics were added to the daily reports. An evening TC toolbox meeting was held for all personnel in camp. Conics Positioning and TC held weekly safety meetings. These were normally held on Sunday nights before the barbecue.

7.0 SUMMARY

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

Survey and line preparation fieldwork took 7 days to complete at an average of 39.80 km / day. Line preparation fieldwork took 8 days to complete at an average of 34.83 km / day.

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

It is Conics Positioning policy to have a dozer pointer on crew to assist with any line preparation problems and to supply mapping information to the seismic crew.

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

Respectfully submitted,

Eric Amedee

Senior Surveyor
Conics Positioning

APPENDIX A

PERMANENT MARKER LISTING

Stn	Description	Easting	Northing	Elev.
CHARO1	RTK Base Station	375447.45	6961057.25	47.82
EMP1	INT R1040/S5024	372150.07	6954209.86	23.93
EMP2	INT R1072/S5080	373270.15	6952250.09	25.85
EMP3	INT R1112/S5160	374670.06	6949449.96	23.14

APPENDIX B

ENVIRONMENTAL MONITORING POINTS LISTING

Stn	Description	Easting	Northing	Elev.
EMP1	INT R1040/S5024	372150.07	6954209.86	23.93
EMP2	INT R1072/S5080	373270.15	6952250.09	25.85
EMP3	INT R1112/S5160	374670.06	6949449.96	23.14

APPENDIX C

BENCHMARK AND OLD PERMANENT MARKER TIES

Station	Line/Well	Surveyed Easting	Surveyed Northing	Surveyed Elev.	Supplied Easting	Supplied Northing	Supplied Elev.	DeltaX	DeltaY	DeltaZ
PM100	371875.44	6948920.57	25.28	83-NQD	371872.72	6948925.48	26.06	2.72	-4.91	-0.78
PM1128	373781.17	6952825.19	23.80	84-SGD	373778.35	6952829.60	24.49	2.82	-4.41	-0.69
PM431	371370.84	6952542.87	29.94	88-BJL	371368.72	6952546.57	30.56	2.12	-3.70	-0.62
PM390	370779.25	6949970.67	33.10	88-BLL	370777.69	6949973.50	33.86	1.56	-2.83	-0.76
PM268	372830.43	6952552.32	28.37	89-CAZ	372826.80	6952554.50	29.33	3.63	-2.19	-0.96
PM362	375374.90	6950111.57	23.01	89-CAZ	375371.75	6950114.51	23.79	3.15	-2.94	-0.78
PM272	372639.43	6949692.73	33.81	89-CBA	372636.74	6949696.53	34.60	2.69	-3.80	-0.79
PM303	373483.73	6950488.77	22.93	89-CBA	373480.78	6950492.51	23.91	2.95	-3.75	-0.98
PM421	376724.09	6953521.10	31.32	89-CBA	376721.76	6953524.50	32.14	2.33	-3.40	-0.83
PM288	372245.72	6950319.24	29.75	95-FYZ	372246.74	6950319.57	29.82	-1.02	-0.33	-0.07
PM368	374433.69	6952372.21	24.49	95-FYZ	374434.76	6952371.57	24.55	-1.07	0.64	-0.06
PM422	375910.38	6953757.44	31.63	95-FYZ	375910.72	6953757.50	31.55	-0.35	-0.06	0.08
PM200	376181.33	6952014.15	25.04	96-HJQ	376181.70	6952014.57	24.96	-0.37	-0.42	0.08
PM200	375972.17	6949543.07	23.37	97-HPR	375972.94	6949543.17	23.54	-0.77	-0.10	-0.17
PM200	376580.19	6953400.39	26.87	97-HPX	376580.89	6953400.32	26.88	-0.70	0.07	-0.01
BM CHR4	CHARO #1	374582.68	6963555.36	23.82	374582.68	6963555.35	23.79	0.01	0.01	0.04
BM CHR3A	CHARO #3	373696.86	6963952.97	30.09	373696.89	6963952.97	30.01	-0.02	0.01	0.08
BM CHR2	CHARO CONTROL	377523.29	6960015.17	25.99	377523.28	6960015.15	25.96	0.02	0.02	0.03

APPENDIX 2 – TERREX SEISMIC FINAL OPERATIONS REPORT

SANTOS LTD
CALLABONNA 2008
3D SEISMIC SURVEY

OPERATIONS REPORT

AUGUST 2008

BY

SHANE GOOSSENS

OF

CREW # 402

TERREX SEISMIC
UNIT # 2 / 37 HOWSON WAY
BIBRA LAKE
WESTERN AUSTRALIA 6163

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PAGE

1. INTRODUCTION

Terrex Seismic was contracted by Santos Ltd to conduct the Callabonna Seismic Survey. Recording commenced on the 13th August 2008 and was completed on the 19th August 2008.

1.1 GEOGRAPHICAL AREA

The Callabonna 3D grid is located approx 45km NW of Tirrawarra Satellite, which itself is approximately 70km West of Moomba. The surrounding area consisted mainly of rolling sand hills and open flat clay pan country, with the Callabonna wells in the middle of the prospect.

Callabonna Beam Pump

1.2 WEATHER

The weather was typical winter weather, fine & cool for the entire job, with quite a few windy days.

1.3 LOGISTICS

All equipment and camp remained in the same site as the Charo 3D, with Callabonna only approximately 10km away. There was minimal down time between programs as the line crew simply continued moving spread from prospect to prospect.

Access to all the lines was via a cleared track that ran through the middle of the prospect to the Callabonna oil wells.

The accommodation facilities were in the form of mobile vans that were provided by Terrex Seismic and were capable of sleeping up to 56 people.

All meals were provided by the mobile kitchen and diner that was staffed by two full time cooks and one kitchen hand.

All supplies and freight were transported via road out of Adelaide and delivered to camp by Mansell's Transport.

Fuel for all vehicles was supplied by I.O.R. Petroleum of Eromanga that was delivered to site. All other logistics were supported out of Terrex Seismic Perth Office.

Preparing for initial layout

2. SURVEYING

2.1 RANGING / CHAINING / SURVEYING

Line chaining and survey for the entire program were completed by Conics Positioning personnel from Brisbane.

2.2 LINE CLEARING

All line clearing was performed by Terrex Contracting

.

2.3 PERMITTING

Permitting was carried out by the client with Tony Kenny acting as the client representative for the contract's entirety.

3.0 RECORDING PARAMETERS

3.1 GENERAL SURVEYING DETAILS

Survey: CPSN08D –Callabonna 3D

Project Code: 5307014

Surface area: 37.24 sq km
Receiver Lines: 23 lines, 280m interval, 139.44 km
Source Lines: 24 lines, 280 m interval, 139.16 km (all orthogonal)

Source Recorded into patch of **10 receiver lines each of 112 channels**
Source between channels 56 and 57

3.2 RECORDING PARAMETERS

<u>Instrumentation</u>		
Instruments	:	Sercel 428XL – 24 bit.
No. Channels	:	1120 (10 lines of 112)
Tape Format	:	SEGD, 8058 IEEE Demultiplexed, LTO 2 Quad. Recorded (LTO 2 & HD)
Filters	:	Hi-cut 200hz. No Lo Cut available
Sample Rate	:	2 ms
Correlated Record Length	:	4 seconds
RTC	:	Yes
Correlation Type	:	Zero Phase, After Sum
Stack	:	Diversity Stack
<u>Source</u>		
Vibrators	:	3 AVH-IV 62,000 lb peak force on 4X4 articulated buggies (1 group)
Electronics	:	Pelton VibPro VCE in vibrators, ESG in recorder.
Sweep Frequency	:	5-90 Hz
Sweep Length	:	**3 seconds** (plus 4s listen)
Sweep Function	:	Linear Upsweep
No. Sweeps	:	2 standing
VP Interval	:	35m. Orthogonal
Vibrator Array	:	3 in line, 12.5 m. pad to pad standing. No move-up.

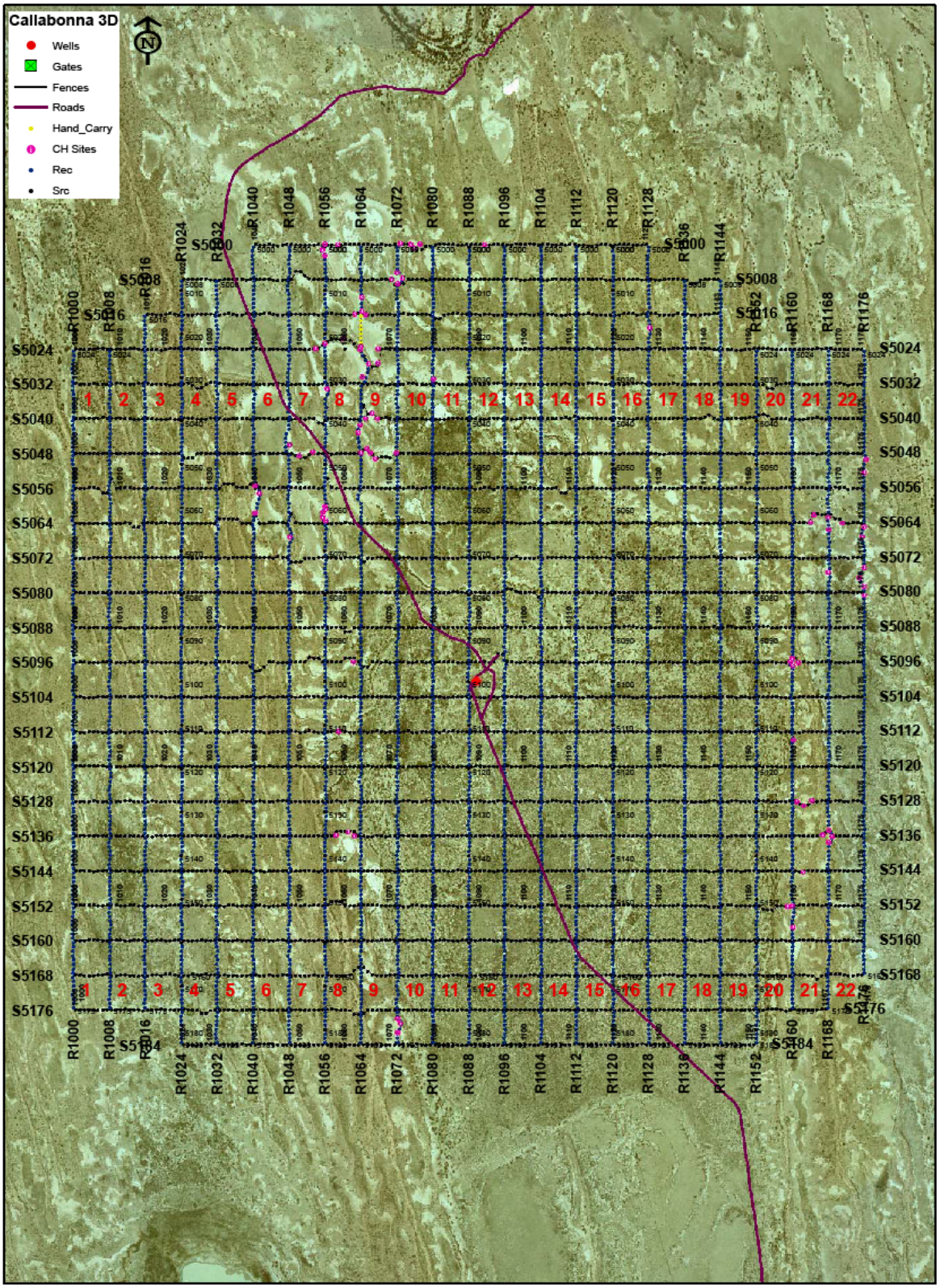
End Tapers (Cosine)	:	0.2s
Phase Locking Type	:	Ground Force using M51 HP accelerometers.
Amplitude Control	:	Peak to Peak
Sweep amplitude taper	:	100% (none)
Drive level	:	Maximum subject to out of spec distortion. Varied by amplitude control function

Receivers

Group Interval	:	35m
Geophones	:	Sensor SM4 10 Hz Hi spec super phones.
Spread	:	Split, source between channel 56 and 57
No. per string	:	12 phones in line 2.92 m. spacing, centred on station.
Far Trace	:	2374m (diagonal) nominal **but longer offset trials may be requested.**

Back crew picking up geophones

3.3 CHARO 3D GRID



3.4 RECORDING

The Callabonna 3D was located in the Cooper Basin, approximately 45km NW of Tirrawarra Satellite near Walkers Crossing. The 37.24 sq km grid was small enough to be recorded as a single panel. Recording commenced on the 13th of August with the final VP being recorded on the 19th of August, at an average production rate of 5.96 sq km per day.
Recording was completed on the 19th August with the next day being a pickup/camp pack up day, with the crew then mobilising to the next prospect 3D on the 21st of August.

