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SEISMIC DATA REPROCESSING 2008

VIC /P63, VIC /P64 & T /46P

GIPPSLAND BASIN

EH-68 (G68A) and G69A SURVEYS

for

GREAT ARTESIAN OIL & GAS LTD

by

J. Saunders

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SEISMIC DATA REPROCESSING 2008.

Executive Summary

Seismic data acquired in VIC /P63, VIC /P64 and T/46P in the Gippsland Basin During 1968 (EH-68/G68A) and 1969 (G69A) were reprocessed in April and May 2008. There is no indication that these data have ever been reprocessed. The seismic sections generated in 1968/69, and available in the archive, are of poor quality.

The results obtained in 2008 appear to show sedimentary section and complex structure below the top Latrobe.

For the most part considerable improvement in processed data quality has been achieved. Therefore it has been possible to provide data that may support a more detailed interpretation.

Introduction

Selected seismic data acquired for Esso Standard Oil (Aust) Pty Ltd in 1968 (EH-68) and 1969 (G69A) in VIC /P63, VIC /P64 and T/46P in the Gippsland Basin were reprocessed in 2008.

The EH-68 (G68A) Marine Seismic Survey was conducted between 1 May 1968 and 24 August 1968 in the south-western part of the Gippsland Basin. The survey was originally named the EH-68 Survey but was later renamed the G68A Survey to conform with a later naming protocol.

The G69A marine Seismic Survey was conducted between 24 December 1968 and 21 March 1969 to infill the earlier data in the south-western part of the Gippsland Basin

The data originally processed by Geophysical Service International in Sydney during the same period are judged to be of poor quality, and have apparently never been reprocessed.

The data from both surveys were acquired by Western Geophysical using a 24 trace streamer and the "Aquapulse" source. Most lines were recorded with a cable length of about 1600 meters, and a few lines, in deeper water, with a 2400 meter cable, (see below for details).

Navigation was by Shoran, which is a radar transponder type of range-range radio positioning system. Original coordinates were referenced to the Clarke 1858 Spheroid, utilising the Australian Transverse Mercator Projection, Belt 7, Central Meridian 146⁰. The antenna position on the vessel was calculated from the intersection of measured arc-ranges from shore based transponders located at fixed trigonometric stations onshore. The final shotpoint locations were then calculated by applying a step-back from the antenna position in the opposite direction from the boat heading to the gun-position.

