Tasmanian Geological Survey Record 1995/15

AGSO RECORD 1995/72

"TASGO" SEISMIC SURVEY 1995: OPERATIONAL REPORT

by

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EXECUTIVE SUMMARY

The Australian Geological Survey Organisation (AGSO) conducted a seismic reflection survey in various localities throughout Tasmania between January and April 1995. This seismic survey formed part of AGSO project 'TASGO' (b103201), a National Geoscience Mapping Accord (NGMA) project carried out in conjunction with the Tasmanian Geological Survey (within Tasmania Development and Resources).

The seismic survey obtained 134 km of 10 to 20 fold common mid-point (CMP) deep reflection seismic data along six traverses over an 8 week acquisition period. In addition, gravity observations were made by the Tasmanian Geological Survey at 120 m intervals along five of the lines. Statewide aeromagnetic data has been interpolated to provide profiles along each seismic line, and shot hole cuttings and water samples were taken for later analysis. The reflection crew provided support for AGSO's refraction and tomography data acquisition which is reported separately.

In addition, a co-operative research project between AGSO and Aberfoyle Resources comprising of a "medium" resolution seismic line was shot in the vicinity of the Hellyer mine. This work will be reported separately.

Good reflectors were detected throughout the crust along all lines.

Copies of the final seismic sections for all AGSO seismic lines can be purchased through the AGSO Sales Centre, GPO Box 378, CANBERRA, ACT 2601, AUSTRALIA.

1. INTRODUCTION

1.1 Background

The TASGO project's main objectives are :

- to increase exploration, development and investment in Tasmania.
- to increase Tasmania's mineral and petroleum potential.
- to develop a tectonic framework of Tasmania's major geologic structures.

The Australian Geological Survey Organisation (AGSO) acquired 134 km of deep seismic reflection data in parts of Tasmania in the early part of 1995. The data form a sub-set of a diverse and comprehensive data set collected by the project. In addition, coincident gravity and bottom hole samples were also acquired to assist in geological interpretation. Other components of the geophysical data acquisition for this project included 1,758 line km of offshore 48 fold deep seismic data (Hill et al., 1995), a refraction and tomography experiment utilising the offshore airgun shots, and 87,000 line km of offshore aeromagnetic data.

The goals of TASGO are to improve the definition of Tasmania's minerals and petroleum potential and improve the understanding of geological controls in the distribution of these resources. The deep seismic reflection data were recorded in the mineralised Dundas Trough (lines 1 & 2), a gold-bearing portion of the Northeast Tasmania Terrane (line 3) and the Tasmania Basin (lines 4 & 5).

1.2 Previous Geophysical Investigations

Since the first regional geophysical survey in 1913, regional gravity and magnetic coverage of Tasmania have been completed (Burrett & Martin, 1989). Modern data sets, sourced from Government agencies, the University of Tasmania and exploration companies have been integrated with the regional information to provide more detailed coverage. One of the tasks of the TASGO project was to enhance these data sets by acquiring additional aeromagnetic data together with detailed seismic reflection and gravity along the seismic lines to gain a greater understanding of the arrangement of Tasmania's rock provinces at depth.

Seismic refraction studies have been conducted in Tasmania to determine crustal structure, while offshore, regional seismic reflection studies have been undertaken for petroleum exploration. Onshore seismic reflection has been limited to experimental work around ore body locations (Read, 1989). Seismic reflection profiling previously proposed throughout Tasmania (ACORP/LITSAC, undated) assisted with the location of the onshore TASGO lines.

1.3 Location

The 1995 AGSO seismic traverses were conducted in various localities around Tasmania. Fig. 1 shows the locality of all lines, ie., line 95AGS-T1 through to 95AGS-T5 and 95AGS-AB. A brief description of each line is given in the following section. A full description of the five major lines is contained in Appendix 8, [Environmental Management Plan : AGSO seismic survey, Jan-April 1995.'(1994, unpublished)].