3.5 PROCESSING

All final data shipments were sent to the below locations.

A & B Tapes: Nick Papanicolaou
Geophysical Assistant
Santos Ltd - Operations Geophysics
60 Flinders Street,
Adelaide S.A. 5000

Example of line weaving performed by Terrex Contracting

APPENDIX A

EQUIPMENT SPECIFICATIONS

RECORDING EQUIPMENT (3D Surveys)

SERCEL 428 Seismic Data Acquisition System

- Three (3) 19inch Flat Screens with Sun Blade Computer
- Veritas V12 Plotter, UPS, LIM, APM
- Two (2) LTO High Density Tape Drives
- One Hundred and Fifty (550) Seismic Cables with 4 x FDUs per cable separated by 55 metres between takeouts (2200 Ch)
- Fifty (50) Power Harness Leads
- Ninety-Seven (97) Line Batteries
- Fifty-Four (54) Transverse Cable
- Twenty-Seven (27) Repeaters
- Fourteen (14) LAUX's
- Forty-Nine (49) LAUL's
- Ten (10) Telwin (Nevaboost 140) Battery Chargers
- **Pelton** Real Time Similarity System
- One (1) 10 metre 6 DB Boost High Gain Antenna on Recording Truck

- **Sensor SM4 10Hz High Specification Superphones**
- Four Thousand Six Hundred (4600) Geophone strings with 6 ph/group (Equivalent of 2300 Channels of 12 phones/group)/

SOURCE EQUIPMENT

- **Four (4) Input-Output AVH IV 4x4 Buggy Vibrators:**
  Peak force is 62000lbs per Vibe and Hold-Down weight is 62400lbs per Vibe
- **Four (4) Pelton VibPro Vibrator Control Electronics**
- One (1) Pelton VibPro Encoder Sweep Generator for Recorder
- Three (3) operating Online and One (1) on Standby
- Electronics are capable of Trade Marked **Varisweep**

APPENDIX B

VEHICLE EQUIPMENT LIST

#	VEHICLE	REGISTRATION
1	100 Series Landcruiser Wagon	1CCX-396
2	100 Series Landcruiser Wagon	366 KKZ
3	100 Series Landcruiser Wagon	094 IIU
4	100 Series Landcruiser Wagon	096 IIU
5	100 Series Landcruiser Wagon	1BYK- 183
6	100 Series Landcruiser Wagon	772 KCU
7	100 Series Landcruiser Wagon	WZI 799
8	Troop Carrier Ambo	1CGX-030
9	Landcruiser Tray back	344IJX
10	Landcruiser Trayback	799-JMJ
11	Landcruiser Trayback	1BRD 044
12	Landcruiser Trayback	308-IJX
13	Landcruiser Trayback	367-KKZ
14	Landcruiser Trayback	798-JMJ
15	Landcruiser Trayback	311-IJX
16	Landcruiser Trayback	1BSR 496
17	Landcruiser Trayback	800-JMJ
18	Landcruiser Trayback	235-GVQ
19	Landcruiser Trayback	801-JMJ
20	Landcruiser Trayback	1CUE-670
	LIGHT VEHICLE LIST	
1	I/O AHV-IV Vibrator	C 32657
2	I/O AHV-IV Vibrator	C 32658
3	I/O AHV-IV Vibrator	C 32659
4	I/O AHV-IV Vibrator	C 32660
5	Hino Recorder	1 CDW 327
6	Paystar Water Truck	627-JAH
7	Kenworth Cab/o	1AGB 177
8	Paystar Vibe ServiceTruck	875 HJU
9	Kenworth Spread Truck	874 HJU
10	Hino Spread Truck	7DT 982
11	Paystar Workshop	371 JCN
12	Freightliner Water	448 KMT
13	Kenworth Generators	WNK750
14	Paystar Spread	626 JAH
15	Hino Crane Truck	1 CMW 981
	HEAVY VEHICLE LIST	

1	6 x 4 Toilet Trailer (Ladies Single)	1TBF 454
2	8 x 5 Tandem Box Trailer (Wash Down)	1TBU 582
3	Dolly	509-QJG
4	Dry Stores/Coolroom on Trailer	508 QJG
5	Elross 1 Room (4 man) sleeper	1TER 545
6	Elross 1 Room (4 man) sleeper	1TER 546
7	Elross HSE Office	1TFB 626
8	Homemade Pig Trailer Laundry	496 QJG
9	Homemade Pig Trailer Showers	504 QJG
10	Mechanic's Workshop (C'made)	1TAR 750
11	Modern Caravan (Battery Hen)	6WC 169
12	Rio Tinto 3 Room Sleeper	506 QJG
13	Spread Trailer	507-QJG
14	Tri-axle trailer (Generators)	126-QMP
15	Tandem-axle trailer (Spread)	092-QIR
16	Tamworth Cable Repair	N 69423
17	Tandem 3 Toilet Trailer	0TDJ 497
18	Elross New Office/ 2 Man sleeper	1 TGL 813
19	Elross Diner	1 TGZ 789
20	Elross Kitchen	1TGZ 790
21	Elross 3 Rooms (6 man) sleeper	1TGL 663
22	Elross 3 Rooms (6 man) sleeper	1TGL 664
23	Elross 3 Rooms (6 man) sleeper	1TGL 666
24	Elross 3 Rooms (6 man) sleeper	1TGL 815
25	Elross 3 Rooms (6 man) sleeper	1TGL 812
26	Elross 3 Rooms (6 man) sleeper	1TGL 811
	TRAILER LIST	

APPENDIX C

TAPE LISTING

Santos Caroowinnie 3D							
Tape #	**Swath**	**First FFID**	**Last FFID**	**First VP**	**Last VP**	**Date Recorded**	**Comments**
8005A		1	3994	5024/1007	5168/1168	13/08/08 - 19/08/08	Callabonna 3D

APPENDIX D

HSE POLICY and
OCCUPATIONAL HEALTH & SAFETY STANDARDS

- Site specific inductions / daily toolbox meetings / weekly safety meetings
    - Weekly Section head meetings
        - Personal protective equipment
            - Traffic Management Safety as required
                - VHF / UHF / HF communications
                    - Vehicle emergency equipment
                        - Random drug and alcohol tests

TERREX SEISMIC HEALTH, SAFETY AND ENVIRONMENT POLICY

Terrex Seismic is an Exploration Contractor involved in Seismic Acquisition to the Oil, Gas and Mineral Industries.

Our Commitments

- To provide a safe, healthy and injury free workplace for our employees, contractors and the general public.
- Assisting all of our employees and contractors to meet their HSE obligations.
- Establish and implement an HSE Management System and Operational Plans at all levels of the Company.
- Education and training of all of our Employees in HSE Systems, Procedures, Risk Assessment and Risk Minimization.
- Ongoing evaluation and modification of all of our HSE Management Systems, Procedures and Plans in order to ensure a consistent improvement in the establishment of a safe, healthy and environmentally sound workplace.
- Ensure all of our HSE Systems are in accordance with the relevant legislation and requirements of Clients and Government Bodies.

Our Goal

- To achieve a workplace where the targets of zero injuries, equipment damage and environmental incidents are attained.

Our Systems

- Management shall provide a visible, personal involvement in all aspects of HSE, and through their actions create a culture that facilitates employee HSE involvement. Management shall make available the appropriate resources to carry out all manner of HSE.
- Policies and objectives shall be initiated, defined, communicated and revised at all organizational levels.
- Organizational responsibilities shall be defined and the necessary resources provided to achieve HSE objectives
- Management shall continuously evaluate the HSE risks to the employees, clients and environment. Comprehensive risk assessment provides the necessary information in order to take action to reduce the risk to our operations.
- HSE shall be integrated in the design, development and delivery of all services. This includes planning for existing operations, managing change and developing emergency response measures.

Each employee has a personal responsibility to comply with this policy and contribute towards its implementation. Management holds the responsibility to communicate the requirements of this policy to all our employees, contractors and visitors and to involve them in its implementation.
Breach of this policy will be taken very seriously and may involve disciplinary action.

Stephen P. C. Tobin

APPENDIX E

END OF CONTRACT HSE REPORT

Health Safety & Environment

End of Contract Report Santos_Callabonna3D

13th August -20th August 2008

Client	**Santos**	**HSE Advisor**	Sarah Burton
Location	103 Km North West of Moomba	**Combined Personnel**	46
Camp Site	57 person Accomodation	**BAC Tests Conducted**	6
Camp Location	**45Km North West of Tirrawarra** **27° 29' 10"** **139° 44' 56"** **E 376 480** **N 6 959 190**	**Preliminary Drug Tests**	0
Sub-Contractors	Terrex Contracting Conics Positioning Surveys	**Standard Operating Procedure Revisions**	0

Summary

10-August-2008	Callabonna site induction, by Tony Kenny
10-12 August-2008	Commenced lay out of the spread. Still shooting the Charo 3D.
13-August-2008	Commenced Shooting.
17-August-2008	Safety Sunday Meeting - Wound, burn and breaks & strains treatment. Refer meeting minutes.
19-August-2008	Shooting completed.
20-August-2008	Spread picked up.