Data Acquisition Parameters in Surveys EH-68A (G68A) and G69A

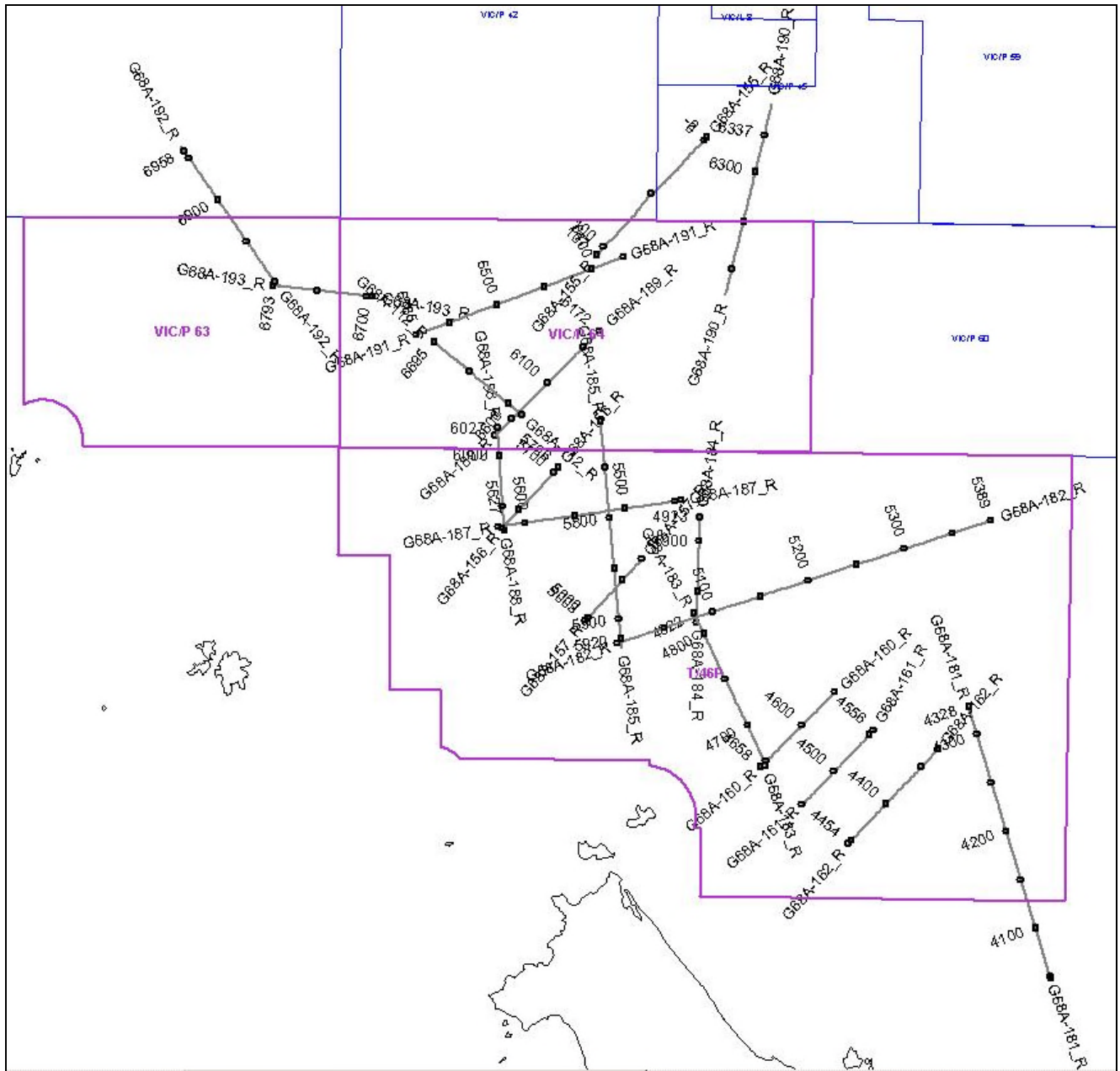
- Source – Aquapulse gas sleeve exploder
- Number of recorded channels – 24
- Channel interval – 70/100 meters *
- Source interval – 6/8 pops per 140/200 meters *
- Minimum offset – approx. 210 meters
- Maximum offset – approx. 1820/2610 meters*
- Fold of coverage – 12 fold
- Sample rate - 2ms
- Contractor – Western Geophysical
- Instruments – SDS1010
- Recording format SEGB

* see the following line listings

Lines reprocessed.

Survey G68A (original name – EH-68A)