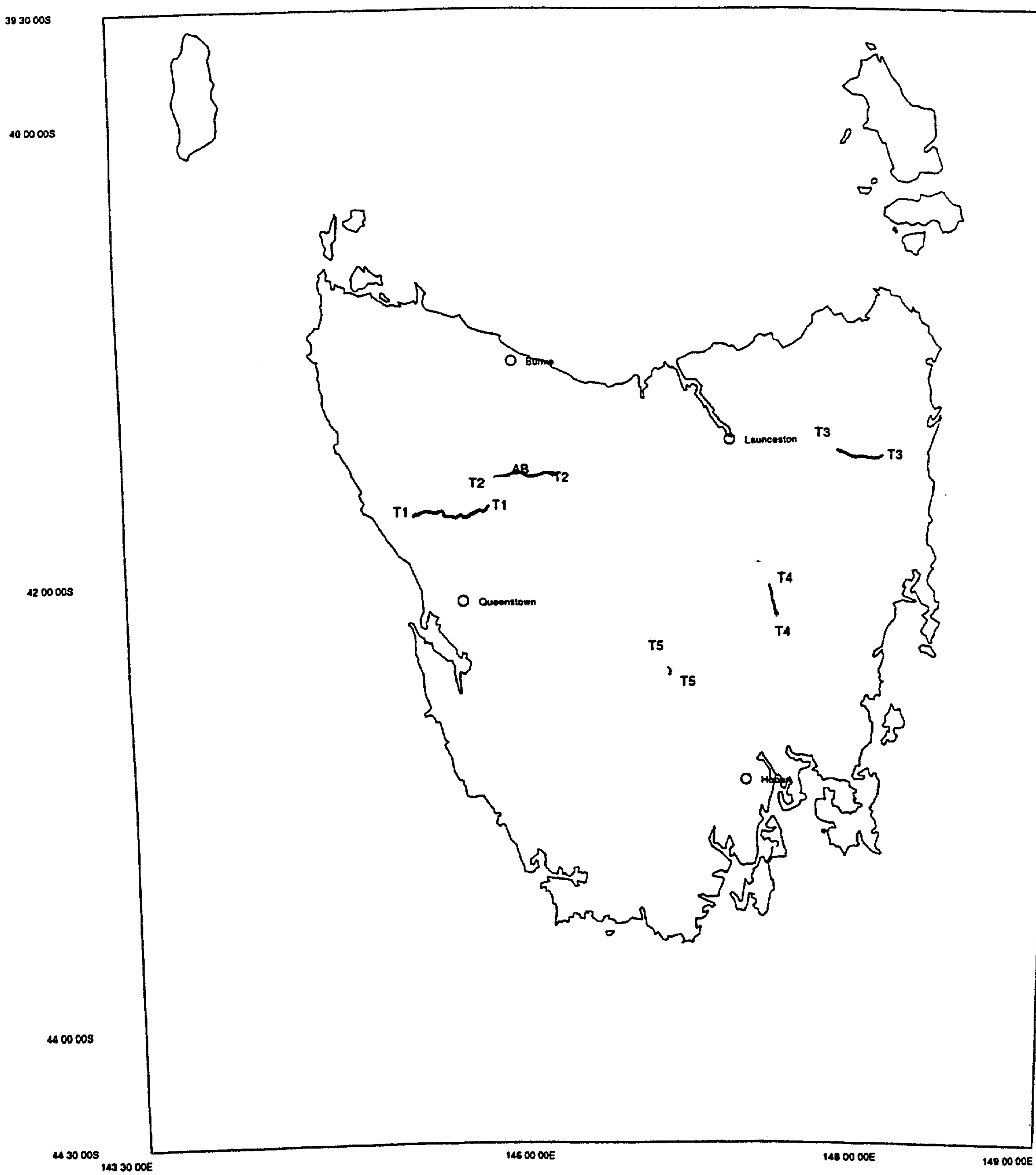


Figure 1. Location map, TASGO land seismic 1995

95AGS-T1 PIEMAN RIVER ROAD

1:100 000 PIEMAN, SOPHIA

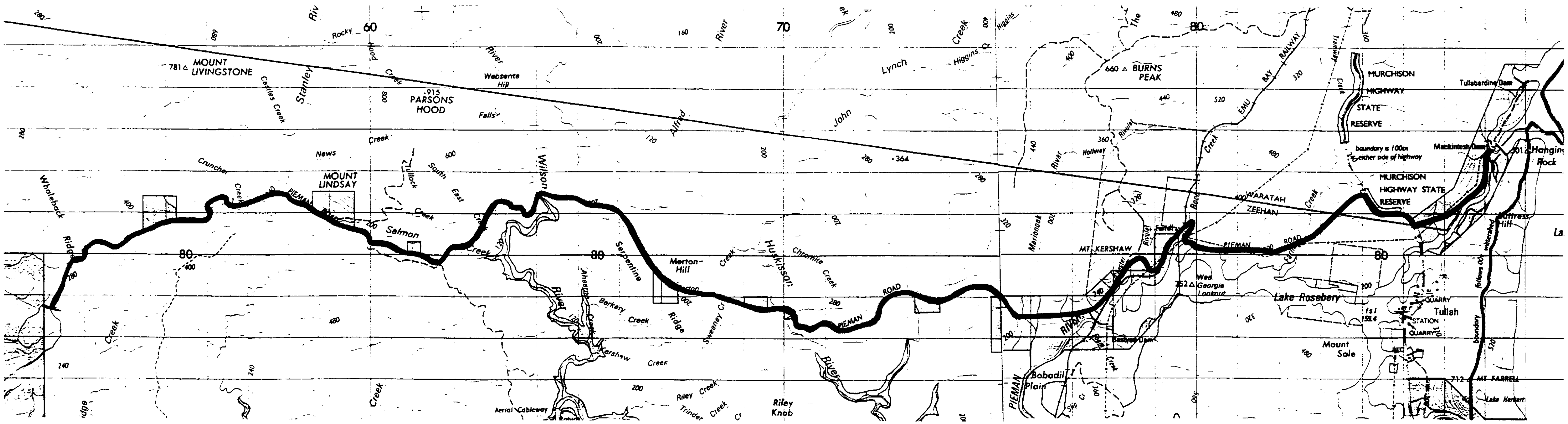


Figure 2. Location map, seismic line 95AGS-T1, Pieman Road

95AGS-T2 CRADLE MOUNTAIN LINK ROAD

1:100 000 SOPHIA, MERSEY

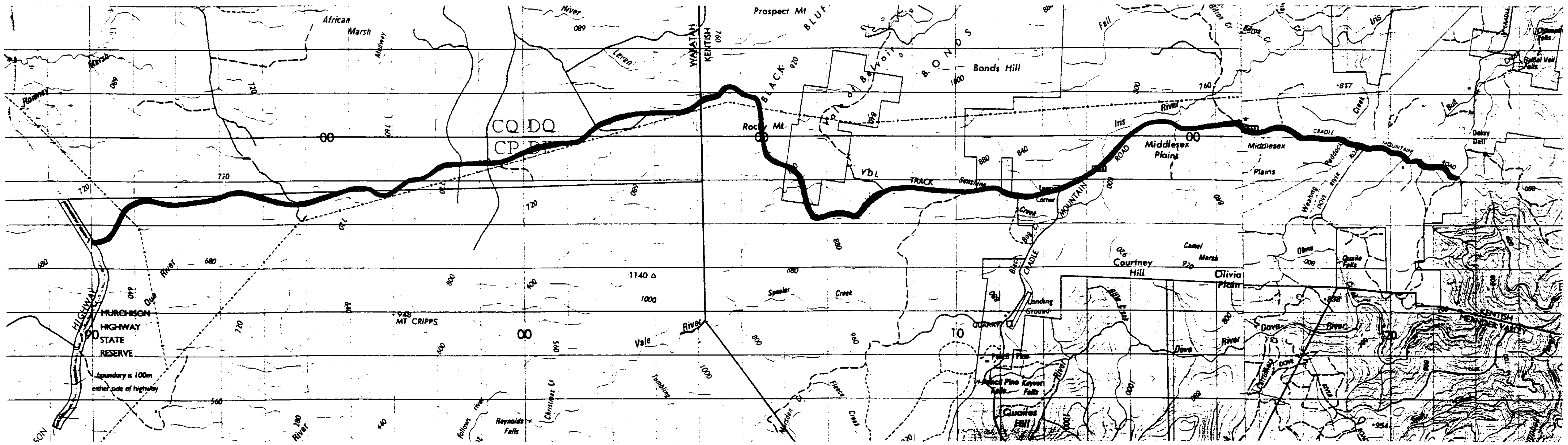


Figure 3. Location map, seismic line 95AGS-T2, Cradle Mountain Link Road

95AGS-T3 MATHINNA

1:100 000 FORESTER, GEORGES BAY

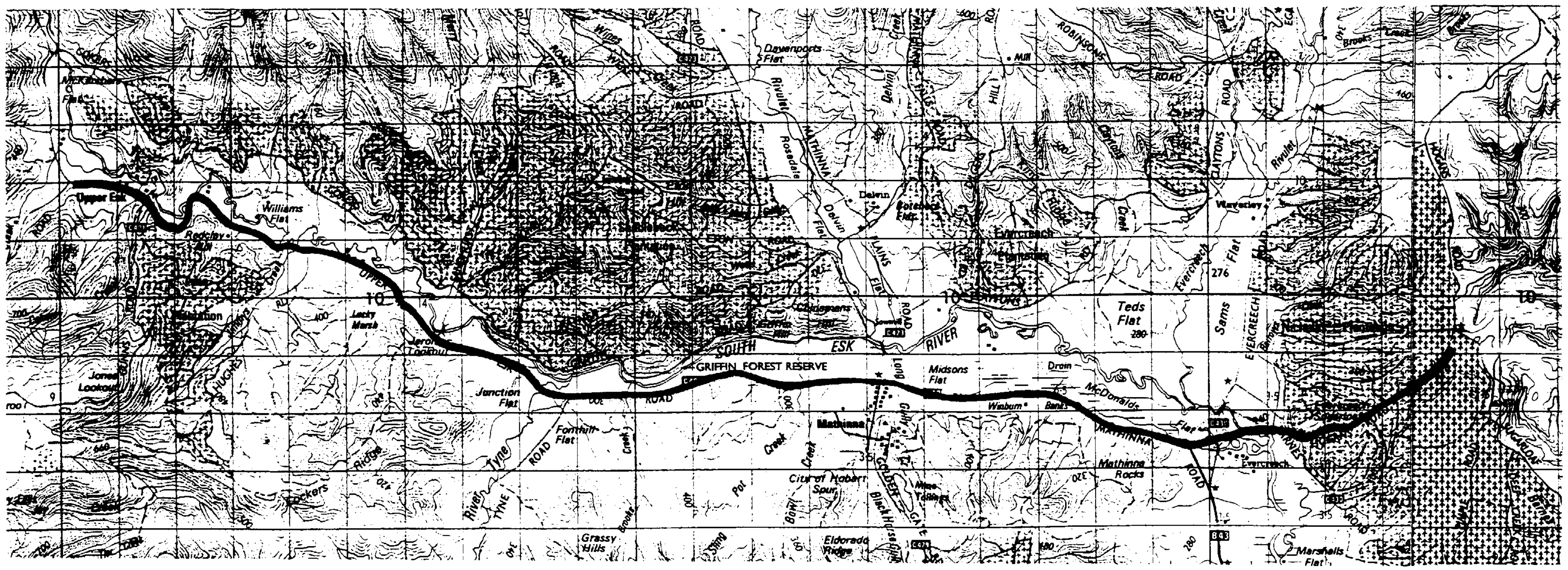


Figure 4. Location map, seismic line 95AGS-T3, Mathinna

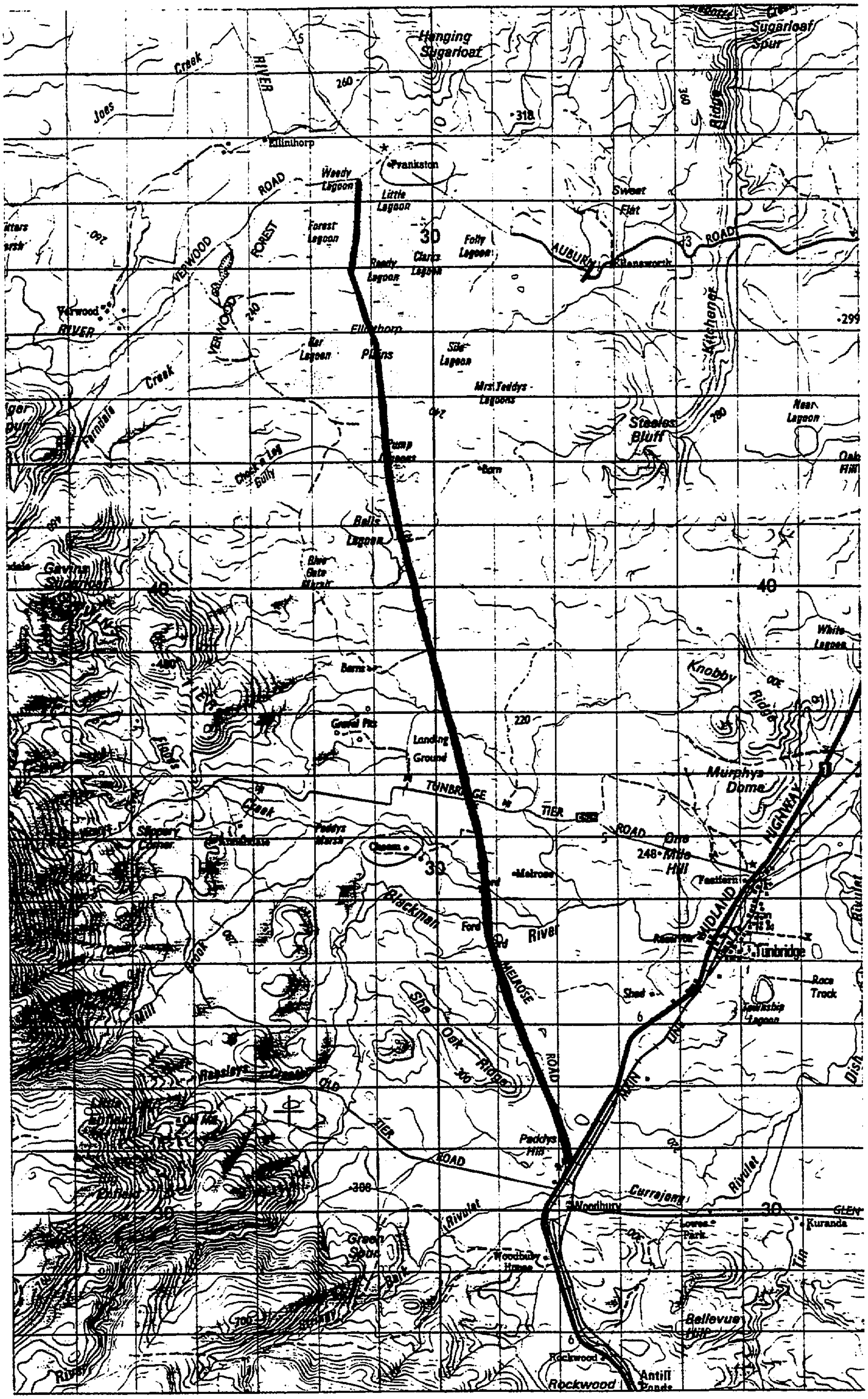


Figure 5. Location map, seismic line 95AGS-T4, Ross - Woodbury Stock Route

95AGS-T5 OUSE - OSTERLEY

1:100 000 SHANNON

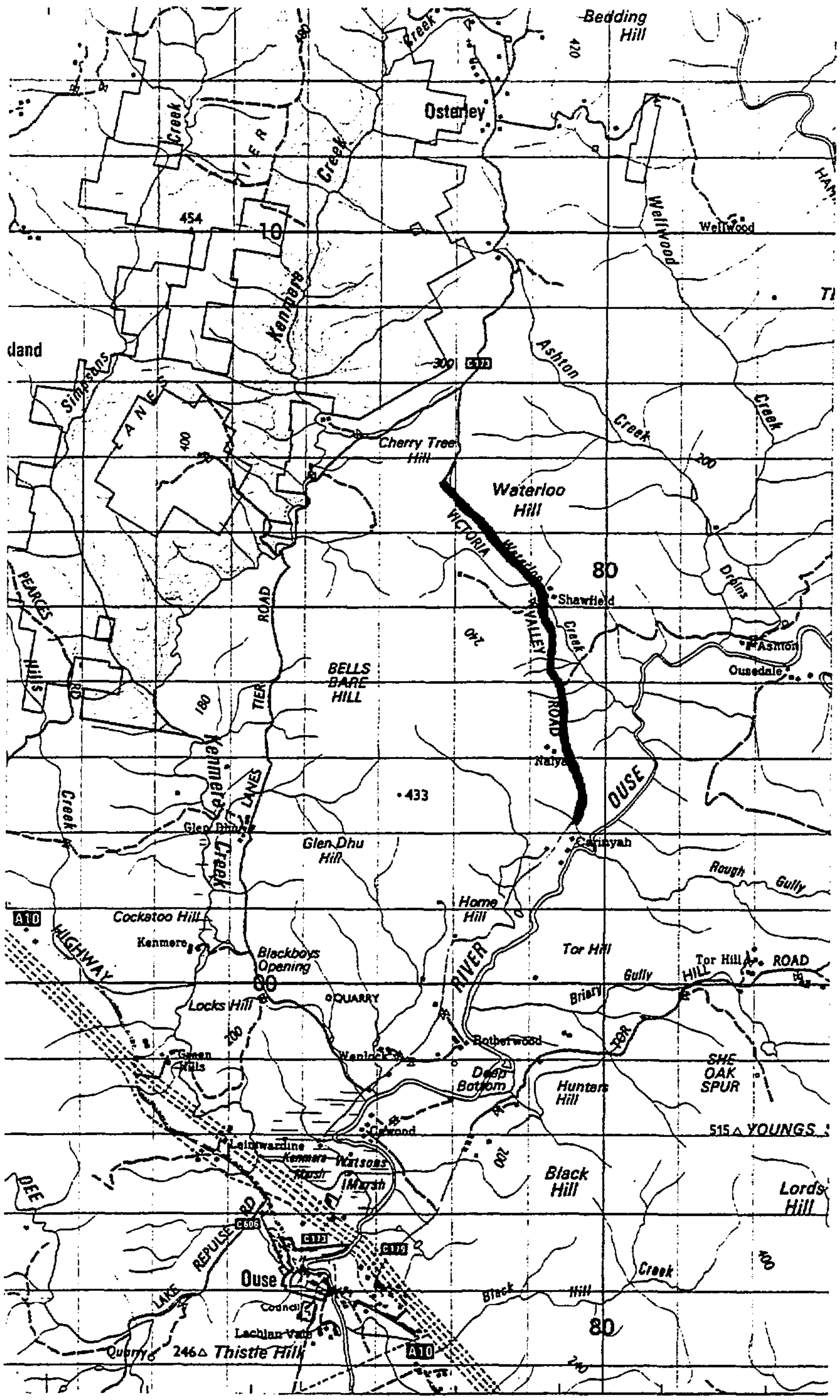


Figure 6. Location map, seismic line 95AGS-T5, Osterely

1.4 Seismic Lines

Line description : 95AGS-T1 (Pieman Road)

This line was conceived with the objective of imaging the west Dundas Trough at depth. It commences 2-3 kilometres to the east from the mapped surface expression of the Arthur Lineament and continues east across the Roseberry Fault and Henty Fault Zone. This line, in conjunction with 95AGS-T2, and offshore lines on the northwest coast and west coasts will all contribute to understanding the nature of the Paleozoic-Precambrian contacts.

Fig. 2 shows the line at 1:100,000 scale. It commences in the west about 1 km west of Whaleback Ridge on the Pieman Road (also known as the Reece Dam Road or Stringers Creek Road) and continues east to its intersection with the Murchison Highway. The traverse then follows the Murchison Highway south for a distance of about 1.5 km then continues along an HEC access road to the Macintosh Dam overflow, across the spillway then northeast for another 2 km along a dam access road.

Map sheet areas :

1:250,000: Tasmania NW
1:100,000: Pieman, Sophia

Line length : 49.20 km

Line description : 95AGS-T2 (Cradle Mountain Link Road)

The objective of this line is the same as 95AGS-T1 and is essentially an extension of that line which could not continue farther to the east because of logistical constraints. The known geological structures intersect both lines enabling the traverses to be merged into a complete section across the entire Dundas Trough.

Fig. 3 shows the line at 1:100,000 scale. The line begins in the west at the intersection of the Murchison Highway with the Cradle Mountain Link Road. It follows the Cradle Mountain Link Road to the east and continues past the Pencil Pine Road across the Middlesex Plains and terminates at the Post Office Tree south of Daisy Dell.

Map sheet areas :

1:250,000: Tasmania NW
1:100,000: Sophia, Mersey

Line length : 36.48 km

Line description : 95AGS-T3 (Mathinna)

This line was an east-west transect across the north-northwest trending line of gold occurrences in the Mathinna beds of the Northeast Tasmania Terrane. Offshore, lines in the northeast were also placed to image any possible offshore continuation of this structure.

Fig. 4 shows the line at 1:100,000 scale. It begins in the west at the intersection of Upper Esk Road with Old Roses Tier Road then continues along the Mathinna Road through paddocks on "Evercreech" then onto Barnes Road and Hogans Road.

Map sheet areas :

1:250,000: Tasmania NE
1:100,000: Forester

Line length : 25.84 km

Line description : 95AGS-T4 (Ross-Woodbury Stock Route)

This line was part of an experiment to determine whether sediments within the Tasmanian Basin could be imaged beneath the cover of difficult to penetrate dolerite and to determine the depth of the Basin. This line was placed such that half was in an area of exposed sedimentary cover and the other half was overlain with surface dolerite, often difficult to image through with the seismic technique. The location of the line was chosen primarily for logistical reasons in that it was relatively straight and contained a gap in the surface dolerite cover

Fig. 5 shows the line at 1:100,000 scale. The line begins in the north at the intersection of Auburn Road with Verwood Road then continues along a stock route to Bells Lagoon. It then continues south to Blackman River and terminates at the Midland Highway near Woodbury.

Map sheet areas :

1:250,000: Tasmania NE
1:100,000: Lake Sorell

Line length : 16.32 km

Line description : 95AGS-T5 (Osterley)

The objective for this short test line was similar to 95AGS-T4 but in a different location.

Fig. 6 shows the line at 1:100,000 scale. It begins in the north along the Victoria Valley Road between Ouse and Osterleyely and terminates approximately 5 km northeast of Ouse.

Map sheet areas :

1:250,000: Tasmania SE
1:100,000: Shannon

Line length : 4.8 km

Line description : 95AGS-AB (Hellyer)

This line was an experimental mid to high resolution line in an area of known massive sulphides and located along a fairly straight portion of line 95AGS-T2. The acquisition parameters were designed to achieve increased spatial and shallow resolution and complement the regional scale data set. This line was later intersected by another line carried out as joint research project with Aberfoyle Resources.

This line was coincident with stations 2132-2162 of line 95AGS-T2

Map sheet areas :

1:250,000: Tasmania NE
1:100,000: Sophia

Line length : 1.2 km

1.5 Associated Gravity Survey : by R. G. Richardson (from Richardson, 1995).

As part of the TASGO project, Industry Safety and Mines (now the Tasmanian Geological Survey) acquired gravity data along the onshore seismic reflection traverses. Repeat readings showed an accuracy of better than 0.1 mgal, and comparison with previously levelled stations showed differences of 0.05 mgal or better after reduction of the data.

Base stations

All base stations used had previously been tied to Australian Geological Survey Organisation (AGSO) Isogal stations and have Isogal65 values. The base stations used were:-

Station	G_{OBS} (Isogal65) (m/sec^2)	Line
Tullah	9.8027489	95AGS-T1
Que River	9.8017750	95AGS-T2
Mathinna	9.8025147	95AGS-T3
Tunbridge	9.8031485	95AGS-T4
Ross	9.8031257	95AGS-T4
Ouse	9.8036534	95AGS-T5

Base readings were made at least three times per day.

Gravity meter

Sodin meter number 183 was used for all readings. This meter was calibrated on the Hobart calibration range immediately prior to commencement of data acquisition and has a scale constant of 0.1014(5) mgal/scale division. Previous usage has shown this meter to have very good drift characteristics and repeatability.

Data processing

All data were corrected for linear drift between base readings. The gravity data were integrated with the height and coordinate data from the seismic line surveying and reduced to Bouguer anomalies using the 1930 International Gravity Formula and a density of 2.67 t/m^3 .

Terrain corrections were computed to a radius of 21 km using a density of 2.67 t/m^3. Station numbers are of the form 9552.NNNN for line 95AGS-T1 and 9553.NNNN for the other lines.

