MACALISTER NO. 1

PEP 120 01 SEP 1988

WELL COMPLETION REPORT

PETROLEUM DIVISION

MAGALISTER NO. 1

PEP 120

WELL COMPLETION REPORT

D. A. Short
for
Crusader Resources N.L.
July 1988

PE601042

This is an enclosure indicator page.
The enclosure PE601042 is enclosed within the container PE902194 at this location in this document.

The enclosure PE601042 has the following characteristics:

ITEM_BARCODE	= PE601042
CONTAINER_BARCODE	= PE902194
NAME	= Composite Well Log
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= COMPOSITE_LOG
DESCRIPTION	= Macalister-1 Composite Well Log. Enclosure 1 of WCR.
REMARKS	=
DATE_CREATED	= 01/04/1988
DATE_RECEIVED	= 01/09/1988
W_NO	= W971
WELL_NAME	= Macalister-1
CONTRACTOR	= Crusader resources NL
CLIENT_OP_CO	= Crusader resources NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE601043

This is an enclosure indicator page.
The enclosure PE601043 is enclosed within the container PE902194 at this location in this document.

The enclosure PE601043 has the following characteristics:

ITEM_BARCODE	= PE601043
CONTAINER_BARCODE	= PE902194
NAME	= Gearhart Mud Log
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= MUD_LOG
DESCRIPTION	= Macalister-1 Gearhart Mud Log. Enclosure 2 of WCR.
REMARKS	=
DATE_CREATED	= 01/04/1988
DATE_RECEIVED	= 01/09/1988
W_NO	= W971
WELL_NAME	= Macalister-1
CONTRACTOR	= Gearharty P/L
CLIENT_OP_CO	= Crusader resources NL

(Inserted by DNRE - Vic Govt Mines Dept)

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1. ABSTRACT

Macalister No. 1 was drilled for Crusader Resources N.L. by ATCO-APM Drilling Pty. Ltd. in the north of PEP 120 - Victoria, about 27 kilometres south of the city of Sale and 6 kilometres west north-west of the small coastal resort of Seaspray.

The closest well to Macalister No. 1 was Merriman No. 1 located 3.6 kms to the east. This well was drilled by Arco in 1963 and no shows were noted. The only hydrocarbons recorded from nearby on-shore wells were gas flows up to 100 MCFD from the Strzelecki Group at North Seaspray No. 1 immediately to the north east of the PEP 120 and minor oil recoveries reported from Woodside No. 2 and Sunday Island No. 1 to the southwest in PEP 123. Off-shore are the marginally economic Dolphin and Perch Oilfields.

Drilling commenced on March 20 1988 and was terminated on April 1 1988 in Cretaceous Age Strzelecki Group sediments. The rig was released on April 4 1988. Total depth was 1452 metres.

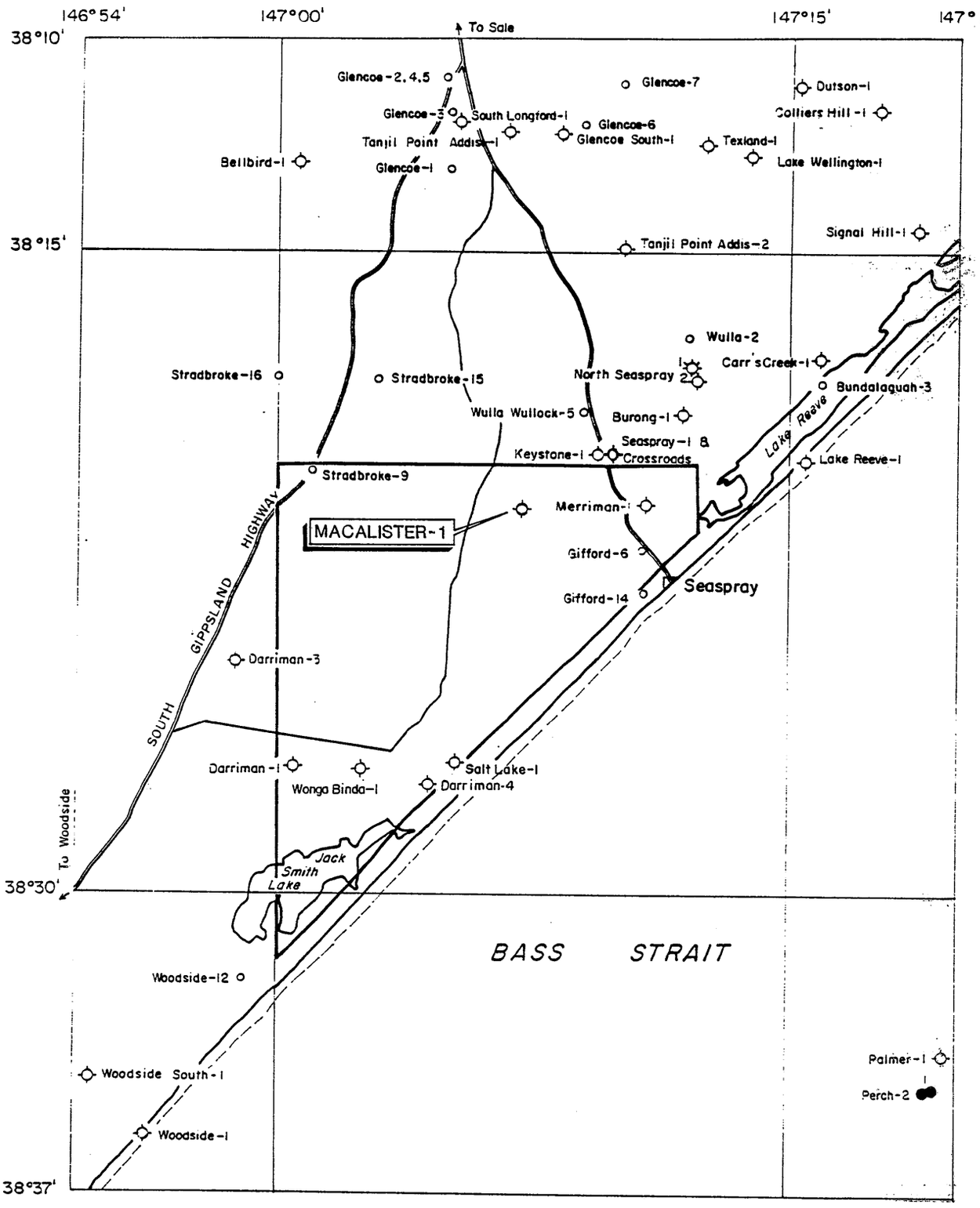
The well was located on the Macalister Prospect, a small culmination on the Merriman Anticline which plunges off-shore to the east northeast. Mapped areal closure is about 2.6 sq. km. with a vertical closure of 40 metres.

The primary targets were sands at the top of the Latrobe Group while secondary targets were sands of the intra Latrobe Group. The sands at the top of the Latrobe Group are the reservoirs for the Dolphin and Perth Oilfields and also for the Golden Beach Gasfield and the giant Barracouta Gasfield.

The section encountered was as predicted and the Latrobe Group sands were well developed with good reservoir quality but no oil or gas shows were recorded from them. The only gas recorded while drilling was a 35 unit methane gas peak from the top coal of the Latrobe Group. Two attempts were made to test the top sand of the Latrobe Group but both were unsuccessful due to over-gauge hole which prevented the packers seating.

After reaching total depth wireline logs, sidewall cores, a velocity survey and an RFT were run. The wireline logs indicated all prospective reservoir sands to be water saturated and the RFT on the top sand of the Latrobe Group recovered water.

Cement plugs were set across the top of the Latrobe Group, the casing shoe and at surface and the well was abandoned.



LOCATION MAP

LEGEND

- Oil show
- Gas show
- Dry hole
- Water bore
- Proposed location

CRUSADER RESOURCES N.L.

VICTORIA

PEP-120-GIPPSLAND BASIN

LOCATION and ACCESS

MACALISTER No.1

SCALE 1:250,000

5 0 5 10 Km.

DRAWN : February, 1986	Figure 1
REVISED : February, 1988	A4 2115/1

MACALISTER NO. 1 - WELL CARD

LATITUDE:	38°21'03.13"S	STATUS:	Dry Hole, P & A
LONGITUDE:	147°08'15.13"E	PARTNERS:	Omega Oil Ltd.
LINE/SP NO.:	GCR-87A-14/1070	DRILLER:	ATCO-APM Drilling P/L
LEASE:	VIC PEP 120	RIG:	Troy 600 (Rig 7)
OPERATOR:	Crusader Limited	ELEVATION(K.B.):	20.2m
SPUD:	20.03.88 (2300)	ELEVATION(G.L.):	16.2m
COMPLETION:	01.04.88 (1630)	TOTAL DEPTH:	1452m
DATA SOURCE:	Well records		

FORMATION TOPS:

	Depth (K.B.)	Depth (S.S.)	Thickness
Jemmy's Point Fm.	Surface	+16.0	108.0
Seaspray Group:			
Tambo River Fm.	112.0	-82.0	103.0
Gippsland Limestone	215.0	-195.0	460.5
("Base Lst. Seismic Marker"	612.2	-592.2)	
Lakes Entrance Fm.			
Seacombe Marl Mbr.	675.5	-655.5	117.0
Giffard Sandstone	Absent		
Latrobe Group:			
Traralgon Fm.	792.5	-772.5	591.5
Strzelecki Group	1384.0	-1364.0	68.0

HOLE SIZES: 12¼" to 187m. / 8½" to 1452m (T.D.)

CASING: Conductor - 13-3/8" set at 21m.
Surface - 15 jts of 9-5/8", 36lb/ft, K-55 set @ 181.6m & cemented with 400 sx Class A cement + 2% CaCl2.

DRILL STEM TESTS: DST #1 789-814m Top Latrobe Group. Could not seat packers.
DST #2 765-814m Top Latrobe Group. Could not seat packers.

REPEAT FORMATION TESTS: A Schlumberger RFT @ 814m recovered approximately 40 litres of water. No chamber pressure was recorded and the field measurement Rw of the water was 2.9 ohm-m @ 22°C.

WIRELINE LOG DATA: (Queensland Shallow Logging)

DLL-GR-SP-CAL	181.5-1447.0m (GR to surface)
LDL-CNL-NGS-EPT	760.0-1445.0m
SHDT-GR	760.0-1450.0m
MSFL	760.0-1440.5m
SLS-GR	181.5-1447.0m
Velocity Survey	

MUD PROPERTIES: Mud Type - Salt/Gel. S.G. 1.16; Vis 49; pH 10; FL 11; Rm=0.33; Rmf=0.23; Rmc=0.50. (All @ 59°C).

SIDEWALL CORES: A total of 27 SWC were recovered from the interval 754.0-1398.0m.

PALYNOLOGY:

WATER ANALYSIS:

TEMPERATURES: (Recorded from logs at total depth).

52°C after 8.0 hours
55°C after 15.3 hours
58°C after 16.3 hours
59°C after 23.8 hours.
Extrapolated bottom hole temperature at 1452m is 63°C.

ABANDONMENT PLUGS: Plug #1 808-777m 125 sacks. Across top of Latrobe Group.
Plug #2 198-168m 65 sacks. Across surface casing shoe. (Tagged @ 162m.)
Plug #3 6- 1m sacks. At top of surface casing.

REMARKS: Macalister No. 1 tested the Latrobe Group sands on a small culmination on the Merriman Anticline in the north of PEP 120. The sands were well developed with good reservoir quality but no gas or oil shows were recorded form them. The only gas recorded while drilling was a 35 unit methane gas peak recorded from the top coal of the Latrobe Group. A Schlumberger RFT of the top sand in the Latrobe Group recovered only formation water with some filtrate. (Two DST's of the sand were attempted but a packer seat could not be obtained.) No hydrocarbon shows were recorded from any other zones and the well was plugged and abandoned.

3. GENERAL DATA

Well Name:	MACALISTER NO. 1
Name and Address of Operator:	Crusader Resources N.L. 27th Level 12 Creek Street BRISBANE. QLD. 4000.
Interests:	Crusader Limited 50.0% Omega Oil Pty. Ltd. 50.0%
Petroleum Title:	PEP 120 Victoria
Location:	Latitude - 38° 21' 03.13"S Longitude - 147° 98' 15.13"E
Elevations:	Ground level - 16.25 metres Kelly Bushing - 20.05 metres
Dates:	Spudded - March 20 1988 @ 2300 hours TD Reached - April 1 1988 @ 1630 hours Rig Released - April 4 1988 @ 1100 hours
Total Depth:	1,452 metres - driller 1,452 metres - logs extrapolated.
Status:	Plugged and Abandoned.

4. ENGINEERING DATA

4.1 ENGINEERING SUMMARY

Macalister No. 1 spudded at 2300 hrs, March 20 1988. 14" conductor pipe had been pre-cemented, in 17½" hole, to a depth of 33m. During drilling of surface hole at 75m, broaching of the conductor to surface occurred, necessitating two cement squeezes to seal the annulus, before drilling could continue. 12¼" surface hole continued thereafter, to 187m, without further incident. 15 joints of 9-5/8" 36 lb/ft K-55 LTC casing were run. Due to tight hole, the casing held up and was cemented at 181.6m. Cement was in place at 0230 hours, 23.3.88. Partial loss of returns during the final stages of displacement necessitated that the cement be topped up from surface.

BOPs were installed and successfully pressure tested. Cement was tagged at 166.4m and the cement, float collar, shoe and rat hole were drilled out to a depth of 187m. Prior to drilling further 8½" hole, the mud system was converted to a sodium chloride brine/prehydrated gel system (this was used in an attempt to provide some inhibition but still allow an EPT log to be run at TD).

Drilling of 8½" hole continued to 594m, at which point a wiper trip was made which encountered very tight hole on the way out. At 757m, the bit was pulled and, again, tight hole was encountered - the bit and stabilizer were completely balled. A new bit was run back to bottom, at which time hole conditions necessitated the addition of drilling detergent and dispersant to the mud system to prevent excessive viscosity and bit balling.

At 814m, returns of coal required that the mud be weighted up to 9.4 ppg for control. After conditioning, the bit was pulled and DST No. 2 was attempted, with the same result.

Drilling of 8½" hole continued and TD of 1452m was reached at 1630 hrs, 2.4.88.

After logging, an RFT survey was run and samples taken. both samples and RFT pressures confirmed the presence of a water column.

Macalister No. 1 was plugged back to surface and abandoned. The rig was released at 1100 hrs, 4.4.88.

4.2 RIG DATA

Contractor:	ATCO APM Drilling Pty. Limited 4 Formation Street WACOL. QLD. 4076
Rig:	A7
Drawworks:	Troy 600. Mechanical drive, Single drum.
Rated Capacity:	2,500 metres.
Power:	Caterpillar D353 diesel engine and National torque convertor.
Drill String:	Drill Pipe 4½", 16.6 lbs/ft, Grade E 4" IF connections. (API NC46 10 joints 4½" Hevi-Wate drill pipe 4" IF connections. (API NC46) Drill Collars 3 x 8" (3" ID) 6-5/8" Reg. connections. (API Reg.) Drill Collars 21 x 6½" (2-13/16" ID) 4" IF connections. (API NC46).
Mast:	Troy (34m x 4.3m) free standing with GNC 190,000 kg and 127,275 kg with 8 lines.
Mud Pumps:	1 - Continental Emsco D500 (7¼" x 16") powered by a D353 Caterpillar engine. 1 - Continental Emsco D500 (7.¼" x 14") powered by a GM 6-71 twin set diesel engine.
Blowout Preventors:	Annular - Shafco (11" x 3000 psi) Rams - 2 Shafco double gate (11" x 3000 psi) Accumulator - Troy type K-90, 90 gallon, 4 station control. Choke Manifold - Willis adjustable (2' x 3000 psi).

4.3 DRILLING DATA

(a) Hole sizes and depths:

Conductor hole: 17½" to 33 m.
Surface hole: 12¼" to 187 m.
Main hole: 8½" to 1452 m. (TD)

(b) Casing and Cementing Record:

Conductor: 14" welded conductor was preset to 33m below G.L. and cemented to surface.

Incompetent formation around the conductor shoe resulted in broaching of the conductor annulus to surface and necessitated two squeeze cement jobs to effect a cure.

Surface: 15 joints of 36 lb/ft K-55 LTC 9-5/8" casing fitted with Halliburton guide show and float collar at the first collar. Spring box centralisers were run on the first three collars and at a depth of 6.1m below GL.

The casing was cemented with 400 sacks of API Class A cement mixed with fresh water containing 2% calcium chloride. A top plug only was used and was bumped with 6,900 kPa and held. Some loss of returns was observed during the last 20 bbl of displacement, presumably around the conductor shoe. The surface annulus was topped with cement.

The casing held up while running and was cemented with the shoe at 181.6m.

(c) Mud Summary:

Surface hole was drilled using a fresh water based native clay system.

After drilling out surface casing, the hole was displaced to a sodium chloride brine drilling fluid. At 594m, due to increasing viscosity, the mud was conditioned with additions of drilling detergent and dispersants. Drilling proceeded into the Latrobe Group where large amounts of coals were encountered and the mud weight was raised to help stabilize the formation.

Drilling continued to total depth with no further problems.

(d) Water Supply:

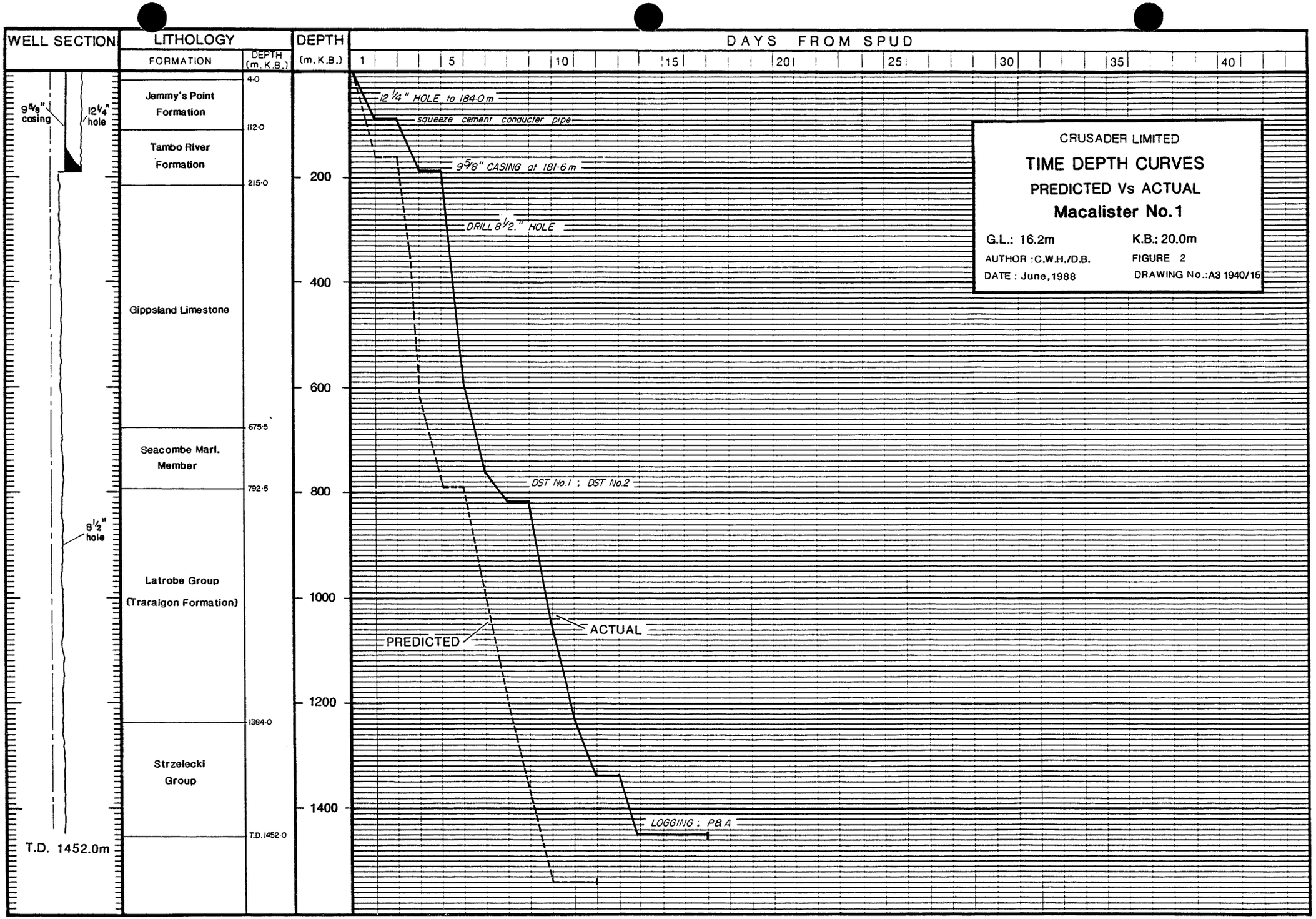
Water was pumped to the site from Merriman Creek, a distance of 1 km.

(e) Formation Testing:

DST No. 1	789-814m.	Latrobe Group. Conventional bottom hole test. Could not seat packers because of over-gauge hole.
DST No. 1	765-814m	Latrobe Group. Conventional bottom hole test. Could not seat packers because of over-gauge hole.
RFT No. 1	814m	Latrobe Group. Recovered approximately 40 litres of water. (Field Rw = 2.9 ohm-m @ 22C).

(f) Abandonment Data:

Plug No. 1:	808-777m	125 sx.	- Across top of Latrobe Gp.
Plug No. 3:	198-168m	65 sx.	- Across casing shoe.
Plug No. 3:	6- 1m		At top of surface casing.


WELL SECTION
LITHOLOGY
FORMATION
DEPTH (m.K.B.)
DEPTH (m.K.B.)
DAYS FROM SPUD
1
5
10
15
20
25
30
35
40
9 5/8" casing
12 1/4" hole
8 1/2" hole
T.D. 1452.0m
Jemmy's Point Formation
Tambo River Formation
Gippsland Limestone
Seacombe Marl Member
Latrobe Group (Traralgon Formation)
Strzelecki Group
4·0
112·0
215·0
675·5
792·5
1364·0
T.D. 1452·0
200
400
600
800
1000
1200
1400
12 1/4" HOLE to 184·0m
squeeze cement conducter pipe
9 5/8" CASING at 181·6m
DRILL 8 1/2" HOLE
DST No.1 ; DST No.2
PREDICTED
ACTUAL
LOGGING ; P&A
CRUSADER LIMITED
TIME DEPTH CURVES
PREDICTED Vs ACTUAL
Macalister No.1
G.L.: 16.2m
K.B.: 20.0m
AUTHOR : C.W.H./D.B.
FIGURE 2
DATE : June, 1988
DRAWING No.: A3 1940/15

5.1 GEOLOGICAL SUMMARY

Macalister No. 1 spudded on March 20 1988 into loose sands of the Jemmy's Point Formation. The Tambo River Formation was encountered at 112.0 metres, 20.0 metres higher than prognosed.

After drilling 12¼" hole to 187.0m 9 5-8" surface casing was set at 181.6m. 8½" hole was then drilled to total depth.

The top of the Gippsland Limestone was placed at 215.0m from cuttings (and may be picked from logs) and was 13.0m high to prognosis. However, because of the lithologic similarity between the Tambo River Formation and the Gippsland Limestone there is a degree of uncertainty for this boundary.

The Seacombe Marl Member of the Lakes Entrance Formation was encountered at 675.5m, 12.5m high to prognosis while the Giffard Sandstone Member was not present.

At 720m the cuttings sampling interval was changed from 10 to 30m and the top of the Traralgon Formation of the Latrobe Group was encountered at 792.5m, 12.5m low to prognosis. Samples were circulated at 795m (coal) - 35 units of methane and 814m (sand) - 2 units of background gas (all methane).

Two drill stem tests were attempted over the top sand of the Traralgon Formation but because of over gauge hole the packers would not seat.

Drilling was then resumed and due to high drill rate, 6m samples were collected from 816m to total depth. The top of the Strzelecki Group was encountered at 1384.0m, 126.0m high to prognosis. No oil or gas shows were noted in either the Traralgon Formation or the Strzelecki Group.

After reaching a total depth of 1452.0m on April 1 1988 wireline logs were run as well as a velocity survey and sidewall cores. An RFT was then run at 814m in the top sand of the Traralgon Formation and it recovered water.

Sample monitoring and gas detection while drilling indicated there were no significant hydrocarbons in any of the sands penetrated and this was confirmed by the wireline logs and the RFT which showed all potential reservoirs to be water saturated.

The well was then plugged and abandoned and the rig released on April 4 1988.

5.2 REASONS FOR DRILLING

Macalister No. 1 was drilled to test for hydrocarbons in a northeast - southwest trending structure with four-way dip closure on the Merriman Anticline. Seismic mapping indicated there was early development of structural closure soon after the deposition of the Latrobe Group and that this almost certainly pre-dated any westward migration of hydrocarbons.

The primary target was the top sand of the Latrobe Group and secondary targets were intra Latrobe Group sands.

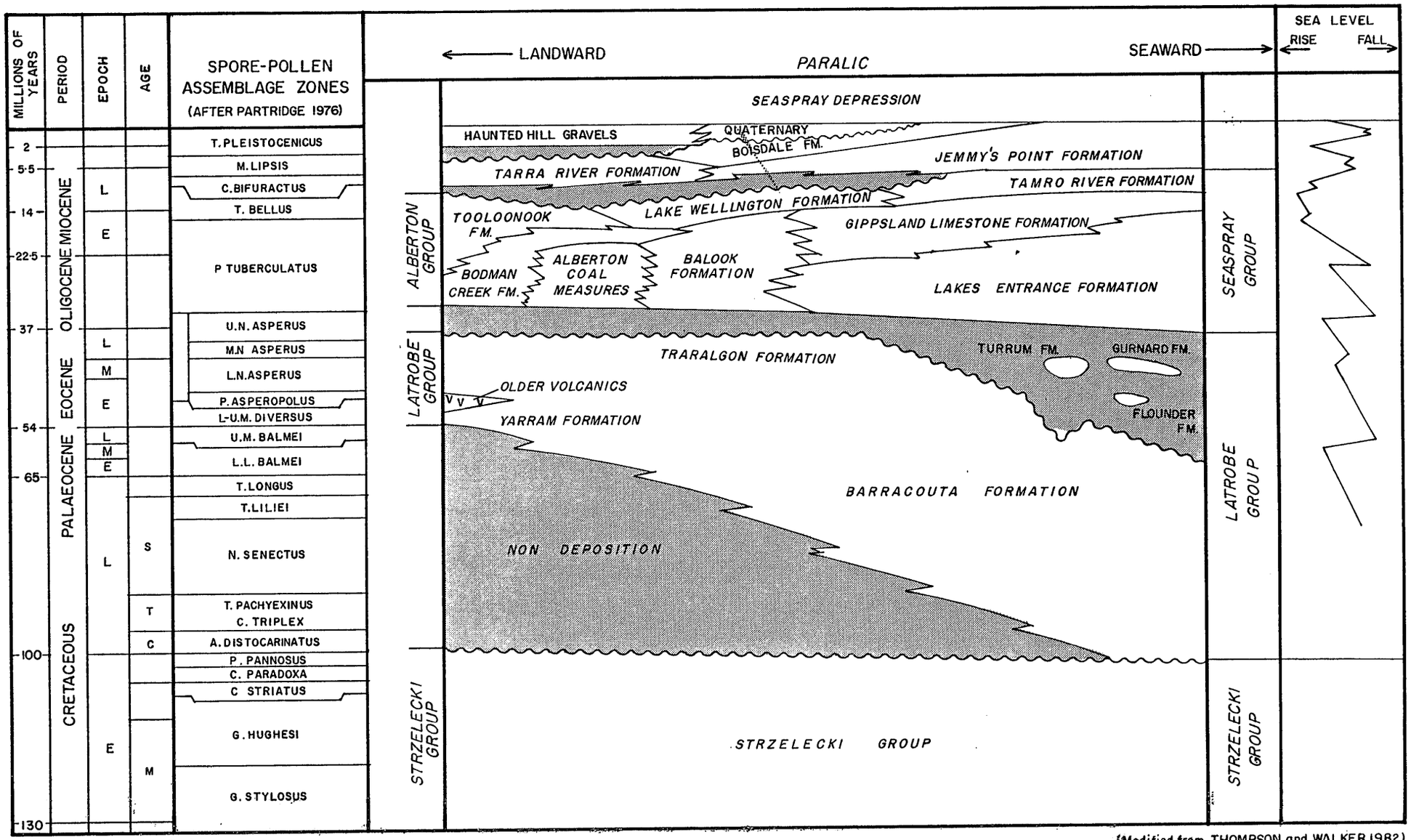
No significant accumulations of hydrocarbons have yet been discovered in the on-shore Gippsland Basin but off-shore from PEP 120 there are several marginally economic oil and gas fields, Golden Beach, Whiptail, Tarwhine, Dolphin and Perch. The sands at the top of the Latrobe Group are the reservoirs for all of these fields.

On-shore, gas flowed at up to 2800 cu.m (100,000 cu. feet) per day from the Strzelecki Group in North Seaspray No. 1 but other wells in the area failed to encounter the reservoir sand suggesting a strong stratigraphic component in its distribution. In the south of the permit minor oil shows were reported from Sunday Island No. 1 and Woodside No. 2. The closest well was Merriman No. 1, 3.6 km to the east, but although it is mapped on a separate closure up-dip from Macalister No. 1 the latest seismic indicates it to be off the crest of the structure.

5.3 STRATIGRAPHY

AGE	GROUP / FORMATION	TOP KB	TOP MSL	THICK
Pliocene	Jemmys Point	Surface	+16.0	108.0
	Seaspray Group			
Miocene	Tambo River	112.0	-82.0	103.0
Miocene	Gippsland Lst.	215.0	-195.0	460.5
	"Base Lst. Seismic Marker"	612.2	-592.2)	
Oligocene	Lakes Entrance			
	Seacombe Marl Mbr.	675.5	-655.5	117.0
	Giffard Sst. Mbr.	Absent		
	Latrobe Group			
Eocene	Traralgon	792.5	-772.5	591.5
Cretaceous	Strzelecki Group	1384.0	-1364.0	+68.0
	Total Depth	1452.0	-1432.0	

STRATIGRAPHIC UNITS GIPPSLAND BASIN



L – Late M – Middle E – Early

(Modified from THOMPSON and WALKER 1982)

Figure 3
A4 2209

5.4 DESCRIPTIVE STRATIGRAPHY

JEMMYS POINT FORMATION (Pliocene) Surface - 112.0m.

SANDSTONE with rare COAL.

Sandstones are clear to white fine to very coarse, minor granular, angular to sub-rounded, occasional rounded with polished surfaces, poor to moderate sorted, minor to common white, grey-brown and green lithic/quartzite grains, minor white feldspar, trace to common greenish balck mica flakes, loose, no matrix or cement, good porosity.

Coal is dull black, lignitic.

TAMBO RIVER FORMATION (Miocene) 112.0 - 215.0m

Interbedded SANDSTONE and LIMESTONE with minor MARL.

Sandstones are clear, white to yellow-brown, very fine to coarse, angular to sub-rounded, poor to moderate sorted, white, grey-brown and green lithic/quartzite grains, minor white feldspar, trace mica flakes, mostly loose, minor hard limonitic/argillaceous matrix/cement, poor to good porosity.

Limestones are white to cream, grey, very fossiliferous, minor dark grey-green to black glauconite, trace silt and very fine sand grains.

Marl, cream and grey, speckled, firm to hard, fossiliferous, minor glauconite. Grades to limestone.

GIPPSLAND LIMESTONE (Miocene) 215.0 - 657.5m

LIMESTONE and MARL with minor SHALE, predominantly limestone at the top and marl and shale at the base.

Limestone is white to cream, minor light to medium grey, friable, grading to coquina with abundant fossil fragments including bryozoa, foraminifera and molluscs, minor dark green glauconite, trace clear and yellow iron stained silty to very fine quartz grains.

Marl is white, cream, light to dark grey, soft to firm, argillaceous, calcareous, with silt and very fine sand grains, dark green-black glauconite.

Shale, greenish grey, soft, sticky, slightly calcareous, minor glauconite, rare pyrite.

Towards the base of the Formation there is a change in wireline log signature at the top of the gradational unit which overlies the Lakes Entrance. For example, in an uphole direction the sonic log shows an increasing velocity profile through the gradational unit. This changes to a decreasing profile through the remainder of the Gippsland Limestone. This point is seen on

all wireline logs in the area of Macalister No. 1. It has been mapped as a seismic event. The name "Base Limestone Seismic Marker" is not meant to be descriptive as limestone can still occur below this point.

LAKES ENTRANCE FORMATION (Oligocene) 675.5 - 792.5

SEACOMBE MARL MEMBER, MARL with minor SHALE, occasional SANDSTONE and rare LIMESTONE.

Marl is white, blue-grey, blue-green to grey, soft, sticky, grading to calcareous claystone, rare coarse quartz grains, glauconitic throughout but abundant below 770 metres.

Shale is light to medium grey, grey-green, grey-brown, soft, calcareous in part, trace pyrite, glauconite.

Sandstone is clear and yellow, iron stained, fine to very coarse, sub-angular to sub-rounded, minor rounded, poorly sorted, loose, no matrix or cement, good apparent porosity.

Limestone is yellow-brown crystalline, hard.

TRARALGON FORMATION (Eocene) 792.5 - 1384.0

SANDSTONE with interbeds of SHALE and COAL.

Sandstones are clear, white, minor light to dark brown (lignite stained), fine to very coarse, angular to sub-angular, occasional sub-rounded, poor to moderate sorted, loose, no matrix or cement, very good apparent porosity. Minor cream to light brown, very fine to fine, hard, sub-angular, moderate sorted, calcareous/dolomitic cement, poor porosity, bright yellow mineral flourescence with no cut. Below 1160m the sandstones have minor grey lithic and quartzite grains, trace pyrite and mica, rare pink garnet, and trace white, silty, dispersive clay matrix.

Shales are very dark brown, dark grey brown to black, silty, soft to firm, friable, sub-fissile, carbonaceous, lignitic, argillaceous/dispersive and grading to claystone in part.

Coal is dark brown to black, lignitic, shaley in part.

STRZELECKI GROUP (Cretaceous) 1384.0 - 1452.0m

SANDSTONE and CLAYSTONE with traces of TUFF and COAL.

Sandstones are clear white to light grey, grey-green, green and minor pink quartz, lithic/quartzite and feldspar grains, very fine to medium, some coarse to very coarse, sub-angular to sub-rounded, poor to moderate sorted, white dispersive clay matrix, common pyrite and mica, poor to fair porosity.

Claystone is white to grey, light brown, soft, dispersive.

Tuff, cream to buff, soft, waxy, minor carbonaceous specks.

Coal, brown to black, shaley.

5.5 FORMATION EVALUATION

(a) MUD LOGGING

Mud logging services were provided by Gearhart Geodata. Basic rate of penetration, pit level, total gas and FID chromatography services were provided as well as lagged sample collection, description and processing (Enclosure 2). Cuttings were collected at 10 metre intervals from surface to 720m and then at 3m intervals to 816m and finally at 6m intervals total depth. These were examined for oil and gas indications, described then split into two sets of plastic sample packets and two sets of Samplex trays. One set of sample packets was sent to the Victorian Department of Industry, Technology and Resources, and the other to the Operator. One set of Samplex trays was retained by the Operator and the other was sent to Omega Oil Pty. Ltd..

(b) WIRELINE LOGGING

The following logs were run by Schlumberger Seaco Inc. at total depth:

DLL-GR-SP-CAL	181.5 - 1447.0 (GR to surface)
MSFL	760.0 - 1440.5
LDL-CNL-NGS	760.0 - 1445.0
SLS-GR	181.5 - 1447.0
SHDT-GR	760.0 - 1450.0
WST	
CST-GR	
RFT-HP-GR	

(c) TEMPERATURES

The following temperatures were recorded from wireline logs:

52°C after 8.0 hours
55°C after 15.3 hours
58°C after 16.3 hours
59°C after 23.8 hours

A time temperature plot of these gives an extrapolated BHT of 63°C @ 1452 metres.

(d) CORING

No conventional cores were cut.
30 sidewall cores were attempted and 27 were recovered.

5.6 RESERVOIR POTENTIAL

The wireline logs and samples indicated the sands of the Latrobe Group had good porosity and permeability with clean sands having only minor amounts of clay matrix and lithic fragments.

The sands of the Strzelecki Group had poor porosities and permeabilities and in general had a high proportion of lithic fragments, feldspar and argillaceous/clay matrix.

Within the Lakes Entrance Formation the Giffard Sandstone was poorly developed and the reservoir character of the Seacombe Marl Member was poor.

Samples from the Gippsland Limestone and the Tambo River Formation indicate some intervals to be friable and to have good reservoir quality.

(Appendix 8 gives a tabulation of log derived porosities.)

5.7 HYDROCARBON SHOWS

Background gas while drilling was generally less that 1 unit and the only significant gas peak recorded was 35 units of methane from the top coal of the Latrobe Group at 801m. Below this level gas readings decreased back to less than 1 unit with minor peaks to 1 unit in the Strzelecki Group.

No indications of oil or fluorescence were observed but there was dark brown to black lignitic staining on some quartz grains.

Wireline logs indicated all potential reservoir sands to be water saturated and an RFT of the top sand of the Latrobe Group recovered formation water.

5.8 CONTRIBUTIONS TO GEOLOGIC CONCEPTS

Formation tops were generally as prognosed. The lithological distinctions from Tambo River Formation to the Gippsland Limestone and the Gippsland Limestone to the Lakes Entrance are imprecise. However, there is fair agreement between lithologically picked tops and the tops as picked from the wireline logs.

The Giffard Sandstone Member is not identified in Macalister No. 1, though a time equivalent may occur between 762m and 792.5m.

The Traralgon Formation in the Macalister No. 1 well includes 30% coal. This quantity of coal continues to the north of the well. Further to the south the amount of coal is very much less (Wonga Binda No. 1). Typically, in all onshore wells in the region of Macalister No. 1 (except for Wonga Binda No. 1), a coal is present at the top of the Latrobe Group. This coal is 13.5m thick at Macalister No. 1.

The Strzelecki Group was readily picked lithologically and confirmed by the wireline logs.

A small gas peak of 35 units (100% methane) was recorded from within the top Latrobe Group coal. This is thought to be a pooling of gas in the top of the structure with the gas source being more deeply buried rocks, probably of the Strzelecki Group. The gas is not likely to have been generated from within the coal as no other coal gas peaks were seen. There were no other hydrocarbon shows.

6. CONCLUSIONS

Macalister No. 1 was located at a crestal position on a structure showing four way dip closure at all mapped horizons. The Macalister Prospect shows early structuring that began soon after the deposition of the Latrobe Group. On present mapping there are higher structures on the Merriman Anticline but these were developed at a later time. Hence the concept that the Macalister Prospect would be ideally located to trap early migrating hydrocarbons.

Merriman No. 1 tested one of the younger and structurally higher features. Though the well is not a crestal location, there is little up dip potential and no shows were recorded. (Mud weights were as high as 10.3 lbs/gallon in this well which may account for a lack of hydrocarbon shows.)

Hydrocarbons migrating along the Merriman Anticline were not trapped in the Macalister Prospect. The lack of significant shows would indicate that hydrocarbons have not migrated through this prospect either.

Other structurally higher prospects have yet to be drilled on the Merriman Anticline.

LIST OF APPENDICES

1. Daily Operations Reports
2. Bit and Hydraulics Record/Deviation Record
3. Mud Record
4. Time Analysis
5. Drill Stem Test Reports
6. Description of Cutting Samples
7. Description of Sidewall Cores
8. Wireline Log Evaluation
9. Water Analysis
10. Well Velocity Survey
11. Well Location Survey

APPENDIX 1

APPENDIX 1

DAILY OPERATIONS REPORTS

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 5-4-88 Days from Spud: 16

Depth at 0700 hrs: 1452 m Progress Last 24 hrs: 0.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: - Viscosity: -

PV/YP: -/- WL: -

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

Complete nipple down BOPs and lay out. Cut off Bradenhead and set 5m. cement plug from 6m. BGL to 1m. BGL. Dump and clean mud tanks. Rig released at 1100 hrs - 4/4/88.

Estimated Costs: Daily = $100,879 Cumulative = $465,720

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 4-4-88 Days from Spud: 15

Depth at 0700 hrs: 1452 m Progress Last 24 hrs: 0.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: - Viscosity: -

PV/YP: -/- WL: -

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

Continue logging with Schlumberger. Run #6 RFT (Pressure and Sampling). Run #7 CST (Shot 30 points - recovered 27). Rig down Schlumberger. R.I.H. with BHA and P.O.O.H. laying down. R.I.H. with open end drillpipe to 808m. Circulate and balance mud. Set plug #1 across top of Latrobe from 808m. back to 777m. with 125 sks class "A" cement. Displace and P.O.O.H. slowly 4 stds plus 2 stds at normal speed. Circulate hole clean. P.O.O.H. to 198.5m. Set plug #2 across shoe of 9.625" csg from 198.5m. back to 168m. with 65 sxs class "A" cement. Displace and P.O.O.H. slowly 4 stds plus 2 stds normal speed. Circulate hole clean. P.O.O.H. laying down pipe. Lay down surplus pipe in Derrick. R.I.H. and tag plug #2 at 162m. P.O.O.H. laying down balance of pipe. Nipple down BOPs.

Estimated Costs: Daily = $12,567 Cumulative = $364,841

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 3-4-88 Days from Spud: 14

Depth at 0700 hrs: 1452 m Progress Last 24 hrs: 0.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.4 ppg Viscosity: 48 sec

PV/YP: 10/11 WL: 11 ml

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

Complete first log run. DLL-MSFL-GR-CAL. Second log run LDL-CNL-NGT-EPT. Third log run LSS. Fourth log run WST. One hour wait on new module. Fifth log run SHDT. Sixth log run RFT.

Estimated Costs: Daily = $12,426 Cumulative = $352,274

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 2-4-88 Days from Spud: 13

Depth at 0700 hrs: 1452 m Progress Last 24 hrs: 60.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.4 ppg Viscosity: 48 sec

PV/YP: 10/11 WL: 11 ml

Deviation Surveys: Preliminary Formation Tops: Nil

1.00° at 1,452.0 m

Operations Summary:

Drill to 1452m. T.D. called 1630 hrs 1.4.88. Circulate hole clean and make 30 std. wiper trip. Hole pulled tight from 1397m. back to 1359m. On way back down wash and ream 1402m. to T.D. Circulate hole clean with 20 BBL. Hi-Vis sweep. Drop survey. Pump slug. P.O.O.H. to log. Rig up Schlumberger and commence R.I.H. with logging tools at 0430 hrs. First log DLL-MFSL-GR-CAL.

Estimated Costs: Daily = $11,949 Cumulative = $339,848

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 1-4-88 Days from Spud: 12

Depth at 0700 hrs: 1392 m Progress Last 24 hrs: 53.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.7 ppg Viscosity: 49 sec

PV/YP: 12/12 WL: 11 ml

Deviation Surveys: Preliminary Formation Tops: Nil

0.50° at 1,334.0 m

Operations Summary:

Drill to 1348m. Circulate and drop survey. P.O.O.H. Pick up new bit and R.I.H. to shoe. Slip and cut 60' drill line. R.I.H. and wash and ream 12m. to bottom. Drill to 1392m.

Estimated Costs: Daily = $14,445 Cumulative = $327,899

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 31-3-88 Days from Spud: 11

Depth at 0700 hrs: 1339 m Progress Last 24 hrs: 106.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.5 ppg Viscosity: 48 sec

PV/YP: 11/10 WL: 11 ml

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

Drill to 1256m. Circulate up bottom hole sample. Drill to 1281m. Circulate hole clean and make 15 std wiper trip. Hole good. Drill to 1339m.

Estimated Costs: Daily = $12,230 Cumulative = $313,454

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 30-3-88 Days from Spud: 10

Depth at 0700 hrs: 1233 m Progress Last 24 hrs: 184.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.4 ppg Viscosity: 48 sec

PV/YP: 13/10 WL: 11 ml

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

Complete P.O.O.H. Guage the stabiliser - in guage. Bit 5-3-1/8. Pick up new bit and R.I.H. Wash and ream 5 singles to bottom. Drill to 1064m. Flow check and circulate up sample. Drill to 1233m.

Estimated Costs: Daily = $26,703 Cumulative = $301,224

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 29-3-88 Days from Spud: 9

Depth at 0700 hrs: 1049 m Progress Last 24 hrs: 235.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.4 ppg Viscosity: 44 sec

PV/YP: 15/10 WL: 5 ml

Deviation Surveys: Preliminary Formation Tops: Nil

1.25° at 944.0 m

Operations Summary:

Complete P.O.O.H. with Test Tools. Break and lay down tools. Pick up bit and stabiliser and R. I.H. to drill ahead. Wash and ream 12m. to bottom. Drill to 1049m. Flow check and circulate up samples at 817m. 852m. 880m. and 978m. Circulate and survey at 944m. Bit quit drilling at 1049m. Circulate hole clean. Slug pipe and P.O.O.H. for bit change. Pulled tight over all the new hole from 1049m. back to 814m.

Estimated Costs: Daily = $12,334 Cumulative = $274,521

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 28-3-88 Days from Spud: 8

Depth at 0700 hrs: 814 m Progress Last 24 hrs: 0.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.4 ppg Viscosity: 54 sec

PV/YP: 9/9 WL: 7 ml

Deviation Surveys: Preliminary Formation Tops:

1.00° at 814.0 m Latrobe Group/Traralgon Fm at 794.0 m (14.0L)

Operations Summary:

Complete P.O.O.H. and lay down stabiliser and bit. Pick up and make up DST tools and R.I.H. with D/Cs. Pick up and make up DST head and landing joint and lay down. R.I.H. with test string for DST #1. Tag bottom of hole at 814m. Make up test lines and manifold. Attempt to set packers but packer seat not attained. Make second attempt but no packer seat. P.O.O.H. and break and lay down test tools. Pick up bit and stabiliser and R.I.H. to shoe with drilling BHA. Slip drill line. Continue to R.I.H. to bottom to condition hole and mud prior to DST #2. Circulate and condition mud. Slug pipe and P.O.O.H. Lay down stabiliser and bit. Pick up and make up DST tools and R.I.H. for DST #2. Tag bottom of hole on target and attempt to set pkrs at 765m. No packer seat. DST #2 aborted. Pick up and fill annulus. Break and lay down test head and manifold. P.O.O.H.

Estimated Costs: Daily = $12,037 Cumulative = $262,187

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 27-3-88 Days from Spud: 7

Depth at 0700 hrs: 814 m Progress Last 24 hrs: 57.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.3 ppg Viscosity: 53 sec

PV/YP: 15/17 WL: 9 ml

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

R.I.H. slowly. 90m. fill on bottom. Wash and ream to bottom. Circulate and condition mud - add drilling detergent and dispersants. Drill to 795m. Circulate sample. Drill to 814m. Circulate sample. Wiper trip to casing shoe (2m. fill). Circulate hole clean. Second wiper trip to shoe. 21m. fill. Wash and ream from 793m. to 814m. Circulate hole clean and condition mud. Coal commenced coming in. Weight up to 9.4 ppg. Circulate and weight up. Slug pipe and P.O.O.H.

Estimated Costs: Daily = $13,888 Cumulative = $250,150

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 26-3-88 Days from Spud: 6

Depth at 0700 hrs: 757 m Progress Last 24 hrs: 167.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 9.1 ppg Viscosity: 49 sec

PV/YP: 15/10 WL: 7 ml

Deviation Surveys: Preliminary Formation Tops: Nil

0.00° at 648.0 m

Operations Summary:

Drill to 594m. Circulate bottoms up and make wiper trip to 9.625" casing shoe. (Pulling up to 30000 lbs over - No drag on way back down). Circulate and condition mud. Drill to 661m. Circulate and survey at 648m. Drill to 750m. Circulate and condition mud. Drill to 757m. Bit quit drilling. Circulate bottoms up and P.O.O.H. to check bit. Pulling 30/35000 over string weight and hole swabbing. Pick up kelly and circulate. P.O.O.H. Still tight and swabbing. Pick up kelly and pump out 6 singles. P.O.O.H. stabiliser and bit completely balled up. Cleaned up (bit in good shape -2-2-I).

Estimated Costs: Daily = $13,921 Cumulative = $236,262

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 25.3.88 Days from Spud: 5

Depth at 0700 hrs: 590 m Progress Last 24 hrs: 403.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: 8.8 ppg Viscosity: 43 sec

PV/YP: -/- WL: 20 ml

Deviation Surveys: Preliminary Formation Tops:

0.75° at 343.0 m Gippsland Lst at 199.0 m (3.0H)
1.00° at 486.0 m

Operations Summary:

Complete top up cement in surface casing annulus (40 sx). Flush out mouse hole and re-install sock. P/U 8.5" bit and drilling BHA and R.I.H. Tag cement at 166.4m and float collar at 168.8m. Drill cement and float collar and shoe track and rat hole to 187m. Install bradenhead valve. Circulate hole over to brine mud. Drill to 355m. Circulate and survey. Drill to 422m. Circulate and condition mud. Drill to 499m. Circ. and survey. Drill to 590m.

Estimated Costs: Daily = $14,773 Cumulative = $222,341

****

REMARKS:

Operation at 0800 hrs: circulate prior to wiper trip

Site visited by DITR inspector D. Radford

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 5-4-88 Days from Spud:

Depth at 0700 hrs: 1452 m Progress Last 24 hrs: 0.0 m

Hole Size: 8.5 in Last Casing: 9.625" at 181.60 m

Mud Weight: - Viscosity: -

PV/YP: -/- WL: -

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

Complete nipple down BOPs and lay out. Cut off Bradenhead and set 5m. cement plug from BGL to 1m. BGL. Dump and clean mud tanks. Rig released at 1100 hrs - 4/4/88.

Estimated Costs: Daily = $100,879 Cumulative = $465,720

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 24.3.88 Days from Spud: 4

Depth at 0700 hrs: 187 m Progress Last 24 hrs: 0.0 m

Hole Size: 12.25 in Last Casing: 9.625" at 181.60 m

Mud Weight: 8.7 ppg Viscosity: 36 sec

PV/YP: -/- WL: -

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

W.O.C. till 0830 hrs. Arranged machine shop services to convert C.I.W. bradenhead to slip-on. Organised bradenhead into Sale. Wait on bradenhead until 1430 hrs. Crew continued with safety items to comply with DITR regs. Checked level of cement in annulus (approximately 21'). Cut 9-5/8" csg and prepared stub. Installed bradenhead and welded. Wrapped in asbestos blanket for one hour cooling down period. (Completed at 2000 hrs). Pressure test between welds on bradenhead to 1500 psi - good - nipple up BOPs etc. Pressure test BOPs as per programme and top up annulus with cement.

Estimated Costs: Daily = $31,458 Cumulative = $207,568

****

REMARKS:

Raised mud chlorides to 20000 ppm. Will drill out shoe track with water & convert to mud prior to drilling new formation.

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 23.3.88 Days from Spud: 3

Depth at 0700 hrs: 187 m Progress Last 24 hrs: 98.0 m

Hole Size: 12.25 in Last Casing: 9.625" at 181.60 m

Mud Weight: - Viscosity: -

PV/YP: -/- WL: -

Deviation Surveys: Preliminary Formation Tops: Nil

0.50° at 99.0 m
1.00° at 146.0 m
1.00° at 154.0 m

Operations Summary:

Cleaned 12.25" hole down to 89m. Drilled ahead with light parameters to 187m. Circulated round hi-vis and made wiper trip to top of 8" D/Cs. SLM correct. Spotted 100 BBLs hi-vis mud in hole and P.O.O.H. Rigged up to run 15 Jts 9.625" surface casing. Run casing as per programme. Casing sat up 183.5m. This was 2m. short of target. Tried to circulate it down and worked casing but lost ground. Could move up but not down. Finally cemented casing in with shoe at 181.6m (3.8m short of target). Cemented casing with 400 sas of class "A" cmt. Received good return of fluid during mixing and pumping but returns were intermittent during last 20 BBLs of displacement. No return of cmt slurry. Bumped plug with 1000 psi. Held pressure 10 mins - good. Bed off pressure and checked FLT - good. Cmt in place at 0230 hrs. WOC.

Estimated Costs: Daily = $21,730 Cumulative = $176,110

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 22.3.88. Days from Spud: 2

Depth at 0700 hrs: 89 m Progress Last 24 hrs: 0.0 m

Hole Size: 12.25 in Last Casing: 13.375" at 21.00 m

Mud Weight: 8.6 ppg Viscosity: 40 sec

PV/YP: -/- WL: -

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

R/U Halliburton and mix and pump 93 sxs class "A" cmt and squeeze to conductor annulus. Slurry returns at surface. Displace conductor with water. Hold pressure for 4 hours. R/D cmt head. R/U conductor riser and flow line. Tried to fill hole but fluid still washing up around conductor. R/D flowline and riser. R/U Halliburton and mix and pump 320 sxs of class "A" cmt. W/- 3% CaCl2. Displace conductor with water and hold pressure on formation 4 hours. R/D cmt head and R.I.H. Tag cmt at 20m. Drill 1m. of cement and wash and ream on down the hole. Lot of sand in returns. Cleaned hole down to 52m. by 0700 hrs.

Estimated Costs: Daily = $154,380 Cumulative = $154,380

****

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 21.3.88 Days from Spud: 1

Depth at 0700 hrs: 89 m Progress Last 24 hrs: 89.0 m

Hole Size: 12.25 in Last Casing: 14.000" at 33.00 m

Mud Weight: 8.6 ppg Viscosity: 36 sec

PV/YP: -/- WL: -

Deviation Surveys: Preliminary Formation Tops: Nil

1.50° at 50.0 m

Operations Summary:

Completed rigging up and carrying out work on rig to comply with DITR regulations. Drilled rat hole and mouse hole. Spudded 2300 hrs 20.3.88. M/U 12-1/4" bit and BHA and RIH. Tagged bottom of conductor at 33m. Drilled from 33m to 89m. Circ and survey at 50m. (1-1/2 deg - suspect calibration of survey instrument - will check). At 75m commenced experiencing broaching of drilling fluid up outside of conductor and through mouse hole. This deteriorated rapidly and decided to take remedial action. POH to shoe. Asked Halliburton to try to locate 13-3/8" protector and cement head so a cement squeeze job can be performed.

Estimated Costs: Daily = $0 Cumulative = $0

****

GEOLOGY

ROP : 0.6 - 1.5 min/metre (shows progressively with depth - probably due to the loss of circulation)

LITHOLOGY

33-89m Sandstone : clear and white, quartz with minor grey and green quartzitic lithic grains, fine to coarse, occasionally very coarse to granular, angular to subrounded, occasionally rounded, poor to moderate sorting trace to common green black mica loose with no matrix, or cement, good porosity.

GAS : nil

CRUSADER LIMITED

MORNING REPORT

Well Name: MacAlister #1 Date: 20.3.88 Days from Spud: 0

Depth at 0700 hrs: - m Progress Last 24 hrs: 0.0 m

Hole Size: - in Last Casing: 14.000" at 33.00 m

Mud Weight: - Viscosity: -

PV/YP: -/- WL: -

Deviation Surveys: Nil Preliminary Formation Tops: Nil

Operations Summary:

Rigged up & carried out work on rig to meet DITR regulations.

Estimated Costs: Daily = $0 Cumulative = $0

****

APPENDIX 2

APPENDIX 2

BIT AND HYDRAULICS RECORD

&

DEVIATION RECORD

CRUSADER LIMITED

BIT & HYDRAULIC RECORD — MacAlister #1 — 20.3.88 - 4.4.88

Run No.	S/N	Size (in)	Type	Nozzles (32nds)	W.O.B. (m lb)	R.P.M.	Volume (gpm)	Pressure (psi)	Depth in, m	Depth out, m	Total Metres	Total Hours	R.O.P. (m/hr)	Condition T	B	G
1	HL 9497	12.25	Smith	3 x 16	5/ 7	140	300	250	33.0	89.0	56.0	2.0	28.0	-	-	-
Remarks: -																
1 R/R	HL9497	12.25	Smith	3 x 16	10	65	340	200	89.0	187.0	98.0	5.0	0.0	2	2	I
Remarks: -																
2	KH494	8.5	X3A	3 x 11	10/25	110/120	235	1,100/1,650	187.0	757.0	570.0	27.5	26.8	2	2	I
Remarks: Bit pulled because of balling																
3RR	KH494	8.5	X3A	3 x 11	15/20	110/120	235	1,100	757.0	814.0	57.0	4.0	14.3	2	2	I
Remarks: -																
4RR	KH494	8.5	X3A	3 x 11	-	-	-	-	814.0	814.0	-	0.0	-	2	2	I
Remarks: Conditioning trip only																
5RR	KH494	8.5	X3A	3 x 11	15/20	110/120	235	1,100	814.0	1049.0	235.0	13.0	18.0	7	5	1/8
Remarks: -																
6	29046	8.5	V437	3 x 11	10/30	60/ 80	235	1,100	1,049.0	1348.0	299.0	44.5	9.7	3	3	I
Remarks: Complete row of inserts dropped on #1 cone - B/T																
7	115ND	8.5	JD4	3 x 11	25/35	60/ 80	234/235	1,150	1,348.0	1452.0	104.0	22.0	3.5	6	2	I
Remarks: -																

APPENDIX 3

MUD REDCORD

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

OPERATOR: CRUSADER RESOURCES

WELLSITE REP: E. BATT

CONTRACTOR: ATCO

CONTRACTOR REP: C. DANN

RIG: A-7

WELL: MACALISTER #1

TOTAL DRILLING DAYS: 13

SPUD DATE: 20.3.88

TOTAL DAYS ON WELL: 16

TOTAL DEPTH DATE: 1.4.88

DRILLING FLUID BY INTERVAL:		MUD COST BY INTERVAL:
SPUD MUD	.....0.to.182 METRES	.....$..1618.70.....
GEL/SALTWATER	....182.to.1452 METRES	.....$.13074.70.....
.....	.....to.....	.....
.....	.....to.....	.....
TOTAL MUD COST:		.....$.14693.40.....

DRESSER MAGCOBAR ENGINEERS: B. SWEET

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

INTRODUCTION

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

INTRODUCTION

Crusader Resources N.L.'s exploration well Macalister #1 was spudded on the 20th March, 1988 by the ATCO Drilling Company using Rig A-7. This was the first of two wells to be drilled in the Gippsland Basin located in Permit PEP-120 near Seaspray. The primary target was the fluvial sandstones near the top of the Latrobe group and the secondary target was the sandstones of the Strzelecki group.

The well was drilled to a total depth of 1452 metres in 13 drilling days. The geological formation tops as supplied by the wellsite geologist were:-

Age	Formation	Depth (metres)	Lithology
	Tambo River	111	Sandstone/Marl/ Limestone
Miocene	Gippsland Limestone	193	Limestone/Marl
Late Eocene	Seacombe Marl	764	Marl
Late Cretaceous	Latrobe Group	792.5	Coal/Sandstone/ Shale
Early Cretaceous	Strzelecki Group	1386	Sandstone/Claystone

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

MUD SUMMARY BY INTERVAL

OBSERVATIONS AND RECOMMENDATIONS

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

SUMMARY BY INTERVAL

INTERVAL: 0-182 METRES 12 1/4" HOLE 9 5/8" CASING

On the 20 th March, 1988 Macalister #1 was spudded using a 12 1/4" bit to clean out the conductor and cement. At 75 metres the drilling fluid started to return up the outside of the conductor and the mouse hole so remedial cementing was carried out.

Drilling progressed to 182 metres using fresh water and when this depth was reached 100 bbls of high viscosity mud was spotted on bottom. The 9 5/8" casing was run and cemented at 181.6 metres as it had hung up there.

INTERVAL: 182-1452 METRES 8 1/2" HOLE

The surface casing was topped up with cement and an 8 1/2" bit was run in to tag cement at 166.4 metres. After drilling out cement, float collar and shoe to 187 metres the hole was displaced to a Sodium Chloride Brine drilling fluid.

Drilling proceeded to 590 metres through the Gippsland Formation of Limestone and Marl. At 594 metres a wiper trip was made with tight hole experienced on the way out. Due to increasing viscosity the mud was circulated and conditioned. To reduce the balling of the bit and the viscosity a drilling detergent and dispersants were added. The well proceeded into the Latrobe Formation to 814 metres where a drill stem test was tried twice unsuccessfully. Large amounts of coals were encountered and the mud weight was raised to help stabilize the formation. Both drill stem tests failed due to an inability to seat the packer.

Drilling continued to the total depth of 1452 metres with bit changes at 1049 and 1347 metres. The drilling of the lower sections of hole encountered less problems than had the upper sections.
The following suite of electric logs were run:-

a) DLL-MSFL-GR
b) LDL-CNL-NGT-EPT-GR
c) SLS-GR
d) SHDT
e) RFT pressure survey.

On the 3rd April, 1988 Macalister #1 was plugged and abandoned.

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

OBSERVATIONS AND RECOMMENDATIONS

The Sodium Chloride mud system ran into a number of problems. The mud making ability of the Gippsland overloaded the system with clays and consequently large viscosities and Gel strengths.

For drilling in this permit the extra formation protection offered by an 8% KCl drilling fluid would be recommended. Apart from the salinity the Potassium ion offers protection to the clays by interaction with the clay matrix. The inability of being able to seat packers for a DST also emphasised the wash out experienced in the well.

The second well in the permit Wonga Binda #1, is to be drilled with a KCl mud which should show up favourable comparisons. With tighter control of the mud properties the cost should be comparatively cheaper.

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

MUD CONSUMPTION BY INTERVAL

TOTAL MATERIAL CONSUMPTION

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

OPERATOR: CRUSADER RESOURCES WELL: MACALISTER #1

HOLE SIZE..12 1/4"...

INTERVAL....0-182 METRES..... CASING SIZE...9 5/8".

PRODUCT	QUANTITY	COST
MAGCOGEL	70 x 100 lb sx	$ 1327.20
CAUSTIC SODA	3 x 25 kg drum	$ 74.25
LIME	7 x 25 kg sx	$ 36.75
MAGCOPOLYPAC	2 x 25 kg sx	$ 180.50
	INTERVAL COST :	$ 1618.70

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

OPERATOR: CRUSADER RESOURCES WELL: MACALISTER #1

HOLE SIZE...8 1/2"...

