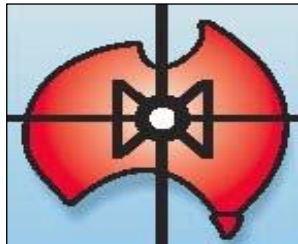


# **CENTRAL PETROLEUM LTD**



## **SUMMARY REPORT OF 2009 AMADEUS-PEDIRKA SEISMIC SURVEYS**

**First Round – Amadeus Basin Lines:**

**February – March 2010**

**Second Round – Pedirka Basin & New Ghan Line:**

**June – August 2010**

**W.M Foster and A.R. Kenny**

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## GENERAL

This report summary covers the Amadeus and Pedirka seismic surveys for Central Petroleum as conducted by Terrex Seismic. Line Preparation and Surveying were subcontracted to Terrex Contracting and RPS, formerly Conics Positioning. An extensive uphole survey was conducted in the Pedirka Basin prospects, with uphole drilling contracted to Underdale Drilling and acquisition by Velocity Data. The uphole survey is outside the scope of this report.

The Amadeus program, with the exception of New Ghan line CCR09-01, was recorded in the first round, from 26<sup>th</sup> February to 30<sup>th</sup> March by Terrex Crew 403. The Pedirka program, including CCR09-01 was recorded in the second round from 24<sup>th</sup> June to August 20th August by Terrex Crew 401.

A full technical report covering this operation was submitted by Terrex Seismic. This report provides only a general overview and a summary of recommendations for future operations.

***Note: this survey is referred to as a 2009 project rather than 2010. This is because the project was budgeted and planned for execution in 2009 but was delayed due to circumstances beyond the control of Central Petroleum.***

## HSE

All work was done in accordance with industry-standard HSE standards. One or two HSE representative were on the crew at all times and HSE was reinforced by morning toolbox meetings, weekly safety meetings and inspections and observations of the crew's safety regime. A Site Safety Plan was prepared and Medivac and Emergency plans were in place. Journey Management was in place, particularly for vehicles travelling to and from Alice Springs and all vehicles were equipped with either VHF or UHF radios or both. Satellite phones were distributed amongst crew personnel such as the Supply Drivers, HSE personnel, Party Chief and Line Boss, and there was as well a fixed unit in the recording truck. No lost time incidents were recorded. There were a total of 3 First Aid cases and one Vehicle Damage incident.

Man Hours	
Amadeus:	34,632
Pedirka:	30,420
<b>Total:</b>	<b><u>65,052</u></b>

## PROGRAM

All lines were acquired using a Vibroseis source. Also, a 480 trace symmetrical split spread with 25m Group and VP intervals were used achieving a fold of 240. The source was uniform throughout using 3 vibrators at a 5-85 Hz linear upsweep. Lines acquired are summarised below, line CCR09-01 was recorded in the Second Round.

### AMADEUS BASIN

Johnstone (EP-115) (CJ09-18 to 35; CBR09-01, CW09-05)	20 Lines	19 Skips	6557 VPs	163.900 km
Magee (EP-82) (CML09-01 to 05, CM09-15, CAR09-01)	7 Lines	19 skips	4550 VPs	114.050 km
New Ghan Line (EP-82) (CCR09-01)	1 Line	34 Skips	2136 VPs	54.225 Km
NW Mereenie (EP-115) (CNWM09-01 to 07)	7 lines	8 Skips	2722 VPs	68.075 km
Parrara (EP-118) (CP09-01 to 04)	4 Lines	156 Skips	4662 VPs	120.350 km
Stone Plains (EP-112) (CSP09-09 to 14)	6 Lines	61 skips	5465 VPs	138.000 km
<b>TOTALS</b>	<b>45 Lines</b>	<b>297 Skips</b>	<b>26092 VPs</b>	<b>658.600 km</b>

### PEDIRKA BASIN

Colson Track (EP-93) (CCT09-01)	1 Line	0 skips	3753 VPs	93.800 km
Flat Top (EP-93) (CFT09-01, 03, 05, 07, 09)	5 Lines	0 skips	2839 VPs	70.850 km
Hale River (EP-97) (CHR09-01 to 04)	4 Lines	0 Skips	3203 VPs	79.975 km
Madigan (EP-93, -97) (CSI09-01 to 11)	11 Lines	4 Skips	9477 VPs	236.750 km
McDonnell Range (EP-93, -107) (CMCD09-01)	1 Line	16 Skips	2616 VPs	65.775 km
Vivien (EP-93) (CV09-10 to 14)	5 Lines	6 Skips	1648 VPs	41.225 km