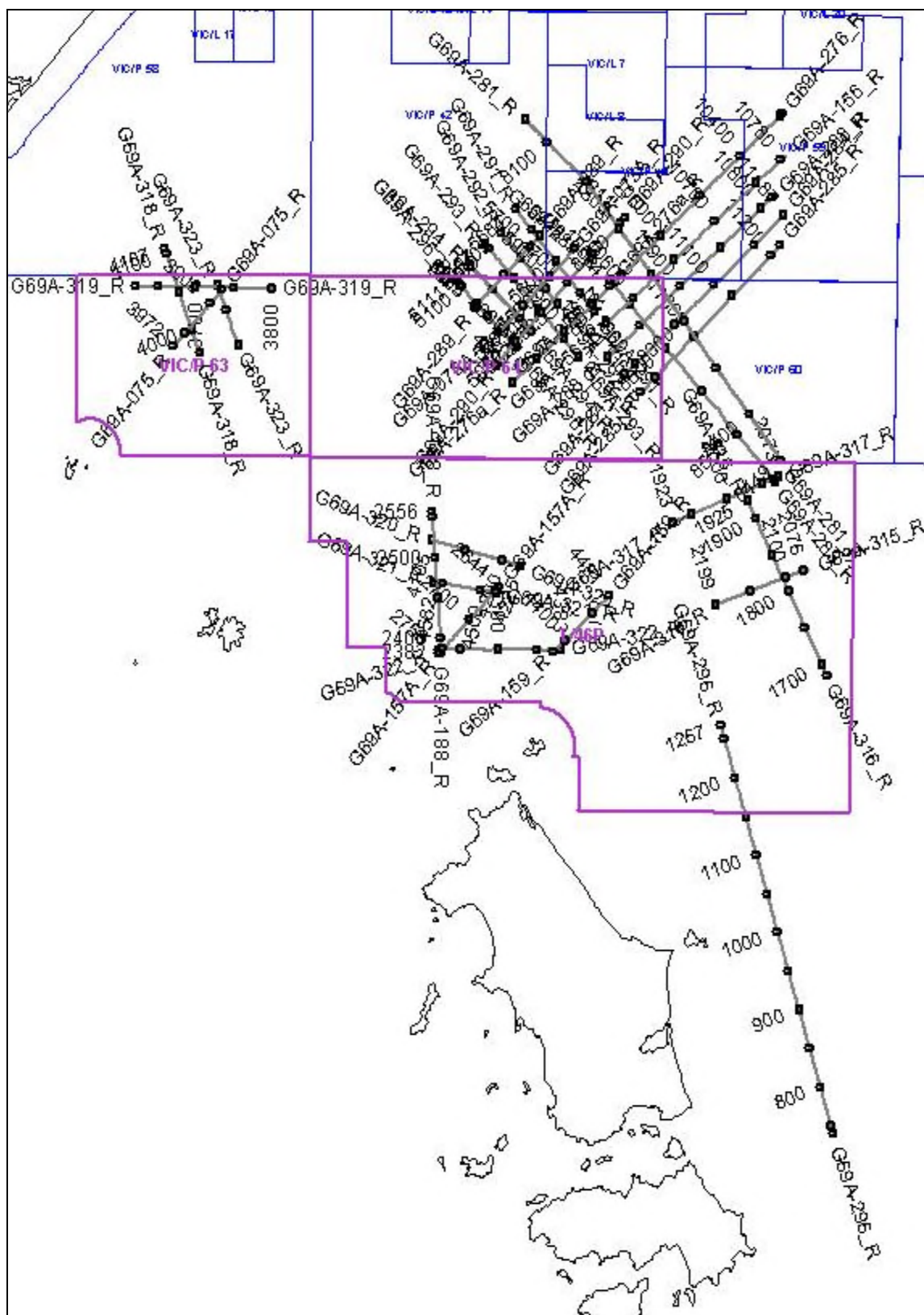
Line #	SP From	SP To	Direction of Shoot	Group Interval m	Shot Interval m
112	6586	6697	NNW	70	140
155	1	107	SW	100	200
156	5628	5704	NE	70	140
157	4925	5004	SW	70	140
160	4558	4658	SW	70	140
161	4457	4557	NE	70	140
162	4329	4454	SW	70	140
181	4052	4328	NNW	70	140
182	5005	5391	ENE	70	140
183	4659	4822	NNW	70	140
184	4823	4924	N	70	140
185	5708	5920	SW	70	140
187	5448	5627	W	70	140
188	5930	6028	N	70	140
189	6030	6173	NE	70	140
190	6205	6338	NNE	70	140
191	6370	6585	SW	70	140
192	6804	6958	NW	70	140
193	6698	6794	W	70	140



Line positions EH68A (G68A)

Survey G69A

Line #	SP From	SP To	Direction of Shoot	Group Interval m	Shot Interval m
73	5807	5948	NE	70	140
75	3891	3972	SW	70	140
156	10570	10786	NE	100	200
157(A)	2647	2758	NE	70	140
159	4384	4481	NE	70	140
188	2385	2558	SE	70	140
276(A)	4813	4994	SW	70	140
276(B+C)	10350	10564	SW	100	200
281	8075	8449	SE	100	200
283	8451	8653	NW	100	200
284	10991	11188	NE	100	200
285	11191	11368	SW	100	200
288	10788	10990	SW	100	200
289	5685	5805	SW	70	140
290	4564	4811	NE	70	140
291	5523	5684	NW	70	140
292	5409	5522	SE	70	140
293	5524	5408	NW	70	140
294	5112	5222	SE	70	140
295	4998	5111	NW	70	140
296	744	1268	NW	70	140
315	2079	2200	SW	70	140
317	1926	2073	E	70	140
318	3974	4107	NW	70	140
319	3624	3800	E	70	140
320	4108	4226	E	70	140
321	4482	4562	E	70	140
322	4226	4382	E	70	140
323	3804	3880	NW	70	140



Line positions G69A

The Seismic Source

The gas sleeve exploder was invented and patented by Exxon Production Research Company in Houston, and licensed to Western Geophysical under the name "Aquapulse". The exploder is basically a sealed rubber sleeve that is filled with a mixture of propane and oxygen and then ignited by an electrical spark. The rubber sleeve contains the explosion and gas residue thereby reducing the bubble pulse that would be generated. The source can be considered to be minimum phase with a nominal peak to residual bubble ratio of about 3:1.