INTERVAL.....182-1452 METRES. CASING SIZE...-.....

PRODUCT	QUANTITY	COST
BARITE	416 x 100 lb sx	$ 3536.00
MAGCOGEL	170 x 100 lb sx	$ 3223.20
CAUSTIC SODA	38 x 25 kg drum	$ 940.50
LIME	3 x 25 kg sx	$ 15.75
MACGOPOLYPAC	7 x 25 kg sx	$ 631.75
MAGCOPOLYSAL	51 x 25 kg sx	$ 2154.75
SALT	140 x 50 kg sx	$ 1400.00
SPERSENE	31 x 25 kg sx	$ 782.75
D-D COMPOUND	1 x 205 lt drum	$ 390.00
	INTERVAL COST :	$ 13074.70

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

TOTAL MATERIAL CONSUMPTION

OPERATOR: CRUSADER RESOURCES

WELL: MACALISTER #1

LOCATION: PEP-120, SEASPRAY, VICTORIA.

PRODUCT	UNIT	COST	%
BARITE	416 x 100 lb sx	$ 3536.00	24.07
MAGCOGEL	240 x 100 lb sx	$ 4550.40	30.97
CAUSTIC SODA	41 x 25 kg drum	$ 1014.75	6.91
LIME	10 x 25 kg sx	$ 52.50	0.36
MACGOPOLYPAC	9 x 25 kg sx	$ 812.25	5.52
MAGCOPOLYSAL	51 x 25 kg sx	$ 2154.75	14.66
SALT	140 x 50 kg sx	$ 1400.00	9.52
SPERSENE	31 x 25 kg sx	$ 782.75	5.33
D-D COMPOUND	1 x 205 lt drum	$ 390.00	2.66
	TOTAL MATERIAL COST :	$ 14693.40	100.00

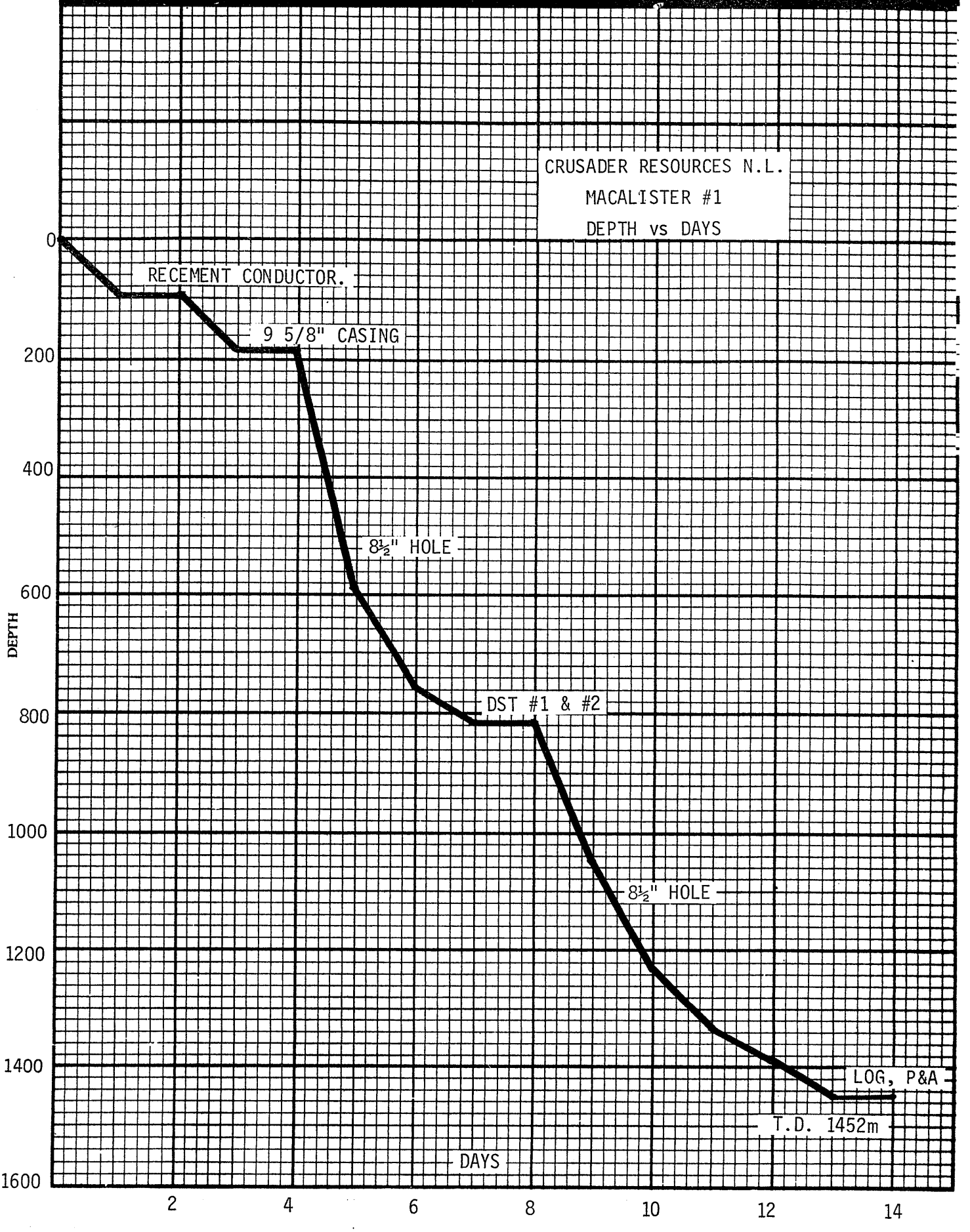
Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

GRAPHS

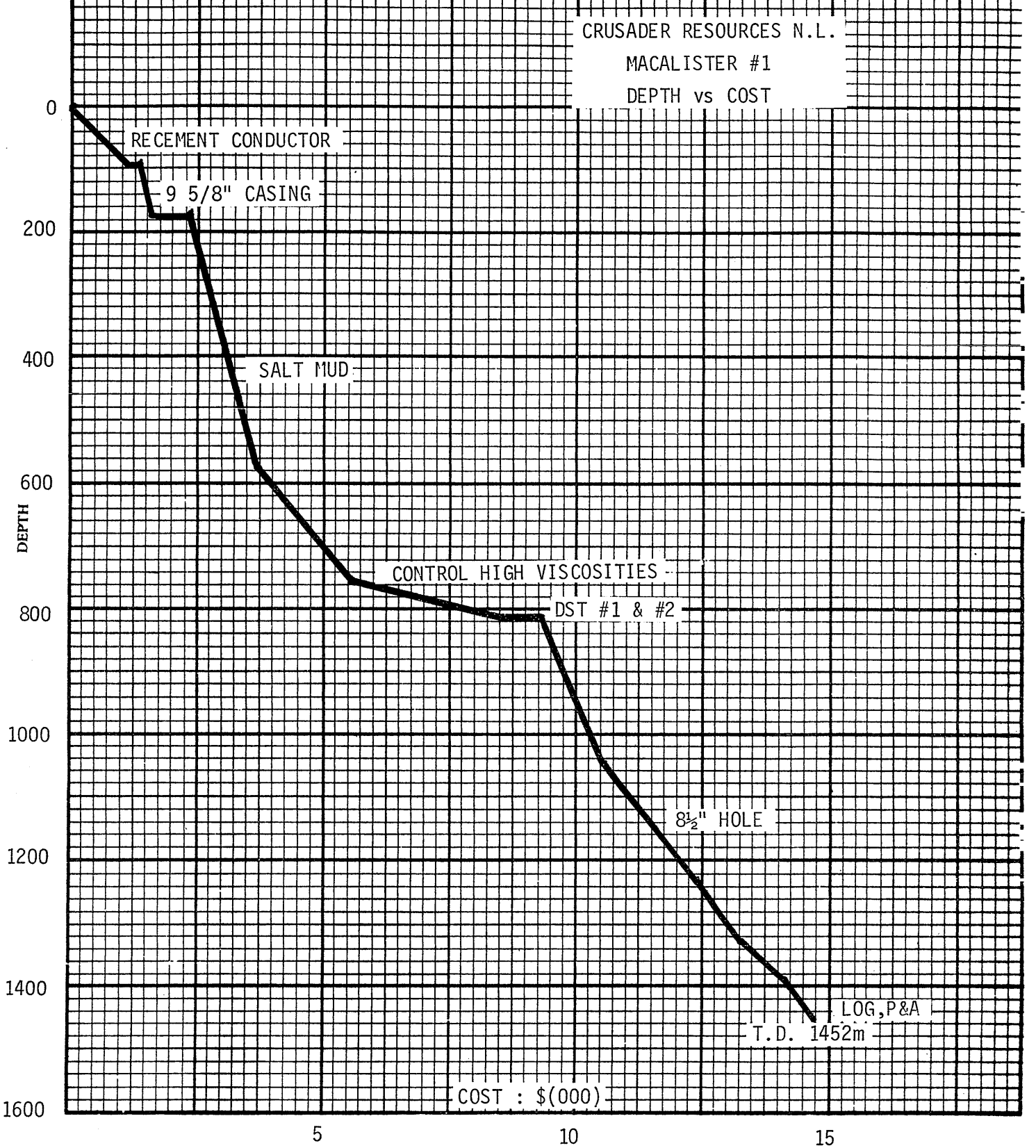
M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY



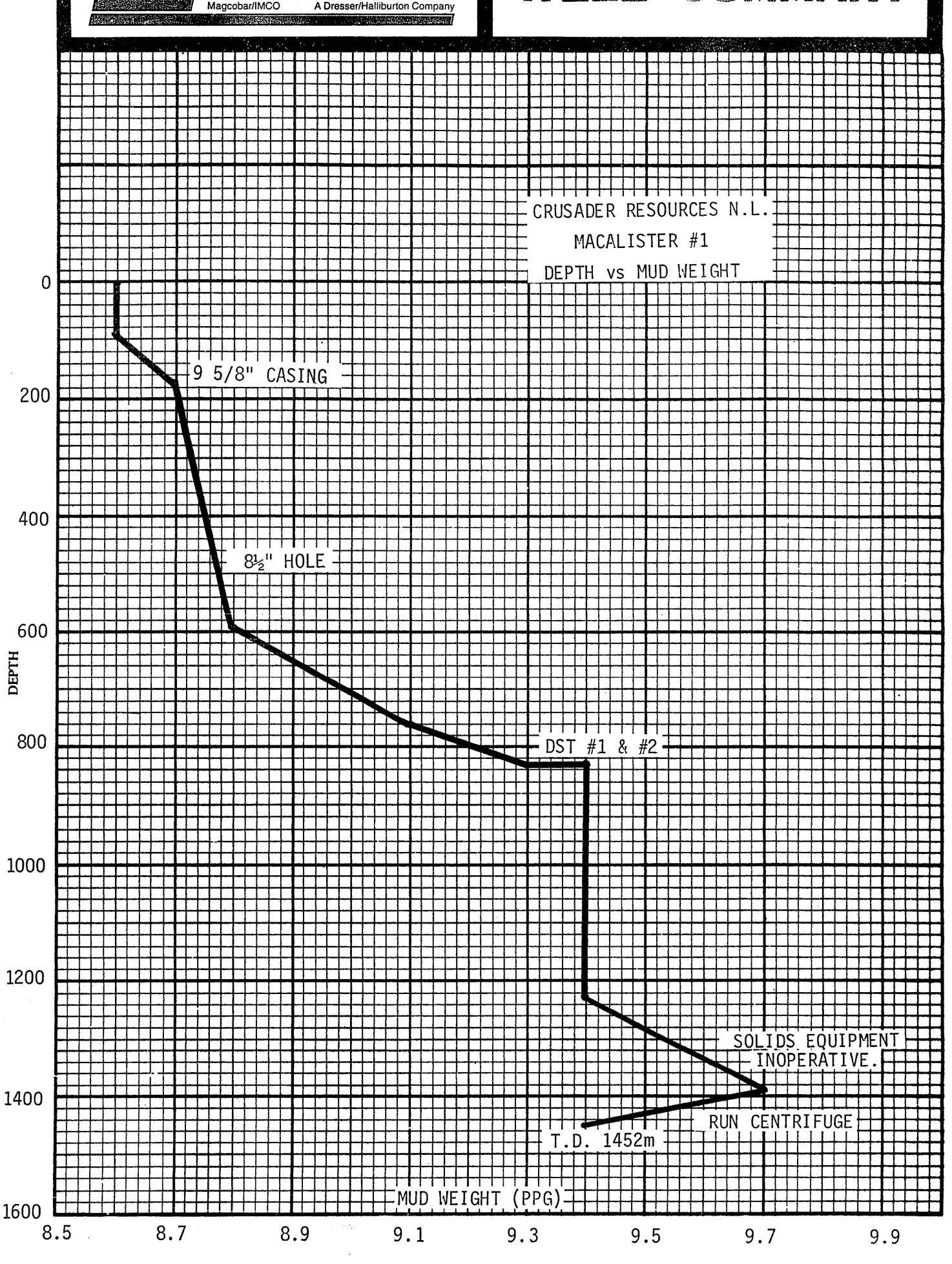
M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY



M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY



M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

BIT AND HYDRAULICS RECORD

BIT & HYDRAULIC RECORD

Contractor	Rig No.	Location	Well
ATCO	A 7	VIC PEP 120	MACALISTER #1
Operator			**Engineer**
CRUSADER		Nr. SEASPRAY, VICTORIA	R. SWEET

Pump Name	Size	Liner Size/Stroke	DRILL Collars O.D. x I.D. x Length	Pipe Drill	Tool Joint Type	Wt/Ft	Pump Output Bbls/Stks	
C-E	D395/500	14&16x5½	8½ & 6½	4½"	IF	16.6	0.124/0.1362	@ 97%

Date	Run No.	Size	Make	Type	Jet Size	Depth Out	Metres Drilled	Hours Run	Weight On Bit	R P M	Pump Pressure	Vert Dev.	Stks/min	Ann Vel Ft./min	Condition T-B-G
	1	12¼	SMITH	S 11	3x16	89	66	2.5				½	80		6-4-I
	1 RR	12¼	SMITH	S 11	3x16	182	93	7.5				1	80		6-4-I
	2	8½	HTC	X3A	3x11	757	575	27.5				1	60	124	5-3-1/8
	2 RR	8½	HTC	X3A	3x11	1048	291	13.0				1	60	124	5-3-1/8
	3	8½	VAREL	437	3x11	1347	299	44.5				½	46	117	7-3-I
	4	8½	HTC	JD4	3x11	1452	105	22.0				1	52	119	7-3-I

REMARKS

APPENDIX 3

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

DAILY MUD REPORTS

AG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

P. O. BOX 6504
HOUSTON, TEXAS 77265

MAGCOBAR GROUP
Dresser Industries, Inc.

DRILLING MUD REPORT NO. 1

DATE 21 - 3 19 88 DEPTH 805m

SPUD DATE 20-3-88 PRESENT ACTIVITY

OPERATOR CRUSADER RESOURCES N.L.	CONTRACTOR ATCO	RIG NO. A7
REPORT FOR E.F. BATT	REPORT FOR C. DANN	SECT., TWNSHP., RANGE GIPPSLAND BASIN
WELL NAME AND NO. MAC ALISTER - 1	FIELD OR BLOCK NO. PEP 120	CTY., PAR. OR OFFSHORE AREA SEASPRAY
		STATE / PROVINCE VIC

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA	
BIT SIZE 12¼	TYPE IS111	JET SIZE 3x16	SURFACE SET @ FT.	HOLE 74.7	PITS 240	PUMP SIZE 14 X 5½ IN. 16 X 5½	ANNULAR VEL. (FT/MIN) DP DC
DRILL PIPE SIZE 8½	TYPE II	LENGTH	INTERMEDIATE SET @ FT.	TOTAL CIRCULATING VOL. 314		PUMP MAKE, MODEL C-E D375 D500	ASSUMED EFF 97 % CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE 5½	TYPE	LENGTH	INTERMEDIATE SET @ FT.	IN STORAGE 240 (GEL)	WEIGHT 8.6	BBL/STK .1362 / .124 STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE 8½ / 6½		LENGTH 89.2	PRODUCTION OR LINER SET @ FT.	MUD TYPE FW GEL SWEEP		BBL/MIN GAL/MIN	TOTAL CIRC. TIME (MIN)

MUD PROPERTIES	☐ F.L. ☑ PIT	☐ F.L. ☑ PIT
SAMPLE FROM		
TIME SAMPLE TAKEN	20⁰⁰	06⁰⁰
DEPTH (ft)	-	805
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	8.6	8.6
FUNNEL VISCOSITY (sec./qt.) API @ °F	36	36
PLASTIC VISCOSITY cP @ °F		
YIELD POINT (lb/100ft²)		
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	/	/
FILTRATE API (cm³ /30 min.)		
API HTHP FILTRATE (cm³ /30 min.) @ °F		
CAKE THICKNESS (32nd in. API/HTHP)	/	/
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT		
LIQUID CONTENT (% BY Vol.) OIL/WATER	/	/
SAND CONTENT (% BY Vol.)		
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm³ /cm³ mud		
pH ☐ STRIP ☐ METER @ °F		
ALKALINITY MUD (Pm)		
ALKALINITY FILTRATE (P_f /M_f)	/	/
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	/	/
CHLORIDE (mg/L)		
TOTAL HARDNESS AS CALCIUM (mg/L)		

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ DRILLING CONTRACTOR ☐ OPERATOR'S REPRESENTATIVE ☐ OTHER

PRODUCTS	TREATMENT
MAGCOGEL	FOR GEL SWEEPS
CAUSTIC	pH CONTROL
LIME	TO FLOCULATE GEL

REMARKS:
PREPARE 240 BBLS GEL TO BE USED IN TOP HOLE SWEEPS WHILST DRILLING WITH FRESH WATER.
CHANGED SPLIT BOTTOM SHAKER SCREEN. CONFIGURATION CURRENTLY B 60 S 80.

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SODIUM NITRATE	STEER SEAL
STARTING INVENTORY	420	40	-	40	200	40	120	40	-	40
RECEIVED	-	-	32	-	-	-	-	30	4	-
USED LAST 24 HR.	-	-	2	2	50	-	-	-	-	-
CLOSING INVENTORY	420	40	30	38	150	40	120	70	4	40
COST LAST 24 HR.	~~$ 50~~		41⁵⁰	10⁵⁰	948⁰⁰			~~1000~~		

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	-	Desilter	2.5	H. S. Cent.	-
Degasser	-	Shaker	2.5	Super Cyclone	-
Desander	2.5	Other	-	—	

DAILY COST $1008.00

CUMULATIVE COST $1008 00

MAGCOBAR ENGINEER ROBERT SWEET
HOME ADDRESS 12 LINCOLN RD, PARADISE S.A. PHONE 336053
MOBILE UNIT
WAREHOUSE LOCATION PHONE

PRINTED IN U.S.A.

THIS REPORT IS GOVERNED BY THE TERMS AND CONDITIONS AS SET FORTH ON THE REVERSE SIDE

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

MAGCOBAR GROUP
Dresser Industries, Inc.

P. O. BOX 6504
HOUSTON, TEXAS 77265

DRILLING MUD REPORT NO. 2

DATE 22-3-1988 DEPTH 89.5

SPUD DATE 20-3-88 PRESENT ACTIVITY R I H

OPERATOR CRUSADER RESOURCES N.L. CONTRACTOR ATCO RIG NO. A7

REPORT FOR E F BATT REPORT FOR C DANN SECT., TWNSHP., RANGE GIPPSLAND BASIN

WELL NAME AND NO. MAC ALISTER -1 FIELD OR BLOCK NO. PEP 120 CTY., PAR. OR OFFSHORE AREA SEASPRAY STATE / PROVINCE VIC

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA	
BIT SIZE: 12 1/4	TYPE: S11	JET SIZE: 3x16	SURFACE SET @ FT.	HOLE	PITS	PUMP SIZE: 14 X 5 1/2 IN. / 16 5 1/2	ANNULAR VEL. (FT/MIN) DP DC
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	TOTAL CIRCULATING VOL.		PUMP MAKE, MODEL: C-F D 375 D 500 / ASSUMED EFF. 97 %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	IN STORAGE: 240	WEIGHT: 8.6+	BBL/STK: .124 / .1362 STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE: 2x8 1/4 8x6 1/4		LENGTH: 89.2	PRODUCTION OR LINER SET @ FT.	MUD TYPE: F WATER/GEL SWEEPS		BBL/MIN: 7.44 / 8.172 / 312.48 / 343.224 GAL/MIN	TOTAL CIRC. TIME (MIN)

MUD PROPERTIES			MUD PROPERTY SPECIFICATIONS		
SAMPLE FROM	☐ F.L. ☐ PIT	☐ F.L. ☐ PIT	WEIGHT: 8.6	VISCOSITY: 40	FILTRATE: -
TIME SAMPLE TAKEN	1800	0615	BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER		
DEPTH (ft)	89.5m	89.5m			
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	8.6+	8.6+			
FUNNEL VISCOSITY (sec./qt.) API @ °F	40	40			
PLASTIC VISCOSITY cP @ °F					
YIELD POINT (lb/100ft²)					
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	/	/			
FILTRATE API (cm^3 /30 min.)					
API HTHP FILTRATE (cm^3 /30 min.) @ °F					
CAKE THICKNESS (32nd in. API/HTHP)	/	/			
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT					
LIQUID CONTENT (% BY Vol.) OIL/WATER	/	/			
SAND CONTENT (% BY Vol.)					
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud					
PH ☐ STRIP ☐ METER @ °F					
ALKALINITY MUD (Pm)					
ALKALINITY FILTRATE (P_f /M_f)	/	/			
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	/	/			
CHLORIDE (mg/L)					
TOTAL HARDNESS AS CALCIUM (mg/L)					

PRODUCTS	TREATMENT
MAGCOGEL	TO INCREASE GEL WEIGHT OF SWEEP MUD
LIME	TO FLOCCULATE GEL.

REMARKS:
- ADDED A FURTHER 10 SX OF GEL AND 1 SX OF LIME TO THE 240 BBL OF GEL SWEEP MUD TO INCREASE VISCOSITY AND TAKE GELS FROM 21 LB/BBL TO 25 LB/BBL.
- RAN A CHLORIDES TEST ON TURKEY'S NEST WATER. RESULT - 1600 mg/L.

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SODIUM NITRATE	SPERSENE
STARTING INVENTORY	420	40	30	38	150	40	120	70	4	40
RECEIVED	-	-	-	-	-	-	-	-	-	-
USED LAST 24 HR.	-	-	-	1	10	-	-	-	-	-
CLOSING INVENTORY	420	40	30	37	140	40	120	70	4	40
COST LAST 24 HR.				5.25	189.60					

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	-	Desilter		H. S. Cent.	-
Degasser	-	Shaker		Super Cyclone	-
Desander		Other		—	-

DAILY COST $194-85 CUMULATIVE COST $1202-85

MAGCOBAR ENGINEER ROBERT SWEET HOME ADDRESS 12 LINCOLN RD PARADISE S.A. PHONE 3366053

MOBILE UNIT WAREHOUSE LOCATION PHONE

PRINTED IN U.S.A.

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

MAGCOBAR GROUP
Dresser Industries, Inc.

P. O. BOX 6504
HOUSTON, TEXAS 77265

DRILLING MUD REPORT NO. 3

DATE 23-3- 19 88 DEPTH 182m

SPUD DATE 20-3-88 PRESENT ACTIVITY WAITING ON CASING

OPERATOR CRUSADER RESOURCES N.L. CONTRACTOR ATCO RIG NO. TO SET A7

REPORT FOR E. F. BATT REPORT FOR C. DANN SECT., TWNSHP., RANGE GIPPSLAND BASIN

WELL NAME AND NO. MAC ALISTER - 1 FIELD OR BLOCK NO. PEP 120 CTY., PAR. OR OFFSHORE AREA SEASPRAY STATE / PROVINCE VIC

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 12 ¼	TYPE S11	JET SIZE 3 x 16	SURFACE SET @ 21m FT.	HOLE	PITS	PUMP SIZE 14 X 5.5 IN. 16 x 5.5		ANNULAR VEL. (FT/MIN) DP ____ DC ____
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	TOTAL CIRCULATING VOL.		PUMP MAKE, MODEL C-E D375/D5Q	ASSUMED EFF. 97 %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	IN STORAGE	WEIGHT	BBL/STK .1362 / .124	STK/MIN	BOTTOMS UP (MIN)
DRILL COLLAR SIZE 8"	LENGTH		PRODUCTION OR LINER SET @ FT.	MUD TYPE		BBL/MIN F/7	GAL/MIN 343/312	TOTAL CIRC. TIME (MIN)

MUD PROPERTIES			MUD PROPERTY SPECIFICATIONS		
SAMPLE FROM	☐ F.L. ☑ PIT	☐ F.L. ☐ PIT	WEIGHT	VISCOSITY	FILTRATE
TIME SAMPLE TAKEN	19⁰⁰		8.7	50+	-
DEPTH (ft)	187m		BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER		
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	8.7				
FUNNEL VISCOSITY (sec./qt.) API @ °F	50+		PRODUCTS	TREATMENT	
PLASTIC VISCOSITY cP @ °F	-		CAUSTIC	pH control	
YIELD POINT (lb/100ft²)	-		LIME	[illegible] gel	
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	-/-	/	MAGCOGEL	for gel sweeps	
FILTRATE API (cm^3 /30 min.)	-		POLYPAC	to increase viscosity	
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-				
CAKE THICKNESS (32nd in. API/HTHP)	./.	/			
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT	-				
LIQUID CONTENT (% BY Vol.) OIL/WATER	./.	/			
SAND CONTENT (% BY Vol.)	.				
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	.				
PH ☐ STRIP ☐ METER @ °F	-				
ALKALINITY MUD (Pm)					
ALKALINITY FILTRATE (P_f /M_f)	./.	/			
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	./-	/			
CHLORIDE (mg/L)	-				
TOTAL HARDNESS AS CALCIUM (mg/L)	-				

REMARKS:

CONTINUED DRILLING WITH WATER AND HIGH VISCOSITY SWEEPS MADE UP MORE GEL TO COVER LOSSES THROUGH SWEEPS

ADDED POLYPAC TO FURTHER INCREASE VISCOSITY FOR HOLE FILL AT 9⅝" CASING POINT.

PITS CLEANED OUT AND WASHED DOWN AFTER CASING SET

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SPERSENE	Na BICARB
STARTING INVENTORY	420	40	30	37	140	40	120	70	40	4
RECEIVED	-	-	-	-	-	-	-	-	-	-
USED LAST 24 HR.	-	-	1	4	10	2	-	-	-	-
CLOSING INVENTORY	420	40	29	33	130	38	120	70	40	4
COST LAST 24 HR.			24⁷⁵	21⁰⁰	189⁰⁰	180⁵⁰				

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	-	Desilter	10.5	H. S. Cent.	-
Degasser	-	Shaker	10.5	Super Cyclone	-
Desander	10.5	Other	-	—	-

DAILY COST $415.65 CUMULATIVE COST $1618.70

MAGCOBAR ENGINEER ROBERT SWEET HOME ADDRESS 12 LINCOLN RD PARKDALE PHONE 3366053

MOBILE UNIT WAREHOUSE LOCATION PHONE

PRINTED IN U.S.A.

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

P. O. BOX 6504
HOUSTON, TEXAS 77265

MAGCOBAR GROUP
Dresser Industries, Inc.

DRILLING MUD REPORT NO.	4
DATE	24 - 3 - 1988
DEPTH	181?
SPUD DATE	20-3-88
PRESENT ACTIVITY	

OPERATOR	CRUSADER RESOURCES N.L.
CONTRACTOR	ATCO
RIG NO.	A7
REPORT FOR	E.F. BATT
REPORT FOR	C. DANN
SECT., TWNSHP., RANGE	GIPPSLAND VALLE
WELL NAME AND NO.	MAC ALISTER -1
FIELD OR BLOCK NO.	PEP 120
CTY., PAR. OR OFFSHORE AREA	SEASPRAY
STATE / PROVINCE	VIC

DRILLING ASSEMBLY / CASING / MUD VOLUME (BBL) / CIRCULATION DATA

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE SET @ 21m FT.	HOLE	PITS	PUMP SIZE 14 X 5.5 / 16 X 5.5 IN.		ANNULAR VEL. (FT/MIN) DP ___ DC ___
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ 182m FT.	TOTAL CIRCULATING VOL.		PUMP MAKE, MODEL CE 5375 / 0500	ASSUMED EFF. 97 %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	IN STORAGE 200 BBLS	WEIGHT 8.7	BBL/STK 1361 / 124 STK/MIN		BOTTOMS UP (MIN)
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER SET @ FT.	MUD TYPE SALT / GEL		8/7 BBL/MIN	343 / 312 GAL/MIN	TOTAL CIRC. TIME (MIN)

MUD PROPERTIES

MUD PROPERTIES		
SAMPLE FROM	☐ F.L. ☐ PIT	☐ F.L. ☑ PIT
TIME SAMPLE TAKEN		06³⁰ hrs
DEPTH (ft)		-
WEIGHT ☐ (ppg) ☐ (lb/cu. ft) ☐ Sp. G		8.7
FUNNEL VISCOSITY (sec./qt.) API @ °F		36
PLASTIC VISCOSITY cP @ °F		
YIELD POINT (lb/100ft²)		-
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	/	-/-
FILTRATE API (cm^3 /30 min.)		-
API HTHP FILTRATE (cm^3 /30 min.) @ °F		-
CAKE THICKNESS (32nd in. API/HTHP)	/	-/-
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT		-
LIQUID CONTENT (% BY Vol.) OIL/WATER	/	-/-
SAND CONTENT (% BY Vol.)		-
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3/cm^3 mud		-
PH ☑ STRIP ☐ METER @ °F		11.5
ALKALINITY MUD (Pm)		2.7
ALKALINITY FILTRATE (P_f /M_f)	/	1.4 / 1.8
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	/	-/-
CHLORIDE (mg/L)		20,000
TOTAL HARDNESS AS CALCIUM (mg/L)		-

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER

PRODUCTS	TREATMENT
MAGCOGEL	} TO PREPARE SALT/GEL
CAUSTIC	} SYSTEM FOR 8½"
LIME	} HOLE.
SALT	

REMARKS:
PREPARED 200 BBLS SALT/GEL MUD FOR NEXT SECTION. LEFT 120 BBL WATER TO DRILL OUT CEMENT. CHANGED SHAKER SCREENS TO 40/60 FOR GIPPSLAND LIMESTONES WHICH OCCUR FROM 202m 599m [illegible] (K.B.). AIMING AT CL⁻ LEVEL 20Kg/

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge		Desilter		H. S. Cent.	
Degasser		Shaker		Super Cyclone	
Desander		Other		——	

PRODUCT INVENTORY

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SODIUM NITRATE	[illegible]
STARTING INVENTORY	420	40	29	33	130	38	120	70	4	40
RECEIVED	-	-	-	-	-	-	-	-	-	-
USED LAST 24 HR.	-	-	2	2	25	-	-	27	-	-
CLOSING INVENTORY	420	40	27	31	105	38	120	43	4	40
COST LAST 24 HR.			49⁵⁰	10⁵⁰	474⁰⁰			270⁰⁰		

DAILY COST	CUMULATIVE COST
$ 804.00	$ 2422.70

MAGCOBAR ENGINEER ROBERT SWEET	HOME ADDRESS 12 LINCOLN RD PARADISE S.A.	PHONE 3366053
MOBILE UNIT	WAREHOUSE LOCATION	PHONE

PRINTED IN U.S.A.

THIS REPORT IS GOVERNED BY THE TERMS AND CONDITIONS AS SET FORTH ON THE REVERSE SIDE

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

P. O. BOX 6504
HOUSTON, TEXAS 77265

MAGCOBAR GROUP
Dresser Industries, Inc.

DRILLING MUD REPORT NO. 5

DATE 25-3- 19 88 | DEPTH 589m

SPUD DATE 20-3-88 | PRESENT ACTIVITY DRILLING AHEAD

OPERATOR: CRUSADER RESOURCES N.L.	CONTRACTOR: ATCO	RIG NO.: A7
REPORT FOR: E.F. BATT	REPORT FOR: C. DANN	SECT., TWNSHP., RANGE: GIPPSLAND VALLE
WELL NAME AND NO.: MAC ALISTER #1	FIELD OR BLOCK NO.: PEP 120	CTY., PAR. OR OFFSHORE AREA: SEASPRAY
		STATE / PROVINCE: VIC

DRILLING ASSEMBLY

BIT SIZE: 8½	TYPE: HTC A	JET SIZE: 5x11
DRILL PIPE SIZE: 5"	TYPE:	LENGTH: 366m
DRILL PIPE SIZE:	TYPE:	LENGTH:
DRILL COLLAR SIZE:		LENGTH: 228m

CASING

SURFACE SET @ 21m Ft.
INTERMEDIATE SET @ 182m Ft.
INTERMEDIATE SET @ FT.
PRODUCTION OR LINER SET @ FT.

MUD VOLUME (BBL)

HOLE | PITS
TOTAL CIRCULATING VOL.
IN STORAGE | WEIGHT
MUD TYPE: SALT / GEL

CIRCULATION DATA

PUMP SIZE: 14 X 5.5 IN. 16 X 5.5
PUMP MAKE, MODEL: C-E 9375 | ASSUMED EFF.: 97 %
BBL/STK: .1362 / 124 | STK/MIN: 60
BBL/MIN: 8/7 | GAL/MIN: 343 / 312
ANNULAR VEL. (FT/MIN) DP: [illegible] DC: [illegible]
CIRCULATION PRESSURE (PSI)
BOTTOMS UP (MIN)
TOTAL CIRC. TIME (MIN)

MUD PROPERTIES

SAMPLE FROM	☐ F.L. ☑ PIT	☐ F.L. ☐ PIT
TIME SAMPLE TAKEN	1900	0600
DEPTH (ft)	360m	580m
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	8.6	8.8
FUNNEL VISCOSITY (sec./qt.) API @ °F	36	43
PLASTIC VISCOSITY cP @ °F	-	
YIELD POINT (lb/100ft²)	-	
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	-/-	/
FILTRATE API (cm^3 /30 min.)	-	20cc+
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-	-
CAKE THICKNESS (32nd in. API/HTHP)	-/-	2/32
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT	-	
LIQUID CONTENT (% BY Vol.) OIL/WATER	-/-	/
SAND CONTENT (% BY Vol.)	1.5%	0.75%
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	-	-
PH ☑ STRIP ☐ METER @ °F	11.5	9.5
ALKALINITY MUD (Pm)	2.8	0.7
ALKALINITY FILTRATE (P_f /M_f)	0.5/0.7	0.1/0.4
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	-/-	-/-
CHLORIDE (mg/L)	9000	15000
TOTAL HARDNESS AS CALCIUM (mg/L)	-	320

MUD PROPERTY SPECIFICATIONS

WEIGHT 9.2 ppg: 8.8 EN
VISCOSITY 40 sec: 43 EN
FILTRATE: 20cc+

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ DRILLING CONTRACTOR ☐ OPERATOR'S REPRESENTATIVE ☐ OTHER

PRODUCTS	TREATMENT
CAUSTIC	TO CONTROL pH
MAGCOGEL	FOR GEL/SALT MUD and HI VIS SW
LIME	TO FLOCULATE HI VIS SWEEP E.
SALT	TO CONTROL CL⁻ AT 70x10g/l
SPERSENE	TO CONTROL VISCOSITY.

REMARKS: AT APPROXIMATELY 1700 HRS WHILST RAPIDLY DRILLING (up to 120m) GIPPSLAND LIMESTONES CONTROL OF RETURNS WAS ALMOST LOST WHEN SHAKER CHANNEL OVERFLOWED AND VISCOSITY OF RETURNING MUD ROSE FROM 41 TO 70+. THIS WAS QUICKLY BROUGHT UNDER CONTROL BY WATER DILUT AND THE USE OF SPERSENE THICKENER.

PRODUCT INVENTORY

	BARITE	CALCIUM CHLORIDE	CAUSTIC	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SODIUM NITRATE	SPERSENE
STARTING INVENTORY	420	40	27	31	105	38	120	43	4	40
RECEIVED	-	-	-	-	-	-	-	-	-	-
USED LAST 24 HR.	-	-	3	1	51	-	-	18	-	3
CLOSING INVENTORY	420	40	24	30	54	38	120	25	4	37
COST LAST 24 HR.			$79.25	$5.25	$766.50			$180.00		$25.25

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	MECHANICAL PROBLEMS	Desilter	13.5	H. S. Cent.	-
Degasser	-	Shaker	13.5	Super Cyclone	-
Desander	13.5	Other	-	——	-

DAILY COST: $1302.21
CUMULATIVE COST: $3724.91

MAGCOBAR ENGINEER: ROBERTS
HOME ADDRESS: 12 LINCOLN RD. PARAMA SA | PHONE: 356 6053
MOBILE UNIT | WAREHOUSE LOCATION | PHONE

PRINTED IN U.S.A.

THIS REPORT IS GOVERNED BY THE TERMS AND CONDITIONS AS SET FORTH ON THE REVERSE SIDE

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

MAGCOBAR GROUP
Dresser Industries, Inc.

P. O. BOX 6504
HOUSTON, TEXAS 77265

DRILLING MUD REPORT NO. 6

DATE 26·3 19 88 DEPTH 757.4

SPUD DATE 20·3·88 PRESENT ACTIVITY TRIPPING

OPERATOR: CRUSADER RESOURCES N.L.	CONTRACTOR: ATCO	RIG NO.: A7
REPORT FOR: L.F. BATT	REPORT FOR: C. DANN	SECT., TWNSHP., RANGE: GIPPSLAND VALL
WELL NAME AND NO.: MAC ALISTER - 1	FIELD OR BLOCK NO.: PEP 120	CTY., PAR OR OFFSHORE AREA: SEASPRAY
		STATE / PROVINCE: VIC

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 8½	TYPE HTC X3A	JET SIZE 3x11	SURFACE SET @ 21m EST	HOLE 100	PITS 480	PUMP SIZE 14 X 5.5 IN. 16 5.5		ANNULAR VEL. (FT/MIN) DP 124 DC 214
DRILL PIPE SIZE 4½	TYPE	LENGTH 405	INTERMEDIATE SET @ 182m EST	TOTAL CIRCULATING VOL. 580 BBLS		PUMP MAKE, MODEL C-E D 375 D 500	ASSUMED EFFC. 97 %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE HWDP	TYPE	LENGTH 182	INTERMEDIATE SET @ FT.	IN STORAGE -	WEIGHT	BBL/STK .1362 / .124	STK/MIN 60	BOTTOMS UP (MIN) 17
DRILL COLLAR SIZE 6½		LENGTH 170m	PRODUCTION OR LINER SET @ FT.	MUD TYPE SALT GEL		817 BBL/MIN	343 / 312 GAL/MIN	TOTAL CIRC. TIME (MIN) 24

MUD PROPERTIES			MUD PROPERTY SPECIFICATIONS		
SAMPLE FROM	☐ F.L. ☐ PIT	☐ F.L. ☐ PIT	WEIGHT: 9.1 IN 9.2 OUT	VISCOSITY: 49 IN 50 OUT	FILTRATE: 7cc
TIME SAMPLE TAKEN	2300	0300	BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER		
DEPTH (ft)	756	757.4			
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	9.1	9.1 IN	PRODUCTS	TREATMENT	
FUNNEL VISCOSITY (sec./qt.) API @ °F	45	49 IN	CAUSTIC	TO RAISE pH	
PLASTIC VISCOSITY cP @ °F	13	15	MAGCOGEL	MIXED TO INCREASE VISCOS	
YIELD POINT (lb/100ft²)	9	10	POLYSAL	FOR RHEOLOGY CONTRO	
STRENGTH (lb/100ft²) 10 sec./10 min.	11 / 52	6/32	SALT	TO RAISE CL⁻ LEVEL.	
FILTRATE API (cm^3 /30 min.)	14	7	SPERSENE	TO DECREASE VISCOSITY	
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-	-			
CAKE THICKNESS (32nd in. API/HTHP)	4/32	4/32			
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT		7			
LIQUID CONTENT (% BY Vol.) OIL/WATER	/	93/			
SAND CONTENT (% BY Vol.)	1.5	1.5			
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	-	-			
PH ☑ STRIP ☐ METER @ °F	9.5	[illegible]			
ALKALINITY MUD (Pm)	1.2	1.0			
ALKALINITY FILTRATE (P_f /M_f)	0.2/0.6	0.2/0.6			
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	-/-	-/-			
CHLORIDE (mg/L)	9200	1400			
TOTAL HARDNESS AS CALCIUM (mg/L)	160	240			

REMARKS: DIFFICULTIES CONTINUED IN CONTROLLING VISCOSITY, pH AND CHLORIDES LEVELS CONTINUED TO DROP. THIS WAS CAUSED BY ADDING WATER AT SHAKERS TO COMPENSATE FOR VOLUME LOSSES OVER THE SURFACE SYSTEM. SPERSENE WAS ALSO ADDED FOR VISCOSITY CON A GREAT DEAL OF SOLIDS HAVE COME IN FROM CALCAREOUS CLAYS IN THE GIPPSLAND.

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SODIUM BICARB	SPERSENE
STARTING INVENTORY	420	40	24	30	54	38	120	25	4	37
RECEIVED 15766	-	-	-	-	160	-	-	50	-	-
USED LAST 24 HR.	-	-	4	-	13	-	22	22	-	14
CLOSING INVENTORY	420	40	20	30	201	38	98	53	4	23
COST LAST 24 HR.	-	-	99.00	-	246.48	-	329.50	220.00	-	353.50

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	14	Desilter	14	H. S. Cent.	—
Degasser	14	Shaker	14	Super Cyclone	—
Desander	14	Other	—	—	—

DAILY COST: $1848.48

CUMULATIVE COST: $5573.39

MAGCOBAR ENGINEER: ROBERT SWEET	HOME ADDRESS: 12 LINCOLN RD; PARADISE S.A	PHONE: 3366053
MOBILE UNIT	WAREHOUSE LOCATION	PHONE

PRINTED IN U.S.A.

THIS REPORT IS GOVERNED BY THE TERMS AND CONDITIONS AS SET FORTH ON THE REVERSE SIDE

MAG 39 P (API Form 47-1)

Magcobar DRESSER

MAGCOBAR GROUP
Dresser Industries, Inc.

P. O. BOX 6504
HOUSTON, TEXAS 77265

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

DRILLING MUD REPORT NO.	7
DATE	27 - 3 19 88
DEPTH	813·7m
SPUD DATE	20-3-88
PRESENT ACTIVITY	DST

OPERATOR	CRUSADER RESOURCES N.L.
CONTRACTOR	ATCO
RIG NO.	A7
REPORT FOR	E. F. BATT
REPORT FOR	C. DANN
SECT., TWNSHP., RANGE	GIPPSLAND VALLE[illegible]
WELL NAME AND NO.	MAC ALISTER - 1
FIELD OR BLOCK NO.	PEP 120
CTY., PAR. OR OFFSHORE AREA	SEASPRAY
STATE / PROVINCE	VIC

DRILLING ASSEMBLY

BIT SIZE	TYPE	JET SIZE
8½	X3A	3x11

DRILL PIPE SIZE	TYPE	LENGTH
4½		572m

DRILL COLLAR SIZE	LENGTH
6¼ x 8¼	241m

CASING

SURFACE SET @	21m FT.
INTERMEDIATE SET @	182m FT.
INTERMEDIATE SET @	FT.
PRODUCTION OR LINER SET @	FT.

MUD VOLUME (BBL)

HOLE	160
PITS	240
TOTAL CIRCULATING VOL.	400
IN STORAGE	100
WEIGHT	9.1
MUD TYPE	SALT / GEL

CIRCULATION DATA

PUMP SIZE	14 X 5.5 / 16 5.5 IN.
ANNULAR VEL. (FT/MIN)	DP 54 DC 79
PUMP MAKE, MODEL	C.E 837D 0500
ASSUMED EFF.	70 %
CIRCULATION PRESSURE (PSI)	
BBL/STK	.114
STK/MIN	49
BOTTOMS UP (MIN)	22
BBL/MIN	5.6
GAL/MIN	234
TOTAL CIRC. TIME (MIN)	27

MUD PROPERTIES

	☐ F.L. ☑ PIT	☐ F.L. ☑ PIT
SAMPLE FROM		
TIME SAMPLE TAKEN	17:00	05:00
DEPTH (ft)	813m	813.7m
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	9.5	9.0
FUNNEL VISCOSITY (sec./qt.) API @ °F	47	53
PLASTIC VISCOSITY cP @ °F	10	15
YIELD POINT (lb/100ft²)	11	17
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	6/15	9/22
FILTRATE API (cm³/30 min.)	11cc	9cc
API HTHP FILTRATE (cm³/30 min.) @ °F	-	-
CAKE THICKNESS (32nd in. API/HTHP)	2/32	2/32
SOLIDS CONTENT (% BY Vol.) ☑ CALCD. ☐ RETORT	4	7
LIQUID CONTENT (% BY Vol.) OIL/WATER	96/	93/
SAND CONTENT (% BY Vol.)	1%	1%
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm³/cm³ mud	-	-
PH ☑ STRIP ☐ METER @ °F	9.5	9.0
ALKALINITY MUD (Pm)	0.8	0.7
ALKALINITY FILTRATE (P_f/M_f)	.1/.5	/
ALTERNATE ALKALINITY FILTRATE (P_1/P_2)	-/-	-/-
CHLORIDE (mg/L)	21,000	12,000
TOTAL HARDNESS AS CALCIUM (mg/L)	200	320

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.3	55	9cc

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER

PRODUCTS	TREATMENT
BARITE	TO INCREASE M[illegible]
CAUSTIC	TO CONTROL pH
D D COMPOUND	[illegible]
MAGCOGEL	—
POLYPAC	[illegible]
POLYSAL	[illegible]
SPERSENE	TO CONTROL VISCOSITY
SALT	[illegible] Cl⁻

REMARKS: HIGH VISCOSITY READINGS OF SURFACE MUD RETURNS BECAME A CONSIDERABLE PROBLEM. THIS WA[S] CONTROLLED BY THE ADDITION OF D-D COMPOUND [illegible] WHICH LOWERED VISCOSITY WITH[illegible] BY 17:00 HRS [illegible] COAL [illegible] THE [illegible] PROVED HAZARDOUS TO MUD [illegible] TO [illegible] TO DST.

PRODUCT INVENTORY

PRODUCT INVENTORY	SODIUM NITRATE	BARITE	CALCIUM CHLORIDE	CAUSTIC	D-D COMPOUND	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SPERSENE
STARTING INVENTORY	4	420	40	20	-	30	201	38	98	53	23
RECEIVED	-	-	-	-	2	-	-	-	-	-	-
USED LAST 24 HR.	-	65	-	5	1	-	-	5	21	25	14
CLOSING INVENTORY	4	355	40	15	1	30	201	33	77	28	9
COST LAST 24 HR.	-	552.00	-	123.75	T.B.A	-	-	451.25	887.25	250.00	353.50

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge		Desilter		H. S. Cent.	
Degasser		Shaker		Super Cyclone	
Desander	-	Other			—

DAILY COST	$2618.25 + $390.00
CUMULATIVE COST	$8191.64

MAGCOBAR ENGINEER	ROBERT SWEET
HOME ADDRESS	12 LINCOLN RD. PARA[illegible]
PHONE	3366553
MOBILE UNIT	
WAREHOUSE LOCATION	
PHONE	

PRINTED IN U.S.A.

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$390.00

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

MAGCOBAR GROUP
Dresser Industries, Inc.

P. O. BOX 6504
HOUSTON, TEXAS 77265

DRILLING MUD REPORT NO. 8

DATE 28-3- 19 88 DEPTH 813.7

SPUD DATE 20-3-88 PRESENT ACTIVITY DST (2)

OPERATOR: CRUSADER RESOURCES N.L	CONTRACTOR: ATCO	RIG NO.: A7
REPORT FOR: L F BATT	REPORT FOR: C. DANN	SECT., TWNSHP., RANGE: GIPPSLAND VALL
WELL NAME AND NO.: MAC ALISTER -1	FIELD OR BLOCK NO.: PEP 120	CTY., PAR., OR OFFSHORE AREA: SEASPRAY
		STATE / PROVINCE: VIC

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE: 8½	TYPE: HTC x3A	JET SIZE: 3x11	SURFACE SET @: 21m RT	HOLE: 160	PITS: 240	PUMP SIZE: 14 X 5.5 IN. 16 5.5		ANNULAR VEL. (FT/MIN) DP: 34 DC: 79
DRILL PIPE SIZE: 4½	TYPE: 16.60	LENGTH: 572m	INTERMEDIATE SET @: 187m RT	TOTAL CIRCULATING VOL.: 400		PUMP MAKE, MODEL: CE D375 D500	ASSUMED EFF. %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE: 6½ C	TYPE:	LENGTH: 180m	INTERMEDIATE SET @: FT.	IN STORAGE: 100	WEIGHT: 9.1	BBL/STK: .1264	STK/MIN: 44	BOTTOMS UP (MIN): 22
DRILL COLLAR SIZE: 8½		LENGTH: 2m	PRODUCTION OR LINER SET @: FT.	MUD TYPE: SALT / GEL		BBL/MIN: 5.6	GAL/MIN: 234	TOTAL CIRC. TIME (MIN): 27
HWDP		59m						

MUD PROPERTIES		
SAMPLE FROM	☐ F.L. ☑ PIT	☐ F.L. ☑ PIT
TIME SAMPLE TAKEN	19 00	22 00
DEPTH (ft)	813.7	813.7
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	9.2	9.4
FUNNEL VISCOSITY (sec./qt.) API @ °F	47	54
PLASTIC VISCOSITY cP @ °F	10	9
YIELD POINT (lb/100ft²)	10	9
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	4/18	6/21
FILTRATE API (cm^3 /30 min.)	5cc	7cc
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-	-
CAKE THICKNESS (32nd in. API/HTHP)	1/32	1/32
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT	6	6.5
LIQUID CONTENT (% BY Vol.) OIL/WATER	94 /	93.5/
SAND CONTENT (% BY Vol.)	1%	1%
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	-	-
PH ☑ STRIP ☐ METER @ °F	9.2	10.5
ALKALINITY MUD (Pm)	.6	1.0
ALKALINITY FILTRATE (P_f /M_f)	.1 /.6	.2/.8
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	-/-	-/-
CHLORIDE (mg/L)	12,000	14,000
TOTAL HARDNESS AS CALCIUM (mg/L)	240	280

MUD PROPERTY SPECIFICATIONS		
WEIGHT	VISCOSITY	FILTRATE
9.4	54	7cc

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ DRILLING CONTRACTOR ☐ OPERATOR'S REPRESENTATIVE ☐ OTHER

PRODUCTS	TREATMENT
CAUSTIC	ADDED TO INCREASE pH
SALT	TO INCREASE CHLORIDES.
POLYSAL	TO MAINTAIN RHEOLOGY.
BARITE	TO INCREASE MUD WEIGHT

REMARKS: DST TEST (1) FAILED DUE TO INABILITY TO SEAT PACKER. FURTHER TRIPPING AND CIRCULATION TOOK PLACE FOLLOWED BY FULL MUD CHECK AT 19⁰⁰ HRS CAUSTIC WAS ADDED TO RAISE pH, SALT TO RAISE CHLORIDES, POLYSAL TO MAINTAIN RHEOLOGY AND BARITE TO INCREASE M.W. AND PREPARE SLUGS. MUD IN GOOD SHAPE FOR DST (2) TEST FAILED DUE TO PACKER NOT SETTING.

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	D-D COMPOUND	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SPEARHEAD SODIUM NITRATE
STARTING INVENTORY	355	40	15	1	30	201	33	77	28	9	4
RECEIVED	-	-	-	-	-	-	-	-	-	-	-
USED LAST 24 HR.	45	-	4	-	-	-	-	6	12	-	-
CLOSING INVENTORY	310	40	11	1	30	201	33	71	16	9	4
COST LAST 24 HR.	382.50	-	99.00	-	-	-	-	253.50	120.00	-	-

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	4	Desilter	4	H. S. Cent.	-
Degasser	4	Shaker	4	Super Cyclone	-
Desander	4	Other	-	----	-

DAILY COST: $855.00

CUMULATIVE COST: $9046.64

MAGCOBAR ENGINEER | HOME ADDRESS | PHONE

MOBILE UNIT | WAREHOUSE LOCATION | PHONE

PRINTED IN U.S.A.

THIS REPORT IS GOVERNED BY THE TERMS AND CONDITIONS AS SET FORTH ON THE REVERSE SIDE

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT — DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

MAGCOBAR GROUP
Dresser Industries, Inc.

P. O. BOX 6504
HOUSTON, TEXAS 77265

DRILLING MUD REPORT NO. 9
DATE 29-3-19 88 DEPTH 1048.5
SPUD DATE 20-3-88 PRESENT ACTIVITY

OPERATOR CRUSADER RESOURCES N.L. | CONTRACTOR ATCO | RIG NO. A7
REPORT FOR E.F BATT | REPORT FOR C. DANN | SECT., TWNSHP., RANGE GIPPSLAND VALL
WELL NAME AND NO. MAC ALISTER -1 | FIELD OR BLOCK NO. PEP-120 | CTY., PAR. OR OFFSHORE AREA SEASPRAY | STATE / PROVINCE VIC

DRILLING ASSEMBLY

BIT SIZE	TYPE	JET SIZE
8½	HTC X3A	3x11

DRILL PIPE SIZE	TYPE	LENGTH
DRILL PIPE SIZE	TYPE	LENGTH
DRILL COLLAR SIZE	LENGTH	

CASING

SURFACE 13⅜ SET @ 21m Est.
INTERMEDIATE 9⅝ SET @ 182m Est.
INTERMEDIATE SET @ FT.
PRODUCTION OR LINER SET @ FT.

MUD VOLUME (BBL)

HOLE	PITS
TOTAL CIRCULATING VOL.	
IN STORAGE -	WEIGHT -
MUD TYPE SALT / GEL	

CIRCULATION DATA

PUMP SIZE 14 X 5.5 IN. 16 5.5
PUMP MAKE, MODEL C-E D 375 D 500
ASSUMED EFF. 90 %
BBL/STK .1264
STK/MIN 46
BBL/MIN 5.8
GAL/MIN 244
ANNULAR VEL. (FT/MIN) DP ---- DC 141
CIRCULATION PRESSURE (PSI)
BOTTOMS UP (MIN) 28
TOTAL CIRC. TIME (MIN) 34

MUD PROPERTIES

SAMPLE FROM	☐ F.L. ☑ PIT	☐ F.L. ☑ PIT
TIME SAMPLE TAKEN	1500	2000
DEPTH (ft)	861	953m
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	9.3	9.4
FUNNEL VISCOSITY (sec./qt.) API @ °F	43	44
PLASTIC VISCOSITY cP @ °F	12	15
YIELD POINT (lb/100ft²)	10	10
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	4/20	10/38
FILTRATE API (cm^3 /30 min.)	5cc	5cc
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-	-
CAKE THICKNESS (32nd in. API/HTHP)	1/32	1/32
SOLIDS CONTENT (% BY Vol.) ☑ CALCD. ☐ RETORT	6.5	6.5
LIQUID CONTENT (% BY Vol.) OIL/WATER	93.5/	93.5/
SAND CONTENT (% BY Vol.)	1%	1%
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	-	-
PH ☑ STRIP ☐ METER @ °F	10.0	10.0
ALKALINITY MUD (Pm)	0.7	1.0
ALKALINITY FILTRATE (P_f /M_f)	0.3/0.7	0.4/0.8
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	-/-	-/-
CHLORIDE (mg/L)	14,000	14,000
TOTAL HARDNESS AS CALCIUM (mg/L)	160	60

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.4	44	5cc

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ DRILLING CONTRACTOR ☐ OPERATOR'S REPRESENTATIVE ☐ OTHER

PRODUCTS	TREATMENT
BARITE	ADDED TO PREMIX & FOR SLUG
MAGCOGEL	TO MAKE UP PREMIX
CAUSTIC	TO MAINTAIN pH
SALT	TO MAINTAIN CHLORIDES LEV

REMARKS: MUD IS NOW SHOWING FAVOURABLE SIGNS OF STABILIZATI WHILST DRILLING THROUGH SEVERAL SMALL LIGNITE BEDS CAUSTIC HAD TO BE ADDED TO MAINTAIN P AGAINST THE ACIDIC REACTION FRO THE COALS. PREMIX GEL WAS WEIGH UP WITH BARITE TO 9.4 lb/g AND ADDED TO SYSTEM TO MAINTAIN VOLUME GEL STRENGTHS.

PRODUCT INVENTORY

	BARITE	CALCIUM CHLORIDE	CAUSTIC	D-D COMPOUND	LIME	POLYPAC	POLYSAL	SALT	SPERSENE	MAGCOGEL	SODIUM NITRATE
STARTING INVENTORY	310	40	11	1	30	33	71	16	9	201	4
RECEIVED	-	-	-	-	-	-	-	-	-	-	-
USED LAST 24 HR.	49	-	6	-	-	-	-	6	-	27	-
CLOSING INVENTORY	261	40	5	1	30	33	71	10	9	174	4
COST LAST 24 HR.	416.50	-	146.50	-	-	-	-	60.00	-	311.32	-

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge		Desilter		H. S. Cent.	
Degasser		Shaker		Super Cyclone	
Desander		Other		—	

DAILY COST $1,136.92
CUMULATIVE COST $10,183.56

MAGCOBAR ENGINEER ROBERT SWEET | HOME ADDRESS 12 LINCOLN RD, PARADISE SA | PHONE 3366053
MOBILE UNIT | WAREHOUSE LOCATION | PHONE

PRINTED IN U.S.A.

THIS REPORT IS GOVERNED BY THE TERMS AND CONDITIONS AS SET FORTH ON THE REVERSE SIDE

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

P. O. BOX 6504
HOUSTON, TEXAS 77265

MAGCOBAR GROUP
Dresser Industries, Inc.

DRILLING MUD REPORT NO. (10) 10

DATE 30-3- 1988 DEPTH 1233

SPUD DATE 20-3-88 PRESENT ACTIVITY 1

OPERATOR: CRUSADER RESOURCES N.L.

CONTRACTOR: ATCO RIG NO. A7

REPORT FOR: E.F. BATT

REPORT FOR: C. DANN

SECT., TWNSHP., RANGE: GIPPSLAND VALLE

WELL NAME AND NO.: MAC ALISTER - 1

FIELD OR BLOCK NO.: PEP 120

CTY., PAR. OR OFFSHORE AREA: SEASPRAY

STATE / PROVINCE: VIC

DRILLING ASSEMBLY

BIT SIZE	TYPE	JET SIZE
8½	VAREL 4-37	3x11

DRILL PIPE SIZE	TYPE	LENGTH
4½	16.60	1005

DRILL PIPE SIZE	TYPE	LENGTH

DRILL COLLAR SIZE: 6½ & 8½ HUDP — LENGTH: 228m

CASING

SURFACE SET @ 21m FT.

INTERMEDIATE SET @ 182m FT.

INTERMEDIATE SET @ FT.

PRODUCTION OR LINER SET @ FT.

MUD VOLUME (BBL)

HOLE: 742 PITS: 306

TOTAL CIRCULATING VOL.: 548

IN STORAGE: 105 WEIGHT: 88

MUD TYPE: SALT / GEL

CIRCULATION DATA

PUMP SIZE 14 X 5.5 IN. 16 5.5

PUMP MAKE, MODEL: C-E D375/D500 ASSUMED EFF. 90 %

BBL/STK: .1152 / .12645 STK/MIN 46

5.8 BBL/MIN 244 GAL/MIN

ANNULAR VEL. (FT/MIN) DP 117 DC 197

CIRCULATION PRESSURE (PSI)

BOTTOMS UP (MIN) 25

TOTAL CIRC. TIME (MIN) HOLE: 42m CYCLE: 94m

MUD PROPERTIES

	☐ F.L. ☑ PIT	☐ F.L. ☑ PIT
SAMPLE FROM		
TIME SAMPLE TAKEN	19⁰⁰	06⁰⁰
DEPTH (ft)	1120	1228
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	9.4	in 9.4 / out 9.7
FUNNEL VISCOSITY (sec./qt.) API @ °F	44	48
PLASTIC VISCOSITY cP @ °F	14	13
YIELD POINT (lb/100ft²)	8	10
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	11/55	4/70
FILTRATE API (cm^3 /30 min.)	12cc	11cc
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-	-
CAKE THICKNESS (32nd in. API/HTHP)	1/32	2/32
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT	7	11
LIQUID CONTENT (% BY Vol.) OIL/WATER	93 /	89 /
SAND CONTENT (% BY Vol.)	1%	1.5%
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	-	-
PH ☑ STRIP ☐ METER @ °F	10.0	10.0
ALKALINITY MUD (Pm)	1.2	1.0
ALKALINITY FILTRATE (P_f /M_f)	.3 / 1.4	.6 / 1.3
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	- / -	- / -
CHLORIDE (mg/L)	12000	11,000
TOTAL HARDNESS AS CALCIUM (mg/L)	80	40
RESISTIVITY	.42 / 72°F	.37 / 75°F

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.4 in	48	11cc

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ DRILLING CONTRACTOR ☐ OPERATOR'S REPRESENTATIVE ☐ OTHER

PRODUCTS	TREATMENT
CAUSTIC	FOR MAINTENANCE OF pH
GEL (MAGCOGEL)	FOR MUDMIX, ADDED AS REQUIRED
POLYSAL	TO MAINTAIN RHEOLOGY
BARITE	ADDED IN PREMIX AND SYSTEM FOR M
SALT	TO MAINTAIN CHLORIDES LEVEL

REMARKS: DURING THE 24 HRS TO 7 A.M. 3 x 100 BBL GEL PREMIXES WERE WEIGHTED UP TO 9.4 PPG AND ADDED TO THE ACTIVE MUD SYSTEM TO COMPENSATE FOR DECREASES IN SURFACE VOLUME. POLYSAL WAS ADDED TO THE SYSTEM TO MAINTAIN A FAVOURABLE RHEOLOGY. pH ADJUSTED WITH CAUSTIC AND SALT FOR CHLORIDES

PRODUCT INVENTORY

	BARITE	CALCIUM CHLORIDE	CAUSTIC	D-D COMPOUND	LIME	POLYPAC	POLYSAL	SALT	SPERSENE	MAGCOGEL	SODIUM NITRATE
STARTING INVENTORY	261	40	5	1	30	33	71	10	9	174	4
RECEIVED	-	-	32	-	-	-	-	-	-	-	-
USED LAST 24 HR.	61	-	7	-	-	-	6	10	-	55	-
CLOSING INVENTORY	200	40	30	1	30	33	65	-	9	119	4
COST LAST 24 HR.	$18.50	-	$173.25	-	-	-	$53.50	$100.00		$104.80	-

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	6	Desilter	10	H. S. Cent.	-
Degasser	19	Shaker	24	Super Cyclone	-
Desander	19	Other	-	——	-

DAILY COST: $2,088.05

CUMULATIVE COST: $12,271.61

MAGCOBAR ENGINEER: ROBERT SWEET HOME ADDRESS: 12 LINCOLN RD, PARADISE SA PHONE: 3566053

MOBILE UNIT WAREHOUSE LOCATION PHONE

PRINTED IN U.S.A.