Statistics

Line 95AGS-T1 (Pieman Road)

- 415 stations
- maximum check difference 0.07 mgal
- average maximum check difference 0.03 mgal

Line 95AGS-T2 (Cradle Mountain Link Road)

- 308 stations
- maximum check difference 0.08 mgal
- average maximum check difference 0.04 mgal

Line 95AGS-T3 (Mathinna)

- 224 stations
- maximum check difference 0.07 mgal
- average maximum check difference 0.04 mgal

Line 95AGS-T4 (Ross-Woodbury Stock Route)

- 138 stations
- maximum check difference 0.09 mgal
- average maximum check difference 0.06 mgal

Line 95AGS-T5 (Osterley)

- 41 stations
- maximum check difference 0.04 mgal
- average maximum check difference 0.02 mgal

2. FIELD OPERATIONS

2.1 General

Five 10-20 fold CMP deep seismic reflection profiles, one short test line and one high resolution line were recorded. In total 133.8 km of new seismic reflection data were acquired by this project.

The seismic lines were surveyed, shot hole drilled and recordings began with line 95AGS-T1 and finished with line 95AGS-T5. Another line, 95AGS-AB2 was also recorded in a joint research project with Aberfoyle Resources which will be reported separately. Spread and recording parameters for all TASGO lines are given in Appendices 4 and 5.

All lines were surveyed by a single contractor, Dynamic Satellite Surveys.

Shot hole drilling for lines 95AGS-T1, 95AGS-T2, and 95AGS-AB was carried out using contract drilling as access and drilling conditions were unsuitable for AGSO rigs. Lines 95AGS-T3, 95AGS-T4 and 95AGS-T5 were drilled by AGSO.

Seismic recording was done using AGSO's SERCEL SN368 acquisition system.

The town of Tullah was used as a base for lines 95AGS-T1, 95AGS-T2 & 95AGS-AB with all personnel involved staying at the Tullah Lakeside Chalet. In addition, office facilities and phone lines were set up at the Chalet to manage operations and carry out preliminary data processing and quality control. Office rental cost was $350 per week. Accommodation was at Fingal for line 95AGS-T3, Ross/Campbell Town for line 95AGS-T4 and New Norfolk for line 95AGS-T5. Office accommodation for these three lines was based at the Fingal Community Centre at a cost of $300 for 14 days. Accomodation at Tullah was based on a subsidised travel allowance rate, with full travelling allowance paid to staff in other areas.

2.2 Reconnaissance

A feasibility study for potential locations of seismic lines was carried out in late 1993 in the preparation of the NGMA project proposal for Tasmania. This study was carried out by Tim Barton (AGSO), Keith Corbett (ISM) and David Duncan (ISM) from the November 29 to December 3, 1993. The objective was to identify logistically feasible seismic traverses in areas where the relationship of rock units could be examined at depth. In total, ten potential lines were identified as technically feasible. Some of these lines were later discarded in favour of offshore lines based on the offshore aeromagnetic data acquired as part of the project. This showed that the structures of interest continued offshore. A map of these lines is included in the 'Tasmania NGMA Project TASGO, 1995/96' document (Yeates et al., 1995).

A further reconnaissance of short-listed survey lines was made from the November 3 to November 11, 1994 by Kevin Wake-Dyster (AGSO) and Tim Barton (AGSO), to finalise selection of survey lines. The chosen locations are shown in Fig. 1.

2.3 Environmental Management Plan

As part of the planning process for the seismic survey, and to comply with State regulations for conducting seismic surveys, an environmental management plan was formulated. The TASGO 'Environmental Management Plan' is appended to this report as Appendix 8.

This plan, in conjunction with letters, was sent to all stakeholders including Local and State Government authorities and property owners in late 1994. The objective of this was to inform the stakeholders and allow them time to identify any problems which the work could potentially cause in particular areas. The stakeholders contacted are listed within Appendix 8.

2.4 Transport of equipment to and from Tasmania.

All vehicles used for the survey were required to be driven from Canberra to Melbourne and then transported across Bass Strait by ferry vessels. As such only essential vehicles were taken with other vehicle requirements met locally.

The reconnaissance crew of Barton and Wake-Dyster left a Toyota station wagon in Hobart at the completion of their reconnaissance. This vehicle was retrieved by Barton on January 13 to commence line pegging on 95AGS-T1. He was supported by Takken and Crawford who arrived in Tullah on January 14 after transporting their vehicles across Bass Strait on the 'Spirit of Tasmania'.

The AGSO drilling and pre-loading crew arrived via the 'Spirit of Tasmania' on February 3 and proceeded to Fingal to begin drilling line 95AGS-T3 on February 6. The recording crew, together with their vehicles, travelled on the 'Spirit of Tasmania' overnight on February 15 then proceeded to Tullah to commence line 95AGS-T1.

The total cost of transporting 15 people and vehicles from Melbourne to Devonport on the 'Spirit of Tasmania' was $10,800.00.

The AGSO drill crew completed their work in Tasmania in late March, 1995. The drill rig and water-tanker were transported by Brambles Shipping from Burnie to Melbourne on April 4. The recording crew also used Brambles Shipping to transport their vehicles from Burnie to Melbourne on April 18. The crew then flew to Melbourne on April 18 and 19, collected the vehicles on April 19 and returned to Canberra.

The total cost for transporting 15 vehicles across Bass Strait via Brambles shipping was $9,775.00 , accommodation and aircraft transport for the 15 personnel was $3,810.00.

2.5 Communications

In order to ensure that the operations of the survey ran as smoothly as possible it was recognised in the planning phase that reliable communication systems were required. For the work on the West Coast (lines 95AGS-T1,T2 & AB) a field office was set up at the Tullah Lakeside Chalet. Two telephone lines were installed to provide voice and fax communication. Express Post facilities were available at the Tullah Post Office providing next day delivery to Canberra. Two PC's were used in the office, one for clerical/scientific and administrative tasks, the other for project management use. Also, field data processing and quality control functions were carried out in this complex using additional computing equipment. While working on lines 95AGS-T3, T4 & T5 an office was rented at the Community Centre in Fingal. This office, also with two phone lines, was configured similarly to the one at Tullah and the local post office handled the survey's mail.

Field communication was via UHF and VHF radios. Two mobile phones were also used in areas where this service was available.

2.6 Line Clearing

Due to environmental restrictions, all lines were placed along existing roads or tracks to minimise any environmental impact of the work. For line 95AGS-T1 all of the work along the Pieman Road and Murchison Highway was done on the edge of the road as no off-road access was possible. The first 18 km of line 95AGS-T2 was also conducted on the edge of the road as significant environmental restoration had been carried out along the road verges and off road access for the drill rig was prohibited. For the remainder of the line, drilling operations were conducted on the road verge. Line 95AGS-T3 was also conducted along roadsides, but sufficient verges allowed the use of an AGSO rotary drill rig, some of the line passed through paddocks which were too soft to permit drill rig access without causing damage to the surface. Part of line 95AGS-T4 along a stock route was slashed to remove patches of Gorse (*Ulex europaeus*, a secondary weed) to minimise the possibility of spreading to other areas and improve line access. In addition, preventive measures were taken as outlined in the Mineral Exploration Code of Practice for Tasmania (Bacon, 1992). Line 95AGS-T5 was entirely along a road verge.

Permission to use the road verges was obtained from the relevant local councils and property owners as outlined in the 'Environmental Management Plan'.

2.7 Surveying

Chaining and pegging of all lines was done by AGSO staff. This work required a minimum of two people and two vehicles to maintain productivity of 5 km to 8 km per day. Additional staff were required when traffic control was needed. Each station was marked on the road edge by green road marking paint which were the points surveyed and used for gravity readings. Wooden pegs 300 mm in length sourced from a local sawmill were placed at each station. Pegs painted white on the top 100 mm were used to denote each station and similar red pegs for shot hole locations. The shorter than normal peg length, usually 600 mm, was used to minimise visual impact of the peg from the road to reduce the incidence of them being stolen as has been the case in prior surveys. This strategy seemed to be fairly successful. The pegs were removed at the completion of operations on each line. Chaining was done using a nylon coated braided steel cable 100 m long and marked at 40 m intervals.

Surveying of the seismic lines was performed under contract by Dynamic Satellite Surveys. Survey data was supplied on PC floppy discs. The company's report 'DSS Report #95-36' lists all relevant information. Included below is a copy of its 'Summary'.

"During February, March and April 1995 *Dynamic Satellite Surveys* performed survey work in Tasmania on behalf of the *Australian Geological Survey Organisation* for their 95AGS-T seismic exploration survey.

All planned goals of the survey were reached and the survey was successfully completed with no mishaps.

Due to the rugged nature of the areas surveyed, the field work required the application of all of *Dynamic Satellite Surveys'* advanced survey techniques during the data acquisition phase. The primary system utilised was kinematic GPS, with infill being obtained with the unique Rapid Elevation Meter."

The total cost for the surveying was $27,472.04, total distance surveyed was 132.64 km, i.e., $207.06 per km.

2.8 Field Safety

Due to the nature of the terrain and the requirement to perform most of the work whilst on roads, special procedures were required to ensure the safety of personnel. All vehicles working on the line were fitted with rotating yellow beacons. Crew members wore reflective vests and were instructed on safe working practices in this environment. Crew members were directed to exercise caution when travelling on the West Coast roads as they were often very slippery.

In addition, road signs were placed at either end of the area being worked using Australian Standard AS 1742.3-1985 as a guide. Where applicable, flagmen were used to control traffic flow to ensure the safety of the workers and the travelling public. In particular, for operations on line 95AGS-T2, flagmen were required for all drilling that was conducted from the rear of the low loader and on various sections of line 95AGS-T1. For drilling operations on the other lines, traffic control consisted of road signs only, as the work in these areas was conducted on the road verge. Flagmen were used at all times during the data acquisition phase to ensure the safety of the workers and minimise noise contamination of shot records.

Consultations were held with the Department Of Transport and Works and the Hydro-Electric Commission to ensure that the practices used by the survey crew were acceptable. Potential hazards included adverse weather conditions, such as rain, snow and fog, and drivers who ignored signs and flagmen. Only minimal drilling production time was lost due to a road weather hazard on one day when visibility was less than 200 metres. Other hazards included tiger snakes.Snake bite kits were kept in each vehicle. Fortunately no member of the crew or contractors suffered a snake bite in the course of the survey.

Blasting operations presented some problems with blow outs occurring through various segments of lines. Line 95AGS-T1 caused the greatest concern and it was necessary to hire a blasting mat and a truck with a lifting crane to prevent material being blown out of the shothole. Attempts to reduce the magnitude of the problem using reduced charge size did not substantially alleviate the problem. Deeper shotholes was not an available option as the holes had been pre-drilled. The problem appeared to be closely related to near surface water-table levels and highly fractured igneous rocks in the vicinity of the hole. The conclusion drawn from the nature of the blow-outs, which were not a case of the shot tamping being blown out, was that crater formation around the hole was due to ground water being compressed between the fractured rock then forced to the surface on a path of least resistance.

Overall crew safety was maintained throughout the entire operation. The only injury was a twisted ankle incurred on the Crew chief whilst inspecting a portion of line 95AGS-T2.

2.8.1 Field Safety Recommendations

The following recommendations are made for future survey operations :

(i) Operations on public roads.

- AS 1742.3-1985 should be adhered to in relation to road signs.
- Flashing yellow beacons should be used on all vehicles, in conjunction with flashing hazard lights.
- Reflective vests should be worn by all crew members.
- Flagmen should be used for all line operations when traffic volume is not low.
- The seismic line should be worked on the side of the road which oncoming traffic uses.

(ii) Blasting Operations.

- In regions of blow outs in hard rock terrain the use of a blasting mat should be considered.
- Where blow outs are anticipated, detonator lead wires should be secured at the top of the hole to prevent wire being caught in overhead structures, e.g. power lines, trees etc.

(iii) General field safety.

- The AGSO Field Safety policy should be examined to ensure that land seismic operations comply with the policy.
- Snake bite kits should be carried in all vehicles along with the standard first aid kit.

2.9 Drilling and Explosives

2.9.1 Drilling

Drilling of line 95AGS-T1 was contracted out to Columbus Drilling, 27 Cattley St., Burnie, Tasmania. Work on this line commenced on January 23, 1995 and was completed on March 17, 1995. Columbus used a truck-mounted Atlas Copco 601 which was capable of working from either side or at the back of the truck. An Ingersoll Rand 750/250 compressor was towed behind on a trailer. The driller for Columbus was John Clayton (22 years experience) and his offsider was Alan Tuxworth.

Columbus drilled a total of 367 shot holes to a maximum depth of 12 m; a total of 4465.5 m was drilled at an average cost of $15.78 per metre. Average drilling rate was 11.77 metres per hour.

Columbus staff were accommodated at the Tullah Lakeside Chalet and worked a five-day week, returning to Burnie on weekends.

Drilling of lines 95AGS-T2, AB and 43 shot holes on line 95AGS-T1 was contracted to Maxfield Nominees Pty. Ltd. of 5 Melrose St., East Devonport, Tasmania. The drillers for Maxfield were Darren Woods and Steve Newall. Work on line 95AGS-T2 began on February 1, 1995 and final work was completed on March 17, 1995. Maxfield used an Atlas Copco 712H drilling rig which sat on the rear of a low loader. When the rig was able to operate off the road, the low loader was de-hired. A trailer-mounted compressor was towed behind a light vehicle. This was a small compressor providing air circulation for cutting removal only, as this rig was hydraulically driven. The drilling was carried out by a driller and one offsider. As no access off the road was allowable for the first 18 km of line 95AGS-T2 all drilling was conducted with the rig on the low loader with the mast swung to one side of the trailer. Drilling was done on either side of the road depending upon suitable hole locations. In this instance a minimum of two flagmen and a low loader driver was also required for operations.

Maxfield drilled 362 shot holes at an average of 11.8 metres depth. Their total drilling was 4252.5 metres at an average cost of $21.75 per metre. The cost would have been cheaper, $16.70 per metre, if low loader costs are removed. Their production rate on average was 11.52 metres per hour.

Maxfield staff were also accommodated at the Tullah Lakeside Chalet and worked a six-day week, returning to Devonport on Saturday evenings.

Traffic control for drilling operations on lines 95AGS-T1 and T2 were carried out by AGSO staff.