There were normally 4 gun units mounted on a sled. In these surveys 4 sleds were used.

Data Acquisition

Diagrams of the source and cable layout for the G69A survey are shown at the end of this report. The layout for the earlier survey was more or less the same.

Units of measurement for the various components were a mixture of imperial and metric. The reprocessing was carried out using metric, imperial measurements having been converted

As far as can be ascertained from the archive documents the source was towed at a depth of about 9 meters, and the cable at about 13.5 meters for both surveys.

Data Available

The original seismic field data were transcribed and made available in SEG Y format on 3590 cassette tape.

All lines had comprehensive observer logs. A few lines had very poor quality seismic sections available.

No original navigation data was available. Shotpoint coordinate data was only accessible from the Victoria Department of Primary Industries 'Petroleum GIS Data 2006 DVD'. However with no metadata, the voracity of this data set could not be relied upon. However it was necessary to provide coordinate data in the reprocessing, but since these did not relate to the real data the processing coordinates in the SEG Y trace headers are fictitious and should be ignored. Furthermore, the available navigation data was only sampled every shotpoint, with widely varying station intervals, which made it unsuitable for use in re-processing data with using 8-pops per shotpoint.

Data Reprocessing

As indicated above in "Data Acquisition" nominally 6 or 8 pops of the Aquapulse source per 140 or 200 meters respectively were recorded. However it should be noted that for many shot points the number of pops varied. This was probably due to inaccuracies in navigation and boat speed.

In the original processing some or all of the pops per shot point were vertically stacked prior to processing. In the 2008 reprocessing 2 alternate pops per half shot point interval were used, but they were not vertically stacked. Instead the 2 pops were processed as separate records. Stacking of the data thus produced a 2 x 12 fold stack with nominal depth point intervals of either 7.5 or 12.5 meters for each of the shot point intervals respectively (i.e. 8 depth points per shot point). Because of this, and the need to QC all the shot records, setting up of the geometry for each line was laborious and time consuming.

Data for all lines were processed using the same sequence.

The following is a description of the processing sequence that was arrived at after rigorous testing and experiment:

- Load SEG Y into PROMAX format
- Resample from 2ms to 4ms
- Assign acquisition geometry to shot records using 24 field traces
- Display all records, edit bad/noisy traces and remove bad records.
- True amplitude recovery 6db per octave
- Mute first arrivals and water breaks
- Sum adjacent CMP gathers into “super gathers”. i.e. A super gather was composed of 24 traces.
- Calculate and apply normal moveout velocities (1 analysis per 200 CMP)
- Apply Radon velocity filtering
- Re-assign acquisition geometry
- Shot record deconvolution. An average 100ms spiking operator was designed from each 24 trace shot record 100ms.
- Calculate and apply normal moveout velocities (1 analysis per 100 CMP)
- Spectral whitening
- Common midpoint stack – 12 fold
- FX deconvolution
- FX migration using 95% stack velocities
- Scale and output in SEG Y – stack and migration
- Output stack velocities in ASCII

Comments:

The shot records were severely affected by ringing and all types of multiple, which the original processing failed to significantly attenuate. In the reprocessing the use of super gathers and radon filtering assisted in the attenuation of both the ring and the simple multiples. as well as providing an effective input to velocity analysis. The velocities derived appear to have a considerable amount of integrity, previously lacking in the original processing.

Shotpoint and Common-mid-point (CMP) numbers in the trace headers were derived from spread geometries as described in the Observers Logs and assumed regular source and receiver spacing.

Comparison of the 1969 and 2008 Processing

The sample sections for line G69A-315 attached to this report show the improvement that has been achieved.

It should be possible to interpret these new data with a fair degree of confidence.

Conclusions

For the most part considerable improvement in processed data quality has been achieved.

Data archiving.

Stack and migrated data in SEG Y, and stacking velocity data for each survey, as listed above, were output to CD in separate directories.