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT — DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

MAGCOBAR GROUP
Dresser Industries, Inc.

P. O. BOX 6504
HOUSTON, TEXAS 77265

DRILLING MUD REPORT NO.	11
DATE	31 - 3 19 88
DEPTH	1338.5
SPUD DATE	20-3-88
PRESENT ACTIVITY	DRILLING AHEAD

OPERATOR	CRUSADER RESOURCES N.L.	CONTRACTOR	ATCO	RIG NO.	A7
REPORT FOR	E.F. BATT	REPORT FOR	C. DANN	SECT., TWNSHP., RANGE	GIPPSLAND VALLE
WELL NAME AND NO.	MAC ALISTER - 1	FIELD OR BLOCK NO.	PEP 120	CTY., PAR. OR OFFSHORE AREA	SEASPRAY
STATE / PROVINCE	VIC				

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 8 1/2	TYPE VAREL 437	JET SIZE 3×11	SURFACE 13 3/8 SET @ 21m FT.	HOLE 254	PITS 306	PUMP SIZE 14 X 5.5 IN. 16 5.5		ANNULAR VEL. (FT/MIN) DP 119 DC 206
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE 9 5/8 SET @ FT.	TOTAL CIRCULATING VOL. 560		PUMP MAKE, MODEL CE D375 D500	ASSUMED EFF 90 %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	IN STORAGE -	WEIGHT -	BBL/STK .1152	STK/MIN 52	BOTTOMS UP (MIN) 32
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER SET @ FT.	MUD TYPE SALT / GEL		BBL/MIN 6	GAL/MIN 252	TOTAL CIRC. TIME (MIN) HOLE 42 SYS 93

MUD PROPERTIES		
SAMPLE FROM	☐ F.L. ☑ PIT	☐ F.L. ☑ PIT
TIME SAMPLE TAKEN	17[30]	06[00]
DEPTH (ft)	1281m	1334
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	9.4+	9.5+
FUNNEL VISCOSITY (sec./qt.) API @ °F	40	48
PLASTIC VISCOSITY cP @ °F	9	11
YIELD POINT (lb/100ft²)	9	10
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	4 / 50	4 / 45
FILTRATE API (cm^3 /30 min.)	11cc	11cc
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-	-
CAKE THICKNESS (32nd in. API/HTHP)	1/32	2/32
SOLIDS CONTENT (% BY Vol.) ☑ CALCD. ☐ RETORT	11	11.5
LIQUID CONTENT (% BY Vol.) OIL/WATER	89 /	88.5 /
SAND CONTENT (% BY Vol.)	1.5	1.5
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	-	-
pH ☑ STRIP ☐ METER @ °F	10.0	10.0
ALKALINITY MUD (Pm)	1.0	1.0
ALKALINITY FILTRATE (P_f /M_f)	.4 / .8	.4 / .8
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	- / -	- / -
CHLORIDE (mg/L)	10,000	12,000
TOTAL HARDNESS AS CALCIUM (mg/L)	40	80
RESISTIVITY	.43 @ 84°F	.37 @ 78°F

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.5+	48	11cc

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER

PRODUCTS	TREATMENT
BARITE	USED IN PREMIX TO MAINTAIN M.W.
CAUSTIC	USED TO MAINTAIN PH
SALT	TO INCREASE
POLYSAL	TO CONTROL WATER LOSS

REMARKS: FURTHER DOWNHOLE LOSSES TO LATROBE COAL MEASURES HAS PROVED COSTLY SINCE FREQUENT ADDITIONS TO THE MUD SYSTEM HAS BEEN REQUIRED OVER THE LAST 550m @ DRILLING. FURTHER TO THIS EQUIPMENT PROBLEMS AT THE SURFACE HAS REINFORCED THIS PROBLEM. HOWEVER DAILY ADDITIONS HAVE BEEN MET AS FREQUENTLY AS REQUIRED.

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	D-D COMPOUND	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SPERSENE	SODIUM NITRATE
STARTING INVENTORY	200	40	30	1	30	119	33	65	-	9	4
RECEIVED	-	-	-	-	-	-	-	-	30	-	-
USED LAST 24 HR.	70	-	4	-	-	-	-	6	9	-	-
CLOSING INVENTORY	130	40	26	1	30	119	33	59	21	9	4
COST LAST 24 HR.	595.00	-	99.00	-	-	-	-	253.50	90.00	-	-

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	12	Desilter	21.5	H. S. Cent.	-
Degasser	21.5	Shaker	21.5	Super Cyclone	-
Desander	9.5	Other	-	——	-

DAILY COST	CUMULATIVE COST
$1037.50	$13309.11

MAGCOBAR ENGINEER ROBERT SWEET	HOME ADDRESS 12 LINCOLN RD, PARADISE S.A.	PHONE 3366053
MOBILE UNIT	WAREHOUSE LOCATION	PHONE

PRINTED IN U.S.A.

THIS REPORT IS GOVERNED BY THE TERMS AND CONDITIONS AS SET FORTH ON THE REVERSE SIDE

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

P. O. BOX 6504
HOUSTON, TEXAS 77265

MAGCOBAR GROUP
Dresser Industries, Inc.

DRILLING MUD REPORT NO. 12

DATE 1-4- 19 88 | DEPTH 1392

SPUD DATE 20-3-88 | PRESENT ACTIVITY DRILLING AHEAD

OPERATOR: CRUSADER RESOURCES N.L.	CONTRACTOR: ATCO	RIG NO.: A7
REPORT FOR: E.F. BATT	REPORT FOR: C. DANN	SECT., TWNSHP., RANGE: GIPPSLAND VALLEY
WELL NAME AND NO.: MAC ALISTER-1	FIELD OR BLOCK NO.: PEP 120	CTY., PAR. OR OFFSHORE AREA: SEASPRAY
		STATE / PROVINCE: VIC

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE: 8½	TYPE: HTC 504	JET SIZE: 3x11	SURFACE: 13⅜ SET @ 21m FT.	HOLE: 264	PITS: 306	PUMP SIZE: 14 X 5.5 IN. 16 5.5		ANNULAR VEL. (FT/MIN) DP 419 DC 206
DRILL PIPE SIZE: 4½	TYPE: 16.60	LENGTH: 1160m	INTERMEDIATE: 9⅝ SET @ 182m FT.	TOTAL CIRCULATING VOL.: 570		PUMP MAKE, MODEL: C-E D500	ASSUMED EFF.: 90 %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	IN STORAGE: -	WEIGHT: -	BBL/STK: .1152/.1264	STK/MIN: 52	BOTTOMS UP (MIN): 34
DRILL COLLAR SIZE: 6½ & 6¼ HWDP		LENGTH: 228m	PRODUCTION OR LINER SET @ FT.	MUD TYPE: SALT/GEL		BBL/MIN: 6	GAL/MIN: 252	TOTAL CIRC. TIME (MIN): +4

MUD PROPERTIES			MUD PROPERTY SPECIFICATIONS		
SAMPLE FROM	☐ F.L. ☑ PIT	☐ F.L. ☐ PIT	WEIGHT	VISCOSITY	FILTRATE
TIME SAMPLE TAKEN	1900	0600	9.7	49	11 cc
DEPTH (ft)	1352m	1388m	BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER		
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	OUT 9.6	OUT 9.7			
FUNNEL VISCOSITY (sec./qt.) API @ °F	49	49	PRODUCTS	TREATMENT	
PLASTIC VISCOSITY cP @ °F	15	12	BARITE	USED IN PREMIX FOR WEIGHT & SLU	
YIELD POINT (lb/100ft²)	11	12	CAUSTIC	TO MAINTAIN pH.	
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	4/49	4/45	POLYPAC	TO INCREASE YP.	
FILTRATE API (cm^3 /30 min.)	11	11	POLYSAL	TO IMPROVE RHEOLOGY.	
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-	-	SALT	TO MAINTAIN CHLORIDES	
CAKE THICKNESS (32nd in. API/HTHP)	2/32	2/32			
SOLIDS CONTENT (% BY Vol.) ☑ CALCD. ☐ RETORT	11	12			
LIQUID CONTENT (% BY Vol.) OIL/WATER	89 /	88 /			
SAND CONTENT (% BY Vol.)	1%	2%			
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	-	-			
PH ☑ STRIP ☐ METER @ °F	10.0	10.0			
ALKALINITY MUD (Pm)	1.0	1.1			
ALKALINITY FILTRATE (P_f /M_f)	0.5/1.0	.4/0.9			
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	-/-	-/-			
CHLORIDE (mg/L)	10,000	10 000			
TOTAL HARDNESS AS CALCIUM (mg/L)	80	80			
Resistivity	.40@76°F	.43@78°F			

REMARKS: DESANDER COULD NOT RUN AS WE ARE WAITING ON SPARE PART TO REPAIR SAME. DESILTER RUN AT INTERMITENT INTERVALS AS SOME OF ITS CONES CAUSE LARGE VOLUME LOSSES. POLYPAC ADDED TO INCREASE YIELD POINT. CENTRIFUGE WILL BE RUN CONTINUOUSLY TO SUBSTITUTE FOR DESANDER AND DESILTER.

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	D-D COMPOUND	LIME	MAGCOBER	POLYPAC	POLYSAL	SALT	SEALENT	SODIUM NITRATE
STARTING INVENTORY	130	40	26	1	30	119	33	59	21	9	4
RECEIVED	-	-	-	-	-	-	-	-	-	-	-
USED LAST 24 HR.	70	-	2	-	-	-	2	1	5	-	-
CLOSING INVENTORY	60	40	24	1	30	119	31	58	16	9	4
COST LAST 24 HR.	$35.00	-	49.50	-	-	-	180.50	42.25	50.00	-	-

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	10	Desilter	5.0	H. S. Cent.	-
Degasser	16.5	Shaker	16.5	Super Cyclone	-
Desander	-	Other	-	—	-

DAILY COST: $917.25

CUMULATIVE COST: $14226.36

MAGCOBAR ENGINEER	HOME ADDRESS	PHONE
ROBERT SWEET	12 LINCOLN RD; PARADISE, S.A.	336053
MOBILE UNIT	WAREHOUSE LOCATION	PHONE

PRINTED IN U.S.A.

MAG 59 P (API Form 47-1)

DRILLING MUD REPORT — DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

P. O. BOX 6504
HOUSTON, TEXAS 77265

MAGCOBAR GROUP
Dresser Industries, Inc.

DRILLING MUD REPORT NO. 13
DATE 2-4- 19 88
T.D. DEPTH 1452m
SPUD DATE 20 3-88
PRESENT ACTIVITY RUNNING LOGS

OPERATOR: CRUSADER RESOURCES N.L.
CONTRACTOR: ATCO
RIG NO.: A7
REPORT FOR: E. F. BATT
REPORT FOR: C DANN
SECT., TWNSHP., RANGE: GIPPSLAND VALLEY
WELL NAME AND NO.: MAC ALISTER -1
FIELD OR BLOCK NO.: PEP - 120
CTY., PAR. OR OFFSHORE AREA: SEASPRAY
STATE / PROVINCE: VIC

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE 8½	TYPE HTC 504	JET SIZE 3x11	SURFACE SET @ 21m 13⅜ FT.	HOLE 276	PITS 306	PUMP SIZE 14 X 5.5 IN. 16 5.5		ANNULAR VEL. (FT/MIN) DP 119 DC 206
DRILL PIPE SIZE 4½	TYPE 16.60	LENGTH 1220m	INTERMEDIATE SET @ 187 9⅝ FT.	TOTAL CIRCULATING VOL. 582		PUMP MAKE, MODEL CE D375	ASSUMED EFF. 90%	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	IN STORAGE -	WEIGHT -	BBL/STK .1152/.12645 D500	STK/MIN 52	BOTTOMS UP (MIN) 36
DRILL COLLAR SIZE 6½ x 8½ x 11WDP		LENGTH 228m	PRODUCTION OR LINER SET @ FT.	MUD TYPE SALT / GEL		BBL/MIN 6	GAL/MIN 252	TOTAL CIRC. TIME (MIN)

MUD PROPERTIES			MUD PROPERTY SPECIFICATIONS		
SAMPLE FROM	☐ F.L. ☑ PIT	☐ F.L. ☐ PIT	WEIGHT	VISCOSITY	FILTRATE
TIME SAMPLE TAKEN	11⁰⁰	16⁰⁰	9.4	48	11cc
DEPTH (ft)	1422m	1452m	BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER		
WEIGHT ☑ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	9.4	9.4			
FUNNEL VISCOSITY (sec./qt.) API @ °F	47	48	PRODUCTS	TREATMENT	
PLASTIC VISCOSITY cP @ °F	9	10	BARITE	TO ADD VOLUME IN PREMIX & SLUG	
YIELD POINT (lb/100ft²)	11	11	MAGGOGEL	FOR GEL SWEEPS	
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	4/45	4/45			
FILTRATE API (cm^3 /30 min.)	11cc	11cc			
API HTHP FILTRATE (cm^3 /30 min.) @ °F	-	-			
CAKE THICKNESS (32nd in. API/HTHP)	2/32	2/32			
SOLIDS CONTENT (% BY Vol.) ☐ CALCD. ☐ RETORT	11.5	11			
LIQUID CONTENT (% BY Vol.) OIL/WATER	88.5/	89/			
SAND CONTENT (% BY Vol.)	1.5%	1.0%			
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	-	-			
PH ☑ STRIP ☐ METER @ °F	10.0	10.0			
ALKALINITY MUD (Pm)	0.8	0.9			
ALKALINITY FILTRATE (P_f /M_f)	0.4 / 1.3	0.4/1.1			
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	- / -	- / -			
CHLORIDE (mg/L)	14,000	12,000			
TOTAL HARDNESS AS CALCIUM (mg/L)	40	40			
RESISTIVITY	.41 @ 81°F	.36 @ 81°F			

REMARKS: RUNNING THE CENTRIFUGE A 3g/min. SUCCESSFULLY AIDED IN REDUCING SOLIDS SUSPENDED IN THE MUD AS WELL AS REDUCING WEIGHT FROM 9.7 (at the close of yesterday) TO 9.4 IN ONLY 4 HOUR REACHED THE STRZELECKI FORMATION AT 1393m AND T.D. WAS CALLED AT 1452m.

PRODUCT INVENTORY	BARITE	CALCIUM CHLORIDE	CAUSTIC	DEFOAMER COMPOUND	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SPERSENE	SODIUM NITRATE
STARTING INVENTORY	60	40	24	1	30	119	31	58	16	9	4
RECEIVED	-	-	-	-	-	-	-	-	-	-	-
USED LAST 24 HR.	56	-	-	-	-	5	-	-	-	-	-
CLOSING INVENTORY	4	40	24	1	30	114	31	58	16	9	4
COST LAST 24 HR.	476⁰⁰	-	-	-	-	94⁵⁰	-	-	-	-	-

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge		Desilter		H. S. Cent.	-
Degasser		Shaker		Super Cyclone	-
Desander	-	Other	-	—	-

DAILY COST: $570 RC
CUMULATIVE COST: $14,797 IC

MAGCOBAR ENGINEER: ROBERT SWEET
HOME ADDRESS: 12 LINCOLN RD; PARADISE S.A.
PHONE: 336053
MOBILE UNIT
WAREHOUSE LOCATION
PHONE

PRINTED IN U.S.A.

THIS REPORT IS GOVERNED BY THE TERMS AND CONDITIONS AS SET FORTH ON THE REVERSE SIDE

MAG 39 P (API Form 47-1)

DRILLING MUD REPORT

DRESSER MAGOBAR REGIONAL OFFICE

Magcobar DRESSER

P. O. BOX 6504
HOUSTON, TEXAS 77265

MAGCOBAR GROUP
Dresser Industries, Inc.

DRILLING MUD REPORT NO.	14
DATE	3 4 . 19 88
DEPTH	1452
SPUD DATE	20 3 88
PRESENT ACTIVITY	RUNNING LOGS

OPERATOR	CONTRACTOR	RIG NO.
CRUSADER RESOURCES N. L.	AICO	A7

REPORT FOR	REPORT FOR	SECT., TWNSHP., RANGE
E. F. BATT	C. DANN	GIPPSLAND VALLEY

WELL NAME AND NO.	FIELD OR BLOCK NO.	CTY., PAR. OR OFFSHORE AREA	STATE / PROVINCE
MAC ALISTER -1	PEP 170	SEASPRAY	VIC

DRILLING ASSEMBLY / CASING / MUD VOLUME (BBL) / CIRCULATION DATA

DRILLING ASSEMBLY			CASING	MUD VOLUME (BBL)		CIRCULATION DATA		
BIT SIZE	TYPE	JET SIZE	SURFACE SET @ FT.	HOLE 276	PITS 306	PUMP SIZE 14 X 5.5 IN. / 11 5.5		ANNULAR VEL. (FT/MIN) DP 119 DC 206
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	TOTAL CIRCULATING VOL. 582		PUMP MAKE, MODEL C-E D500/D375	ASSUMED EFF. 90 %	CIRCULATION PRESSURE (PSI)
DRILL PIPE SIZE	TYPE	LENGTH	INTERMEDIATE SET @ FT.	IN STORAGE	WEIGHT –	BBL/STK .1152/.1264	STK/MIN 52	BOTTOMS UP (MIN) 36
DRILL COLLAR SIZE		LENGTH	PRODUCTION OR LINER SET @ FT.	MUD TYPE SALT / GEL		BBL/MIN 6/6.6	GAL/MIN 252/277	TOTAL CIRC. TIME (MIN) :46 / :47

MUD PROPERTIES

	☐ F.L. ☐ PIT	☐ F.L. ☐ PIT
SAMPLE FROM		
TIME SAMPLE TAKEN	07.00	
DEPTH (ft)	1452 m	
WEIGHT ☐ (ppg) ☐ (lb/cu. ft) ☐ Sp. G	9.4	
FUNNEL VISCOSITY (sec./qt.) API @ °F	48	
PLASTIC VISCOSITY cP @ °F	10	
YIELD POINT (lb/100ft²)	11	
GEL STRENGTH (lb/100ft²) 10 sec./10 min.	4/4C	/
FILTRATE API (cm^3 /30 min.)	11cc	
API HTHP FILTRATE (cm^3 /30 min.) @ °F	–	
CAKE THICKNESS (32nd in. API/HTHP)	2/32	/
SOLIDS CONTENT (% BY Vol.) ☑ CALCD. ☐ RETORT	11	
LIQUID CONTENT (% BY Vol.) OIL/WATER	89 /	/
SAND CONTENT (% BY Vol.)	1	
METHYLENE BLUE CAPACITY ☐ lb/bbl equiv. ☐ cm^3 /cm^3 mud	–	
PH ☑ STRIP ☐ METER @ °F	10.0	
ALKALINITY MUD (Pm)	0.9	
ALKALINITY FILTRATE (P_f /M_f)	0.4 / 1.1	/
ALTERNATE ALKALINITY FILTRATE (P_1 /P_2)	– / –	/
CHLORIDE (mg/L)	17 000	
TOTAL HARDNESS AS CALCIUM (mg/L)	40	
RESISTIVITY	.36 @ 87° F	

MUD PROPERTY SPECIFICATIONS

WEIGHT	VISCOSITY	FILTRATE
9.4	48	11cc

BY AUTHORITY: ☐ OPERATOR'S WRITTEN ☐ OPERATOR'S REPRESENTATIVE ☐ DRILLING CONTRACTOR ☐ OTHER

PRODUCTS	TREATMENT
NO CIRCULATION DURING THE	
24 HRS TO 7.00 3/4.	

REMARKS: CALIPER LOG INDICATES THE HOLE VERY ENLARGED IN PARTS, MAINLY IN COAL SECTION BUT ALSO IN SOME SANDSTONE BEDS. FURTHER DETAILS WILL BE DISCUSSED IN THE WELL REPORT.

SACKED BARITE WAS NOT AVAILABLE FROM LOCAL STOCKS SO 2 x 2 TONNE BULK CONTAINERS WERE SUPPLIED.

PRODUCT INVENTORY

PRODUCT INVENTORY	BARITE BULK / BARITE SX	CALCIUM CHLORIDE	CAUSTIC	D-D COMPOUND	LIME	MAGCOGEL	POLYPAC	POLYSAL	SALT	SPERSENE	SODIUM SULFITE
STARTING INVENTORY –	4	40	23	1	30	120	31	69	10	9	4
RECEIVED 2T	–	–	–	–	–	–	–	–	–	–	–
USED LAST 24 HR. –	–	–	–	–	–	–	–	–	–	–	–
CLOSING INVENTORY 2T	4	40	23	1	30	120	31	69	10	9	4
COST LAST 24 HR. –	–	–	–	–	–	–	–	–	–	–	–

EQUIPMENT

	HOURS		HOURS		HOURS
Centrifuge	–	Desilter	–	H. S. Cent.	–
Degasser	–	Shaker	–	Super Cyclone	–
Desander	–	Other	–	——	–

DAILY COST	CUMULATIVE COST
STOCK TAKE SHOWING OUTSTANDING COST OF D-D COMP. FROM 27/3 CREDIT 54-76	$ 14742-90

MAGCOBAR ENGINEER	HOME ADDRESS	PHONE
ROBERT SWEET	12 LINCOLN RD. PARADISE S.A.	3366053
MOBILE UNIT	WAREHOUSE LOCATION	PHONE

M-I Australia Pty. Ltd.
Magcobar/IMCO A Dresser/Halliburton Company

WELL SUMMARY

WELL HISTORY SHEET

MATERIALS INVENTORY

WELL HISTORY
MAG-464-C

Magcobar
DRILLING FLUID SERVICES

OPERATOR: CRUSADER	SECTION: PEP 120	TOWNSHIP: SEASPRAY	RANGE: GIPPSLAND	MUD TYPE: SALT/GEL	
WELL: MACALISTER #1	FIELD: GIPPSLAND BASIN			SPUD DATE: 20.3.88	
CONTRACTOR: ATCO	COUNTY/PARISH: SEASPRAY			T D DATE: 2.4.88	
ENGINEER: ROBERT SWEET	STATE: VICTORIA			DAYS TO T D: 13	

	SIZE	DEPTH	BIT SIZE	N	RITE	ROTATING HOURS	DEGASSER	DESANDER	DESILTER	CENTRIFUGE	SHAKER SCREENS
CONDUCTOR											
SURFACE	13 3/8	21				0					60/80
INTERMEDIATE	9 5/8	182	12¼	1		10					
LINER(S)		1452	8½	3		107					40/60
PRODUCTION											

DATE	MEASURED DEPTH	T.V.D.	MUD WT.	VIS SEC.	ANGLE AND DIRECTION	FLOW RATE (gpm)	FLOW LINE TEMP. °F °C	PV.	YP.	GELS 0 / 10	PH	API FLUID LOSS	H.T.H.P. FLUID LOSS	P_f	M_f	P_m	SALT OR CHLORIDE ppm mg/l	CALCIUM (ppm)	SOL %	OIL %	BARITE	CaCl2	CAUSTIC	LIME	GEL	POLYPAC	POLYSAL	SALT	NaNO3	SPERSENE	D-D	MUD COST
21.3	89.5		8.6	36		655				/													2	2	50							1008.00
Spud. Drill with water with sweeps.																																
22.3	89.5		8.6	40		655				/														1	10							194.85
Drill ahead. ~~Run 9 5/8 casing. Nipple~~																																
23.3	182		8.7	50		655				/													1	4	10	2						415.85
Drill ahead. Run 9 5/8 casing.																																
24.3	182		8.7	36		655				/	11.5			1.4	1.8	2.7	20000						2	2	105			27				804.00
Nipple up																																
25.3	589		8.8	43		655				/	9.5	20		0.1	0.4	0.7	15000						3	1	51			18		3		1302.21
Drill ahead.																																
26.3	757		9.1	49		655		15	10	6 / 32	9.0	7		0.2	0.6	1.0	14000	240	7	0			4		13		22	22		14		1848.48
Drill ahead.																																
27.3	814		9.1	53		234		15	17	9 / 22	9.0	9		0.1	0.5	0.8	12000	320	7	0		65		5			5	21	25		14	1	3008.25
Drill ahead.																																
28.3	814		9.4	54		234		9	9	6 / 21	10.5	7		0.2	0.8	1.0	13000	280	6.5	0		45		4			6	12				855.00
DST #1. DST #2. Both failed.																																
29.3	1049		9.4	44		244		10	10	10 / 38	10.0	5		0.4	0.8	1.0	14000	60	6.5	0		49		6		27			6			1136.92
Drill ahead.																																
30.3	1233		9.4	48		244		13	10	4 / 70	10.0	11		0.6	1.3	1.0	11000	40	11	0		61		7		54		2	10			1900.09
Drill ahead.																																
31.3	1338		9.5+	48		252		11	10	4 / 45	10.0	11		0.4	0.8	1.0	12000	80	11.5	0		70		4					9			784.00
Drill ahead.																																
1.4	1392		9.7	49		252		12	12	4 / 45	10.0	11		0.4	0.9	1.1	10000	80	12	0		70		2			2		5			875.00
Drill ahead.																																
2.4	1452		9.4	48		252		10	11	4 / 45	10.0	11		0.4	1.1	0.9	12000	40	11	0		56		1					6			560.75
Logging at T.D.																																
3.4	1452		9.4	48		252		10	11	4 / 45	10.0	11		0.4	1.1	0.9	12000	40	11	0												
Complete logging. P & A.																																

APPENDIX 4

APPENDIX 4

TIME ANALYSIS

CRUSADER LIMITED

TIME ANALYSIS: MacAlister #1 20.3.88 - 5.4.88

MARCH, 1988

Opcode + Description	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Month Total	%
PREPARATION																	
**********																	
A 1 Preparation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL PREPARATION:																.	.
MOBILIZATION/MOVING																	
**********																	
B 1 Mobilization	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
B 2 Moving	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
B 3 Rigging up	.	.	.	24.0	16.0	.	.	.	.	.	.	.	.	.	.	40.0	13.9
B 4 Rigging Down	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
B 5 Demobilization	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
B 6 Dismantling	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL MOBILIZATION/MOVING:																40.0	13.9
MAKING HOLE																	
**********																	
C10 Drilling	.	.	.	.	2.5	.	5.0	.	15.0	12.5	4.0	.	13.0	19.0	21.5	92.5	32.1
C11 Adding Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C12 Survey	.	.	.	.	.	.	.	.	1.0	0.5	.	.	0.5	.	.	2.0	0.7
C13 Check Trip	.	.	.	.	.	.	2.0	.	.	1.5	6.0	.	.	.	1.0	10.5	3.6
C20 Trip - Bit Change	.	.	.	.	2.0	.	.	.	.	6.0	2.0	.	4.0	3.0	.	17.0	5.9
C21 Trip - Deviation Op	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C30 Circulation	.	.	.	.	.	5.0	1.0	.	1.5	3.0	8.5	.	1.0	.	0.5	20.5	7.1
C31 Reaming/Washing	.	.	.	.	.	1.5	2.5	.	.	.	2.0	.	.	0.5	.	6.5	2.3
C32 Formation Kick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C33 Lost Circulation	.	.	.	.	1.5	7.5	.	.	.	.	.	.	.	.	.	9.0	3.1
C39 Stuck Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	.	0.5	0.2
C42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	.	0.5	0.2
C43 Wait Time	.	.	.	.	2.0	10.0	.	.	.	.	.	.	.	.	.	12.0	4.2
C44 Miscellaneous	.	.	.	.	.	.	.	.	5.5	0.5	.	.	.	.	.	6.0	2.1
TOTAL MAKING HOLE:																177.0	61.5

Opcode + Description	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Month Total	%
SECURING HOLE																	
**********																	
D10 Drilling cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D11 Adding Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D12 Survey	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D13 Check Trip	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D14 Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D20 Trip - Drilling Cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D22 Trip - Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D25 Trip - Before Casing	.	.	.	.	.	.	1.5	.	.	.	.	.	.	.	.	1.5	0.5
D26 Trip - Bit & Scraper	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D30 Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D31 Reaming/Washing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D32 Formation Kick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D33 Lost Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D39 Stuck Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D43 Wait Time	.	.	.	.	.	.	4.5	6.0	.	.	.	.	.	.	.	10.5	3.6
D44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D55 Run & Cement Casing	.	.	.	.	.	.	7.5	.	1.0	.	.	.	.	.	.	8.5	3.0
D56 Nippling Up BOP	.	.	.	.	.	.	.	16.5	.	.	.	.	.	.	.	16.5	5.7
D57 Standing Cement	.	.	.	.	.	.	.	1.5	.	.	.	.	.	.	.	1.5	0.5
												TOTAL SECURING HOLE:				38.5	13.4
FORMATION EVALUATION																	
**********																	
E10 Coring	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E11 Adding Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E12 Survey	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E13 Check Trip	.	.	.	.	.	.	.	.	.	.	.	3.0	.	.	.	3.0	1.0
E14 Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E20 Trip - Coring	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E22 Trip - Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E23 Trip - Logging	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E24 Trip - Formation Test	.	.	.	.	.	.	.	.	.	.	.	15.5	3.5	.	.	19.0	6.6
E30 Circulation	.	.	.	.	.	.	.	.	.	.	.	3.5	.	.	.	3.5	1.2
E31 Reaming/Washing	.	.	.	.	.	.	.	.	.	.	.	0.5	.	.	.	0.5	0.2
E32 Formation Kick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E33 Lost circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E34 Fmn Strength Test	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E39 Stuck Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	0.5	.	.	.	0.5	0.2
E42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E43 Wait Time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E50 Logging - Open Hole	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E60 Testing Formation	.	.	.	.	.	.	.	.	.	.	.	1.0	.	.	.	1.0	0.3
E65 Circ - Geol/Res Info	.	.	.	.	.	.	.	.	.	.	1.5	.	2.0	0.5	1.0	5.0	1.7
											TOTAL FORMATION EVALUATION:					32.5	11.3

Opcode + Description	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Month Total	%
COMPLETION/SUSPENSION																	
**********																	
F10 Drilling Cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F11 Adding Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F12 Survey	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F13 Check Trip	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F14 Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F20 Trip - Drilling Cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F22 Trip - Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F25 Trip - Before Casing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F26 Trip - Bit & Scraper	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F30 Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F31 Reaming/Washing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F32 Formation Kick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F33 Lost Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F34 Fmn Leak Off Test	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F39 Stuck Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F43 Wait Time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F50 Logging - Completion	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F55 Run & Cement Casing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F56 Nippling Up Wellhead	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F57 Standing Cemented	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F60 Testing & Perforation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F70 Run Tubing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F71 Run Production Pakcer	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F72 Run Wireline	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F73 Pressure Surveys	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F80 Well Stimulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F81 Sand Exclusion	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
											TOTAL COMPLETION/SUSPENSION:					.	.
PLUGBACK/ABANDONMENT																	
**********																	
G40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G43 Waiting	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G90 Abandonment	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G95 Plugback for sidetrack	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
											TOTAL PLUGBACK/ABANDONMENT:					.	.

Opcode + Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Month Total	%	Grand Total	%
PREPARATION																				
********																				
A 1 Preparation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL PREPARATION:																	.	.	.	.
MOBILIZATION/MOVING																				
********************																				
B 1 Mobilization	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
B 2 Moving	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
B 3 Rigging up	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	40.0	9.8
B 4 Rigging Down	.	.	.	.	20.0	.	.	.	.	.	.	.	.	.	.	.	20.0	16.7	20.0	4.9
B 5 Demobilization	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
B 6 Dismantling	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL MOBILIZATION/MOVING:																	20.0	16.7	60.0	14.7
MAKING HOLE																				
**********																				
C10 Drilling	16.5	9.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	26.0	21.7	118.5	29.0
C11 Adding Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C12 Survey	.	0.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	0.4	2.5	0.6
C13 Check Trip	.	4.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	4.5	3.8	15.0	3.7
C20 Trip - Bit Change	5.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5.5	4.6	22.5	5.5
C21 Trip - Deviation Op	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C30 Circulation	0.5	1.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2.0	1.7	22.5	5.5
C31 Reaming/Washing	0.5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	0.4	7.0	1.7
C32 Formation Kick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C33 Lost Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	9.0	2.2
C39 Stuck Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
C41 Rig Service	1.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0	0.8	1.5	0.4
C42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	0.1
C43 Wait Time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	12.0	2.9
C44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	6.0	1.5
TOTAL MAKING HOLE:																	40.0	33.3	217.0	53.2

Opcode + Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Month Total	%	Grand Total	%
SECURING HOLE																				
**********																				
D10 Drilling cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D11 Adding Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D12 Survey	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D13 Check Trip	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D14 Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D20 Trip - Drilling Cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D22 Trip - Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D25 Trip - Before Casing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.5	0.4
D26 Trip - Bit & Scraper	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D30 Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D31 Reaming/Washing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D32 Formation Kick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D33 Lost Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D39 Stuck Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D43 Wait Time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	10.5	2.6
D44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
D55 Run & Cement Casing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	8.5	2.1
D56 Nippling Up BOP	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	16.5	4.0
D57 Standing Cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.5	0.4
												TOTAL SECURING HOLE:					.	.	38.5	9.4
FORMATION EVALUATION																				
**********																				
E10 Coring	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E11 Adding Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E12 Survey	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E13 Check Trip	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3.0	0.7
E14 Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E20 Trip - Coring	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E22 Trip - Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E23 Trip - Logging	.	5.0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5.0	4.2	5.0	1.2
E24 Trip - Formation Test	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	19.0	4.7
E30 Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3.5	0.9
E31 Reaming/Washing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	0.1
E32 Formation Kick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E33 Lost circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E34 Fan Strength Test	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E39 Stuck Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	0.5	0.1
E42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E43 Wait Time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
E50 Logging - Open Hole	.	3.0	24.0	7.5	.	.	.	.	.	.	.	.	.	.	.	.	34.5	28.8	34.5	8.5
E60 Testing Formation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1.0	0.2
E65 Circ - Geol/Res Info	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	5.0	1.2
												TOTAL FORMATION EVALUATION:					39.5	32.9	72.0	17.6

APRIL, 1988

Jpcode + Description	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Month Total	%	Grand Total	%
COMPLETION/SUSPENSION																				
**********																				
F10 Drilling Cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F11 Adding Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F12 Survey	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F13 Check Trip	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F14 Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F20 Trip - Drilling Cement	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F22 Trip - Reaming	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F25 Trip - Before Casing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F26 Trip - Bit & Scraper	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F30 Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F31 Reaming/Washing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F32 Formation Kick	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F33 Lost Circulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F34 Fmn Leak Off Test	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F39 Stuck Pipe	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F43 Wait Time	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F50 Logging - Completion	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F55 Run & Cement Casing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F56 Nippling Up Wellhead	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F57 Standing Cemented	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F[illegible] Testing & Perforation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
[illegible] Run Tubing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F71 Run Production Pakcer	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F72 Run Wireline	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F73 Pressure Surveys	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F80 Well Stimulation	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
F81 Sand Exclusion	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL COMPLETION/SUSPENSION:																	.	.	.	.
PLUGBACK/ABANDONMENT																				
**********																				
G40 Fishing	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G41 Rig Service	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G42 Repairs	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G43 Waiting	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G44 Miscellaneous	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
G90 Abandonment	.	.	.	16.5	4.0	.	.	.	.	.	.	.	.	.	.	.	20.5	17.1	20.5	5.0
G95 Plugback for sidetrack	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TOTAL PLUGBACK/ABANDONMENT:																	20.5	17.1	20.5	5.0

APPENDIX 5

APPENDIX 5

DRILL STEM TEST REPORTS

HALLIBURTON SERVICES

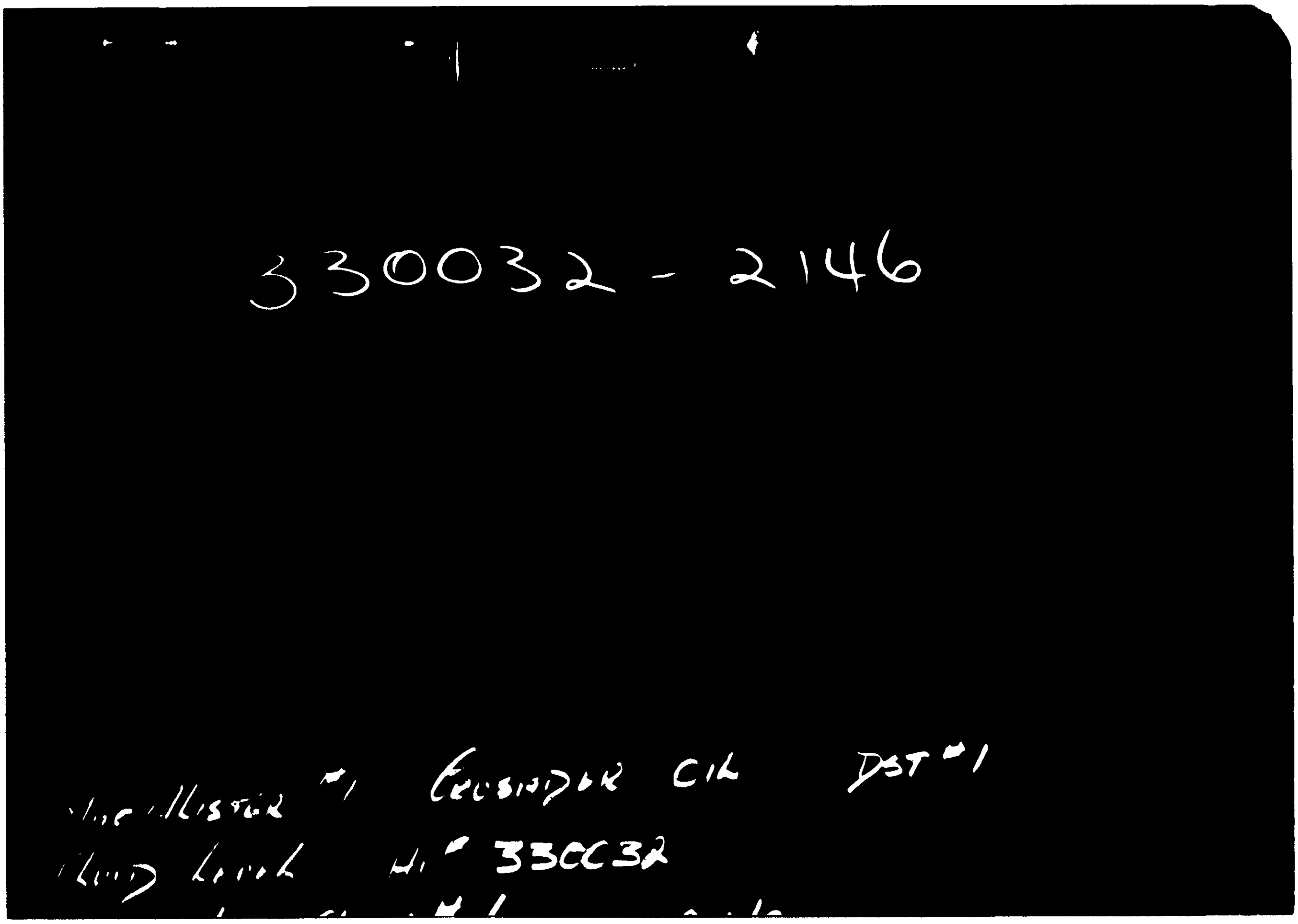
TICKET NO. 33003200

25-MAY-88

ROMA

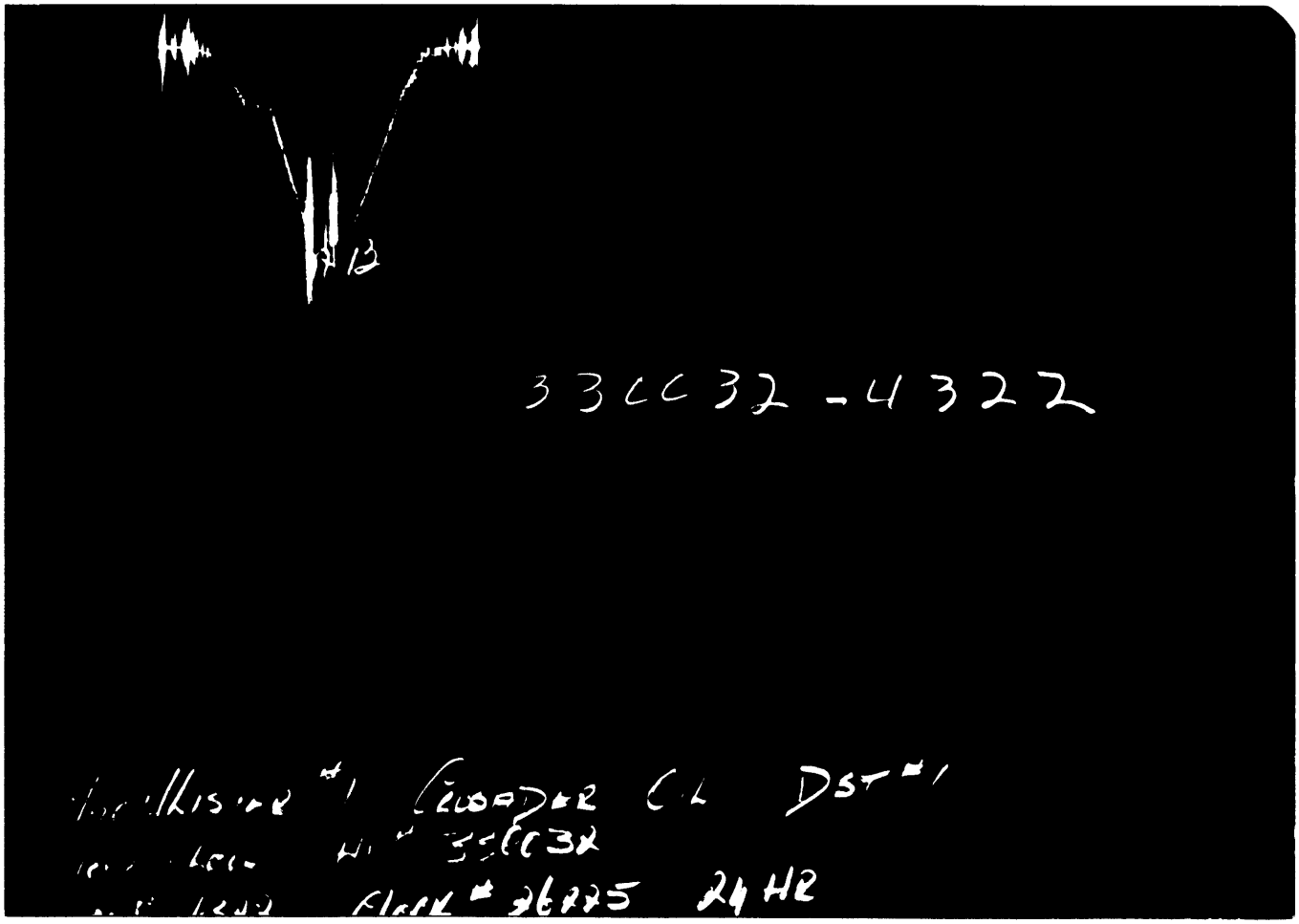
FORMATION TESTING SERVICE REPORT

LEGAL LOCATION SEC. - TWP. - RNG.	FIELD AREA	COUNTY VICTORIA	STATE AUSTRALIA DR	LEASE OWNER/COMPANY NAME CRUSADER OIL NL	
LEASE NAME MAC ALISTER	WELL NO. 1	TEST NO. 1	TESTED INTERVAL 2588.4 - 2671.0		



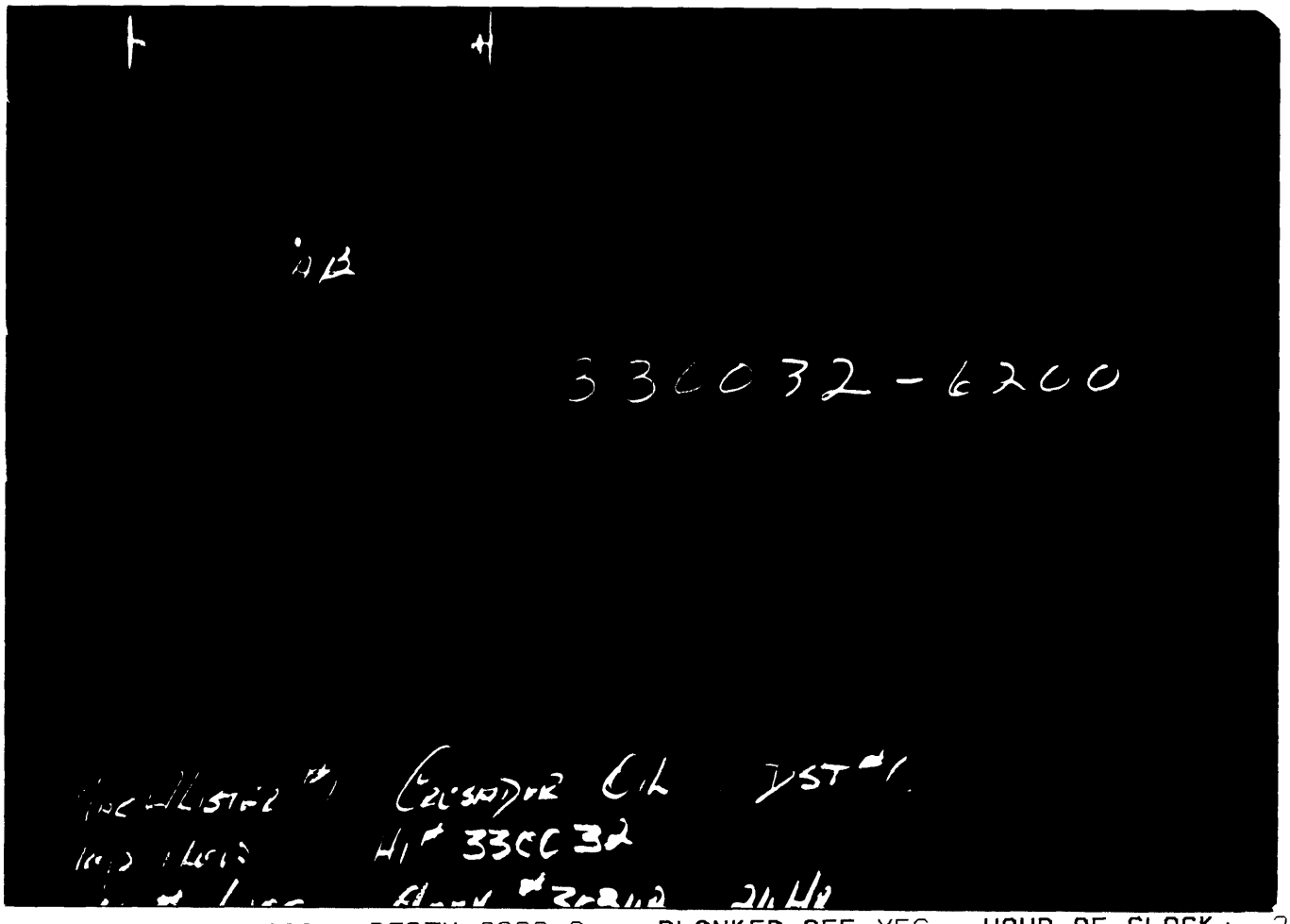
GAUGE NO : 2146 DEPTH : 2545.0 BLANKED OFF : NO HOUR OF CLOCK : 12

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC					
B	FINAL HYDROSTATIC					



GAUGE NO: 4322 DEPTH: 2565.3 BLANKED OFF: NO HOUR OF CLOCK: 24

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1197	1216.4			
B	FINAL HYDROSTATIC	1197	1216.4			



GAUGE NO: 6200 DEPTH: 2666.9 BLANKED OFF: YES HOUR OF CLOCK: 24

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1311	1313.4			
B	FINAL HYDROSTATIC	1311	1313.4			

EQUIPMENT & HOLE DATA

FORMATION TESTED: _____
NET PAY (ft): _____
GROSS TESTED FOOTAGE: 82.6
ALL DEPTHS MEASURED FROM: KELLY BUSHING
CASING PERFS. (ft): _____
HOLE OR CASING SIZE (in): 8.500
ELEVATION (ft): _____
TOTAL DEPTH (ft): 2671.0
PACKER DEPTH(S) (ft): 2581, 2588
FINAL SURFACE CHOKE (in): _____
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): _____
MUD VISCOSITY (sec): _____
ESTIMATED HOLE TEMP. (°F): 100
ACTUAL HOLE TEMP. (°F): ____ @ _____ ft

TICKET NUMBER: 33003200

DATE: 3-27-88 TEST NO: 1

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: ROMA

TESTER: A. HADWEN

WITNESS: _____

DRILLING CONTRACTOR: ATCO RIG #7

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
	@ °F	ppm
	@ °F	ppm
	@ °F	ppm
	@ °F	ppm
	@ °F	ppm
	@ °F	ppm

SAMPLER DATA

Psig AT SURFACE: _____
cu.ft. OF GAS: _____
cc OF OIL: _____
cc OF WATER: _____
cc OF MUD: _____
TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): _____ @ ____ °F
GAS/OIL RATIO (cu.ft. per bbl): _____
GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT

RECOVERED:

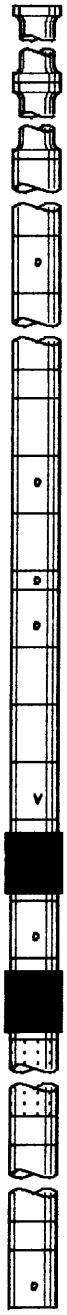
MEASURED FROM TESTER VALVE

REMARKS:

LOST PACKER SEAT WHEN TOOL OPEN.

TYPE & SIZE MEASURING DEVICE:					TICKET NO: 33003200
TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
3-27-88					
0815					MADE UP TOOLS AND WENT IN HOLE
1200					MADE UP HEAD
1210					MADE UP SURFACE EQUIPMENT
1213					PUT WEIGHT ON TOOL
1218					OPENED TOOL, LOST ANNULUS
					CLOSED TOOL
1224					OPENED TOOL
1225					LOST ANNULUS, CLOSED TOOL AND
					PULLED OUT OF HOLE

TICKET NO. 33003200



		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE	4.500	3.826		
4	FLEX WEIGHT	4.500	2.764	182.3	
3	DRILL COLLARS	6.250	2.813	497.7	
50	IMPACT REVERSING SUB	6.000	3.000	1.0	2511.9
3	DRILL COLLARS	6.250	2.813	31.1	
258	BAR CATCHER SUB	5.750	2.000	1.0	
80	AP RUNNING CASE	5.000	2.250	4.1	2545.0
12	DUAL CIP VALVE	5.000	0.870	4.9	
202	SAMPLE CHAMBER	5.000	2.370	5.0	
33	DRAIN VALVE	5.250	2.800	1.0	
61	INDEXING HYDROSPRING TESTER	5.000	0.750	5.3	
80	AP RUNNING CASE	5.000	2.250	4.1	2565.3
15	JAR	5.000	1.750	5.0	
16	VR SAFETY JOINT	5.000	1.000	2.8	
70	OPEN HOLE PACKER	7.750	1.680	5.9	2580.6
18	DISTRIBUTOR VALVE	5.000	1.680	2.0	
70	OPEN HOLE PACKER	7.750	1.680	5.8	2588.4
20	FLUSH JOINT ANCHOR	5.000	2.370	43.0	
5	CROSSOVER	5.250	2.400	1.0	
3	DRILL COLLARS	6.250	2.813	31.1	
5	CROSSOVER	5.750	2.400	1.0	
81	BLANKED-OFF RUNNING CASE	5.000		4.1	2666.9
	TOTAL DEPTH				2671.0

EQUIPMENT DATA

HALLIBURTON SERVICES

TICKET NO. 33003300

26-MAY-88

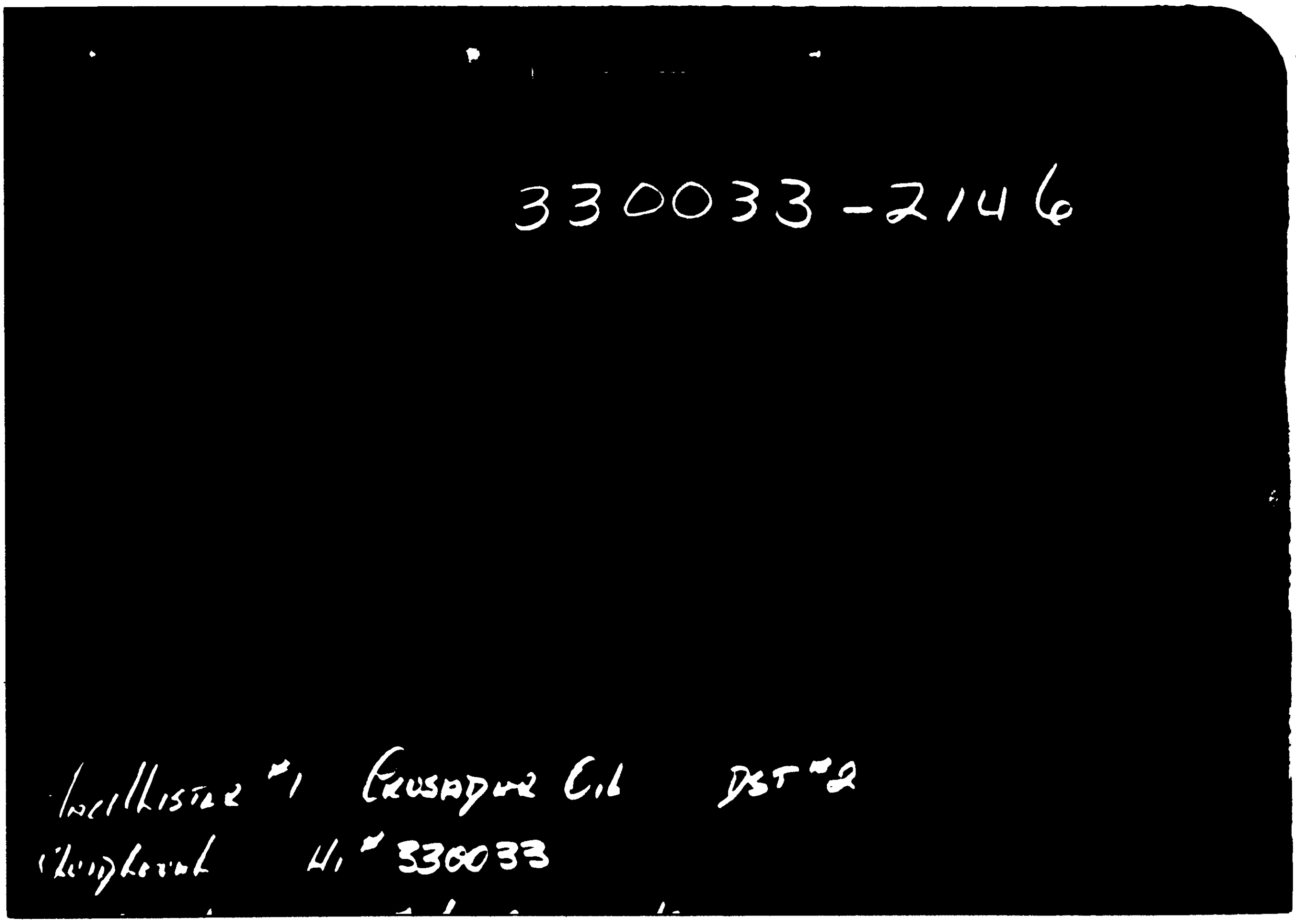
ROMA

FORMATION TESTING SERVICE REPORT

MAC ALISTER	1	2	2510.1 - 2671.0
LEASE NAME	WELL NO.	TEST NO.	TESTED INTERVAL

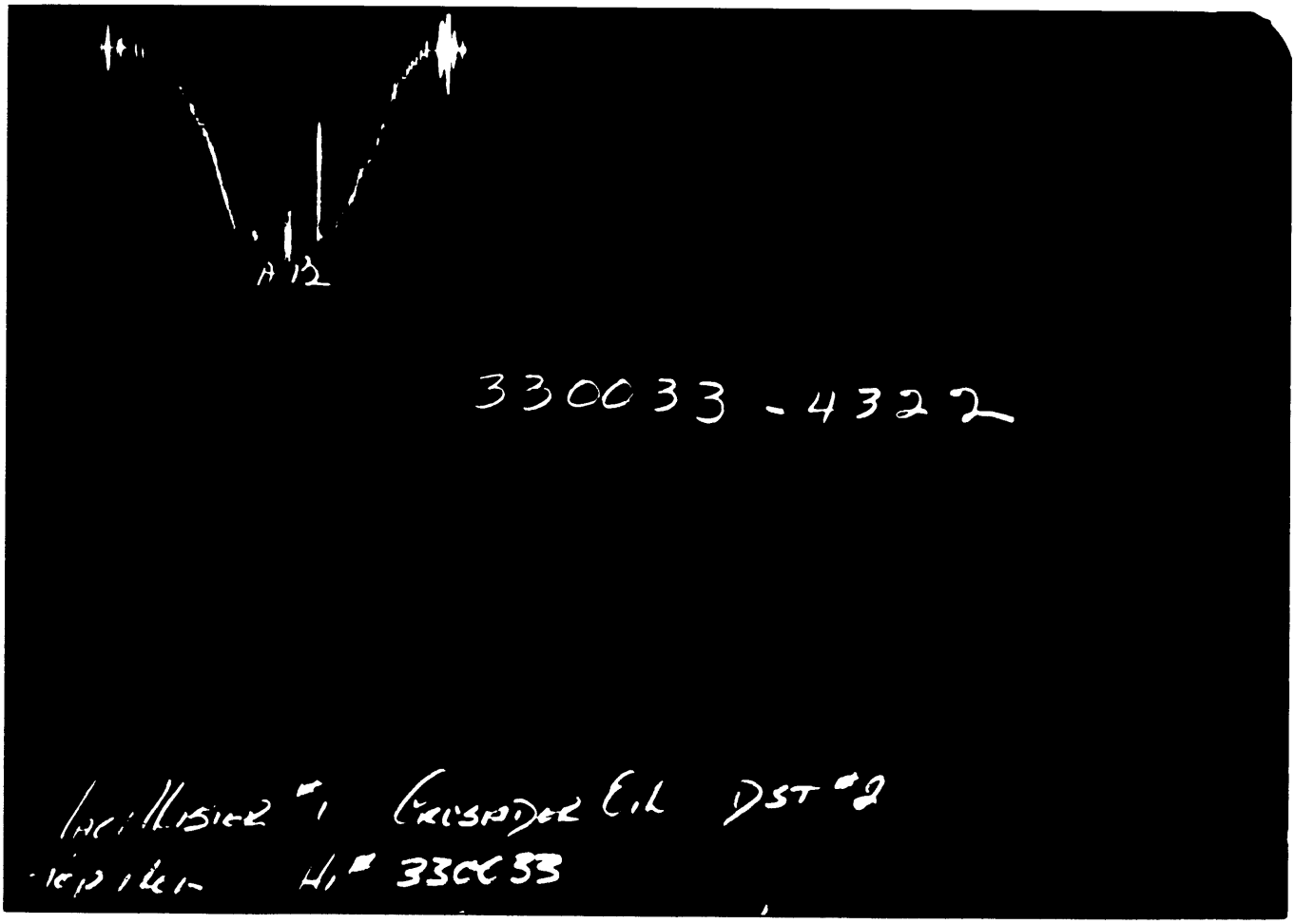
LEGAL LOCATION SEC. - TWP. - RNG.	FIELD AREA	COUNTY VICTORIA	STATE AUSTRALIA DR

CRUSADER OIL NL
LEASE OWNER/COMPANY NAME



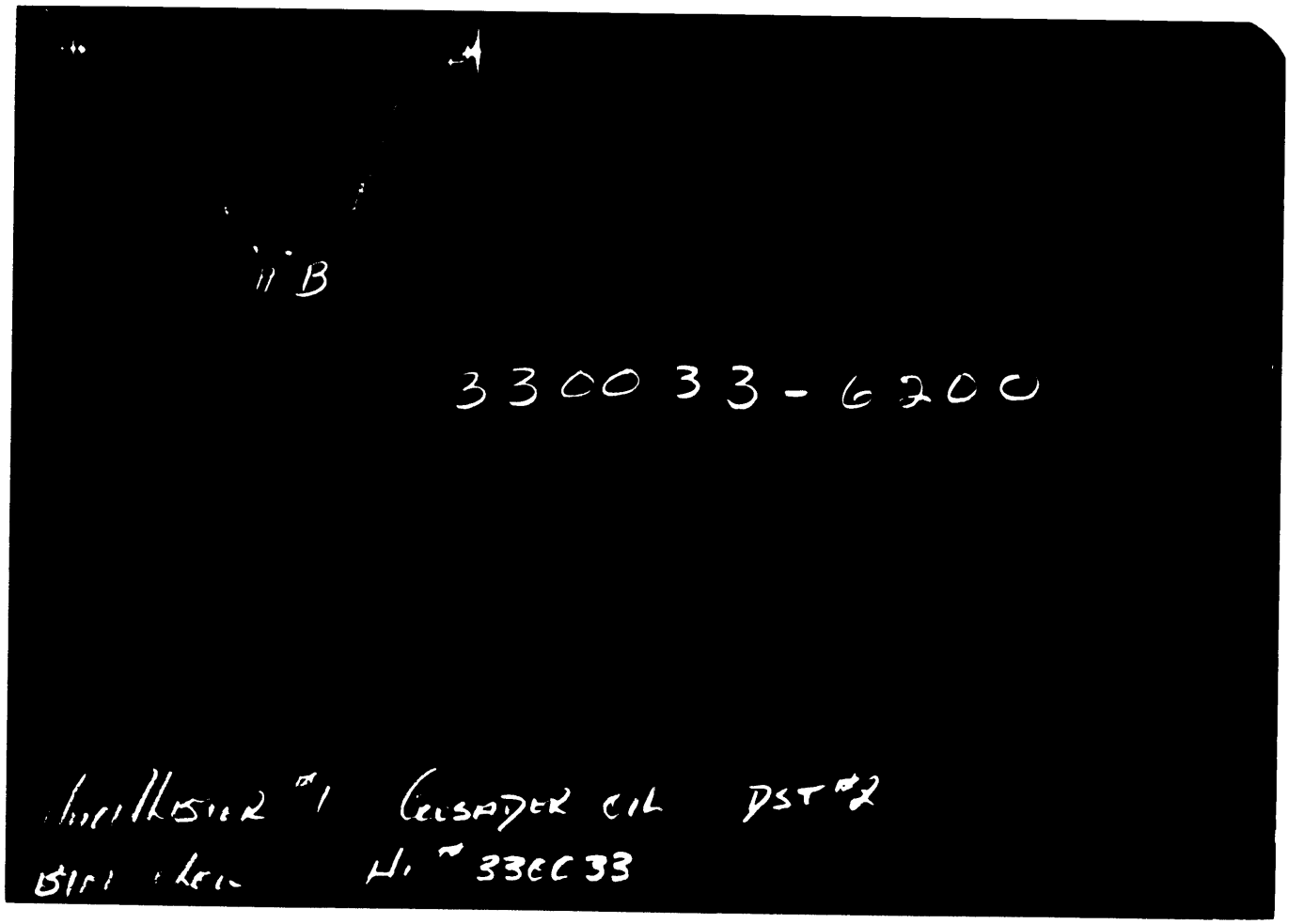
GAUGE NO : 2146 DEPTH : 2468.9 BLANKED OFF : NO HOUR OF CLOCK : 12

ID	DESCRIPTION	PRESSURE REPORTED	PRESSURE CALCULATED	TIME REPORTED	TIME CALCULATED	TYPE
A	INITIAL HYDROSTATIC					
B	FINAL HYDROSTATIC					



GAUGE NO: 4322 DEPTH: 2489.0 BLANKED OFF: NO HOUR OF CLOCK: 24

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1197	1205.8			
B	FINAL HYDROSTATIC	1197	1205.8			



GAUGE NO: 6200 DEPTH: 2666.9 BLANKED OFF: YES HOUR OF CLOCK: 24

ID	DESCRIPTION	PRESSURE		TIME		TYPE
		REPORTED	CALCULATED	REPORTED	CALCULATED	
A	INITIAL HYDROSTATIC	1311	1310.4			
B	FINAL HYDROSTATIC	1311	1310.4			

EQUIPMENT & HOLE DATA

FORMATION TESTED: _____
NET PAY (ft): _____
GROSS TESTED FOOTAGE: 160.9
ALL DEPTHS MEASURED FROM: KELLY BUSHING
CASING PERFS. (ft): _____
HOLE OR CASING SIZE (in): 8.500
ELEVATION (ft): _____
TOTAL DEPTH (ft): 2671.0
PACKER DEPTH(S) (ft): 2504, 2510
FINAL SURFACE CHOKE (in): _____
BOTTOM HOLE CHOKE (in): 0.750
MUD WEIGHT (lb/gal): _____
MUD VISCOSITY (sec): _____
ESTIMATED HOLE TEMP. (°F): 100
ACTUAL HOLE TEMP. (°F): ____ @ _____ ft

TICKET NUMBER: 33003300

DATE: 3-28-88 TEST NO: 2

TYPE DST: OPEN HOLE

HALLIBURTON CAMP: ROMA

TESTER: A. HADWEN

WITNESS: _____

DRILLING CONTRACTOR: ATCO RIG #7

FLUID PROPERTIES FOR RECOVERED MUD & WATER

SOURCE	RESISTIVITY	CHLORIDES
	@ °F	ppm
	@ °F	ppm
	@ °F	ppm
	@ °F	ppm
	@ °F	ppm
	@ °F	ppm

SAMPLER DATA

Psig AT SURFACE: _____
cu.ft. OF GAS: _____
cc OF OIL: _____
cc OF WATER: _____
cc OF MUD: _____
TOTAL LIQUID cc: _____

HYDROCARBON PROPERTIES

OIL GRAVITY (°API): _____ @ ____ °F
GAS/OIL RATIO (cu.ft. per bbl): _____
GAS GRAVITY: _____

CUSHION DATA

TYPE	AMOUNT	WEIGHT

RECOVERED:

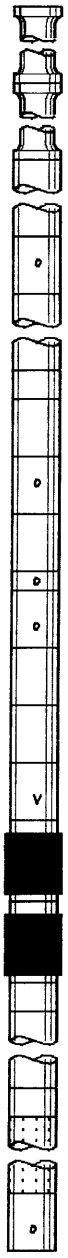
MEASURED FROM TESTER VALVE

REMARKS:

LOST ANNULUS WHEN TOOL OPENED.