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<b>TOTALS</b>	<b>27 Lines</b>	<b>26 Skips</b>	<b>23536 VPs</b>	<b>588.375 km</b>
<b>PROJECT TOTALS</b>	<b>72 Lines</b>	<b>323 Skips</b>	<b>45,155 VPs</b>	<b>1246.975 km</b>

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## LINE PREPARATION AND RESTORATION

Line clearing and grading was done by Terrex Contracting Crew # 1, which provided two Komatsu D-65 dozers and a John Deere 672 grader. They were supported by a well-equipped fly camp which had air-conditioned sleeper and diner/kitchen, a shower trailer, a mobile workshop, water and fuel tankers and a low loader. In general, there were 6-7 personnel in the camp, comprised of a Supervisor, 3 operators, 1-2 mechanic-helpers and one cook. The Restoration grader was also based in the TC camp for much of this period.

Surveying was done by RPS, formerly Conics Positioning, with a Senior Surveyor and helper, two vehicles and a mobile office which was parked with the Terrex Construction line camp. Positioning was by standard RTK techniques using Trimble equipment. Control was taken from previous Central Petroleum surveys in the area.

Restoration was done by a TC grader which flattened the windrows, spread biomass back over the line to aid in regeneration and put in drainages where necessary to avoid erosion. The grader operator was accompanied by a field operator who provided logistical backup, scouted, and took photographs of the restoration work. The Central seismic QCs were generally not involved in the restoration work, apart from inspections when possible and provision of opinions and advice when solicited by Terrex Contacting personnel. The restoration on the Pedirka section had not commenced at the time of this report; the restoration crew were obliged to follow behind the weathering crew which is still, at this time, operating.

## RECORDING

### *Personnel*

- One or sometimes 2 observers
- One vibe technician and 4 operators
- One line boss and an average of 16 line crew

### *Equipment*

- 1 set Sercel 438 instruments with NAS drives and Pelton vibe controllers mounted on Isuzu 4x4 with 750 Channels spread.
  - First Round – 4 x Hemi 60 vibes mounted on Birdwagen buggies
  - Second Round – 4 x Hemi 50 Vibes mounted on International 6x6 Paystars
-



- 3 x Geophone traybacks, 3 x cable traybacks, 2 x troubleshooters traybacks, 2 x personnel carrier station wagons (all 90 series Toyota)
- 1 x Isuzu Vibe support vehicle, 1 x 100 series Toyota personnel carrier

## ***Parameters***

- Spread: 480 symmetrical split, no gap, 25m Group intervals and 25m VP intervals, 240 fold and maximum 5987.5m long offset.
- Source: 1 x 12 second 5-85 Hz linear upsweep
- Receiver Array: 12 x 10 Hz phones over nominal 25m interval, 2.2m spacing, centred on peg.
- Source Array: 3 vibes, 12.5m pad to pad, centred between pegs.

## ***Startup***

An example of line acquisition is shown in figure 1. A standard set of start-up tests were carried out, as well as SMT400 tests on a random choice of 80 sets of phones, which gave 3 failures. Standard Sercel 428 tests were carried out each day, and wireline-vibrator sims (synchronisation tests) were run each week. Sweep comparisons were carried out (see Table 1).

## ***Sweep Tests***

A series of sweep tests are to be performed to enable evaluation of the production sweep in the western part of the Amadeus Basin. It is envisaged that sweep tests are performed again in the Pedirka Basin once the crew has move to this location.

The sweep tests are required to set the start and end frequencies and minimum number of vibrators allowed in production (standard array is 3; however detours and the like may reduce the array to 2 or even in exceptional circumstances 1, if sweep tests indicate sufficient energy). No alterations are required to sweep length, tapers and type.

The sweep tests are to be performed on the first seismic line to be acquired (CJ09-19) at the first VP with the entire line laid if possible (line length is approximately 7km) in an end-on configuration. If not entire line laid then at least the full production line length of 6km. This will allow far offset energy to be assessed with changes in sweep parameters. At the conclusion of each sweep the entire vibrator array is to move to a new pad position so that the sweep tests are on comparable surface conditions without changes in coupling as a result of compacted ground.