Safety Statistics

Terrex Seismic Man-hours	4428.00
Sub-Contractor Man-hours	1632.00
Fatalities	0
LTI's	0
MTI's	0
Days since last MTI/LTI	22
First Aid Incidents	0
Incident / Accident Reports	0
Work Days Lost	0
Near Miss Reports	1
Hazard Identification Reports	2
Training Hours	152.30
Tool Box / Safety Meeting Man-hours	93.00
Audits / Inspections	99
Drills	0
Land Spills (< 5 litres)	0

Medical Statistics

Clinic Attendance	
Colds/Flu/Sore throat	1
Non Specific	0
Ear / Nose / Throat	0
Allergies	0
Muscular / Skeletal / Soft Tissue	1
Eye Irritation	0
Headaches	1
Gynaecological	0
Wound / Laceration / Dressing	0
Skin / Rash / Fungal	0
Dental	1
Burn	0
Heat Illness	0
Bites / Stings	0
Nausea/Vomiting/Diarrhoea	1
TOTAL	**5**

APPENDIX F

PERSONNEL – CREW LIST

POSITION	NAMES
Client Representative	Allen John
Client Representative	Kenny Tony
Client Representative	Thirlwell Stewart
Client Rep	
Crew Manager	Goossens Shane
Crew Manager	Hutchison Tony
HSE	Burton Sarah
HSE Trainee	Wulff Joanne
HSE Trainee	Bobrowski Shirley
Admin Staff	
Mechanic	Goossens Julien
Mechanic	Lawless Shane
Mechanic	Paul Marco
Mechanic	McKenzie Peter
Campy	Halpin Julian
Campy	Harris Sarah
Campy	Powell Lorraine
Cook	Cook Alan
Cook	Smith Geoff
Cook	Togo Beau
Kitchen Hand	Iwaski Masako
Kitchen Hand	MacDonald Mandy
Supply Driver	Laycock Timothy
Supply Driver	Fuller Patrick
Supply Driver	Kelly Shane
Camp Staff	
Observer	Helme Nik
Observer	Carry Joel
Cable Repair	Humphries Ben
Cable Repair (Trainee)	Richardson Brad
Technical	

POSITION	NAMES
De-Pegger	Dittmer Karl
De-Pegger	Harmston Kenneth
De-Peggers	
Vib Op/Scout	Lynch David
Vib Op	Samios Luke
Vib Op	Davidson Anthony
Vib Op	Cabot Allen
Vib Op	James Dave
Vib Op	Little Greg
Vib Op	Shufflebotham Shane
Vib Op	Kelly Shane
Vibrator Crew	
Vib Tech	Manning Edward
Vib Tech	Jourdrey Donald
Vib Tech Trainee	Cabot Allen
Vib Tech	
Line Boss	Byrne Gareth
Snr Line	
T/Shooter	Byrne Nathan
T/Shooter	Capper Alyx
T/Shooter	Miles Keeley
T/Shooter	Taylor Aaron
T/Shooter	Wilson Dave
T/Shooter	Phillips Chris
Trouble Shooters	

POSITION	NAMES
Line Crew	Ablitt Gregory
Line Crew	Ambachtsheer Nola
Line Crew	Archer Warren
Line Crew	Barns Dan
Line Crew	Bourke Kristy
Line Crew	Brandley Jessica
Line Crew	Capper Alyx
Line Crew	Dittmer Karl
Line Crew	Durance Dale
Line Crew	Eagles Jason
Line Crew	Fuller Patrick
Line Crew	Geisler Steven
Line Crew	Harrison Josh
Line Crew	Harmston Kenneth
Line Crew	Howell Jabez
Line Crew	Kelly Shane
Line Crew	Knight Beau
Line Crew	Lloyd Tyson
Line Crew	Maher Josh
Line Crew	Mc Carthy Jeremy
Line Crew	McConville Christina
Line Crew	McInroy Ryan
Line Crew	McLaren Nichola
Line Crew	Miles Keeley
Line Crew	Newbould Ryan
Line Crew	Novley Darryl
Line Crew	Paul Carlo
Line Crew	Phillips Chris
Line Crew	Powell Lorraine
Line Crew	Post James
Line Crew	Reynolds Johnathan
Line Crew	Rogers Luke
Line Crew	Sampson Brooke
Line Crew	Smith Christine
Line Crew	Smith William
Line Crew	Spring Rebecca
Line Crew	Taylor Aaron
Line Crew	Tepa Eldon
Line Crew	Tonkin Anthony
Line Crew	Wilson Dave
Line Crew	Wyllie Edward
Line Crew	

PERSONNEL – CREW NUMBERS

POSITION	NUMBERS
Crew Manager	2
HSE Advisor	3
Observer	2
Cable Repair	2
Vib Op	8
Vib Tech	3
Line Boss	1
Trouble Shooter	6
Line Crew	41
Client Rep	3
Mechanic	4
Campy	3
Cook	3
Kitchen Hand	2
Supply Driver	3
De- Pegger	2

APPENDIX G

DAILY REPORTS

Terrex Seismic
Daily Report

CREW 402

Client..... SANTOS
Survey Name. Callabonna 3D
Area..... PPL 176(Santos), PEL 104(Victoria Petroleum)
State..... SA

Party Manager: Shane Goossens
Client Rep: Tony Kenny
Weather: Fine / Cool
DATE: Wednesday, 13 August 2008

PRODUCTION

Swath	Source	Receiver	Kms.	Skips	Vp's
1	5024-5176	1000-1040	5.6	0	160
2	5176-5024	1000-1048	5.6	0	160
3	5016-5176	1000-1056	5.88	0	168
4	5184-5176	1000-1064	0.56	0	16
5	5184-5176	1000-1072	0.56	0	16

Daily Totals

VP's:	520
Skips:	0
Lin.Kms:	18.2000
Day.Sq.Klms:	4.8704

Cumulative Totals

Cum. Skip Vp's:	0
Cum. VP's:	520
Cum.Lin.Kms:	18.2000
Cum.Sq.Klm:	4.8704
Lin.Kms.Remaining:	120.9600
Sq.Kms.Remaining:	32.3696
% Completed:	13.08%
Average Daily Production Sq. Kms:	4.8704
Average Daily Production Line Kms:	18.2000
Estimated Finish Date:	Wednesday, 20 August 2008

HOURS

Working Time -		**Down Time -**		**Standby Time -**			
Recording:	5.4	Human Error:		Toolbox/Safety Meeting:	0.3		
Requested Experimental:		Troubleshooting:	0.2	Induction:			
Recorder Moveup:		Recorder:		Weather:			
Vibrator Moveup:		Vibes:		Other:			
Detour:	0.5	WOS:					
Traverse Move:	2.4	Other:		**Other -**			
Swath Move:	0.2	**Non-Charge Time -**					
Spread Damage:	0.9	Travel Time:	0.6	Spread Layout/Pickup:			
Interprospect Move:	1.0	Instrument Tests\Morning QC:		Crew Demobe/Remobe:			
		Panel Move:		Camp Move:			
		Other:	0.6				

Daily Totals

Working Time:	10.4
Standby Time:	0.3
Down Time:	0.2
Non-Charge Time:	1.2
Other:	0.0
Total Day Hrs:	12.1
Total Day Charge Hours:	10.7

Cumulative Totals

Working Time(Job):	10.4
Standby Time(Job):	0.3
Down Time(Job):	0.2
Non-Charge Time(Job):	1.2
Total Hrs (Job):	12.1

COMMENTS:

*Production started on Callabonna 3D
*Other Non-Charge time for hardwires & point source test
*Spread damage due to dingo chewage

Spread Movement

Client: Callabonna 3D — **Date:** Wednesday, 13 August 2008

Layout Line	Station #		Tot	Pickup Line	Station #		Tot
1056	5000	5103	104				
1064	5000	5183	184				
1072	5000	5183	184				
1080	5000	5183	184				
1088	5000	5183	184				
1096	5000	5183	184				
1104	5135	5183	49				
		Total Stations :	1073			**Total Stations:**	0

Total Crew #'s:44 **Line Crew #'s:24** **Vehicle #'s:18**

Equipment Report **Bad Phones:** 4 **Bad Cable:** 3

Crew Manager .....

Client Rep .....

Terrex Seismic
Daily Report

CREW 402

Client..... SANTOS
Survey Name. Callabonna 3D
Area..... PPL 176(Santos), PEL 104(Victoria Petroleum)
State..... SA

Party Manager: Shane Goossens
Client Rep: Tony Kenny
Weather: Fine / Cool
DATE: Thursday, 14 August 2008

PRODUCTION

Swath	Source	Receiver	Kms.	Skips	Vp's
4	5168-5008	1000-1064	5.88	0	168
5	5168-5008	1000-1072	5.88	0	168
6	5000-5184	1008-1080	6.72	0	192
7	5184-5088	1016-1088	3.64	0	104

Daily Totals

VP's:	632
Skips:	0
Lin.Kms:	22.1200
Day.Sq.Klms:	5.9194

Cumulative Totals

Cum. Skip Vp's:	0
Cum. VP's:	1152
Cum.Lin.Kms:	40.3200
Cum.Sq.Klm:	10.7898
Lin.Kms.Remaining:	98.8400
Sq.Kms.Remaining:	26.4502
% Completed:	28.97%
Average Daily Production Sq. Kms:	5.3949
Average Daily Production Line Kms:	20.1600
Estimated Finish Date:	Tuesday, 19 August 2008

HOURS

Working Time -		**Down Time -**		**Standby Time -**		**Daily Totals**	
Recording:	7.4	Human Error:		Toolbox/Safety Meeting:	0.3	**Working Time:**	11.0
Requested Experimental:		Troubleshooting:	0.3	Induction:		**Standby Time:**	0.3
Recorder Moveup:		Recorder:		Weather:		**Down Time:**	0.3
Vibrator Moveup:		Vibes:		Other:		**Non-Charge Time:**	0.6
Detour:	0.6	WOS:				**Other:**	0.0
Traverse Move:	2.5	Other:		**Other -**		**Total Day Hrs:**	12.2
Swath Move:	0.1	**Non-Charge Time -**				**Total Day Charge Hours:**	11.3
Spread Damage:	0.4	Travel Time:	0.4	Spread Layout/Pickup:		**Cumulative Totals**	
Interprospect Move:		Instrument Tests\Morning QC:	0.1	Crew Demobe/Remobe:		**Working Time(Job):**	21.4
		Panel Move:		Camp Move:		**Standby Time(Job):**	0.6
		Other:	0.1			**Down Time(Job):**	0.5
						Non-Charge Time(Job):	1.8
						Total Hrs (Job):	24.3

COMMENTS:

*Crew change in via Innamincka
*Good production considering large crew change
*Troubleshooting time due to cable problems
*Spread damage due to dingo chewage

Spread Movement

Client: Callabonna 3D — **Date:** Thursday, 14 August 2008

Layout Line	Station #		Tot	Pickup Line	Station #		Tot
1104	5000	5134	135	1000	5024	5175	152
1112	5000	5183	184	1008	5024	5175	152
				1016	5160	5175	16
	Total Stations :	319			**Total Stations:**	320	

Total Crew #'s:44 **Line Crew #'s:24** **Vehicle #'s:18**

Equipment Report **Bad Phones:** 2 **Bad Cable:** 2

Crew Manager .....

Client Rep .....