TYPE & SIZE MEASURING DEVICE:					TICKET NO: 33003300
TIME	CHOKE SIZE	SURFACE PRESSURE PSI	GAS RATE MCF	LIQUID RATE BPD	REMARKS
3-28-88					
0049					STARTED MAKING UP TOOLS
0515					MADE UP SURFACE EQUIPMENT
0605					PUT WEIGHT ON TOOLS
0610					OPENED TOOL
0611					CLOSED TOOL, LOST ANNULUS
					PULLED OUT OF HOLE

TICKET NO. 33003300



		O.D.	I.D.	LENGTH	DEPTH
1	DRILL PIPE	4.500	3.826	1856.9	
4	FLEX WEIGHT	4.500	2.764	182.3	
3	DRILL COLLARS	6.250	2.813	373.3	
50	IMPACT REVERSING SUB	6.000	3.000	1.0	2404.6
3	DRILL COLLARS	6.250	2.813	62.2	
258	BAR CATCHER SUB	5.750	2.000	1.0	
80	AP RUNNING CASE	5.000	2.250	4.1	2468.9
12	DUAL CIP VALVE	5.000	0.870	4.9	
202	SAMPLE CHAMBER	5.000	2.370	5.0	
33	DRAIN VALVE	5.250	2.800	1.0	
61	INDEXING HYDROSPRING TESTER	5.000	0.750	5.3	
80	AP RUNNING CASE	5.000	2.250	4.1	2489.0
15	JAR	5.000	1.750	5.0	
16	VR SAFETY JOINT	5.000	1.000	2.8	
70	OPEN HOLE PACKER	7.750	1.680	5.8	2504.3
70	OPEN HOLE PACKER	7.750	1.680	5.8	2510.1
5	CROSSOVER	5.250	2.400	1.0	
3	DRILL COLLARS	6.250	2.813	124.4	
5	CROSSOVER	5.750	2.400	1.0	
20	FLUSH JOINT ANCHOR	5.000	2.370	28.0	
81	BLANKED-OFF RUNNING CASE	5.000		4.1	2666.9
	TOTAL DEPTH				2671.0

EQUIPMENT DATA

APPENDIX 6

APPENDIX 6

DESCRIPTION OF CUTTING SAMPLES

150 50 SANDSTONE, a.a. coarse to very coarse.
20 MARL, cream and grey, speckled, firm to hard, minor glauconite, fossiliferous. Grades to limestone.
30 LIMESTONE, a.a. - shell fragments.

160 40 SANDSTONE, a.a.
40 MARL, a.a. - becoming limestone.
20 LIMESTONE, a.a. - shell fragments.

170 30 SANDSTONE, a.a.
70 LIMESTONE, cream, grey, fossiliferous, glauconitic, trace silty grains.

180 20 SANDSTONE, a.a.
80 LIMESTONE, speckled cream and grey with dark grey-green to black glauconitic grains, minor silty grains, very fossiliferous.

190 100 LIMESTONE, white, grey, firm, very fossiliferous, trace glauconite, silt and quartz grains.

200 100 LIMESTONE, a.a. - bryozoa, shell fragments, forams.

210 100 LIMESTONE, a.a. - grades to coquina.

220 100 LIMESTONE, a.a. - grades to coquina, abundant bryozoa.

230 100 LIMESTONE, white, cream, yellow-cream, friable, very fossiliferous, minor glauconite, trace clear and yellow iron stained silty to very fine quartz grains.

240 100 LIMESTONE, a.a. - trace glauconite and silty to very fine quartz grains.

250 100 LIMESTONE, a.a. trace sandstone and glauconite.

260 100 LIMESTONE, a.a.

270 100 LIMESTONE, a.a. - 5% grey, silty "claystone" with some silty to very fine quartz grains.

280 100 LIMESTONE, a.a. - light grey, very fossiliferous, with up to 5% grey, silty "claystone" with some silty to very fine quartz grains.

290 100 LIMESTONE, white, light to medium grey, very fossiliferous, friable, minor silt and very fine quartz grains, minor glauconite.

300 100 LIMESTONE, a.a. - fossiliferous, minor glauconite and silty quartz grains.

310 100 LIMESTONE, a.a. - trace silt and quartz grains.

320 100 LIMESTONE, a.a. - trace silt and quartz grains.

330 30 MARL, grey, calcareous, with silt and very fine sand grains, minor glauconite.
70 LIMESTONE, a.a.

340 50 MARL, grey, calcareous, silt and very fine sand grains, glauconitic.
50 LIMESTONE, cream to grey, fossiliferous, glauconitic, grades to marl.

350 20 SANDSTONE, clear, white, medium to very coarse, sub-rounded, moderate sorted, loose quartz grains.
20 MARL, a.a. - grey, silty and sandy.
60 LIMESTONE, a.a. - trace glauconite, fossiliferaous.

360 50 MARL, a.a. - approximately 30% is non-calcareous.
50 LIMESTONE, a.a. - fossiliferous.

370 30 MARL, white, cream, grey, dark greenish-black specks of glauconite, calcareous, silt and very fine sand grains.
70 LIMESTONE, a.a. - white, very fossiliferous.

380 50 MARL, a.a.
50 LIMESTONE, a.a.

390 30 MARL, a.a.
70 LIMESTONE, a.a. - minor glauconite, fossiliferous.

400 60 MARL, a.a. - approximately 40% is non-calcareous silty to very fine sand grains, minor glauconite.
40 LIMESTONE, a.a. - white, cream, fossiliferous.

410 50 MARL, a.a.
50 LIMESTONE, a.a.

420 60 MARL, a.a. - light to medium grey, glauconitic, silty.
40 LIMESTONE, a.a.

430 60 MARL, a.a.
40 LIMESTONE, a.a.

440 60 MARL, a.a.
40 LIMESTONE, a.a.

450 60 MARL, light to medium grey, dark grey, glauconitic, silty and argillaceous fragments/grains, silty / very fine sand.
40 LIMESTONE, white, cream, light grey, fossiliferous, trace glauconite, friable.

460 70 MARL, a.a. - medium grey, also minor green-grey, glauconitic.
30 LIMESTONE, a.a. - fossiliferous.

470 70 MARL, light brown-grey, medium grey, firm, argillaceous, silty, glauconitic.
30 LIMESTONE, white, cream, fossiliferous, glauconitic.

480 70 MARL, a.a.
30 LIMESTONE, a.a.

490 80 MARL, a.a.
20 LIMESTONE, a.a.

500 80 MARL, a.a.
20 LIMESTONE, a.a.

510 70 MARL, a.a.
30 LIMESTONE, a.a.

520 70 MARL, a.a.
30 LIMESTONE, a.a.

530 80 MARL, a.a. - minor glauconite.
20 LIMESTONE, a.a.

540 80 MARL, a.a.
20 LIMESTONE, a.a.

550 80 MARL, a.a. - some medium to dark grey.
20 LIMESTONE, a.a.

560 80 MARL, light to medium grey, firm to hard, silty, also medium to dark grey, soft to firm, argillaceous.
20 LIMESTONE, a.a.

570 80 MARL, a.a.
20 LIMESTONE, a.a.

580 80 MARL, a.a. - becoming medium to dark grey, argillaceous.
20 LIMESTONE, a.a.

590 70 MARL, a.a. -
30 LIMESTONE, a.a. - fossiliferous, also white to light grey with moderate to abundant glauconite.

600 80 MARL, a.a.
20 LIMESTONE, a.a.

610 70 MARL, a.a.
30 LIMESTONE, a.a.

620 40 SHALE, greenish grey, soft, slightly calcareous, trace glauconite, rare pyrite.
30 MARL, a.a.
30 LIMESTONE, a.a.

630 30 SHALE, a.a.
30 MARL, medium to dark grey, hard, silty, trace glauconite, grading to limestone.
40 LIMESTONE, a.a. - white, cream, grey, hard, some fossiliferous.

640 30 SHALE, a.a.
30 MARL, a.a.
40 LIMESTONE, a.a.

650 20 SHALE, a.a.
60 MARL, a.a.
20 LIMESTONE, a.a.

660 30 SHALE, a.a. - trace pyrite.
60 MARL, a.a.
10 LIMESTONE, a.a.

670 20 SHALE, a.a. - sticky.
80 MARL, a.a.

680 30 SHALE, grey, grey-green, grey-brown, soft, calcareous in part, trace glauconitic.
70 MARL, blue-grey, soft, sticky, grading to calcareous claystone.

690 40 SHALE, a.a. - no glauconite.
60 MARL, a.a.

700 30 SHALE, a.a.
70 MARL, a.a.

710 30 SHALE, a.a.
70 MARL, a.a.

720 40 SHALE, light to medium grey, calcareous, trace pyrite, soft.
60 MARL, light to medium grey, soft.

723 40 SHALE, a.a.
60 MARL, a.a.
Tr LIMESTONE, yellow-brown crystalline, hard.

726 40 SHALE, a.a.
60 MARL, a.a. - rare coarse quartz grains.
Tr LIMESTONE, a.a.

729 40 SHALE, a.a.
60 MARL, a.a.

732 30 SANDSTONE, clear and yellow, iron stained, fine to very coarse, sub-angular to sub-rounded, occasional rounded, poorly sorted, loose, no matrix or cement, good apparent porosity.
20 SHALE, a.a. - trace glauconite.
50 MARL, a.a.

735 10 SANDSTONE, a.a.
30 SHALE, a.a.
60 MARL, a.a.

738 30 SHALE, a.a.
70 MARL, a.a. - trace sand grains.

741 Tr SANDSTONE, a.a. - clear coarse, loose quartz grains.
30 SHALE, a.a.
70 MARL, a.a.

744 Tr SANDSTONE, a.a.
30 SHALE, a.a.
70 MARL, a.a.
Tr LIMESTONE, yellow, hard, crystalline, minor fossils.

747 Tr SHALE, a.a.
100 MARL, grey-green, minor dark grey, soft.
Tr LIMESTONE, white, yellow, hard, fossiliferous.

750 100 MARL, a.a. - minor glauconite.
Tr LIMESTONE, a.a. - fossiliferous.

753 100 MARL, a.a. - trace loose, coarse sand grains.

756 100 MARL, a.a. - trace green glauconitic grains.

759 100 MARL, light blue-green to grey, soft, shaley, trace glauconite.

762 100 MARL, a.a.

765 Tr SANDSTONE, clear, loose, medium to coarse quartz grains.
100 MARL, a.a.

768 100 MARL, a.a. - common common green glauconitic grains, rare quartz grains.

771 100 MARL, cream, light green-blue to grey, soft, shaley, common dark green glauconitic grains.

774 100 MARL, a.a. - very argillaceous, common dark green glauconitic grains.

777 100 MARL, white to green-grey, very argillaceous, soft, up to 5% glauconite - rounded grains.

780 100 MARL, a.a. - 5% glauconite.

783 100 MARL, a.a. - 5% glauconite.

786 100 MARL, a.a. - 5% glauconite.

789 100 MARL, a.a. - very argillaceous, 5% glauconite.

792 100 MARL, a.a.

795 80 MARL, a.a.
20 COAL, dark brown to black, shaley, lignitic.

798 50 MARL, a.a.
50 COAL, a.a.

801 100 COAL, a.a.

804 100 COAL, a.a.

807 100 SANDSTONE, clear and brown, lignite stained, fine to coarse, sub-angular to rounded, poor to moderate sorted, polished surfaces on some grains, loose, no matrix or cement, very good apparent porosity. NO FLUORESCENCE.

810 100 SANDSTONE, a.a.

813 100 SANDSTONE, a.a.

816 100 SANDSTONE, clear, fine to very coarse, angular to sub-angular, minor sub-rounded, poor to moderate sorted, loose quartz grains, very good porosity.
Tr COAL, a.a.

822 50 SANDSTONE, a.a.
10 SHALE, very dark brown, sub-fissile, lignitic.
40 COAL, dark brown to black, lignitic.

828 20 SANDSTONE, a.a.
80 SHALE, very dark brown, crumbly, grading to lignite/coal.

834 60 SANDSTONE, a.a. - sub-angular to sub-rounded, some lignite stained, loose, no matrix or cement, good porosity.
40 SHALE, a.a.

840 60 SANDSTONE, a.a.
40 SHALE, a.a.

846 70 SANDSTONE, mostly clear, some milky white, medium to very coarse, sub-angular to sub-rounded, minor rounded, moderate sorted, very good porosity.
30 SHALE, a.a. - soft to firm.

852 80 SANDSTONE, a.a.
20 SHALE, a.a. - dark brown to black, silty, lignitic.

858 90 SANDSTONE, a.a.
10 SHALE, dark grey-brown to black, silty, very carbonaceous.

864 70 SANDSTONE, a.a.
30 SHALE, a.a. - grades to clay.

870 70 SANDSTONE, a.a.
30 SHALE, very dark brown, sub-fissile, lignitic.

876 30 SANDSTONE, a.a.
70 SHALE, dark grey-brown to black, soft to firm, argillaceous/dispersive in part, very carbonaceous.

882 50 SANDSTONE, a.a.
50 SHALE, dark grey-brown to black, silty/argillaceous, dispersive, very carbonaceous.

888 60 SANDSTONE, a.a.
40 SHALE, a.a.

894 60 SANDSTONE, a.a.
40 SHALE, a.a.

900 100 SANDSTONE, a.a.
Tr COAL, a.a.

906 80 SANDSTONE, a.a.
20 SHALE, a.a.

912 80 SANDSTONE, a.a.
20 SHALE, a.a.

918 90 SANDSTONE, a.a. - fine to very coarse, mostly coarse to very coarse, sub-rounded, moderate sorted, loose, good porosity.
10 SHALE, a.a.

924 90 SANDSTONE, a.a.
10 SHALE, a.a. - grades to coal.

930 20 SANDSTONE, a.a.
50 SHALE, a.a.
30 COAL, brown to black, shaley.

936 30 SANDSTONE, a.a.
70 SHALE, dark brown and grey to black, silty, dispersive, very carbonaceous, grading to coal.

942 Tr SANDSTONE, a.a.
100 SHALE/COAL, very dark brown-black, silty, soft to firm, crumbly, argillaceous.

948 100 SHALE/COAL, a.a.

954 Tr SANDSTONE, a.a.
100 SHALE/COAL, a.a.

960 50 SHALE, a.a. - grades to lignitic coal.
50 COAL, a.a. - grades to lignitic shale.

966 100 SHALE, very dark brown, brown-black, crumbly to hard, lignitic, silty, very carbonaceous, grading to coal.

972 100 SHALE, a.a. - grades to lignitic coal.

978 10 SANDSTONE, clear, coarse to very coarse, sub-angular to sub-rounded, moderate sorted loose quartz grains, good porosity.
60 SHALE, a.a.
30 COAL, a.a.

984 70 SANDSTONE, a.a.
30 SHALE, a.a.

990 10 SANDSTONE, a.a.
90 COAL, a.a.

996 50 SANDSTONE, a.a.
20 SHALE, a.a.
30 COAL, a.a.

1002 90 SANDSTONE, clear, coarse to very coarse, sub-angular, moderate sorted, loose, no matrix or cement, good porosity.
10 COAL, a.a.

1008 50 SANDSTONE, a.a.
50 COAL, a.a.

1014 80 SANDSTONE, a.a.
20 COAL, a.a.

1020 20 SANDSTONE, a.a.
80 COAL, brown to black, silty, firm to brittle.

1026 60 SANDSTONE, a.a.
40 COAL, a.a.

1032 80 SANDSTONE, a.a.
20 COAL, a.a.

1038 70 SANDSTONE, a.a. - clear, coarse to very coarse.
30 COAL, a.a. - shaley in part.

1044 90 SANDSTONE, a.a.
10 COAL, a.a.

1050 20 SANDSTONE, a.a. - also minor cream, very fine to fine, hard, sub-angular, moderate sorted, dolomitic? cement, poor porosity.
80 COAL, a.a. - large amounts of cavings / fill.

1056 50 SANDSTONE, mostly a.a. - clear, medium to very coarse, loose, angular to sub-rounded, poor to moderate sorted quartz grains, good porosity. Also some cream to light brown, fine, sub-angular, moderate sorted, hard, dolomitic cement, poor porosity, bright yellow mineral fluorescence with no cut. (c.f. Merriman #1 @ 3,295 feet).
50 COAL, a.a.

1062 30 SANDSTONE, mostly clear, a.a. - minor dolomitic.
70 COAL, a.a.

1068 Tr SANDSTONE, a.a.
100 COAL, a.a.

1074 50 SANDSTONE, clear, loose, coarse grains with good porosity.
50 COAL, black, shaley.

1080 60 SANDSTONE, a.a.
40 COAL, a.a.

1086 80 SANDSTONE, clear, fine to very coarse, angular to sub-rounded, poor to moderate sorted, loose, no matrix or cement, good porosity.
20 COAL, a.a.

1092 80 SANDSTONE, a.a.
20 COAL, a.a.

1098 80 SANDSTONE, a.a.
20 COAL, a.a.

1104 70 SANDSTONE, a.a.
30 COAL, a.a.

1110 30 SANDSTONE, a.a. - clear quartz grains.
70 COAL, a.a.

1116 30 SANDSTONE, clear, fine to coarse, angular to sub-rounded, poor to moderate sorted.
70 COAL, a.a. - minor brown, crumbly, lignitic.

1122 40 SANDSTONE, a.a.
60 COAL, brown to black, lignitic, grading to carbonaceous shale.

1128 20 SANDSTONE, a.a.
80 COAL, a.a.

1134 80 SANDSTONE, a.a.
20 COAL, a.a.

1140 80 SANDSTONE, a.a.
20 COAL, a.a.

1146 90 SANDSTONE, a.a. - trace white, silty, dispersive clay matrix.
10 COAL, a.a.

1152 80 SANDSTONE, a.a. - trace white, silty, dispersive clay matrix.
20 COAL, a.a.

1158 90 SANDSTONE, clear, fine to very coarse, angular to sub-angular, poorly sorted quartz grains, loose, rare white clay matrix on some grains, good porosity.
10 COAL, a.a.

1164 100 SANDSTONE, a.a.

1170 90 SANDSTONE, a.a. - rare pyrite.
10 COAL, a.a.

1176 90 SANDSTONE, clear, fine to very coarse, angular to sub-rounded, poorly sorted quartz grains, trace white dispersive clay matrix, rare pyrite and mica, good porosity.
10 COAL, a.a.

1182 60 SANDSTONE, a.a.
20 CLAYSTONE, white, light brown, soft, dispersive, sticky.
20 COAL, a.a.

1188 80 SANDSTONE, a.a. - rare pyrite.
20 COAL, a.a.

1194 100 SANDSTONE, a.a. - rare white mica.

1200 100 SANDSTONE, a.a. - trace clay matrix, rare pyrite and white mica, good porosity.

1206 100 SANDSTONE, a.a. - angular to sub-rounded, trace clay matrix, rare mica, loose, good porosity.
Tr COAL, a.a.

1212 100 SANDSTONE, a.a. - rare pyrite.

1218 100 SANDSTONE, a.a. - rare grey lithic/quartzite grains.

1224 100 SANDSTONE, a.a.

1230 90 SANDSTONE, a.a.
10 COAL, brown to black, shaley.

1236 100 SANDSTONE, a.a.

1242 100 SANDSTONE, a.a. - slight increase in pinkish-white mica flakes.

1245 80 SANDSTONE, a.a. - with trace of mica and grey lithic/quartzite grains, rare pink garnet.
20 COAL, a.a. - grades to carbonaceous shale.

1248 50 SANDSTONE, a.a. - rare pyrite.
50 COAL, brown to black, shaley and lignitic in part, trace pyrite.

1251 40 SANDSTONE, a.a.
60 COAL, a.a.

1254 100 SANDSTONE, clear, fine to very coarse, angular to sub-rounded, poorly sorted, minor white to grey lithic/quartzite grains, trace pyrite and pinkish-white mica, rare pink garnet, no matrix or cement, good porosity.

1257 100 SANDSTONE, a.a.

1260 80 SANDSTONE, a.a. - trace grey lithic/quartzite grains, pyrite and mica.
20 COAL, a.a.

1263 60 SANDSTONE, a.a.
40 COAL, a.a.

1266 10 SANDSTONE, a.a.
90 COAL, a.a.

1269 80 SANDSTONE, a.a.
20 COAL, a.a.

1272 40 SANDSTONE, a.a. - trace pyrite and mica.
60 COAL, black, firm, silty and shaley in part.

1275 10 SANDSTONE, a.a.
40 SHALE, dark brown to black, coally, very carbonaceous, sub-fissile to fissile.
50 COAL, a.a.

1278 20 SANDSTONE, a.a.
20 SHALE, a.a.
60 COAL, a.a.

1281 10 SANDSTONE, a.a.
30 SHALE, a.a.
60 COAL, a.a.

1284 10 SANDSTONE, a.a.
30 SHALE, a.a. - grades to coal.
60 COAL, a.a.

1287 Tr SANDSTONE, a.a.
20 SHALE, a.a. - grades to coal.
80 COAL, a.a.

1290 50 SANDSTONE, a.a. - trace pyrite.
50 COAL, a.a.

1293 60 SANDSTONE, a.a.
40 COAL, a.a.

1296 100 SANDSTONE, clear, fine to very coarse, angular to sub-rounded, poor to moderate sorting, trace white, dispersive clay matrix, rare pyrite, good porosity.
Tr COAL, a.a.

1299 90 SANDSTONE, clear, minor white, fine to very coarse, angular to sub-rounded, poorly sorted, trace white, dispersive clay matrix, rare white mica and pyrite, good porosity.
10 COAL, a.a.

1302 100 SANDSTONE, a.a.
Tr COAL, a.a.

1305 40 SANDSTONE, a.a.
10 SHALE, a.a.
50 COAL, a.a.

1308 80 SANDSTONE, a.a. - trace clay matrix, pyrite, mica and grey lithic/quartzite grains.
20 COAL, a.a.

1311 80 SANDSTONE, a.a.
20 COAL, a.a.

1314 100 SANDSTONE, a.a. - becoming angular.

1317 100 SANDSTONE, a.a. - clear quartz, angular, trace mica and grey lithic/quartzite grains.

1320 100 SANDSTONE, a.a. - clear, fine to very coarse, angular to sub-angular, poor to moderate sorted, trace mica and grey lithic/quartzite grains, good porosity.

1323 100 SANDSTONE, a.a.
Tr COAL, a.a.

1326 100 SANDSTONE, a.a.
Tr COAL, a.a.

1329 20 SANDSTONE, a.a. - trace pyrite.
60 CLAYSTONE, white to light grey-brown, soft, silty in part, trace to common carbonaceous material, dispersive.
20 COAL, a.a.

1332 100 SANDSTONE, a.a. - trace grey and green lithic/quartzite grains, mica and pyrite.
Tr CLAYSTONE, a.a.
Tr COAL, a.a.

1335 100 SANDSTONE, a.a.

1338 100 SANDSTONE, a.a.

1341 100 SANDSTONE, a.a.

1344 100 SANDSTONE, a.a.

1347 60 SANDSTONE, a.a.
30 CLAYSTONE, a.a. - silty, soft, dispersive.
10 COAL, a.a.

1350 70 SANDSTONE, a.a.
20 CLAYSTONE, a.a.
10 COAL, a.a.

1353 100 SANDSTONE, clear, fine to very coarse, angular to sub-rounded, poor to moderate sorted, loose, trace pyrite and mica, good porosity.

1356 100 SANDSTONE, a.a.

1404 90 SANDSTONE, a.a. - clear quartz and white to light grey, lithic/quartzite grains in a roughly 50:50 ratio, quartz grains are generally coarser, more angular and possibly come from the overlying LaTrobe Group.
10 CLAYSTONE, a.a.

1407 90 SANDSTONE, a.a.
10 CLAYSTONE, a.a.

1410 80 SANDSTONE, a.a.
Tr SHALE, a.a.
20 CLAYSTONE, a.a.
Tr TUFF, a.a.
Tr COAL, a.a.

1413 60 SANDSTONE, a.a. - common pyrite.
40 CLAYSTONE, white to light grey, soft, dispersive.

1416 60 SANDSTONE, a.a.
40 CLAYSTONE, a.a.

1419 70 SANDSTONE, clear quartz, white, grey, green, black, pink, yellow lithic/quartzite grains and rock fragments, white feldspar, (weathered in part), very fine to medium, occasional coarse to very coarse, sub-angular to sub-rounded, some angular, poor to moderate sorted, mostly loose, some aggregates with white clay matrix, common mica flakes and pyrite, poor to fair porosity.
Tr SHALE, grey to dark grey-brown, silty, carbonaceous, firm.
30 CLAYSTONE, a.a.
Tr TUFF, buff, soft, waxy, occasional carbonaceous inclusions.

1422 70 SANDSTONE, a.a.
30 CLAYSTONE, a.a.

1425 70 SANDSTONE, a.a. - very fine to medium, occasional coarse.
30 CLAYSTONE, a.a.

1428 70 SANDSTONE, a.a. - 50% clear quartz and 50% coloured lithic/quartzite grains and rock fragments, predominantly medium to dark grey and grey-green, fine to medium, sub-angular to sub-rounded, moderate sorted, poor porosity.
30 CLAYSTONE, a.a.

1431 80 SANDSTONE, a.a. - clear quartz, coloured lithic/quartzite grains and white feldspar.
20 CLAYSTONE, a.a.

1434 80 SANDSTONE, a.a.
20 CLAYSTONE, a.a.

1437 80 SANDSTONE, a.a.
20 CLAYSTONE, a.a.

1440 70 SANDSTONE, a.a.
30 CLAYSTONE, a.a.

1443 70 SANDSTONE, a.a.
30 CLAYSTONE, a.a.

1446 60 SANDSTONE, a.a.
40 CLAYSTONE, a.a.

1449 60 SANDSTONE, a.a.
40 CLAYSTONE, a.a.

1452 60 SANDSTONE, a.a.
40 CLAYSTONE, a.a.

MACALISTER #1 : SAMPLE DESCRIPTIONS.

Metres	%	Description
SURFACE CONDUCTOR PIPE WAS PRE-SET TO 21 METRES.		
30	100	SANDSTONE, clear to white quartz with minor white, orange-pink and green lithic/quartzite and feldspar grains, fine to medium, minor coarse, angular to sub-angular, poorly sorted, common grenish black mica flakes, loose, no matrix or cement, good porosity.
40	100	SANDSTONE, clear and white quartz with minor grey-green lithic/quartzite grains, fine to coarse, angular to sub-rounded, poorly sorted, common grenish black mica flakes, loose, no matrix or cement, good porosity.
50	100	SANDSTONE, a.a. - sub-angular to sub-rounded, trace brown lithic grains, loose, no matrix or cement, good porosity.
60	100	SANDSTONE, clear and white quartz grains, minor grey-brown lithic/quartzite grains, medium to very coarse, sub-rounded to rounded, polished surfaces on some grains, moderate sorted, loose, no matrix or cement, good porosity.
70	100	SANDSTONE, a.a. - occasionally granular, probably the base of a downward coarsening sequence.
	Tr	COAL, dull black, lignitic.
80	100	SANDSTONE, clear quartz with minor light grey quartzite grains, very fine to fine, some medium, angular to sub-angular, poor to moderate sorted, common greenish black mica, loose, no matrix or cement, good porosity.
90	100	SANDSTONE, clear to milky white quartz, coarse to very coarse, occasionally granular, sub-rounded to occasionally rounded, moderate sorted, loose, no matrix or cement, good porosity.
100	100	SANDSTONE, clear to milky white, very coarse, sub-angular to sub-rounded, moderate to well sorted, minor grey lithic/quartzite grains, loose, no matrix or cement, good porosity.
	Tr	COAL, dull black, lignitic.
110	100	SANDSTONE, a.a. - angular to sub-rounded, minor to common yellow, green and grey lithic/quartzite grains, and minor greenish black mica, loose, no matrix or cement, good porosity.
	Tr	CLAYSTONE, grey, silty.
	Tr	COAL, a.a.
120	100	SANDSTONE, a.a. - sub-angular to sub-rounded.
	Tr	COAL, a.a.
	Tr	LIMESTONE, a.a. - shell fragments.
130	60	SANDSTONE, a.a. - also minor yellow-brown, fine, sub-rounded, moderate sorted, hard, ferruginous / limonitic / argillaceous matrix and cement (lateritic), very poor porosity.
	10	CLAYSTONE, light to dark grey and bluish-grey, soft to firm, silty in part, occasionally calcareous.
	30	LIMESTONE, white, cream, shell fragments.
140	50	SANDSTONE, a.a.
	20	CLAYSTONE, a.a.
	30	LIMESTONE, a.a.

1359 100 SANDSTONE, a.a. - trace white dispersive clay matrix.

1362 100 SANDSTONE, a.a.

1365 100 SANDSTONE, a.a.
Tr CLAYSTONE, light brown, soft, silty, dispersive, minor carbonaceous material.
Tr COAL, a.a.

1368 100 SANDSTONE, a.a.
Tr CLAYSTONE, a.a.
Tr COAL, a.a.

1371 100 SANDSTONE, a.a.

1374 100 SANDSTONE, a.a. - trace pyrite, mica and clay matrix.
Tr COAL, a.a.

1377 80 SANDSTONE, a.a.
10 SHALE, brown to brown-black, sub-fissile, firm, very carbonaceous, silty in part.
10 CLAYSTONE, light brown, soft, silty, dispersive, minor carbonaceous material.

1380 100 SANDSTONE, clear, fine to very coarse, angular to sub-angular, poorly sorted, loose, trace mica, good poros
Tr CLAYSTONE, a.a.

1383 100 SANDSTONE, a.a. - angular to sub-angular, trace white clay matrix, trace grey lithic/quartzite grains.
Tr CLAYSTONE, a.a.

1386 100 SANDSTONE, a.a. - minor grey lithic/quartzite grains.
Tr CLAYSTONE, a.a.

1389 100 SANDSTONE, a.a.

1392 80 SANDSTONE, a.a. - common to abundant grey lithic/quartzite grains.
20 CLAYSTONE, a.a.

1395 80 SANDSTONE, clear quartz, white to light grey, grey-green and minor green and pink lithic/quartzite grains, very fine to medium, some coarse and very coarse, angular (clear quartz) to sub-rounded (lithic/quartzite grains), poor to moderate sorted, predominantly loose, trace dispersive clay matrix, minor pyrite and mica, fair porosity.
Tr SHALE, brown to black, carbonaceous.
20 CLAYSTONE, white to light brown, soft, dispersive.
Tr COAL, a.a.
Tr TUFF, cream to light yellow-brown, soft, waxy.

1398 80 SANDSTONE, a.a. - predominantly quartz and lithic/quartzite grains and minor pink, green and black rock fragments, trace pyrite and mica, fair porosity.
Tr SHALE, a.a.
20 CLAYSTONE, a.a.
Tr TUFF, a.a.

1401 90 SANDSTONE, a.a. - mostly loose grains, aggregates have a clay matrix and are poorly cemented, poor to fair porosity.
Tr SHALE, a.a.
10 CLAYSTONE, a.a.

APPENDIX 7

APPENDIX 7

DESCRIPTION OF SIDEWALL CORES

MACALISTER #1 SIDEWALL CORE DESCRIPTIONS

SWC	DEPTH m. (Rec mm)	DESCRIPTION
1	1398.0	NO RECOVERY
2	1389.0	NO RECOVERY
3	1383.5	NO RECOVERY
4	1373.0 (13)	CLAYSTONE, light grey, soft to firm, silty.
5	1328.0 (20)	SILTSTONE, light grey, very argillaceous, firm, lithic, micaceous, trace carbonaceous material, grading to very fine sandstone in part.
6	1290.0 (24)	SILTSTONE, light grey, very argillaceous, as for SWC #5.
7	1264.0 (26)	SILTSTONE, light grey-brown, sandy, firm, lithic, carbonaceous with laminae of SANDSTONE, white, very fine, sub-rounded, moderate to well sorted, clay matrix, trace mica, poor porosity.
8	1249.0 (24)	SHALE, dark brown to black, silty, very carbonaceous.
9	1181.0 (30)	SHALE, dark grey to black, silty, very carbonaceous.
10	1154.5 (25)	SILTSTONE, light grey, argillaceous, sandy, micaceous, lithic.
11	1125.0 (40)	CLAYSTONE, buff, soft, trace carbonaceous material.
12	1109.0 (50)	SANDSTONE, white to light grey, very fine to fine, sub-rounded, moderate to well sorted, friable, trace mica and grey black lithics, poor porosity.
13	1105.0 (42)	SANDSTONE, as for SWC #12, trace carbonaceous material and moderate clay matrix.
14	1047.0 (20)	SANDSTONE, white to cream, very fine to fine, sub-angular, moderate sorted, abundant clay matrix, silty in part, trace carbonaceous material, poor porosity.
15	988.0 (32)	SILTSTONE, light grey, very argillaceous, firm, trace coally fragments.

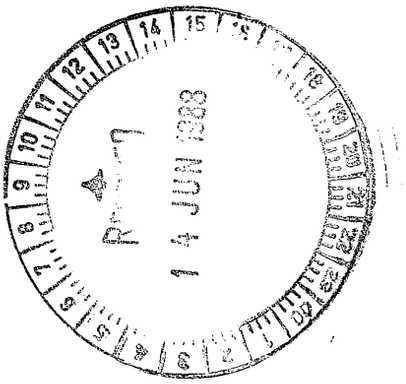
16	965.0 (52)	SHALE, very dark brown to black, grading to coal.
17	953.0 (48)	SILTSTONE, medium grey-brown, sandy, micaceous, carbonaceous material and laminae.
18	924.0 (50)	SILTSTONE, very dark brown to black, very carbonaceous, grading to coally shale.
19	865.0 (50)	SHALE/COAL, very dark brown to black, minor white to light grey siltstone laminae.
20	847.0 (50)	SHALE/COAL, as for SWC #19.
21	839.0 (40)	SANDSTONE, clear quartz grains, medium to very coarse, sub-angular to sub-rounded, poorly sorted, friable, abundant silty clay matrix, fair to good porosity.
22	826.5 (40)	SANDSTONE, clear, white, very fine, sub-angular to sub-rounded, moderate to well sorted, friable, trace clay matrix, fair porosity, minor silty carbonaceous laminae.
23	814.0 (30)	SANDSTONE, dark brown (lignite stain), fine to coarse, sub-rounded, poorly sorted, abundant brown silty carbonaceous matrix, carbonaceous fragments, friable, fair porosity.
24	810.0 (30)	SANDSTONE, as for SWC #22, but with very abundant lignitic/carbonaceous material, friable, poor to fair porosity.
25	809.0 (45)	Lignitic SANDSTONE, as for SWC #24.
26	794.0 (48)	COAL, dark brown to black, crumbly, lignitic.
27	788.5 (60)	MARL, medium brown, very calcareous, very argillaceous, soft, puggy, common glauconite and fossil fragments.
28	775.0 (25)	MARL, light to medium grey, abundant white fossil fragments and green glauconite.
29	763.0 (40)	MARL, green, puggy, common glauconite, trace pyrite, very calcareous.
30	754.0 (50)	MARL, medium grey-green, puggy, disseminated pyrite, very calcareous.

APPENDIX 8

APPENDIX 8

WIRELINE LOG EVALUATION

dnc



CRUSADER OIL NL

MACALISTER #1

WIRELINE LOG EVALUATION

BOWLER LOG CONSULTING SERVICES PTY. LTD.

JACK BOWLER
Telephone: (051) 56 6170

P.O. BOX 2,
PAYNESVILLE, VICTORIA.
AUSTRALIA, 3880.

Mr. Doug Barrenger
Crusader Oil N.L.
27th Floor, AMP Centre
12 Creek Street
Brisbane, Queensland 4000

5 April, 1988

Dear Doug,

Please find my evaluation for the porous intervals of the Latrobe sands of Macalister #1. The evaluation, RFT pressure plot and recovered water samples show the Latrobe sands to be 100% water saturated with very fresh formation waters.

Logs and data available over the zones of interest included:
-DLL-MSFL-GR-CAL-SP
-LDL-CNL-NGS-EPT-CAL
-SLS-GR
-SHDT-GR
-RFT-HP-GR and formation water samples.
-Mudlog
- Rmf=0.468 ohm.m @ 18°C. BHT first log=52°C. Mud weight=9.7#/gal and contains barite.

Log Quality

The Latrobe (793-1390 meters?) from the logs consists of clean porous sandstones, 111 meters of thin to thick coals, three tight streaks and a few 2-3 meter shales. Generally the coals are badly washed out, in some cases to the maximum SHDT caliper reading of 24 inches. Fortunately the sands are usually washed out less than three inches resulting in good quality RHOB and MSFL readings. This is confirmed by the Rmfa=0.25 ohm.m computed from the Rxo-Density porosity plot which is equal to the surface measured value of Rmf converted to reservoir temperature. RHOB in the upper part of the 806-615 sand is useless so the sonic is used for porosity.

The rugosity of the hole through the sands resulted in EPT readings that were of little use over much of the sands. The EPT can be dropped from the next logging program particularly since the MSFL did a good job of evaluating the flushed zone near the borehole and the RFT HP pressures were able to resolve the very high resistivity zones. The RFT with HP gage should be made available for the next well as it was very useful in identifying the fluid content of the rocks where log evaluation techniques were uncertain due to uncertainties in Rw.

The PEF values were degraded by the barite in the mud as can be seen by the negative ΔRHO corrections, the classic barite response of increasing PEF at small caves such as at 1160 meters and the PEF readings of 2 or more opposite clean, porous sands that should have a PEF of 1.6. However, this was not a problem as the clean sandstone lithology was clearly identified from the RHOB-NPHI plot and the cuttings.

Log Evaluation

Representative data points were taken in the sands and evaluated using MacLog® software. The sands were clean and porous as can be seen on the RHOB-NPHI plot with porosities ranging from 23-35%. Despite the high gamma ray the sands were clean so it was possible to use the Archie water saturation equation which found the sands to be 100% water wet. The NGS suggests that the high gamma ray in some of the sands and coals is due to uranium. The uranium in the sands may be associated with the disseminated lignitic or carbonaceous material reported in the sands recovered in the sidewall cores.

The RHOmaa-Umaa plot shows the barite effect on the data pulling it away from the quartz point in the direction of increasing Umaa.

It appears that the "freshwater wedge" mentioned in the 1986 APEA Journal paper "Freshwater Influx in the Gippsland Basin: Impact on Formation Evaluation, Hydrocarbon Volumes, and Hydrocarbon Migration", by Kuttan, Kulla and Neumann, may be present from 1065-1266 meters. This is suggested by DLL-MSFL log, the Pre Evaluation Rwa values and the RT-Porosity plots. Rw= 6.5 ohm.m (500 PPM NaCl eqv @ 50°C) was used everywhere except from 1065-1266 meters where Rw=22 ohm.m (about 100 PPM NaCl eqv @ 50°C).

Because RHOB was useless from 806-813.9 meters the sonic was used at 809 and 810 meters where it was valid. The Wylie Time Average formula with a sonic porosity compaction factor of 1.5 was used to compute porosity over this interval. This resulted in porosities that agreed with those of the density-neutron which can be seen from the agreement of data and computed Rmfa=0.25 ohm.m from the Rxo-Sonic and Rxo-Density/Neutron plots.

RFT Evaluation

The RFT HP gage pressure profiles of 0.993 g/cc and 1.002 g/cc clearly show that the free fluid within the pore space of the Latrobe sands is fresh water.

The Long Nose Probe was used to obtain HP formation pressures at 10 representative levels throughout the well with particular emphasis on the upper Latrobe sand. An inspection of the SHDT caliper shows that the best chance for a seal from 806-813 meters was at 810 meters where 4 good pressures were obtained. After successful pressures at 814 and 814.4 meters an attempted pressure test at 810 meters resulted in a seal failure. We were fortunate to obtain a pressure reading at 810 meters considering the hole rugosity, 11.5-12 inch hole diameter and hole ovality.

The Martineau Probe, designed for unconsolidated sands, was used to sample the 814 meter interval. The 6 gallon sample chamber was opened first and sampled at 1140 psia HP recovering 4-5 gallons of 1.49 ohm.m water @ 22°C. The final pressure built up to 1175 psia HP. The sample was sealed and the 2 3/4 gallon chamber was opened and sampled at 1163 psia HP and filled to reach a final pressure of 1175 psia HP. Water recovered measured 2.9 ohm.m @ 22°C.

Surface chamber pressure was 35 psi for the 6 gallon chamber which recovered 4-5 gallons of water and 400 psi for the 2 3/4 gallon chamber which recovered 2 gallons of fluid. No gas or oil was reported. The sampling pressures suggested that both the 6 and 2 3/4 gallon chambers were completely filled (unless the pistons jammed). The descrepancy between fluid recovery and sample chamber size may be due to the method used to measure the volumes of recovered water.

Mud salinity and resistivity data extracted from the mud report are:

Depth (meters)	Cl	Rmf	Temperature °F
813	21-12,000		
1048.5	14,000		
1233	12,000	0.37	72
		0.42	75
1338.5	10-12,000	0.43	84
		0.37	78
1392	10,000	0.40	76
		0.43	78
Schlumberger		0.468	64.4
circulated sample.		0.393	78

The percent formation water recovered (X) can be computed knowing Rmf, Rw and the resistivity of the recovered water (Rrf):
$1/Rrf=X/Rw + (1-X)/Rmf$

First case where Rmf=0.468 ohm.m @ 64.4 °F:

Rmf=0.407 @ 75°F
Rrf 6 gal =1.428 @ 75°F — Rrf 2 3/4 gal = 2.779
Rw=8.932 @ 75°F
X=75% — **X=89%**

Second case where Cl=21,000 or NaCl=34,650 and Rmf=0.19 @ 75°F:
Rmf=0.19 @ 75°F
Rrf 6 gal =1.428 @ 75°F — Rrf 2 3/4 gal = 2.779
Rw=8.932 @ 75°F
X=89% — **X=95%**

The high percentage recovery of formation water suggests that mud filtrate invasion is not deep and the Latrobe will produce water from 814 meters.. The DLL-MSFL suggest that the diameter of invasion is 30 inches or less.

Yours truly,

Jack Bowler

Macalister #1 Latrobe
RHOF=1.01.
Fluid DT=189.00 & clean matrix DT=55.50 microsec/ft.
Rw=6.500 everywhere except from 1065.00 to 1270.00 where Rw=22.000.
Rmf=0.250 a=1.00 m=2.00 n=2.00 Sonic por. comp. factor=1.50.
PHIE cutoff sets Sw and Sxo to 100% below 0.0 % porosity.
Coal is detected if RHOB<1.40 or if NPHI>55.0
or if Sonic>140.0 microsec/ft.
SwArch^n=(a*Rw)/(RT*PHIT^m)
**** Sonic porosity when RHOB<=1.95g/cc from 809.00 to 1425.00 meters.
**** Sonic porosity when MSFL<=0.00 from 0.00 to 0.00 meters.

EVALUATION

Depth meters	RHOma	PHIT	Vclay	PHIE	SwArch	SxoArch
809.00	****	26.2	0.0	26.2	100.0	100.0
810.00	****	26.2	0.0	26.2	100.0	100.0
814.00	2.65	28.0	0.0	28.0	100.0	100.0
836.00	2.68	30.1	0.0	30.1	100.0	100.0
841.00	2.67	35.7	0.0	35.7	100.0	100.0
842.00	2.65	33.2	0.0	33.2	99.5	99.5
850.50	2.67	33.0	0.0	33.0	100.0	100.0
855.00	2.66	30.0	0.0	30.0	100.0	100.0
877.50	2.65	30.3	0.0	30.3	98.0	98.0
883.00	2.65	25.8	0.0	25.8	98.6	100.0
894.00	2.65	27.7	0.0	27.7	99.0	100.0
908.00	2.65	35.2	0.0	35.2	92.2	100.0
912.00	2.66	28.5	0.0	28.5	96.0	100.0
919.00	2.66	31.2	0.0	31.2	98.8	100.0
934.60	2.64	26.5	0.0	26.5	100.0	100.0
952.50	2.74	33.0	0.0	33.0	100.0	100.0
976.50	2.65	35.5	0.0	35.5	100.0	100.0
997.00	2.66	28.5	0.0	28.5	83.8	100.0
1002.00	2.66	30.4	0.0	30.4	73.4	94.9
1022.00	2.66	26.3	0.0	26.3	100.0	100.0
1026.50	2.65	32.2	0.0	32.2	100.0	100.0
1032.00	2.64	28.4	0.0	28.4	100.0	100.0
1050.00	2.68	33.5	0.0	33.5	100.0	100.0
1067.00	2.67	30.9	0.0	30.9	96.7	96.7
1081.50	2.65	28.9	0.0	28.9	100.0	100.0
1092.00	2.63	31.7	0.0	31.7	100.0	100.0
1136.00	2.70	24.0	0.0	24.0	100.0	100.0
1146.00	2.68	24.2	0.0	24.2	99.4	99.4
1158.00	2.67	27.9	0.0	27.9	100.0	100.0
1167.00	2.65	28.5	0.0	28.5	100.0	100.0
1186.00	2.65	23.2	0.0	23.2	100.0	100.0
1192.00	2.65	30.1	0.0	30.1	100.0	100.0
1199.00	2.65	29.3	0.0	29.3	100.0	100.0
1208.00	2.66	29.4	0.0	29.4	100.0	100.0
1217.00	2.66	26.4	0.0	26.4	100.0	100.0
1230.00	2.64	26.6	0.0	26.6	100.0	100.0

Macalister #1 Latrobe
RHOF=1.01.
Fluid DT=189.00 & clean matrix DT=55.50 microsec/ft.
Rw=6.500 everywhere except from 1065.00 to 1270.00 where Rw=22.000.
Rmf=0.250 a=1.00 m=2.00 n=2.00 Sonic por. comp. factor=1.50.
PHIE cutoff sets Sw and Sxo to 100% below 0.0 % porosity.
Coal is detected if RHOB<1.40 or if NPHI>55.0
or if Sonic>140.0 microsec/ft.
SwArch^n=(a*Rw)/(RT*PHIT^m)
**** Sonic porosity when RHOB<=1.95g/cc from 809.00 to 1425.00 meters.
**** Sonic porosity when MSFL<=0.00 from 0.00 to 0.00 meters.

EVALUATION

Depth meters	RHOma	PHIT	Vclay	PHIE	SwArch	SxoArch
1230.00	2.64	26.6	0.0	26.6	100.0	100.0
1238.00	2.68	28.4	0.0	28.4	100.0	100.0
1251.00	2.67	27.9	0.0	27.9	100.0	100.0
1261.00	2.67	27.9	0.0	27.9	100.0	100.0
1266.00	2.67	25.7	0.0	25.7	100.0	100.0
1288.00	2.67	23.8	0.0	23.8	100.0	100.0
1292.00	2.68	26.9	0.0	26.9	100.0	100.0
1306.00	2.66	24.2	0.0	24.2	100.0	100.0
1315.00	2.64	23.6	0.0	23.6	100.0	100.0
1320.00	2.66	26.4	0.0	26.4	100.0	100.0
1331.00	2.69	25.8	0.0	25.8	100.0	100.0
1342.00	2.66	24.5	0.0	24.5	100.0	100.0
1347.50	2.67	25.0	0.0	25.0	100.0	100.0
1360.00	2.66	24.2	0.0	24.2	100.0	100.0
1366.00	2.67	25.0	0.0	25.0	100.0	100.0
1375.00	2.67	25.0	0.0	25.0	100.0	100.0
1390.00	2.73	25.2	0.0	25.2	100.0	100.0
1425.00	2.71	26.1	0.0	26.1	100.0	100.0

Macalister #1 Latrobe
Vclay is min. of VclayDN, VclayGR & VclayRt. PHIE=(1-Vclay)*PHIT.
Clean matrix density=2.65 Clay matrix density=2.92 Rt clay=100.0.
RHOF=1.01 GR clean=20.00 GR clay=140.00.
Fluid DT=189.00 & clean matrix DT=55.50 microsec/ft.
RWA=(RT*PHIT^2.00)/1.00 RMFA=(Rxo*PHIT^2.00)/1.00 Son por comp fac=1.50.
**** Sonic porosity when RHOB<=1.95g/cc from 809.00 to 1425.00 meters.
**** Sonic porosity when Rxo<=0.00 from 0.00 to 0.00 meters.

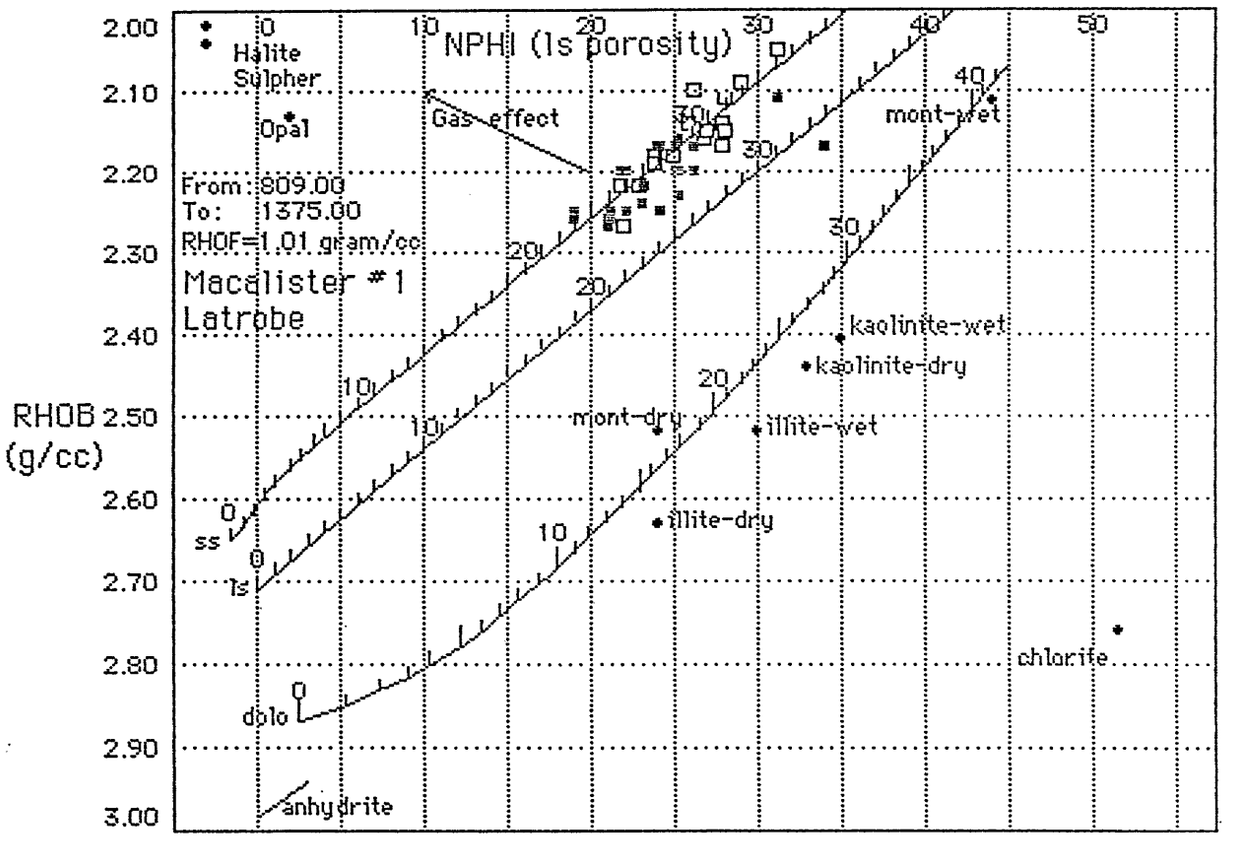
PRE EVALUATION

Depth meters	RHOma	PHIT	VclayRt	VclayGR	VclayDN	Vclay	PHIE	RWA	RMFA
809.00	****	26.2	100.0	33.3	****	33.3	17.5	1.827	0.137
810.00	****	26.2	100.0	39.2	****	39.2	15.9	2.692	0.309
814.00	2.65	28.0	100.0	0.0	0.0	0.0	28.0	2.242	0.196
836.00	2.68	30.1	100.0	0.0	10.1	0.0	30.1	4.483	0.254
841.00	2.67	35.7	100.0	14.2	7.9	7.9	32.9	6.274	0.267
842.00	2.65	33.2	100.0	8.3	0.0	0.0	33.2	6.562	0.276
850.50	2.67	33.0	100.0	14.2	5.7	5.7	31.1	5.509	0.251
855.00	2.66	30.0	100.0	8.3	5.2	5.2	28.5	5.621	0.261
877.50	2.65	30.3	100.0	8.3	0.0	0.0	30.3	6.765	0.275
883.00	2.65	25.8	99.6	4.2	0.2	0.2	25.7	6.680	0.213
894.00	2.65	27.7	100.0	4.2	1.2	1.2	27.4	6.637	0.222
908.00	2.65	35.2	100.0	16.7	0.0	0.0	35.2	7.643	0.247
912.00	2.66	28.5	100.0	4.2	2.6	2.6	27.7	7.047	0.227
919.00	2.66	31.2	100.0	0.0	5.0	0.0	31.2	6.658	0.243
934.60	2.64	26.5	100.0	25.0	0.0	0.0	26.5	4.006	0.211
952.50	2.74	33.0	100.0	100.0	31.8	31.8	22.5	4.160	0.425
976.50	2.65	35.5	100.0	4.2	0.0	0.0	35.5	6.241	0.253
997.00	2.66	28.5	87.8	15.0	2.9	2.9	27.7	9.265	0.228
1002.00	2.66	30.4	76.7	8.3	3.8	3.8	29.2	12.061	0.277
1022.00	2.66	26.3	100.0	10.8	3.8	3.8	25.3	5.966	0.138
1026.50	2.65	32.2	100.0	8.3	0.0	0.0	32.2	3.862	0.280
1032.00	2.64	28.4	100.0	33.3	0.0	0.0	28.4	3.581	0.283
1050.00	2.68	33.5	100.0	33.3	9.5	9.5	30.3	5.344	0.326
1067.00	2.67	30.9	40.6	4.2	7.3	4.2	29.6	23.504	0.286
1081.50	2.65	28.9	54.2	29.2	1.3	1.3	28.5	15.399	0.167
1092.00	2.63	31.7	75.7	10.0	0.0	0.0	31.7	13.281	0.503
1136.00	2.70	24.0	35.0	12.5	16.8	12.5	21.0	15.114	0.230
1146.00	2.68	24.2	31.2	8.3	10.0	8.3	22.2	22.276	0.293
1158.00	2.67	27.9	79.4	33.3	7.0	7.0	26.0	9.811	0.234
1167.00	2.65	28.5	67.0	33.3	0.0	0.0	28.5	12.116	0.243
1186.00	2.65	23.2	71.2	25.0	0.0	0.0	23.2	7.584	0.216
1192.00	2.65	30.1	44.4	14.2	1.2	1.2	29.7	20.330	0.271
1199.00	2.65	29.3	79.1	30.8	0.0	0.0	29.3	10.833	0.343
1208.00	2.66	29.4	88.9	45.8	4.9	4.9	27.9	9.710	0.259
1217.00	2.66	26.4	96.9	45.8	4.4	4.4	25.2	7.176	0.264
1230.00	2.64	26.6	72.5	33.3	0.0	0.0	26.6	9.766	0.212

Macalister #1 Latrobe
Vclay is min. of VclayDN, VclayGR & VclayRt. PHIE=(1-Vclay)*PHIT.
Clean matrix density=2.65 Clay matrix density=2.92 Rt clay=100.0.
RHOF=1.01 GR clean=20.00 GR clay=140.00.
Fluid DT=189.00 & clean matrix DT=55.50 microsec/ft.
RWA=(RT*PHIT^2.00)/1.00 RMFA=(Rxo*PHIT^2.00)/1.00 Son por comp fac=1.50.
**** Sonic porosity when RHOB<=1.95g/cc from 809.00 to 1425.00 meters.
**** Sonic porosity when Rxo<=0.00 from 0.00 to 0.00 meters.