Drilling of lines 95AGS-T3, T4 and T5 were also offered for tender. However, the quoted costs were higher than those estimated for AGSO to carry out the work itself, including transportation to and from Tasmania. AGSO staff Des Eaton and Alan Porter carried out the work using a Mayhew 1000 drill rig mounted on 6x8 Mack truck and a water tanker mounted on a Mercedes 911 5 tonne 4x4 truck.

AGSO drilled 199 holes at an average depth of 22 metres, a total of 4157 metres at an average rate of 16.05 metres per hour. The higher drilling rate, as compared to the contract work, was solely due to the different geology on the West Coast. It should also be noted that AGSO rigs were not suitable for the West Coast lines due to limited access. After completing the reflection drilling, the AGSO rig was used to drill holes for the reverse shoot refraction experiment at Osterley.

Staff were accommodated at Fingal, Ross and Ouse and a 4x4 Toyota station wagon used as a support vehicle.

Bottom hole samples were obtained by the drillers for all the lines, and sent to Hobart and Canberra for later analysis. Water samples were also collected where possible. Two litre samples were taken and subsequently sent to Hobart for analysis by the Tasmanian Geological Survey's ground water group, who also carried out conductivity measurements in open holes when possible.

2.9.2 Explosives

2 kg cartridges of ICI 'Powergel Seismic 3000' explosive were used as the seismic energy source. A 10 kg charge was selected as the best size to meet the project's objectives, although this size was reduced where shot holes were shallow. A 2 kg per hole charge was used on line 95AGS-AB.

ICI No. 8 star detonators with 3.6 m leads were used to detonate all charges. Additional shot firing wire was used to connect the charge to the blasting unit at a safe working distance. 'Scotcklok' connectors were used for this.

Explosives and detonators were stored at the ICI magazines at Hellyer for lines 95AGS-T1 and T2 and at The Cornwall Coal Company magazines at Fingal for lines 95AGS-T3, T4 and T5. Explosives were collected on a daily basis and unused quantities returned at the end of each days work.

Difficulty was experienced with holes standing up due to collapse or washing in. Over the course of the survey an average loss of 14% of the drilled depth was encountered when holes were loaded.

Holes on lines 95AGS-T1 & T2 were tamped with road metal purchased from Burnie, as insufficient cuttings were produced by the hammer drilling. Tamping for the other lines was done with drill cuttings.

2.10 Seismic Recording

The recording crew performed very well under some difficult circumstances. Poor weather conditions made work very unpleasant. A total of two working days were lost because of weather. Rain and fog during acquisition of lines 95AGS-T1 & T2 were the main contributing factors. The acquisition crew also had to contend with traffic control on all of the lines except 95AGS-T4. This, together with having to support the contract drill crew and surveying crew and supplying gravel for tamping, slowed the acquisition crew. Support was also provided for a separate refraction survey carried out by AGSO at the same time. It was a rare day that four buggies were manned and employed in reflection acquisition.

Prior to commencing acquisition on line 95AGS-T1, some tests were carried out to determine those acquisition parameters which could be altered. Parameters tested on this line, 95AGS-TEST, were a 50 Hz notch filter test and low cut filter tests. It also served the purpose of familiarising new staff and determining the best means of traffic control. Results indicated that the notch filter removed power line noise effectively. However, since the 50 Hz was not saturating the signal it was decided to do this filtering in the processing phase. A low cut filter value of 8 Hz was determined as the best to attenuate ground roll and shot-generated noise.

Spread and recording parameters for all lines are given in Appendices 4 and 5.

153 station units were available for the survey and if found to be faulty were repaired in the field and returned to the line as soon as possible. Strings of geophones, 16 to a group, were laid out in line, centred on the station. Any faulty sets of geophones were also repaired in the

field. In general, the 24 pick up and leapfrog technique was employed, (24 sets of cables, station units and geophones were moved from the back to the front of the line) to maximise recording efficiency.

On the completion of acquisition on line 95AGS-T1 & T2 two 'juggies', locally employed, were de-hired, leaving six staff for work on the other lines.

The 'jug' crew were also responsible for removal of wooden survey marker pegs at the end of acquisition of each line.

2.10.1 Conventional SEG-D

The Sercel SN368 telemetry seismic acquisition system was operated in 120 channel configuration for the survey. Four auxiliary channels were also recorded with channel 1 being the uphole, the other three being empty. The SEG-D recordings were on 0.5 inch 9 track "Graham' brand magnetic tapes at 6250 bpi in GCR format. The tapes were 1200 feet long and could hold up to twenty-four 20 second shot records at 2 ms sampling rate. The first record on each tape was a 20 second internal sine wave test and a second 'eof' mark was placed at the end of each tape. A 'cap' test was also performed at the commencement of each day and recorded on tape.

Following is a summary of SN368 acquisition faults:

TAPE NUMBER	FFID	ERROR
95/001	002	Tape synchro
95/002	013	Synchro (line)
	019	Short record (misfire)
	024	Synchro (misfire)
95/004	059	F3 Tape parity
	069	Tape parity
	075	F3 Tape parity
	077	F1 Tape parity
95/005	081	F0 Tape parity
95/007	140	F1 Tape parity
	142	Line parity
	145	F5 Tape parity
	146	F1 Tape parity, 1 Tape synchro
	150	F1 Tape parity
95/008	156	F1 Tape parity
	160	F5 Tape parity
	170	1 Encoding error
	174	RF transmission interrupt
95/009	179	F1 Tape parity
95/010	203	2 Tape parity
95/011	227	1 Tape synchro
95/012	258	Tape parity
	260	Tape parity

TAPE NUMBER	FFID	ERROR
	261	Tape parity
95/014	290	Tape parity
	305	Tape synchro
95/015	313	Tape parity
	322	Tape parity
	327	Tape parity
95/017	358	Tape parity
	360	Tape parity
	365	Tape parity
95/019	419	F7 Tape parity
	420	F3 Tape parity
95/020	449	F3 Tape parity
95/021	452	Line failure at shotpoint
	454	Tape parity
95/022	464	Tape synchro
95/023	488	F7 Tape parity
	493	Tape synchro
95/025	524	2 Tape parity
95/026	559	Tape synchro
	561	Tape synchro
	565	Tape synchro
	566	Tape synchro
95/027	580	Line synchro
95/028	604	Tape synchro
95/029	628	Tape synchro
	629	Tape synchro
	631	Tape synchro
	635	Line synchro, interrupt
	636	Line synchro, interrupt
95/031	645	Tape synchro
	653	Tape synchro
	663	Line synchro
95/032	670	Tape synchro
95/034	720	Tape parity
95/037	787	Tape synchro
95/038	811	Line failure
	819	RF interrupt
95/040	830	Line failure
	839	Tape synchro

Jim Whatman from ESU, AGSO made the following comments on the SERCEL SN368 errors.

Line synchro, line parity , line fail (loss of power supply to one or more station units) and R.F. (data corruption or excessive power supply noise) are externally sourced and very difficult to control.

Tape synchro and tape parity are, I believe, a problem with reading/writing the tape which has insufficient saturation of magnetic material. This could result from either :

(i) A defect in the coating of the tape (the error can be repeated at the same spot on tape by writing another record)
(ii) The tape has lost close contact with the head during writing (reading back the original record produces a consistent error but the record can be over written with no errors).
(iii) The tape lost contact with the head during reading (reading back the record consistently produces no error)
(iv) The head is wearing and needs lapping (write currents are at full amplitude to produce barely acceptable read levels).

2.10.2 Eavesdropping on the SERCEL

An eavesdropping system was trialed for the first time in production mode during the TASGO survey. This system has three parts:

1. A real time interface (RTI) from the Sercel data cable to the PC.
2. A PDMA16 interface card and LINUX software driver which writes the digital data into memory.
3. A 486 PC running a LINUX operating system, with demux and control programs.

The system captures a copy of the SEG-D data as it is written to tape by the Sercel system.

Shane Brandon from ESU, AGSO developed the hardware and Jim Leven supervised the software development for the eavesdropper. A brief description of the hardware configuration follows:

2.10.2.1 Eavesdropper Interface Box

There are two data cables connected between the Sercel SN368 Master Control Unit (MCU) and the Sercel SN368 tape transport : the write cable carries the data to be written on tape plus several signals to control the transport, the read cable carries the data read from tape plus several signals indicating the tape transport status. Presently the Eavesdropper Interface Box monitors the data on the write cable and sends this data to the PC through a digital I/O board (MetraByte PDMA16 compatible) mounted in the PC.

Besides serving as a wiring junction, the Eavesdropper Interface Box provides electronics for three main functions:

1) First In First Out (FIFO) memory for intermediate storage of data. Data transfers via the board within the PC are performed under the control of the PC's Direct Memory Access (DMA) controller. While the PC can perform most DMA transfers within the 6.3µs between incoming data bytes, some DMA transfers will be longer (due to the DMA controller requiring re-programming every 64 kb

transferred, and also vital PC housekeeping functions such as DRAM refreshing). Hence data arriving at these times need to be stored temporarily until the PC can catch up.

2) A controller to mediate between the FIFO memory and the PC. The difference between the average DMA transfer time and the above 6.3μs is nowhere near sufficient to allow PC software control of the FIFO. More time can be bought with a larger FIFO, but due to the large number of bytes transferred per record (3,257,598 bytes for a 20s record) the present 2 kb FIFO would buy over 12ms for any single transfer but only 4ns on a per transfer basis. A sufficiently large memory would rule out the use of a commercial FIFO adding significantly to the complexity of the design. A hardware controller is thus used to conduct the data transfer operation between the FIFO and PC by monitoring their respective status lines and asserting their control lines accordingly.

3) Signal buffering. Signals on long lines are susceptible to noise and ringing etc. Buffering is provided to reduce further degradation, re-shape the signals before use, and drive outgoing lines.

2.10.2.2 PDMA16 interface card

A commercial PDMA16 interface card was employed to write the digital data from the interface box into memory. This requires writing around 3.2 Mb of data to memory in 20 seconds, corresponding to a transfer rate of 160 kb s^{-1} (within the capability of the PDMA16 interface board).

2.10.2.3 Eavesdropper PC

The eavesdropper PC uses a 486 DX2/66 with 16 Mb of RAM and runs a LINUX operating system. It has two SCSI disks : 420 Mb, and 1Gb, and an exabyte 8505 tape drive. A specialised driver has been written for the PDMA16 interface card by David Blackman. Custom programs have been written to enable the data acquisition, and to demultiplex the captured data.

The capture program resets the PDMA16 driver and interface box, and passes control to the PDMA16 driver. This driver writes the incoming data via DMA into kernel memory, whereafter it is written to a disk file in the SEG-D format. The demultiplex program reads this disk file and demultiplexes the data into SEG-Y format, writing the appropriate header information into the SEG-Y headers. The SEG-Y data is written to a disk file on the other disk, to ensure data security in the event of a disk failure.

At the conclusion of recording, the SEG-Y data are written to an exabyte tape in UNIX tar format, for transfer to the field processing computer at the base camp. Both the SEG-D and SEG-Y data are stored on the eavesdrop PC until this transfer has been verified. Together with the SEG-Y data, a log file of the day's acquisition is also transferred to the field geophysicist.

The eavesdropper proved a successful tool to have in the field. The most obvious advantage being the fact the SEG-D tapes did not have to be de-multiplexed with the 'Vista' on the field processing system. Further development of the system enable the play-back of SEG-D records on the Sercel and the writing of these to the PC disc.

The following errors were reported by the Observer for the eavesdropping system :

TAPE NUMBER	FFID	ERROR	DATA CAPTURE
95/002	19	Short record	14158 ms
95/002	27	Extra 10 bytes	2 ms
95/005	95	Extra 2 bytes	2700 ms
95/007	146	Short record	8820 ms
95/008	174	RF interrupt	19256 ms
95/011	220	EV timeout	704 ms
95/020	452	Line interrupt	14 ms
95/022	465	Nil Ev	2 ms
95/023	491	Extra 2 bytes	17182 ms
95/026	580	EV short- line synchro error	2324 ms
95/029	624	Extra 2 bytes	7074 ms
95/029	628	Extra 1 byte - tape synchro	16438 ms
95/029	635	EV short - line interrupt	14 ms
95/029	636	EV short - line interrupt	4 ms
95/031	657	Line interrupt	964 ms
95/039	808	Extra byte	6474 ms
95/039	811	Line fail	18 ms
95/039	819	RF interrupt	3338 ms
95/040	830	EV short - line fail	338 ms

2.11 Data Processing

2.11.1 In field 'Vista'

The 'Vista' field seismic processing system was used on the seismic survey for quality control and to produce 'Brute stacks' in the field. QC was done by reading in the SEG-Y eavesdropper tapes, concatenating the separate SEG-Y files and writing these out to exabyte tape in SEG-Y 32 bit IBM floating point format. The odd short or missing file could be de-multiplexed from the SEG-D field tape on Vista and incorporated with the other data.

Uphole signals, recorded on auxiliary trace number 1, were demultiplexed separately and written onto exabyte tape. These were also concatenated and analysed on the Vista and uphole time arrivals computed.

Geometry information was taken from the SEG-Y headers, stacking velocities calculated from constant velocity analysis and datum statics applied to produce a 'brute' stack, (straight line geometry assumed).

First breaks were also picked in the field using 'Green Mountain Geophysics' software to compute refraction statics, but were not applied to the field processed data as crooked line geometry was not available at this point.

Field QC also included the checking of shot geometry from the monitor records and observers reports. Loading, drilling and shot firing logs were also cross-checked for correctness in the field.

Survey information from Dynamic Satellite Surveys was checked using the 'Green Mountain Geophysics' software on the elevation profiles and x, y plots.

2.11.2 Head office 'Disco/Focus'

Full processed sections of all seismic lines were produced in-house at AGSO, at both 20 and 4 seconds two-way-time. The software used in the processing stream was provided by 'Cogniseis' and was both batch mode 'Disco' and interactive mode 'Focus'. These programs were run on an IBM RS6000 machine under a UNIX operating system.

Crooked line processing was undertaken for all lines, the CMP locations for binning being calculated from geometry distribution plots. As a rule the deep sections have a large binning window while the shallow sections were binned with an 80 metre maximum offset. Constant velocity analysis was undertaken on CMP coherency stacked data with particular emphasis placed on the top three seconds of section.