SEGY Header Information

The following table is a listing of the relevant trace header information and the byte number where it is located:

Use	Bytes.
Trace Sequence no. within processed line	5-8
Shot point number x 1000	17-20
CMP ensemble number	21-24
CMP Fold	33-34
Approx water depth (fathoms)	61-64
Coordinate units (m)	89-90
Total static applied (source & cable in m.)	103-104
No. of samples in a trace	115-116
Sample interval (ms)	117-118

The text header (EBCDIC) briefly describes the acquisition and processing parameters.

Disclaimer

The reprocessing discussed in this report and shown in any inclusions and/or attachments has been derived from the original raw seismic data and ships logs.

However as no independent verification of the said data is possible, IGEC, its members and employees gives no warranty, either direct or implied, that the said information or the reprocessing is correct, and accepts no responsibility for any resultant errors contained herein or for any damage or loss, however caused, suffered by any individual, company or corporation.

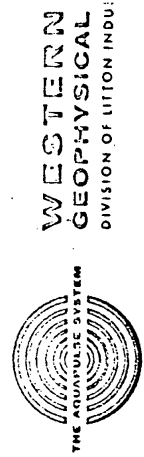
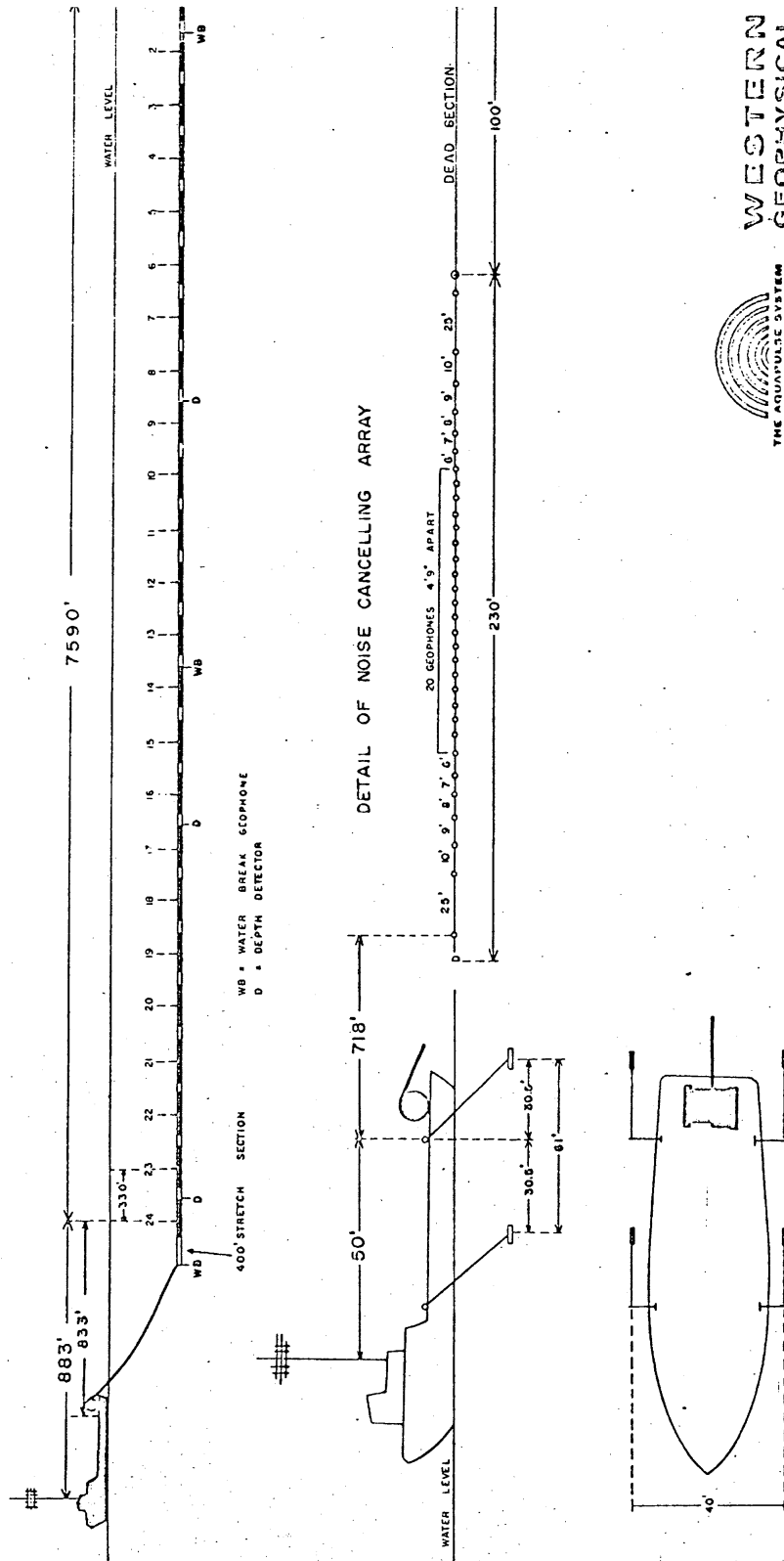
Respectfully submitted
J Saunders
IGEC PTY LTD
May 2008.