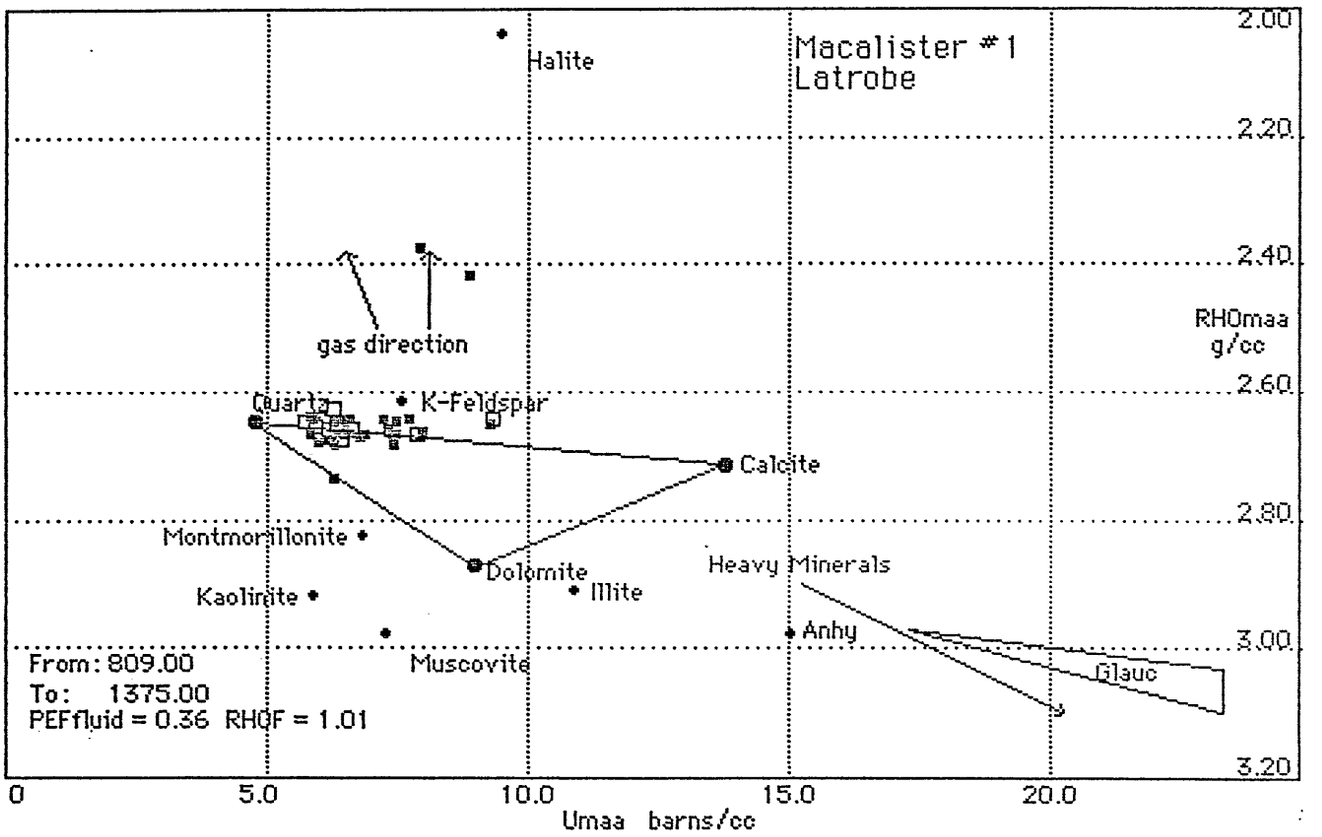
PRE EVALUATION

Depth meters	RHOma	PHIT	VclayRt	VclayGR	VclayDN	Vclay	PHIE	RWA	RMFA
1230.00	2.64	26.6	72.5	33.3	0.0	0.0	26.6	9.766	0.212
1238.00	2.68	28.4	84.2	58.3	10.4	10.4	25.4	9.559	0.242
1251.00	2.67	27.9	100.0	41.7	7.3	7.3	25.9	4.885	0.250
1261.00	2.67	27.9	89.6	39.2	7.3	7.3	25.9	8.715	0.250
1266.00	2.67	25.7	80.0	41.7	8.1	8.1	23.6	8.261	0.211
1288.00	2.67	23.8	100.0	33.3	7.2	7.2	22.1	3.555	0.227
1292.00	2.68	26.9	100.0	45.8	12.8	12.8	23.5	4.532	0.254
1306.00	2.66	24.2	100.0	35.8	5.4	5.4	22.8	5.148	0.292
1315.00	2.64	23.6	100.0	45.8	0.0	0.0	23.6	3.147	0.223
1320.00	2.66	26.4	100.0	33.3	4.7	4.7	25.2	4.368	0.349
1331.00	2.69	25.8	100.0	35.8	13.3	13.3	22.4	4.417	0.267
1342.00	2.66	24.5	100.0	26.7	3.7	3.7	23.6	5.941	0.186
1347.50	2.67	25.0	100.0	62.5	6.9	6.9	23.2	3.102	0.249
1360.00	2.66	24.2	100.0	45.8	5.6	5.6	22.8	4.357	0.292
1366.00	2.67	25.0	100.0	45.8	7.0	7.0	23.2	3.990	0.218
1375.00	2.67	25.0	100.0	47.5	7.0	7.0	23.2	1.870	0.249
1390.00	2.73	25.2	100.0	70.8	30.8	30.8	17.5	0.509	0.509
1425.00	2.71	26.1	100.0	58.3	24.0	24.0	19.8	0.409	0.191

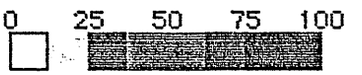


GR clean =20.0 GR clay =140.0

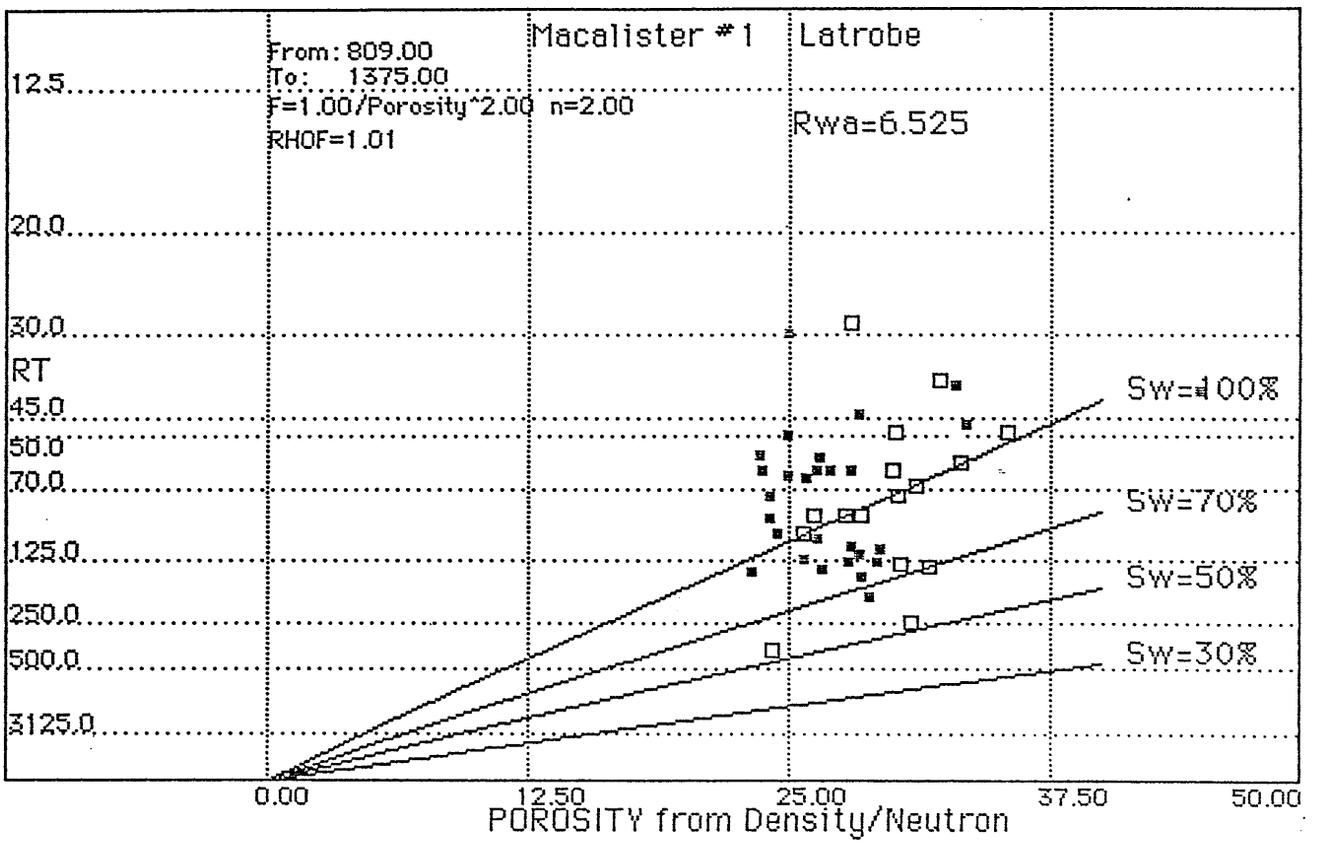
Vclay from the gamma ray.



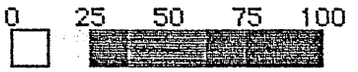
GR clean =20.0 GR clay =140.0



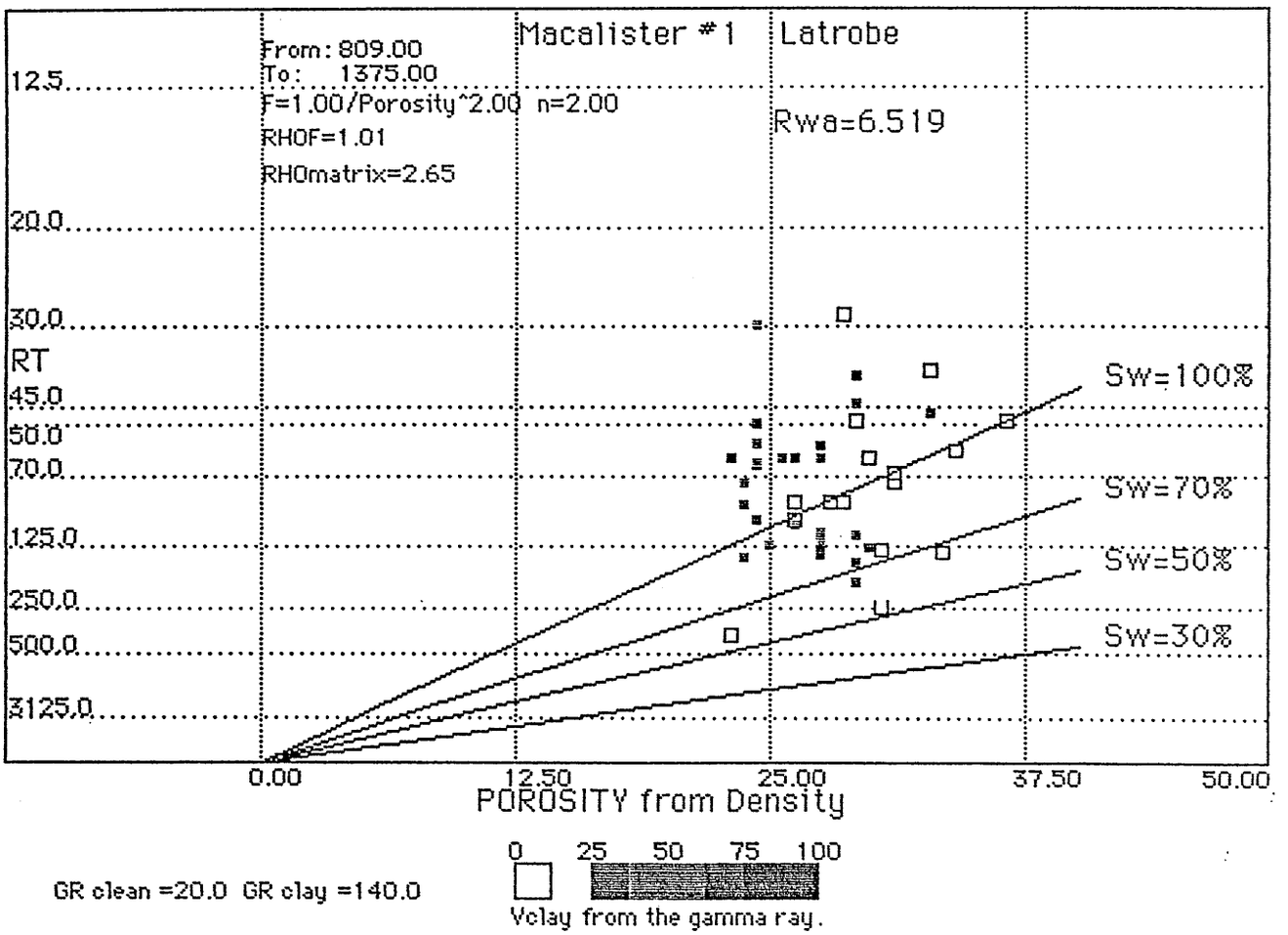
Vclay from the gamma ray.

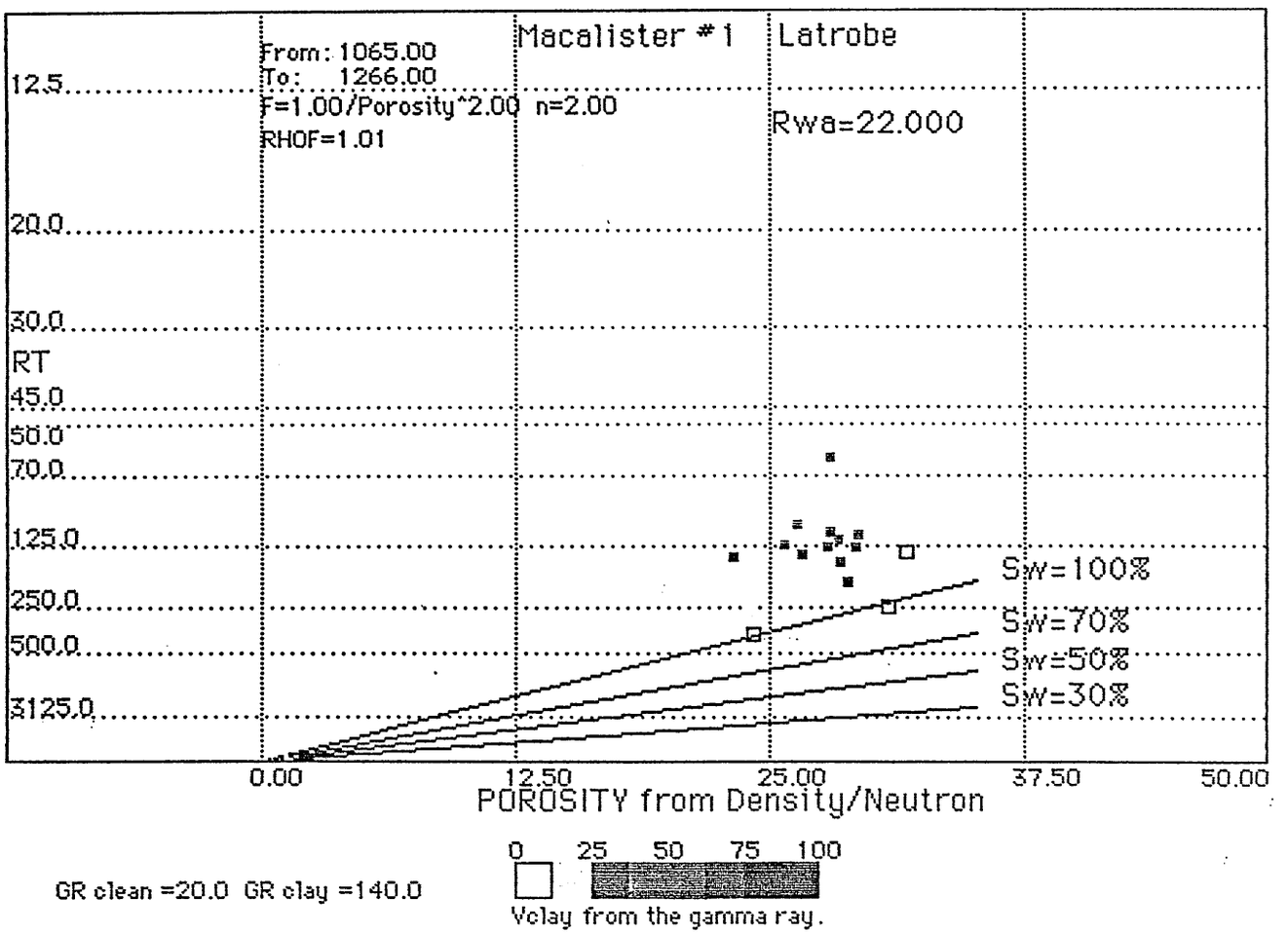


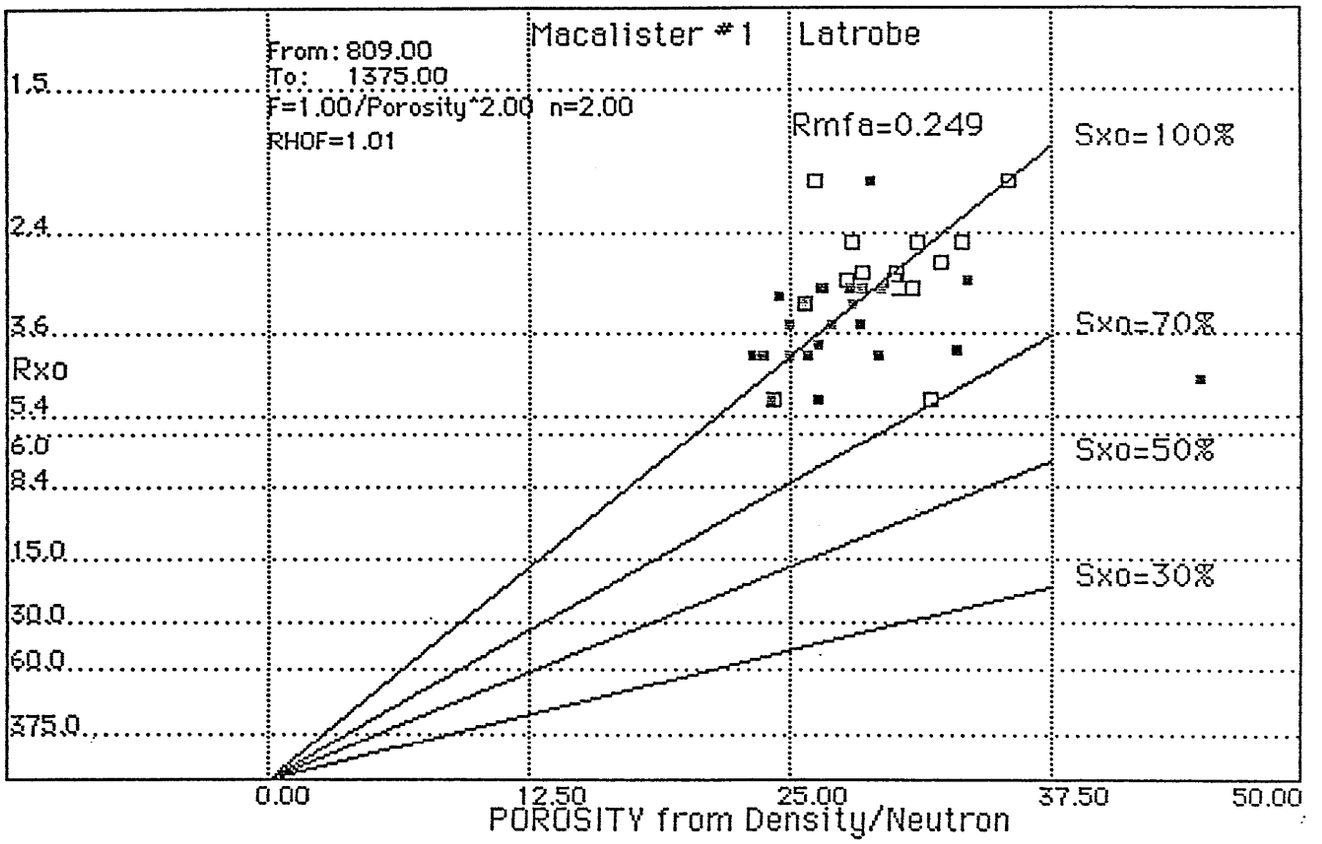
GR clean =20.0 GR clay =140.0



Vclay from the gamma ray.

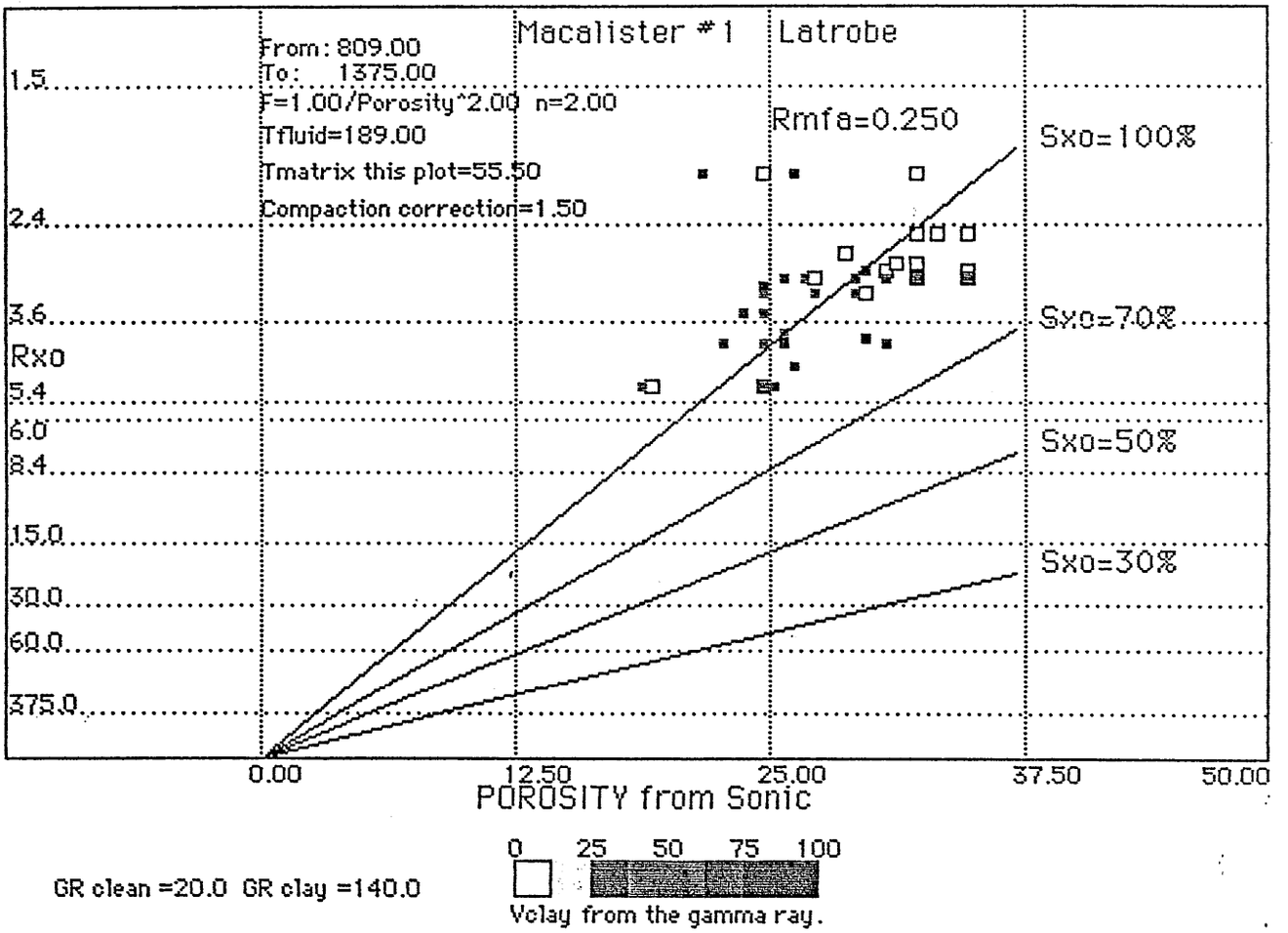

Macalister #1
Latrobe
From: 809.00
To: 1375.00
F=1.00/Porosity^2.00 n=2.00
RHOF=1.01
RHOmatrix=2.65
Rwa=6.519
12.5
20.0
30.0
RT
45.0
50.0
70.0
125.0
250.0
500.0
3125.0
Sw=100%
Sw=70%
Sw=50%
Sw=30%
0.00
12.50
25.00
37.50
50.00
POROSITY from Density
0
25
50
75
100
Vclay from the gamma ray.
GR clean =20.0 GR clay =140.0


From: 1065.00
To: 1266.00
F=1.00/Porosity^2.00 n=2.00
RHOF=1.01
Macalister #1
Latrobe
Rwa=22.000
12.5
20.0
30.0
RT
45.0
50.0
70.0
125.0
250.0
500.0
3125.0
Sw=100%
Sw=70%
Sw=50%
Sw=30%
0.00
12.50
25.00
37.50
50.00
POROSITY from Density/Neutron
GR clean =20.0 GR clay =140.0
0
25
50
75
100
Vclay from the gamma ray.



GR clean =20.0 GR clay =140.0

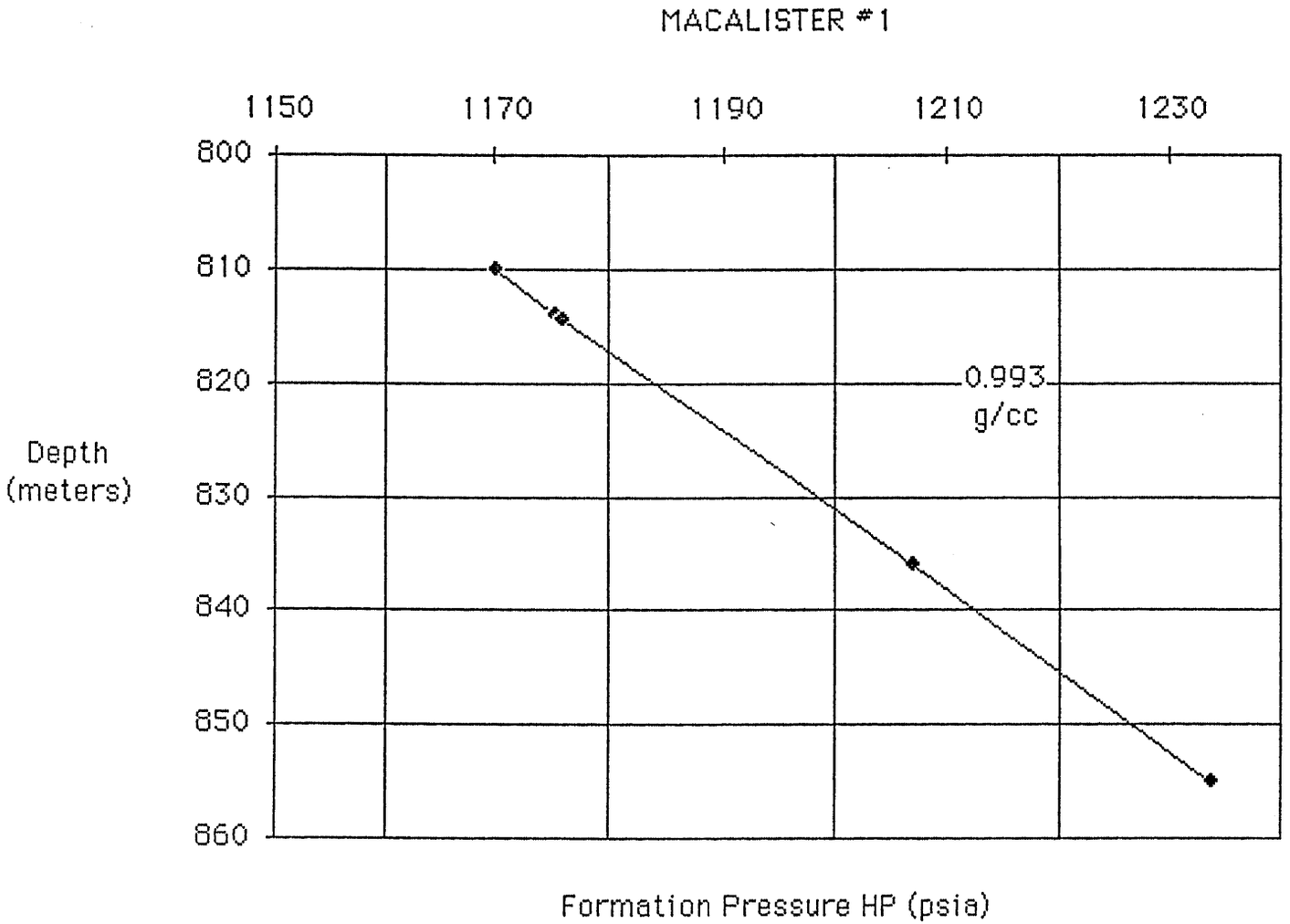
Vclay from the gamma ray.


Macalister #1
Latrobe
From: 809.00
To: 1375.00
F=1.00/Porosity^2.00 n=2.00
Tfluid=189.00
Tmatrix this plot=55.50
Compaction correction=1.50
Rmfa=0.250
Sxo=100%
Sxo=70%
Sxo=50%
Sxo=30%
Rxo
1.5
2.4
3.6
5.4
6.0
8.4
15.0
30.0
60.0
375.0
0.00
12.50
25.00
37.50
50.00
POROSITY from Sonic
0
25
50
75
100
Vclay from the gamma ray.
GR clean =20.0 GR clay =140.0

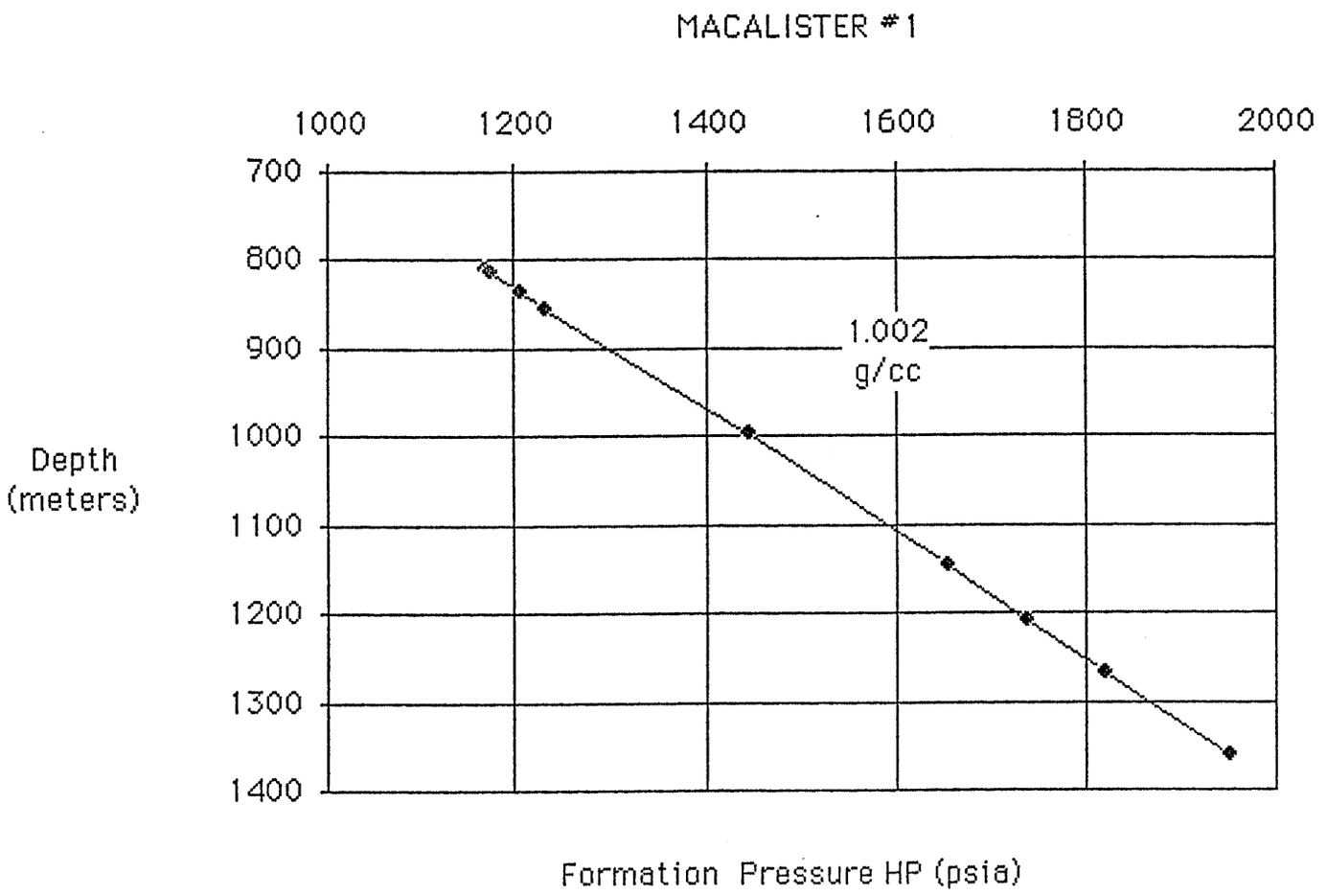
Macalister #1
Mud filtrate density=1.01 g/cc.
Surface temperature=80.00 deg. F. Bottom hole temperature=133.00 deg. F.
Surface depth=0.00 Meters. Total depth=1451.00 Meters.

DATA LISTING

Depth Meters	MSFL	LLS	LLD	RT	RHOB	NPHIls	NPHIc	GR	PEF	Sonic mcs/ft
809.00	2.00	13.00	21.00	26.58	1.45	33.0	34.7	60.0	2.5	108.0
810.00	4.50	18.00	30.00	39.17	1.70	24.0	25.3	67.0	3.0	108.0
814.00	2.50	18.00	23.00	28.59	2.18	23.0	23.8	17.0	2.2	125.0
836.00	2.80	30.00	40.00	49.48	2.17	27.0	27.9	20.0	2.1	120.0
841.00	2.10	30.00	40.00	49.29	2.07	32.0	33.1	37.0	2.0	123.0
842.00	2.50	33.00	48.00	59.37	2.09	28.0	29.0	30.0	1.9	122.0
850.50	2.30	31.00	41.00	50.54	2.11	29.0	30.0	37.0	2.1	120.0
855.00	2.90	30.00	50.00	62.41	2.16	26.0	26.9	30.0	2.0	125.0
877.50	3.00	45.00	60.00	73.90	2.14	25.0	26.0	30.0	2.0	125.0
883.00	3.20	48.00	81.00	100.37	2.22	21.0	21.8	25.0	2.1	115.0
894.00	2.90	45.00	70.00	86.53	2.19	23.0	23.9	25.0	2.1	117.0
908.00	2.00	32.00	50.00	61.79	2.06	30.0	31.2	40.0	2.0	122.0
912.00	2.80	40.00	70.00	86.89	2.18	24.0	25.0	25.0	2.0	118.0
919.00	2.50	30.00	55.00	68.60	2.14	27.0	28.0	20.0	2.1	120.0
934.60	3.00	32.00	46.00	57.07	2.20	21.0	21.9	50.0	2.0	125.0
952.50	3.90	20.00	30.00	38.19	2.17	33.0	34.1	180.0	2.0	115.0
976.50	2.00	28.00	40.00	49.41	2.05	30.0	31.3	25.0	3.0	120.0
997.00	2.80	49.00	92.00	113.96	2.18	24.0	25.0	38.0	2.0	115.0
1002.00	3.00	50.00	105.00	130.42	2.15	26.0	27.1	30.0	2.2	120.0
1022.00	2.00	42.00	70.00	86.32	2.22	22.0	23.0	33.0	2.1	105.0
1026.50	2.70	23.00	30.00	37.21	2.11	27.0	28.2	30.0	2.1	113.0
1032.00	3.50	22.00	35.00	44.32	2.17	23.0	24.1	60.0	2.0	103.0
1050.00	2.90	25.00	38.00	47.49	2.11	30.0	31.3	60.0	2.0	115.0
1067.00	3.00	90.00	200.00	246.48	2.15	27.0	28.2	25.0	2.6	110.0
1081.50	2.00	70.00	150.00	184.53	2.17	24.0	25.1	55.0	3.1	99.0
1092.00	5.00	50.00	105.00	132.13	2.10	25.0	26.2	32.0	2.1	105.0
1136.00	4.00	60.00	210.00	263.27	2.29	22.0	23.0	35.0	2.0	95.0
1146.00	5.00	60.00	300.00	380.32	2.27	21.0	22.0	30.0	2.2	94.0
1158.00	3.00	35.00	100.00	126.01	2.20	24.0	25.2	60.0	2.3	120.0
1167.00	3.00	50.00	120.00	149.35	2.17	23.0	24.2	60.0	2.6	114.0
1186.00	4.00	35.00	110.00	140.52	2.26	18.0	19.0	50.0	2.2	105.0
1192.00	3.00	50.00	180.00	225.08	2.15	25.0	26.3	37.0	3.0	112.0
1199.00	4.00	40.00	100.00	126.38	2.16	24.0	25.3	57.0	2.5	117.0
1208.00	3.00	40.00	90.00	112.48	2.17	25.0	26.3	75.0	2.1	109.0
1217.00	3.80	27.00	80.00	103.23	2.22	22.0	23.2	75.0	2.2	107.0
1230.00	3.00	40.00	110.00	137.94	2.20	21.0	22.2	60.0	2.2	117.0
1238.00	3.00	41.00	95.00	118.71	2.20	25.0	26.3	90.0	2.0	107.0
1251.00	3.20	30.00	50.00	62.58	2.20	24.0	25.2	70.0	2.2	105.0
1261.00	3.20	50.00	90.00	111.60	2.20	24.0	25.3	67.0	2.5	114.0
1266.00	3.20	43.00	100.00	125.02	2.24	22.0	23.2	70.0	2.3	110.0
1288.00	4.00	32.00	50.00	62.70	2.27	20.0	21.1	60.0	2.0	105.0
1292.00	3.50	32.00	50.00	62.46	2.23	24.0	25.2	75.0	2.1	105.0
1306.00	5.00	40.00	70.00	88.22	2.26	20.0	21.1	63.0	2.5	106.0
1315.00	4.00	30.00	45.00	56.42	2.25	18.0	19.1	75.0	2.5	101.0
1320.00	5.00	35.00	50.00	62.65	2.22	22.0	23.2	60.0	2.7	105.0
1331.00	4.00	35.00	53.00	66.19	2.25	23.0	24.2	63.0	2.5	107.0
1342.00	3.10	50.00	80.00	98.90	2.25	20.0	21.2	52.0	2.5	105.0
1347.50	4.00	30.00	40.00	49.82	2.25	21.0	22.2	95.0	2.2	105.0
1360.00	5.00	50.00	60.00	74.54	2.26	20.0	21.2	75.0	2.2	93.0
1366.00	3.50	42.00	52.00	64.03	2.25	21.0	22.2	75.0	2.5	105.0
1375.00	4.00	30.00	30.00	30.00	2.25	21.0	22.2	77.0	2.5	105.0
1390.00	8.00	8.00	8.00	8.00	2.30	25.0	26.2	105.0	2.5	95.0
1425.00	2.80	6.00	6.00	6.00	2.27	25.0	26.3	90.0	3.3	85.0



[(1233.58-1170.07)/((855-810)*3.281)]/0.433=0.993 g/cc



[(1952.87-1170.07)/((1360-810)*3.281)]/0.433=1.002 g/cc

MACALISTER #1

Formation Press	Depth (meters)
1170.07	810
1175.4	814
1176.06	814.4
1207.15	836
1233.58	855
1444.24	998
1653.7	1146
1738.9	1208
1820.87	1266
1952.87	1360

MACALISTER #1

FIELD LOG EVALUATION

MACALISTER #1 Field evaluation
RHOF=1.01.
Fluid DT=189.00 & clean matrix DT=55.50 microsec/ft.
Rw=6.420 everywhere except from 0.00 to 0.00 where Rw=6.420.
Rmf=0.250 a=1.00 m=2.00 n=2.00 Sonic por. comp. factor=1.00.
PHIE cutoff sets Sw and Sxo to 100% below 0.0 % porosity.
Coal is detected if RHOB<1.50 or if NPHI>55.0
or if Sonic>140.0 microsec/ft.
SwArch^n=(a*Rw)/(RT*PHIT^m)
**** Sonic porosity when RHOB<=0.00g/cc from 0.00 to 0.00 meters.
**** Sonic porosity when MSFL<=0.00 from 0.00 to 0.00 meters.

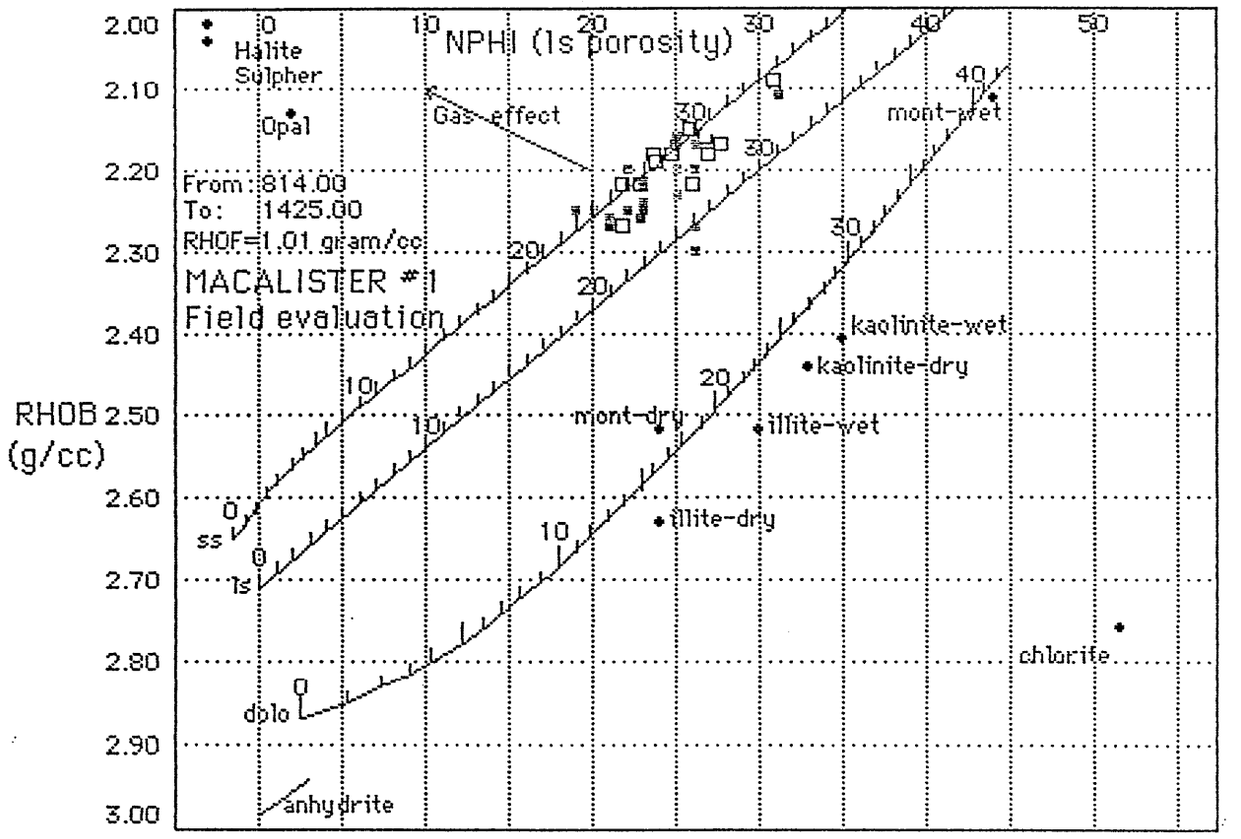
EVALUATION

Depth meters	RHOma	PHIT	Vclay	PHIE	SwArch	SxoArch
814.00	2.65	28.0	0.0	28.0	100.0	100.0
836.00	2.68	30.1	0.0	30.1	100.0	100.0
841.00	2.67	35.7	0.0	35.7	100.0	100.0
842.00	2.66	34.1	0.0	34.1	96.4	96.4
850.50	2.67	33.4	0.0	33.4	100.0	100.0
855.00	2.66	30.0	0.0	30.0	100.0	100.0
877.50	2.65	29.9	0.0	29.9	98.6	98.6
883.00	2.65	25.8	0.0	25.8	98.1	100.0
894.00	2.65	27.7	0.0	27.7	98.4	100.0
908.00	2.65	35.1	0.0	35.1	91.7	100.0
912.00	2.66	28.5	0.0	28.5	95.5	100.0
997.00	2.67	29.4	0.0	29.4	80.8	100.0
1002.00	2.66	30.4	0.0	30.4	73.0	95.0
1022.00	2.66	26.3	0.0	26.3	100.0	100.0
1035.00	2.65	28.8	0.0	28.8	100.0	100.0
1050.00	2.68	33.5	0.0	33.5	100.0	100.0
1092.00	2.69	27.6	0.0	27.6	79.8	81.0
1136.00	2.69	23.9	0.0	23.9	65.2	100.0
1146.00	2.68	24.2	0.0	24.2	53.7	92.5
1158.00	2.67	27.9	0.0	27.9	81.0	100.0
1167.00	2.65	28.9	0.0	28.9	71.7	99.9
1186.00	2.68	25.0	0.0	25.0	85.6	100.0
1199.00	2.65	29.2	0.0	29.2	77.1	85.5
1208.00	2.66	29.4	0.0	29.4	81.4	98.3
1217.00	2.66	26.3	0.0	26.3	94.7	97.4
1230.00	2.64	26.6	0.0	26.6	81.2	100.0
1238.00	2.68	28.3	0.0	28.3	82.0	100.0
1251.00	2.67	27.9	0.0	27.9	100.0	100.0
1261.00	2.67	27.9	0.0	27.9	85.9	100.0
1266.00	2.67	25.7	0.0	25.7	88.4	100.0
1288.00	2.67	23.8	0.0	23.8	100.0	100.0
1292.00	2.68	26.9	0.0	26.9	100.0	100.0
1306.00	2.66	24.1	0.0	24.1	100.0	100.0
1315.00	2.64	23.6	0.0	23.6	100.0	100.0
1320.00	2.66	26.4	0.0	26.4	100.0	100.0
1331.00	2.68	25.4	0.0	25.4	100.0	100.0
1342.00	2.64	25.5	0.0	25.5	99.9	100.0
1347.50	2.67	24.9	0.0	24.9	100.0	100.0
1360.00	2.66	24.1	0.0	24.1	100.0	100.0
1366.00	2.65	24.1	0.0	24.1	100.0	100.0
1375.00	2.67	24.9	0.0	24.9	100.0	100.0
1390.00	2.73	25.2	0.0	25.2	100.0	100.0
1425.00	2.71	26.1	0.0	26.1	100.0	100.0

MACALISTER #1 Field evaluation
Vclay is min. of VclayDN, VclayGR & VclayRt. PHIE=(1-Vclay)*PHIT.
Clean matrix density=2.65 Clay matrix density=2.92 Rt clay=5.0.
RHOF=1.01 GR clean=20.00 GR clay=140.00.
Fluid DT=189.00 & clean matrix DT=55.50 microsec/ft.
RWA=(RT*PHIT^2.00)/1.00 RMFA=(Rxo*PHIT^2.00)/1.00 Son por comp fac=1.00.
**** Sonic porosity when RHOB<=0.00g/cc from 0.00 to 0.00 meters.
**** Sonic porosity when Rxo<=0.00 from 0.00 to 0.00 meters.

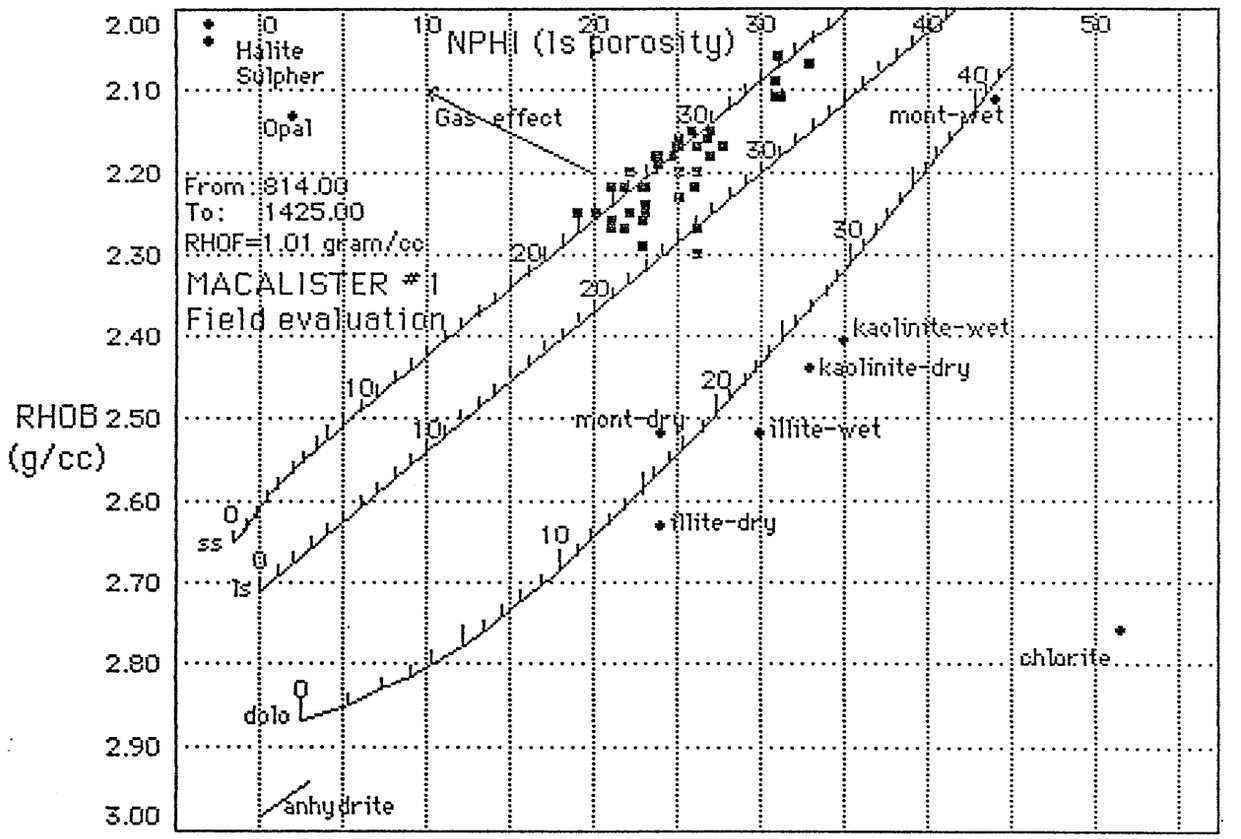
PRE EVALUATION

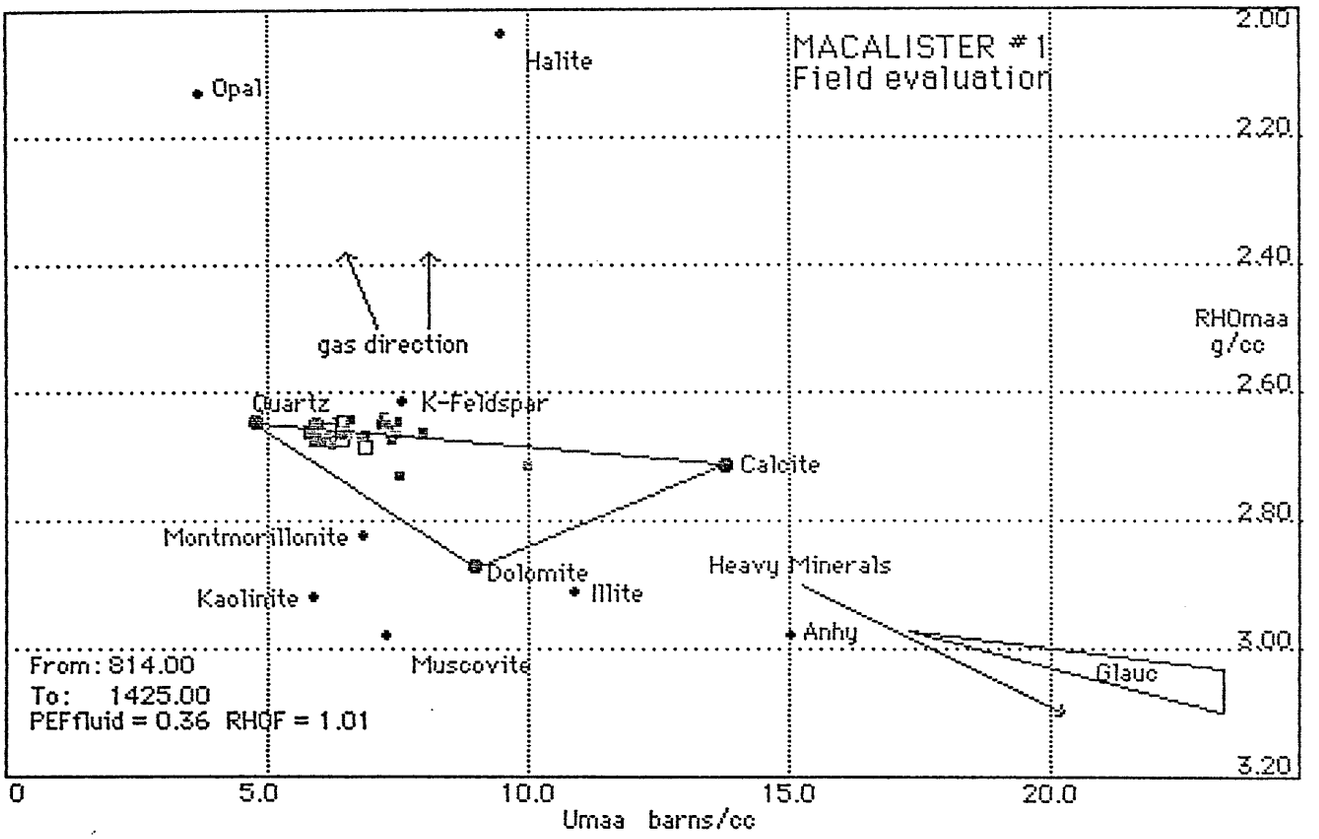
Depth meters	RHOma	PHIT	VclayRt	VclayGR	VclayDN	Vclay	PHIE	RWA	RMFA
814.00	2.65	28.0	26.9	0.0	0.0	0.0	28.0	2.239	0.196
836.00	2.68	30.1	21.1	0.0	10.0	0.0	30.1	4.478	0.253
841.00	2.67	35.7	21.2	14.2	7.7	7.7	32.9	6.262	0.254
842.00	2.66	34.1	19.2	8.3	5.0	5.0	32.4	6.904	0.291
850.50	2.67	33.4	20.9	14.2	8.7	8.7	30.5	5.649	0.257
855.00	2.66	30.0	18.7	8.3	5.1	5.1	28.5	5.613	0.261
877.50	2.65	29.9	16.9	8.3	0.1	0.1	29.9	6.605	0.268
883.00	2.65	25.8	13.7	4.2	0.1	0.1	25.8	6.671	0.213
894.00	2.65	27.7	15.3	4.2	1.1	1.1	27.4	6.628	0.222
908.00	2.65	35.1	18.8	16.7	0.0	0.0	35.1	7.632	0.247
912.00	2.66	28.5	15.2	4.2	2.5	2.5	27.8	7.037	0.227
997.00	2.67	29.4	12.4	8.3	9.1	8.3	26.9	9.831	0.242
1002.00	2.66	30.4	11.0	12.5	3.7	3.7	29.3	12.043	0.277
1022.00	2.66	26.3	15.3	10.8	3.7	3.7	25.3	5.956	0.138
1035.00	2.65	28.8	24.3	33.3	1.0	1.0	28.6	3.059	0.291
1050.00	2.68	33.5	21.6	29.2	9.3	9.3	30.4	5.336	0.326
1092.00	2.69	27.6	10.8	10.0	13.4	10.0	24.9	10.076	0.381
1136.00	2.69	23.9	3.6	12.5	16.6	3.6	23.1	15.087	0.229
1146.00	2.68	24.2	0.0	8.3	9.9	0.0	24.2	22.235	0.292
1158.00	2.67	27.9	11.3	33.3	6.8	6.8	26.0	9.793	0.233
1167.00	2.65	28.9	9.5	33.3	1.4	1.4	28.5	12.471	0.251
1186.00	2.68	25.0	10.2	29.2	11.3	10.2	22.4	8.763	0.249
1199.00	2.65	29.2	11.3	30.8	0.0	0.0	29.2	10.812	0.342
1208.00	2.66	29.4	12.5	45.8	4.7	4.7	28.0	9.692	0.259
1217.00	2.66	26.3	13.4	45.8	4.2	4.2	25.2	7.162	0.264
1230.00	2.64	26.6	10.4	33.3	0.0	0.0	26.6	9.747	0.212
1238.00	2.68	28.3	11.9	33.3	10.2	10.2	25.4	9.541	0.241
1251.00	2.67	27.9	18.7	41.7	7.1	7.1	25.9	4.876	0.249
1261.00	2.67	27.9	12.6	39.2	7.1	7.1	25.9	8.698	0.249
1266.00	2.67	25.7	11.4	41.7	7.9	7.9	23.6	8.213	0.211
1288.00	2.67	23.8	18.6	33.3	7.0	7.0	22.1	3.547	0.226
1292.00	2.68	26.9	18.7	45.8	12.6	12.6	23.5	4.523	0.253
1306.00	2.66	24.1	15.1	35.8	5.2	5.2	22.9	5.137	0.291
1315.00	2.64	23.6	19.8	45.8	0.0	0.0	23.6	3.140	0.223
1320.00	2.66	26.4	18.7	33.3	4.5	4.5	25.2	4.359	0.348
1331.00	2.68	25.4	18.1	35.8	9.9	9.9	22.9	4.258	0.257
1342.00	2.64	25.5	13.9	23.3	0.0	0.0	25.5	6.432	0.202
1347.50	2.67	24.9	21.1	62.5	6.7	6.7	23.2	3.095	0.249
1360.00	2.66	24.1	16.8	45.8	5.4	5.4	22.9	4.348	0.292
1366.00	2.65	24.1	18.4	45.8	0.4	0.4	24.0	3.704	0.202
1375.00	2.67	24.9	26.4	47.5	6.8	6.8	23.2	1.866	0.249
1390.00	2.73	25.2	62.5	70.8	30.5	30.5	17.5	0.508	0.508
1425.00	2.71	26.1	83.3	58.3	23.7	23.7	19.9	0.408	0.190



GR clean =20.0 GR clay =140.0

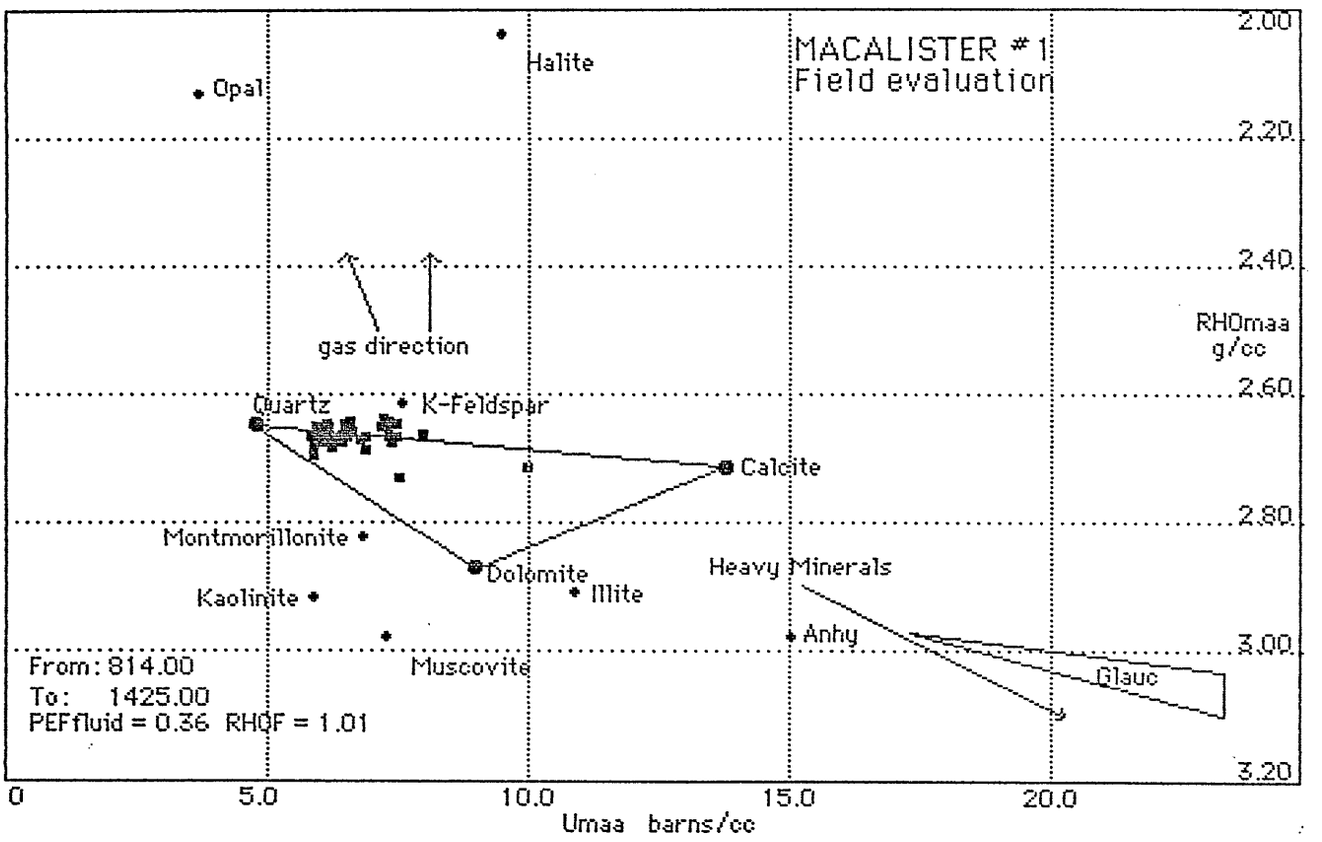
Vclay from the gamma ray.