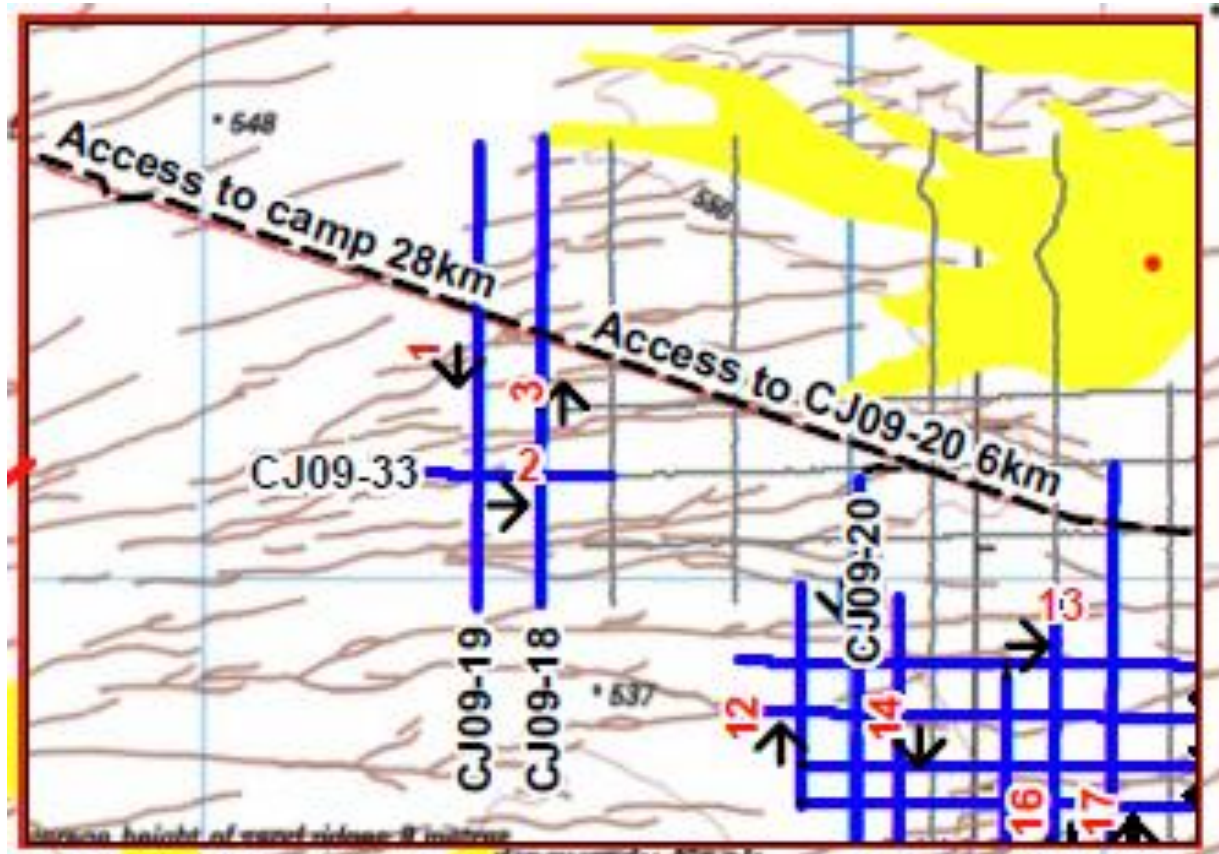


Figure 1. Location map

Table 1. Sweep test parameters

Sweep no	Sweep type	Start (Hz)	End (Hz)	Cosine taper (ms)	Length (s)	Listen (s)	No vibes
1	Linear upsweep	2	70	200	12	6	3
2	Linear upsweep	2	70	200	12	6	2
3	Linear upsweep	2	70	200	12	6	1
4	Linear upsweep	3	70	200	12	6	3
5	Linear upsweep	4	70	200	12	6	3
6	Linear upsweep	5	70	200	12	6	3
7	Linear upsweep	2	75	200	12	6	3
8	Linear upsweep	2	80	200	12	6	3
9	Linear upsweep	2	80	200	12	6	2
10	Linear upsweep	2	80	200	12	6	1
11	Linear upsweep	2	85	200	12	6	3
12	Linear upsweep	2	90	200	12	6	3
13	Linear upsweep	2	100	200	12	6	3

## ***General Operations***

Acquisition was normal with roll-on with initial 240 channels. Production rates were in the order of 12-18 km/day, depending on circumstances. Data was generally good. Round One was in the Amadeus Basin while Round 2 was principally the Pedirka Basin. Pedirka Basin data were variable, generally fair to good but with unusually poor data on the New Ghan line.