Attachments to this report

- Diagrams of the cable and source deployment
- Comparison of the reprocessing for line G69A-315 with the original 1969 section

ESSO SEISMIC SURVEY 1969

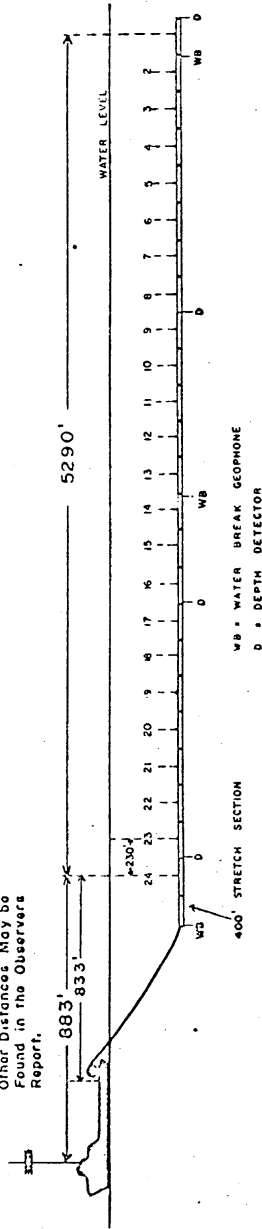
DIAGRAM OF 7590 FT. STREAMER CABLE



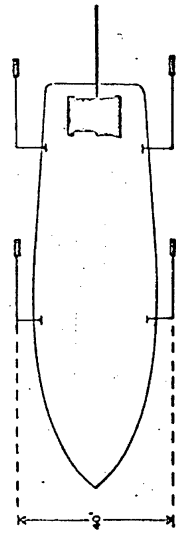
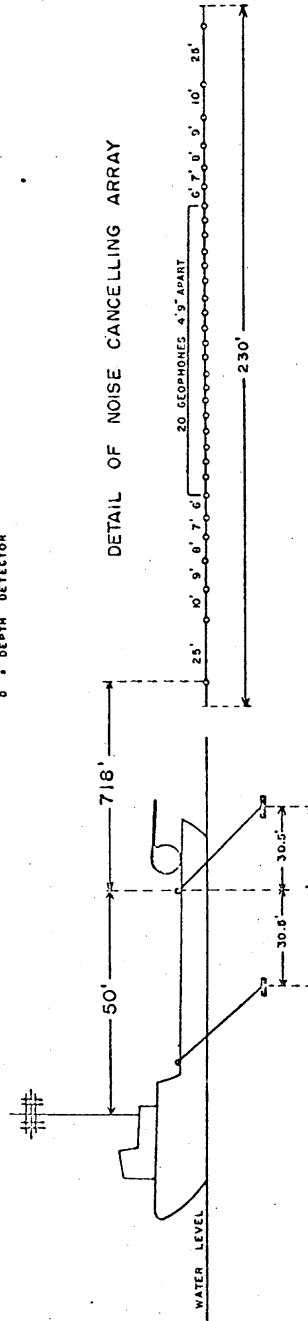
ESSO SEISMIC SURVEY 1969