Terrex Seismic
Daily Report

CREW 402

Client.....	SANTOS	Party Manager:	Shane Goossens
Survey Name.	Callabonna 3D	Client Rep:	Tony Kenny
Area.....	PPL 176(Santos), PEL 104(Victoria Petroleum)	Weather:	Fine / Cool
State.....	SA	DATE:	Friday, 15 August 2008

PRODUCTION

Swath	Source	Receiver	Kms.	Skips	Vp's
7	5080-5000	1016-1088	3.08	0	88
8	5000-5184	1024-1096	6.72	0	192
9	5184-5000	1032-1104	6.72	0	192
10	5000-5160	1040-1112	5.88	0	168

Daily Totals

VP's:	640
Skips:	0
Lin.Kms:	22.4000
Day.Sq.Klms:	5.9944

Cumulative Totals

Cum. Skip Vp's:	0
Cum. VP's:	1792
Cum.Lin.Kms:	62.7200
Cum.Sq.Klm:	16.7842
Lin.Kms.Remaining:	76.4400
Sq.Kms.Remaining:	20.4558
% Completed:	45.07%
Average Daily Production Sq. Kms:	5.5947
Average Daily Production Line Kms:	20.9067
Estimated Finish Date:	Tuesday, 19 August 2008

HOURS

Working Time -		Down Time -		Standby Time -		Daily Totals	
Recording:	6.9	Human Error:		Toolbox/Safety Meeting:	0.3	Working Time:	11.3
Requested Experimental:		Troubleshooting:		Induction:		Standby Time:	0.3
Recorder Moveup:		Recorder:		Weather:		Down Time:	0.0
Vibrator Moveup:		Vibes:		Other:		Non-Charge Time:	0.7
Detour:	0.8	WOS:				Other:	0.0
Traverse Move:	3.0	Other:		**Other -**		Total Day Hrs:	12.3
Swath Move:	0.3	**Non-Charge Time -**				Total Day Charge Hours:	11.6
Spread Damage:	0.3	Travel Time:	0.4	Spread Layout/Pickup:		**Cumulative Totals**	
Interprospect Move:		Instrument Tests\Morning QC:	0.1	Crew Demobe/Remobe:		Working Time(Job):	32.7
		Panel Move:		Camp Move:		Standby Time(Job):	0.9
		Other:	0.2			Down Time(Job):	0.2
						Non-Charge Time(Job):	2.5
						Total Hrs (Job):	36.6

COMMENTS:

*Spread damage due to dingo chewage
*Good production
*Detour time due to short but steep sand dunes

Spread Movement

Client: Callabonna 3D — **Date:** Friday, 15 August 2008

Layout Line	Station #		Tot	Pickup Line	Station #		Tot
1120	5000	5183	184	1016	5016	5159	144
1128	5000	5183	184	1024	5008	5183	176
1136	5040	5183	144	1032	5008	5183	176
				1040	5000	5087	88
	Total Stations :	512			Total Stations:	584	

Total Crew #'s:44 **Line Crew #'s:24** **Vehicle #'s:18**

Equipment Report **Bad Phones: 2** **Bad Cable: 1**

Crew Manager .....

Client Rep .....

Terrex Seismic
Daily Report

CREW 402

Client..... SANTOS
Survey Name. Callabonna 3D
Area..... PPL 176(Santos), PEL 104(Victoria Petroleum)
State..... SA

Party Manager: Shane Goossens
Client Rep: Tony Kenny
Weather: Fine / Cool
DATE: Saturday, 16 August 2008

PRODUCTION

Swath	Source	Receiver	Kms.	Skips	Vp's
10	5168-5184	1040-1112	0.84	0	24
11	5184-5000	1048-1120	6.72	0	192
12	5000-5184	1056-1128	6.72	0	192
13	5184-5000	1064-1136	6.72	0	192
14	5000-5064	1072-1144	2.52	0	72

Daily Totals

VP's:	672
Skips:	0
Lin.Kms:	23.5200
Day.Sq.Klms:	6.2941

Cumulative Totals

Cum. Skip Vp's:	0
Cum. VP's:	2464
Cum.Lin.Kms:	86.2400
Cum.Sq.Klm:	23.0783
Lin.Kms.Remaining:	52.9200
Sq.Kms.Remaining:	14.1617
% Completed:	61.97%
Average Daily Production Sq. Kms:	5.7696
Average Daily Production Line Kms:	21.5600
Estimated Finish Date:	Tuesday, 19 August 2008

HOURS

Working Time -		Down Time -		Standby Time -	
Recording:	7.1	Human Error:		Toolbox/Safety Meeting:	0.3
Requested Experimental:		Troubleshooting:		Induction:	
Recorder Moveup:	0.8	Recorder:		Weather:	
Vibrator Moveup:		Vibes:		Other:	
Detour:		WOS:			
Traverse Move:	3.2	Other:		**Other -**	
Swath Move:	0.2	**Non-Charge Time -**			
Spread Damage:		Travel Time:	0.4	Spread Layout/Pickup:	
Interprospect Move:		Instrument Tests\Morning QC:	0.1	Crew Demobe/Remobe:	
		Panel Move:		Camp Move:	
		Other:	0.1		

Daily Totals

Working Time:	11.3
Standby Time:	0.3
Down Time:	0.0
Non-Charge Time:	0.6
Other:	0.0
Total Day Hrs:	12.2
Total Day Charge Hours:	11.6

Cumulative Totals

Working Time(Job):	44.0
Standby Time(Job):	1.2
Down Time(Job):	0.5
Non-Charge Time(Job):	3.1
Total Hrs (Job):	48.8

COMMENTS:

*Excellent production
*Depegging nearly completed on Charo 3D

Spread Movement

Client: Callabonna 3D — **Date:** Saturday, 16 August 2008

Layout Line	Station #		Tot	Pickup Line	Station #		Tot
1136	5008	5039	32	1040	5088	5183	96
1144	5008	5183	176	1048	5000	5183	184
1152	5024	5183	160	1056	5000	5183	184
1160	5024	5175	152	1064	5000	5183	184
1168	5072	5175	104				
	Total Stations :	624			Total Stations:	648	

Total Crew #'s:44 **Line Crew #'s:24** **Vehicle #'s:18**

Equipment Report **Bad Phones:** 1 **Bad Cable:** 1

Crew Manager .....

Client Rep .....

Terrex Seismic
Daily Report

CREW 402

Client..... SANTOS
Survey Name. Callabonna 3D
Area..... PPL 176(Santos), PEL 104(Victoria Petroleum)
State..... SA

Party Manager: Shane Goossens
Client Rep: Tony Kenny
Weather: Fine / Cool
DATE: Sunday, 17 August 2008

PRODUCTION

Swath	Source	Receiver	Kms.	Skips	Vp's
14	5072-5184	1072-1144	4.2	0	120
15	5184-5000	1080-1152	6.72	0	192
16	5000-5184	1088-1160	6.72	0	192
17	5000-5184	1096-1168	6.44	0	184
18	5184-5160	1104-1176	1.12	0	32

Daily Totals

VP's:	720
Skips:	0
Lin.Kms:	25.2000
Day.Sq.Klms:	6.7437

Cumulative Totals

Cum. Skip Vp's:	0
Cum. VP's:	3184
Cum.Lin.Kms:	111.4400
Cum.Sq.Klm:	29.8220
Lin.Kms.Remaining:	27.7200
Sq.Kms.Remaining:	7.4180
% Completed:	80.08%
Average Daily Production Sq. Kms:	5.9644
Average Daily Production Line Kms:	22.2880
Estimated Finish Date:	Tuesday, 19 August 2008

HOURS

Working Time -		**Down Time -**		**Standby Time -**		**Daily Totals**	
Recording:	10.2	Human Error:		Toolbox/Safety Meeting:	0.5	**Working Time:**	10.2
Requested Experimental:		Troubleshooting:	0.2	Induction:		**Standby Time:**	0.5
Recorder Moveup:		Recorder:		Weather:		**Down Time:**	0.2
Vibrator Moveup:		Vibes:		Other:		**Non-Charge Time:**	1.3
Detour:		WOS:				**Other:**	0.0
Traverse Move:		Other:		**Other -**		**Total Day Hrs:**	12.2
Swath Move:		**Non-Charge Time -**				**Total Day Charge Hours:**	10.7
Spread Damage:		Travel Time:	0.8	Spread Layout/Pickup:		**Cumulative Totals**	
Interprospect Move:		Instrument Tests\Morning QC:	0.3	Crew Demobe/Remobe:		**Working Time(Job):**	54.2
		Panel Move:		Camp Move:		**Standby Time(Job):**	1.7
		Other:	0.2			**Down Time(Job):**	0.4
						Non-Charge Time(Job):	4.4
						Total Hrs (Job):	61.0

COMMENTS:

*Excellent production
*Due to large number of files Obs logs are in text format, therefore no way to break down traverse time etc
*Longer standby for toolbox due to Sunday safety meeting

Spread Movement

Client: Callabonna 3D — **Date:** Sunday, 17 August 2008

Layout Line	Station #		Tot	Pickup Line	Station #		Tot
1168	5024	5071	48	1072	5000	5183	184
1176	5024	5167	144	1080	5000	5183	184
				1088	5000	5183	184
				1096	5000	5183	184
	Total Stations :	192			**Total Stations:**	736	

Total Crew #'s:44 **Line Crew #'s:24** **Vehicle #'s:18**

Equipment Report **Bad Phones:** 1 **Bad Cable:**

Crew Manager .....

Client Rep .....

Terrex Seismic
Daily Report

CREW 402

Client..... SANTOS
Survey Name. Callabonna 3D
Area..... PPL 176(Santos), PEL 104(Victoria Petroleum)
State..... SA

Party Manager: Shane Goossens
Client Rep: Tony Kenny
Weather: Fine / Cool
DATE: Monday, 18 August 2008

PRODUCTION

Swath	Source	Receiver	Kms.	Skips	Vp's
18	5152-5008	1104-1176	5.32	0	152
19	5024-5184	1112-1176	5.88	0	168
20	5024-5176	1120-1176	5.6	0	160
21	5176-5024	1128-1176	5.6	0	160
22	5024-5080	1136-1176	2.24	0	64

Daily Totals

VP's:	704
Skips:	0
Lin.Kms:	24.6400
Day.Sq.Klms:	6.5938

Cumulative Totals

Cum. Skip Vp's:	0
Cum. VP's:	3888
Cum.Lin.Kms:	136.0800
Cum.Sq.Klm:	36.4158
Lin.Kms.Remaining:	3.0800
Sq.Kms.Remaining:	0.8242
% Completed:	97.79%
Average Daily Production Sq. Kms:	6.0693
Average Daily Production Line Kms:	22.6800
Estimated Finish Date:	Tuesday, 19 August 2008

HOURS

Working Time -		Down Time -		Standby Time -	
Recording:	7.8	Human Error:		Toolbox/Safety Meeting:	0.3
Requested Experimental:		Troubleshooting:	0.3	Induction:	
Recorder Moveup:		Recorder:		Weather:	
Vibrator Moveup:		Vibes:		Other:	
Detour:	0.2	WOS:			
Traverse Move:	2.8	Other:		**Other -**	
Swath Move:	0.2	**Non-Charge Time -**			
Spread Damage:		Travel Time:	0.4	Spread Layout/Pickup:	
Interprospect Move:		Instrument Tests\Morning QC:	0.2	Crew Demobe/Remobe:	
		Panel Move:		Camp Move:	
		Other:	0.1		

Daily Totals

Working Time:	11.0
Standby Time:	0.3
Down Time:	0.3
Non-Charge Time:	0.7
Other:	0.0
Total Day Hrs:	12.3
Total Day Charge Hours:	11.3

Cumulative Totals

Working Time(Job):	65.2
Standby Time(Job):	2.0
Down Time(Job):	0.8
Non-Charge Time(Job):	5.1
Total Hrs (Job):	73.3

COMMENTS:

*Excellent production
*Only 88 VP's left to complete job
*Depegging continued on Charo & Callabonna prospects

Total Crew #'s:44 **Line Crew #'s:24** **Vehicle #'s:18**

Spread Movement

Client: Callabonna 3D **Date:** Monday, 18 August 2008

Layout Line	Station #		Tot	Pickup Line	Station #		Tot
				1104	5000	5183	184
				1112	5000	5183	184
				1120	5000	5183	184
				1128	5000	5183	184
		Total Stations :	0		Total Stations:		736

Equipment Report **Bad Phones:** **Bad Cable:**

Crew Manager .....

Client Rep .....