A series of sweep tests were carried out in the Flat Top prospect prior to start of production recording in the Pedirka Basin. Recording continued with the standard Amadeus Basin parameters while the tests were evaluated. It was decided no change was necessary.

## **GRAVITY AND WEATHERING SURVEYS**

### ***Gravity***

Gravity acquisition was carried out by Daishshat Pty Ltd, a SA based company. One operator did all the work, operating from a self-contained field camp consisting of a well-equipped camper trailer with a portable satellite link for communications. The work was carried out just after the surveying and dozing for most of the program. However, timing and weather constraints mandated the acquisition of the Flat Top, Vivien, Hale River and Madigan Extension work after recording. The gravity acquisition will be the subject of a separate report.

### ***Uphole Drilling and Acquisition***

A very extensive uphole survey with a 2 km spacing was done in the Pedirka Basin prospects. Drilling was carried out by Underdale Drilling and acquisition by Velocity Data. This work was delayed by rain and will be the subject of a separate report

## **OPERATING CONDITIONS AND LOGISTICS**

### ***Terrain***

The Amadeus Basin section west of the Stuart Highway consisted principally of arid semi-desert with mostly mulga and spinifex and stands of desert oak in the sandy area. A number of areas had rock breakaways had to be hand-carried.

The Pedirka Basin was mostly Simpson Desert with moderately high parallel sand dunes ranging from 5 to 15 metres in height and up to 400 meters apart. The cool weather and relatively wet conditions made negotiating the dunes much easier than anticipated.

## ***Weather***

Rain caused difficulties in both Rounds One and Two. The entire program was delayed by general rains to begin with, and rain fell on occasion during round one, causing a minor amount of weather standby. However, a good deal of rain fell in the Pedirka area and operations had to be suspended after the Magee survey. The crew returned to Pedirka in June and managed to keep working although rain fell again north of the work area making resupply quite difficult at times.

## ***Camp***

Terrex fielded similar camps for both Rounds. The photographs will give an indication. Sleepers were 3 room 2-bed units although most senior staff had their own room. The sleepers were towed by Landcruisers and the mess, kitchen, bathroom, workshop and generator sets were on trailers, either towed as part of a road train or directly behind a prime mover. The camps were well appointed and practical, but not desert-mobile, principally because of the prime movers.

## ***Personnel***

Both crews were around 35-36 people, with a 14-16 person line crew and 5 man person vibe crew. The camp crew included Party Manager, HSE officer, two cooks, one cable repairman, one camp attendant, two mechanics and two or three supply drivers/utility men.

Crew changes were by air to Alice Springs and road to the crews. This was a long journey on the Pedirka operation. It had been planned to fly personnel from Alice Springs to one of the Pedirka area strips but rain and wet strips prevented this.

## ***Supplies***

- Fuel came from Adelaide, Kulgera and Alice Springs.
- Water (Round 1) came from property bores in the area, drinking water from Erldunda.
- Water (Round 2). Shower water came from Charlie Bore (salty and rank). Drinking water from Old Andado.
- General Supplies came from Alice Springs.

## STATISTICS

### *Line preparation*

#### **Amadeus Basin** (Johnstone, Magee, NW Mereenie, New Ghan, Parrara, Stone Plains)

Total Km Dozed:	551.375		
Crew Work Days:	42	<u>Km Work Day:</u>	<u>13.13</u>
Total Site Days:	52	<u>Km per Site Day:</u>	<u>10.60</u>

#### **Pedirka Basin** (Colson Track, Flat Top, Hale River, Madigan, McDonnell, Vivien)

Total Km Dozed:	522.675		
Crew Work Days:	45	<u>Km per Work Day:</u>	<u>11.62</u>
Total Site Days:	64	<u>Km per Site Day:</u>	<u>8.17</u>

#### **SURVEY - all areas**

Total Km Line Surveyed:	1302.100		
Days Worked:	73	<u>Km per Work Day:</u>	<u>17.84</u>

### *Recording*

#### **Amadeus**

Total Km Recorded:	658.600	Total VPs Programmed:	26389
Total Skips:	297	Total VPs Recorded:	26092
Days Worked:	65	<u>Km per Work Day:</u>	<u>10.13</u>
Days on Site:	76	<u>Km per Site Day:</u>	<u>8.66</u>