DIAGRAM OF 5290 Ft. STREAMER CABLE

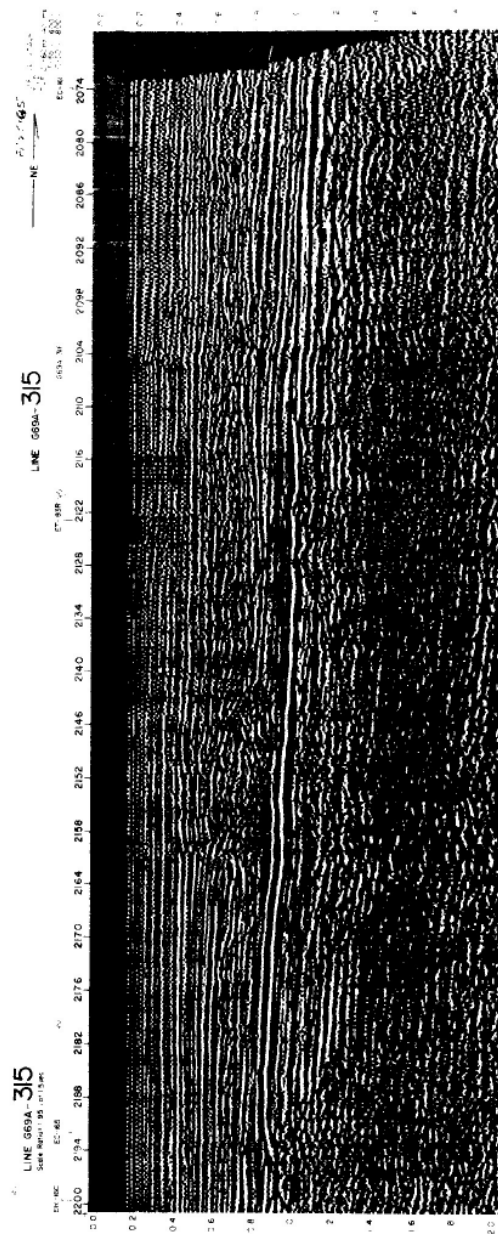
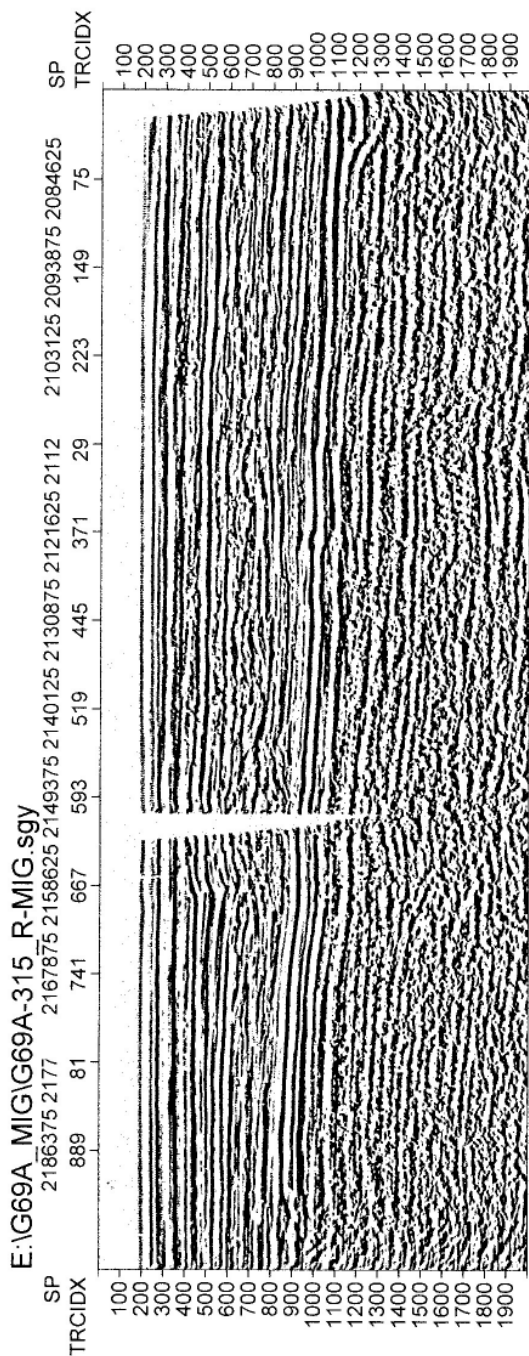
NOTE: Distance from Centre of Guns to Centre GP. 24 = 833' for Majority of Survey but Varied for Certain Lines. These Other Distances May be Found in the Observers Report.



DETAIL OF NOISE CANCELLING ARRAY



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Highly compressed images of G69A-315 - 2008 reprocessing (Top) / original processing (Bottom)