The processing stream used for the 20 second displays was :

1. Crooked line geometry definition
2. Field SEG-Y to 'Disco' format
3. Resample to 4 milliseconds
4. Quality control display and edits
5. Crooked line binning
6. Spherical divergence and gain correction
7. Statics computation (first breaks or uphole method, differing datums)
8. CMP sort
9. 50 Hz notch filter (where required)
10. Velocity analysis (cvs)
11. Normal moveout correction
12. Pre-stack NMO mute (55% stretch mute)
13. Common mid-point stack
14. Post stack balance
15. Bandpass filter
16. Time varying equalisation
17. Signal enhancement (fxdecon & digistack)
18. Display

The 4 second section processing also included pre-stack spectral equalisation to enhance high frequency near surface events. Pre-stack migration or DMO was not applied due to fold and offset variability caused by the crooked line geometry.

Profiles of residual magnetics, Bouguer gravity or residual gravity were displayed on top of all seismic sections together with the elevation.

Highly compressed displays of stack data at 1:1 scale are shown in figs. 7 to 11. All lines show data was obtained throughout the crust.

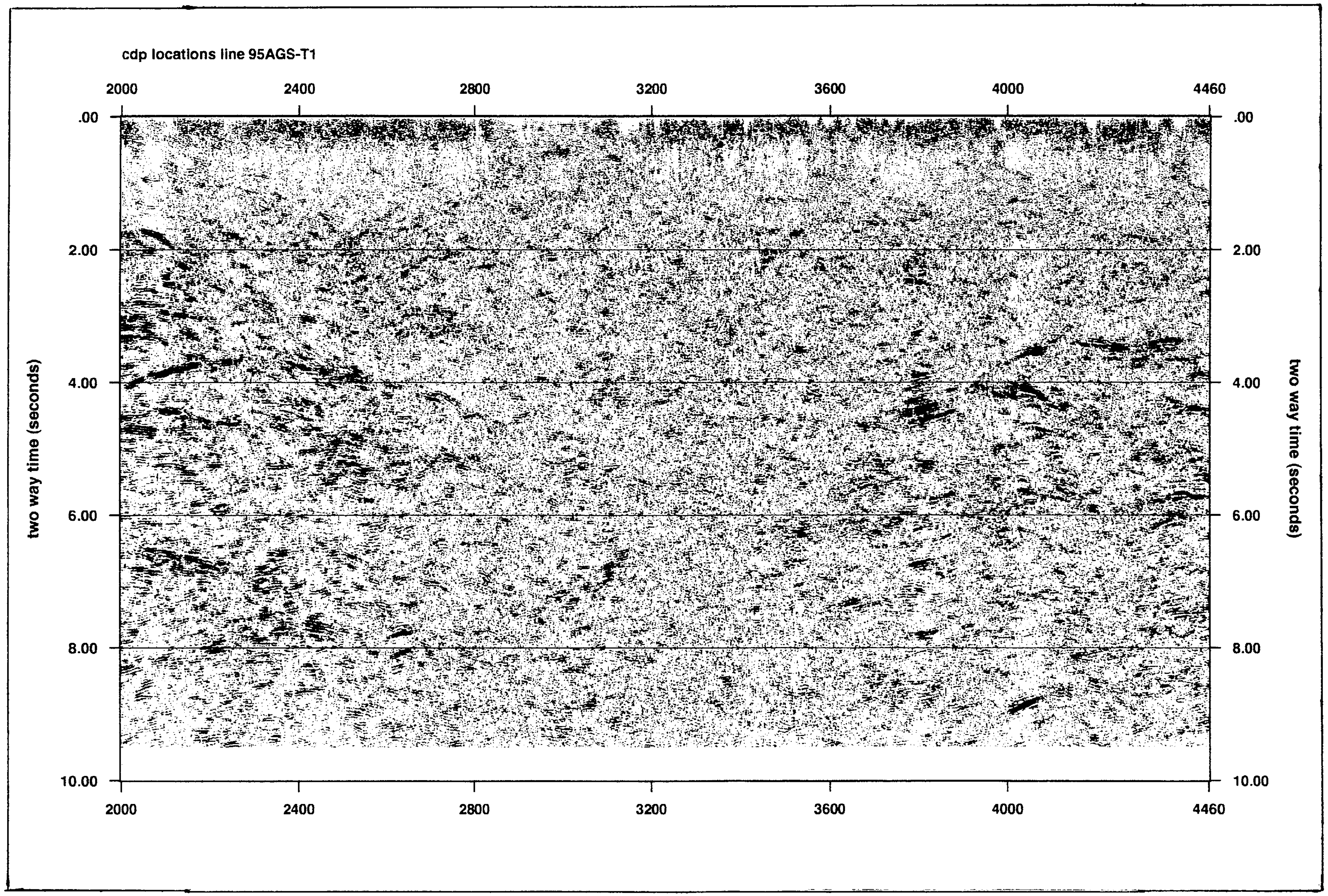


Figure 7. Processed section, Line 95AGS-T1, 10 sec. twt

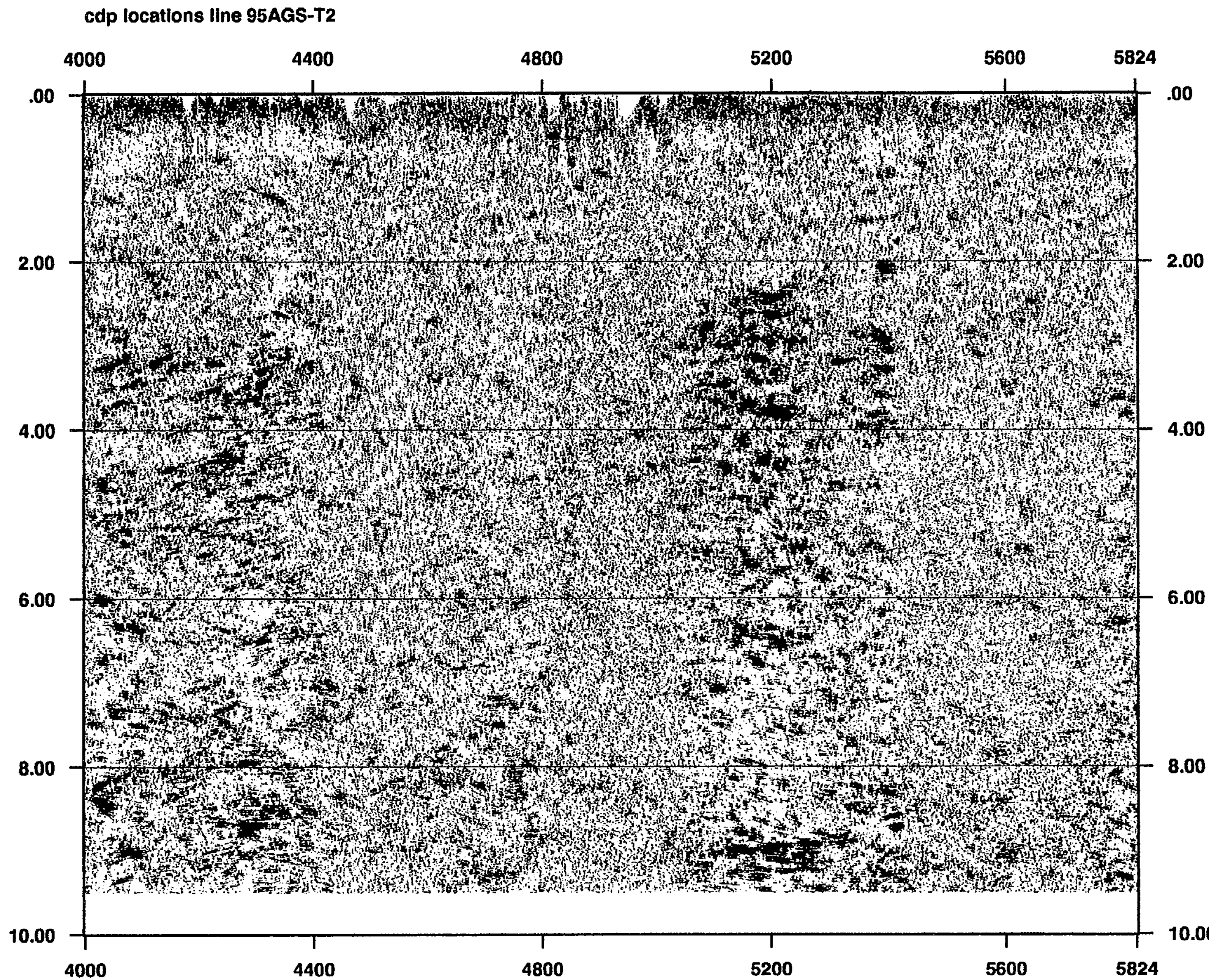


Figure 8. Processed section, Line 95AGS-T2, 10 sec. twt

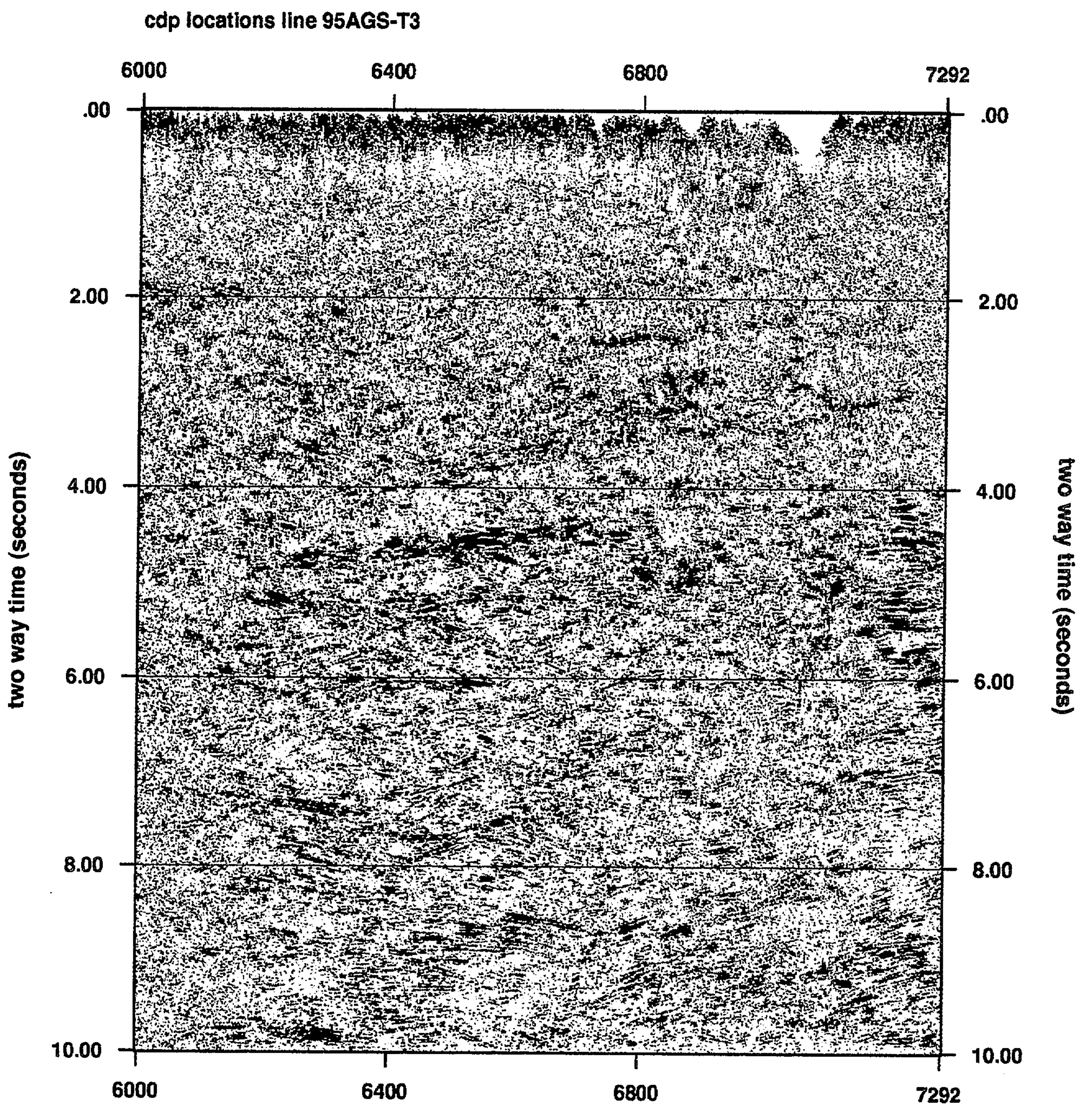
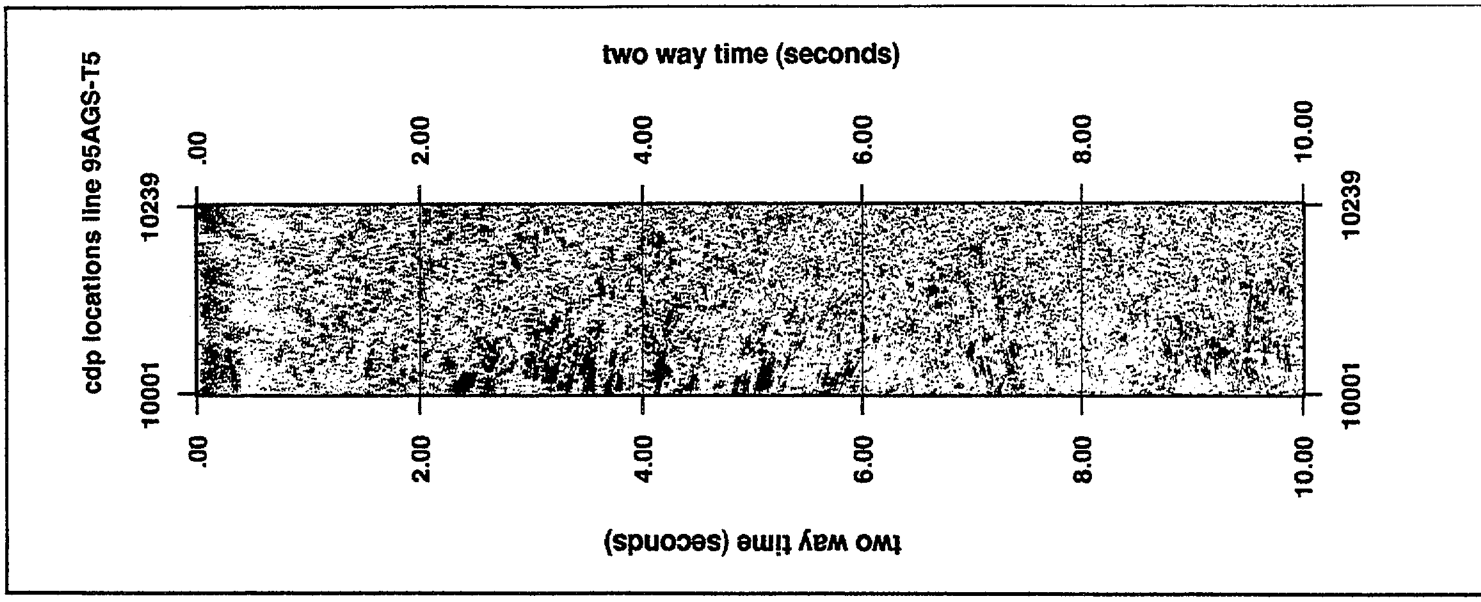