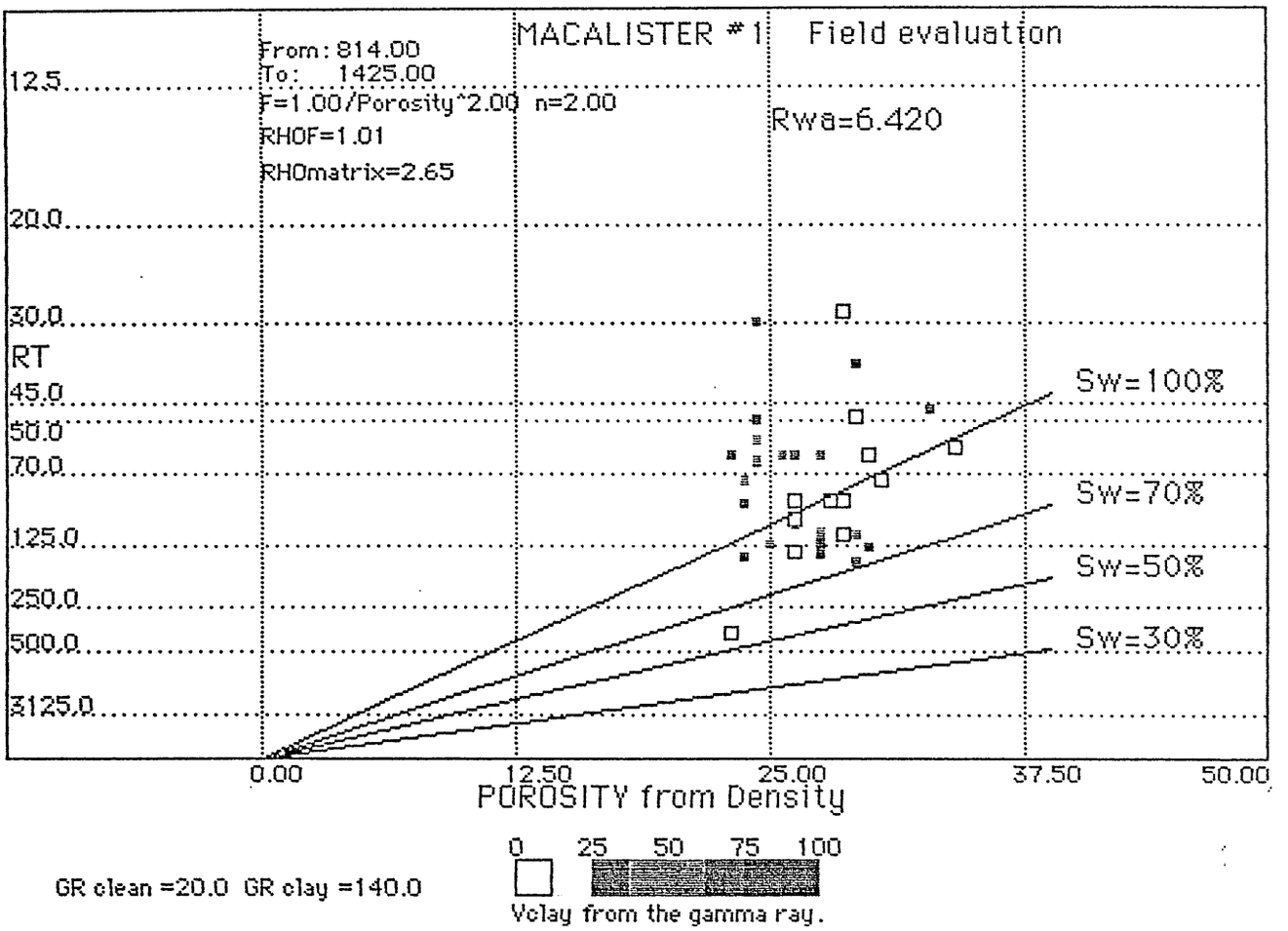

NPHI (ls porosity)
RHOB (g/cc)
Halite
Sulpher
Opal
Gas effect
From: 814.00
To: 1425.00
RHOF=1.01 gram/cc
MACALISTER #1
Field evaluation
mont-wet
kaolinite-wet
kaolinite-dry
mont-dry
illite-wet
illite-dry
chlorite
ss
ls
dolo
anhydrite

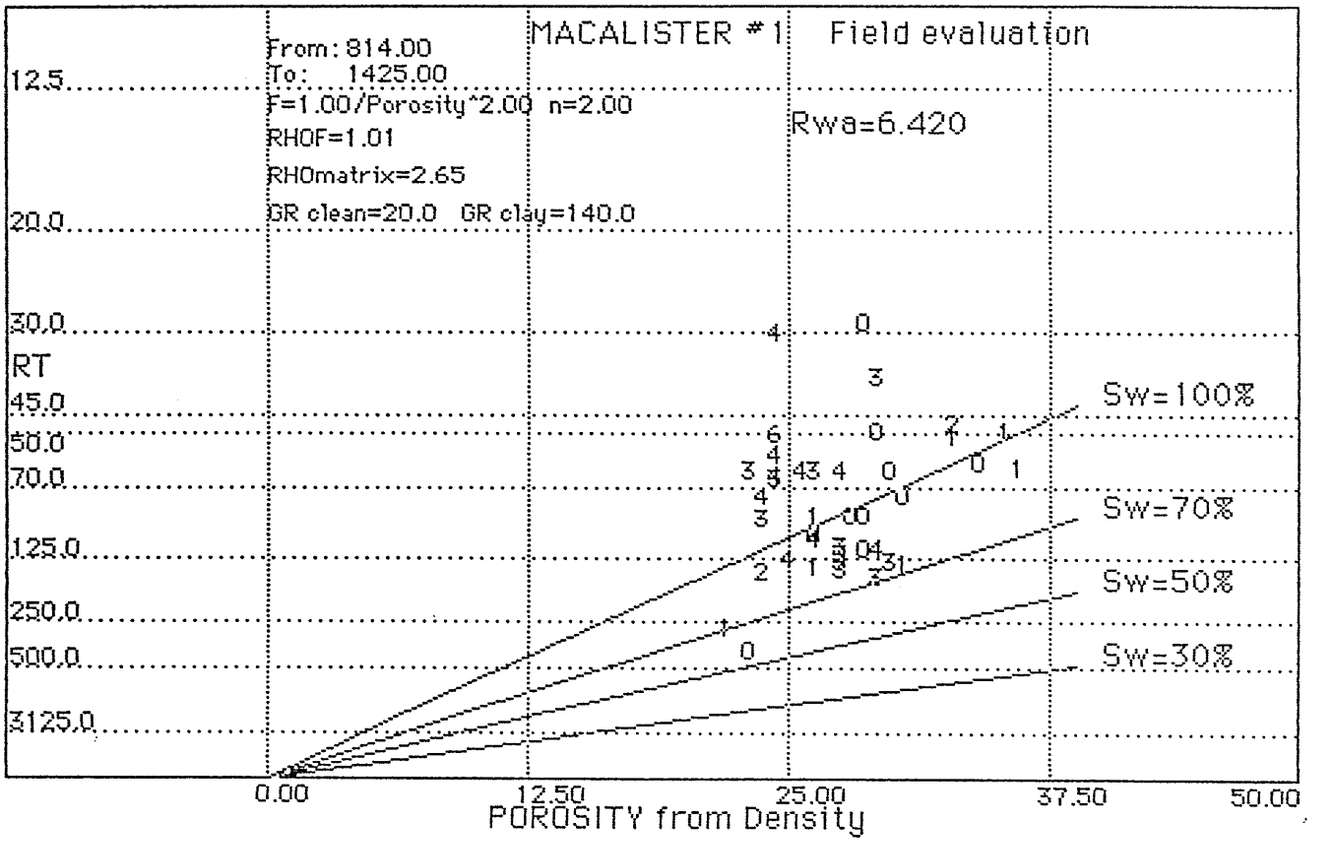


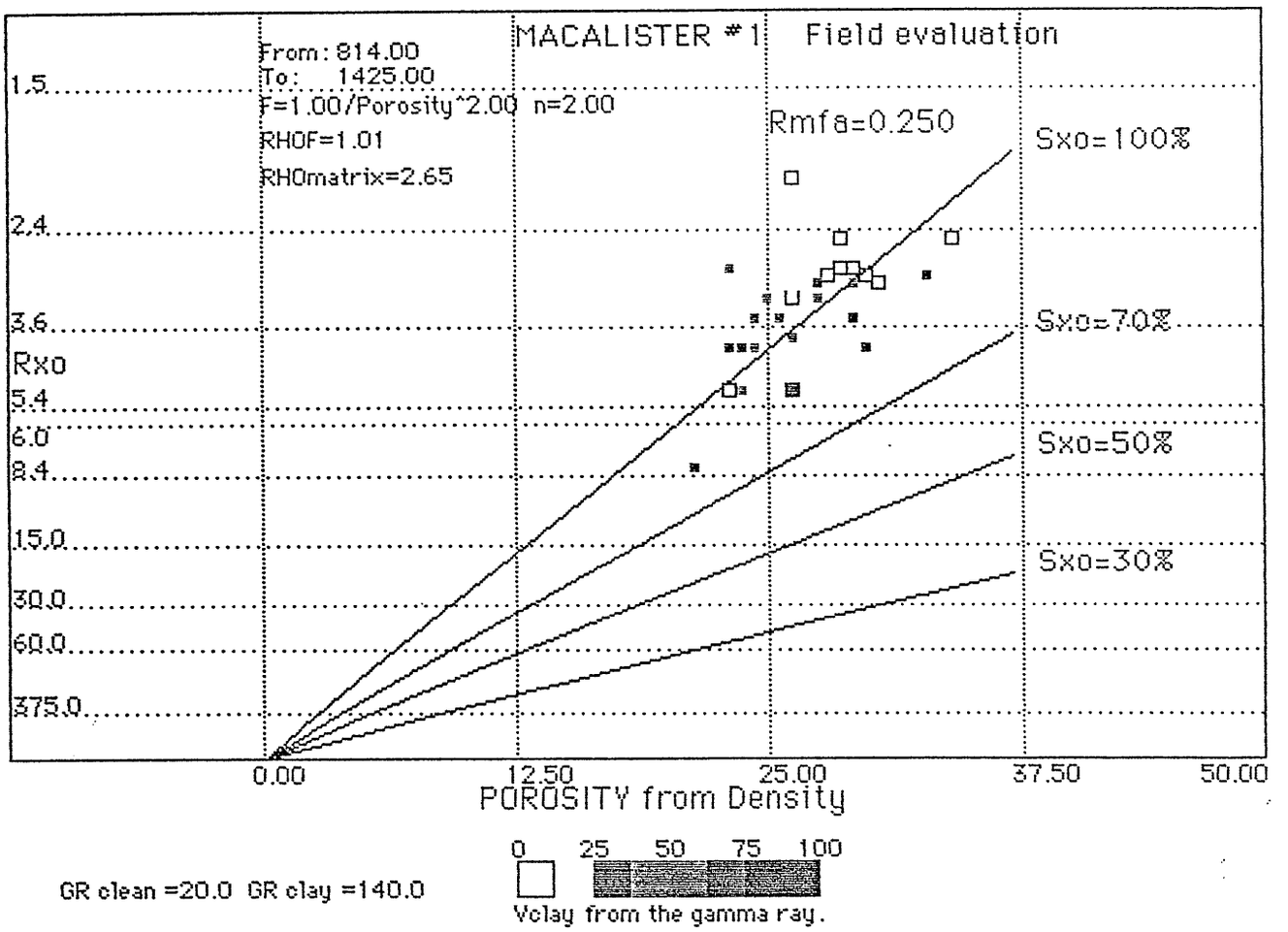
GR clean =20.0 GR clay =140.0

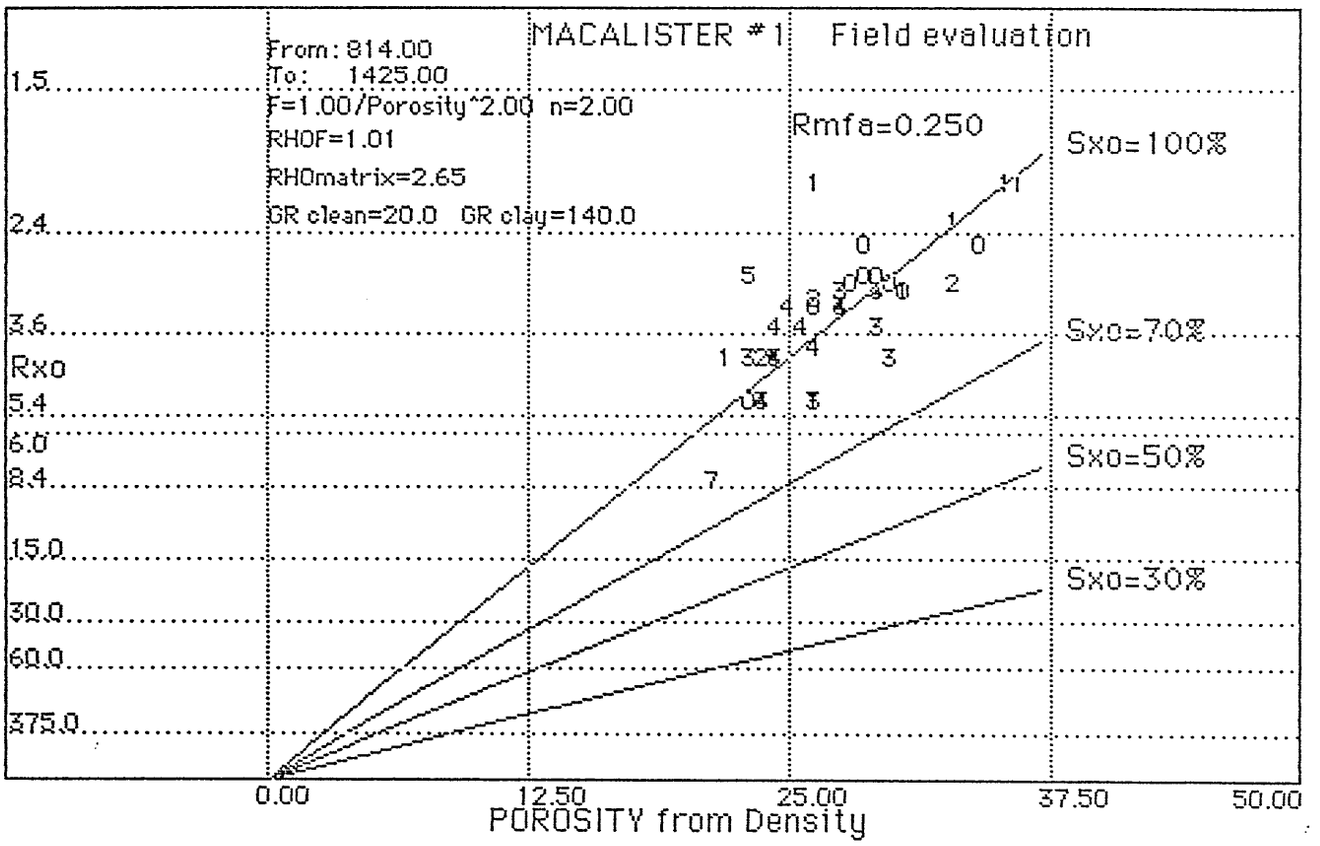
Vclay from the gamma ray.


MACALISTER # 1
Field evaluation
Halite
Opal
gas direction
Quartz
K-Feldspar
Calcite
Montmorillonite
Dolomite
Illite
Kaolinite
Muscovite
Heavy Minerals
Anhy
Glauc
From: 814.00
To: 1425.00
PEFfluid = 0.36 RHOF = 1.01
2.00
2.20
2.40
2.60
2.80
3.00
3.20
RHOmaa
g/cc
0
5.0
10.0
15.0
20.0
Umaa barns/cc


From: 814.00
To: 1425.00
F=1.00/Porosity^2.00 n=2.00
RHOF=1.01
RHOmatrix=2.65
MACALISTER #1 Field evaluation
Rwa=6.420
12.5
20.0
30.0
RT
45.0
50.0
70.0
125.0
250.0
500.0
3125.0
Sw=100%
Sw=70%
Sw=50%
Sw=30%
0.00
12.50
25.00
37.50
50.00
POROSITY from Density
GR clean =20.0 GR clay =140.0
0 25 50 75 100
Vclay from the gamma ray.

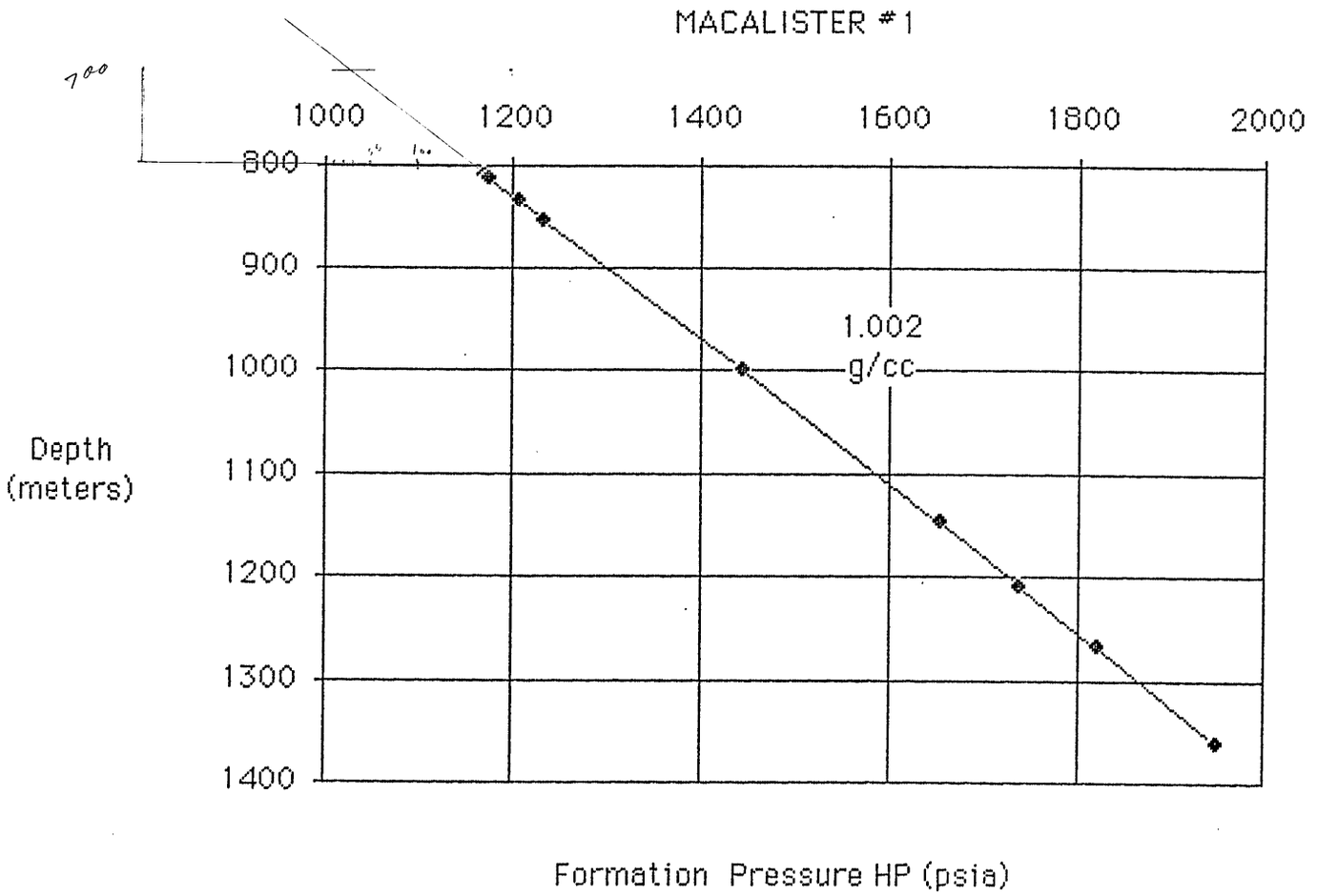

MACALISTER # 1 Field evaluation
From: 814.00
To: 1425.00
F=1.00/Porosity^2.00 n=2.00
RHOF=1.01
RHOmatrix=2.65
GR clean=20.0 GR clay=140.0
Rwa=6.420
12.5
20.0
30.0
RT
45.0
50.0
70.0
125.0
250.0
500.0
3125.0
Sw=100%
Sw=70%
Sw=50%
Sw=30%
0.00
12.50
25.00
37.50
50.00
POROSITY from Density


MACALISTER #1 Field evaluation
From: 814.00
To: 1425.00
F=1.00/Porosity^2.00 n=2.00
RHOF=1.01
RHOmatrix=2.65
Rmfa=0.250
Sxo=100%
Sxo=70%
Sxo=50%
Sxo=30%
Rxo
1.5
2.4
3.6
5.4
6.0
8.4
15.0
30.0
60.0
375.0
0.00
12.50
25.00
37.50
50.00
POROSITY from Density
0
25
50
75
100
Vclay from the gamma ray.
GR clean =20.0 GR clay =140.0


MACALISTER #1 Field evaluation
From: 814.00
To: 1425.00
F=1.00/Porosity^2.00 n=2.00
RHOF=1.01
RHOmatrix=2.65
GR clean=20.0 GR clay=140.0
Rmfa=0.250
Sxo=100%
Sxo=70%
Sxo=50%
Sxo=30%
Rxo
1.5
2.4
3.6
5.4
6.0
8.4
15.0
30.0
60.0
375.0
0.00
12.50
25.00
37.50
50.00
POROSITY from Density

MACALISTER #1

Formation Press	Depth (meters)
1170.07	810
1175.4	814
1176.06	814.4
1207.15	836
1233.58	855
1444.24	998
1653.7	1146
1738.9	1208
1820.87	1266
1952.87	1360



Bowler Log Consulting Services Pty Ltd

APPENDIX 9

APPENDIX 9

WATER ANALYSIS

Water Analysis Report Job No. 2894/88 Method W2/1 Page W1

Sample ID. MACALISTER 1

Chemical Composition			
		mg/L	me/L
Cations			
Calcium	(Ca)	41.0	2.046
Magnesium	(Mg)	19.0	1.564
Sodium	(Na)	680.0	29.578
Potassium	(K)	16.5	0.422
Anions			
Hydroxide	(OH)		
Carbonate	(CO3)		
Bi-Carbonate	(HCO3)	578.9	9.490
Sulphate	(SO4)	55.0	1.145
Chloride	(Cl)	912	25.701
Nitrate	(NO3)	<0.1	

Other Analyses

Reaction - pH	6.9
Conductivity (E.C) (micro -S/cm at 25°C)	3550
Resistivity Ohm.M at 25°C	2.817

Derived Data	mg/L
Total Dissolved Solids	
A. Based on E.C.	2041
B. Calculated (HCO3=CO3)	2013
Total Hardness	181
Carbonate Hardness	181
Non-Carbonate Hardness	
Total Alkalinity (Each as CaCO3)	541

Totals and Balance			
Cations (me/L)	33.6	Diff=	2.73
Anions (me/L)	36.3	Sum =	69.95
ION BALANCE (Diff*100/Sum) =			3.90%
Sodium / Total Cation Ratio			88.0%

Remarks

IMBALANCE UNKNOWN ALL RESULTS CHECKED AND VERIFIED

Note: mg/L = Milligrams per litre
me/L = MilliEqivs.per litre

Name: ATIZVAR PTY LTD
Address: P.O BOX 251
NORWOOD
ADELAIDE 5067

Date Collected 3-4-88
Date Received 6-4-88
Collected by D.A SHORT

Formation LATROBE GROUP
Type
Point
Time
Interval
Geologist
Depth 814METRES

amdel
technology and enterprise

Amdel Limited
(Incorporated in S.A.)
31 Flemington Street,
Frewville, S.A. 5063

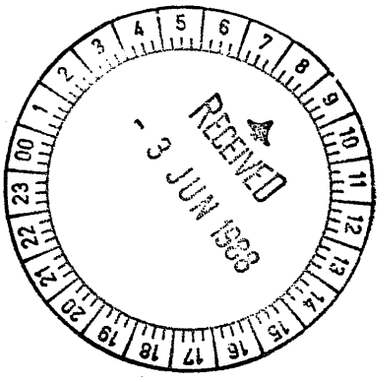
Telephone: (08) 372 2700

P.O. Box 114,
Eastwood, S.A. 5063

Telex: AA82520
Facsimile: (08) 79 6623

NATA CERTIFICATE

27 May 1988



Mr D. Barrenger
Crusader Resources N.L.
27th Level
12 Creek Street
BRISBANE QLD 4000

REPORT AC 2894/88

YOUR REFERENCE:	Letter dated 6 April 1988
REPORT COMPRISING:	Cover Sheet Page W1 Well: MacAlister #1
DATE RECEIVED:	6 April 1988
Approved Signatory:	Don Patterson

D. Patterson

Manager, Chemistry Services

for Dr William G. Spencer
General Manager
Applied Sciences Group

The report relates specifically to the sample tested and also to the entire batch in so far as the sample is truly representative of the sample source.

APPENDIX 10

APPENDIX 10

WELL VELOCITY SURVEY

Schlumberger

CRUSADER RESOURCES N.L.

GEOGRAM PROCESSING REPORT

MACALISTER - 1

FIELD : WILDCAT

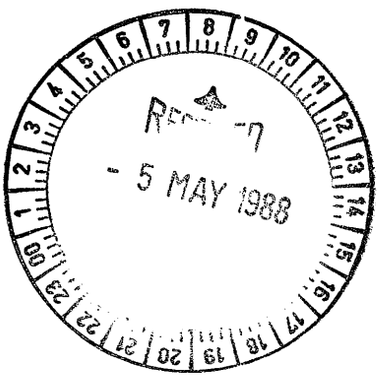
STATE : QUEENSLAND

COUNTRY : AUSTRALIA

COORDINATES : 038 deg 21' 02.36" S
147 deg 08' 16.00" E

DATE OF SURVEY : 02-APRIL-1987

REFERENCE NO. : 569150



Contents

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List of Figures

1. Introduction

A checkshot survey was shot in the Macalister - 1 well on 2 April 1988. Data was acquired using a dynamite source located near the wellhead. Twenty levels were shot from 1447 metres to 20 metres below KB. All levels are used in the sonic calibration processing.

2. Data Acquisition

The data was acquired using the well seismic tool (WST). Recording was made on the Schlumberger Cyber Service Unit (CSU) using LIS format at a tape density of 800 BPI.

Table 1: Survey Parameters

Datum	MSL
Elevation KB	20.0 metres AMSL
Elevation DF	19.5 metres AMSL
Elevation GL	16.0 metres AMSL
Total Depth	1447.0 metres below KB
Energy Source	Dynamite
Source Offset	33 metres
Source Depth	1 metre
Reference Sensor	Hydrophone
Sensor Offset	3 metres from shot
Downhole Geophone	Geospace HS-1
	High Temp. (350 deg F)
	Coil Resist. 225Ω $\pm$10 %
	Natural Freq. 8-12 hertz
	Sensitivity 0.45 V/in/sec
	Maximum tilt angle 60 deg

3. Sonic Calibration Processing

3.1 Sonic Calibration

A 'drift' curve is obtained using the sonic log and the vertical check level times. The term 'drift' is defined as the seismic time (from check shots) minus the sonic time (from integration of edited sonic). Commonly the word 'drift' is used to identify the above difference, or to identify the gradient of drift versus increasing depth, or to identify a difference of drift between two levels.

The gradient of drift, that is the slope of the drift curve, can be negative or positive.

For a negative drift $\frac{\Delta drift}{\Delta depth} < 0$, the sonic time is greater than the seismic time over a certain section of the log.

For a positive drift $\frac{\Delta drift}{\Delta depth} > 0$, the sonic time is less than the seismic time over a certain section of the log.

The drift curve, between two levels, is then an indication of the error on the integrated sonic or an indication of the amount of correction required on the sonic to have the TTI of the corrected sonic match the check shot times.

Two methods of correction to the sonic log are used.

1. **Uniform or block shift** This method applies a uniform correction to all the sonic values over the interval. This uniform correction is applied in the case of positive drift and is the average correction represented by the drift curve gradient expressed in μsec/ft.

2. ΔT **Minimum** In the case of negative drift a second method is used, called Δt minimum. This applies a differential correction to the sonic log, where it is assumed that the greatest amount of transit time error is caused by the lower velocity sections of the log. Over a given interval the method will correct only Δt values which are higher than a threshold, the Δt_{min}. Values of Δt which are lower than the threshold are not corrected. The correction is a reduction of the excess of Δt over Δt_{min}, Δt - Δt_{min}.

   $\Delta t - \Delta t_{min}$ is reduced through multiplication by a reduction coefficient which remains constant over the interval. This reduction coefficient, named G, can be be defined as:

   $$G = 1 + \frac{drift}{\int (\Delta t - \Delta t_{min}) dZ}$$

   Where drift is the drift over the interval to be corrected and the value $\int (\Delta t - \Delta t_{min}) dZ$ is the time difference between the integrals of the two curves Δt and Δt_{min}, only over the intervals where $\Delta t > \Delta t_{min}$.

   Hence the corrected sonic: $\Delta t = G(\Delta t - \Delta t_{min}) + \Delta t_{min}$.

3.2 Checkshot Data

The hydrophone break times are of good quality and are consistent with instantaneous source detonation. The shot delay time of 20 millisecs is used as the zero time reference. The checkshot data quality is good and is displayed in Figure 2.

3.3 Correction to Datum

The sonic calibration processing has been referenced to the seismic datum at MSL. A surface velocity of 700 metres/sec is used to correct transit times to datum. The equivalent static time from source depth to datum is -21.43 msec one way time.

3.4 Open Hole Logs

The sonic log was recorded from 1447 metres to the casing shoe at 179 metres below KB. The density log was recorded up to 750 metres and is extrapolated to the surface at a constant density of 2.1 gm/cc.

The caliper and gamma ray curves are included as correlation curves.

3.5 Sonic Calibration Results

The top of the sonic log (179 metres below KB) is chosen as the origin for the calibration drift curve.

The drift curve indicates a number of corrections to be made to the sonic log. The adjusted sonic curve is considered to be the best result using the available data. A list of shifts used on the sonic data is given below.

Table 2: Sonic Drift

Depth Interval (metres below KB)	Block Shift μsec/ft	Δt_{min} μsec/ft	Equiv Block Shift μsec/ft
179.0-350.0	0.0	-	0.0
350.0-764.0	4.05	-	4.05
764.0-922.0	4.82	-	4.82
922.0-1063.5	1.08	-	1.08
1063.5-1447.0	2.78	-	2.78

4. Synthetic Seismogram Processing

GEOGRAM plots were generated using 10-80 hertz zero phase ricker wavelets.

The presentations include both normal and reverse polarity on a time scale of 20 cm/sec.

GEOGRAM processing produces synthetic seismic traces based on reflection coefficients generated from sonic and density measurements in the well-bore. The steps in the processing chain are the following:

Depth to time conversion
Reflection coefficients
Attenuation coefficients
Convolution
Output.

4.1 Depth to Time Conversion

Open hole logs are recorded from the bottom to top with a depth index. This data is converted to a two-way time index and flipped to read from the top to bottom in order to match the seismic section.

4.2 Primary Reflection Coefficients

Sonic and density data are averaged over chosen time intervals (normally 2 or 4 millisecs). Reflection coefficients are then computed using:

$$R = \frac{\rho_2.\nu_2 - \rho_1.\nu_1}{\rho_2.\nu_2 + \rho_1.\nu_1}$$

where:

ρ_1 = density of the layer above the reflection interface
ρ_2 = density of the layer below the reflection interface
ν_1 = compressional wave velocity of the layer above the reflection interface
ν_2 = compressional wave velocity of the layer below the reflection interface

This computation is done for each time interval to generate a set of primary reflection coefficients without transmission losses.

4.3 Primaries with Transmission Loss

Transmission loss on two-way attenuation coefficients is computed using:

$$A_n = (1 - R_1^2).(1 - R_2^2).(1 - R_3^2)...(1 - R_n^2)$$

A set of primary reflection coefficients with transmission loss is generated using:

$$Primary_n = R_n.A_{n-1}$$

4.4 Primaries plus Multiples

Multiples are computed from these input reflection coefficients using the transform technique from the top of the well to obtain the impulse response of the earth. The transform outputs primaries plus multiples.

4.5 Multiples Only

By subtracting previously calculated primaries from the above result we obtain multiples only.

4.6 Wavelet

A theoretical wavelet is chosen to use for convolution with the reflection coefficients previously generated. Choices available include:

Klauder wavelet
Ricker zero phase wavelet
Ricker minimum phase wavelet
Butterworth wavelet
User defined wavelet.

Time variant Butterworth filtering can be applied after convolution.

4.7 Polarity Convention

An increase in acoustic impedance gives a positive reflection coefficent and is displayed as a white trough under normal polarity. Polarity conventions are displayed in Figure-1.

4.8 Convolution

Standard procedure of convolution of wavelet with reflection coefficients. The output is the synthetic seismogram.

A Summary of Geophysical Listings

Six geophysical data listings are appended to this report. Following is a brief description of the format of each listing.

A1 Geophysical Airgun Report

1. Level number : the level number starting from the top level (includes any imposed shots).
2. Vertical depth from KB : *dkb*, the depth in metres from kelly bushing .
3. Vertical depth from SRD : *dsrd*, the depth in metres from seismic reference datum.
4. Vertical depth from GL : *dgl*, the depth in metres from ground level.
5. Observed travel time HYD to GEO : *tim*0, the transit time picked from the stacked data by subtracting the surface sensor first break time from the downhole sensor first break time.
6. Vertical travel time SRC to GEO : *timv*, is corrected for source to hydrophone distance and for source offset.
7. Vertical travel time SRD to GEO : *shtm*, is *timv* corrected for the vertical distance between source and datum.
8. Average velocity SRD to GEO : the average seismic velocity from datum to the corresponding checkshot level, $\frac{dsrd}{shtm}$.
9. Delta depth between shots : $\Delta depth$, the vertical distance between each level.
10. Delta time between shots : $\Delta time$, the difference in vertical travel time (*shtm*) between each level.
11. Interval velocity between shots : the average seismic velocity between each level, $\frac{\Delta depth}{\Delta time}$.

A2 Drift Computation Report

1. Level number : the level number starting from the top level (includes any imposed shots).
2. Vertical depth from KB : the depth in metres from kelly bushing .
3. Vertical depth from SRD : the depth in metres from seismic reference datum.
4. Vertical depth from GL : the depth in metres from ground level.
5. Vertical travel time SRD to GEO : the calculated vertical travel time from datum to downhole geophone (see column 7, Geophysical Airgun Report).

6. Integrated raw sonic time : the raw sonic log is integrated from top to bottom and listed at each level. An initial value at the top of the sonic log is set equal to the checkshot time at that level. This may be an imposed shot if a shot was not taken at the top of the sonic.

7. Computed drift at level : the checkshot time minus the integrated raw sonic time.

8. Computed blk-shft correction : the drift gradient between any two checkshot levels $(\frac{\Delta drift}{\Delta depth})$.

A3 Sonic Adjustment Parameter Report

1. Knee number : the knee number starting from the highest knee. (The first knees listed will generally be at SRD and the top of sonic. The drift imposed at these knees will normally be zero.)

2. Vertical depth from KB : the depth in metres from kelly bushing .

3. Vertical depth from SRD : the depth in metres from seismic reference datum.

4. Vertical depth from GL : the depth in metres from ground level.

5. Drift at knee : the value of drift imposed at each knee.

6. Blockshift used : the change in drift divided by the change in depth between any two levels.

7. Delta-T minimum used : see section 4 of report for an explanation of Δt_{min}.

8. Reduction factor : see section 4 of report.

9. Equivalent blockshift : the gradient of the imposed drift curve.

A4 Velocity Report

1. Level number : the level number starting from the top level (includes any imposed shots).

2. Vertical depth from KB : the depth in metres from kelly bushing .

3. Vertical depth from SRD : the depth in metres from seismic reference datum

4. Vertical depth from GL : the depth in metres from ground level

5. Vertical travel time SRD to GEOPH : the vertical travel time from SRD to downhole geophone (see column 7, Geophysical Airgun Report)

6. Integrated adjusted sonic time : the adjusted sonic log is integrated from top to bottom. An initial value at the the top of the sonic is set equal the checkshot time at that level. (The adjusted sonic log is the drift corrected sonic log.)

7. Drift=shot time-raw son : the check shot time minus the raw integrated sonic time.

8. Residual=shot time-adj son : the check shot time minus the adjusted integrated sonic time. This is the difference between calculated drift and the imposed drift.

9. Adjusted interval velocity : the interval velocity calculated from the integrated adjusted sonic time at each level.

A5 Time Converted Velocity Report

The data in this listing has been resampled in time.

1. Two way travel time from SRD : This is the index for the data in this listing. The first value is at SRD (0 millisecs) and the sampling rate is 2 millisecs.

2. Measured depth from KB : the depth from KB at each corresponding value of two way time.

3. Vertical depth from SRD : the vertical depth from SRD at each corresponding value of two way time.

4. Average velocity SRD to GEO : the vertical depth from SRD divided by half the two way time.

5. RMS velocity : the root mean square velocity from datum to the corresponding value of two way time.

$$v_{rms} = \sqrt{\Sigma_1^n v_i^2 t_i / \Sigma_1^n t_i}$$

where v_i is the velocity between each 2 millisecs interval.

6. First normal moveout : the correction time in millisecs to be applied to the two way travel time for a specified moveout distance (default = 3000 feet).

$$\Delta t = \sqrt{t^2 + (\frac{X}{v_{rms}})^2} - t$$

where:

Δt = normal moveout (secs)
X = moveout distance (metres)
t = two way time (secs)
v_{rms} = rms velocity (metres /sec)

7. Second normal moveout : the correction time in millisecs to be applied to the two way travel time for a specified moveout distance (default = 4500 feet).

8. Third normal moveout : the correction time in millisecs to be applied to the two way travel time for a specified moveout distance (default = 6000 feet).

9. Interval velocity : the velocity between each sampled depth. Typically, the sampling rate is 2 millisecs two way time, (1 millisec one way time) therefore the interval velocity will be equal to the depth increment divided by 0.001. It is equivalent to column 9 from the the Velocity Report.

A6 Synthetic Seismogram Table

1. Two way travel time from SRD : This is the index for the data in this listing. The first value is at the top of the sonic. The default sampling rate is 2 millisecs.

2. Vertical depth from SRD : the vertical depth from SRD at each corresponding value of two way time.

3. Interval velocity : the velocity between each sampled depth. Typically, the sampling rate is 2 millisecs two way time, (1 millisec one way time) therefore the interval velocity will be equal to the depth increment divided by 0.001. It is equivalent to column 9 from the the Velocity Report.

4. Interval density : the average density between two successive values of two way time.

5. Reflect. coeff. : the difference in acoustic impedance divided by the sum of the acoustic impedance between any two levels. The acoustic impedance is the product of the interval density and the interval velocity.

6. Two way atten. coeff. : is computed from the series

$$A_n = (1 - R_1^2).(1 - R_2^2).(1 - R_3^2)...(1 - R_n^2)$$

7. Sythetic seismo. primary : the product of the reflection coefficient at each depth and the two way attenuation coefficient up to that depth.

$$Primary_n = R_n.A_{n-1}$$

8. Primary + multiple : a transform technique is used to calculate multiples from the input reflection coefficients.

9. Multiples only : (Primary + multiple) - (Synthetic seismo. primary)

SCHLUMBERGER (SEG-1976) WAVELET POLARITY CONVENTION

Figure 1

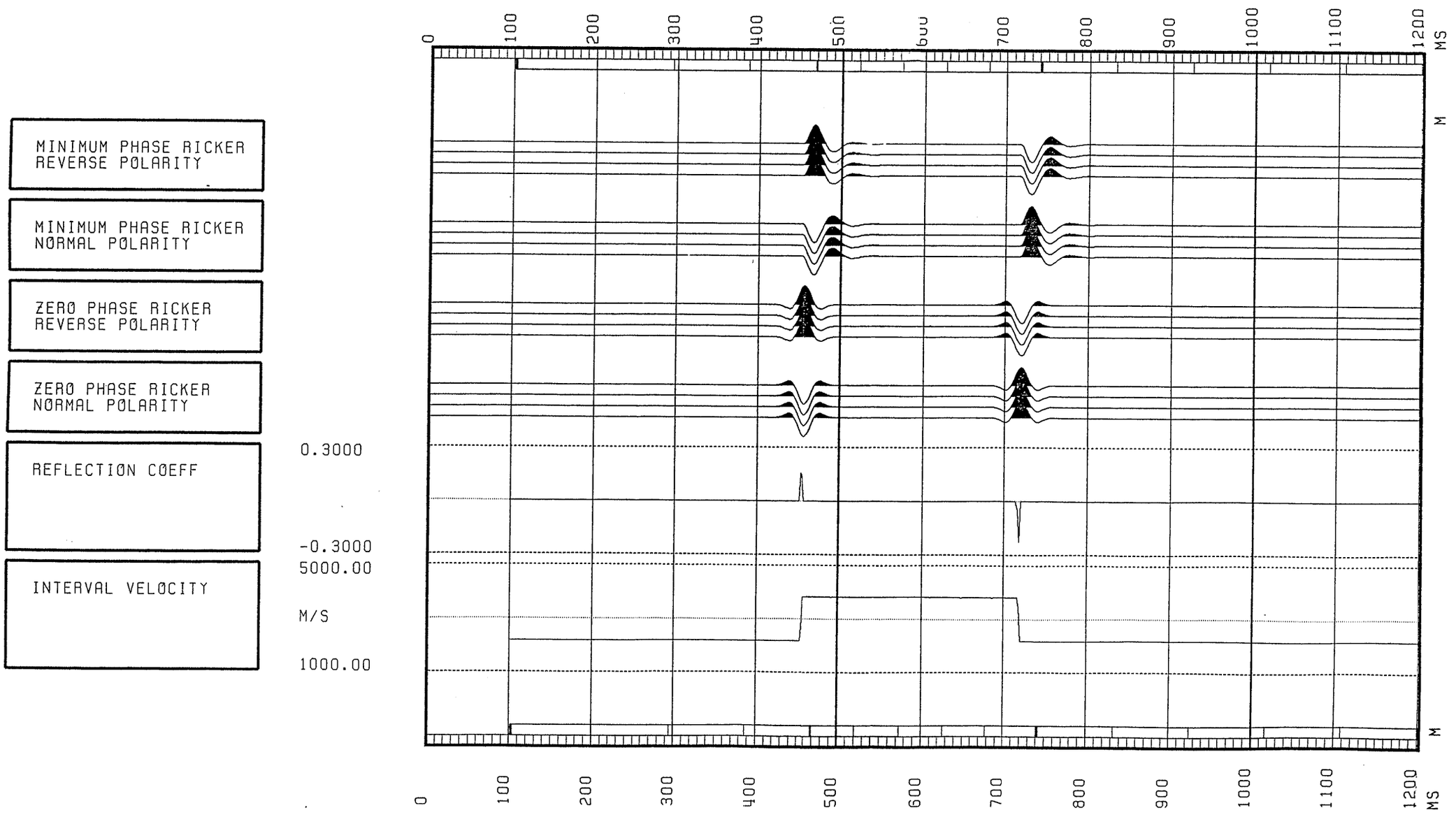
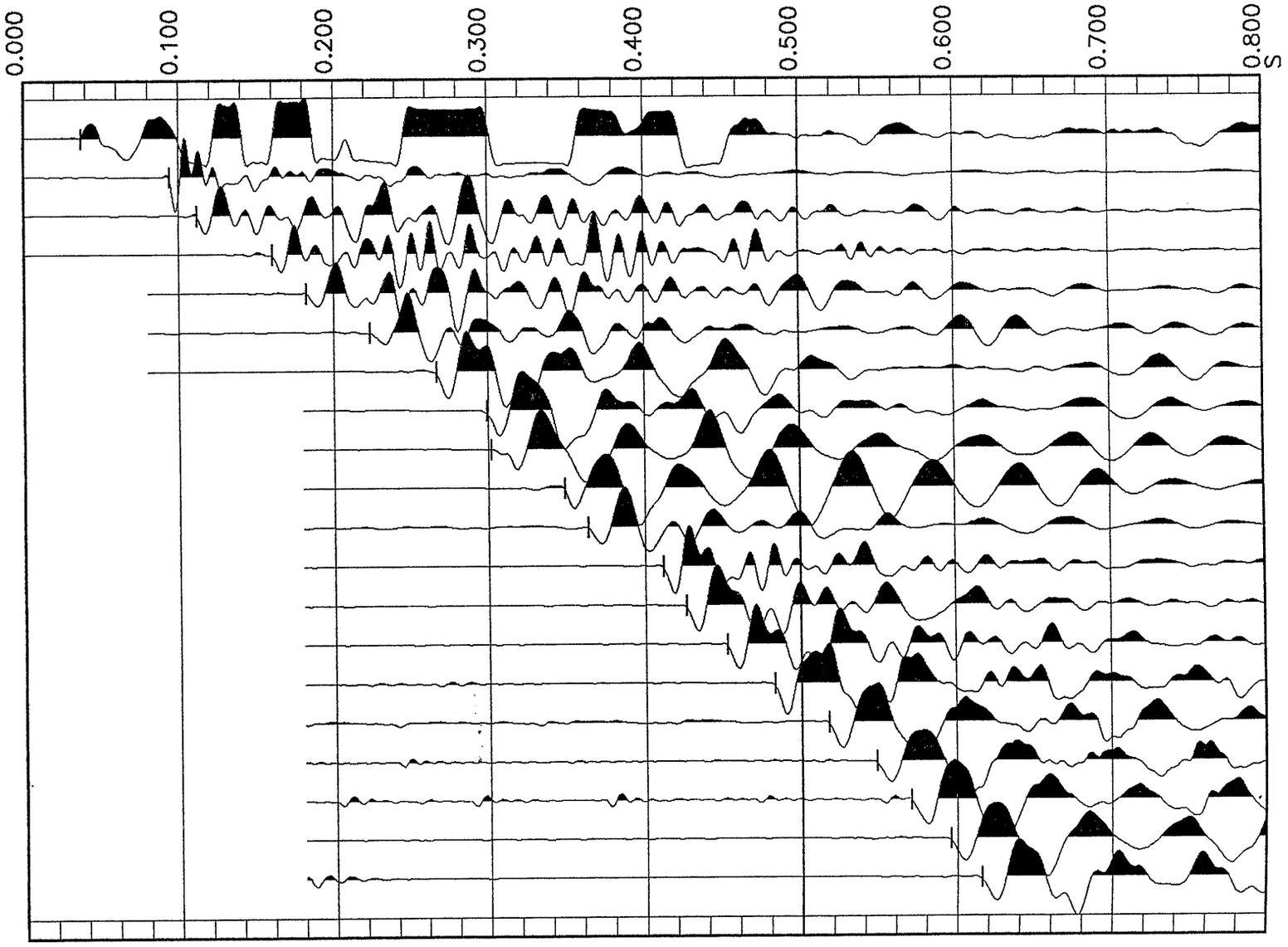


Figure 2

MACALISTER - 1
STACKED CHECKSHOT DATA

RAW DEPTH M	TRANSIT TIME S
20.0	0.037
150.3	0.094
179.0	0.112
295.0	0.160
350.5	0.182
449.5	0.223
560.0	0.267
650.0	0.300
675.0	0.302
754.0	0.349
785.0	0.364
891.5	0.412
922.0	0.426
984.0	0.452
1063.5	0.483
1155.5	0.517
1240.0	0.548
1303.0	0.570
1386.0	0.596
1447.0	0.616



SHOTS

ANALYST: M. SANDERS 12-APR-88 12:09:01 PROGRAM: GSHOT 007.E08

SCHLUMBERGER

GEOPHYSICAL AIRGUN REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

LONG DEFINITIONS

GLOBAL

KB - ELEVATION OF THE KELLY-BUSHING ABOVE MSL OR MWL
SRD - ELEVATION OF THE SEISMIC REFERENCE DATUM ABOVE MSL OR MWL
EKB - ELEVATION OF KELLY BUSHING
GL - ELEVATION OF USER'S REFERENCE (GENERALLY GROUND LEVEL) ABOVE SRD
VELHYD - VELOCITY OF THE MEDIUM BETWEEN THE SOURCE AND THE HYDROPHONE
VELSUR - VELOCITY OF THE MEDIUM BETWEEN THE SOURCE AND THE SRD

MATRIX

GUNELZ - SOURCE ELEVATION ABOVE SRD (ONE FOR THE WHOLE JOB; OR ONE PER SHOT)
GUNEWZ - SOURCE DISTANCE FROM THE BOREHOLE AXIS IN EW DIRECTION (CF. GUNELZ)
GUNNSZ - SOURCE DISTANCE FROM THE BOREHOLE AXIS IN NS DIRECTION (CF. GUNELZ)
HYDELZ - HYDROPHONE ELEVATION ABOVE SRD (CF. GUNELZ)
HYDEWZ - HYDROPHONE DISTANCE FROM THE BOREH AXIS IN EW DIRECTION (CF GUNELZ)
HYDNSZ - HYDROPHONE DISTANCE FROM THE BOREH AXIS IN NS DIRECTION (CF GUNELZ)
TRTHYD - TRAVEL TIME FROM THE HYDROPHONE TO THE SOURCE
TRTSRD - TRAVEL TIME FROM THE SOURCE TO THE SRD
DEVWEL - DEVIATED WELL DATA PER SHOT : MEAS. DEPTH, VERT. DEPTH, EW, NS

SAMPLED

SHOT.GSH - SHOT NUMBER
DKB.GSH - MEASURED DEPTH FROM KELLY-BUSHING
DSRD.GSH - DEPTH FROM SRD
DGL.GSH - VERTICAL DEPTH RELATIVE TO GROUND LEVEL (USER'S REFERENCE)
TIMO.GSH - MEASURED TRAVEL TIME FROM HYDROPHONE TO GEOPHONE
TIMV.GSH - VERTICAL TRAVEL TIME FROM THE SOURCE TO THE GEOPHONE
SHTM.GSH - SHOT TIME (WST)
AVGV.GSH - AVERAGE SEISMIC VELOCITY
DELZ.GSH - DEPTH INTERVAL BETWEEN SUCCESSIVE SHOTS
DELT.GSH - TRAVEL TIME INTERVAL BETWEEN SUCCESSIVE SHOTS
INTV.GSH - INTERNAL VELOCITY, AVERAGE

(GLOBAL PARAMETERS)			(VALUE)	
ELEV OF KB AB. MSL (WST)	KB	:	20.0000	M
ELEV OF SRD AB. MSL(WST)	SRD	:	0	M
ELEVATION OF KELLY BUSHI	EKB	:	20.0000	M
ELEV OF GL AB. SRD(WST)	GL	:	16.0000	M
VEL SOURCE-HYDRO(WST)	VELHYD	:	1500.00	M/S
VEL SOURCE-SRD (WST)	VELSUR	:	700.000	M/S

(MATRIX PARAMETERS)

	SOURCE ELV M	SOURCE EW M	SCURCE NS M	HYDRO ELEV M	HYDRO EW M	HYDRO NS M
1	15.00	0	33.00	15.00	0	33.00

	TRT HYD-SC MS	TRT SC-SRD MS
1	0	-21.43

	MD @ KB M	VD @ KB M	VD @ SRD M	E-W COORD M	N-S COORD M
1	179.00	179.00	159.00	0	0
2	295.00	295.00	275.00	0	0
3	350.50	350.50	330.50	0	0
4	449.50	449.50	429.50	0	0
5	560.00	560.00	540.00	0	0
6	650.00	650.00	630.00	0	0
7	754.00	754.00	734.00	0	0
8	785.00	785.00	765.00	0	0
9	891.50	891.50	871.50	0	0
10	922.00	922.00	902.00	0	0
11	984.00	984.00	964.00	0	0
12	1063.50	1063.50	1043.50	0	0
13	1155.50	1155.50	1135.50	0	0
14	1240.00	1240.00	1220.00	0	0
15	1303.00	1303.00	1283.00	0	0
16	1386.00	1386.00	1366.00	0	0
17	1447.00	1447.00	1427.00	0	0

LEVEL NUMBER	MEASUR DEPTH FROM KB M	VERTIC DEPTH FROM SRD M	VERTIC DEPTH FROM GL M	OBSERV TRAVEL TIME HYD/GEO MS	VERTIC TRAVEL TIME SRC/GEO MS	VERTIC TRAVEL TIME SRD/GEO MS	AVERAGE VELOC SRD/GEO M/S	DELTA DEPTH BETWEEN SHOTS M	DELTA TIME BETWEEN SHOTS MS	INTERV VELOC BETWEEN SHOTS M/S
1	179.00	159.00	175.00	112.02	110.06	88.63	1794			
								116.00	49.35	2350
2	295.00	275.00	291.00	160.44	159.41	137.98	1993			
								55.50	22.25	2494
3	350.50	330.50	346.50	182.49	181.66	160.23	2063			
								99.00	41.16	2405
4	449.50	429.50	445.50	223.44	222.83	201.40	2133			
								110.50	43.47	2542
5	560.00	540.00	556.00	266.77	266.30	244.87	2205			
								90.00	32.89	2736
6	650.00	630.00	646.00	299.58	299.19	277.76	2268			
								104.00	49.14	2116
7	754.00	734.00	750.00	348.67	348.33	326.90	2245			
								31.00	15.22	2036
8	785.00	765.00	781.00	363.88	363.55	342.13	2236			
								106.50	47.99	2219
9	891.50	871.50	887.50	411.83	411.54	390.12	2234			
								30.50	14.35	2126
10	922.00	902.00	918.00	426.17	425.89	404.47	2230			
								62.00	26.18	2368
11	984.00	964.00	980.00	452.33	452.07	430.64	2239			
								79.50	30.68	2591
12	1063.50	1043.50	1059.50	482.99	482.76	461.33	2262			
								92.00	34.46	2670
13	1155.50	1135.50	1151.50	517.43	517.22	495.79	2290			
								84.50	30.29	2790
14	1240.00	1220.00	1236.00	547.70	547.50	526.08	2319			
								63.00	22.66	2780
15	1303.00	1283.00	1299.00	570.35	570.17	548.74	2333			
								83.00	25.33	3276
16	1336.00	1366.00	1382.00	595.67	595.50	574.07	2379			
								61.00	20.14	3029
17	1447.00	1427.00	1443.00	615.80	615.64	594.21	2402			

DRIFT

ANALYST: M. SANDERS 12-APR-88 12:15:56 PROGRAM: GDRIFT 007.E09

DRIFT COMPUTATION REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

ANALYST: M. SANDERS 12-APR-88 12:15:56 PROGRAM: GDRIFT 007.E09

DRIFT COMPUTATION REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

LONG DEFINITIONS

GLOBAL

KB - ELEVATION OF THE KELLY-BUSHING ABOVE MSL OR MWL
SRD - ELEVATION OF THE SEISMIC REFERENCE DATUM ABOVE MSL OR MWL
EKB - ELEVATION OF KELLY BUSHING
GL - ELEVATION OF USER'S REFERENCE (GENERALLY GROUND LEVEL) ABOVE SRD
XSTART - TOP OF ZONE PROCESSED BY WST
XSTOP - BOTTOM OF ZONE PROCESSED BY WST
GAD001 - RAW SONIC CHANNEL NAME USED FOR WST SONIC ADJUSTMENT
UNFDEN - UNIFORM DENSITY VALUE

ZONE

LOFDEN - LAYER OPTION FLAG FOR DENSITY : -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYDEN - USER SUPPLIED DENSITY DATA

SAMPLED

SHOT - SHOT NUMBER
DKE - MEASURED DEPTH FROM KELLY-BUSHING
DSRD - DEPTH FROM SRD
DGL - VERTICAL DEPTH RELATIVE TO GROUND LEVEL (USER'S REFERENCE)
SHTM - SHOT TIME (WST)
RAWS - RAW SONIC (WST)
SHDR - DRIFT AT SHOT OR KNEE
BLSH - BLOCK SHIFT BETWEEN SHOTS OR KNEE

(GLOBAL PARAMETERS)		(VALUE)	
ELEV OF KB AB. MSL (WST)	KB	: 20.0000	M
ELEV OF SRD AB. MSL(WST)	SRD	: 0	M
ELEVATION OF KELLY BUSHI	EKB	: 20.0000	M
ELEV OF GL AB. SRD(WST)	GL	: 16.0000	M
TOP OF ZONE PROCD (WST)	XSTART	: 0	M
BOT OF ZONE PROCD (WST)	XSTOP	: 0	M
RAW SONIC CH NAME (WST)	GAD001	: DT.ATT.002.FLP.*	
UNIFORM DENSITY VALUE	UNFDEN	: 2.30000	G/C3

(ZONED PARAMETERS)		(VALUE)		(LIMITS)		
LAYER OPTION FLAG DENS	LOFDEN	: 1.000000		30479.7	-	0
USER SUPPLIED DENSITY DA	LAYDEN	:-999.2500	G/C3	30479.7	-	0

LEVEL NUMBER	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	VERTICAL DEPTH FROM GL M	VERTICAL TRAVEL TIME SRD/GEO MS	INTEGRATED RAW SONIC TIME MS	COMPUTED DRIFT AT LEVEL MS	COMPUTED BLK-SHFT CORRECTION US/F
							0
1	179.00	159.00	175.00	88.63	88.63	0	-.87
2	295.00	275.00	291.00	137.98	138.31	-.33	-5.20
3	350.50	330.50	346.50	160.23	161.51	-1.28	4.49
4	449.50	429.50	445.50	201.40	201.22	.18	5.81
5	560.00	540.00	556.00	244.87	242.58	2.29	3.50
6	650.00	630.00	646.00	277.76	274.44	3.32	6.12
7	754.00	734.00	750.00	326.90	321.49	5.41	20.25
8	785.00	765.00	781.00	342.13	334.66	7.47	.41
9	891.50	871.50	887.50	390.12	382.50	7.61	21.25
10	922.00	902.00	918.00	404.47	394.73	9.74	-11.61
11	984.00	964.00	980.00	430.64	423.27	7.38	1.77
12	1063.50	1043.50	1059.50	461.33	453.49	7.84	7.47
13	1155.50	1135.50	1151.50	495.79	485.69	10.09	3.42
14	1240.00	1220.00	1236.00	526.08	515.03	11.04	5.11
15	1303.00	1283.00	1299.00	548.74	536.64	12.10	-2.83
16	1386.00	1366.00	1382.00	574.07	562.74	11.33	8.06
17	1447.00	1427.00	1443.00	594.21	581.27	12.94	

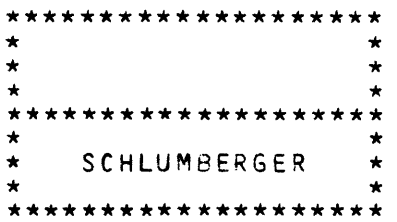
ANALYST: M. SANDERS 12-APR-88 14:02:28 PROGRAM: GADJST 008.E08

SCHLUMBERGER

SONIC ADJUSTMENT PARAMETER REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

ANALYST: M. SANDERS 12-APR-88 14:02:28 PROGRAM: GADJST 008.E08



SONIC ADJUSTMENT PARAMETER REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

LONG DEFINITIONS

GLOBAL

SRCDRF - ORIGIN OF ADJUSTMENT DATA
CONADJ - CONSTANT ADJUSTMENT TO AUTOMATIC DELTA-T MINIMUM = 7.5 US/F
UNERTH - UNIFORM EARTH VELOCITY (GTRFRM)

ZONE

ZDRIFT - USER DRIFT AT BOTTOM OF THE ZONE
ADJOPZ - TYPE OF ADJUSTMNENT IN THE DRIFT ZONE : 0=DELTA-T MIN, 1=BLOCKSHIFT
ADJUSZ - DELTA-T MINIMUM USED FOR ADJUSTMENT IN THE DRIFT ZONE
LOFVEL - LAYER OPTION FLAG FOR VELOCITY: -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYVEL - USER SUPPLIED VELOCITY DATA

SAMPLED

SHOT - SHOT NUMBER
VDKB - VERTICAL DEPTH RELATIVE TO KB
DSRD - DEPTH FROM SRD
DGL - VERTICAL DEPTH RELATIVE TO GROUND LEVEL (USER'S REFERENCE)
KNEE - KNEE
BLSH - BLOCK SHIFT BETWEEN SHOTS OR KNEE
DTMI - VALUE OF DELTA-T MINIMUM USED
COEF - DELTA-T MIN COEFFICIENT USED IN THE DRIFT ZONE
DRGR - GRADIENT OF DRIFT CURVE

(GLOBAL PARAMETERS)		(VALUE)	
ORIG OF ADJ DATA (WST)	SRCDRF	: 2.00000	
CONS SONIC ADJST (WST)	CONADJ	: 7.50000	US/F
UNIFORM EARTH VELOCITY	UNERTH	: 2133.60	M/S

(ZONED PARAMETERS)		(VALUE)		(LIMITS)
USER DRIFT ZONE (WST)	ZDRIFT	: 12.00000	MS	1447.00 - 1063.50
		8.500000		1063.50 922.000
		8.000000		922.000 764.000
		5.500000		764.000 350.000
		0		350.000 179.000
		0		179.000 0
ADJUSMNT MODE (WST)	ADJOPZ	:-999.2500		30479.7 - 0
USER DELTA-T MIN (WST)	ADJUSZ	:-999.2500	US/F	30479.7 - 0
LAYER OPTION FLAG VELOC	LOFVEL	: 1.000000		30479.7 - 0
USER VELOC (WST)	LAYVEL	: 1794.000	M/S	179.000 - 20.0000
		700.0000		20.0000 0

KNEE NUMBER	VERTICAL DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	VERTICAL DEPTH FROM GL M	DRIFT AT KNEE MS	BLOCKSHIFT USED US/F	DELTA-T MINIMUM USED US/F	REDUCTION FACTOR G	EQUIVALENT BLOCKSHIFT US/F
					0			0
2	179.00	159.00	175.00	0	0			0
3	350.00	330.00	346.00	0	4.05			4.05
4	764.00	744.00	760.00	5.50	4.82			4.82
5	922.00	902.00	918.00	8.00	1.08			1.08
6	1063.50	1043.50	1059.50	8.50	2.78			2.78
7	1447.00	1427.00	1443.00	12.00				

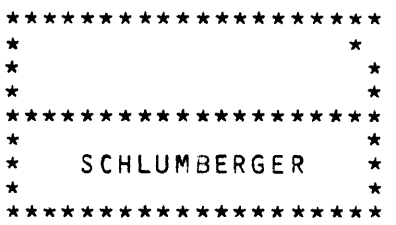
ANALYST: M. SANDERS 12-APR-88 14:03:53 PROGRAM: GADJST 008.E08

SCHLUMBERGER

VELOCITY REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

ANALYST: M. SANDERS 12-APR-88 14:03:53 PROGRAM: GADJST 008.E08



VELOCITY REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

LONG DEFINITIONS

GLOBAL

KB - ELEVATION OF THE KELLY-BUSHING ABOVE MSL OR MWL
SRD - ELEVATION OF THE SEISMIC REFERENCE DATUM ABOVE MSL OR MWL
EKB - ELEVATION OF KELLY BUSHING
GL - ELEVATION OF USER'S REFERENCE (GENERALLY GROUND LEVEL) ABOVE SRD
UNERTH - UNIFORM EARTH VELOCITY (GTRFRM)

ZONE

LOFVEL - LAYER OPTION FLAG FOR VELOCITY: -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYVEL - USER SUPPLIED VELOCITY DATA