Terrex Seismic
Daily Report

CREW 402

Client..... SANTOS
Survey Name. Callabonna 3D
Area..... PPL 176(Santos), PEL 104(Victoria Petroleum)
State..... SA

Party Manager: Shane Goossens
Client Rep: Tony Kenny
Weather: Fine / Cool
DATE: Tuesday, 19 August 2008

PRODUCTION

Swath	Source	Receiver	Kms.	Skips	Vp's
22	5088-5168	1136-1176	3.08	0	88

Daily Totals

VP's:	88
Skips:	0
Lin.Kms:	3.0800
Day.Sq.Klms:	0.8242

Cumulative Totals

Cum. Skip Vp's:	0
Cum. VP's:	3976
Cum.Lin.Kms:	139.1600
Cum.Sq.Klm:	37.2400
Lin.Kms.Remaining:	0.0000
Sq.Kms.Remaining:	0.0000
% Completed:	100.00%
Average Daily Production Sq. Kms:	5.9584
Average Daily Production Line Kms:	22.2656
Estimated Finish Date:	Tuesday, 19 August 2008

HOURS

Working Time -		Down Time -		Standby Time -	
Recording:	0.8	Human Error:		Toolbox/Safety Meeting:	0.3
Requested Experimental:		Troubleshooting:		Induction:	
Recorder Moveup:		Recorder:		Weather:	
Vibrator Moveup:		Vibes:		Other:	
Detour:		WOS:			
Traverse Move:	0.4	Other:		**Other -**	
Swath Move:		**Non-Charge Time -**			
Spread Damage:	0.5	Travel Time:	0.4	Spread Layout/Pickup:	9.5
Interprospect Move:		Instrument Tests\Morning QC:	0.1	Crew Demobe/Remobe:	
		Panel Move:		Camp Move:	
		Other:			

Daily Totals

Working Time:	1.7
Standby Time:	0.3
Down Time:	0.0
Non-Charge Time:	0.5
Other:	9.5
Total Day Hrs:	12.0
Total Day Charge Hours:	2.0

Cumulative Totals

Working Time(Job):	66.9
Standby Time(Job):	2.3
Down Time(Job):	0.4
Non-Charge Time(Job):	15.1
Total Hrs (Job):	85.3

COMMENTS:

*Program comleted
*Final spread pickup continued for the rest of the day
*Depegging continued on Charo & Callabonna prospects

Total Crew #'s:44 **Line Crew #'s:24** **Vehicle #'s:18**

Spread Movement

Client: Callabonna 3D **Date:** Tuesday, 19 August 2008

Layout Line	Layout Station #		Layout Tot	Pickup Line	Pickup Station #		Pickup Tot
				1136	5008	5183	176
				1144	5000	5183	184
				1152	5024	5183	160
				1160	5024	5175	152
				1168	5024	5175	152
				1176	5024	5167	144
	Total Stations :	0			**Total Stations:**	968	

Equipment Report **Bad Phones:** **Bad Cable:** 1

Crew Manager .....

Client Rep .....

APPENDIX H

RECORDING STATISTICS

Vibrators in production

RECORDING STATISTICS

Date	Travel Time	Prospect Move	Other	Recording Time	Detours & Terrain	Trouble-shooting	Testing	Traverse Move	Spread Damage	Downtime	Swath Move	Safety Meeting's	Total Stand-by	Total Hours	Total Km's	Total Sq Km's	Crew Numbers	Channel Numbers
	Non-Chargeable	Chargeable	Non-Chargeable	Chargeable	Chargeable	Non Chargeable	Non Chargeable	Chargeable	Chargeable	Non Chargeable	Chargeable	Stand-by	Chargeable	Chargeable			Above 42	Above 2200
13 August 2008	**0.60**	**1.00**	**0.60**	**5.40**	**0.50**	**0.20**		**2.40**	**0.90**		**0.20**	**0.30**	**0.30**	**10.40**	**18.2000**	**4.8704**	2	200
14 August 2008	**0.40**		**0.10**	**7.40**	**0.60**	**0.30**	**0.10**	**2.50**	**0.40**		**0.10**	**0.30**	**0.30**	**11.40**	**22.1200**	**5.9194**	2	200
15 August 2008	**0.40**		**0.20**	**6.90**	**0.80**		**0.10**	**3.00**	**0.30**		**0.30**	**0.30**	**0.30**	**11.30**	**22.4000**	**5.9944**	2	200
Total	**1.4000**	**1.0000**	**0.9000**	**19.7000**	**1.9000**	**0.5000**	**0.2000**	**7.9000**	**1.6000**	**0.0000**	**0.6000**	**0.9000**	**0.9000**	**33.1000**	**62.7200**	**16.7842**	**6.0000**	**600.0000**

APPENDIX 3 - RECORDING PRODUCTION STATISTICS

RECORDING STATISTICS

Date	Travel Time	Prospect Move	Other	Recording Time	Detours & Terrain	Trouble-shooting	Testing	Traverse Move	Spread Damage	Downtime	Swath Move	Safety Meeting's	Total Stand-by	Total Hours	Total Km's	Total Sq Km's	Crew Numbers	Channel Numbers
	Non-Chargeable	Chargeable	Non-Chargeable	Chargeable	Chargeable	Non Chargeable	Non Chargeable	Chargeable	Chargeable	Non Chargeable	Chargeable	Stand-by	Chargeable	Chargeable			Above 42	Above 2200
13 August 2008	**0.60**	**1.00**	**0.60**	**5.40**	**0.50**	**0.20**		**2.40**	**0.90**		**0.20**	**0.30**	**0.30**	**10.40**	**18.2000**	**4.8704**	2	200
14 August 2008	**0.40**		**0.10**	**7.40**	**0.60**	**0.30**	**0.10**	**2.50**	**0.40**		**0.10**	**0.30**	**0.30**	**11.40**	**22.1200**	**5.9194**	2	200
15 August 2008	**0.40**		**0.20**	**6.90**	**0.80**		**0.10**	**3.00**	**0.30**		**0.30**	**0.30**	**0.30**	**11.30**	**22.4000**	**5.9944**	2	200
Total	**1.4000**	**1.0000**	**0.9000**	**19.7000**	**1.9000**	**0.5000**	**0.2000**	**7.9000**	**1.6000**	**0.0000**	**0.6000**	**0.9000**	**0.9000**	**33.1000**	**62.7200**	**16.7842**	**6.0000**	**600.0000**

APPENDIX 4 - PERSONNEL LIST

APPENDIX 4
PERSONNEL LIST

(Total Crew involved in project)

Terrex Seismic

Crew Manager (1)
QHSE Officer (2)
Cook (3)
Cook's Assistant (1)
Camp Attendants (2)
Mechanics (3)
Supply Drivers (2)
Observers (1)
Cable Repair Technicians (2)
Vibrator Operators (3)
Vibrator Scouts (2)
Vibrator Technician (2)
Line Boss (1)
Trouble Shooter (2)
Line Crew (min 22)

Conics Positioning

Senior Surveyor / Line Pointer (1)
GPS Operators (3)

Terrex Contracting

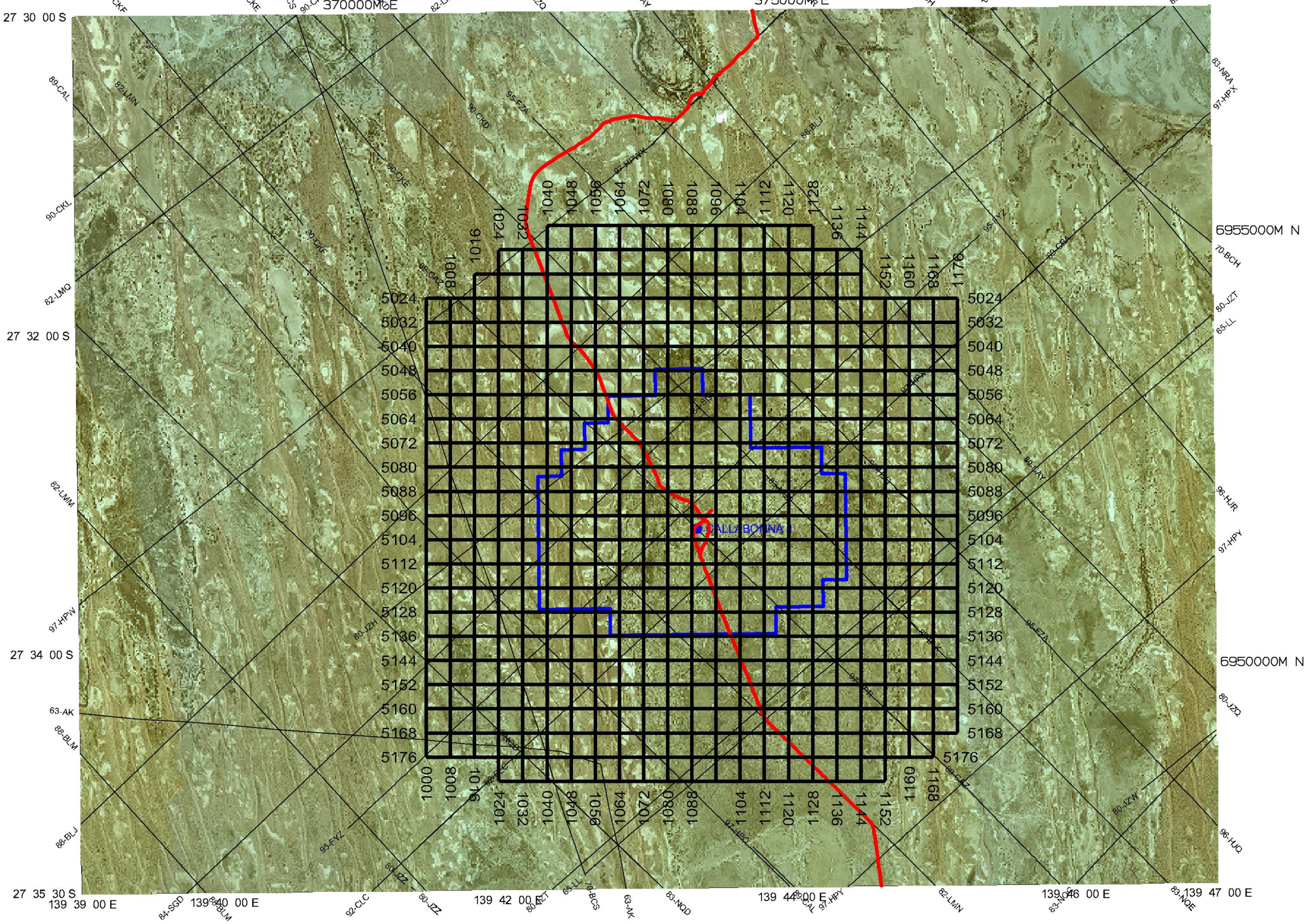
Crew Supervisor (2)
Mechanics (3)
Mechanics Assistant (1)
Cooks (2)
Bulldozer Operators (4)
Grader Operators (2)