Figure 9. Processed section, Line 95AGS-T3, 10 sec. twt



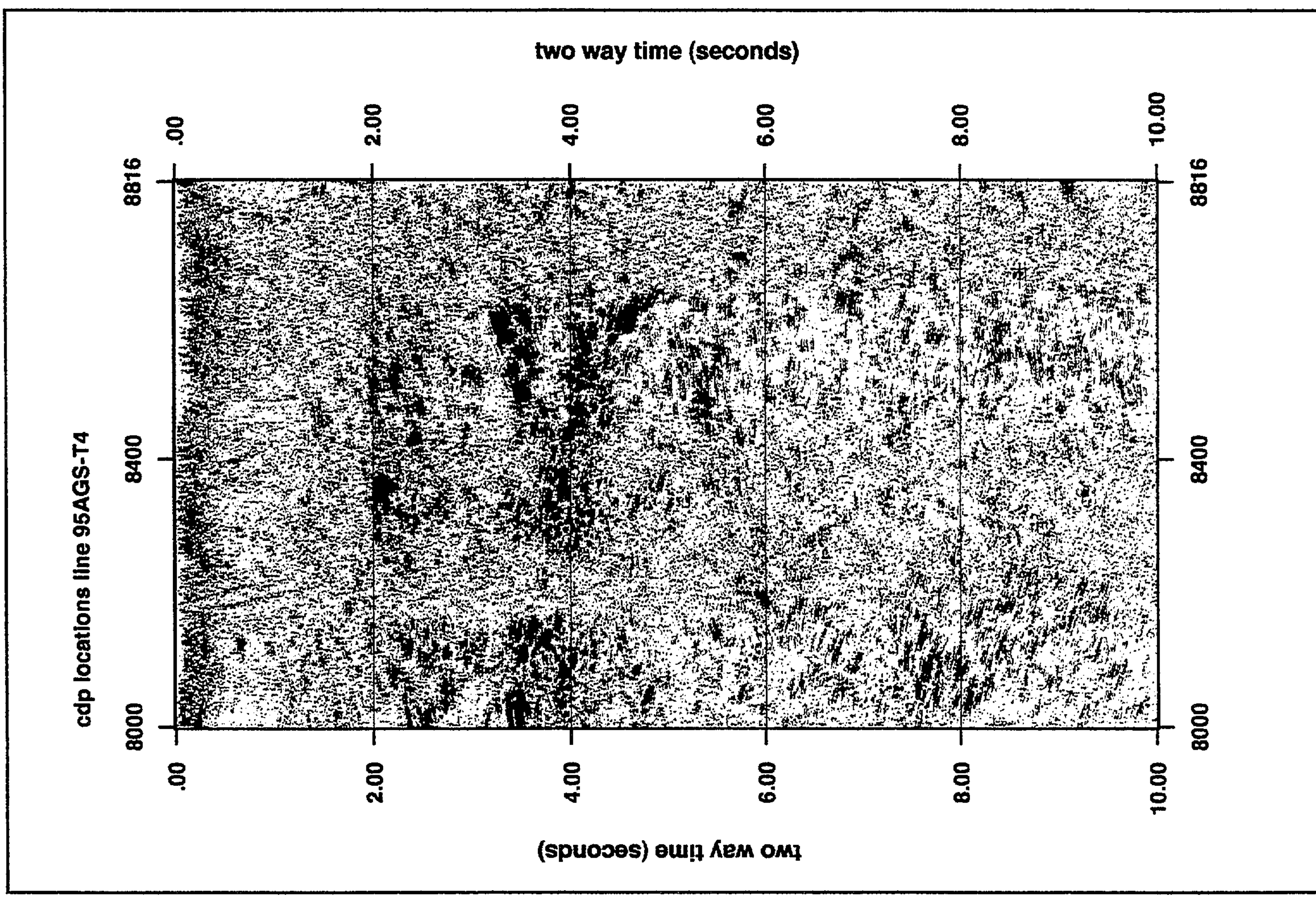


Figure 10. Processed sections, Lines 95AGS-T4, T5, 10 sec. twt

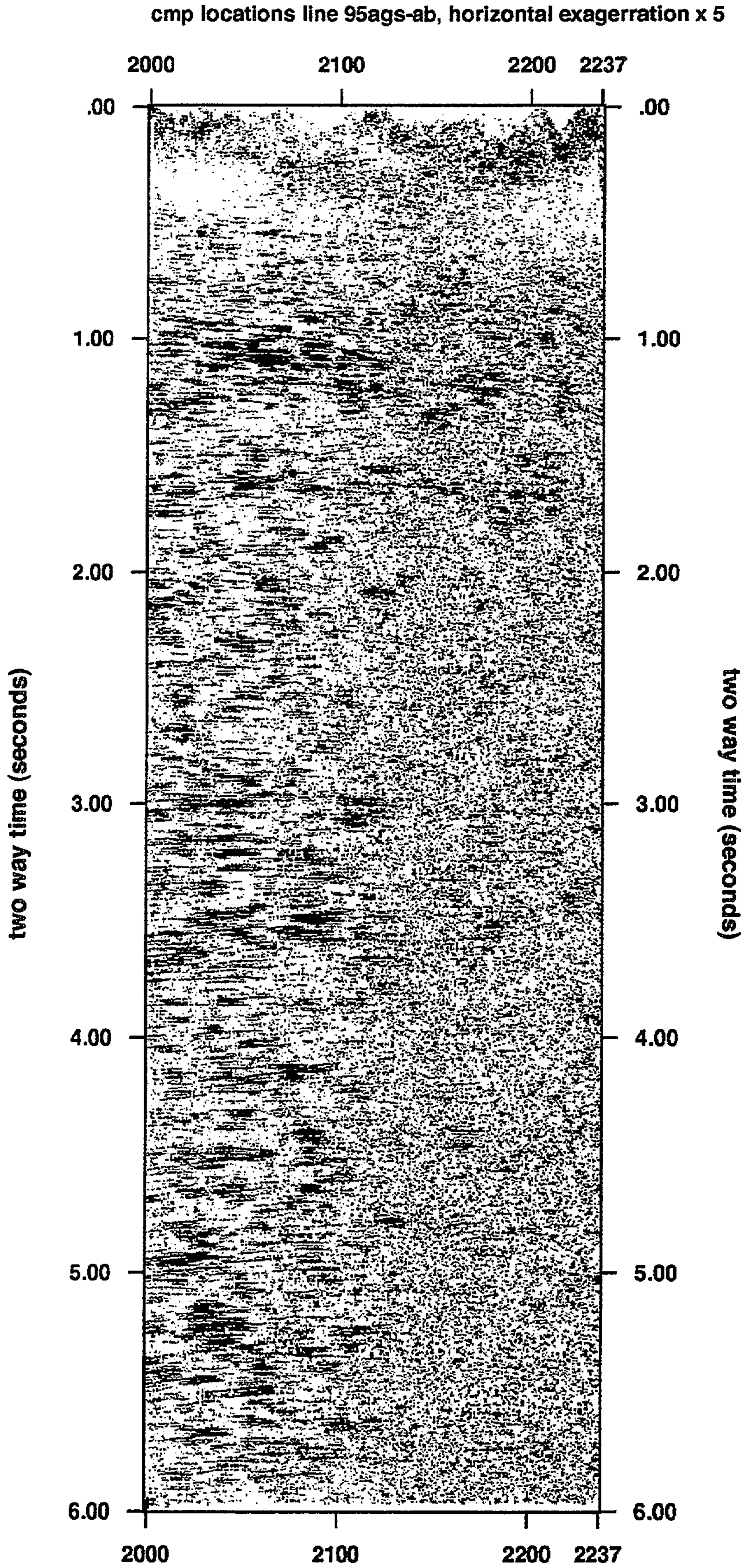


Figure 11. Processed section, Line 95AGS-AB, 6 sec. twt

3. ACKNOWLEDGMENTS

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Survey Design
B. Drummond, T. Barton, K. Wake-Dyster (AGSO); R. Richardson, A. V. Brown (TGS).

Survey Crew
T. Barton (scientific party leader), D. Johnstone, A. Owen (scientific officers) K. Wake-Dyster (operations manager), J. Leven (software development), S. Brandon (eavesdropper hardware), B. Devenish (quality control and technology expert), A. Crawford (mechanical technician), J. Whatman, S. Thomas (technical officers), D. Eaton (driller), A. Porter (driller's offsider), S. Pardalis, A. Takken (loaders and shot firers), A. Cherry, R. Fisher, D. Keast, P. Kebblewhite, S. Nulsen (field hands), D. Hampton, S. Krushka, B. Ralph, G. Wright (locally recruited temporary field hands), R. Richardson, S. Hayward (TGS).

Gravity Readings
R. Richardson (ISM).

Groundwater and Cuttings Sampling
R. Donaldson (ISM), T. Barton (AGSO).

Field Office Rental
H. and J. Turnbull (Tullah Lakeside Chalet); B. Yates (Fingal Community Centre).

Surveying Contractor
P. Robinson, D. Williams, D. Brooks, B. Hedditch (Dynamic Satellite Surveys).

Environmental Issues
D. Gatehouse, C. Bacon (TGS) T. Barton (AGSO) K. Lynd, P. Rainbird, (Hydroelectric Commission) O. Hedberg and staff (Land Resources Branch) G. Williams (Forestry Tasmania) innumerable land holders.

Road Signs
J. Foley, T. Scolyer, L. Braid, J. Gillian, T. Berryman, B. Chillcott (Works Tasmania).

Drilling Contractors
M. Lillas, Columbus Drilling (Line 1);
M. Maxfield, Maxfield Nominees Pty. Ltd. (Lines 1 and 2).

Supply of Low Loader
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Supply of Gravel
P. Beamish, Beamish Contractors, Burnie.

Explosives Licences and Use
M. Robertson, C. Bacon, D. Blackaby, J. Coffey, S. Halfacre, J. Mollison (TGS).

Explosives Supply and Shipment
M. Kelly, G. Burstow, N. Kramer (ICI)

Explosives Storage
J. McGiveron, The Cornwall Coal Company NL, Fingal,
ICI Hellyer Mine.

Car Hire
Avis, Burnie, A. V. Browm (TGS)

Equipment Transhipment
M. Brown, R. Ryder (Brambles Shipping)
L. Polden (Spirit of Tasmania)

Field Communications
D. Schoe, Telecom Australia.

Data Processing
T. Barton, D. Johnstone, A. Owen (AGSO).

Supervision and Customer Liaison
B. Drummond (AGSO)

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Yeates, A. N. & Brown, A.V. 1995. Tasmania NGMA Project "TASGO": Geological Framework of an "Island State with Potential", The first year and plans for 1995/96, presented to delegates attending the Tasmanian Chamber of Mines Exploration Division Meeting, Launceston 30 June 1995. (Unpublished AGSO/MRT document)

APPENDIX 1

Operational Statistics and Timetable

Line pegging commenced	16/1/1995
Contract drilling commenced	23/1/1995
Contract drilling completed	17/3/1995
AGSO drill crew departed Canberra	2/2/1995
AGSO drilling commenced	6/2/1995
AGSO drilling completed	22/3/1995
AGSO drilling crew returned to Canberra	6/4/1995
Contract surveying commenced	12/2/1995
Contract surveying completed	11/4/1995
Recording crew departed Canberra	14/2/1995
Recording crew commenced acquisition	22/2/1995
Recording completed	8/4/1995
Recording crew returned to Canberra	20/4/1995

Recording:

Total number of recording days worked	32
Recording days lost:	
Due to travel to and from Canberra	4
Due to town shifts	4
Due to adverse weather	2
Due to instrument breakdown	0
CMP fold	10-20
Total number of shots	765
Average number of production shots/recording day	23.9
Explosives used	7036 kg
Detonators used	809
Average charge/production shot (lines T1- T5)	10 kg
(line AB)	2 kg

Drilling:

AGSO

Number of drilling rigs	1
Total number of rig days worked	33
Rig days lost:	
Due to town shifts	4
Due to adverse weather	1
Due to equipment breakdowns and maintenance	1

Shot holes:		
Total number of shot holes		199
Total metres drilled		4,157.0 m
Average depth/shot hole		21.92 m
Average number of holes/rig/day		6.0

MAXFIELD

Number of drilling rigs		1
Total number of rig days worked		35
Shot holes:		
Total number of shot holes		362
Total metres drilled		4252.5 m
Average depth/shot hole	(T1, T2)	11.57 m
	(AB)	5.0 m
Average number of holes/rig/day		10.3

COLUMBUS

Number of drilling rigs	1
Total number of rig days worked	41
Shot holes:	
Total number of shot holes	367
Total metres drilled	4465.5 m
Average depth/shot hole	12.17 m
Average number of holes/rig/day	8.9

DRILLING

Line	Explosives		Drilling					
	Powergel (kg)	Dets #8 star	Hole depth (m)	DBC (m)	% waste	No. Holes	Drilling Days	Average depth (m)
95AGS-T1	3128	347	4836.0	3884.5	19.68	415	41	11.65
95AGS-T2	1996	253	3559.5	2698.2	24.20	310	30	11.48
95AGS-T3	1000	104	2375.0	2038.5	14.17	109	19	21.79
95AGS-T4	684	69	1234.0	1026.5	16.82	69	13	17.88
95AGS-T5	198	21	548.0	501.3	8.52	21	3	26.10
95AGS-AB	30	15	75.0	74.0	1.33	15	1	5.00
Total	7036	809	12627.5			939	107	