#### **Pedirka**

Total Km Recorded:	588.375	Total VPs:	23562
Total Skips:	26	Total VPs Recorded:	23536
Days Worked:	46	<u>Km per Work Day:</u>	<u>12.79</u>
Days on Site:	52	<u>Km per Site Day:</u>	<u>11.30</u>

Total Contract Hours:	1445.0
Total VPs Recorded:	49628
Average VPs per Hour:	34.35

## BRIEF WORK HISTORY

### **FIRST ROUND**

#### **NW MERREENIE (January 25<sup>th</sup> - 30<sup>th</sup>)**

The road to Kintore was closed due to recent heavy rains so the NW Merreenie survey was recorded first. Camped on SANTOS lease with their permission, two boggy patches on line CNW09-07 but vibe trucks broke through. Camp moved via the Haasts Bluff Rd to Papunyah-Kintore Rd., difficulty with creek crossing, ended up being a three day camp move to Johnstone.

#### **JOHNSTONE (February 3<sup>rd</sup> - 17<sup>th</sup>)**

Very good data was obtained in main seismic grid. Data fell away to 'Poor' moving south on line CJ09-01, big dunes. There was a long drive time from camp site, especially CBR09-01 and CW09-05. Terrex Camp still not equipped for remote area work – 1xRoad train configuration (Prime Mover & 2 trailers). 1xSpread truck 6x4 wheel drive. These limit access into sand dune areas.

#### **PARRARA (February 21<sup>st</sup> - March 6<sup>th</sup>)**

Quite a few hand-carry areas, some fairly rough country, drive time reasonable, data uninspiring.

#### **STONE PLAINS (March 9<sup>th</sup> – 19<sup>th</sup>)**

Access road still wet for camp move, got to within 12 km of site, camped for couple days then moved again. The drive time was not too bad, access acceptable. Production picked up considerably, combination of change of observers, good lines and sorting out leakage/power problems from Parrara. Data was reasonable. Restoration crew start working on 2008 lines.

#### **MAGEE (March 21<sup>st</sup> – 30<sup>th</sup>)**

We moved to Magee after scouting was deemed acceptable. We had to camp at Maryvale. There were long drive times but production was acceptable. The data was much better, especially on the Old Ghan line. Lot of pad marks on Old Ghan line, had to grade them out, Also on Chamber Pillar access road but not as bad. Data was reasonable.

### **Shutdown**

There was discussion about trying to continue with Rodinga. Scout planned, but Station Owner would not agree to meet till following week, so idea abandoned. The crew moved to other clients.

## **SECOND ROUND**

Crew started up again in June, using Party 401 with new camp. Inductions were carried out in Alice Springs with T. Kenny and Bill Lowe on June. Camp went pretty well on maiden voyage, considering not only new camp but inexperienced personnel too. Having Shane Goosens and Richard Barnes helping with the move was good. However, this is still by no means a desert-mobile camp. Kitchen, mess and shower vans are actually converted shipping containers on semi-trailers and have to be moved by prime movers (Kenworths). Also, the fuel tanker is a regular semi-trailer.

### **FLAT TOP (June 24<sup>th</sup> – June 29<sup>th</sup>)**

Flat Top was ok but a lot of new personnel so production rates were lower than expected. Data pretty good. Dunes were not as big as expected but Paystars having some problems in places nonetheless.

### **COLSON TRACK (June 30<sup>th</sup> – July 8<sup>th</sup>)**

Move to Colson Track went ok, camp setup was quite smooth. These new vans have external flouro lights on the backs so camp is well lit up at night. Some have lights on front too. It beats setting up floodlights. Move to Simpson area, delayed by rain, which in turn delayed and isolated supply and fuel trucks. Data was reasonable.

### **VIVIEN (July 10<sup>th</sup> – July 14<sup>th</sup>)**

Long move to Madigan was ok but stopped by last dune – Tatra with 14 tons of water and pulling shower van got stuck on dune crossing. Several reasons – van was heavy, tyre pressures still up 60 psi, but biggest reason was that grader has just graded dune, turning what was a hard packed crossing into a soft surface. Re-graded twice, bogging two more trucks (prime movers) before he was stopped, after which remaining trucks sailed over. Lessons – (1) the Tatrass are maybe not as good in sand as advertised (2) don't mess with a hard-packed dune crossing.