SAMPLED

SHOT - SHOT NUMBER
DKB - MEASURED DEPTH FROM KELLY-BUSHING
DSRD - DEPTH FROM SRD
DGL - VERTICAL DEPTH RELATIVE TO GROUND LEVEL (USER'S REFERENCE)
SHTM - SHOT TIME (WST)
ADJS - ADJUSTED SONIC TRAVEL TIME
SHDR - DRIFT AT SHOT OR KNEE
REST - RESIDUAL TRAVEL TIME AT KNEE
INTV - INTERNAL VELOCITY, AVERAGE

(GLOBAL PARAMETERS)			(VALUE)	
ELEV OF KB AB. MSL (WST)	KB	:	20.0000	M
ELEV OF SRD AB. MSL(WST)	SRD	:	0	M
ELEVATION OF KELLY BUSHI	EKB	:	20.0000	M
ELEV OF GL AB. SRD(WST)	GL	:	16.0000	M
UNIFORM EARTH VELOCITY	UNERTH	:	2133.60	M/S

(ZONED PARAMETERS)			(VALUE)		(LIMITS)		
LAYER OPTION FLAG VELOC	LOFVEL	:	1.000000		30479.7	-	0
USER VELOC (WST)	LAYVEL	:	1794.000	M/S	179.000	-	20.0000
			700.0000		20.0000		0

LEVEL NUMBER	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	VERTICAL DEPTH FROM GL M	VERTICAL TRAVEL TIME SRD/GEOPH MS	INTEGRATED ADJUSTED SONIC TIME MS	DRIFT = SHOT TIME - RAW SON MS	RESIDUAL = SHOT TIME - ADJ SON MS	ADJUSTED INTERVAL VELOCITY M/S
								1794
1	179.00	159.00	175.00	88.63	88.63	0	0	
								2335
2	295.00	275.00	291.00	137.98	138.31	-.33	-.33	
								2392
3	350.50	330.50	346.50	160.23	161.51	-1.28	-1.27	
								2413
4	449.50	429.50	445.50	201.40	202.54	.18	-1.14	
								2581
5	560.00	540.00	556.00	244.87	245.36	2.29	-.48	
								2723
6	650.00	630.00	646.00	277.76	278.41	3.32	-.65	
								2146
7	754.00	734.00	750.00	326.90	326.86	5.41	.04	
								2276
8	785.00	765.00	781.00	342.13	340.48	7.47	1.64	
								2150
9	891.50	871.50	887.50	390.12	390.02	7.61	.10	
								2401
10	922.00	902.00	918.00	404.47	402.72	9.74	1.74	
								2156
11	984.00	964.00	980.00	430.64	431.48	7.38	-.83	
								2606
12	1063.50	1043.50	1059.50	461.33	461.98	7.84	-.65	
								2784
13	1155.50	1135.50	1151.50	495.79	495.02	10.09	.77	
								2807
14	1240.00	1220.00	1236.00	526.08	525.12	11.04	.95	
								2840
15	1303.00	1283.00	1299.00	548.74	547.30	12.10	1.43	
								3090
16	1386.00	1366.00	1382.00	574.07	574.17	11.33	-.09	
								3194
17	1447.00	1427.00	1443.00	594.21	593.26	12.94	.95	

TIME / DEPTH

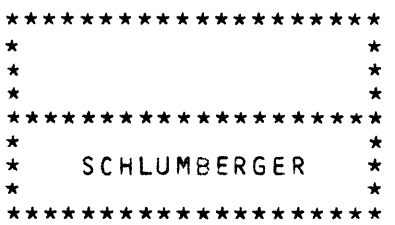
ANALYST: M. SANDERS 12-APR-88 14:09:38 PROGRAM: GTRFRM 001.E12

SCHLUMBERGER

TIME CONVERTED VELOCITY REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

ANALYST: M. SANDERS 12-APR-88 14:09:38 PROGRAM: GTRFRM 001.E12



TIME CONVERTED VELOCITY REPORT

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

LONG DEFINITIONS

GLOBAL

KB - ELEVATION OF THE KELLY-BUSHING ABOVE MSL OR MWL
SRD - ELEVATION OF THE SEISMIC REFERENCE DATUM ABOVE MSL OR MWL
GL - ELEVATION OF USER'S REFERENCE (GENERALLY GROUND LEVEL) ABOVE SRD
UNERTH - UNIFORM EARTH VELOCITY (GTRFRM)
UNFDEN - UNIFORM DENSITY VALUE

MATRIX

MVODIS - MOVE-OUT DISTANCE FROM BOREHOLE

ZONE

LOFVEL - LAYER OPTION FLAG FOR VELOCITY: -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYVEL - USER SUPPLIED VELOCITY DATA
LOFDEN - LAYER OPTION FLAG FOR DENSITY : -1=NONE; 0=UNIFORM; 1=UNIFORM+LAYER
LAYDEN - USER SUPPLIED DENSITY DATA

SAMPLED

TWOT - TWO WAY TRAVEL TIME (RELATIVE TO THE SEISMIC REFERENCE
DKE - MEASURED DEPTH FROM KELLY-BUSHING
DSRD - DEPTH FROM SRD
AVGV - AVERAGE SEISMIC VELOCITY
RMSV - ROOT MEAN SQUARE VELOCITY (SEISMIC)
MVOT - NORMAL MOVE-OUT
MVOT - NORMAL MOVE-OUT
MVOT - NORMAL MOVE-OUT
INTV - INTERNAL VELOCITY, AVERAGE

(GLOBAL PARAMETERS)		(VALUE)	
ELEV OF KB AB. MSL (WST)	KB :	20.0000	M
ELEV OF SRD AB. MSL(WST)	SRD :	0	M
ELEV OF GL AB. SRD(WST)	GL :	16.0000	M
UNIFORM EARTH VELOCITY	UNERTH :	2133.60	M/S
UNIFORM DENSITY VALUE	UNFDEN :	2.30000	G/C3

(MATRIX PARAMETERS)

	MVOUT DIST M
1	1000.0
2	1500.0
3	2000.0

(ZONED PARAMETERS)		(VALUE)		(LIMITS)		
LAYER OPTION FLAG VELOC	LOFVEL	: 1.000000		30479.7	-	0
USER VELOC (WST)	LAYVEL	: 1794.000	M/S	179.000	-	20.0000
		700.0000		20.0000		0
LAYER OPTION FLAG DENS	LOFDEN	:-1.000000		30479.7	-	0
USER SUPPLIED DENSITY DA	LAYDEN	:-999.2500	G/C3	30479.7	-	0

COMPANY : CRUSADER RESOURCES N.L. WELL : MACALISTER #1 PAGE 3

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								700
0	20.00	0						1794
2.00	21.79	1.79	1794	1794	555.42	834.12	1112.83	1794
4.00	23.59	3.59	1794	1794	553.43	832.13	1110.83	1794
6.00	25.38	5.38	1794	1794	551.45	830.14	1108.84	1794
8.00	27.18	7.18	1794	1794	549.47	828.16	1106.86	1794
10.00	28.97	8.97	1794	1794	547.50	826.18	1104.87	1794
12.00	30.76	10.76	1794	1794	545.54	824.21	1102.89	1794
14.00	32.56	12.56	1794	1794	543.59	822.24	1100.91	1794
16.00	34.35	14.35	1794	1794	541.64	820.27	1098.94	1794
18.00	36.15	16.15	1794	1794	539.70	818.31	1096.97	1794
20.00	37.94	17.94	1794	1794	537.77	816.36	1095.01	1794
22.00	39.73	19.73	1794	1794	535.85	814.41	1093.04	1794
24.00	41.53	21.53	1794	1794	533.93	812.46	1091.09	1794
26.00	43.32	23.32	1794	1794	532.02	810.52	1089.13	1794
28.00	45.12	25.12	1794	1794	530.12	808.59	1087.18	1794
30.00	46.91	26.91	1794	1794	528.22	806.66	1085.23	1794
32.00	48.70	28.70	1794	1794	526.33	804.73	1083.29	1794
34.00	50.50	30.50	1794	1794	524.45	802.81	1081.35	1794
36.00	52.29	32.29	1794	1794	522.57	800.90	1079.41	1794
38.00	54.09	34.09	1794	1794	520.71	798.98	1077.47	1794
40.00	55.88	35.88	1794	1794	518.85	797.08	1075.54	1794
42.00	57.67	37.67	1794	1794	516.99	795.17	1073.62	1794
44.00	59.47	39.47	1794	1794	515.15	793.28	1071.70	1794
46.00	61.26	41.26	1794	1794	513.31	791.38	1069.78	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								1794
48.00	63.06	43.06	1794	1794	511.48	789.50	1067.86	
								1794
50.00	64.85	44.85	1794	1794	509.65	787.61	1065.95	
								1794
52.00	66.64	46.64	1794	1794	507.83	785.74	1064.04	
								1794
54.00	68.44	48.44	1794	1794	506.02	783.86	1062.13	
								1794
56.00	70.23	50.23	1794	1794	504.22	781.99	1060.23	
								1794
58.00	72.03	52.03	1794	1794	502.42	780.13	1058.34	
								1794
60.00	73.82	53.82	1794	1794	500.63	778.27	1056.44	
								1794
62.00	75.61	55.61	1794	1794	498.85	776.42	1054.55	
								1794
64.00	77.41	57.41	1794	1794	497.08	774.57	1052.66	
								1794
66.00	79.20	59.20	1794	1794	495.31	772.72	1050.78	
								1794
68.00	81.00	61.00	1794	1794	493.55	770.88	1048.90	
								1794
70.00	82.79	62.79	1794	1794	491.79	769.05	1047.02	
								1794
72.00	84.58	64.58	1794	1794	490.04	767.21	1045.15	
								1794
74.00	86.38	66.38	1794	1794	488.30	765.39	1043.28	
								1794
76.00	88.17	68.17	1794	1794	486.57	763.57	1041.41	
								1794
78.00	89.97	69.97	1794	1794	484.84	761.75	1039.55	
								1794
80.00	91.76	71.76	1794	1794	483.13	759.94	1037.69	
								1794
82.00	93.55	73.55	1794	1794	481.41	758.13	1035.84	
								1794
84.00	95.35	75.35	1794	1794	479.71	756.33	1033.99	
								1794
86.00	97.14	77.14	1794	1794	478.01	754.53	1032.14	
								1794
88.00	98.94	78.94	1794	1794	476.32	752.74	1030.30	
								1794
90.00	100.73	80.73	1794	1794	474.63	750.95	1028.45	
								1794
92.00	102.52	82.52	1794	1794	472.95	749.17	1026.62	
								1794
94.00	104.32	84.32	1794	1794	471.28	747.39	1024.78	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								1794
96.00	106.11	86.11	1794	1794	469.62	745.61	1022.95	1794
98.00	107.91	87.91	1794	1794	467.96	743.84	1021.13	1794
100.00	109.70	89.70	1794	1794	466.31	742.08	1019.30	1794
102.00	111.49	91.49	1794	1794	464.67	740.32	1017.48	1794
104.00	113.29	93.29	1794	1794	463.03	738.56	1015.67	1794
106.00	115.08	95.08	1794	1794	461.40	736.81	1013.86	1794
108.00	116.88	96.88	1794	1794	459.78	735.07	1012.05	1794
110.00	118.67	98.67	1794	1794	458.16	733.33	1010.24	1794
112.00	120.46	100.46	1794	1794	456.55	731.59	1008.44	1794
114.00	122.26	102.26	1794	1794	454.95	729.86	1006.64	1794
116.00	124.05	104.05	1794	1794	453.36	728.13	1004.85	1794
118.00	125.85	105.85	1794	1794	451.77	726.41	1003.05	1794
120.00	127.64	107.64	1794	1794	450.18	724.69	1001.27	1794
122.00	129.43	109.43	1794	1794	448.61	722.97	999.48	1794
124.00	131.23	111.23	1794	1794	447.04	721.27	997.70	1794
126.00	133.02	113.02	1794	1794	445.48	719.56	995.93	1794
128.00	134.82	114.82	1794	1794	443.92	717.86	994.15	1794
130.00	136.61	116.61	1794	1794	442.37	716.17	992.38	1794
132.00	138.40	118.40	1794	1794	440.83	714.48	990.61	1794
134.00	140.20	120.20	1794	1794	439.29	712.79	988.85	1794
136.00	141.99	121.99	1794	1794	437.76	711.11	987.09	1794
138.00	143.79	123.79	1794	1794	436.24	709.43	985.34	1794
140.00	145.58	125.58	1794	1794	434.73	707.76	983.58	1794
142.00	147.37	127.37	1794	1794	433.22	706.09	981.83	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								1794
144.00	149.17	129.17	1794	1794	431.71	704.43	980.09	
								1794
146.00	150.96	130.96	1794	1794	430.22	702.77	978.35	
								1794
148.00	152.76	132.76	1794	1794	428.73	701.12	976.61	
								1794
150.00	154.55	134.55	1794	1794	427.24	699.47	974.87	
								1794
152.00	156.34	136.34	1794	1794	425.77	697.82	973.14	
								1794
154.00	158.14	138.14	1794	1794	424.30	696.18	971.41	
								1794
156.00	159.93	139.93	1794	1794	422.83	694.55	969.69	
								1794
158.00	161.73	141.73	1794	1794	421.37	692.92	967.97	
								1794
160.00	163.52	143.52	1794	1794	419.92	691.29	966.25	
								1794
162.00	165.31	145.31	1794	1794	418.48	689.67	964.54	
								1794
164.00	167.11	147.11	1794	1794	417.04	688.05	962.83	
								1794
166.00	168.90	148.90	1794	1794	415.61	686.44	961.12	
								1794
168.00	170.70	150.70	1794	1794	414.18	684.83	959.41	
								1794
170.00	172.49	152.49	1794	1794	412.76	683.23	957.71	
								1794
172.00	174.28	154.28	1794	1794	411.35	681.63	956.02	
								1794
174.00	176.08	156.08	1794	1794	409.94	680.03	954.32	
								1794
176.00	177.87	157.87	1794	1794	408.54	678.44	952.63	
								1959
178.00	179.83	159.83	1796	1796	406.57	675.98	949.76	
								2209
180.00	182.04	162.04	1800	1801	403.68	672.08	944.96	
								2209
182.00	184.25	164.25	1805	1806	400.85	668.26	940.26	
								2255
184.00	186.50	166.50	1810	1812	397.89	664.24	935.28	
								2271
186.00	188.77	168.77	1815	1817	394.92	660.21	930.29	
								2245
188.00	191.02	171.02	1819	1822	392.11	656.40	925.60	
								2202
190.00	193.22	173.22	1823	1827	389.51	652.92	921.33	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
192.00	195.58	175.58	1829	1833	386.40	648.62	915.96	2356
194.00	197.95	177.95	1835	1839	383.27	644.31	910.57	2375
196.00	200.28	180.28	1840	1845	380.37	640.32	905.62	2333
198.00	202.58	182.58	1844	1850	377.64	636.61	901.02	2297
200.00	204.85	184.85	1849	1855	375.06	633.10	896.71	2270
202.00	207.09	187.09	1852	1859	372.63	629.83	892.71	2236
204.00	209.34	189.34	1856	1863	370.18	626.52	888.65	2254
206.00	211.62	191.62	1860	1868	367.70	623.16	884.52	2275
208.00	214.13	194.13	1867	1875	364.47	618.62	878.79	2519
210.00	216.50	196.50	1871	1880	361.81	614.95	874.24	2366
212.00	218.88	198.87	1876	1885	359.17	611.31	869.71	2375
214.00	221.21	201.21	1880	1890	356.69	607.92	865.53	2334
216.00	223.53	203.53	1885	1895	354.28	604.63	861.46	2326
218.00	225.77	205.77	1888	1898	352.16	601.77	857.99	2239
220.00	228.17	208.17	1892	1903	349.62	598.25	853.61	2398
222.00	230.51	210.51	1896	1908	347.28	595.06	849.67	2338
224.00	232.84	212.84	1900	1912	345.00	591.93	845.82	2334
226.00	235.27	215.27	1905	1917	342.49	588.44	841.48	2429
228.00	237.62	217.62	1909	1921	340.26	585.38	837.71	2342
230.00	239.99	219.99	1913	1926	337.97	582.22	833.79	2378
232.00	242.38	222.38	1917	1930	335.70	579.08	829.91	2382
234.00	244.72	224.72	1921	1934	333.57	576.17	826.33	2340
236.00	247.04	227.04	1924	1938	331.52	573.36	822.89	2322
238.00	249.42	229.42	1928	1942	329.36	570.37	819.19	2380

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								2379
240.00	251.80	231.80	1932	1946	327.23	567.43	815.56	
								2397
242.00	254.19	234.19	1935	1950	325.09	564.46	811.88	
								2398
244.00	256.59	236.59	1939	1954	322.98	561.52	808.25	
								2366
246.00	258.96	238.96	1943	1958	320.97	558.75	804.84	
								2336
248.00	261.29	241.29	1946	1961	319.05	556.12	801.61	
								2355
250.00	263.65	243.65	1949	1964	317.13	553.46	798.34	
								2300
252.00	265.95	245.95	1952	1967	315.34	551.02	795.37	
								2291
254.00	268.24	248.24	1955	1970	313.59	548.64	792.47	
								2337
256.00	270.58	250.58	1958	1973	311.77	546.13	789.40	
								2351
258.00	272.93	252.93	1961	1976	309.94	543.60	786.30	
								2321
260.00	275.25	255.25	1963	1979	308.20	541.20	783.37	
								2318
262.00	277.57	257.57	1966	1982	306.49	538.84	780.49	
								2357
264.00	279.92	259.92	1969	1985	304.71	536.38	777.46	
								2391
266.00	282.31	262.31	1972	1989	302.89	533.83	774.32	
								2377
268.00	284.69	264.69	1975	1992	301.12	531.37	771.28	
								2387
270.00	287.08	267.08	1978	1995	299.35	528.90	768.24	
								2402
272.00	289.48	269.48	1981	1998	297.58	526.41	765.16	
								2398
274.00	291.88	271.88	1985	2001	295.83	523.96	762.14	
								2400
276.00	294.28	274.28	1988	2005	294.10	521.54	759.15	
								2389
278.00	296.67	276.67	1990	2008	292.41	519.17	756.23	
								2514
280.00	299.18	279.18	1994	2012	290.51	516.46	752.84	
								2512
282.00	301.70	281.70	1998	2016	288.64	513.78	749.49	
								2639
284.00	304.33	284.33	2002	2021	286.56	510.75	745.64	
								2480
286.00	306.81	286.81	2006	2024	284.80	508.25	742.52	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								2369
288.00	309.18	289.18	2008	2027	283.26	506.09	739.86	2457
290.00	311.64	291.64	2011	2030	281.58	503.70	736.90	2349
292.00	313.99	293.99	2014	2033	280.11	501.64	734.37	2363
294.00	316.35	296.35	2016	2035	278.63	499.56	731.82	2463
296.00	318.82	298.82	2019	2038	277.00	497.23	728.92	2447
298.00	321.26	301.26	2022	2041	275.41	494.97	726.11	2244
300.00	323.51	303.51	2023	2043	274.16	493.25	724.04	2279
302.00	325.79	305.79	2025	2044	272.88	491.46	721.87	2294
304.00	328.08	308.08	2027	2046	271.58	489.65	719.67	2394
306.00	330.47	310.47	2029	2049	270.14	487.60	717.14	2365
308.00	332.84	312.84	2031	2051	268.76	485.65	714.74	2367
310.00	335.21	315.21	2034	2053	267.39	483.70	712.35	2363
312.00	337.57	317.57	2036	2055	266.03	481.79	709.99	2337
314.00	339.91	319.91	2038	2057	264.74	479.95	707.74	2380
316.00	342.29	322.29	2040	2059	263.39	478.03	705.37	2358
318.00	344.64	324.64	2042	2061	262.08	476.17	703.08	2293
320.00	346.94	326.94	2043	2063	260.88	474.48	701.03	2344
322.00	349.28	329.28	2045	2065	259.62	472.69	698.82	2417
324.00	351.70	331.70	2048	2067	258.27	470.74	696.41	2206
326.00	353.90	333.90	2048	2068	257.21	469.28	694.65	2342
328.00	356.25	336.25	2050	2070	255.99	467.53	692.50	2297
330.00	358.54	338.54	2052	2071	254.84	465.90	690.51	2479
332.00	361.02	341.02	2054	2074	253.45	463.87	687.97	2451
334.00	363.47	343.47	2057	2076	252.12	461.93	685.54	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								2345
336.00	365.82	345.82	2058	2078	250.93	460.23	683.45	
								2460
338.00	368.28	348.28	2061	2080	249.61	458.30	681.03	
								2141
340.00	370.42	350.42	2061	2081	248.70	457.04	679.54	
								2285
342.00	372.71	352.71	2063	2082	247.62	455.50	677.66	
								2393
344.00	375.10	355.10	2065	2084	246.42	453.76	675.49	
								2444
346.00	377.54	357.54	2067	2086	245.16	451.92	673.19	
								2313
348.00	379.86	359.86	2068	2088	244.08	450.36	671.28	
								2330
350.00	382.19	362.19	2070	2089	242.99	448.78	669.33	
								2358
352.00	384.54	364.54	2071	2091	241.87	447.16	667.32	
								2408
354.00	386.95	366.95	2073	2093	240.71	445.45	665.19	
								2408
356.00	389.36	369.36	2075	2095	239.55	443.76	663.07	
								2462
358.00	391.82	371.82	2077	2097	238.34	441.97	660.82	
								2385
360.00	394.21	374.21	2079	2098	237.23	440.34	658.80	
								2299
362.00	396.50	376.50	2080	2100	236.23	438.89	657.02	
								2404
364.00	398.91	378.91	2082	2101	235.12	437.26	654.97	
								2448
366.00	401.36	381.36	2084	2103	233.97	435.55	652.82	
								2350
368.00	403.71	383.71	2085	2105	232.94	434.04	650.94	
								2456
370.00	406.16	386.16	2087	2107	231.80	432.34	648.81	
								2393
372.00	408.55	388.55	2089	2109	230.74	430.77	646.84	
								2417
374.00	410.97	390.97	2091	2110	229.67	429.17	644.84	
								2610
376.00	413.58	393.58	2094	2113	228.39	427.22	642.33	
								2494
378.00	416.08	396.08	2096	2116	227.25	425.51	640.16	
								2580
380.00	418.66	398.66	2098	2118	226.03	423.65	637.78	
								2539
382.00	421.20	401.20	2100	2121	224.87	421.89	635.53	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								2494
384.00	423.69	403.69	2103	2123	223.76	420.22	633.42	
								2300
386.00	425.99	405.99	2104	2124	222.87	418.90	631.78	
								2388
388.00	428.38	408.38	2105	2125	221.89	417.44	629.95	
								2609
390.00	430.99	410.99	2108	2128	220.69	415.61	627.58	
								2413
392.00	433.40	413.40	2109	2129	219.71	414.13	625.72	
								2380
394.00	435.78	415.78	2111	2131	218.76	412.71	623.95	
								2475
396.00	438.25	418.25	2112	2133	217.74	411.15	621.96	
								2492
398.00	440.75	420.75	2114	2135	216.70	409.57	619.95	
								2556
400.00	443.30	423.30	2117	2137	215.61	407.90	617.80	
								2488
402.00	445.79	425.79	2118	2139	214.60	406.36	615.83	
								2435
404.00	448.22	428.22	2120	2140	213.65	404.91	613.99	
								2318
406.00	450.54	430.54	2121	2141	212.81	403.65	612.42	
								2420
408.00	452.96	432.96	2122	2143	211.88	402.24	610.64	
								2257
410.00	455.22	435.22	2123	2143	211.11	401.09	609.22	
								2394
412.00	457.61	437.61	2124	2145	210.22	399.74	607.51	
								2462
414.00	460.07	440.07	2126	2146	209.28	398.30	605.67	
								2492
416.00	462.57	442.57	2128	2148	208.32	396.82	603.77	
								2474
418.00	465.04	445.04	2129	2150	207.38	395.38	601.93	
								2489
420.00	467.53	447.53	2131	2152	206.44	393.92	600.06	
								2543
422.00	470.07	450.07	2133	2154	205.46	392.40	598.09	
								2548
424.00	472.62	452.62	2135	2156	204.49	390.87	596.12	
								2505
426.00	475.12	455.12	2137	2157	203.56	389.43	594.26	
								2550
428.00	477.67	457.67	2139	2159	202.60	387.93	592.32	
								2532
430.00	480.21	460.21	2140	2161	201.66	386.46	590.43	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
432.00	482.73	462.73	2142	2163	200.74	385.02	588.57	2525
434.00	485.30	465.30	2144	2165	199.79	383.52	586.62	2571
436.00	487.81	467.81	2146	2167	198.90	382.13	584.83	2504
438.00	490.38	470.38	2148	2169	197.96	380.65	582.90	2575
440.00	492.94	472.94	2150	2171	197.04	379.21	581.02	2557
442.00	495.55	475.55	2152	2173	196.09	377.70	579.05	2609
444.00	498.14	478.14	2154	2175	195.16	376.23	577.13	2591
446.00	500.70	480.70	2156	2177	194.27	374.82	575.30	2556
448.00	503.35	483.35	2158	2179	193.31	373.27	573.27	2657
450.00	505.85	485.85	2159	2181	192.48	371.97	571.58	2496
452.00	508.42	488.42	2161	2183	191.60	370.57	569.76	2569
454.00	510.96	490.96	2163	2184	190.75	369.22	568.00	2541
456.00	513.60	493.60	2165	2187	189.83	367.74	566.05	2647
458.00	516.17	496.17	2167	2188	188.98	366.38	564.27	2565
460.00	518.89	498.89	2169	2191	188.02	364.82	562.20	2721
462.00	521.56	501.56	2171	2193	187.10	363.35	560.26	2667
464.00	524.21	504.21	2173	2195	186.21	361.91	558.36	2650
466.00	526.85	506.85	2175	2198	185.34	360.49	556.49	2643
468.00	529.40	509.40	2177	2199	184.53	359.20	554.80	2553
470.00	532.21	512.21	2180	2202	183.55	357.59	552.64	2803
472.00	534.99	514.99	2182	2205	182.59	356.01	550.54	2788
474.00	537.71	517.71	2184	2207	181.69	354.55	548.59	2716
476.00	540.48	520.48	2187	2210	180.76	353.02	546.55	2770
478.00	543.12	523.12	2189	2212	179.93	351.67	544.76	2643

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
480.00	545.85	525.85	2191	2214	179.05	350.23	542.83	2727
482.00	548.57	528.57	2193	2217	178.18	348.81	540.93	2720
484.00	551.16	531.16	2195	2218	177.41	347.55	539.28	2591
486.00	553.80	533.80	2197	2220	176.61	346.25	537.54	2642
488.00	556.41	536.41	2198	2222	175.85	344.99	535.89	2604
490.00	559.05	539.05	2200	2224	175.06	343.70	534.16	2647
492.00	561.78	541.78	2202	2226	174.22	342.32	532.31	2730
494.00	564.38	544.38	2204	2228	173.48	341.10	530.69	2601
496.00	567.16	547.16	2206	2230	172.62	339.68	528.78	2777
498.00	569.79	549.79	2208	2232	171.87	338.45	527.14	2627
500.00	572.41	552.41	2210	2234	171.14	337.23	525.53	2619
502.00	575.35	555.35	2213	2237	170.20	335.65	523.37	2939
504.00	578.21	558.21	2215	2240	169.31	334.16	521.35	2869
506.00	581.01	561.01	2217	2242	168.49	332.79	519.49	2791
508.00	583.82	563.82	2220	2245	167.66	331.39	517.60	2818
510.00	586.71	566.71	2222	2248	166.79	329.92	515.60	2885
512.00	589.83	569.83	2226	2252	165.76	328.17	513.20	3126
514.00	592.85	572.85	2229	2255	164.83	326.58	511.01	3020
516.00	595.90	575.90	2232	2259	163.88	324.97	508.79	3044
518.00	598.62	578.62	2234	2261	163.15	323.74	507.13	2724
520.00	601.43	581.43	2236	2263	162.38	322.43	505.36	2803
522.00	604.03	584.03	2238	2265	161.73	321.34	503.90	2604
524.00	607.00	587.00	2240	2268	160.86	319.87	501.88	2971
526.00	609.83	589.83	2243	2270	160.10	318.57	500.11	2825

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								2750
528.00	612.58	592.58	2245	2272	159.38	317.36	498.47	
								2323
530.00	614.90	594.90	2245	2272	158.90	316.57	497.43	
								2366
532.00	617.26	597.26	2245	2273	158.39	315.74	496.34	
								2612
534.00	619.88	599.88	2247	2274	157.77	314.69	494.93	
								2663
536.00	622.54	602.54	2248	2276	157.12	313.59	493.45	
								2668
538.00	625.21	605.21	2250	2277	156.47	312.50	491.97	
								2816
540.00	628.02	608.02	2252	2279	155.75	311.27	490.28	
								2783
542.00	630.81	610.81	2254	2281	155.06	310.08	488.66	
								2647
544.00	633.45	613.45	2255	2283	154.44	309.03	487.24	
								2634
546.00	636.09	616.09	2257	2284	153.83	308.00	485.84	
								2590
548.00	638.68	618.68	2258	2285	153.25	307.02	484.52	
								2529
550.00	641.21	621.21	2259	2286	152.70	306.10	483.28	
								2642
552.00	643.85	623.85	2260	2288	152.10	305.08	481.90	
								2623
554.00	646.47	626.47	2262	2289	151.52	304.09	480.55	
								2512
556.00	648.98	628.98	2263	2290	150.99	303.20	479.35	
								2421
558.00	651.40	631.40	2263	2290	150.51	302.39	478.27	
								2189
560.00	653.59	633.59	2263	2290	150.13	301.76	477.46	
								2469
562.00	656.06	636.06	2264	2291	149.63	300.92	476.33	
								2535
564.00	658.60	638.60	2265	2292	149.10	300.03	475.12	
								2260
566.00	660.86	640.86	2265	2292	148.70	299.36	474.24	
								2328
568.00	663.18	643.18	2265	2292	148.27	298.64	473.29	
								2099
570.00	665.28	645.28	2264	2291	147.93	298.09	472.59	
								2225
572.00	667.51	647.51	2264	2291	147.55	297.45	471.76	
								2150
574.00	669.66	649.66	2264	2290	147.19	296.87	471.01	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
576.00	671.79	651.79	2263	2290	146.84	296.31	470.28	2133
578.00	673.96	653.96	2263	2289	146.49	295.71	469.51	2171
580.00	676.25	656.25	2263	2289	146.08	295.04	468.62	2283
582.00	678.34	658.34	2262	2289	145.76	294.51	467.93	2090
584.00	680.39	660.39	2262	2288	145.45	294.00	467.28	2057
586.00	682.51	662.51	2261	2287	145.11	293.45	466.57	2122
588.00	684.61	664.61	2261	2287	144.79	292.91	465.88	2096
590.00	686.72	666.72	2260	2286	144.46	292.37	465.18	2113
592.00	688.88	668.88	2260	2286	144.11	291.80	464.44	2153
594.00	691.06	671.06	2259	2285	143.76	291.22	463.66	2185
596.00	693.21	673.21	2259	2285	143.42	290.65	462.92	2153
598.00	695.32	675.32	2259	2284	143.10	290.12	462.24	2101
600.00	697.46	677.46	2258	2284	142.76	289.56	461.51	2147
602.00	699.55	679.55	2258	2283	142.45	289.04	460.83	2093
604.00	701.68	681.68	2257	2283	142.13	288.50	460.13	2124
606.00	703.84	683.84	2257	2282	141.79	287.94	459.39	2162
608.00	705.86	685.86	2256	2282	141.50	287.47	458.78	2018
610.00	707.93	687.93	2255	2281	141.20	286.97	458.14	2066
612.00	709.99	689.99	2255	2280	140.90	286.47	457.49	2067
614.00	712.00	692.00	2254	2279	140.62	286.02	456.90	2006
616.00	714.15	694.15	2254	2279	140.30	285.47	456.18	2148
618.00	716.19	696.19	2253	2278	140.01	284.99	455.55	2047
620.00	718.29	698.29	2253	2278	139.70	284.48	454.89	2096
622.00	720.30	700.30	2252	2277	139.42	284.02	454.29	2011

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
624.00	722.50	702.50	2252	2277	139.08	283.44	453.53	2199
626.00	724.60	704.60	2251	2276	138.78	282.93	452.86	2101
628.00	726.61	706.61	2250	2275	138.51	282.48	452.27	2010
630.00	728.63	708.63	2250	2275	138.23	282.02	451.67	2023
632.00	730.71	710.71	2249	2274	137.94	281.52	451.02	2079
634.00	732.87	712.87	2249	2274	137.62	280.99	450.31	2152
636.00	735.07	715.07	2249	2273	137.29	280.42	449.55	2204
638.00	737.21	717.21	2248	2273	136.98	279.89	448.84	2145
640.00	739.42	719.42	2248	2273	136.65	279.32	448.08	2210
642.00	741.63	721.63	2248	2273	136.32	278.76	447.32	2207
644.00	743.79	723.79	2248	2272	136.00	278.22	446.60	2162
646.00	746.04	726.04	2248	2272	135.66	277.63	445.81	2250
648.00	748.11	728.11	2247	2272	135.38	277.16	445.18	2065
650.00	750.15	730.15	2247	2271	135.11	276.70	444.58	2045
652.00	752.22	732.22	2246	2270	134.83	276.23	443.95	2068
654.00	754.28	734.28	2245	2270	134.56	275.76	443.33	2058
656.00	756.40	736.40	2245	2269	134.26	275.26	442.66	2121
658.00	758.64	738.64	2245	2269	133.94	274.69	441.89	2237
660.00	760.73	740.73	2245	2269	133.65	274.21	441.25	2094
662.00	762.80	742.80	2244	2268	133.38	273.74	440.62	2071
664.00	764.98	744.98	2244	2268	133.07	273.21	439.91	2178
666.00	767.38	747.38	2244	2268	132.70	272.55	438.99	2396
668.00	769.76	749.76	2245	2269	132.33	271.90	438.09	2382
670.00	772.09	752.09	2245	2269	131.98	271.28	437.24	2335

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
672.00	774.49	754.49	2246	2269	131.61	270.62	436.32	2399
674.00	776.87	756.87	2246	2270	131.24	269.98	435.43	2381
676.00	779.28	759.28	2246	2270	130.87	269.32	434.52	2406
678.00	781.53	761.53	2246	2270	130.56	268.76	433.76	2252
680.00	783.89	763.89	2247	2270	130.20	268.14	432.89	2362
682.00	786.23	766.23	2247	2270	129.86	267.54	432.05	2337
684.00	788.42	768.42	2247	2270	129.57	267.02	431.35	2195
686.00	790.63	770.63	2247	2270	129.27	266.50	430.63	2202
688.00	792.82	772.82	2247	2270	128.98	265.98	429.93	2191
690.00	794.70	774.70	2246	2269	128.77	265.63	429.48	1886
692.00	796.55	776.55	2244	2268	128.57	265.30	429.05	1848
694.00	798.33	778.33	2243	2266	128.39	265.00	428.67	1780
696.00	800.20	780.20	2242	2265	128.18	264.66	428.22	1869
698.00	802.00	782.00	2241	2264	128.00	264.35	427.83	1797
700.00	803.88	783.88	2240	2263	127.79	264.00	427.37	1885
702.00	805.78	785.78	2239	2262	127.59	263.65	426.91	1897
704.00	808.11	788.11	2239	2262	127.26	263.06	426.09	2334
706.00	810.72	790.72	2240	2263	126.84	262.31	425.02	2604
708.00	813.03	793.03	2240	2264	126.52	261.74	424.23	2315
710.00	815.30	795.30	2240	2264	126.22	261.20	423.47	2267
712.00	817.23	797.23	2239	2263	126.01	260.83	422.99	1928
714.00	819.15	799.15	2239	2262	125.80	260.48	422.52	1922
716.00	821.07	801.07	2238	2261	125.59	260.12	422.04	1924
718.00	822.98	802.98	2237	2260	125.39	259.77	421.58	1903

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								1940
720.00	824.92	804.92	2236	2259	125.18	259.40	421.09	
								2048
722.00	826.97	806.97	2235	2259	124.94	258.98	420.52	
								2122
724.00	829.09	809.09	2235	2258	124.68	258.53	419.90	
								2173
726.00	831.26	811.26	2235	2258	124.41	258.05	419.24	
								2011
728.00	833.27	813.27	2234	2257	124.18	257.65	418.70	
								2177
730.00	835.45	815.45	2234	2257	123.92	257.17	418.04	
								2337
732.00	837.79	817.79	2234	2257	123.60	256.61	417.24	
								2317
734.00	840.10	820.10	2235	2258	123.30	256.06	416.47	
								2290
736.00	842.39	822.39	2235	2258	123.00	255.52	415.72	
								2049
738.00	844.44	824.44	2234	2257	122.77	255.12	415.16	
								2015
740.00	846.46	826.46	2234	2257	122.55	254.73	414.63	
								2007
742.00	848.46	828.46	2233	2256	122.33	254.34	414.10	
								2373
744.00	850.84	830.84	2233	2256	122.01	253.77	413.29	
								2300
746.00	853.14	833.14	2234	2256	121.72	253.24	412.54	
								2324
748.00	855.46	835.46	2234	2257	121.42	252.69	411.77	
								2329
750.00	857.79	837.79	2234	2257	121.12	252.15	411.01	
								2365
752.00	860.15	840.15	2234	2257	120.82	251.59	410.21	
								2194
754.00	862.35	842.35	2234	2257	120.56	251.12	409.55	
								2087
756.00	864.44	844.44	2234	2256	120.33	250.71	408.98	
								2078
758.00	866.51	846.51	2234	2256	120.10	250.30	408.42	
								2128
760.00	868.64	848.64	2233	2256	119.86	249.87	407.81	
								2661
762.00	871.30	851.30	2234	2257	119.47	249.15	406.77	
								2269
764.00	873.57	853.57	2234	2257	119.20	248.65	406.07	
								2099
766.00	875.67	855.67	2234	2256	118.97	248.24	405.49	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
768.00	878.00	858.00	2234	2257	118.68	247.71	404.74	2334
770.00	880.16	860.16	2234	2256	118.44	247.27	404.13	2154
772.00	882.53	862.53	2235	2257	118.14	246.73	403.35	2373
774.00	885.00	865.00	2235	2257	117.82	246.13	402.49	2468
776.00	887.35	867.35	2235	2257	117.53	245.60	401.74	2352
778.00	889.45	869.45	2235	2257	117.31	245.20	401.17	2096
780.00	891.47	871.47	2235	2257	117.10	244.83	400.66	2022
782.00	893.86	873.86	2235	2257	116.81	244.29	399.88	2394
784.00	896.31	876.31	2235	2257	116.50	243.71	399.05	2446
786.00	898.57	878.57	2236	2257	116.24	243.24	398.38	2260
788.00	900.84	880.84	2236	2257	115.98	242.76	397.70	2266
790.00	903.23	883.23	2236	2258	115.69	242.22	396.92	2396
792.00	905.65	885.65	2236	2258	115.39	241.68	396.14	2416
794.00	908.04	888.04	2237	2259	115.11	241.14	395.36	2397
796.00	910.43	890.43	2237	2259	114.82	240.62	394.60	2386
798.00	912.91	892.91	2238	2259	114.52	240.05	393.78	2475
800.00	915.39	895.39	2238	2260	114.21	239.47	392.95	2483
802.00	917.88	897.88	2239	2261	113.90	238.90	392.11	2492
804.00	920.29	900.29	2240	2261	113.62	238.37	391.35	2406
806.00	922.59	902.59	2240	2261	113.36	237.90	390.67	2299
808.00	924.78	904.78	2240	2261	113.13	237.47	390.06	2196
810.00	926.90	906.90	2239	2261	112.92	237.08	389.51	2116
812.00	928.95	908.95	2239	2260	112.72	236.72	389.00	2056
814.00	930.90	910.90	2238	2259	112.54	236.40	388.56	1946

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
816.00	933.06	913.06	2238	2259	112.32	236.00	387.98	2160
818.00	935.52	915.52	2238	2260	112.04	235.46	387.19	2459
820.00	937.71	917.71	2238	2260	111.81	235.04	386.60	2195
822.00	939.71	919.71	2238	2259	111.63	234.70	386.13	1998
824.00	941.70	921.70	2237	2258	111.44	234.37	385.67	1991
826.00	943.68	923.68	2237	2258	111.27	234.05	385.21	1973
828.00	945.64	925.64	2236	2257	111.09	233.73	384.77	1968
830.00	947.61	927.61	2235	2256	110.91	233.41	384.32	1969
832.00	949.59	929.59	2235	2256	110.74	233.09	383.87	1972
834.00	951.86	931.86	2235	2256	110.50	232.65	383.23	2272
836.00	954.15	934.15	2235	2256	110.26	232.19	382.57	2294
838.00	956.15	936.15	2234	2255	110.08	231.87	382.11	2000
840.00	958.12	938.12	2234	2255	109.90	231.55	381.67	1973
842.00	960.10	940.10	2233	2254	109.73	231.23	381.22	1978
844.00	962.09	942.09	2232	2253	109.55	230.91	380.76	1993
846.00	964.16	944.16	2232	2253	109.36	230.56	380.27	2061
848.00	966.36	946.36	2232	2253	109.15	230.15	379.68	2202
850.00	968.41	948.41	2232	2252	108.96	229.81	379.19	2050
852.00	970.49	950.49	2231	2252	108.77	229.45	378.68	2085
854.00	973.09	953.09	2232	2253	108.46	228.87	377.82	2594
856.00	975.60	955.60	2233	2254	108.18	228.33	377.03	2509
858.00	978.07	958.07	2233	2254	107.91	227.82	376.27	2472
860.00	980.58	960.58	2234	2255	107.63	227.28	375.48	2512
862.00	982.89	962.89	2234	2255	107.39	226.84	374.84	2313

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								2905
864.00	985.80	965.80	2236	2257	107.02	226.12	373.75	
								2522
866.00	988.32	968.32	2236	2257	106.74	225.58	372.96	
								2810
868.00	991.13	971.13	2238	2259	106.39	224.92	371.96	
								2779
870.00	993.91	973.91	2239	2260	106.06	224.27	370.99	
								2726
872.00	996.64	976.64	2240	2261	105.74	223.65	370.06	
								2548
874.00	999.18	979.18	2241	2262	105.46	223.12	369.27	
								2724
876.00	1001.91	981.91	2242	2263	105.14	222.51	368.36	
								2747
878.00	1004.66	984.66	2243	2264	104.82	221.89	367.43	
								2464
880.00	1007.12	987.12	2243	2265	104.57	221.40	366.71	
								1983
882.00	1009.10	989.10	2243	2264	104.41	221.10	366.29	
								2481
884.00	1011.58	991.58	2243	2265	104.15	220.61	365.56	
								2893
886.00	1014.48	994.48	2245	2266	103.80	219.93	364.53	
								2075
888.00	1016.55	996.55	2244	2266	103.63	219.61	364.06	
								1977
890.00	1018.53	998.53	2244	2265	103.47	219.32	363.65	
								2823
892.00	1021.35	1001.35	2245	2267	103.14	218.68	362.68	
								2876
894.00	1024.23	1004.23	2247	2268	102.80	218.02	361.68	
								2862
896.00	1027.09	1007.09	2248	2270	102.47	217.37	360.70	
								2657
898.00	1029.75	1009.75	2249	2271	102.18	216.81	359.87	
								2713
900.00	1032.46	1012.46	2250	2272	101.89	216.24	359.01	
								2964
902.00	1035.42	1015.42	2251	2273	101.53	215.55	357.96	
								2924
904.00	1038.35	1018.35	2253	2275	101.19	214.88	356.95	
								3142
906.00	1041.49	1021.49	2255	2277	100.80	214.11	355.77	
								3035
908.00	1044.53	1024.53	2257	2279	100.44	213.40	354.69	
								3767
910.00	1048.29	1028.29	2260	2284	99.88	212.29	352.97	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
912.00	1051.04	1031.04	2261	2285	99.59	211.72	352.12	2747
914.00	1053.45	1033.45	2261	2285	99.37	211.30	351.49	2411
916.00	1055.46	1035.46	2261	2285	99.22	211.02	351.08	2012
918.00	1057.41	1037.41	2260	2284	99.08	210.76	350.71	1946
920.00	1059.41	1039.41	2260	2283	98.93	210.48	350.31	2001
922.00	1061.46	1041.46	2259	2283	98.78	210.19	349.88	2051
924.00	1063.59	1043.59	2259	2282	98.61	209.88	349.42	2127
926.00	1066.50	1046.50	2260	2284	98.29	209.25	348.46	2918
928.00	1069.38	1049.38	2262	2285	97.98	208.64	347.54	2872
930.00	1072.46	1052.46	2263	2287	97.63	207.94	346.46	3086
932.00	1075.48	1055.48	2265	2289	97.29	207.28	345.45	3015
934.00	1078.49	1058.49	2267	2291	96.96	206.62	344.44	3014
936.00	1081.56	1061.56	2268	2293	96.61	205.94	343.39	3073
938.00	1084.65	1064.65	2270	2295	96.27	205.25	342.35	3085
940.00	1087.49	1067.49	2271	2296	95.98	204.68	341.48	2842
942.00	1090.50	1070.50	2273	2298	95.65	204.05	340.50	3005
944.00	1093.47	1073.47	2274	2300	95.34	203.43	339.55	2974
946.00	1095.48	1075.49	2274	2299	95.20	203.16	339.16	2015
948.00	1097.55	1077.55	2273	2299	95.05	202.88	338.76	2065
950.00	1099.98	1079.98	2274	2299	94.85	202.49	338.16	2425
952.00	1102.52	1082.52	2274	2299	94.63	202.05	337.49	2548
954.00	1105.21	1085.21	2275	2300	94.38	201.56	336.75	2685
956.00	1107.83	1087.83	2276	2301	94.14	201.10	336.04	2624
958.00	1110.57	1090.57	2277	2302	93.88	200.59	335.27	2739

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								2116
960.00	1112.69	1092.69	2276	2302	93.73	200.30	334.85	
								2515
962.00	1115.20	1095.20	2277	2302	93.52	199.88	334.21	
								2966
964.00	1118.17	1098.17	2278	2304	93.22	199.29	333.30	
								2810
966.00	1120.98	1100.98	2279	2305	92.96	198.77	332.49	
								2009
968.00	1122.99	1102.99	2279	2304	92.83	198.52	332.13	
								2222
970.00	1125.21	1105.21	2279	2304	92.66	198.20	331.66	
								2172
972.00	1127.38	1107.38	2279	2304	92.51	197.91	331.22	
								3128
974.00	1130.51	1110.51	2280	2306	92.18	197.25	330.21	
								3011
976.00	1133.52	1113.52	2282	2308	91.88	196.66	329.29	
								3050
978.00	1136.57	1116.57	2283	2309	91.58	196.05	328.35	
								3104
980.00	1139.67	1119.67	2285	2311	91.26	195.42	327.37	
								3255
982.00	1142.93	1122.93	2287	2314	90.92	194.73	326.30	
								3242
984.00	1146.17	1126.17	2289	2316	90.58	194.05	325.24	
								3063
986.00	1149.23	1129.23	2291	2318	90.28	193.45	324.32	
								2928
988.00	1152.16	1132.16	2292	2319	90.01	192.91	323.48	
								3294
990.00	1155.45	1135.45	2294	2321	89.67	192.22	322.41	
								2729
992.00	1158.18	1138.18	2295	2322	89.43	191.76	321.70	
								2663
994.00	1160.85	1140.85	2295	2323	89.21	191.33	321.03	
								2861
996.00	1163.71	1143.71	2297	2324	88.96	190.82	320.25	
								2890
998.00	1166.60	1146.60	2298	2325	88.70	190.31	319.46	
								2718
1000.00	1169.31	1149.31	2299	2326	88.48	189.86	318.77	
								2784
1002.00	1172.10	1152.10	2300	2327	88.24	189.39	318.04	
								2762
1004.00	1174.86	1154.86	2301	2328	88.01	188.93	317.34	
								2684
1006.00	1177.54	1157.54	2301	2329	87.80	188.50	316.67	

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								3091
1008.00	1180.64	1160.64	2303	2331	87.51	187.93	315.78	
								2862
1010.00	1183.50	1163.50	2304	2332	87.27	187.44	315.02	
								2859
1012.00	1186.36	1166.36	2305	2333	87.02	186.96	314.27	
								2857
1014.00	1189.21	1169.21	2306	2334	86.78	186.48	313.52	
								2686
1016.00	1191.90	1171.90	2307	2335	86.57	186.06	312.88	
								2707
1018.00	1194.61	1174.61	2308	2336	86.36	185.63	312.22	
								2784
1020.00	1197.39	1177.39	2309	2337	86.14	185.18	311.52	
								2761
1022.00	1200.15	1180.15	2309	2338	85.92	184.74	310.84	
								2845
1024.00	1203.00	1183.00	2311	2339	85.69	184.28	310.12	
								2990
1026.00	1205.99	1185.99	2312	2340	85.43	183.76	309.32	
								2819
1028.00	1208.81	1188.81	2313	2341	85.20	183.31	308.62	
								2847
1030.00	1211.65	1191.65	2314	2342	84.98	182.85	307.90	
								2770
1032.00	1214.42	1194.42	2315	2343	84.76	182.42	307.23	
								2935
1034.00	1217.36	1197.36	2316	2344	84.52	181.93	306.47	
								2730
1036.00	1220.09	1200.09	2317	2345	84.31	181.52	305.83	
								2708
1038.00	1222.80	1202.80	2318	2346	84.11	181.11	305.20	
								2857
1040.00	1225.65	1205.65	2319	2347	83.89	180.66	304.50	
								3168
1042.00	1228.82	1208.82	2320	2349	83.61	180.10	303.62	
								2608
1044.00	1231.43	1211.43	2321	2350	83.43	179.74	303.05	
								2694
1046.00	1234.12	1214.12	2321	2350	83.23	179.34	302.44	
								2836
1048.00	1236.96	1216.96	2322	2351	83.01	178.91	301.76	
								2656
1050.00	1239.61	1219.61	2323	2352	82.82	178.53	301.17	
								3150
1052.00	1242.76	1222.76	2325	2354	82.56	177.99	300.32	
								2843
1054.00	1245.61	1225.61	2326	2355	82.34	177.56	299.65	

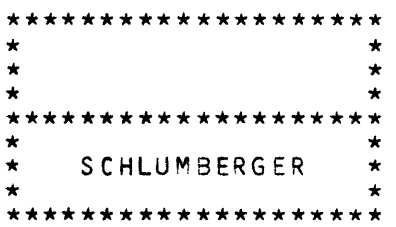
TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
1056.00	1248.69	1228.69	2327	2356	82.09	177.05	298.85	3083
1058.00	1251.75	1231.75	2328	2358	81.85	176.55	298.06	3059
1060.00	1254.51	1234.51	2329	2359	81.65	176.15	297.44	2764
1062.00	1257.26	1237.26	2330	2359	81.45	175.75	296.82	2745
1064.00	1260.17	1240.17	2331	2361	81.23	175.31	296.13	2913
1066.00	1262.84	1242.84	2332	2361	81.05	174.94	295.55	2670
1068.00	1265.89	1245.89	2333	2363	80.81	174.45	294.79	3052
1070.00	1268.69	1248.69	2334	2364	80.61	174.05	294.16	2798
1072.00	1271.67	1251.67	2335	2365	80.39	173.59	293.44	2981
1074.00	1274.43	1254.43	2336	2366	80.20	173.21	292.84	2755
1076.00	1277.35	1257.35	2337	2367	79.98	172.77	292.15	2928
1078.00	1279.91	1259.91	2337	2367	79.82	172.45	291.64	2555
1080.00	1282.06	1262.06	2337	2367	79.71	172.22	291.30	2155
1082.00	1284.97	1264.97	2338	2368	79.50	171.80	290.63	2909
1084.00	1288.03	1268.03	2340	2369	79.26	171.33	289.89	3060
1086.00	1291.11	1271.11	2341	2371	79.03	170.85	289.14	3075
1088.00	1293.88	1273.88	2342	2372	78.85	170.47	288.55	2775
1090.00	1296.56	1276.56	2342	2372	78.67	170.12	288.00	2679
1092.00	1299.21	1279.21	2343	2373	78.50	169.78	287.46	2647
1094.00	1302.06	1282.06	2344	2374	78.31	169.39	286.84	2849
1096.00	1305.31	1285.31	2345	2376	78.05	168.87	286.01	3255
1098.00	1308.18	1288.18	2346	2377	77.86	168.47	285.39	2864
1100.00	1311.13	1291.13	2348	2378	77.65	168.05	284.72	2957
1102.00	1313.98	1293.98	2348	2379	77.46	167.66	284.11	2843

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
1104.00	1317.10	1297.10	2350	2380	77.23	167.19	283.37	3124
1106.00	1319.97	1299.97	2351	2381	77.04	166.80	282.75	2867
1108.00	1323.04	1303.04	2352	2383	76.82	166.35	282.04	3076
1110.00	1326.27	1306.27	2354	2385	76.58	165.86	281.26	3223
1112.00	1329.61	1309.61	2355	2387	76.32	165.33	280.42	3339
1114.00	1332.48	1312.48	2356	2388	76.14	164.95	279.81	2877
1116.00	1335.68	1315.68	2358	2389	75.90	164.47	279.05	3198
1118.00	1338.65	1318.65	2359	2390	75.71	164.07	278.41	2965
1120.00	1341.44	1321.44	2360	2391	75.53	163.71	277.85	2798
1122.00	1344.37	1324.37	2361	2392	75.34	163.32	277.23	2926
1124.00	1347.64	1327.64	2362	2394	75.10	162.83	276.45	3266
1126.00	1350.58	1330.58	2363	2395	74.91	162.44	275.83	2946
1128.00	1353.30	1333.30	2364	2396	74.75	162.11	275.31	2715
1130.00	1356.85	1336.85	2366	2398	74.47	161.54	274.39	3554
1132.00	1360.18	1340.18	2368	2400	74.23	161.04	273.60	3330
1134.00	1363.27	1343.27	2369	2402	74.02	160.62	272.92	3094
1136.00	1366.33	1346.33	2370	2403	73.82	160.20	272.26	3061
1138.00	1369.50	1349.50	2372	2405	73.61	159.76	271.56	3169
1140.00	1372.86	1352.86	2373	2407	73.37	159.27	270.77	3352
1142.00	1375.88	1355.88	2375	2408	73.18	158.87	270.14	3028
1144.00	1379.04	1359.04	2376	2409	72.97	158.44	269.45	3154
1146.00	1382.22	1362.22	2377	2411	72.76	158.01	268.75	3186
1148.00	1385.46	1365.46	2379	2413	72.54	157.56	268.03	3240
1150.00	1388.78	1368.78	2380	2414	72.31	157.09	267.28	3313

TWO-WAY TRAVEL TIME FROM SRD MS	MEASURED DEPTH FROM KB M	VERTICAL DEPTH FROM SRD M	AVERAGE VELOCITY SRD/GEO M/S	RMS VELOCITY M/S	FIRST NORMAL MOVEOUT MS	SECOND NORMAL MOVEOUT MS	THIRD NORMAL MOVEOUT MS	INTERVAL VELOCITY M/S
								3175
1152.00	1391.95	1371.95	2382	2416	72.10	156.66	266.60	3114
1154.00	1395.07	1375.07	2383	2417	71.91	156.25	265.95	3222
1156.00	1398.29	1378.29	2385	2419	71.70	155.82	265.25	3163
1158.00	1401.45	1381.45	2386	2420	71.49	155.40	264.58	2942
1160.00	1404.39	1384.39	2387	2421	71.32	155.05	264.01	3091
1162.00	1407.48	1387.48	2383	2423	71.13	154.65	263.38	3129
1164.00	1410.61	1390.61	2389	2424	70.94	154.25	262.74	3102
1166.00	1413.71	1393.71	2391	2425	70.75	153.86	262.11	3184
1168.00	1416.90	1396.90	2392	2427	70.55	153.45	261.45	3234
1170.00	1420.13	1400.13	2393	2429	70.34	153.02	260.77	3388
1172.00	1423.52	1403.52	2395	2431	70.12	152.56	260.03	3388
1174.00	1426.91	1406.91	2397	2432	69.90	152.10	259.29	3286
1176.00	1430.19	1410.19	2398	2434	69.69	151.67	258.59	3209
1178.00	1433.40	1413.40	2400	2436	69.49	151.26	257.94	3328
1180.00	1436.73	1416.73	2401	2437	69.28	150.83	257.24	3114
1182.00	1439.84	1419.84	2402	2439	69.10	150.45	256.63	3140
1184.00	1442.98	1422.98	2404	2440	68.92	150.07	256.01	3146
1186.00	1446.13	1426.13	2405	2442	68.73	149.68	255.40	

SYNTHETIC

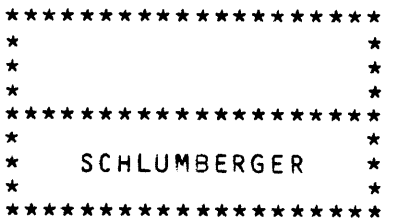
ANALYST: M. SANDERS 12-APR-88 19:17:00 PROGRAM: GMULTP 006.E06



SYNTHETIC SEISMOGRAM TABLE

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

ANALYST: M. SANDERS 12-APR-88 19:17:00 PROGRAM: GMULTP 006.E06



SYNTHETIC SEISMOGRAM TABLE

COMPANY : CRUSADER RESOURCES N.L.
WELL : MACALISTER #1
FIELD : WILDCAT
REFERENCE: 569150
LOGGED : 02/04/88

THE HEADINGS AND FLAGS SHOWN IN THE DATA LIST ARE DEFINED
AS FOLLOWS:

IGEOFL- FLAG INDICATING MODE OF PROCESSING
IGEOFL = 0 WST DATA AVAILABLE AND PROCESSED
IGEOFL = 1 WST DATA NOT AVAILABLE

LOG INPUT DATA :
GRFOO1- CHANNEL NAME FOR INPUT DENSITY LOG DATA
GTROC1- CHANNEL NAME FOR INPUT SONIC LOG DATA
GCURVE- CORRELATION LOG NAMES

USER DEFINED MODELING

LOFVEL- LAYER OPTION FLAG FOR VELOCITY
LOFDEN- LAYER OPTION FLAG FOR DENSITY
LAYVEL- LAYERED VELOCITY VALUES FOR USER SUPPLIED ZONE LIMIT
WITH RESPECT TO SONIC LOG DATA
LAYDEN- LAYERED DENSITY VALUES FOR USER SUPPLIED ZONE LIMITS
WITH RESPECT TO SONIC LOG DATA
UNERTH- UNIFORM EARTH VELOCITY
UNFDEN- UNIFORM EARTH DENSITY
SRATE SAMPLING RATE IN MS
INIDEP START DEPTH FOR COMPUTING SYNTHETIC SEISMOGRAM
WITH RESPECT TO SONIC LOG DATA
IGESTP STOP DEPTH FOR COMPUTING SYNTHETIC SEISMOGRAM
WITH RESPECT TO SONIC LOG DATA
INITAU TWO WAY TRAVEL TIME FROM TOP SONIC TO SRD
EKB ELEVATION OF KELLY BUSHING WITH RESPECT TO
MEAN SEA LEVEL
SRDGEO SEISMIC REFERENCE DEPTH WITH RESPECT TO
MEAN SEA LEVEL
ICDP FLAG FOR COMPUTING RESIDUAL MULTIPLES
CDPTIM TWO WAY TIME INTERVAL FOR COMPUTATION OF
RESIDUAL MULTIPLES
SCRTIM SURFACE REFLECTOR TWO WAY TIME ABOVE INITAU
SCREFL SURFACE REFLECTION COEFFICIENT
RCMAX REFLECTION COEFFICIENTS THAT ARE EQUAL TO OR
GREATER THAN THIS VALUE SHALL BE FLAGGED

NOTE IN CASE OF MODELING A SYNTHETIC SEISMOGRAM WITHOUT
SONIC LOG DATA ,THE DEPTH REFERENCES SHALL BE USER
DEFINED

OUTPUT DATA

RMSVWE ROOT MEAN SQUARE VELOCITY FOUND FOR THE WELL
SRDTIM TWO WAY TRANSIT TIME BETWEEN INIDEP AND SRDGEO

CHANNNEL NAMES

TWOT- TWO WAY TRAVEL TIME
DSRD- DEPTH OF COMPUTED DATA WITH RESPECT TO SRD
INTV- INTERVAL VELOCITY ON A TIME SCALE
RHOT- INTERVAL DENSITY ON A TIME SCALE
REFL- REFLECTION COEFFICIENT AT GIVEN TWO WAY TRAVEL TIMES
ATTE- ATTENUATION COEFFICIENT AT GIVEN TWO WAY TRAVEL TIMES
PRIM- SYNTHETIC SEISMOGRAM - PRIMARIES
MULT- SYNTHETIC SEISMOGRAM - PRIMARIES + MULTIPLES
MUON- MULTIPLES ONLY

CHANNEL NAMES

CHAN 1 - TWOT.GMU.002.*
CHAN 2 - DSRD.GRF.006.*
CHAN 3 - INTV.GRF.007.*
CHAN 4 - RHOT.GRF.001.*
CHAN 5 - REFL.GRF.001.*
CHAN 6 - ATTE.GRF.001.*
CHAN 7 - PRIM.GRF.001.*
CHAN 8 - MULT.GMU.001.*
CHAN 9 - MUON.GMU.001.*

(GLOBAL PARAMETERS)		(VALUE)	
MODE OF PROC (GEOGRAM)	IGEOFL	0	
INITIALIZE CDP LOGIC	ICDP	0	
CDP TIME	CDPTIM	.200C00	S
TIME SAMPLING (WST)	SRATE	2.00000	MS
TOP DEPTH OF PROCESSING	INIDEP	157.870	M
BOTTOM DEPTH OF PROCESSI	IGESTP	1426.00	M
INITIAL TWO WAY TRAVEL T	INITAU	.176C00	S
SRD FOR GEOGRAM	SRDGEO	-30479.7	M
ELEVATION OF KELLY BUSHI	EKB	0	M
SRD TIME	SRDTIM	0	MS
SURFACE COEFFICIENT OF R	SCRTIM	0	MS
SURFACE COEFFICIENT OF R	SCREFL	-1.00000	
REFLECTION COEFF MAXIMUM	RCMAX	.300000	
RMS VELOCITY IN WELL	RMSVWE	2543.45	M/S
UNIFORM EARTH VELOCITY	UNERTH	2133.60	M/S
UNIFORM DENSITY VALUE	UNFDEN	2.30000	G/C3

(MATRIX PARAMETERS)