RECORDING

Line	No. Shots	No. Days	Shots/day	Line km	km/day
95AGS-T1	323	12	26.92	49.20	4.10
95AGS-T2	243	10	24.30	36.48	3.65
95AGS-T3	97	5	19.40	25.84	5.17
95AGS-T4	68	3	22.67	16.32	5.44
95AGS-T5	19	1	19.00	4.80	4.80
95AGS-AB	15	1	15.00	1.20	1.20
Total	765	32		133.8	

Table 1. Operational Statistics, Line Summary

APPENDIX 2

Seismic Survey Personnel

Australian Geological Survey Organisation :

Project Leader	T. J. Barton
Seismic Field Party Leader/Geophysicist	D. W. Johnstone
Visiting Geophysicists	A. Owen
	K. D. Wake-Dyster
	J. H. Leven
Engineer	B. Devenish
Technical Officers (Engineering)	J. Whatman
	S. Thomas
	A. Crawford
Field Assistants (Explosives)	S. Pardalis (Contract)
	A.C. Takken
Temporary Personnel	A. Cherry
	R. Fisher
	D. Hampton
	D. Keast
	P. Kebblewhite
	S. Krushka
	S. Nulsen
	B. Ralph
	G. Wright
AGSO Driller	D. Eaton
AGSO Assistant Driller	A. Porter

Contract Personnel :

Contract Drilling :	Columbus Drilling
Driller	J. Clayton
Assistant Driller	A Tuxworth
Contract Drilling :	Maxfield Nominees Pty. Ltd.
Driller	D. Woods
Assistant Driller	R. Dransfield
Contract Surveying :	Dynamic Satellite Surveys Pty. Ltd.
Head Surveyor	P. Robinson
Surveyors	D. Brooks
	D. Williams

APPENDIX 3

Seismic Survey Vehicles

Recording:

Recording truck	Mercedes 911 4X4	ZBE-748
Workshop/electronics truck	Mercedes 911 4X4	ZBE-689
Cable/stores truck	Mercedes 911 4X4	ZBE-687
Geophone carrier	Toyota Landcruiser 4X4 T/Top	ZRM-016
Geophone carrier	Toyota Landcruiser 4X4 T/Top	ZRM-017
Geophone carrier	Toyota Landcruiser 4X4 T/Top	ZRM-018
Geophone carrier	Toyota Landcruiser 4X4 T/Top	ZRM-020
Shooting truck	Toyota Landcruiser 4X4 T/Top	ZRM-019
Personnel carrier	Toyota Landcruiser 4X4 S/W	ZJE-152
Reconnaissance vehicle	Toyota Landcruiser 4X4 S/W	ZJE-129
Crew Chief vehicle	Toyota Camry	Leased by TGS for AGSO

Drilling:

Drilling rig	Mayhew 1000/Mack R600, 8X6	ZBE-606
Drilling rig (Columbus)	Atlas Copco 601/MAN truck Ingersoll Rand 750/250 compressor	
Drilling rig (Maxfield)	Atlas Copco 712H, track mounted Atlas Copco low volume compressor	
Drill water tanker	Mercedes 911 5 tonne 4X4	ZSU-782
Preloading truck	Toyota Landcruiser, 4X4, T/Top	ZJE-055
Stores/preloader truck	Toyota Landcruiser, 4X4, T/Top	ZJE-015
Personnel carrier	Toyota Landcruiser 4X4 S/W	ZJE-269

APPENDIX 4

Recording System

Seismic System	Sercel SN368, S/No. 17
Geophones	8 Hz GSC20D, 16 in-line per string
Eavesdropper System	AGSO Interface to 486 DX2/66 PC with LINUX O/S
Blaster	OYO Model 1340
Camera	OYO DFM-480
Station Unit Test & Repair System	Prosol TRS-2
Field Processing System	Seismic Image Software (Calgary, Canada) VISTA package run on a 386 PC system

<u>Sercel SN368 acquisition settings :</u>

Recording mode	Digital
Data format(s)	Sercel Multiplexed SEG-D (9 track) PC 32 bit I.E.E.E. SEG-Y (exabyte)
Tape(s)	9 track, 6250 bpi GCR, 0.5 inch, 1200 ft, 8.5 inch reel 5 Gb 8505 exabyte (compressed data format)
Number of input channels:	
Data	120
Auxiliary	4
Record length	20 seconds
Sample rate	2 ms
Input filters:	
Low-cut	8 Hz @ 18db/Oct
Anti-alias Hi-cut	178 Hz
Pre-Amp Gain	7**2

Monitor Record Playback Parameters:	
Low-cut	12 Hz
Hi-cut	90 Hz
Slope	18 ms
Seis Monitor Gain	42 db
Output Adjust	4 db
Gain Curve	1
Release Time	10 ms
Compression Delay	8 ms
Early Gain	36 db
AGC	1
Recovery Delay	32 ms

APPENDIX 5

Line recording spread parameters

Line 95AGS-TEST

Active spread length	2400 m
Spread Type	Off-end
Number of channels	120
Station interval	20 m
Geophone group interval	20 m
Number geophones/trace	16
Geophone spacing	1.3 m
Geophone pattern	in-line

Line orientation	West - East (High SP numbers East, Trace 1 to the West)
Line length	2.40 km
First Geophone station	001 (Adjacent to Station 1777 on 95AGS-T1)
Last Geophone station	120 (Adjacent to Station 1837 on 95AGS-T1)

TESTS

(i) Power Line test : Cap test with and without 50 Hz notch filter.
(ii) Low Cut Filter comparison with notch filter out :

(a)	Shotpoint at station	060
	Depth to top of charge	10.7 m
	Charge size	5 kg, water tamped
	Low Cut Filter	16 Hz
(b)	Shotpoint at station	001
	Depth to top of charge	11.3 m
	Charge size	5 kg, solid tamped
	Low Cut Filter	8 Hz
(c)	Shotpoint at station	120
	Depth to top of charge	6.6 m
	Charge size	6 kg, solid tamped
	Low Cut Filter	Open

The test site chosen had minimal topographical variation and was relatively straight however drilling conditions were fairly poor thus further tests were ruled out due to the impact on drilling production on line 95AGS-T1.

Line 95AGS-T1

Active spread length	4760 m
Spread Type	Split Spread
Number of channels	120
Station interval	40 m
Geophone group interval	40 m
Number geophones/trace	16
Geophone spacing	2.67 m
Geophone pattern	in-line
Shotpoint interval (nominal)	120 m
Hole depth (nominal)	12 m
Charge size	up to 10 kg
CMP fold (nominal)	20
Line orientation	West - East (High SP numbers East, Trace 1 to the West)
Line length	49.20 km
First Geophone station	1000
Last Geophone station	2230
First Shotpoint	1000
Last shotpoint	2230

Line 95AGS-T2

Active spread length	4760 m
Spread Type	Split Spread
Number of channels	120
Station interval	40 m
Geophone group interval	40 m
Number geophones/trace	16
Geophone spacing	2.67 m
Geophone pattern	in-line
Shotpoint interval (nominal)	120 m
Hole depth (nominal)	12 m
Charge size	up to 10 kg
CMP fold (nominal)	20
Line orientation	West - East (High SP numbers East, Trace 1 to the West)
Line length	36.48 km
First Geophone station	2000
Last Geophone station	2912
First Shotpoint	2000
Last shotpoint	2912

Line 95AGS-T3

Active spread length	4760 m
Spread Type	Split Spread
Number of channels	120
Station interval	40 m
Geophone group interval	40 m
Number geophones/trace	16
Geophone spacing	2.67 m
Geophone pattern	in-line
Shotpoint interval (nominal)	240 m
Hole depth (average)	30 m
Charge size	10 kg
CMP fold (nominal)	10
Line orientation	West - East (High SP numbers East, Trace 1 to the West)
Line length	25.84 km
First Geophone station	3000
Last Geophone station	3646
First Shotpoint	3000
Last shotpoint	3646

Line 95AGS-T4

Active spread length	4760 m
Spread Type	Split Spread
Number of channels	120
Station interval	40 m
Geophone group interval	40 m
Number geophones/trace	16
Geophone spacing	2.67 m
Geophone pattern	in-line
Shotpoint interval (nominal)	240 m
Hole depth (average)	30 m
Charge size	10 kg
CMP fold (nominal)	10
Line orientation	North-South (High SP numbers South, Trace 1 to the North)
Line length	16.32 km
First Geophone station	4000
Last Geophone station	4408
First Shotpoint	4000
Last shotpoint	4408

Line 95AGS-T5

Active spread length	4760 m
Spread Type	Split Spread
Number of channels	120
Station interval	40 m
Geophone group interval	40 m
Number geophones/trace	16
Geophone spacing	2.67 m
Geophone pattern	in-line
Shotpoint interval (nominal)	240 m
Hole depth (average)	32 m
Charge size	10 kg
CMP fold (nominal)	10
Line orientation	North-South (High SP numbers South, Trace 1 to the North)
Line length	4.80 km
First Geophone station	5000
Last Geophone station	5120
First Shotpoint	5001
Last shotpoint	5120

Line 95AGS-AB

Active spread length	4760 m
Spread Type	Split Spread
Number of channels	120
Station interval	10 m
Geophone group interval	20 m
Number geophones/trace	16
Geophone spacing	1.3 m
Geophone pattern	in-line
Shotpoint interval (nominal)	60 m
Hole depth (nominal)	5 m
Charge size	2 kg
CMP fold (nominal)	20
Line orientation	West - East (High SP numbers East, Trace 1 to the West)
Line length	1.20 km
First Geophone station	1000 (at same location as 2132 on 95AGS-T2)
Last Geophone station	1118
First Shotpoint	1000
Last shotpoint	1118

APPENDIX 6

SEISMIC FIELD TAPE INDEX

SEG-D (9 track)

Tape No.	Line	Shotpoints	Recording Dates	Record Mode	Survey
95001	95AGS-T1	Test shots	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95002	95AGS-T1	1000-1075	23/02/95-23/02/95	6250 bpi GCR	TASGO 1995
95003	95AGS-T1	1078-1159	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95004	95AGS-T1	1162-1252	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95005	95AGS-T1	1255-1320	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95006	95AGS-T1	1331-1390	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95007	95AGS-T1	1396-1459	23/02/95-23/02/95	6250 bpi GCR	TASGO 1995
95008	95AGS-T1	1462-1527	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95009	95AGS-T1	1531-1576	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95010	95AGS-T2	2000-2066	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95011	95AGS-T2	2069-2159	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95012	95AGS-T2	2161-2261	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95013	95AGS-T2	2264-2345	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95014	95AGS-T2	2352-2435	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95015	95AGS-T2	2438-2534	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95016	95AGS-T2	2537-2603	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95017	95AGS-T2	2606-2675	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95018	95AGS-T2	2678-2741	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95019	95AGS-T2	2744-2816	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95020	95AGS-T2	2819-2891	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95021	95AGS-T2	2897-2912	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95022	95AGS-AB	1000-1118	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95023	95AGS-T1	1588-1662	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95024	95AGS-T1	1666-1744	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95025	95AGS-T1	1747-1849	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95026	95AGS-T1	1858-1954	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95027	95AGS-T1	1957-2053	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95028	95AGS-T1	2062-2152	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95029	95AGS-T1	2155-2224	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95030	95AGS-T1	2227-2230	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95031	95AGS-T3	3000-3144	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95032	95AGS-T3	3150-3278	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95033	95AGS-T3	3284-3424	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95034	95AGS-T3	3449-3565	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95035	95AGS-T3	3578-3646	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995

Tape No.	Line	Shotpoints	Recording Dates	Record Mode	Survey
95036	95AGS-T4	4000-4114	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95037	95AGS-T4	4120-4246	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95038	95AGS-T4	4252-4396	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95039	95AGS-T4	4403-4408	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95040	95AGS-T5	5001-5120	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95041	95AGS-AB2	1006-1138	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95042	95AGS-AB2	1144-1288	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995
95043	95AGS-AB2	1294-1300	22/02/95-22/02/95	6250 bpi GCR	TASGO 1995

SEG-Y (I.E.E.E 32 bit, 5 Gb compressed, exabyte)

Tape No.	FFID Range	Record Mode	Survey
EV95T01	2 - 6	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T02	9 - 43	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T03	44 - 84	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T04	85 - 140	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T05	141 - 174	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T06	176 - 190	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T07	176 - 213	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T08	215 - 225	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T09	226 - 252	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T10	226 - 287	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T11	288 - 303	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T12	304 - 335	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T13	336 - 360	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T14	361 - 402	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T15	404 - 439	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T16	440 - 458	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T17	460 - 475	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T18	460 - 497	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T19	499 - 536	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T20	537 - 548	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T21	549 - 564	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T22	565 - 592	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T23	593 - 626	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T24	627 - 643	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T25	645 - 666	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T26	645 - 697	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T27	698 - 718	UNIX 'TAR' (Exabyte)	TASGO 1995

Tape No.	FFID Range	Record Mode	Survey
EV95T28	719 - 734	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T29	735 - 751	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T30	753 - 773	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T31	790 - 803	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T32	790 - 826	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T33	828 - 847	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T34	828 - 883	UNIX 'TAR' (Exabyte)	TASGO 1995
EV95T35	884 - 899	UNIX 'TAR' (Exabyte)	TASGO 1995

APPENDIX 7

ARCHIVAL INFORMATION

BMR/AGSO Land seismic survey number : 139

Digital field tapes stored at Australian Archives, Mitchell, ACT under accession number A4729.

Record boxes containing monitor records and associated documentation stored Australian Archives, Mitchell, ACT under accession number A5692.

Relevant AGSO files relating to TASGO field operations :

94/1085	Land Seismic Tasmania - Surveying
94/1086	Land Seismic Tasmania
94/1087	Land Seismic Tasmania - Drilling

APPENDIX 8

ENVIRONMENTAL MANAGEMENT PLAN : AGSO SEISMIC SURVEY, JAN-APRIL 1995

INTRODUCTION

As part of the Australian National Geoscience Mapping Accord (NGMA), the Australian Geological Survey Organisation (AGSO) proposes to conduct seismic reflection profiling over a number of regions in Tasmania in early 1995. This research is aimed at achieving a better understanding of the sub-surface structure in regions of considerable mineral resource potential. Part of the work is aimed at determining the depth of the Tasmania Basin which may have potential hydrocarbon prospectivity. Experience in other parts of Australia has shown that AGSO seismic reflection profiling techniques for investigating the deep geologic structure provides a new perspective on geologic evolution not available using other techniques.