At Vivien the Paystars began to have problems, maybe because these Paystars don't have low-range boxes. Lack of low range should not be an issue, plenty of power, but some traction problems. The Allison gearbox on these trucks has an undesirable characteristic; when going up a dune in first gear the torque convertor will lock, which is similar to dropping a half-ratio. A bit later, when transmission pressure has built up, the convertor unlocks, creating a minor gear change effect. This often makes the vib jump a bit, sometimes enough to lose traction. The old Paystars also had Allison automatics and managed ok, but these longer, heavier vibs are possibly a bit more marginal in terms of traction and so the gear change issue becomes critical. It is doubtful that this could have been anticipated. Vivien data was good.

### **MADIGAN/HALE RIVER (July 14<sup>th</sup> – 27<sup>th</sup>)**

Despite having the biggest dunes, this went well and production rates were high due to less travel time. The data was not as good as at Vivien. Rain fell during this period, almost cutting access to Alice Springs. Fuel tanker was

unable to come in and fuel had to be brought in by 5000 liter pods. Shower water was taken from salty and rank Charlie Bore and there were some food shortages. The crew managed without having to shut down.

**SIMPSON (July 28<sup>th</sup> – August 3<sup>rd</sup>)**

Work progressed to the Simpson Line (CSI09-01, Madigan) and the crew shot this out before moving to McDonnell. Progress was good with the easy access although drive times became high at the end. Data was good, dropping off to north.

**McDONNELL (August 5<sup>th</sup> – August 9<sup>th</sup>)**

This area had received a lot of rain and part of the line was along the supply access road and was badly cut up. Also, nearly all the pegs on the southern section had been taken out by cattle and had to be rechaind. All ok, only 16 skips for flooded areas, and the best data seen to date.

**NEW GHAN (August 13<sup>th</sup> – 18<sup>th</sup>)**

The access across via New Andado was still unusable so the crew moved to Alice Springs. The New Ghan line was scouted and found ok and the camp moved to the north end (Hugh River Stock Route), recorded to the Finke, then moved to the Idracowra access road and recorded the remainder. There was a crossing at Idracowra used by crews laying fiber optic cable along the rail easement, but this was deemed not available to Central Fibre optic operations had mostly finished by the time crew arrived. The New Ghan data was poor to fair, most uninspiring seen so far.

**DEMOB (August 19<sup>th</sup>)**

After completion of this line, the camp was demobilised to Alice Springs and parked at the cattle sale yards.



## NOTES AND RECOMMENDATIONS

### ***General Notes***

This job was unusual in that it was done for a block fee. It can therefore be assumed that the production rates obtained were probably about as good as would be obtained under the circumstances.

The principal difficulties were the long distances between prospects and some periods of rain which delayed the continuation of acquisition in the Pedirka Basin. Rain also fell during the Pedirka acquisition. This compounded problems for long supply runs for stores, fuel and camp water.

Also, the camp was not properly “desert-mobile”. Several units, including the kitchen, mess, generators and workshop were pulled by prime movers, which are no good in sand.

There were three 6x6 Tatra trucks on the crew. These seemed desert worthy but had some mechanical problems, including overheating (probably due to a faulty sensor), intermittent transmission problems and one unit, which lost the clutch.

The Amadeus round was done with M60 vibes on Birdwagen buggies. These were equipped with rice and cane tyres, i.e. standard tractor lug tyres, and they had problems in the dunes, often having to be towed by the old Paystar service truck. Sand tyres would have been better, but there was enough rock and scrub to ensure there would have been plenty of staked tyres too. The rice and cane tyres were probably the better choice.

On the Pedirka round, new Paystar vib carriers were used and it was thought, given their good performance in previous years, they would have no problems. In fact, the new model Paystars had no low range gearboxes and some experimentation was needed to find the correct technique to get over the dunes. However, tyre pressures needed to be very low. It seems the old Paystars managed better. Birdwagens with sand tyres would be the best choice for future Pedirka operations. It should be remembered that conditions during this survey were the best they could have been, with cool weather and damp sand.

Terrex did not have a pump to get water from the various bores in the area. In particular, while in the Simpson prospect, access to Old Andado water was cut and the crew had to use very salty and obnoxious-smelling water from Charlie Bore. If a pump had been available, good water was obtainable from Bravo Bore.