APPENDIX 5 - TAPE LIST

Tape listing for 2008 Callabonna 3D Seismic Survey

Field Data
8005A & 8005B (LTO-2)
SPS/OBS Logs – 1 x CD

APPENDIX 6 - MAPS



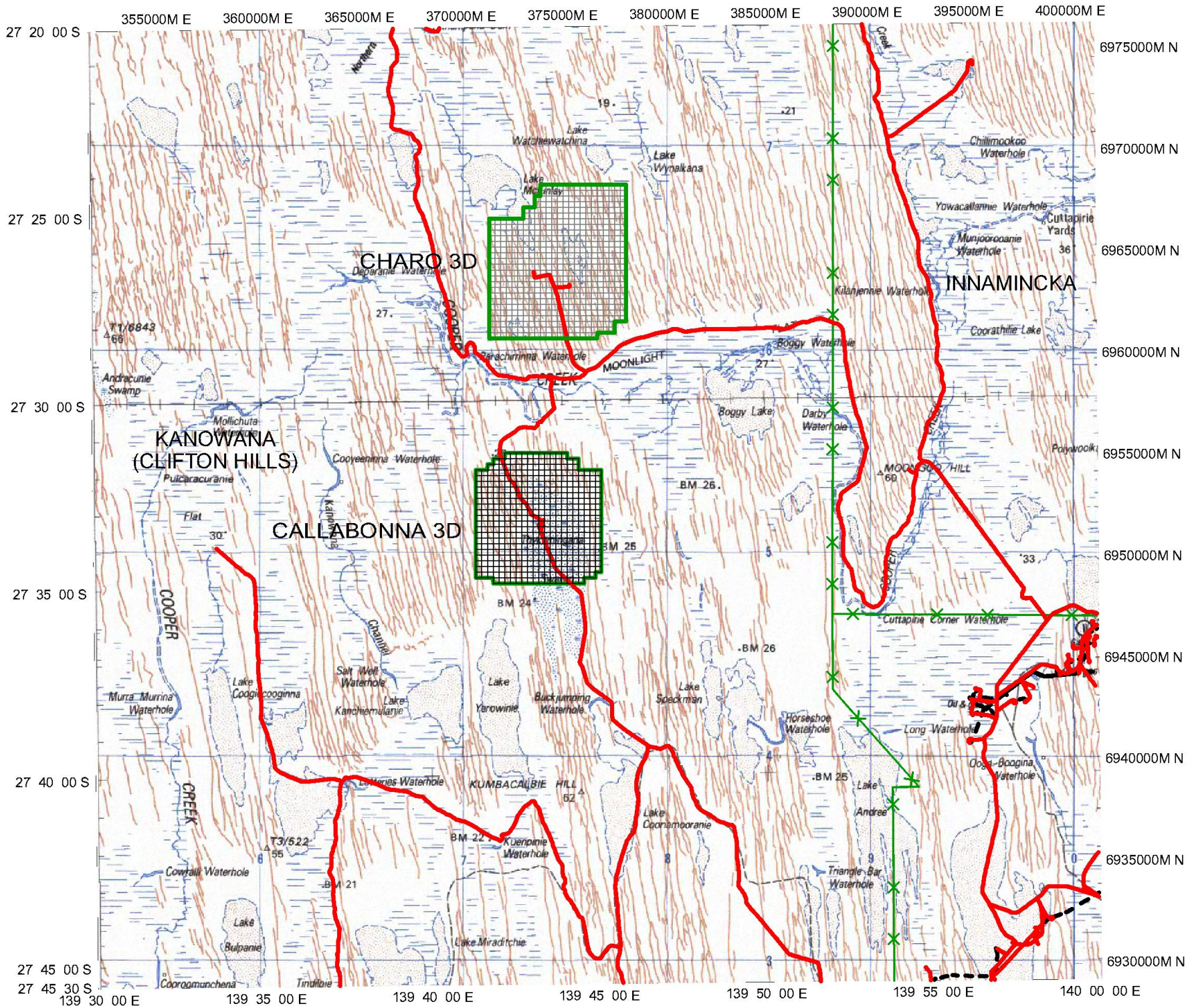
0 1 2

KILOMETRES

UNIVERSAL TRANSVERSE MERCATOR PROJECTION
G.R.S. 1980 SPHEROID
CENTRAL MERIDIAN 141 00 00 E
Map sheet datum: "GDA94"

Santos
South Australia Business Unit

CALLABONNA 3D


355000M E
360000M E
365000M E
370000M E
375000M E
380000M E
385000M E
390000M E
395000M E
400000M E
27 20 00 S
27 25 00 S
27 30 00 S
27 35 00 S
27 40 00 S
27 45 00 S
27 45 30 S
6975000M N
6970000M N
6965000M N
6960000M N
6955000M N
6950000M N
6945000M N
6940000M N
6935000M N
6930000M N
139 30 00 E
139 35 00 E
139 40 00 E
139 45 00 E
139 50 00 E
139 55 00 E
140 00 00 E
CHARO 3D
CALLABONNA 3D
KANOWANA
(CLIFTON HILLS)
INNAMINCKA
COOPER CREEK
MOONLIGHT CREEK
Lake Watchiewatchina
Lake Wynalkana
Lake Mcinlay
Chillimookoo Waterhole
Yowacatlannie Waterhole
Cuttapirie Yards
Munjoorooanie Waterhole
Kilanjennie Waterhole
Coorathilie Lake
Boggy Waterhole
Boggy Lake
Darby Waterhole
Polywoolki
MOODY BORE HILL
Cuttapirie Corner Waterhole
Oil & Gas
Horseshoe Waterhole
Long Waterhole
Oogaa-Boogina Waterhole
Lake Andree
Triangle Bar Waterhole
Lake Coonamoorane
Lake Speckman
Buckjumping Waterhole
Yarowinie
Lake Kanchiemullanie
Lake Coogincooginna
Murra Murrina Waterhole
Salt Well Waterhole
Channel
Cooveeninna Waterhole
Pulcaracuranie
Andracunie Swamp
Mollichuta Waterhole
Parachurinna Waterhole
Deparanie Waterhole
T1/6843
T3/522
KUMBACALBIE HILL
Kuenpinie Waterhole
Cowrali Waterhole
Lake Bulpanie
Lake Miraditchie
Coorocmanchena
Tindilpie
BM 26
BM 25
BM 24
BM 22
BM 21
0 1 2 3 4 5
KILOMETRES
UNIVERSAL TRANSVERSE MERCATOR PROJECTION
G.R.S. 1980 SPHEROID
CENTRAL MERIDIAN 141 00 00 E
Mapsheet datum: 'GDA94'
Santos
South Australia Business Unit
PROPOSED
CHARO 3D
&
CALLABONNA 3D