The proposed traverses pose a number of particular technical and environmental problems in the acquisition of seismic data. All the lines are along existing roads to avoid the need for any line clearing, most of the terrain is hilly and the roads are not as straight as would be desired. All of the lines have extensive hard rock cover and areas of sensitive vegetation. These all present specific difficulties for setting recording parameters. Some of these problems will be addressed in a short series of tests along parts of these lines prior each lines acquisition.

This Environmental Management Plan has been formulated to address matters relating to the conduct of AGSO seismic work in Tasmania during January - April 1995. Fig 1 shows the location of the five proposed seismic lines. In general the work will be carried out in compliance with the AGSO Code of Environmental Practice. Some specific areas of concern relating to the proposed lines are covered in a later section of this document. Initial reconnaissance was carried out in conjunction with Industry Safety and Mines (ISM) in November 1993 and followed up by a second visit in November 1994 to finalise line placement. In conjunction with ISM matters concerning access to seismic lines, land ownership, possible environmental degradation are currently being addressed. Attached to this document are detailed descriptions of the routes for the proposed seismic lines and other pertinent information.

CO-OPERATIVE PARTNERS

The proposed 1995 Tasmanian seismic profiles will be conducted under the National Geoscience Mapping Accord (NGMA) which provides a mechanism for co-operative research and geological mapping between State and Commonwealth geoscience institutions, universities and industry.

The partners in the TASGO project are :

1. The Australian Geological Survey Organisation (AGSO), a research bureau of the Commonwealth Department of Primary Industry & Energy (DPIE).
2. Tasmanian Geological Survey, within Industry Safety and Mines (ISM), Tasmania Development and Resources.

The co-operative partners in this project are jointly responsible for the preparation of this document which was drafted by T. Barton, Project Scientist, TASGO project, AGSO.

PROPOSED SCHEDULE

It is proposed that line surveying and drilling commence in mid January 1995. Data acquisition is expected to begin in mid February. Field operations are anticipated to be completed by the end of March. Details of timing for individual lines is given in the appendices.

SPECIFIC ENVIRONMENTAL ISSUES

It is proposed to conduct the seismic survey in areas of Tasmania. Although all are along roads and road reserves, each have some special requirements. It is in the interests of all concerned that the work practices of the AGSO seismic crew and contractors engaged by AGSO do not impinge on the environment in any lasting way. To minimise impact along the Pieman Road (95AGS-T1) drilling operations will be carried out in such a way as not to cause any damage to the road pavement Little, if any, drilling is anticipated greater than 10 m from the road verge. It is most probable that the drill rig will be mounted on a low loader.

The Cradle Mountain Link Road (95AGS-T2) presents a number of special problems for shothole drilling. In particular the first 15 km of road verge has been totally rehabilitated and disturbances of the verges would interfere with this recently completed very expensive rehabilitation plan. One option being explored to minimise any impact is to drill from the road with a rig mounted on a low loader. This would require a lane closure around drilling operations and traffic control. For the remainder of the line, work would be carried out off the road verge. The technical feasibility of such an operation on this road will be determined when AGSO selects a drilling contractor for the work.

The Mathinna (95AGS-T3), Woodbury (95AGS-T4) and Ouse (95AGS-T5) lines are all along road verges and present no specific environmental difficulties which are not covered in the AGSO Code of Environmental Practice.

If you require more information please contact :

Mr Tim Barton (Seismic Crew Leader)		or	Mr A N (Tony) Yeates (Project Coordinator)	
Telephone :	(06) 249 9625		Telephone :	(06) 249 9335
Fax :	(06) 249 9972		Fax :	(06) 249 9983

LINE DESCRIPTION : 95AGS-T1 PIEMAN RIVER ROAD

1. MAP SHEET AREAS

1:250 000 scale :	Tasmania NW
1:100 000 scale :	Pieman, Sophia
Special :	1:25 000 Mt. Read Volcanics Project (1986) Map 2 Geology of the Rosebery - Mt. Block area 1:25 000 Regional Geology of the Dundas - Mt. Lindsay - Mt. Ramsay area (1983) Parts 1 & 2 1:50 000 Corinna (1991) Geological Atlas Series. Sheet 7914N

2. LOCAL GOVERNMENT

Waratah/Wynyard
West Coast

3. TRAVERSE DESCRIPTION

The proposed traverse commences approximately 1 km west of the Stanley River along the Pieman River road and continues to the intersection with the Murchison Highway. The line then follows the highway southeast for 2 km then continues along a HEC access road up to the Macintosh Dam wall.

The Pieman Road is an all bitumen road with very limited road verge available to allow for operations to be carried out off the road. This will require drilling operations to be carried out from the road using suitable machinery to avoid damage to the road surface. Little if any drilling is possible along the Murchison Highway section due to the traffic volume along the road and limited access to drill hole locations. The dam road presents no practical difficulties.

The nominal shot hole spacing is 120m with expected hole depths of 12 - 15m. Drilling will be carried out using a track-mounted rig, possibly on the rear of a low loader. All operations will be required to be done along the road, limiting access along the specific areas being worked to a single lane.

No line clearing will be required along any part of this traverse. No major security problems are envisioned along the Pieman or dam Roads. However, some measures will be required along the 2 km highway section. The crew will be based in Tullah for this line.

Traverse Length : 51 km

4. CONTACTS FOR OPERATIONS

Mr Kevin Lynd
Asset Co-Ordinator - West Coast
Hydro Electric Commission
EBU Building

TULLAH
TASMANIA 7321
Phone : (004) 73 4295

5. PROPOSED SCHEDULE OF OPERATIONS

DRILLING
Nominal hole interval : 120m
Number of holes : ~425
Nominal hole depth : 12 - 15m
Anticipated drilling rate : 10 holes/rig/day
Commence : mid January 1995
Completion : late February 1995

DATA ACQUISITION
Station interval : 40m
Group interval : 40m
No. channels : 120
Anticipated recording rate : 40 shots/day (4.8 km/day)
Commence : ~18 th February 1995
Completion : ~3 March 1995

LINE DESCRIPTION : 95AGS-T2 CRADLE MOUNTAIN LINK ROAD

1. MAP SHEET AREAS

1:250 000 scale :	Tasmania NW
1:100 000 scale :	Sophia, Mersey
Special :	1:25 000 Mt. Read Volcanics Project (1988) Map 7 Geology of the Back Peak - Cradle Mountain Link Road area

2. LOCAL GOVERNMENT

Waratah/Wynyard
Kentish

3. TRAVERSE DESCRIPTION

The proposed traverse commences at the intersection of the Murchison Highway and the Cradle Mountain Link Road and continues past the Pencil Pine Road across the Middlesex Plains and terminates at the Post Office Tree corner just south of Daisy Dell.

Throughout the majority of this line, the road is elevated and has little or no shoulder available for drilling operations. There is a corridor of cleared area on either side of the road for most of the line suitable for track mounted drill rigs. It is understood that the first 15 km of road has undergone extensive restoration and will require careful location of shot hole sites and rig access.

Shot hole sites will be within the road reserve, mainly along the immediate roadside, and in extremely sensitive areas some holes can be missed thus allowing minimal impact on the area. Traffic volume along this road is expected to be much greater than that along the Pieman road and thus the work is timed to be at the end of the tourist season. All of the recording work will require vehicles to work from the road and thus at any one time during operations traffic control will be employed over a 5 km section of road. All recording equipment will be deployed along the edge of the road usually within the table drains.

The nominal shot hole spacing is 120m with expected hole depths of 12 - 15m. Drilling will be carried out using track mounted rigs.

No line clearing will be required along any part of this traverse. Some security problems are envisioned along the traverse and some measures will be required whilst working along it to secure equipment. Traffic control will include road signs including Stop/Go control, flashing lights, reflective vests on authorised personnel and any other measures as advised by Transport and Works. The crew will be based in Tullah for this line.

Traverse Length : 36 km

4. CONTACTS FOR OPERATIONS

Mr Les Braid
Access Inspector - Northern Region
Dept of Transport and Works
Northern Region
PO Box 1906
LAUNCESTON
TASMANIA 7250
Phone : (003) 36 2113

Mr Jed Gillian
Environmental Planner
Dept of Transport and Works
Northern Region
PO Box 936J
HOBART
TASMANIA 7001
Phone : (002) 33 3174

5. PROPOSED SCHEDULE OF OPERATIONS

DRILLING
Nominal hole interval : 120m
Number of holes : ~300
Nominal hole depth : 12 - 15m
Anticipated drilling rate : 10 holes/rig/day
Commence : early February 1995

Completion : late February 1995

DATA ACQUISITION
Station interval : 40m
Group interval : 40m
No. channels : 120
Anticipated recording rate : 35 shots/day (4.2 km/day)
Commence : ~4 th March 1995
Completion : ~14 th March 1995

LINE DESCRIPTION : 95AGS-T3 MATHINNA

1. MAP SHEET AREAS

1:250 000 scale :	Tasmania NE
1:100 000 scale :	Forester
Special :	1:50 000 Alberton (1993) Geological Atlas Series. Sheet 8415S

2. LOCAL GOVERNMENT

Break O'Day

3. TRAVERSE DESCRIPTION

The proposed traverse commences at the intersection of Upper Esk Road with Old Roses Tier Road, then continues along the Mathinna Road to Evercreech Road, then along Barnes Road and Hogans Road. Throughout the majority of this line, the roads have sufficient verge to operate rigs off the road. There are some underground Telecom cables which need to be avoided but otherwise no significant problems are anticipated. If feasible the line may be able to be redirected through some paddocks from Mathinna Road to Hogans Road to remove some bends from it.

The nominal shot hole spacing is 240m with expected hole depths of 12 - 40m. Drilling will be carried out using a wheel based rotary rig.

No line clearing will be required along any part of this traverse. No security problems are envisioned along the traverse. Traffic control is not expected to present any problems apart from the possibility of logging trucks working in the area. The crew will be based in Fingal or St. Marys for this line.

Traverse Length : 27 km

4. CONTACTS FOR OPERATIONS

UPPER ESK ROAD/MATHINNA
ROAD TO BARNES ROAD

Mr Trevor Berryman
Works Supervisor
Break O'Day Municipality
PO Box 21
ST HELENS
TASMANIA 7216
Phone : (003) 76 1281

HOGANS ROAD
Mr Robin Costain
Deputy District Forester - Works Forestry Tasmania
PO Box 42
FINGAL
TASMANIA 7214
Phone : (003) 74 2102

5. PROPOSED SCHEDULE OF OPERATIONS

DRILLING
Nominal hole interval : 240m
Number of holes : ~110
Nominal hole depth : 12 - 40m
Anticipated drilling rate : 5 holes/rig/day
Commence : ~6 th February 1995
Completion : ~4 th March 1995

DATA ACQUISITION
Station interval : 40m
Group interval : 40m
No. channels : 120
Anticipated recording rate : 35 shots/day (8.4 km/day)
Commence : ~17 th March 1995
Completion : ~21 st March 1995

LINE DESCRIPTION : 95AGS-T4 ROSS - WOODBURY STOCK ROUTE

1. MAP SHEET AREAS

1:250 000 scale : Tasmania NE
1:100 000 scale : Lake Sorell
Special :

2. LOCAL GOVERNMENT

Northern Midlands Council
Southern Midlands Council

3. TRAVERSE DESCRIPTION

The proposed traverse commences near the intersection of Auburn and Verwood Roads and continues along a stock route down to Bells Lagoon where it meets a road which continues down to the Blackman River and then into a track to the Midland Highway at Woodbury.

The nominal shot hole spacing is 240m with expected hole depths of 12 - 40m. Drilling will be carried out using a wheel based rotary rig.

Some minor line clearing in the form of slashing would be desirable along the stock route section of the line. The remainder of the line presents no operational difficulties. There are some locked gates which must remain locked when not in use. Some of the line passes close to poppy growing areas. However, it is anticipated that harvest should be complete prior to operations commencing. The crew will be based in a town within 40 minutes drive of the line.

Traverse Length : 16 km

4. CONTACTS FOR OPERATIONS

AUBURN ROAD TO
BLACKMAN RIVER
Mr Wayne Chellis
Works Manager
Northern Midlands Municipality
PO Box 156
LONGFORD
TASMANIA 7300
Phone : (003) 91 1303

BLACKMAN RIVER TO
WOODBURY
Mr Wayne Birieux
Works Superintendent
Southern Midlands Council
PO Box 21
OATLANDS
TASMANIA 7120
Phone : (002) 54 0011

5. PROPOSED SCHEDULE OF OPERATIONS

DRILLING
Nominal hole interval : 240m
Number of holes : ~70
Nominal hole depth : 12 - 40m

Anticipated drilling rate : 5 holes/rig/day
Commence : ~6 th March 1995
Completion : ~22 nd March 1995

DATA ACQUISITION
Station interval : 40m
Group interval : 40m
No. channels : 120
Anticipated recording rate : 35 shots/day (8.4 km/day)
Commence : ~23 rd March 1995
Completion : ~27 th March 1995

LINE DESCRIPTION : 95AGS-T5 OUSE - OSTERLEY

1. MAP SHEET AREAS

1:250 000 scale : Tasmania SE
1:100 000 scale : Shannon
Special : 1:50 000 Ouse (1994) Special ARCINFO edition

2. LOCAL GOVERNMENT

Central Highlands Council

3. TRAVERSE DESCRIPTION

The proposed traverse is along the Victoria Valley Road between Ouse and Osterley and will be 4.8 km in length. Its precise location will be determined at a later date but will be within the 10 km section as shown on the map. Part of the road is bitumen with sufficient verge to conduct drilling operations. Recording equipment will be deployed along the edge of the road.

The nominal shot hole spacing is 240m with expected hole depths of 12 - 40m. Drilling will be carried out using a wheel based rotary rig.

No line clearing is required. The line presents no operational difficulties. The crew will be based in a town within 40 minutes drive of the line.

Traverse Length : 5 km

4. CONTACTS FOR OPERATIONS

Mr Len Hills
Works Supervisor
Central Highlands Council
PO Box 20
HAMILTON
TASMANIA 7140

Phone : (002) 86 3202

5. PROPOSED SCHEDULE OF OPERATIONS

DRILLING
Nominal hole interval : 240m
Number of holes : ~20
Nominal hole depth : 12 - 40m
Anticipated drilling rate : 5 holes/rig/day
Commence : ~23 rd March 1995
Completion : ~27 th March 1995

DATA ACQUISITION
Station interval : 40m
Group interval : 40m
No. channels : 120
Anticipated recording rate : 35 shots/day
Commence : ~28 th March 1995
Completion : ~29 th March 1995