The nearest airfield to the Simpson camp was 70 km north. The Simpson Well airstrip was overgrown and unusable except perhaps as an emergency strip for light aircraft. During the wet period, the northern strip would have been the only fixed-wing access point. It had been intended to clean up the Simpson strip but a combination of lack of diesel and wet conditions made this impractical. Any urgent medivac from the crew would have to have been by helicopter.

## ***Summary of Recommendations***

1. Selection of vibes for upcoming work will depend on location and circumstances. Pedirka operations in hot, dry conditions will be best done with Birdwagens using sand tyres, or perhaps the old M44 Paystars.
2. Any program with widely-scattered prospects will be better done with Paystars since they can be driven at highway speeds (80 kph in 6x6 and 100 kph with front hubs unlocked) and do not have to be trucked.
3. Until reliability issues have been dealt with and they have proved themselves, not too much reliance should be placed on the capabilities of the Tattras.
4. Any crew moving back into the Pedirka Basin should be equipped with a heat-resistant downhole pump to be able to use bore water.
5. Travel time is an issue in the desert blocks, particularly so since the Terrex camps are not able to get into the really sandy areas. Care should be taken with contracts to ensure that travel time is not chargeable. Granted, Terrex will load the prices to compensate for this, but at least they will be making the maximum effort to get as close to the work area as possible.
6. Prospect move time is also an issue, given the widely spaced Central acreage. Contracts should be written to minimize costs to Central in this regard.
7. Line Preparation crews should be instructed to immediately on arrival open up nearby airstrips when operating in remote locations, both for crew change and medivac.
8. HSE regimen appears adequate but closer attention should be paid to emergency medivac requirements in remote areas. Also need more attention to safe transit of crew vehicles over badly washed-out roads.
9. There had been some discussion of line speed limits as low as 15 km/hr. This is far too low and would result in considerable decreases in production. In general, limits should be held at State limits on sealed highways (although maximum of 100 kph, 80 kph on unsealed roads and 60 kph off-road, with the firm direction that vehicle operators must all times drive to conditions).





## PHOTOGRAPHS



*Photo 1: Terrex Contracting Camp*



*Photo 2: Terrex Seismic Party 403 Camp at the Colson Track*



*Photo 3: Terrex Seismic 401 Camp at Parrara*



*Photo 4: Recording truck on Parrarra*





*Photo 5: Hand Carry area in Parrara*



*Photo 6: Chaining up vib on Stones Plains*



*Photo 7: Towing vib with Paystar service truck on Stones Plains*





*Photo 8: Result of dropping vib tyre pressure far enough to get over dunes*



*Photo 9: Cable truck in Stones Plains*





*Photo 10: Vib passing through desert oaks in Stones Plains*



*Photo 11: Morning Toolbox meeting.*



*Photo 12: Loading Restoration grader*



*Photo 13: Rehabilitated line in Stones Plains desert oak area*





*Photo 14: Access road in Stones Plains*



*Photo 15: Camp from vantage point in Stones Plains*



*Photo 16: Old sleepers showing on part of the Old Ghan railway.*



*Photo 17: Pad marks on the Old Ghan railway.*





*Photo 18: Pad mark warning sign for tourists on Old Ghan line*



*Photo 19: Vibrs shaking on Old Ghan beside bike track*



*Photo 20: Line crew getting their orders on Old Ghan*



*Photo 21: Loading jugs on to cable truck in Magee*





*Photo 22: Remnants of siding on Old Ghan*



*Photo 23: Flooded Santa Teresa access - McDonnell*



*Photo 24: Emergency supply run traybacks bogged on Santa Teresa road.*



*Photo 25: Flooded river on Stuart Highway*





*Photo 26: Partly-flooded camp at Simpson # 1*



*Photo 27: Mud-encrusted supply truck*



*Photo 28: Mud-encrusted Land Cruiser*



*Photo 29: Steep dune in Simpson Desert*





*Photo 30: Vibrs working through Vivian*



*Photo 31: Part of camp crossing New Ghan line*





*Photo 32: Laying phones along New Ghan*



*Photo 33: Line truck fording deep gully on New Ghan access*



*Photo 34: Finke River in May*



*Photo 35: Fink River in August*





*Photo 36: Scout team checking Finke at New Ghan bridge*



*Photo 37: Quicksand in Finke at New Ghan bridge*



*Photo 38: Train crossing Finke*



*Photo 39: Terrex Observer Lisa Welch*





*Photo 40: Central QC Tony Kenny*



*Photo 41: Central QC Bill Foster and PM Terry Ernst*