Data Processing Report

For

SANTOS LTD

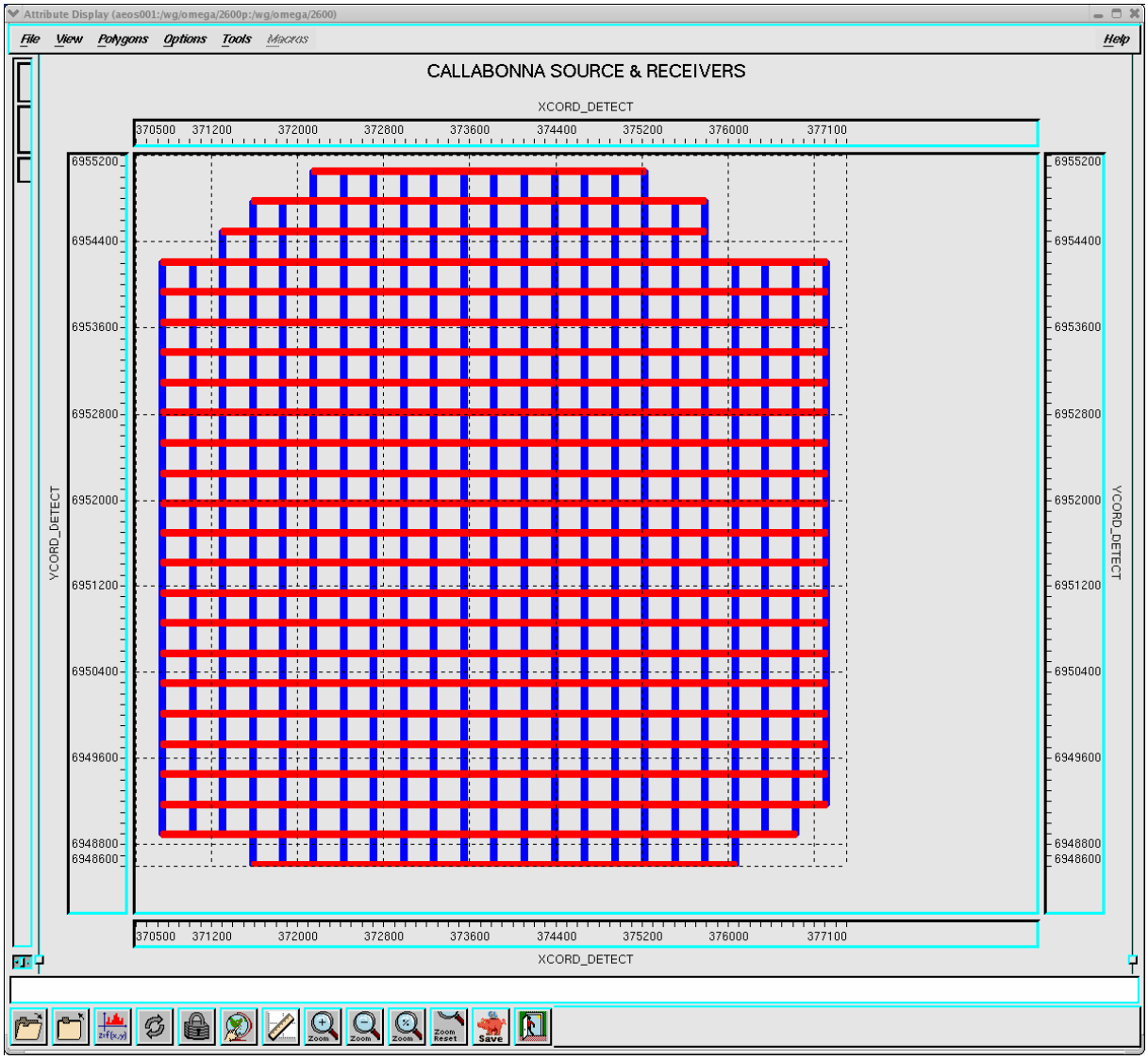
CALLABONNA 3D

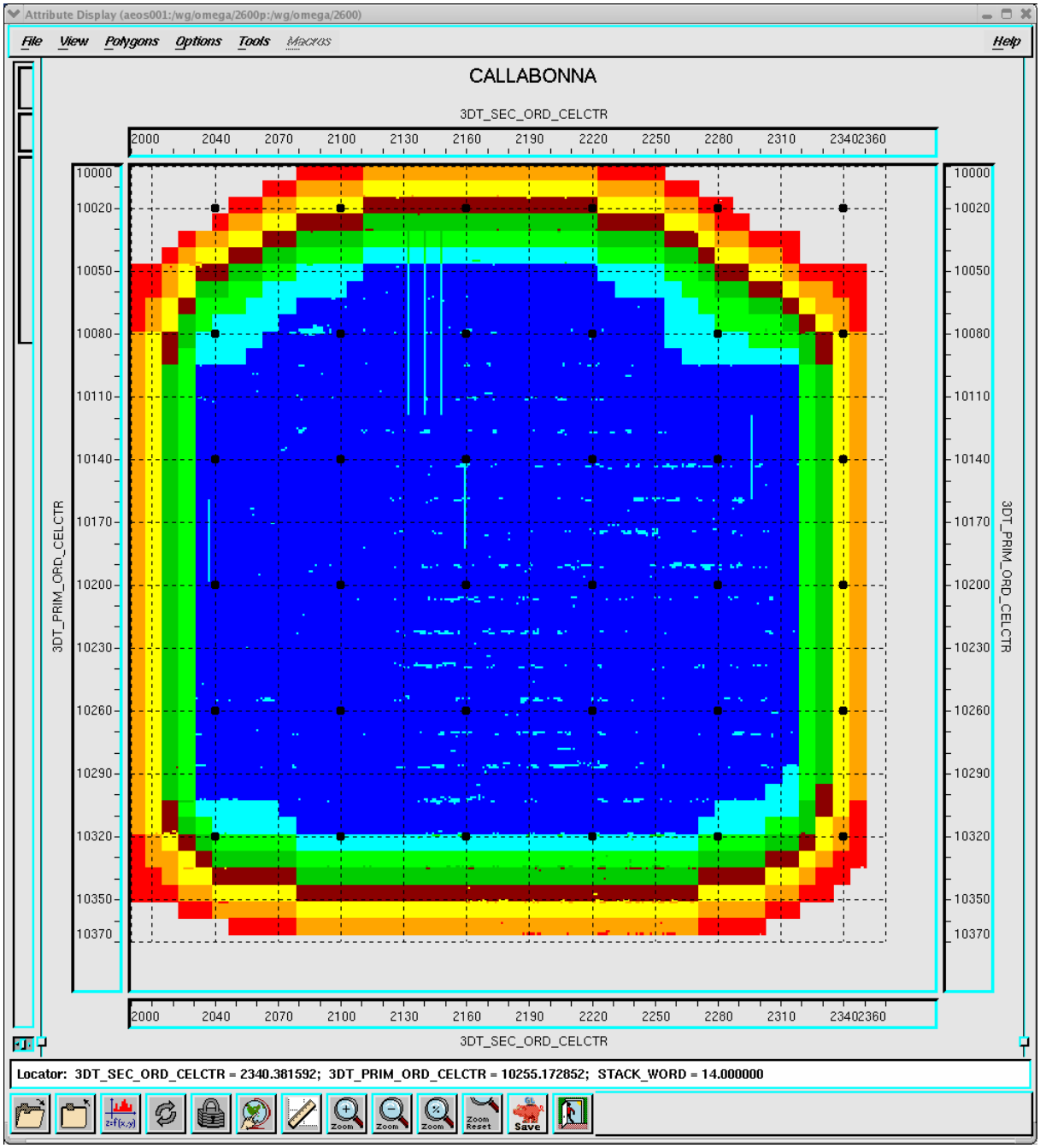
WesternGeco (Australia) Pty Ltd

INTRODUCTION

This report details the processing of the Callabonna 3D seismic survey recorded from 13th August – 19th August, 2008.

Callabonna consisted of 23 receiver lines, 1000-1176 incrementing by 8. The lines were 280m apart. There were 24 source lines, 5000-5184 also incrementing by 8 and 280m apart.


Attribute Display (aeos001:/wg/omega/2600p:/wg/omega/2600)
File View Polygons Options Tools Macros Help
CALLABONNA SOURCE & RECEIVERS
XCORD_DETECT
370500 371200 372000 372800 373600 374400 375200 376000 377100
YCORD_DETECT
6955200 6954400 6953600 6952800 6952000 6951200 6950400 6949600 6948800 6948600
Zoom Zoom Zoom Zoom Reset Save


Attribute Display (aeos001:/wg/omega/2600p:/wg/omega/2600)
File View Polygons Options Tools Macros Help
CALLABONNA
3DT_SEC_ORD_CELCTR
2000 2040 2070 2100 2130 2160 2190 2220 2250 2280 2310 23402360
3DT_PRIM_ORD_CELCTR
10000 10020 10050 10080 10110 10140 10170 10200 10230 10260 10290 10320 10350 10370
Locator: 3DT_SEC_ORD_CELCTR = 2340.381592; 3DT_PRIM_ORD_CELCTR = 10255.172852; STACK_WORD = 14.000000
Zoom
Zoom
Zoom
Zoom Reset
Save

PROCESSING PARAMETERS

FORMAT CONVERSION

Field data for Callabonna was recorded in SEGD format onto one LTO2 tapes

GEOMETRY UPDATE

Geometry information was applied to the data.

GRID DEFINE

A processing grid was defined to allow sorting to the CMP domain.
The primary ordinal number was defined to be two times the source line number and the secondary ordinal number was defined to be two times the detector line number.

X COORD	Y COORD	PRIMARY ORDINAL	SECONDARY ORDINAL
369833.25	6955915.75	9950	1950
369833.25	6948600.75	10368	1950
377793.25	6955915.75	9950	2402
377793.25	6948600.75	10368	2402

The cell size for this grid is 17.5 m x 17.5 m.

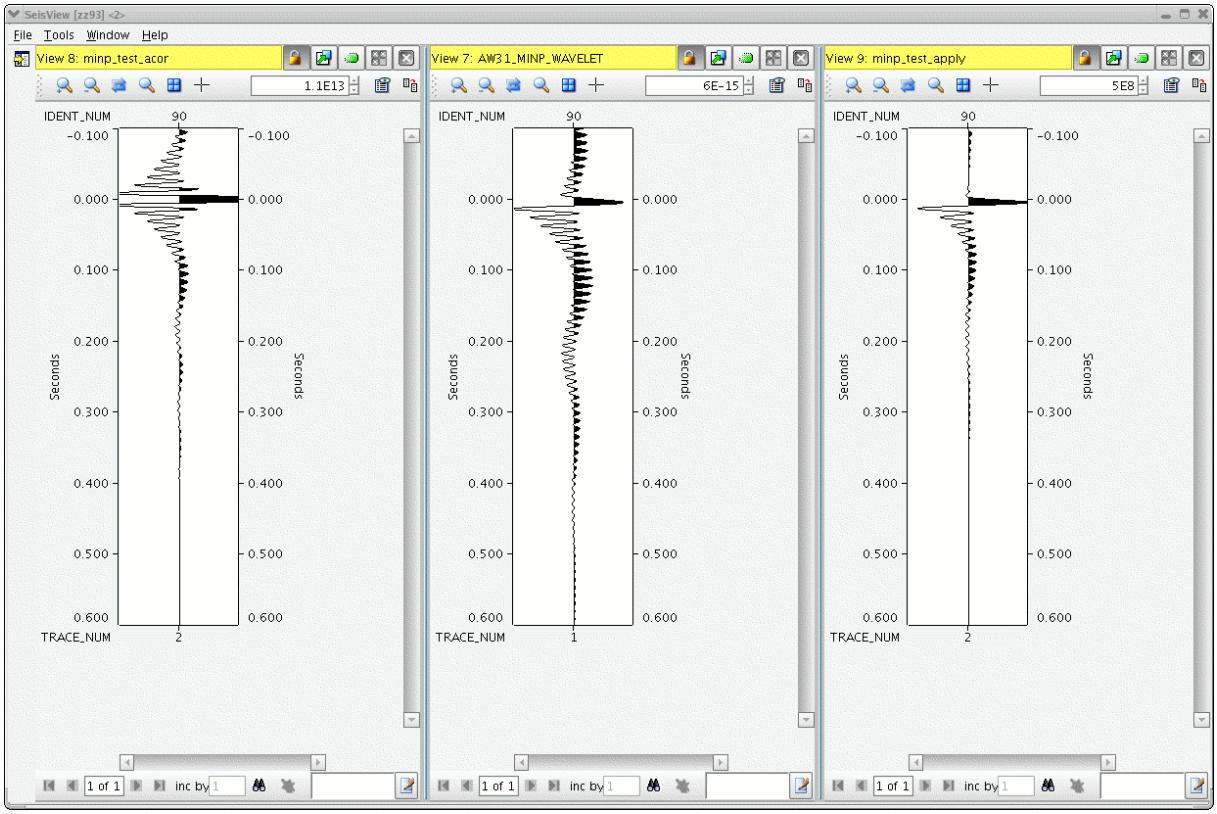
A display of the processing grid is shown below.

AMPLITUDE RECOVERY

Spherical Divergence Compensation & Exponential Gain 4 dB/sec was applied.

MINIMUM PHASE CONVERSION

An operator was derived from the filtered sweep trace (aux channel 2) and used to convert that data from zero to minimum phase. The autocorrelated sweep before and after the application of the operator is displayed below.



Sweep before and after minimum phase operator.

NOISE ATTENUATION

The data was sorted into the cross spread gather domain - that is a gather with a common detector line and common source line.

A very mild AAA (anomalous amplitude attenuation) was used, initially, to remove spikes or excessive noise from any traces.

3D-RNA (FX deconvolution) was then applied to reduce the random noise.

This allowed the **3D-FK** to work more effectively.

Dips of 10, 12, 15 and 20 ms/tr were evaluated. Test displays were produced on gathers and on stacked data. The test line was inline 2224.

The noise reduction increased with decreasing applied dip.

The dip selected was 10.0 ms/tr

DECONVOLUTION

Deconvolution tests were performed on the same inline as the noise attenuation tests. All tests were run using surface consistent deconvolution with a design window at the near trace of 1100 – 2600 ms. Stacks panels were produced with

1) No deconvolution
2) 80 ms spike
3) 120 ms spike
4) 160 ms spike
5) 200 ms spike

The 160 test was repeated using WesternGeco's new surface consistent deconvolution.

It was decided to use the new version surface consistent **160 ms Spiking Deconvolution.**

PRE STACK GAIN

For the residual & trim static computation processing, 500ms gates with 10% overlap were applied.

COMMON MIDPOINT SORT

The data was sorted to common midpoint order.

VELOCITY ANALYSIS

Velocities were run at 1 km intervals.
Velocity interpretation was done using WesternGeco's InVA software

MUTE

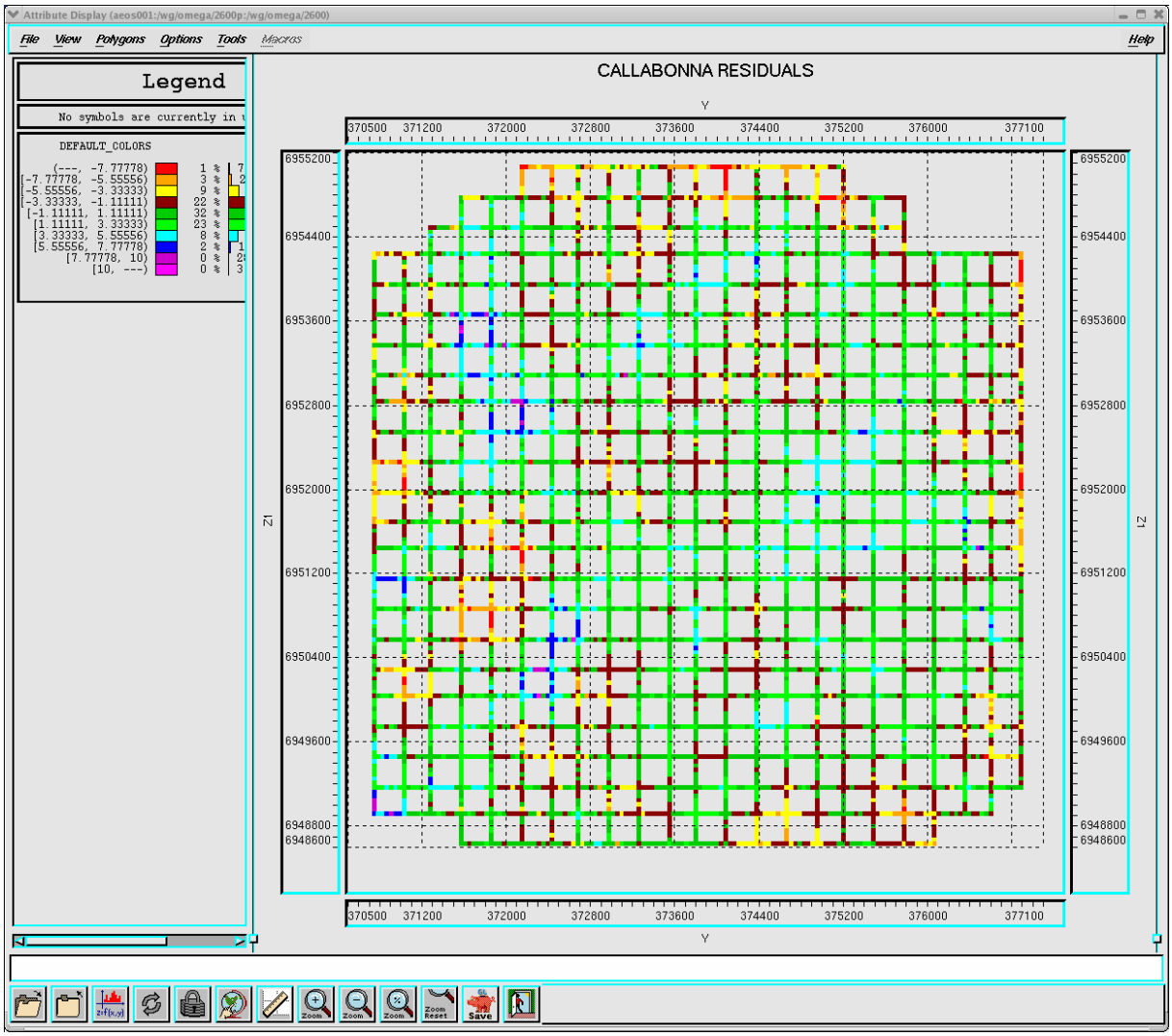
Pre Stack Mute applied

Offset (m)	Time (ms)
350	0
450	500
650	700
1450	1100
1900	1550

A brute stack was produced at this stage.