1 GR*
2 CALI*

(ZONED PARAMETERS)		(VALUE)		(LIMITS)	
LAYER OPTION FLAG DENS	LOFDEN	:-1.000000		30479.7 -	0
LAYER OPTION FLAG VELOC	LOFVEL	: 1.000000		30479.7 -	0
USER SUPPLIED DENSITY DA	LAYDEN	:-999.2500	G/C3	30479.7 -	0
USER VELOC (WST)	LAYVEL	: 1794.000	M/S	179.000 -	20.0000
		700.0000		20.0000	0

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		1941	2.100					
178.0	159.81			.065	.99583	.06459	.06459	0
		2209	2.100					
180.0	162.02			0	.99583	0	-.00417	-.00417
		2209	2.100					
182.0	164.23			.009	.99576	.00851	.00878	.00027
		2247	2.100					
184.0	166.47			.007	.99570	.00733	.00621	-.00112
		2280	2.100					
186.0	168.75			-.009	.99563	-.00863	-.00948	-.00084
		2241	2.100					
188.0	171.00			-.009	.99555	-.00855	-.00743	.00112
		2203	2.100					
190.0	173.20			.033	.99445	.03309	.03397	.00089
		2354	2.100					
192.0	175.55			.003	.99444	.00338	-.00086	-.00424
		2370	2.100					
194.0	177.92			-.008	.99438	-.00757	-.00735	.00022
		2334	2.100					
196.0	180.26			-.008	.99432	-.00777	-.00740	.00038
		2298	2.100					
198.0	182.56			-.006	.99429	-.00552	-.00518	.00035
		2273	2.100					
200.0	184.83			-.008	.99423	-.00807	-.00671	.00136
		2236	2.100					
202.0	187.06			.004	.99421	.00391	.00557	.00166
		2254	2.100					
204.0	189.32			.004	.99420	.00401	.00230	-.00171
		2272	2.100					
206.0	191.59			.047	.99196	.04713	.04662	-.00051
		2498	2.100					
208.0	194.09			-.022	.99146	-.02222	-.02795	-.00572
		2389	2.100					
210.0	196.48			-.005	.99144	-.00513	-.00150	.00363
		2364	2.100					
212.0	198.84			-.005	.99141	-.00497	-.00519	-.00022
		2341	2.100					
214.0	201.18			-.002	.99141	-.00212	-.00114	.00098
		2331	2.100					
216.0	203.51			-.020	.99099	-.02026	-.01919	.00107
		2237	2.100					
218.0	205.75			.032	.98998	.03163	.03388	.00226
		2385	2.100					
220.0	208.14			-.007	.98994	-.00687	-.01465	-.00778
		2352	2.100					
222.0	210.49			-.005	.98992	-.00459	-.00125	.00334
		2330	2.100					
224.0	212.82			.021	.98946	.02113	.02225	.00111
		2432	2.100					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
226.0	215.25			-.019	.98909	-.01928	-.02194	-.00266
228.0	217.59	2339	2.100	.008	.98902	.00810	.01170	.00360
230.0	219.97	2377	2.100	.001	.98902	.00085	.00082	-.00002
232.0	222.35	2382	2.100	-.008	.98897	-.00745	-.01072	-.00327
234.0	224.69	2346	2.100	-.005	.98894	-.00521	-.00364	.00157
236.0	227.01	2321	2.100	.011	.98882	.01081	.00952	-.00129
238.0	229.39	2373	2.100	.002	.98882	.00187	.00184	-.00004
240.0	231.77	2382	2.100	.003	.98881	.00292	.00394	.00102
242.0	234.16	2396	2.100	.001	.98881	.00131	.00112	-.00019
244.0	236.57	2402	2.100	-.008	.98874	-.00814	-.00902	-.00088
246.0	238.93	2363	2.100	-.005	.98872	-.00472	-.00162	.00311
248.0	241.27	2340	2.100	.003	.98871	.00270	-.00009	-.00279
250.0	243.62	2353	2.100	-.013	.98855	-.01252	-.01111	.00141
252.0	245.92	2294	2.100	.002	.98855	.00155	.00263	.00108
254.0	248.22	2302	2.100	.007	.98850	.00680	.00431	-.00249
256.0	250.55	2334	2.100	.003	.98849	.00293	.00476	.00184
258.0	252.90	2347	2.100	-.005	.98847	-.00518	-.00546	-.00027
260.0	255.22	2323	2.100	-.002	.98846	-.00158	-.00159	-.00001
262.0	257.54	2315	2.100	.009	.98838	.00898	.01026	.00128
264.0	259.90	2358	2.100	.007	.98834	.00670	.00697	.00028
266.0	262.29	2390	2.100	-.003	.98833	-.00310	-.00731	-.00421
268.0	264.66	2375	2.100	.003	.98832	.00268	.00477	.00208
270.0	267.05	2388	2.100	.003	.98831	.00336	.00089	-.00246
272.0	269.45	2404	2.100	-.002	.98831	-.00155	-.00162	-.00007
274.0	271.85	2397	2.100	.001	.98830	.00083	.00374	.00291

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2401	2.100					
276.0	274.25			-.003	.98830	-.00255	-.00395	-.00140
		2389	2.100					
278.0	276.64			.025	.98770	.02433	.02376	-.00057
		2509	2.100					
280.0	279.15			-.002	.98770	-.00176	-.00276	-.00100
		2500	2.100					
282.0	281.65			.028	.98692	.02775	.02683	-.00092
		2645	2.100					
284.0	284.29			-.029	.98606	-.02902	-.03404	-.00502
		2494	2.100					
286.0	286.79			-.025	.98545	-.02465	-.01981	.00484
		2372	2.100					
288.0	289.16			.014	.98526	.01353	.01653	.00299
		2438	2.100					
290.0	291.60			-.016	.98502	-.01531	-.01754	-.00223
		2363	2.100					
292.0	293.96			0	.98502	.00029	.00260	.00231
		2365	2.100					
294.0	296.33			.020	.98463	.01964	.01847	-.00117
		2461	2.100					
296.0	298.79			-.004	.98462	-.00369	-.00767	-.00399
		2443	2.100					
298.0	301.23			-.038	.98316	-.03786	-.03447	.00340
		2262	2.100					
300.0	303.49			.003	.98315	.00280	.00847	.00567
		2275	2.100					
302.0	305.77			.003	.98314	.00319	.00204	-.00115
		2290	2.100					
304.0	308.06			.020	.98276	.01935	.02000	.00065
		2381	2.100					
306.0	310.44			-.003	.98275	-.00278	-.00531	-.00253
		2368	2.100					
308.0	312.81			.002	.98275	.00219	-.00220	-.00440
		2379	2.100					
310.0	315.18			-.004	.98273	-.00435	-.00385	.00050
		2358	2.100					
312.0	317.54			-.005	.98271	-.00473	-.00326	.00147
		2335	2.100					
314.0	319.88			.009	.98263	.00845	.01434	.00589
		2376	2.100					
316.0	322.25			-.002	.98263	-.00190	-.00423	-.00233
		2366	2.100					
318.0	324.62			-.016	.98237	-.01591	-.01817	-.00226
		2291	2.100					
320.0	326.91			.012	.98224	.01144	.01355	.00211
		2345	2.100					
322.0	329.26			.015	.98201	.01497	.01292	-.00204
		2418	2.100					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
324.0	331.67			-.045	.98005	-.04387	-.04828	-.00441
		2211	2.100					
326.0	333.88			.028	.97928	.02750	.03630	.00880
		2338	2.100					
328.0	336.22			-.010	.97919	-.00940	-.00983	-.00043
		2294	2.100					
330.0	338.52			.036	.97794	.03497	.03124	-.00373
		2464	2.100					
332.0	340.98			0	.97794	.00003	.00101	.00098
		2464	2.100					
334.0	343.44			-.024	.97740	-.02299	-.02712	-.00413
		2351	2.100					
336.0	345.80			.022	.97693	.02135	.02249	.00114
		2456	2.100					
338.0	348.25			-.066	.97264	-.06480	-.06311	.00169
		2150	2.100					
340.0	350.40			.027	.97191	.02657	.03464	.00808
		2271	2.100					
342.0	352.67			.025	.97128	.02478	.01817	-.00662
		2390	2.100					
344.0	355.06			.015	.97107	.01436	.01146	-.00290
		2462	2.100					
346.0	357.52			-.033	.96999	-.03236	-.03256	-.00020
		2303	2.100					
348.0	359.83			.005	.96996	.00476	.00874	.00398
		2326	2.100					
350.0	362.15			.007	.96992	.00655	.00518	-.00137
		2357	2.100					
352.0	364.51			.011	.96980	.01095	.01484	.00389
		2411	2.100					
354.0	366.92			-.001	.96980	-.00101	.00025	.00126
		2406	2.100					
356.0	369.33			.012	.96966	.01140	.00203	-.00937
		2463	2.100					
358.0	371.79			-.015	.96945	-.01426	-.01578	-.00151
		2392	2.100					
360.0	374.18			-.021	.96901	-.02062	-.01758	.00305
		2292	2.100					
362.0	376.47			.024	.96846	.02307	.02668	.00360
		2404	2.100					
364.0	378.88			.008	.96840	.00808	.00628	-.00179
		2444	2.100					
366.0	381.32			-.019	.96806	-.01795	-.01823	-.00027
		2355	2.100					
368.0	383.68			.019	.96771	.01858	.02155	.00298
		2448	2.100					
370.0	386.13			-.009	.96763	-.00862	-.01625	-.00763
		2404	2.100					
372.0	388.53			-.001	.96763	-.00106	.00308	.00414

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2399	2.100					
374.0	390.93			.044	.96573	.04283	.04022	-.00261
		2621	2.100					
376.0	393.55			-.026	.96509	-.02484	-.02214	.00270
		2490	2.100					
378.0	396.04			.018	.96480	.01694	.01234	-.00460
		2579	2.100					
380.0	398.62			-.007	.96475	-.00659	-.00435	.00224
		2544	2.100					
382.0	401.16			-.011	.96464	-.01026	-.01375	-.00350
		2490	2.100					
384.0	403.65			-.038	.96325	-.03660	-.03566	.00094
		2308	2.100					
386.0	405.96			.016	.96302	.01517	.02420	.00903
		2382	2.100					
388.0	408.35			.045	.96111	.04286	.03916	-.00370
		2604	2.100					
390.0	410.95			-.038	.95971	-.03662	-.03824	-.00162
		2413	2.100					
392.0	413.36			-.005	.95969	-.00497	-.00458	.00039
		2388	2.100					
394.0	415.75			.017	.95941	.01623	.01373	-.00250
		2470	2.100					
396.0	418.22			.006	.95938	.00563	.00723	.00160
		2499	2.100					
398.0	420.72			.011	.95927	.01026	.01338	.00313
		2553	2.100					
400.0	423.27			-.015	.95907	-.01404	-.01619	-.00215
		2480	2.100					
402.0	425.75			-.008	.95901	-.00735	-.00831	-.00097
		2442	2.100					
404.0	428.19			-.026	.95837	-.02478	-.02471	.00007
		2319	2.100					
406.0	430.51			.019	.95801	.01864	.02135	.00271
		2411	2.100					
408.0	432.92			-.032	.95703	-.03065	-.03531	-.00466
		2262	2.100					
410.0	435.19			.029	.95622	.02777	.03268	.00491
		2397	2.100					
412.0	437.58			.013	.95606	.01248	.01051	-.00197
		2460	2.100					
414.0	440.04			.005	.95603	.00522	.00966	.00444
		2487	2.100					
416.0	442.53			-.003	.95602	-.00320	-.01221	-.00901
		2471	2.100					
418.0	445.00			.005	.95599	.00485	.01011	.00526
		2496	2.100					
420.0	447.50			.009	.95592	.00814	.00547	-.00268
		2539	2.100					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
422.0	450.04			.003	.95592	.00267	.00206	-.00061
424.0	452.59	2553	2.100	-.009	.95583	-.00896	-.00823	.00073
426.0	455.09	2505	2.100	.009	.95576	.00817	.00957	.00139
428.0	457.64	2549	2.100	-.003	.95575	-.00317	-.01001	-.00684
430.0	460.17	2532	2.100	-.002	.95575	-.00174	.00614	.00788
432.0	462.70	2523	2.100	.010	.95565	.00981	.00625	-.00356
434.0	465.27	2575	2.100	-.013	.95550	-.01206	-.01356	-.00150
436.0	467.78	2511	2.100	.011	.95537	.01087	.01296	.00209
438.0	470.35	2568	2.100	-.003	.95536	-.00280	-.00043	.00237
440.0	472.90	2553	2.100	.009	.95528	.00895	.00468	-.00427
442.0	475.51	2602	2.100	0	.95528	-.00005	-.00044	-.00039
444.0	478.11	2602	2.100	-.010	.95518	-.01002	-.00589	.00413
446.0	480.65	2548	2.100	.024	.95463	.02288	.01849	-.00439
448.0	483.33	2673	2.100	-.037	.95334	-.03499	-.04028	-.00529
450.0	485.81	2484	2.100	.014	.95317	.01307	.02305	.00997
452.0	488.36	2553	2.100	.001	.95317	.00061	.00196	.00136
454.0	490.92	2556	2.100	.018	.95285	.01729	.01110	-.00619
456.0	493.57	2650	2.100	-.016	.95261	-.01514	-.01253	.00261
458.0	496.14	2567	2.100	.029	.95181	.02757	.02433	-.00324
460.0	498.86	2720	2.100	-.007	.95176	-.00701	-.01673	-.00972
462.0	501.54	2681	2.100	-.011	.95164	-.01092	.00179	.01271
464.0	504.16	2620	2.100	.007	.95160	.00623	.00709	.00086
466.0	506.81	2654	2.100	-.022	.95115	-.02068	-.02330	-.00262
468.0	509.35	2541	2.100	.048	.94893	.04594	.04329	-.00265
470.0	512.15	2799	2.100	.001	.94893	.00109	.00013	-.00096

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2806	2.100					
472.0	514.96			-.018	.94863	-.01676	-.01758	-.00082
		2708	2.100					
474.0	517.67			.014	.94845	.01315	.01372	.00056
		2785	2.100					
476.0	520.45			-.028	.94772	-.02622	-.02843	-.00221
		2635	2.100					
478.0	523.09			.016	.94749	.01474	.02732	.01259
		2718	2.100					
480.0	525.80			.005	.94747	.00477	-.01140	-.01617
		2745	2.100					
482.0	528.55			-.029	.94669	-.02725	-.02377	.00348
		2592	2.100					
484.0	531.14			.004	.94667	.00419	.01017	.00598
		2615	2.100					
486.0	533.76			-.001	.94667	-.00140	-.00520	-.00379
		2607	2.100					
488.0	536.36			.007	.94662	.00666	.01180	.00514
		2644	2.100					
490.0	539.01			.015	.94641	.01400	.01599	.00199
		2724	2.100					
492.0	541.73			-.025	.94583	-.02350	-.02711	-.00361
		2592	2.100					
494.0	544.32			.037	.94451	.03524	.03153	-.00372
		2792	2.100					
496.0	547.12			-.032	.94354	-.03039	-.02262	.00777
		2618	2.100					
498.0	549.73			0	.94354	.00042	-.00492	-.00534
		2620	2.100					
500.0	552.35			.059	.94031	.05521	.05111	-.00410
		2946	2.100					
502.0	555.30			-.017	.94002	-.01641	-.01445	.00195
		2845	2.100					
504.0	558.15			-.007	.93998	-.00616	-.00556	.00060
		2808	2.100					
506.0	560.95			.003	.93997	.00328	.00030	-.00298
		2828	2.100					
508.0	563.78			.008	.93991	.00763	.00577	-.00186
		2874	2.100					
510.0	566.66			.040	.93838	.03791	.04924	.01133
		3116	2.100					
512.0	569.77			-.015	.93816	-.01436	-.02492	-.01056
		3022	2.100					
514.0	572.79			.003	.93815	.00320	.00752	.00431
		3042	2.100					
516.0	575.83			-.051	.93568	-.04807	-.06060	-.01253
		2746	2.100					
518.0	578.58			.008	.93563	.00709	.01513	.00804
		2788	2.100					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
520.0	581.37			-.036	.93438	-.03413	-.03105	.00308
522.0	583.96	2592	2.100	.068	.93004	.06369	.06655	.00286
524.0	586.93	2971	2.100	-.021	.92964	-.01928	-.02862	-.00933
526.0	589.78	2850	2.100	-.012	.92950	-.01146	-.00572	.00574
528.0	592.56	2781	2.100	-.092	.92162	-.08560	-.08991	-.00431
530.0	594.87	2312	2.100	.003	.92161	.00258	.01371	.01114
532.0	597.20	2325	2.100	.062	.91809	.05700	.05101	-.00599
534.0	599.83	2631	2.100	.005	.91807	.00416	.01213	.00797
536.0	602.48	2655	2.100	.005	.91805	.00435	.00486	.00051
538.0	605.16	2680	2.100	.022	.91762	.01974	.00664	-.01310
540.0	607.96	2798	2.100	.001	.91762	.00047	.00482	.00435
542.0	610.76	2801	2.100	-.030	.91679	-.02761	-.02907	-.00146
544.0	613.40	2637	2.100	.002	.91679	.00187	.01192	.01006
546.0	616.05	2648	2.100	-.009	.91672	-.00788	-.01094	-.00305
548.0	618.65	2603	2.100	-.018	.91642	-.01653	-.02728	-.01076
550.0	621.16	2511	2.100	.027	.91575	.02482	.04300	.01819
552.0	623.81	2651	2.100	-.007	.91571	-.00621	-.03199	-.02578
554.0	626.43	2615	2.100	-.017	.91544	-.01563	-.00273	.01290
556.0	628.96	2527	2.100	-.022	.91500	-.02000	-.02006	-.00006
558.0	631.37	2419	2.100	-.048	.91289	-.04394	-.02450	.01944
560.0	633.57	2197	2.100	.058	.90987	.05253	.04368	-.00885
562.0	636.04	2466	2.100	.014	.90969	.01294	.00883	-.00411
564.0	638.57	2537	2.100	-.055	.90690	-.05036	-.05959	-.00922
566.0	640.85	2271	2.100	.012	.90676	.01110	.01011	-.00099
568.0	643.17	2327	2.100	-.051	.90437	-.04661	-.03036	.01625

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2099	2.100					
570.0	645.27	2223	2.100	.029	.90363	.02590	.01715	-.00875
572.0	647.50	2152	2.100	-.016	.90339	-.01465	.00010	.01475
574.0	649.65	2118	2.100	-.008	.90333	-.00731	-.02499	-.01767
576.0	651.77	2178	2.100	.014	.90315	.01267	.02079	.00812
578.0	653.94	2288	2.100	.025	.90261	.02217	.02958	.00741
580.0	656.23	2093	2.100	-.045	.90082	-.04017	-.04942	-.00925
582.0	658.32	2056	2.100	-.009	.90075	-.00804	.00689	.01493
584.0	660.38	2120	2.100	.015	.90053	.01389	.00791	-.00598
586.0	662.50	2097	2.100	-.005	.90051	-.00487	-.01950	-.01463
588.0	664.60	2101	2.100	.001	.90051	.00083	.01944	.01861
590.0	666.70	2161	2.100	.014	.90033	.01270	.00229	-.01042
592.0	668.86	2187	2.100	.006	.90029	.00542	-.00457	-.00999
594.0	671.05	2149	2.100	-.009	.90023	-.00788	.01357	.02144
596.0	673.20	2105	2.100	-.010	.90013	-.00941	-.02123	-.01182
598.0	675.30	2148	2.100	.010	.90004	.00904	.00761	-.00142
600.0	677.45	2080	2.100	-.016	.89981	-.01443	-.00976	.00467
602.0	679.53	2137	2.100	.014	.89964	.01226	.01485	.00258
604.0	681.67	2157	2.100	.005	.89962	.00407	-.00334	-.00741
606.0	683.82	2026	2.100	-.031	.89875	-.02804	-.02440	.00364
608.0	685.85	2059	2.100	.008	.89869	.00721	.00205	-.00517
610.0	687.91	2072	2.100	.003	.89868	.00270	.01370	.01099
612.0	689.98	2007	2.100	-.016	.89845	-.01421	-.01942	-.00521
614.0	691.99	2140	2.100	.032	.89754	.02870	.02497	-.00372
616.0	694.13	2054	2.100	-.020	.89717	-.01824	-.00557	.01267

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
618.0	696.18			.009	.89709	.00826	-.00689	-.01516
		2093	2.100					
620.0	698.27			-.020	.89673	-.01790	-.00150	.01641
		2011	2.100					
622.0	700.28			.045	.89489	.04061	.04279	.00218
		2201	2.100					
624.0	702.49			-.026	.89429	-.02319	-.04345	-.02026
		2090	2.100					
626.0	704.58			-.016	.89405	-.01468	.00023	.01491
		2023	2.100					
628.0	706.60			0	.89405	-.00008	-.01084	-.01076
		2022	2.100					
630.0	708.62			.013	.89389	.01205	.02456	.01250
		2078	2.100					
632.0	710.70			.014	.89370	.01296	.00986	-.00309
		2139	2.100					
634.0	712.84			.018	.89343	.01566	.01686	.00120
		2215	2.100					
636.0	715.05			-.015	.89323	-.01321	-.01799	-.00478
		2150	2.100					
638.0	717.20			.013	.89309	.01133	-.00532	-.01665
		2206	2.100					
640.0	719.41			-.002	.89308	-.00206	.01148	.01353
		2196	2.100					
642.0	721.60			-.005	.89306	-.00429	-.00150	.00279
		2175	2.100					
644.0	723.78			.016	.89284	.01424	.00896	-.00528
		2245	2.100					
646.0	726.02			-.042	.89130	-.03706	-.02991	.00715
		2066	2.100					
648.0	728.09			-.006	.89127	-.00530	-.00270	.00260
		2046	2.095					
650.0	730.14			.001	.89126	.00115	-.01115	-.01230
		2073	2.073					
652.0	732.21			-.010	.89118	-.00880	-.00181	.00699
		2059	2.047					
654.0	734.27			.026	.89056	.02343	.02817	.00474
		2117	2.098					
656.0	736.38			.033	.88960	.02931	.02017	-.00914
		2240	2.118					
658.0	738.62			-.050	.88734	-.04479	-.03391	.01087
		2087	2.055					
660.0	740.71			-.001	.88734	-.00092	-.00111	-.00018
		2076	2.062					
662.0	742.79			.033	.88640	.02892	.02769	-.00123
		2164	2.111					
664.0	744.95			.066	.88248	.05892	.05074	-.00817
		2396	2.179					
666.0	747.35			.016	.88226	.01399	.00892	-.00507

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2386	2.258					
668.0	749.73			-.026	.88169	-.02250	-.02216	.00034
		2342	2.186					
670.0	752.08			.014	.88152	.01199	.02061	.00862
		2386	2.205					
672.0	754.46			-.002	.88152	-.00213	.00370	.00584
		2381	2.198					
674.0	756.84			.011	.88141	.01000	.01039	.00039
		2403	2.229					
676.0	759.25			-.041	.87995	-.03586	-.05804	-.02218
		2251	2.193					
678.0	761.50			.018	.87965	.01620	.01931	.00311
		2372	2.160					
680.0	763.87			-.010	.87956	-.00859	-.00616	.00244
		2335	2.151					
682.0	766.20			-.041	.87810	-.03590	-.03101	.00489
		2203	2.102					
684.0	768.41			.011	.87799	.00972	.03102	.02130
		2199	2.152					
686.0	770.61			-.017	.87773	-.01524	-.04336	-.02813
		2206	2.073					
688.0	772.81			-.162	.85478	-.14191	-.13368	.00823
		1885	1.750					
690.0	774.70			-.009	.85472	-.00767	-.01831	-.01064
		1852	1.750					
692.0	776.55			-.018	.85445	-.01518	.00035	.01553
		1787	1.750					
694.0	778.34			.020	.85410	.01714	.02455	.00741
		1860	1.750					
696.0	780.20			-.017	.85385	-.01468	-.02052	-.00584
		1797	1.750					
698.0	781.99			.023	.85339	.01974	.01501	-.00473
		1882	1.750					
700.0	783.87			.004	.85338	.00300	.00296	-.00004
		1896	1.750					
702.0	785.77			.108	.84347	.09196	.11097	.01900
		2306	1.786					
704.0	788.08			.054	.84103	.04536	.02812	-.01724
		2617	1.753					
706.0	790.69			-.050	.83895	-.04188	-.04549	-.00361
		2319	1.791					
708.0	793.01			.059	.83607	.04910	.05250	.00340
		2278	2.049					
710.0	795.29			-.160	.81465	-.13382	-.14767	-.01385
		1931	1.750					
712.0	797.22			-.002	.81465	-.00179	.00881	.01060
		1923	1.750					
714.0	799.14			0	.81465	.00016	-.00044	-.00060
		1924	1.750					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
716.0	801.07			-.005	.81463	-.00433	-.01302	-.00869
		1903	1.750					
718.0	802.97			.010	.81455	.00791	.03548	.02757
		1940	1.750					
720.0	804.91			.044	.81295	.03609	.01962	-.01646
		2047	1.813					
722.0	806.96			.020	.81261	.01659	.02221	.00563
		2115	1.828					
724.0	809.07			.046	.81086	.03774	.04274	.00501
		2179	1.947					
726.0	811.25			-.080	.80562	-.06517	-.06528	-.00012
		2010	1.797					
728.0	813.26			.087	.79952	.07014	.06130	-.00883
		2160	1.990					
730.0	815.42			.083	.79399	.06648	.07386	.00738
		2342	2.169					
732.0	817.76			-.016	.79379	-.01261	-.02023	-.00762
		2315	2.125					
734.0	820.08			-.016	.79359	-.01263	-.02932	-.01669
		2293	2.078					
736.0	822.37			-.079	.78866	-.06257	-.04580	.01677
		2059	1.976					
738.0	824.43			-.045	.78705	-.03557	-.03614	-.00057
		2015	1.846					
740.0	826.44			.004	.78704	.00286	.04956	.04670
		2006	1.868					
742.0	828.45			.133	.77320	.10438	.07018	-.03420
		2355	2.077					
744.0	830.81			.005	.77318	.00349	-.01575	-.01924
		2309	2.137					
746.0	833.11			.007	.77314	.00574	.00688	.00113
		2320	2.159					
748.0	835.43			-.027	.77257	-.02106	-.00874	.01232
		2324	2.041					
750.0	837.76			-.020	.77226	-.01525	-.01751	-.00226
		2370	1.924					
752.0	840.13			-.038	.77112	-.02972	-.02116	.00856
		2206	1.914					
754.0	842.34			-.025	.77064	-.01925	-.01787	.00139
		2086	1.925					
756.0	844.42			.003	.77063	.00244	-.02203	-.02447
		2078	1.945					
758.0	846.50			0	.77063	-.00015	.01086	.01100
		2115	1.910					
760.0	848.61			.181	.74550	.13917	.12732	-.01185
		2661	2.187					
762.0	851.28			-.120	.73473	-.08962	-.08315	.00646
		2270	2.014					
764.0	853.55			-.079	.73010	-.05830	-.03828	.02003

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2107	1.850					
766.0	855.65			.109	.72144	.07953	.07583	-.00370
		2323	2.089					
768.0	857.98			-.053	.71940	-.03833	-.04811	-.00978
		2166	2.014					
770.0	860.14			.062	.71668	.04426	.04091	-.00335
		2355	2.096					
772.0	862.50			.037	.71568	.02675	-.00661	-.03336
		2471	2.152					
774.0	864.97			-.029	.71506	-.02109	.01530	.03639
		2370	2.115					
776.0	867.34			-.132	.70259	-.09442	-.08992	.00450
		2093	1.837					
778.0	869.43			-.035	.70171	-.02483	.00861	.03344
		2019	1.774					
780.0	871.45			.161	.68362	.11269	.09719	-.01549
		2380	2.081					
782.0	873.83			.021	.68330	.01464	-.00945	-.02408
		2443	2.115					
784.0	876.27			-.050	.68157	-.03445	-.02371	.01073
		2268	2.060					
786.0	878.54			-.016	.68140	-.01058	-.01318	-.00260
		2267	1.998					
788.0	880.81			.057	.67922	.03855	.03092	-.00763
		2393	2.120					
790.0	883.20			0	.67922	0	.00456	.00456
		2414	2.101					
792.0	885.62			-.005	.67920	-.00354	.02893	.03247
		2399	2.093					
794.0	888.02			-.006	.67918	-.00375	-.01850	-.01475
		2383	2.083					
796.0	890.40			.040	.67811	.02700	-.00092	-.02792
		2472	2.175					
798.0	892.87			.002	.67811	.00115	.02196	.02081
		2485	2.171					
800.0	895.36			-.012	.67802	-.00791	-.01114	-.00323
		2495	2.112					
802.0	897.85			-.016	.67784	-.01086	-.01033	.00054
		2413	2.115					
804.0	900.26			-.045	.67644	-.03079	-.01424	.01655
		2311	2.017					
806.0	902.57			-.050	.67477	-.03362	-.01580	.01782
		2194	1.923					
808.0	904.77			-.044	.67347	-.02959	-.08553	-.05594
		2116	1.826					
810.0	906.89			-.034	.67268	-.02315	-.04059	-.01744
		2060	1.751					
812.0	908.95			-.030	.67208	-.02010	-.00901	.01110
		1942	1.750					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
814.0	910.89			.074	.66838	.04982	.06344	.01363
		2142	1.841					
816.0	913.03			.141	.65509	.09426	.14080	.04655
		2458	2.131					
818.0	915.49			-.113	.64673	-.07400	-.12510	-.05110
		2214	1.885					
820.0	917.70			-.087	.64180	-.05652	-.04785	.00867
		2002	1.750					
822.0	919.70			-.001	.64179	-.00094	.00624	.00718
		1996	1.750					
824.0	921.70			-.007	.64177	-.00422	-.02513	-.02091
		1970	1.750					
826.0	923.67			-.001	.64176	-.00085	.01112	.01198
		1965	1.750					
828.0	925.63			.001	.64176	.00096	-.02547	-.02643
		1970	1.750					
830.0	927.60			0	.64176	-.00019	-.00523	-.00504
		1969	1.750					
832.0	929.57			.109	.63418	.06976	.06186	-.00790
		2250	1.906					
834.0	931.82			.032	.63352	.02047	.04375	.02328
		2316	1.974					
836.0	934.14			-.132	.62244	-.08378	-.08781	-.00403
		2003	1.750					
838.0	936.14			-.007	.62241	-.00448	.02395	.02843
		1974	1.750					
840.0	938.12			.001	.62241	.00053	.00130	.00078
		1977	1.750					
842.0	940.09			.002	.62240	.00120	.00250	.00131
		1985	1.750					
844.0	942.08			.036	.62160	.02233	-.00115	-.02348
		2061	1.811					
846.0	944.14			.068	.61876	.04206	.01303	-.02903
		2209	1.935					
848.0	946.35			-.086	.61421	-.05302	-.03101	.02201
		2044	1.761					
850.0	948.39			.015	.61407	.00941	.07917	.06977
		2083	1.782					
852.0	950.47			.180	.59426	.11029	.06951	-.04078
		2574	2.073					
854.0	953.05			0	.59426	.00019	-.00807	-.00826
		2520	2.119					
856.0	955.57			-.035	.59351	-.02103	.01935	.04038
		2467	2.016					
858.0	958.04			.004	.59350	.00235	-.03946	-.04181
		2514	1.995					
860.0	960.55			-.069	.59064	-.04123	-.03149	.00974
		2309	1.890					
862.0	962.86			.111	.58337	.06555	.07270	.00715

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2894	1.884					
864.0	965.75			-.060	.58127	-.03495	-.02248	.01247
		2510	1.926					
866.0	968.26			.131	.57128	.07620	.10213	.02592
		2827	2.227					
868.0	971.09			-.041	.57033	-.02334	-.07835	-.05501
		2775	2.090					
870.0	973.86			.008	.57030	.00429	.06610	.06181
		2735	2.154					
872.0	976.60			-.038	.56948	-.02160	-.06181	-.04021
		2548	2.142					
874.0	979.15			.031	.56893	.01763	.03500	.01737
		2717	2.137					
876.0	981.86			.010	.56887	.00577	-.00851	-.01428
		2737	2.165					
878.0	984.60			-.099	.56333	-.05616	-.02031	.03585
		2508	1.938					
880.0	987.11			-.168	.54752	-.09438	-.12544	-.03106
		1981	1.750					
882.0	989.09			.157	.53397	.08612	.07941	-.00671
		2447	1.946					
884.0	991.54			.147	.52238	.07867	.03888	-.03979
		2891	2.216					
886.0	994.43			-.236	.49333	-.12318	-.06595	.05722
		2114	1.874					
888.0	996.54			-.068	.49103	-.03369	-.01330	.02039
		1974	1.750					
890.0	998.52			.268	.45589	.13136	.09984	-.03153
		2785	2.147					
892.0	1001.30			.034	.45537	.01538	.00515	-.01024
		2867	2.231					
894.0	1004.17			-.001	.45537	-.00065	.04681	.04746
		2872	2.220					
896.0	1007.04			-.071	.45310	-.03218	-.07533	-.04314
		2682	2.064					
898.0	1009.72			.008	.45307	.00370	.02185	.01815
		2687	2.094					
900.0	1012.41			.073	.45066	.03300	.03072	-.00228
		2955	2.203					
902.0	1015.37			-.011	.45061	-.00492	.04712	.05204
		2924	2.179					
904.0	1018.29			.045	.44970	.02024	-.02844	-.04868
		3137	2.222					
906.0	1021.43			-.009	.44966	-.00403	.01710	.02113
		3051	2.244					
908.0	1024.48			.116	.44358	.05230	.10654	.05424
		3713	2.329					
				-.171	.43055	-.07602	-.07673	-.00071

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
912.0	1030.99			-.126	.42376	-.05407	-.07722	-.02315
		2450	1.940					
914.0	1033.44			-.150	.41425	-.06349	-.12321	-.05973
		2008	1.750					
916.0	1035.45			-.016	.41415	-.00649	.01072	.01721
		1946	1.750					
918.0	1037.40			.013	.41408	.00554	-.05613	-.06167
		1999	1.750					
920.0	1039.40			.013	.41400	.00543	-.07245	-.07788
		2052	1.750					
922.0	1041.45			.010	.41396	.00433	.08030	.07598
		2087	1.757					
924.0	1043.54			.285	.38042	.11784	.10709	-.01075
		2926	2.250					
926.0	1046.46			-.048	.37955	-.01811	-.03689	-.01878
		2856	2.096					
928.0	1049.32			.051	.37858	.01925	.11385	.09460
		3081	2.151					
930.0	1052.40			-.042	.37792	-.01577	.00635	.02212
		3018	2.020					
932.0	1055.42			-.005	.37791	-.00188	-.01571	-.01383
		3025	1.995					
934.0	1058.44			.058	.37664	.02193	-.02646	-.04839
		3067	2.210					
936.0	1061.51			-.006	.37662	-.00233	.04433	.04665
		3110	2.153					
938.0	1064.62			-.052	.37560	-.01965	-.02222	-.00256
		2823	2.137					
940.0	1067.44			.030	.37525	.01144	.01646	.00502
		2989	2.144					
942.0	1070.43			.009	.37522	.00352	-.01913	-.02265
		2993	2.182					
944.0	1073.42			-.286	.34456	-.10726	-.05468	.05258
		2050	1.770					
946.0	1075.47			-.001	.34456	-.00048	-.04926	-.04878
		2067	1.750					
948.0	1077.54			.119	.33964	.04117	.01286	-.02832
		2395	1.920					
950.0	1079.94			.022	.33947	.00738	.02670	.01932
		2546	1.887					
952.0	1082.48			.085	.33705	.02869	.02280	-.00589
		2687	2.118					
954.0	1085.17			-.026	.33683	-.00861	.02590	.03452
		2610	2.071					
956.0	1087.78			.072	.33508	.02428	.02306	-.00122
		2761	2.262					
958.0	1090.54			-.250	.31414	-.08377	-.14097	-.05720
		2104	1.782					
960.0	1092.64			.137	.30824	.04304	.09884	.05580

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2501	1.975					
962.0	1095.15			.158	.30057	.04862	-.00009	-.04871
		2977	2.280					
964.0	1098.12			-.089	.29816	-.02690	-.03302	-.00612
		2819	2.012					
966.0	1100.94			-.222	.28347	-.06619	-.05563	.01055
		2032	1.778					
968.0	1102.97			.065	.28229	.01833	-.03178	-.05011
		2222	1.850					
970.0	1105.20			-.031	.28202	-.00866	-.06132	-.05267
		2125	1.819					
972.0	1107.32			.302	.25624	.08527	.17682	.09155
		3134	2.303					
974.0	1110.46			-.082	.25454	-.02090	.08275	.10366
		3014	2.034					
976.0	1113.47			.055	.25378	.01391	-.02921	-.04312
		3043	2.247					
978.0	1116.51			.011	.25375	.00269	-.03117	-.03386
		3094	2.257					
980.0	1119.61			.038	.25338	.00965	.02287	.01322
		3254	2.316					
982.0	1122.86			-.006	.25337	-.00149	.05258	.05407
		3248	2.294					
984.0	1126.11			-.041	.25295	-.01038	-.01580	-.00542
		3058	2.244					
986.0	1129.17			-.056	.25216	-.01413	-.02791	-.01378
		2927	2.097					
988.0	1132.09			.111	.24906	.02794	.07878	.05084
		3314	2.313					
990.0	1135.41			-.116	.24570	-.02895	-.09625	-.06730
		2732	2.221					
992.0	1138.14			-.031	.24547	-.00750	.02731	.03481
		2660	2.146					
994.0	1140.80			.036	.24514	.00892	-.04515	-.05406
		2860	2.147					
996.0	1143.66			.027	.24496	.00670	.02322	.01653
		2899	2.237					
998.0	1146.56			-.048	.24441	-.01164	.01722	.02886
		2703	2.182					
1000.0	1149.26			.016	.24434	.00395	-.01112	-.01507
		2806	2.171					
1002.0	1152.07			.005	.24434	.00128	-.02984	-.03111
		2764	2.227					
1004.0	1154.83			-.032	.24408	-.00793	-.00914	-.00121
		2673	2.158					
1006.0	1157.50			.039	.24371	.00943	.08557	.07614
		3079	2.023					
1008.0	1160.58			.003	.24371	.00072	.00580	.00509
		2871	2.183					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1010.0	1163.45			.004	.24371	.00103	-.03690	-.03793
		2856	2.213					
1012.0	1166.31			.004	.24370	.00092	.00346	.00255
		2852	2.233					
1014.0	1169.16			-.034	.24342	-.00832	-.03529	-.02698
		2695	2.207					
1016.0	1171.86			-.002	.24342	-.00051	.02727	.02778
		2709	2.187					
1018.0	1174.57			.014	.24337	.00350	.01115	.00764
		2773	2.198					
1020.0	1177.34			.005	.24336	.00133	-.05863	-.05996
		2761	2.232					
1022.0	1180.10			.006	.24335	.00136	.08756	.08619
		2851	2.186					
1024.0	1182.95			.028	.24316	.00682	-.01521	-.02203
		2973	2.218					
1026.0	1185.92			-.022	.24304	-.00538	-.07775	-.07237
		2833	2.226					
1028.0	1188.76			.004	.24304	.00101	.01871	.01770
		2859	2.225					
1030.0	1191.62			-.037	.24270	-.00904	.04505	.05409
		2754	2.143					
1032.0	1194.37			.056	.24194	.01362	-.00225	-.01588
		2945	2.243					
1034.0	1197.31			-.045	.24144	-.01099	-.07213	-.06114
		2734	2.206					
1036.0	1200.05			-.010	.24142	-.00231	.00787	.01018
		2707	2.186					
1038.0	1202.76			.039	.24105	.00945	.03293	.02348
		2850	2.246					
1040.0	1205.61			.024	.24091	.00576	-.00650	-.01226
		3178	2.112					
1042.0	1208.78			-.078	.23945	-.01877	.00803	.02680
		2600	2.208					
1044.0	1211.38			.029	.23924	.00705	.04292	.03587
		2698	2.257					
1046.0	1214.08			.028	.23905	.00681	.02952	.02272
		2845	2.266					
1048.0	1216.93			-.058	.23825	-.01381	-.05485	-.04104
		2635	2.180					
1050.0	1219.56			.098	.23597	.02329	.02710	.00381
		3154	2.215					
1052.0	1222.72			-.071	.23477	-.01684	-.01466	.00218
		2821	2.148					
1054.0	1225.54			.006	.23476	.00151	-.01902	-.02054
		3098	1.981					
1056.0	1228.64			.072	.23355	.01689	.08175	.06485
		3067	2.311					
1058.0	1231.70			-.068	.23247	-.01587	-.12303	-.10716

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		2772	2.231					
1060.0	1234.47			-.003	.23247	-.00074	.08115	.08190
		2717	2.262					
1062.0	1237.19			.042	.23206	.00975	-.07856	-.08831
		2940	2.274					
1064.0	1240.13			-.098	.22984	-.02270	-.01453	.00816
		2642	2.079					
1066.0	1242.77			.137	.22553	.03147	.01551	-.01596
		3075	2.353					
1068.0	1245.85			-.081	.22405	-.01824	.01131	.02955
		2795	2.201					
1070.0	1248.64			-.036	.22376	-.00804	.06358	.07162
		2982	1.921					
1072.0	1251.63			-.040	.22340	-.00904	-.02366	-.01462
		2730	1.935					
1074.0	1254.36			.088	.22166	.01971	-.05625	-.07596
		2985	2.112					
1076.0	1257.34			-.164	.21567	-.03644	-.05361	-.01716
		2539	1.782					
1078.0	1259.88			-.093	.21380	-.02010	.01831	.03841
		2131	1.761					
1080.0	1262.01			.202	.20505	.04325	.03555	-.00770
		2889	1.958					
1082.0	1264.90			.125	.20185	.02558	.02871	.00313
		3084	2.357					
1084.0	1267.99			-.008	.20184	-.00168	.01004	.01172
		3064	2.333					
1086.0	1271.05			-.065	.20099	-.01311	.01691	.03002
		2784	2.255					
1088.0	1273.83			-.015	.20094	-.00309	-.05187	-.04879
		2698	2.256					
1090.0	1276.53			-.026	.20081	-.00516	.00623	.01139
		2648	2.184					
1092.0	1279.18			.049	.20032	.00990	-.02003	-.02992
		2827	2.258					
1094.0	1282.01			.082	.19896	.01652	.03138	.01487
		3260	2.309					
1096.0	1285.27			-.084	.19756	-.01669	.00376	.02045
		2863	2.223					
1098.0	1288.13			.029	.19739	.00581	.01473	.00893
		2961	2.279					
1100.0	1291.09			-.045	.19698	-.00898	.00515	.01412
		2835	2.173					
1102.0	1293.93			.067	.19611	.01311	.00289	-.01022
		3123	2.255					
1104.0	1297.05			-.052	.19558	-.01019	-.05401	-.04382
		2870	2.211					
1106.0	1299.92			.046	.19516	.00903	.03047	.02144
		3067	2.269					

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1108.0	1302.99			.018	.19510	.00356	.05353	.04996
1110.0	1306.20	3210	2.248	.020	.19501	.00399	.02896	.02497
1112.0	1309.55	3354	2.242	-.072	.19400	-.01405	.00197	.01602
1114.0	1312.43	2883	2.258	.061	.19329	.01175	-.01389	-.02564
1116.0	1315.63	3197	2.299	-.064	.19250	-.01233	-.00979	.00254
1118.0	1318.60	2966	2.180	-.022	.19241	-.00433	-.02029	-.01596
1120.0	1321.41	2810	2.200	.003	.19240	.00062	-.01245	-.01307
1122.0	1324.31	2900	2.146	.027	.19227	.00510	.01637	.01126
1124.0	1327.59	3284	1.998	.007	.19226	.00137	-.00055	-.00191
1126.0	1330.54	2947	2.259	-.102	.19024	-.01968	-.05169	-.03201
1128.0	1333.25	2712	1.998	.195	.18304	.03702	-.00857	-.04559
1130.0	1336.75	3501	2.296	-.020	.18297	-.00370	.05163	.05534
1132.0	1340.12	3367	2.293	-.049	.18252	-.00898	-.00660	.00238
1134.0	1343.21	3095	2.261	.006	.18252	.00105	.02792	.02687
1136.0	1346.27	3063	2.311	.002	.18252	.00041	-.00501	-.00543
1138.0	1349.43	3155	2.254	-.036	.18228	-.00665	.00789	.01454
1140.0	1352.79	3364	1.965	-.016	.18223	-.00298	-.00918	-.00620
1142.0	1355.82	3022	2.117	.061	.18155	.01113	.02530	.01417
1144.0	1358.97	3157	2.290	-.035	.18132	-.00639	-.05056	-.04417
1146.0	1362.16	3184	2.116	-.002	.18132	-.00040	-.01766	-.01726
1148.0	1365.40	3240	2.071	.034	.18111	.00612	.04855	.04243
1150.0	1368.72	3323	2.159	.005	.18111	.00098	.04514	.04416
1152.0	1371.89	3172	2.287	-.008	.18110	-.00140	-.01182	-.01042
1154.0	1375.00	3108	2.298	.024	.18099	.00435	-.00003	-.00438
1156.0	1378.23	3226	2.323	-.011	.18097	-.00195	.04422	.04616

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
		3166	2.317					
1158.0	1381.39			-.061	.18031	-.01098	-.10484	-.09386
		2946	2.205					
1160.0	1384.34			.015	.18026	.00276	-.00657	-.00933
		3084	2.172					
1162.0	1387.42			.010	.18025	.00176	.01362	.01186
		3131	2.182					
1164.0	1390.55			.026	.18013	.00464	-.00892	-.01355
		3102	2.318					
1166.0	1393.65			.022	.18004	.00404	.04198	.03795
		3177	2.367					
1168.0	1396.83			-.003	.18004	-.00058	.04120	.04178
		3234	2.311					
1170.0	1400.07			.021	.17996	.00372	.02142	.01770
		3383	2.303					
1172.0	1403.45			-.010	.17994	-.00187	-.05467	-.05280
		3377	2.259					
1174.0	1406.83			-.004	.17994	-.00080	.01776	.01856
		3310	2.285					
1176.0	1410.14			-.033	.17973	-.00602	-.01136	-.00534
		3197	2.212					
1178.0	1413.33			.042	.17942	.00752	.06060	.05307
		3330	2.309					
1180.0	1416.66			-.044	.17908	-.00784	-.07024	-.06241
		3126	2.254					
1182.0	1419.79			.010	.17906	.00176	.00422	.00246
		3137	2.291					
1184.0	1422.93			.004	.17906	.00069	-.00715	-.00784
		3148	2.300					
1186.0	1426.07			0	0	0	-.03377	-.03377
1188.0							.02273	.02273
1190.0							-.00949	-.00949
1192.0							.01697	.01697
1194.0							-.01257	-.01257
1196.0							.03544	.03544
1198.0							-.03104	-.03104
1200.0							-.04135	-.04135
1202.0							.06229	.06229
1204.0							.02360	.02360

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1206.0							-.05036	-.05036
1208.0							-.01705	-.01705
1210.0							-.00121	-.00121
1212.0							.03155	.03155
1214.0							.07696	.07696
1216.0							-.11653	-.11653
1218.0							-.02353	-.02353
1220.0							.02620	.02620
1222.0							-.00282	-.00282
1224.0							.01763	.01763
1226.0							-.03447	-.03447
1228.0							-.00272	-.00272
1230.0							.01398	.01398
1232.0							-.00992	-.00992
1234.0							.04974	.04974
1236.0							.02597	.02597
1238.0							-.00815	-.00815
1240.0							-.00482	-.00482
1242.0							.06123	.06123
1244.0							.01608	.01608
1246.0							-.04538	-.04538
1248.0							-.01063	-.01063
1250.0							-.01688	-.01688
1252.0							-.01470	-.01470
1254.0							-.00338	-.00338

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1256.0							.01031	.01031
1258.0							-.00654	-.00654
1260.0							.01960	.01960
1262.0							-.03023	-.03023
1264.0							.06941	.06941
1266.0							-.06263	-.06263
1268.0							-.06125	-.06125
1270.0							.06202	.06202
1272.0							.05246	.05246
1274.0							-.02288	-.02288
1276.0							.01251	.01251
1278.0							.01499	.01499
1280.0							.00071	.00071
1282.0							.06067	.06067
1284.0							-.09874	-.09874
1286.0							-.00557	-.00557
1288.0							-.00296	-.00296
1290.0							.00203	.00203
1292.0							.01255	.01255
1294.0							.01529	.01529
1296.0							-.03553	-.03553
1298.0							-.00613	-.00613
1300.0							.05548	.05548
1302.0							-.01901	-.01901

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1304.0							.09148	.09148
1306.0							-.10002	-.10002
1308.0							-.00024	-.00024
1310.0							-.04777	-.04777
1312.0							.04227	.04227
1314.0							.01185	.01185
1316.0							.01854	.01854
1318.0							-.01504	-.01504
1320.0							-.06663	-.06663
1322.0							.02668	.02668
1324.0							-.02341	-.02341
1326.0							.08308	.08308
1328.0							.00666	.00666
1330.0							-.06056	-.06056
1332.0							.04703	.04703
1334.0							-.03648	-.03648
1336.0							-.01736	-.01736
1338.0							-.00435	-.00435
1340.0							-.01672	-.01672
1342.0							-.06639	-.06639
1344.0							.06221	.06221
1346.0							-.02574	-.02574
1348.0							.02878	.02878
1350.0							.00935	.00935
1352.0							.04574	.04574

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1354.0							-.04447	-.04447
1356.0							.01733	.01733
1358.0							-.00575	-.00575
1360.0							.04866	.04866
1362.0							-.05123	-.05123
1364.0							.01587	.01587
1366.0							.11882	.11882
1368.0							-.05954	-.05954
1370.0							-.03864	-.03864
1372.0							.03168	.03168
1374.0							.01718	.01718
1376.0							.04785	.04785
1378.0							-.07542	-.07542
1380.0							-.02627	-.02627
1382.0							.02217	.02217
1384.0							-.00582	-.00582
1386.0							.02497	.02497
1388.0							-.03572	-.03572
1390.0							.00300	.00300
1392.0							.00974	.00974
1394.0							-.03022	-.03022
1396.0							.02600	.02600
1398.0							-.02175	-.02175
1400.0							-.01671	-.01671

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1402.0							.05865	.05865
1404.0							.05711	.05711
1406.0							-.03823	-.03823
1408.0							.04821	.04821
1410.0							-.05575	-.05575
1412.0							.04974	.04974
1414.0							-.02518	-.02518
1416.0							-.04103	-.04103
1418.0							-.07927	-.07927
1420.0							.04239	.04239
1422.0							.02291	.02291
1424.0							.01518	.01518
1426.0							-.06560	-.06560
1428.0							-.00474	-.00474
1430.0							-.05677	-.05677
1432.0							.04957	.04957
1434.0							.05091	.05091
1436.0							-.00904	-.00904
1438.0							.00826	.00826
1440.0							.03652	.03652
1442.0							.05483	.05483
1444.0							-.02263	-.02263
1446.0							-.03075	-.03075
1448.0							.00480	.00480
1450.0							-.05403	-.05403

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1452.0							.04658	.04658
1454.0							-.11779	-.11779
1456.0							-.02651	-.02651
1458.0							.07544	.07544
1460.0							-.03501	-.03501
1462.0							.02921	.02921
1464.0							.06005	.06005
1466.0							.01699	.01699
1468.0							-.05294	-.05294
1470.0							-.00779	-.00779
1472.0							-.02274	-.02274
1474.0							.01466	.01466
1476.0							-.01630	-.01630
1478.0							-.03495	-.03495
1480.0							-.00515	-.00515
1482.0							-.00482	-.00482
1484.0							.10116	.10116
1486.0							.04137	.04137
1488.0							.01935	.01935
1490.0							-.03544	-.03544
1492.0							-.02570	-.02570
1494.0							.02654	.02654
1496.0							.02512	.02512
1498.0							.00225	.00225

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1500.0							.01897	.01897
1502.0							-.04141	-.04141
1504.0							-.01808	-.01808
1506.0							-.03890	-.03890
1508.0							.03299	.03299
1510.0							.02376	.02376
1512.0							-.00463	-.00463
1514.0							-.03489	-.03489
1516.0							.04335	.04335
1518.0							.05397	.05397
1520.0							-.07428	-.07428
1522.0							.06629	.06629
1524.0							-.05813	-.05813
1526.0							-.02496	-.02496
1528.0							.00505	.00505
1530.0							.00746	.00746
1532.0							.00332	.00332
1534.0							.00771	.00771
1536.0							.04732	.04732
1538.0							-.05265	-.05265
1540.0							-.03473	-.03473
1542.0							.08814	.08814
1544.0							-.07187	-.07187
1546.0							-.08127	-.08127
1548.0							-.02232	-.02232

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1550.0							.08213	.08213
1552.0							.02191	.02191
1554.0							.06480	.06480
1556.0							-.03945	-.03945
1558.0							-.02197	-.02197
1560.0							.07213	.07213
1562.0							-.01405	-.01405
1564.0							-.10465	-.10465
1566.0							.04949	.04949
1568.0							-.02709	-.02709
1570.0							.00568	.00568
1572.0							.02773	.02773
1574.0							.02751	.02751
1576.0							-.06853	-.06853
1578.0							-.01979	-.01979
1580.0							.03553	.03553
1582.0							-.01547	-.01547
1584.0							.02773	.02773
1586.0							-.00169	-.00169
1588.0							-.01995	-.01995
1590.0							.02687	.02687
1592.0							-.05184	-.05184
1594.0							.05200	.05200
1596.0							-.04780	-.04780

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1598.0							-.00135	-.00135
1600.0							.00196	.00196
1602.0							-.00049	-.00049
1604.0							.06577	.06577
1606.0							.02152	.02152
1608.0							-.01611	-.01611
1610.0							-.00306	-.00306
1612.0							-.06215	-.06215
1614.0							.00297	.00297
1616.0							.03707	.03707
1618.0							-.00038	-.00038
1620.0							.03044	.03044
1622.0							-.04279	-.04279
1624.0							.03729	.03729
1626.0							-.05272	-.05272
1628.0							.02949	.02949
1630.0							.01634	.01634
1632.0							.07262	.07262
1634.0							-.05735	-.05735
1636.0							-.03100	-.03100
1638.0							-.00220	-.00220
1640.0							.02820	.02820
1642.0							.04332	.04332
1644.0							.05429	.05429
1646.0							-.07668	-.07668

TWO WAY TRAVEL TIME MS	DEPTH FROM SRD (OR TOP) M	INTERVAL VELOCITY M/S	INTERVAL DENSITY G/C3	REFLECT. COEFF.	TWO WAY ATTEN. COEFF.	SYNTHETIC SEISMO. PRIMARY	PRIMARY + MULTIPLES	MULTIPLES ONLY
1648.0							.01623	.01623
1650.0							-.11755	-.11755
1652.0							.07046	.07046
1654.0							-.08104	-.08104
1656.0							.00359	.00359
1658.0							.00060	.00060
1660.0							.03754	.03754
1662.0							-.08669	-.08669
1664.0							.07043	.07043
1666.0							.06935	.06935
1668.0							-.03576	-.03576
1670.0							.03898	.03898
1672.0							.00971	.00971
1674.0							-.01990	-.01990
1676.0							.00194	.00194
1678.0							-.02464	-.02464
1680.0							.00277	.00277
1682.0							-.02192	-.02192
1684.0							.07148	.07148
1686.0							-.06738	-.06738
1688.0							.01410	.01410
1690.0							.00147	.00147

PE601045

This is an enclosure indicator page.
The enclosure PE601045 is enclosed within the container PE902194 at this location in this document.

The enclosure PE601045 has the following characteristics:

ITEM_BARCODE	= PE601045
CONTAINER_BARCODE	= PE902194
NAME	= Drift Corrected Sonic
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= WELL_LOG
DESCRIPTION	= Drift Corrected Sonic
REMARKS	=
DATE_CREATED	= 12/04/1988
DATE_RECEIVED	= 01/09/1988
W_NO	= W971
WELL_NAME	= Macalister-1
CONTRACTOR	= Schlumberger
CLIENT_OP_CO	= Crusader resources NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE601046

This is an enclosure indicator page.
The enclosure PE601046 is enclosed within the container PE902194 at this location in this document.

The enclosure PE601046 has the following characteristics:

ITEM_BARCODE	= PE601046
CONTAINER_BARCODE	= PE902194
NAME	= Seismic Calibration log
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Seismic Calibration log
REMARKS	=
DATE_CREATED	= 12/04/1988
DATE_RECEIVED	= 01/09/1988
W_NO	= W971
WELL_NAME	= Macalister-1
CONTRACTOR	= Schlumberger
CLIENT_OP_CO	= Crusader resources NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE902196

This is an enclosure indicator page.
The enclosure PE902196 is enclosed within the container PE902194 at this location in this document.

The enclosure PE902196 has the following characteristics:

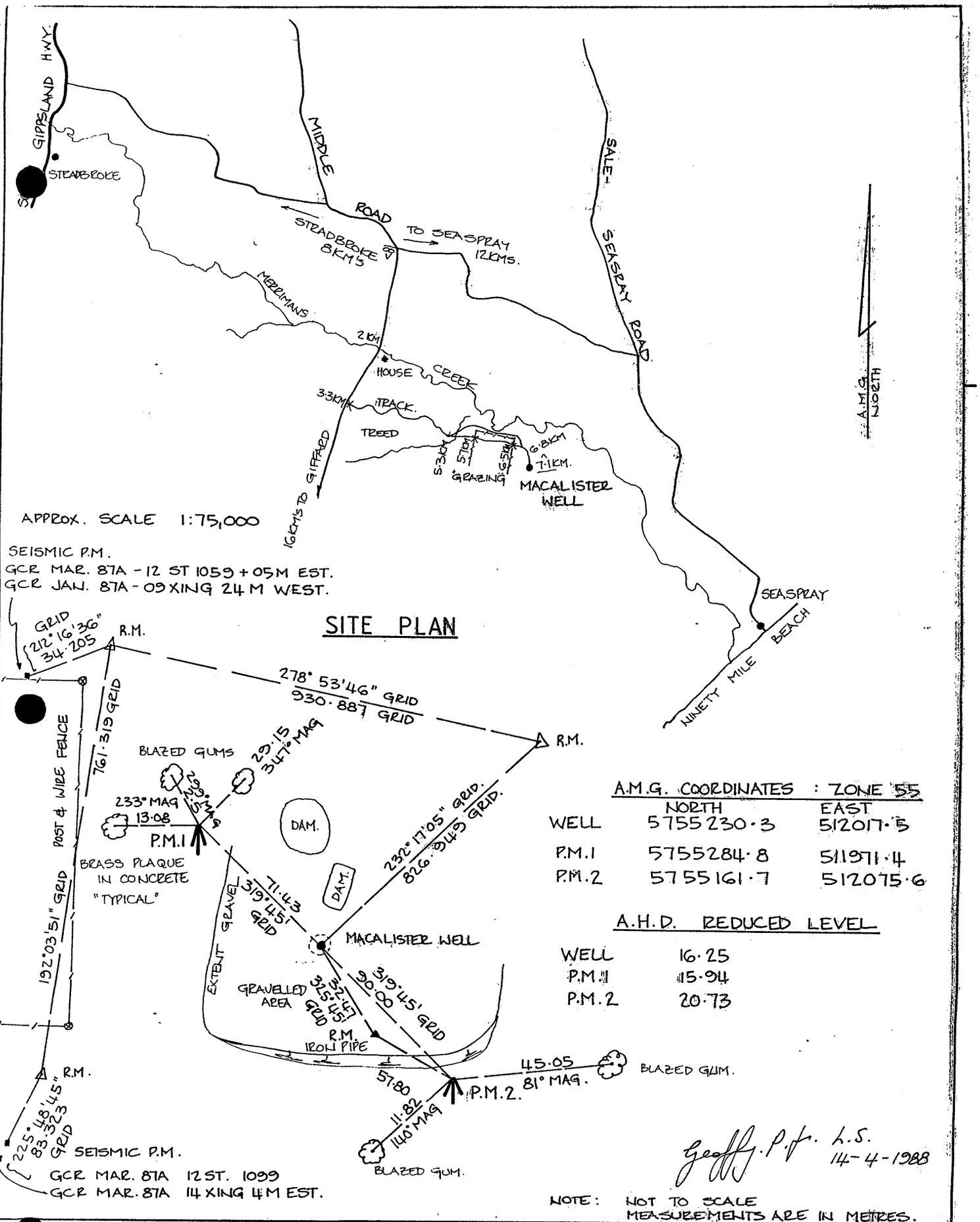
ITEM_BARCODE	= PE902196
CONTAINER_BARCODE	= PE902194
NAME	= Synthetic Seismogram - Geogram
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= SYNTH_SEISMOGRAM
DESCRIPTION	= Synthetic Seismogram - Geogram
REMARKS	=
DATE_CREATED	= 12/04/1988
DATE_RECEIVED	= 01/09/1988
W_NO	= W971
WELL_NAME	= Macalister-1
CONTRACTOR	= Schlumberger
CLIENT_OP_CO	= Crusader resources NL

(Inserted by DNRE - Vic Govt Mines Dept)

APPENDIX 11

APPENDIX 11

WELL LOCATION SURVEY



A.M.G. COORDINATES : ZONE 55

	NORTH	EAST
WELL	5755230·3	512017·5
P.M.1	5755284·8	511971·4
P.M.2	5755161·7	512075·6

A.H.D. REDUCED LEVEL

WELL	16·25
P.M.1	15·94
P.M.2	20·73

Geoff. P.f. L.S.
14-4-1988

NOTE: NOT TO SCALE
MEASUREMENTS ARE IN METRES.

MACALISTER WELL No.1 SITE & P.M. REFERENCE PLAN FOR CRUSADER OIL N.L.

KLUGE JACKSON CONSULTANTS PTY. LTD.
SURVEYORS & TOWN PLANNERS
45 MACALISTER STREET SALE 3850 (051) 44 3877
41 BREED STREET TRARALGON 3844 (051) 74 4808

LEVEL DATUM	SCALE	DATE	DRN.	CHK.	PROJ. SURV.
AUSTRALIAN HEIGHT DATUM. P.M. 41	AS SHOWN	14/4/88	G.P.I	J.J.	G.P.I.

REF./DRAWING NUMBER	REV.
88039A	1