RESIDUAL STATICS

The determination of residual statics consists of two parts, the statics deviation picker and the statics computation. The picker derives reflection times and quality factors. The statics are obtained by decomposing the reflection pick times into surface consistent source and receiver statics using the Gauss-Seidel iterative algorithm. The window used for Residual Statics Analysis was, 800 – 2400 ms.



VELOCITY ANALYSIS

Velocities were run at 500 m intervals.
Velocity interpretation was done using WesternGeco's InVA software

TRIM STATICS ANALYSIS

Trim Statics analysis were run over a 500 – 2400 ms window with a maximum shift of 24 ms allowed.
The trim statics were applied and the volume was stacked and a post stack migration was produced.

COMMON OFFSET GATHER

Surface consistent deconvolved data with the noise reduction was sorted into common offset gathers using a statistical equal trace distribution method.
Residual statics and the trim statics were applied.

AMPLITUDE RECOVERY

The Spherical Divergence Compensation & Exponential Gain were removed prior to the PreStack Time Migration

TIME MIGRATED VELOCITY ANALYSIS

A targeted velocity line migration was run to output fully migrated gathers along selected velocity lines. Velocities were run at 500 m intervals on these pre stack time migrated gathers. Velocity interpretation was done using WesternGeco's InVA software. The velocity field was smoothed for use in the full Kirchhoff migration.

DMO

Pre-stack Kirchhoff time migration was to be performed to fully image the dataset. However, forward and reverse DMO was applied to the offset volumes prior to migration in order to regularise the fold and place each trace at its bin-centre position i.e. all output traces at single inline aperture. It was hoped that additional potential benefits of DMO, e.g. attenuation of residual dipping noise might also occur.
Dip Moveout (DMO) is a process that attempts to take traces recorded at a non-zero offset and make them appear as if they had been recorded with zero offset. It can therefore be thought of as a prestack partial migration. After DMO has been applied several goals are achieved:
DMO was applied using the Kirchhoff integral method in the X-T domain. This method works by spreading energy from one trace to its neighbours along the DMO ellipse (the input having had NMO applied). The shape of the ellipse was computed from a constant-velocity algorithm; truncating and tapering the ellipse produced the DMO operator that was applied along the shot-receiver azimuth.
The limbs of the DMO operator have progressively steeper dips, which results in spatial aliasing occurring at progressively lower frequencies, as one moves out along the operator. To reduce the impact of aliasing the limbs of the operator were time and space variantly high-cut filtered to remove aliased energy from the operator.
At near offsets the DMO operator can quickly reach the stage where its width is comparable to or smaller than the mid-point spacing. Where this occurs accurate amplitude treatment of the data is compromised if the spatial sampling of the operator remains at or greater than the mid-point spacing. To correct for this the operator was super-sampled (spatially) at near offsets. This option, referred to as Hi-Fi DMO, ensures accurate treatment of amplitudes even at very short offsets.

DMO relies on constructive and destructive interference of the various operators in order to formulate the output image and can be heavily influenced by the acquisition geometry of the input data. Any deficiencies in this geometry can result in:
Poor reflection amplitude and phase reconstruction.
Noise (residual energy) from irregularly sampled DMO operators within a gather.

A combination of Equalisation DMO (EQ DMO) and Spatially Unaliased DMO (FAT DMO) were used to mitigate these effects.

EQ DMO works by analysing the geometry of every trace to determine the DMO contribution being made to each and every output location, and calculating the appropriate normalisation factor. The DMO contributions can be loosely segregated into different offset ranges, dip ranges and azimuth ranges in order to fine-tune this equalisation.

In FAT DMO two sets (inline and crossline) of a 2-D modified sinc function are used to interpolate DMO contributions to cell centre. In this way, the initial DMO correction, which was along the source-receiver trajectory, is now spread to cells surrounding the trajectory. This ensures that the requirement for effective implementation of DMO - that the operator is regularly sampled at all times in all cells - is better achieved.

HOLEFILL

Each offset plane had missing traces interpolated using a post stack 2D trace interpolator in both the inline and crossline directions.

KXKY FILTER

A post stack KXKY filter was applied to each offset plane to reduce the acquisition footprint.

INVERSE DMO

The bin-centred regularised data underwent inverse DMO along the inline azimuth.

PRE STACK TIME MIGRATION

The Kirchhoff Time Migration Seismic Function Module (SFM) performs seismic time migration using the Kirchhoff summation method. The migrated image is constructed by summing weighted amplitudes along diffraction curves or curved surfaces for the 3D case. These diffraction curves are determined by two-way travel times from the surface to subsurface scatterers that are computed from the user-supplied velocity field. In prestack mode, migration is performed on common offset volumes for 3D data.
Prestack migration is achieved by migrating the sorted common-offset panels into individual zero-offset panels. During migration the traces are effectively NMO-corrected; however, inverse NMO using the migration velocity is typically applied prior to output of the data. This allows a final velocity analyses and moveout to be performed on the data prior to stacking it.

The data was moved back to the smoothed surface from the mean sea level datum

PRE STACK TIME MIGRATED VELOCITY ANALYSIS

The migrated output data was sorted to cmp order and the smoothed migration velocity field was removed. Post migration velocities were run at 500 m intervals. Velocity interpretation was done using WesternGeco's InVA software

NMO

The velocity functions were applied to the data

PRE STACK GAIN
A prestack gain was applied to the data of 500ms gates with 10% overlap.

TRIM STATICS ANALYSIS
Trim Statics analysis were run over a 500 – 2400 ms window.
The trim statics were applied and a trim stack was produced at this stage.

RADON DEMULTIPLE
A radon demultiple using a 96 pct velocity mute was tested and applied to the data.

PRE STACK TIME MIGRATED STACK
The data was stacked and subsequently shifted from the smoothed surface to the mean sea level datum.

WHITENING
A range of spectral whitening options were tested. Frequency ranges of 10-65, 10-70, 10-75 and 10-80 Hz were tested. Monk whitening was also tested. As a result of these tests it was decided to apply both a 10-75 Hz spectral whitening and monk whitening to produce two versions of the final stack.

FILTER
An 8-75 Hz post stack filter was applied.

GAIN
A post stack trace balance was applied.

ANGLE STACKS
Angle stacks were produced for approximate 0-20 degree and 20-40 degree angle ranges using the mute functions listed below.

Far angle 20-40 degree

40 degree		20 degree	
ms	m	ms	m
4	350	300	105
250	385	600	385
750	1015	1100	665

875	1155	1450	945
1400	1785	1600	1085
1525	1925	1740	1225
1700	2135	2075	1715
		2500	2065

Near angle	Full angle
0-20 degree	0-35degree+

ms	m	ms	m
0	105	0	350
300	385	500	450
1100	665	700	650
1450	945	1300	1450
1600	1085	1500	1900
1740	1225		
2075	1715		
2500	2065		

The angle stacks were also produced with monk whitening applied.

DELIVERABLES

Intermediate stacks were output in SEGY format on DVD.

Decon gathers were output in Segy format to LTO tape.

Final PSTM gathers both with and without radon were output in SEGY format to LTO tapes.

The final stack archives were produced in SEGY on DVD.

Raw final PSTM – 4 copies
Final PSTM (sw) – 4 copies
Final PSTM (monk) – 4 copies
Near angle stack – 4 copies
Far angle stack – 4 copies
Near angle stack (monk) – 4 copies
Far angle stack (monk) – 4 copies

The final velocities in text format and residual statics in text format were ftp'd.

SEGY HEADER

The following is an example of the segy ebcdic header showing the byte locations of stored trace header information.

```
*** SEGY EBCDIC HEADER ***

C01 CLIENT     : SANTOS
C02 AREA        : CALLABONNA
C03 INLINE       : 2000-2351
C04 XLINE        : 10000-10367
C05 FINAL  STACK
C 6 SAMPLE INTERVAL  4.00   SAMPLES/TRACE  1001 BITS/IN      BYTES/SAMPLE
4
C 7 RECORDING FORMAT        FORMAT THIS REEL SEG-Y  MEASUREMENT SYSTEM
METERS
C08 SEGY BYTE LOCATIONS
C09 XCORD CELL CENTER  (I4)  81-84     YCORD CELL CENTER (I4)  85-89
C10 SOURCE STATIC  (I2)         99-100   DETECT STATIC  (I2)       101-102
C11 SOURCE RESID    (R4)        185-188 DETECT RESID  (R4)         189-192
C12 INLINE ORDINAL   (I4)       197-200 XLINE ORDINAL  (I4)       201-204
C13 SWEEP  START     HZ  END     HZ  LENGTH      MS  CHANNEL NO     TYPE
C14
C15 GRID          X                          Y         PRIM ORD     SEC ORD
C16       369883.25         6955915.25        9950           1950
C17       369883.25         6948600.75        10368          1950
C18       377793.25         6955915.75        9950           2402
C19       377793.25         6948600.75        10368          2402
C20
C21 PROCESSING PARAMETERS
C22 CONVERT FROM SEGD TO OMEGA FORMAT
C23 APPLICATION OF GEOMETRY AND GRID
C24 CONVERT TO MINIMUM PHASE  RESAMPLE TO 4MS
C25 GRIDDED UH STATICS  GAIN APPLICATION AND DESPIKE(AAA)
C26 SORT TO XSPREAD GATHERS  3D RNA
C27 3DFK - CUTS +/- 10MS PER TRACE 1750M/SEC
C28 SORT TO CMP
C29 SURFACE CONSISTENT DECON 160MS SPIKE WIN 1100-2200 NEAR TR
C30 SURFACE CONSISTENT AMP COMPENSATION  VELOCITIES 1KM SPACING
C31 RESIDUAL STATICS 1000-1900 MS WINDOW
C32 PRELIM STACK  VELOCITIES 1KM SPACING
C33 TRIM STATICS 500-2400MS WINDOW
C34 SORT TO COMMON OFFSET  TARGETED PSTM ON VELOCITY LINES
C35 MIGRATION VELOCITIES 500M SPACING  INVERSE GAIN
C36 DMO KXKY INVERSE DMO  PSTM  POST MIGRATION VELS 500M SPACING
C37 TRIM STATICS 500-2400MS WINDOW
C38 RADON 96 PCT VELOCITY MUTE
C39 SPECWHIT 10-75HZ  TRACE BALANCE
C40 END EBCDIC
```